

Knowledge Management Practices, and Organizational Performance: A Case of the Royal Thai Air Force

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Abstract

The purpose of the research is to develop a model of knowledge management (KM) practices and organizational performance (OP), to validate the relationship of KM practices and OP in the model, and 3) to suggest for the improvement of KM practices and OP.

This research investigates the relationship of KM practices, innovation and OP. Both quantitative research and qualitative research are conducted to test the relationship of the variables in the proposed model and conceptual framework. In quantitative research, a questionnaire survey is conducted to collect the data from all 185 commanders and directors (Senior Group Captain) of the Royal Thai Air Force (RTAF) organizations. And the number of returned questionnaires is 100%. In qualitative research, the populations are six RTAF administrators who are responsible for knowledge management. The unit of analysis is organization.

The Path Analysis is employed to find out direct and indirect relationship of the independent variable, the dependent variable and the intervening variable.

The characteristics of sample are described by descriptive statistics. The results show that KM practices positively influence innovation, innovation positively influences OP and KM practices positively influence OP. KM practices influence OP indirectly through innovation. The empirical results provide considerable support to the proposed hypotheses. The results of quantitative analysis are supported by the results of qualitative analysis.

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This study contributes to the literature by theoretically developing a conceptual model and then empirically examining the relationships among knowledge management practices, innovation and organizational performance. The findings support the researcher's argument that KM practices positively influence OP, through innovation. The findings in this study are valuable for manager's reference, especially for those whose circumstances are similar to the military organizations. The model provides useful information for managers to enhance organizational performance through knowledge management practices and innovation.

Keywords: Knowledge management practices, organizational performance, innovative

การทำการจัดการความรู้และผลการปฏิบัติงานขององค์กร: กรณีศึกษา กองทัพอากาศ

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บทคัดย่อ

งานวิจัยเรื่องการทำการจัดการความรู้และผลการปฏิบัติงานขององค์กร กรณีศึกษา กองทัพอากาศ มีวัตถุประสงค์เพื่อพัฒนาและทดสอบ ตัวแบบการทำการจัดการความรู้และผลการปฏิบัติงานขององค์กร และเพื่อเสนอแนะในการพัฒนาการทำการจัดการความรู้และผลการปฏิบัติงานขององค์กร

การวิจัยครั้งนี้ ศึกษาความสัมพันธ์ระหว่าง การทำการจัดการความรู้ นวัตกรรม และ ผลการปฏิบัติงานขององค์กร การวิจัยนี้ใช้การศึกษาผสมผสานระหว่างการศึกษาเชิงปริมาณกับเชิงคุณภาพ เพื่อทดสอบความสัมพันธ์ระหว่างตัวแปรในตัวแบบและกรอบแนวคิดในการวิจัย สำหรับวิธีการศึกษาเชิงปริมาณ ได้ส่งแบบสอบถามไปยังผู้บังคับการและผู้อำนวยการของหน่วยงานของกองทัพอากาศ ชั้นยศ นาวาอากาศเอกพิเศษ ซึ่งมีจำนวนทั้งหมด 185 คน โดยแบบสอบถามได้รับกลับคืนมาทั้งหมด (100%) นอกจากนี้ ยังใช้วิธีการศึกษาเชิงคุณภาพโดยการสัมภาษณ์ผู้บริหารระดับสูงของกองทัพอากาศ ที่รับผิดชอบเกี่ยวกับการจัดการความรู้ จำนวน 6 คน ทั้งนี้ ใช้ระดับการวิเคราะห์ ในระดับหน่วยงาน

การวิเคราะห์ด้วย Path Analysis ใช้ในการวิเคราะห์ความสัมพันธ์ทางตรงและทางอ้อมระหว่างตัวแปรอิสระ ตัวแปรส่งผ่าน และตัวแปรตาม การบรรยายสภาพทั่วไปของกลุ่มตัวอย่างใช้สถิติเชิงพรรณนา ผลการวิเคราะห์เชิงปริมาณได้แสดงให้เห็นว่า การทำการจัดการความรู้มีผลเชิงบวกต่อผลการปฏิบัติงานขององค์กร โดยผ่านนวัตกรรม ซึ่งเป็นไปดังเช่นสมมติฐานที่ได้ตั้งไว้ ซึ่งผลการวิเคราะห์เชิงคุณภาพสนับสนุนผลการวิเคราะห์เชิงปริมาณ

จากผลการศึกษาวิเคราะห์ได้นำไปสู่ข้อเสนอแนะเชิงทฤษฎี จากตัวแบบที่แสดงความสัมพันธ์ระหว่างการทำการจัดการความรู้และผลการปฏิบัติงานขององค์กรซึ่งได้เสนอว่า การทำการจัดการความรู้ได้ส่งผ่านเป็นนวัตกรรม นำสู่การพัฒนาผลการปฏิบัติงานขององค์กร ส่วนข้อเสนอแนะเชิงปฏิบัติ สำหรับผู้บริหารองค์กรอื่นที่มีบริบทเช่นเดียวกันกับองค์กรทหารในการวิจัยนี้ โดยการใช้ตัวแบบการพัฒนาผลการปฏิบัติงานขององค์กรจากการพัฒนาการทำการจัดการความรู้และนวัตกรรม

คำสำคัญ: การทำการจัดการความรู้ ผลการปฏิบัติงานขององค์กร นวัตกรรม

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Introduction

Since 1997, investigation of knowledge management has obviously increased (Serenko & Bontis, 2004). But measurement of the organizational KM value has not been widely studied. Most previous studies have focused on the effects of knowledge management in individual private organizations, especially on financial perspective (Moffet & McAdam, 2006; Wei et al., 2007; Ho, 2008; Khalifa et al., 2008; Zack et al., 2009; Akroush & Al-Mohammad, 2010; Gharakhani & Mousakhani, 2012; Hsiao et al., 2011; Mills & Smith, 2011; Lee et al., 2012). However, only financial measures may not accurately indicate the whole organizational performance (Wei et al., 2007). Additionally, previous researches which examined private organizations in some geographic, economic and cultural settings, for example, Canada, USA, Australia (Zack et al., 2009), Jamaica (Mills & Smith, 2011), Taiwan (Ho, 2008; Hsiao et al., 2011), Korea (Lee et al., 2011), China (Khalifa et al., 2008), Malaysia (Wei et al., 2007), Jordan (Akroush & Al-Mohammad, 2010), South Africa (Moffet & McAdam, 2006), Iran (Gharakhani & Mousakhani, 2011). The findings from the studies may not reflect KM practices in other settings.

Although many related researches have attempted to measure KM practices, and organizational performance (OP), of many private organizations, the findings are not applicable for public organizations. Furthermore, although some researchers attempted to study KM in public organizations (Cong et al., 2007; Monavarian & Kasaei, 2007; Pietrantonio, 2007; Gomes et al., 2008; Seba et al., 2012), they hardly measured public OP.

It is widely accepted that KM is related to innovation (Drucker, 1998; Alegre et al., 2011; Lungu, 2011; Gubbins & Dooley, 2013), but so far few empirical investigations were made to clarify the relationship of KM, innovation and OP. Previous research could not clearly explain how knowledge management practices and innovation affect the overall public organizational performance, nor could they indicate what the overall effects of knowledge management practices and innovation on organizational performance are. So there is a gap to fill up in this matter, especially the measurement of organizational performance in public organizations. Thus, in this research, the

researcher focused on the effects of knowledge management practices and innovation on organizational performance evaluation in Thai military organizations, which are public, hierarchical, and bureaucratic organizations.

This study intends to develop a model of KM practices and OP and to validate the relationship of a model of KM practices and OP. The population for quantitative research includes 185 directors and commanders (Senior Group Captain) who are considered organizational representatives. In the qualitative research, the participants are six RTAF administrators who are responsible for KM. This study investigates in all RTAF organizations which have various missions, so the measurement of all variables--KM practices, innovation, OP-- in the study is applicable.

Theoretical framework

Related concepts and theories are reviewed to clarify the related constructs and then to create the conceptual framework, model, and hypothesis.

From the related past literature about KM for innovation, OP was not measured. Lungu (2011) also states in the conceptual paper that KM processes cause innovation and performance improvement. However, in Lungu's research (2011) KM processes, innovation and OP were not measured, and innovation was not focused. Khalifa, Yu & Shen (2008) suggested that KMS usage caused innovativeness and then high OP; however, KM practices and innovation were ignored. After integration and concentration of important factors, the author assumes that new knowledge from knowledge management can create innovations and then foster the overall organizational performance.

In order to investigate KM practice as antecedents to OP, the researcher attempted to include factors (e.g. organizational behavior, culture) that are similar to some previous research investigated by Gold et al. (2001) and others. Since the objectives of the research were to develop a model of knowledge management practices and organizational performance, to validate the relationship of a model of knowledge management practices and organizational performance and to suggest for the improvement of knowledge management practices and organizational performance.

The researcher focused on how knowledge management practices and innovation effect on organizational performance, and what the overall effects of knowledge management practices and innovation on organizational performance are. Thus, the researcher intended to clarify the relationship of knowledge management practices, innovation and organizational performance.

KM Practices

Knowledge management practices can be defined as knowledge obtaining, knowledge organizing, and knowledge applying. According to the literature, three dimensions of KM practices were related to innovation and OP.

Knowledge is essential for creating innovation (Polanyi, 1966). Knowledge is the useful information for operational supporting, or better performance (Lorsuwannarat, 2005). The advantage of organization results from organizational ability to create and transfer knowledge (Ghosal & Moran, 1996). Long-term competitive advantages of the organization are achieved by its ability to continuously create new knowledge for producing new products and services (Von Krogh et al., 1994). More applicable knowledge can be gained by knowledge management (Teece, 1998). In fact, new combinations of organizational knowledge and other sources create new knowledge and innovation (Cohen & Levinthal, 1990; Kogut & Zander, 1992). Relationships (for example, buyers and suppliers or network of relationships) and closed linkages among cross-functional team result in innovation performance (Clark & Fujimoto, 1987; Von Hippel, 1998). Flexible capability of knowledge conversion to share each other functions in the organization fosters firms to speedy create new product development (Clark & Fujimoto, 1991). The ability of the firm to recognize, understand, and utilize knowledge leads to its innovation as a new commercial goods and services (Cohen & Levinthal, 1990). Organizational knowledge gives rise to organizational core competence, sustainable competitiveness (Prahalad & Hamel, 1990). Thus, knowledge is the most valuable resource for organizations because it results in sustainable competitive advantage (Polanyi, 1966). In addition, knowledge results in high organizational performance, effectiveness and efficiency (Schultze & Leidner, 2002). Furthermore, knowledge management practices can be divided into three stages which are

knowledge obtaining, knowledge organizing and knowledge applying (Niu, 2010). Knowledge management may improve organizational processes, and both individual and organizational performances (Lungu, 2011). In brief, knowledge management practices foster innovation and organizational performance.

In total, KM practices classified as knowledge obtaining, knowledge organizing and knowledge applying had been suggested to be essential for innovation and OP. Twenty-three KM practices were listed in the items for measurement. A ten-point Likert scale was applied to examine each of these KM practices.

Innovation

New combinations of organizational knowledge and other sources lead to new knowledge and innovation (Cohen & Levinthal, 1990; Kogut & Zander, 1992). Knowledge transfer among organizations is a source of innovation (Frenz & Ietto-Gillies, 2009). Since innovative processes are co-operative, networked processes, networking such as dialogues of co-operators will enhance the environment for innovation (Harmaakorpi & Mutanen, 2008). Community of Practices also contribute power for knowledge creation to produce new product and service (Marquardt, 1996). Knowledge creates innovation, such as new technologies (Sunding & Zilberman, 2001). Characteristics and types of innovation are product innovation, process innovation, technological innovation and information innovation which depend on computer technologies (Schumpeter, 1943; Moore & Benbasat, 1991; Sunding & Zilberman, 2001; Tether, 2002; Organization for Economic Cooperation and Development and European Community, 2005; Palangkalaya et al., 2010). Innovation is the fostering power for the organization (Harmaakorpi & Mutanen, 2008). The capability of organization to create and utilize intangible assets and creative-based innovation is beneficial for customer's satisfaction and need (Nicholas, 2010). There is a link between organizational decision to innovate, organizational innovative processes, output and OP (Palangkalaya, et al., 2010). Output of innovation process is measured by the number of new product and process (Jensen & Webster, 2009; Palangkalaya et al., 2010).

In total, three forms of innovation (new product and/or service, new technologies, new process) were listed in the measurement items.

Organizational Performance

Knowledge management practices create innovation (Sunding & Zilberman, 2001) and improve organizational performances (Lungu, 2011). OP are usually measured on the basis of the achievement of organizational objectives or goal-- how well an organization accomplishes organizational objectives or an organization's efficiency and effectiveness of goal achievement (Venkatraman & Ramanujam, 1986; Robbins & Coulter, 2002; Anderson, 2006). In order to measure OP, the customer satisfaction index was invented to measure the organizational performance (Ho, 2008; Lee et al., 2005). Akroush and Al-Mohammad (2010) examines OP by customer satisfaction (creating satisfied customers by organizational capabilities for new products). Nicholas (2010) examines OP by efficiency measures (the monetary expense per unit of output), effectiveness measures (the extent to which organizational goals are attained).

In total, three dimensions of OP (efficiency, customer satisfaction and effectiveness) are listed for measurement. A ten-point Likert scale is applied to examine each of these OP dimensions. There are six questions in the items for measurement.

The research model and conceptual framework to be empirically examined in the study are depicted in Figure 1 and Figure 2. This model is constructed according the research objectives and is derived from the concepts and theories described in the literature review. According to the past literature, the model suggests that KM practices influence innovation, innovation influence OP, and KM practices influence OP. Consequently, the model also suggests that KM practices influence OP, through innovation. The relationship of KM practices and innovation with the overall OP in the proposed model and conceptual framework are tested. Both quantitative research and qualitative research are conducted.

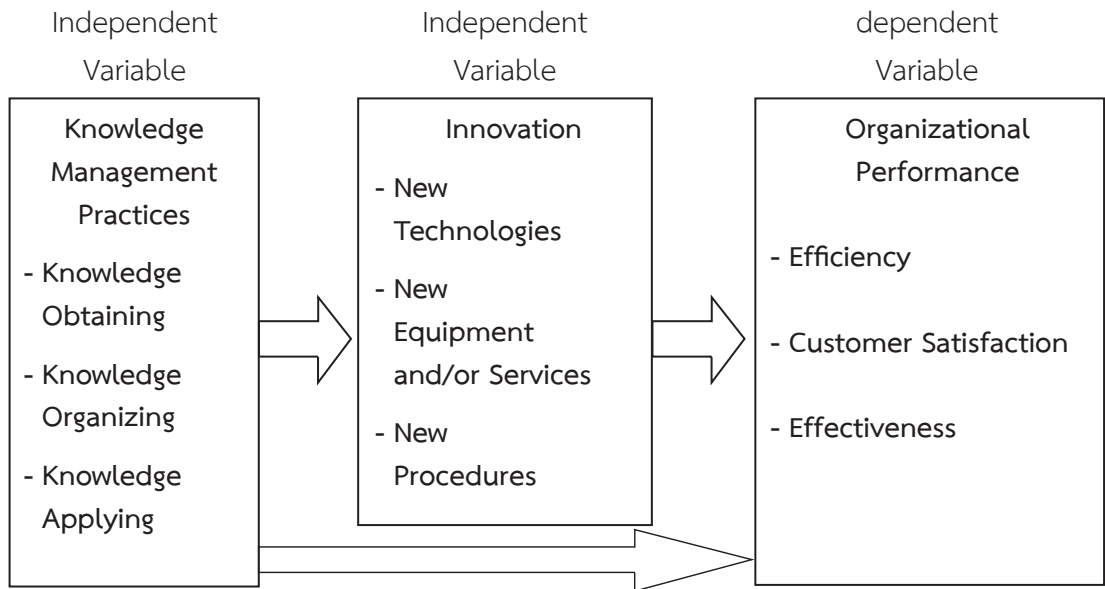


Figure 1: Model

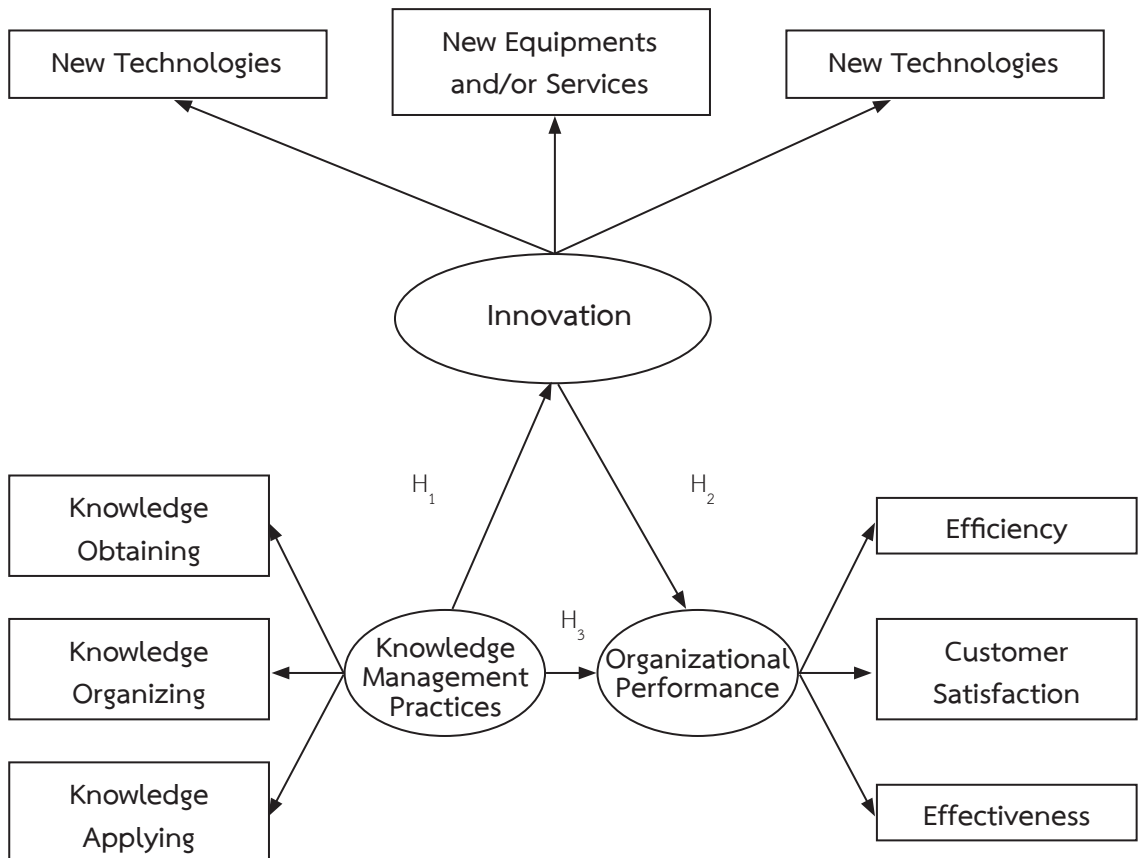


Figure 2: Conceptual Framework

From the past literature, the researcher assumes that innovation can be conducted from KM and the innovation affect the OP (Gubbins & Dooley, 2013; Lungu, 2011; Khalifa et al., 2008). Thus, the researcher formulated the following hypotheses.

H₁: Knowledge management practices positively influence innovation

Knowledge management practices can be classified into 3 processes: knowledge obtaining, knowledge organizing, and knowledge applying (Niu, 2010). Knowledge in practice-based processes also affects the innovation (Harmaakorpi & Mutanen, 2008). In addition, long- term competitive advantages of the organization are achieved by its ability to continuously create new knowledge for producing new products and services (Von Krogh et al., 1994). In fact, new combinations of organizational knowledge and other sources create new knowledge and innovation (Cohen & Levinthal, 1990; Kogut & Zander, 1992). Flexible capability of knowledge conversion to share each other functions in the organization fosters firms to speedy create new product development (Clark & Fujimoto, 1991). The ability of the firm to recognize, understand, and utilize external information and knowledge leads to its innovation as a new commercial goods and services (Cohen & Levinthal, 1990). Having access to expertise and facilities leads to organizational ability to build and strengthen skills and knowledge needed to advance new technologies (Lakpetch, 2010). Community of Practice (CoP) is also a tool for knowledge management. CoP is a group of individuals from inside and outside organizations attempting to solve organizational problems by providing links among individuals to support useful information for achieving knowledge, innovation, and vision (Nonaka, 1994).

H₂: Innovation positively influences organizational performance

Innovation is defined as a continuous process for new products and services (Harmaakorpi & Mutanen, 2008). Innovation, which is the development of new products and processes, is the fostering power for the organization (Harmaakorpi & Mutanen, 2008). Innovation is defined as cooperation for knowledge production by different background people within the same interest network (Harmaakorpi & Mutanen, 2008),

innovative processes are co-operative, networked processes, networking such as dialogues of co-operators will enhance the environment for innovation (Harmaakorpi & Mutanen, 2008). Successful innovations may result from the co-operation of interactive operators and experts in the gradually learning processes (Harmaakorpi & Mutanen, 2008). Long-term competitive advantages of an organization are achieved by the organizational ability to continuously create new knowledge for producing new products and services (Von Krogh et al., 1994). Creation of innovation improve individual and organizational performances (Lungu, 2011).

H₃: Knowledge management practices positively influence organizational performance

KM practices, concentrated on processes, mechanism and the ability to locate and share internal best practices, are essential for overall organizational performance (Davenport & Prusak, 1998; Szulanski, 1996). And KM is also focused on utilizing external knowledge for new product innovation (Von Hippel, 1994) and organizational performance (Sher & Lee, 2004).

In this study, the first latent variable is knowledge management practices, which is measured by three observed variables: knowledge obtaining, knowledge organizing, and knowledge applying. The second latent variable is innovation, which is measured by two observed variables: new technologies and new procedures. The last latent variable is organizational performance, which is measured by three observed variables: efficiency, customer satisfaction, and effectiveness.

Research Method

The design of this study was a mixed method of quantitative and qualitative research. This cross-sectional study was investigated during April, 2014-August, 2014. The unit of analysis was organization (Division and Wing). This study used a survey research method to examine the relationship between knowledge management practices, innovation and organizational performance.

The participants in the research were determined by considering their mission or responsibility related to KM practices in RTAF organizations. In quantitative research,

the populations were 185 directors and commanders from 185 organizations of RTAF in Bangkok and other provinces in Thailand. Because of the small population size, census sampling was applied. In qualitative research, the populations were six administrators of RTAF related to knowledge management of RTAF.

The research instruments were questionnaires and interviews. They were employed to investigate the relationship of knowledge management practices, innovation and organizational performance.

Questionnaire Design

The researcher designed a questionnaire as an instrument for data collection and analysis by following three steps: 1) preparation of the question items related to reviewed literature, the conceptual framework and the indicators, 2) analysis of the quality of measurement items, and 3) adjustment of the questionnaire before distribution for data collection. The concepts, the sub-concepts including questions or items for measurement are shown in Specification Table (Appendix 1). Detailed definitions of the concepts are described as follows.

Knowledge Management Practices. Based on the literature (Niu, 2010), knowledge management practices can be classified into 3 processes: knowledge obtaining, knowledge organizing, and knowledge applying.

1) Knowledge obtaining is composed of knowledge acquisition, and knowledge creation.

(1) Knowledge Acquisition

From the past researches (Cohen & Levinthal, 1990; Huber, 1991; Levinthal, 1991; March, 1991; Leonard, 1995; Nonaka & Takeuchi, 1995; Grant, 1996; Quinstas et al., 1997; Matusik & Hill, 1998; Crossan et al., 1999; Lim et al., 1999; McDermott, 1999; Duffy, 2000; Brown & Dugaid, 2001; Gold et al., 2001; Holsapple & Singh, 2001; Yli –Renko et al., 2001; Assimakopoulos & Yan, 2006; Gottschalk, 2006; Cepeda & Vera, 2007; Ho, 2008; Niu, 2010; Hsiao et al., 2011; Gharakhani & Mousakhani, 2012), it can be concluded that knowledge acquisition is composed of knowledge identification, knowledge searching. Knowledge identification can be defined as the evaluation, and selection of the essential knowledge to be managed for organizational

core functional mission and vision. Knowledge searching is an organization's activity to obtain information and/or knowledge for the organization's core functional mission and vision from internal and/or external sources, from tacit and/or explicit knowledge, and from personnel and/or virtual networks.

(2) Knowledge Creation

Knowledge creation is an organization's attempt to create new knowledge (March, 1991; Nonaka & Takeuchi, 1995; Nonaka & Konno, 1998; Crossan et al., 1999; Lim et al., 1999; Gottschalk, 2006; Cepeda & Vera, 2007; Ho, 2008; Niu, 2010) from obtained knowledge.

2) Knowledge Organizing

Knowledge organizing is composed of knowledge refining, knowledge storing, and knowledge distributing or sharing (Niu, 2010).

(1) Knowledge Refining

From past researches (Huber, 1991; March, 1991; Crossan et al., 1999; Zack, 1999; Earl, 2001; Grover & Davenport, 2001; Niu, 2010), knowledge refining is composed of knowledge systemizing, and knowledge integration and validation. Knowledge systemizing is an organization's value-adding process to newly obtained information and/or knowledge by categorizing, and indexing by human or information technology software for easily examination and access. Knowledge integration and validation is an organization's value-adding process to newly obtained information and/or knowledge by integration, and validation.

(2) Knowledge Storing

From past researches (Huber, 1991; Crossan et al., 1999; Zack, 1999; Duffy, 2000; Lee et al., 2005; Niu, 2010; Lee et al., 2012), knowledge storing is an organization's attempt to store and save information and/or knowledge after refining it manual or by IT with suitable protection for knowledge access.

(3) Knowledge Sharing

Knowledge sharing is the sharing or exchanging of new knowledge in both formal or informal face-to-face meetings, through virtual networks, and between internal and external organizations (Adapted from Davenport & Prusak, 1998; Hogel et al., 2003).

3) Knowledge Applying

From past researches (Tushman & Romanelli, 1985; Grant, 1996; Pfeffer & Sutton, 2000; Wong & Radcliffe, 2000; Bhatt, 2001; Gold et al., 2001; Niu, 2010), knowledge applying is an organization's value-creating activity by using new knowledge.

Innovation. Based on the literature (Damanpour, 1991; Ibarra, 1993; Zack et al., 2009; Chen et al., 2010; Lee et al., 2012), three major constructs were considered, namely new technologies, new equipments and/or services, and new procedures.

New technologies refer to an innovative technologies or systems from new knowledge for organizational operations and/or communication.

New equipments/ and services refer to innovative equipment and/ or services obtained from new knowledge to fulfill internal and/or external customer satisfaction.

New procedures refer to an innovative procedure from new knowledge for effectively organizational operations.

Organizational Performance. Based on the literature (Kaplan & Norton, 1992; Robbins & Coulter, 2002; Lee et al., 2005; Anderson, 2006; Ho, 2008; Zack et al., 2009; Nicholas, 2010), three major constructs were considered, namely efficiency, customer satisfaction and effectiveness.

Organizational efficiency refer to the organizational output resulted from operations by the use of innovations.

Customer satisfaction refer to the satisfaction resulted from the responsiveness of new equipments and/or services fitted to the internal and/or external customer's need.

Effectiveness refer to the achievement of organizational effectiveness, or ultimate goal, or vision, or the capability to response to unexpected incidents and crises.

In the quantitative study, the participants were asked to fill out a ten-point Likert scale questionnaire with an additional open ended question. The questionnaire has two sections: Section A: General information about the participant and the organization and Section B: Effects of knowledge management practices and innovation

on organizational performance of RTAF. The researcher used several channels to get questionnaires back. For example, the researcher visited some participants' offices to distribute the questionnaire herself and asked them to return by 1-2 weeks. Also, the researcher asked the messenger to distribute the questionnaire at the documentary morning market at the RTAF headquarters and collect them back a few days after that. In addition, the questionnaires were sent online via RTAF e-mail for the participants to complete and return through the same channel. After distribution of the questionnaires, the researcher also made telephone calls to request them to fill out the questionnaires, so 100% of them were returned.

Benbasat, Goldstein, and Mead (1987) indicate that "a phenomenon in a natural settings, employing multiple methods of data collection to gather information from one to a few entities". Thus, in this study, the data for qualitative research were taken from related papers and document of all the RTAF organizations. The secondary data included the policy, plan, minutes of the meeting, academic documents, research reports, journal papers, and related dissertations. These documentary data were analyzed to be used to formulate the conceptual framework and hypotheses and to create items in the questionnaire, and to form questions for interviews. Additionally, semi-structure interviews of the six key informants were conducted. The researcher modified the semi-structure interview according to the situation.

Validity Testing

Quantitative Analysis

The quality of the measurement tool was analyzed by Item Analysis

The validity was evaluated as follows:

1) Content Validity

The researcher examined that the items or indicators at the empirical level, whether they have the right and complete contents as indicated in operational definitions and conceptual definitions of the sub-concepts and concepts. And the researcher adjusted all the items after the pretest by deleting some words in the items which had no content validity.

2) Logical Validity or Face Validity

Five experts evaluated the logical validity of each item and the researcher adjusted all the items by deleting unsuitable words and adding suitable words in the items as suggested by these experts.

3) Criteria Related Validity

An item in the questionnaire is valid when the Item -Total Correlation is more than 0.7. The result of pretest analysis showed that from the total of 34 items, there were 31 items which had the Item -Total Correlation of more than 0.7. The three items which were item number 25 (Innovation, New Equipment and/or Services), item number 26 (Innovation, New Equipment and/or Services), and item number 29 (Organizational Performance, Efficiency) had the Item -Total Correlation of less than 0.7 . So these items were deleted from the questionnaire, then the total number of items was reduced from 34 to 31 items. All of the 31 items had criteria related validity (more than 0.7) as proved by the Item -Total Correlation , which ranged from 0.925 to 0.712. In fact, measures with Item -Total Correlation of more than 0.6 are considered to have high Criteria Related Validity (Kerlinger, 1999), the criterion related validity in this study is very satisfactory.

4) Construct Validity

In order to ensure the validity, the researcher examined whether the concepts and sub-concepts and had construct validity or theoretical validity. The LISREL measurement model was used for evaluating construct validity of the latent variables. The results of measurement model as shown in Figure 3 and Figure 4 indicated that the construct validity of two latent variables-- knowledge management practices and organizational performance. The results of measurement model did not indicate the construct validity of one latent variable, i.e., innovation, all the three latent variables have been proved to have Content Validity, Logical Validity or Face Validity, and Criteria Related Validity to have strong validity in the previous validity examination. So all of the three latent variables, which were KM practices, innovation and OP were further analyzed by LISREL to find out the relationship of latent variables.

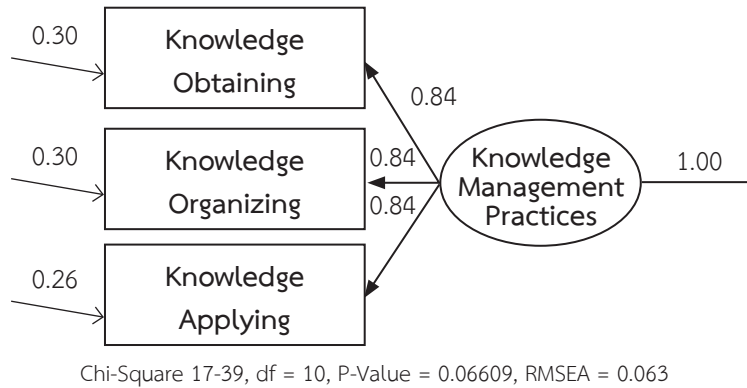


Figure 3: Measurement Model of Knowledge Management Practices

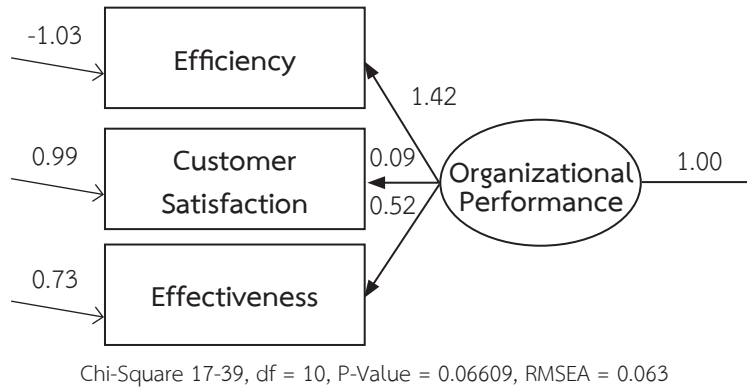


Figure 4: Measurement Model of Organizational Performance

The acceptable thresholds for the fit indices were shown in Table 1.

Table 1: Acceptable Thresholds for the Fit Indices

Absolute Fit Index	Acceptable Thresholds Level
Chi-Square (χ^2)	Low χ^2 relative to degrees of freedom with an insignificant p value ($p > 0.05$)
Relative Chi-Square (χ^2/df)	not be more than 2 (Tabachnik and Fidell, 2007)
Root Mean Square Error of Approximation (RMSEA)	Value 0.05 to 0.10 (MacCallum et al., 1996)

Validity of Qualitative Analysis

The validity of the qualitative data was analyzed by the data triangulation method or the use of multiple sources of data (official documents and related participants including organizational executives) to confirm the validity as mentioned by Rossman and Rallis (2012). Being closely involved in the setting for a long period of time is another strategy for enhancing the credibility of the qualitative analysis (Rossman & Rallis, 2012). In this research, the researcher has been working in the RTAF for 29 years. And the researcher has been involved in many KM activities of RTAF for 8 years, and has until now been head of CoP, a lecturer, an evaluator and a member of related subcommittees

Reliability Testing

In general, Cronbach's Alpha Coefficient is used to test the internal consistency reliability of the question, the Likert scale of which is more than 3 (Nunnally, 1978). In this study, the Alpha Coefficient Reliability was calculated to find out the reliability of the questionnaire, had 10- Likert scale. Cronbach's Alpha estimation which was applied to measure the internal consistency of the measurement items revealed that each item was reliable since the reliability value/ (Cronbach's Alpha: α - coefficient) was higher than 0.9, indicated the strong reliability (Cuieford, 1965). To be specific, the result of pretest analysis showed that Cronbach's Alpha was .980 and the result of the final analysis showed that Cronbach's Alpha was .929.

The Examination of Multicollinearity

LISREL Analysis requires data cleansing by examining the multicollinearity which must be evaluated before the statistical analysis of the full model of Structural Equation Model (SEM). Multicollinearity exists if the independent variables are highly correlated with each other, which results in difficulty in determining the contribution of each independent variable. Suchart Prasith-Rathsint (1997) and Hair et al. (1998) propose that the correlation of 0.8 or above indicates a Multicollinearity problem. In this study, the correlation matrix for the constructs in the model as shown in Table 2 indicates that the correlation coefficients of all variables in this study ranged from

0.46 to 0.76 at the 0.01 level of statistical significance. So the Multicollinearity was not problematic for further analysis.

Table 2: Correlation Matrix

Variables	1	2	3	4	5	6	7
1.K obtaining							
2.K organizing	.76**						
3.K applying	.69**	.75**					
4.Innovation (IT)	.46**	.64**	.49**				
5.Innovation (procedure)	.60**	.71**	.69**	.59**			
6.OP (efficiency)	.61**	.69**	.66**	.46**	.81**		
7.OP (satisfaction)	.54**	.64**	.55**	.58**	.67**	.65**	
8.OP (effectiveness)	.71**	.76**	.72**	.47**	.71**	.72**	.57**

Notes: n=185 **. Correlation is significant at the 0.01 level (2-tailed).

Methods of Data Analysis

Quantitative Analysis

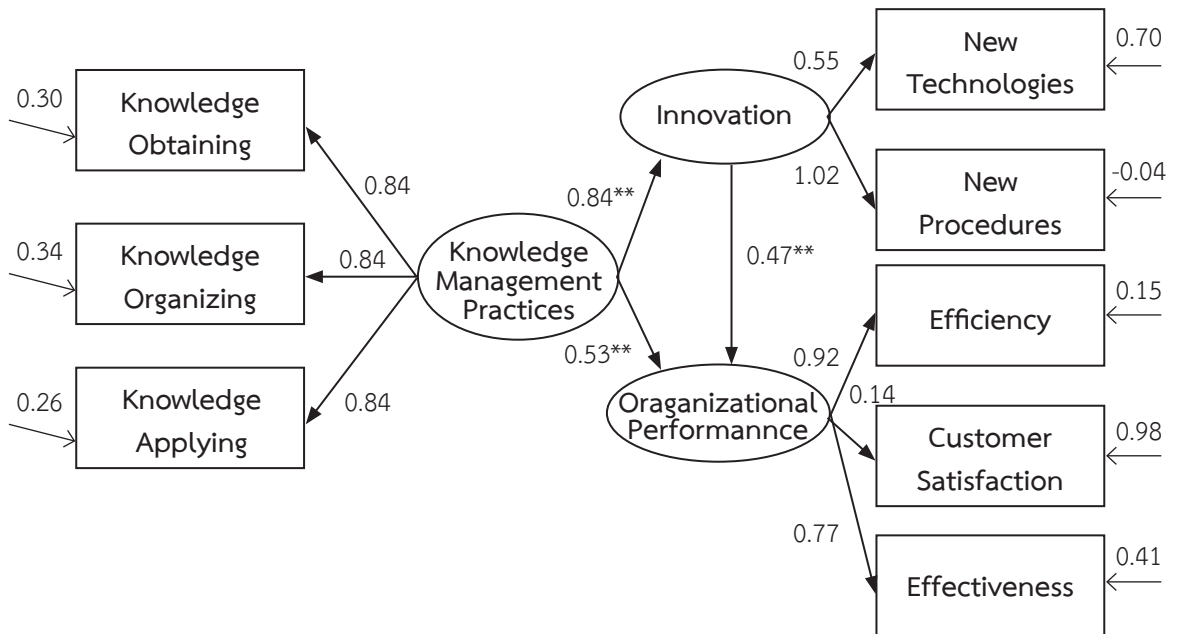
The data concerning research of KM practices, innovation and OP were statistically analyzed by full model of Structural Equation Model (SEM). The Path Analysis in the LISREL version 8.52 (Joreskog & Sorbon, 1993) was employed to find out direct and indirect relationship of the independent variable, the dependent variable and the intervening variable.

Qualitative Analysis

Data analysis which is interpretation, data connection (categorizing, and identifying patterns), and the presentation of the information or reporting the findings to be appropriate for the audiences to access and understand were performed (Rossman & Rallis, 2012).

Results

The relationship among the three latent variables which are KM practices, innovation and OP is fitted to the Path Analysis Model as shown in Figure 5. Thus, the analytical results of the LISREL model indicate a fit for the sample data. All of the three hypothesized relationships are statistically significant.



Chi-Square 17-39, df = 10, P-Value = 0.06609, RMSEA = 0.063

Figure 5: Research Model for Structural Equation Modeling Analysis

The results show that the effect of KM practices and innovation on OP is statistically significance. Effective knowledge management can increase OP (Lee & Sukoco, 2007). And KM practices may contribute to innovation (Marquardt,1996), as well. Additionally, innovation creation by knowledge management practices can, in turn, improve individuals and organizational performance (Lungu, 2011). The testing of the three hypotheses by Path analysis are summarized in Table 3. The value of β in the model is used to explain the causal relationship. In Table 3, the paths leading from knowledge management practices to innovation are statistically significant ($\beta = 0.84$); thus, hypothesis I is accepted. KM practices have a positive direct influence on innovation (H1 is supported). Similarly, the paths leading from innovation

to OP are statistically significant ($\beta = 0.47$); thus, hypothesis II is accepted. Innovation has a positive direct influence on OP (H2 is supported). Next, the paths leading from KM practices to OP are statistically significant ($\beta = 0.53$); thus, hypothesis III is accepted. KM practices have a positive direct influence on OP (H3 is supported). And KM practices have an indirect influence on OP, through innovation (H₁ and H₂ are supported).

Table 3: The Summary of the Results of Hypothesis Testing

Hypotheses	Path	Results
H ₁ : KM practices	KM → Innovation	Statistically significant
positively influence innovation		
H ₂ : Innovation	Innovation → OP	Statistically significant
positively influences OP		
H ₃ : KM practices	KM → OP	Statistically significant
positively influence OP		

The results of the data analysis indicated that the observed variables were reliable measures for the three latent variables. The theoretical model also satisfactorily fits the empirical data, which support the construct validity.

H₁: Knowledge management practices positively influence innovation

The results of the current study indicate that knowledge management practices positively influence innovation. Knowledge in practice-based processes also affects the innovation (Harmaakorpi & Mutanen, 2008). In addition, long-term competitive advantages of the organization are achieved by its ability to continuously create new knowledge for producing new products and services (Von Krogh et al., 1994). In fact, new combinations of organizational knowledge and other sources create new knowledge and innovation (Cohen & Levinthal, 1990; Kogut & Zander, 1992). Flexible capability of knowledge conversion to share each other functions in the organization fosters firms to speedy create new product development (Clark & Fujimoto, 1991). The ability of

the firm to recognize, understand, and utilize external information and knowledge leads to its innovation as a new commercial goods and services (Cohen & Levinthal, 1990). Having access to expertise and facilities leads to organizational ability to build and strengthen skills and knowledge needed to advance new technologies (Lakpetch, 2010). Community of Practice (CoP) is also a tool for knowledge management. CoP is a group of individuals from inside and outside organizations attempting to solve organizational problems by providing links among individuals to support useful information for achieving knowledge, innovation, and vision (Nonaka, 1994).

In the study, KM practices were hypothesized to effectively facilitate innovation (H1). The standardized coefficient for the relationships represented by H_1 ($\beta=0.84$) showed a strong positive effect of the proposed variables.

H_2 : Innovation positively influences organizational performance

The results of this study indicate that innovation has a positive effect on OP. Innovation, which is the development of new products and processes, is the fostering power for the organization (Harmaakorpi & Mutanen, 2008). The capability of organization to create and utilize intangible assets and creative-based innovation is beneficial for customer's satisfaction and need (Nicholas, 2010). There is a link between organizational decision to innovate, organizational innovative processes, output and OP (Palangkalaya et al., 2010). Long-term competitive advantages of an organization are achieved by the organizational ability to continuously create new knowledge for producing new products and services (Von Krogh et al., 1994). Innovation improves individual and organizational performances (Lungu, 2011).

In the study, innovation was hypothesized to effectively facilitate OP (H_2). The standardized coefficient for the relationships represented by H_2 ($\beta =0.47$) showed a strong positive effect of the proposed variables.

H_3 : Knowledge management practices positively influence organizational performance

The results of the current study support that KM practices have a positive effect on OP. KM practices, concentrated on processes, mechanism and the ability to locate and share internal best practices, are essential for overall organizational performance (Szulanski, 1996; Davenport & Prusak, 1998). And KM is also focused on utilizing external knowledge for new product innovation (Von Hippel, 1994) and organizational performance (Sher & Lee, 2004).

In the study, KM practices were hypothesized to effectively facilitate OP (H_3). The standardized coefficient for the relationships represented by H_3 ($\beta = 0.53$) showed a strong positive effect of the proposed variables.

From the analysis of the variables, it was found that KM practices could adequately explain innovation with the value of square multiple correlation of 0.85 ($R^2=0.85$). And KM practices could adequately explain the OP with the value of square multiple correlation of 0.94 ($R^2=0.94$). KM practices and innovation could adequately explain the OP with the value of the coefficient determination in the model, or square multiple correlation (R^2) of greater than .40 (Joreskog & Sorbon, 1993). To conclude, KM practices and innovation were hypothesized to effectively facilitate the OP (H_1 , H_2 , and H_3). The standardized coefficient for the relationships represented by H_1 ($\beta = 0.84$), H_2 ($\beta = 0.47$), and H_3 ($\beta = 0.53$) showed a strong positive effect of all proposed variables. All of the three hypotheses were accepted. So it could be concluded that KM practices positively influence the OP, through innovation in the public organization context.

Discussion

In this study, the researcher attempts to investigate the effects of KM practices and innovation on OP. The empirical results provide considerable support to the proposed framework. As predicted, the findings are clearly in favor of the view that KM practices and innovation are enablers of OP. The following discussion is based upon the results of LISREL analysis (Figure 5).

H_1 : Knowledge management practices positively influence innovation

It is first noted that the paths leading from knowledge management practices to innovation were statistically significant ($\beta = 0.84$); thus, hypothesis I was accepted. KM practices have a positive direct influence on innovation (H_1 is supported).

As estimated, the results clearly support the concepts that new knowledge from KM practices is the key factor of innovation (Tidd et al., 2005; Gubbins & Dooley, 2013). And organizational KM practices may convert to new products and services or innovation (Balconi et al., 2004). The results of this study support the findings of previous studies concerning the influence of knowledge management practices on innovation (Clark & Fujimoto, 1991; Von Krogh et al., 1994; Harmaakorpi & Mutanen, 2008), since the researcher found the direct influence of KM practices on OP (i.e. H_1 is supported). Based on the structure of this research model, the results seem to be reasonable. That is the model suggests that the organizations need to effectively practice KM to create innovation.

The findings of qualitative research confirm those of quantitative analysis that KM practices positively influence innovation.

H_2 : Innovation positively influences organizational performance

The paths leading from innovation to OP were statistically significant ($\beta = 0.47$); thus, hypothesis II was accepted. Innovation has a positive direct influence on OP (H_2 is supported).

Consistent with expectation, the results show the clearly support that innovation is the fostering power for the organizational performance (Harmaakorpi & Mutanen, 2008) by the development of new products or equipments and services or maintenance, new processes or procedure, and new technologies. The innovation is beneficial for customer's satisfaction and need (Nicholas, 2010). And innovation improves organizational performances (Lungu, 2011). The results of this study support the findings of previous studies concerning the influence of innovation on OP (Harmaakorpi & Mutanen, 2008; Lungu, 2011). Since the researcher found the direct influence of innovation on OP (i.e. H_2 is supported). Based on the structure of this research model, the results seem to be reasonable. That is the model suggests that the organizations need to create innovation to enhance OP.

The findings of qualitative research support the results of quantitative analysis that an innovation from KM practices in RTAF organizations positively influences OP.

H₃: Knowledge management practices positively influence organizational performance

The paths leading from KM practices to OP were statistically significant ($\beta = 0.53$); thus, hypothesis III was accepted. KM practices have a positive direct influence on OP (H₃ is supported).

KM practices, concentrated on processes, mechanism and the ability to locate and share internal best practices, are essential for overall organizational performance (Szulanski, 1996; Davenport & Prusak, 1998). And KM is also focused on utilizing external knowledge for new product innovation (Von Hippel, 1994) and organizational performance (Sher & Lee, 2004). Since the researcher found the direct influence of KM practices on OP (i.e. H₃ is supported). Based on the structure of this research model, the results seem to be reasonable. That is the model suggests that the organizations need to effectively practice KM to enhance OP. To understand the linkage between KM practices, innovation on OP in greater detail, three sub models were tested. The study results provide strong empirical support for the overall research model. KM practices have an indirect influence on OP, through innovation (H₁ and H₂ are supported). The findings of this study indicate that KM practices enable OP, through innovation.

The findings of qualitative research support the results of quantitative analysis that knowledge management practices positively influence organizational performance through innovation.

The findings from quantitative analysis by means of Path analysis proved the hypotheses of the proposed model that measured the relationship of knowledge management practices, innovation and organizational performance. Knowledge management practices include knowledge obtaining, knowledge organizing, and knowledge applying. The innovations include new technologies, new procedures,

and new services and products. The results showed that the effect of knowledge management practices on organizational performance was statistically significant through innovation. The findings reveal that KM practices and innovation have increased the efficiency, customer satisfaction, and effectiveness of the organizational performance.

Conclusion

The objectives of the research were 1) to develop a model of knowledge management practices and organizational performance, 2) to validate the relationship of knowledge management practices and organizational performance in the model, and 3) to suggest for the improvement of knowledge management practices and organizational performance.

The proposed model was analyzed by path analysis applying structural equation modeling to evaluate the theoretical construct, to validate the measures, and to evaluate the relationships of the variables in the causal model. In quantitative research, a questionnaire survey was conducted to collect the data from all 185 commanders and directors of Royal Thai Air Force organizations. And the number of returned questionnaires was 100%. In qualitative research, the populations were six RTAF administrators who were responsible for knowledge management.

The results was statistically proved the proposed model and supported hypothesis testing by the examination of Multicollinearity, measurement model and LISREL program version 8.52 which were applied to evaluate the relations of latent variables. The findings were that knowledge management practices positively influenced the organizational performance, through innovation. The results of quantitative analysis were supported by the results of qualitative analysis.

The findings of this study contribute to the theoretical development of a conceptual model for explaining the relationships among KM practices, innovation and OP. Previous studies have paid attentions to investigate the role of KM on OP. To illustrate, the results of Khalifa, Yu and Shen (2008) clearly proved the effects of Knowledge management systems (KMS) in private firms on OP, and the research model

indicated that the innovativeness influenced the OP. However, the study of Khalifa, Yu and Shen (2008) had a gap in OP measurement in public organizations and the innovation was not measured. Lungu (2011) showed the model which explained the knowledge management, innovation and other factors on the performance of military forces which was a public organization. However, there were no focus on innovation factors that affected on organizational performance, and since this paper presented a conceptual model, thus no evidence-based research study (such as the statistical methods and findings) was shown to test the integrated model. According to the literature, few empirical evidences have been provided to connect the relationships among KM practices, innovation and OP. This lack is serious because of the increasing important of KM to the improvement of OP. This study argues that the link between KM practices and OP may be influenced by innovation. Following the suggestion of previous research (Lungu, 2011), this study builds up the conceptual model and hypothesizes the moderating role of innovation between KM practices and OP.

The findings in this study are valuable for manager's reference, especially for those whose circumstances are similar to the military organizations. The structural equation model provides useful information for managers to enhance OP through KM practices and innovation. Practitioners can use the findings to extend research on knowledge management and innovation.

The findings of this study should be interpreted with caution in some limitations. First, from the literature review, innovation should be measured by new technologies, new equipment and/or services, and new procedures of the organization. However, not all the RTAF organizations manufacture equipment or products. So the only two dimensions employed to measure innovation are new technologies and new procedures. The measurement of innovation should be evaluated in other ways in future research.

The source of data collected is in a military organization in Thailand; hence the findings may not be easily generalized to non military organizations in other regions or countries. So future work should investigate the influence of geography and culture on KM practices.

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Apopendix 1 Specification

Concept	Sub-concept	Definition	Item/Indicator
1. Knowledge Management Practices (Niu, 2010)	1.1 Knowledge Obtaining 1.1.1 Knowledge Acquisition (Duffy, 2000; Cohen & Levinthal 1990; McDermott, 1999; Crossan et al., 1999; Levinthal, 1991; March, 1991; Huber, 1991; Niu, 2010; Lim et al., 1999; Gottschalk, 2006; Cepeda & Vera, 2007; Ho, 2008; Hsiao et al., 2011; Holsapple & Singh, 2001; Gold et al., 2001; Quinstas et al., 1997; Huber, 1991; Nonaka & Takeuchi, 1995; Leonard 1995; Grant, 1996; Matusik & Hill, 1998; Assimakopoulos & Yan, 2006; Brown & Dugaid, 2001; Gharakhani & Mousakhani, 2012; Yli –Renko et al., 2001)	1.1.1.1 Knowledge identification is the evaluation, and selection of essential knowledge to be managed for the present and future organizational core functional mission and vision. 1.1.1.2 Knowledge searching is an organization’s activity to obtain tacit and/or explicit knowledge for organizational core functional mission and vision from internal and/or external sources and from the personnel and/or papers, virtual networks	1. Your organization evaluates organizational knowledge which is essential for organizational core functional mission and vision. 2. Your organization identifies knowledge by the selection of core identical knowledge which is fitted for organizational core functional mission and vision. 3. Your organization identifies knowledge by the selection of the knowledge which the organization must acquire and create. 4. Your organization has activities to gain knowledge from internal sources for obtaining the selected knowledge. 5. Your organization has activities to gain knowledge from external sources for obtaining the selected knowledge.

Concept	Sub-concept	Definition	Item/Indicator
1.1.2	Knowledge Creation (Lim et al., 1999; Gottschalk, 2006; Cepeda & Vera, 2007; Ho, 2008; Nonaka & Takeuchi, 1995; Crossan et al, 1999; March, 1991; Niu, 2010).	1.1.2.1 Knowledge Creation is an organization's attempt to create new knowledge from obtained knowledge.	10. Your organization has the processes of transforming the obtained knowledge to new organizational knowledge in meetings, and by experimenting, practicing, research and development.
1.2	Knowledge Organizing (Crossan et al, 1999; Zack, 1999; March, 1991; Huber, 1991; Niu, 2010; Grover & Davenport, 2001; Earl, 2001)	1.2.1.1 Knowledge Systemizing is an organization's value-adding process of knowledge categorizing, and indexing to newly obtained knowledge.	11. Your organization has a process of adjusting the new organizational knowledge by many cycles of knowledge searching and knowledge creation
1.2.1	Knowledge Refining	1.2.1.1 Knowledge Systemizing is an organization's value-adding process of knowledge categorizing, and indexing to newly obtained knowledge.	12. Your organization systemizes or categorizes newly created knowledge by information technology software or programs for easy searching and access.
1.2.1.2	Knowledge Integration and Validation is an organization's value-adding process of integrating and validating to newly obtained knowledge.	1.2.1.2 Knowledge Integration and Validation is an organization's value-adding process of integrating and validating to newly obtained knowledge.	13. Your organization systemizes or categorizes newly created knowledge by manual indexing for easy searching and access
1.2.1.2	Knowledge Integration and Validation is an organization's value-adding process of integrating and validating to newly obtained knowledge.	1.2.1.2 Knowledge Integration and Validation is an organization's value-adding process of integrating and validating to newly obtained knowledge.	14. Your organization has the integrate newly created knowledge to the main unique organizational knowledge which is fitted to the core mission and RTAF vision

Concept	Sub-concept	Definition	Item/Indicator
			15. Your organization validates the newly knowledge by experts and skilled practitioners.
1.2.2 Knowledge Storing	(Crossan et al., 1999; Duffy, 2000; Huber, 1991; Zack, 1999; Niu, 2010; Lee & Yang, 2000; Lee et al., 2012)	Knowledge Storing is an organization's attempt to store and save knowledge after refining by manual or IT with suitable protection for knowledge access.	16. Your organization has computerized systems to store and save knowledge after refining. 17. Your organization has documentary systems to store and save knowledge after refining.
1.2.3 Knowledge sharing	(Adapted from Hogel et al., 2003; Davenport & Prusak, 1998).	Knowledge sharing is the sharing or exchanging of new knowledge by applying both formal or informal face-to-face meetings and virtual networks, between internal and external organizations.	18. Your organization has suitable protection of knowledge storing for accessing refined knowledge. 19. Your organization has the exchange of new knowledge through formal and/or informal face-to-face meetings among internal organizations. 20. Your organization exchange new knowledge through formal and/or informal face-to-face meetings among external organizations.
			21. Your organization exchange new knowledge via virtual networks among internal organizations.

Concept	Sub-concept	Definition	Item/Indicator
2. Innovation (Adapted from Damanpour, 1991; Ibarra, 1993; Chen et al. 2010, Zack, McKeen & Singh, 2009; Lee et al, 2012)	1.3 Knowledge Applying (Bhatt, 2001; Grant, 1996; Gold et al., 2001; Pfeffer & Sutton, 2000; Wong & Radcliffe, 2000; Tushman & Romanelli, 1985; Niu, 2010) 2.1 New Technologies	Knowledge Applying is an organization's value creating activity by using new technologies or systems from new knowledge for organizational operations and/or communication.	22. Your organization exchange new knowledge via virtual networks among external organizations.
	2.2 New Equipments and/or Services	New Equipment/ and Services are innovative equipment and/ or services obtained from new knowledge to fulfill internal and/or external customer satisfaction	23. Your organization's new knowledge is actually utilized.
	2.3 New Procedures	New Procedures are an innovative procedures from new knowledge for effectively organizational operations	24. Your organization has created or developed from new knowledge new technologies or systems for operations and/or communication. 25. Your organization has created or developed new equipments from new knowledge. 26. Your organization has created or developed new services from new knowledge. 27. Your organization has created or developed new procedures from new knowledge.

Concept	Sub-concept	Definition	Item/Indicator
3. Organizational Performance	3.1 Efficiency	Organizational efficiency are organizational output resulted from operations by the use of innovations (Robbins & Coulter, 2002; Anderson, 2006; Ho, 2008)	28. Your organization has more efficiency by reducing the operational cost. 29. Your organization has more efficiency by reducing steps and time of operational processes.
	3.2 Customer Satisfaction	The customer satisfaction is the satisfaction resulted from the responsiveness of new equipments and/or services fitted to the internal and/or external customer's need (Ho, 2008; Zack et al., 2009)	30. Your organization has better quality of equipment production and maintenance fitted to customer's need. 31. Your organization has better quality of services fitted to customer's need.
	3.3 Effectiveness	Achievement of organizational effectiveness (Robbins & Coulter, 2002; Anderson, 2006; Ho, 2008), or ultimate goal, or vision (Kaplan & Norton, 1992; Lee et al., 2005), or the capability to response to unexpected incidents and crises (Adapted from Lee et al., 2012).	32. Your organization has the capability to respond to unexpected incidents and crises 33. Your organization has the capability to achieve organizational outcomes or ultimate goals. 34. Your organization has the capability to fulfill the RTAF vision.