THE IMPACT OF KNOWLEDGE MANAGEMENT ON ORGANIZATIONAL PERFORMANCE (CASE STUDY AT PTT)

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ABSTRACT

This study aims to examine the impact of knowledge management on organizational performance specifically in the context of PTT. Survey questionnaires are distributed to Top & middle level management employees and analyze the impact of strategy, KM infrastructure and KM process that foster formulating and implementing of effective KM to enhance organizational performance. Also, findings point out that the possible existing gaps in implementation process. Besides, this paper provides an understanding of enablers that involved greatly in implementing effective KM concept and suggested possible ways based on reflection of theoretical, previous research findings and present study analysis. The results show that two main factors namely knowledge conversion and application have positive significant relationship with organizational performance. As a whole, the result confirms the effect of strategy, KM infrastructure and KM process on performance improvement.

KEYWORD: Knowledge Management (KM) Knowledge Management Infrastructure / Knowledge Management Process / Strategy / Organizational Performance

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CHAPTER I
INTRODUCTION

1.1 Research Background

Recent trends in KM are leading most of the major corporations to use KM initiatives, especially to improve employees' skills and knowledge to produce innovative products in faster and efficient way to get competitive advantage. Effective and efficient knowledge has been recognized as the main and important intangible resource to achieve distinctive competencies that are strongly needed and basis in these knowledge-based organizations. Moreover, sophisticated customers, new and disruptive technology and hyper-competition make companies utilize their knowledge assets in order to survive in the market. At the meantime, enabling organizations to capture, share and apply the collective experiences, lesson learned and know-how of employees have become critical to get competitive advantage in this knowledge economy. Also, organizations are facing too much disruption and industry's boundaries became more and more boundless because of the rapid changes in industry's standards by first movers' actions. To ensure long-term survival of the organization, it is important to adapt changes of the external environment. In order to do so, organization's internal resources become the major player to start the change or to adapt to the changes.

Because the distinctive competency of organization's human resources, knowledge, skills and experiences are enablers and organization's knowledge assets act as main contributor to get competitive advantage. In addition, rivalry among the firms become very intense due to the force of globalization, disruptive technology and hyper-competition and all are striving to achieve distinctive competencies to remain competitive. As a result, many companies have paid great attention to knowledge management as an approach to generate distinctive competencies to enhance organizational performance in order to ensure long-term survival. PTT, which is famous Oil and Gas Company in Thailand and was established on December

29, 1978. The company is operating in a very intense environment and it is important to possess distinctive competencies in order to differentiate itself from competitors.

From the perspective of industrial organization concept, the firm should operate in the environmental conditions that favor high level of firm performance. To take advantage from the external environment, the firm needs to possess strategic resources that cannot be easily imitated by competitors. The distinctive competency of organization's internal resources such as human resources, knowledge, skills and experiences are the enablers and drive organization's long-term survival and also for better performance. Among these resources, organization's knowledge asset is the special and specific resource of the firm because that is difficult to imitate by outsiders and the main driver for innovation. Most importantly, organization needs to have the capability to utilize these knowledge assets successfully. Gold et al, 2001 found that KM infrastructure and processes are the drivers of organizational effectiveness. Based on this, this study intends to find out how KM infrastructure and process along with the business strategy impact on the PTT's performance.

1.2 Oil and Gas Industry environment

World Energy markets are continually expanding and this business segment is the worldwide commercialization with a massive scale. Moreover, overnight changes I technologies including automation, data analytics, and the internet are shaping this business sector and driving major savings for consumers and productivity boost for producers. Therefore, companies are trying to spend billions of dollars to maintain and increase their oil and gas production and to reduce costs. Although, it is a profitable and successful industry, it has cyclical pattern because of the industry's heavy dependency of the main product of oil and Gas. Furthermore, industry's environment changes all the times and bargaining power of the buyers, rivalry among competitors, bargaining power from suppliers and threats of the substitutes from five forces lead to very high competition in the industry. As a result, organization's long-term survival is very difficult to maintain because of the nature of the industry's high competition and cyclical performance. Globally, demand for Oil and Gas sector keeps increasing and low prices are also fueling very intense

competition. In order to survive in this environment, companies are continually trying to reduce their production costs and find alternative ways to create new processes and products.

1.2.1 KM at PTT

PTT is one of the largest corporations in Thailand and listed in Fortune Global 500 companies. Because of intensified market competition, PTT strives to operate its business operations in align with a sustainability strategy by maintaining a balance of being a high performance organization and of an endeavor to the continuous improvement of technology, innovation and knowledge. It enhances business operations based on knowledge, expertise, experiences of personnel and cooperation among companies in PTT Group. It possesses a lot of experiences, important lessons learned and powerful resource to maintain its long-term survival. Here, knowledge management capability plays strategic role to achieve performance and to boost external competitiveness.

At the same time, formulating and implementing organization's strategy should take account the relative contribution of KM practices to enhance internal performance. Strategy serves as a building block to become effective KM and organization needs to have related KM infrastructure to support strategy and KM process. These three elements of strategy, KM infrastructure and process have strong impact on organization and these all should have alignment. Therefore, research objectives are derived from this analysis and as follows:

(1) To analyze the impact of overall company strategy on KM infrastructure, process and organizational performance

(2) To examine specifically in the context of PTT the contribution of KM infrastructure in implementing KM.

(3) To analyze the impact of knowledge management infrastructure on organizational performance

(4) To analyze the impact of knowledge management process on organizational performance

(5) To identify challenges and barriers of developing and implementing knowledge management in PTT

1.3 Methodology

In order to investigate the impact of KM on organization's performance, it is necessary to ascertain the supportive KM infrastructure and process are well organized in the organization. Therefore, the questionnaires are the investigation tool designed for this purpose. It comprises five main parts. The first part is based on the investigation about how strategy supports to become effective KM. The second part is concerned with how KM infrastructure supports in developing and implementation of KM in the organization. The third part is about the overall process of KM. The fourth part is about improved organizational performance derived from KM. The fifth part comprises open-ended questions designed to gather important insights from participants. The results of the questionnaire will help to find out how KM impact on organization's performance.

1.3.1 Population and Sample

The research population consists of Top and middle-level management employees who have profound knowledge and practical experiences in strategic management. Since it is very difficult to reach all of the population in PTT, researcher has chosen to conduct research (150) Top & middle-level management employees. HR managers from leadership and human resource department help to identify targeted sample, distribute and collect questionnaires.

1.4 Expected Outcomes of the study

This research intends to provide an understanding of factors that involve in developing and implementing knowledge management to enhance organizational performance. Also, an analysis based on questionnaires intends to assess in depth look at PTT's strategy, KM infrastructure, process, and performance. It also aims to find out challenges concerned with developing and implementing KM in organization and suggest the possible ways to overcome these challenges in order to enhance organizational performance.

CHAPTER II
LITERATURE REVIEW

2.1 Industry Environment

According to the industrial organization concept, firm's competitive advantage lies in the external environment. Until 1980s, this outside- in focus assumed that firm's sustainable competitive advantage mainly comes from external environment. The underlying assumption is that firm should operate in the environmental conditions that favor high levels of firm performance because attractive industry can offer the greater opportunities in order to take advantage from the external environment. However, in order to take advantage and tackle competitive environment, firms should also need to possess effective knowledge assets (intellectual capital) that reside within the firm and its employees. According to the Grant, R. M (1996), firm's should establish their long-term strategies on organizational capabilities in order to survive in unstable market conditions and intense competition. The reason is firm could earn firm movers' advantages result from organizational capabilities and they can also reform industry standards. This is the inside-out perspective. Therefore, organizational capabilities especially knowledge asset can act as a strategically value-creating resource of the firm. In addition, the nature of knowledge resides in different levels of the organization. So, competitive advantage is the result of integration and interaction between individual organizational members through knowledge creating and sharing process.

2.2 Inward Focus (Importance of Internal Resources)

According to the resource-based view (RBV), it focuses on the firm's internal resources to improve organization performance. Mwailu & Mercer, 1983, Wernerfelt, 1984; Rumelt, 1984, & Penrose, 1959 identified (RBV) as "a basis for the competitive advantage of a firm lies mainly in the application of a bundle of valuable

tangible or intangible resources at the firm's disposal". Moreover, Peteraf, 1993 proposed that firm's resources should be heterogenous in nature and not perfectly mobile by rivals in order to transform short-run competitive advantage into a sustained competitive advantage. As Barney, 1991 suggested, firm resources should be valuable resources that can not be perfectly imitable not substitutable without putting too many efforts from competitors. Therefore, (RBV) helps firms to understand the importance of knowledge as a strategic asset and contributes greatly to achieve competitive advantage.

Afterward, the knowledge-based perspective of the firm which extends the assumptions of the resource-based view of the firm that is initially promoted by Penrose (1959) and broadened by others (Barney 1991: Conner, 1991; Wernerfelt, 1984). It regarded knowledge is a special and specific resource of the firm because this is difficult to imitate by outsiders and it forms the basis for competitive advantage. In addition, Barney (1991) pointed out that strategic resources are heterogeneously distributed across firms and firm can only generate sustainable competitive advantages based on the rare, valuable, non-imitable and non-substitutable resources. Therefore, organization's performance and achieving competitive advantage are associated primarily with heterogeneous resource endowments of firms. Here, how to manage these knowledge assets become a critical issue.

2.3 Definitions of Knowledge Management

Many authors proposed various definitions of knowledge management based on different perspectives. Some extend the scope of the knowledge management by bringing different aspects of it. Gorelick, 2005 suggested that knowledge can be intangible, personal, elusive and immeasurable and also it is a dynamic combination of experience, expert insight, values and contextual information. According to the Davenport & Prusak, 1998, knowledge serves as a foundation to evaluate new experiences and valuable information results from continuous transformation through a new experience. According to the Nonaka & Takeuchi, 1995, knowledge has two dimensions such as tacit knowledge which is embedded in the minds of individuals and cannot easily identify and documented and explicit knowledge which is easily

documented, recorded and communicate with each other. Standards Australia, 2001 identified KM as a multi-disciplinary approach to derive strategic objective of the firm by utilizing the best possible way of knowledge. Therefore, KM practitioners regarded knowledge as an important strategic resource of the firm.

Alternatively, Lim & Klobas, 2000 recognized that the value of knowledge should be difficult to reproduce by competitors and it provides a source of a unique competitive advantage to the organization. The works of Nonaka and Takeuchi have led to the idea that organizations and individuals within them would be more effective and efficient if they "knew what they know" (Nonaka & Takeuchi, 1995). Knowledge has been thus recognized as a "core competency" of an organization and has a significant impact on organizational structure, processes, service/product delivery (Ellis, 2005; Salisbury, 2003).and organizational performance. As long & Seemann, 2000 mentioned, knowledge management is, therefore, a social system that promotes and accounts tools, processes, strategies, and cultures for creating, sharing, and using knowledge.

2.4 Recent Trends on Knowledge Management

Rapid changes in business, technology and industry's environment are forcing organizations to learn at an unprecedented rate. If the organization's knowledge collection and transfer cannot occur at an equally rapid rate, organization's competitiveness is affected greatly. Therefore, many large companies, public institutions, and non-profit organization have recognized the relative importance of knowledge management and strive to improve internal KM efforts because they regard knowledge management as an important weapon for sustaining competitive advantage. It mainly concerned with what organizations know and understand about customers, products, processes, mistakes and successes that are accumulated over time. Therefore, it includes experiences, culture, and competence to create the best value for organization from utilizing this accumulated knowledge.

From the system perspective, knowledge has been regarded as a process to continually managing knowledge of all forms and needs companywide strategy which comprises policy, implementation, monitoring and evaluation. So, the important

elements namely; culture, people, structure, technology, leadership and human resource management should be regarded organization's KM infrastructure because knowledge is incorporated in many facets of these elements and these all are enabling condition for whole KM process to come alive. KM infrastructure components provide the launching platform for organization's KM process. This infrastructure can leverage or trigger KM process that can help to acquire, convert, apply and protect of valuable knowledge in the organization in an efficient and effective manner.

Therefore, organization's KM infrastructure and KM process serve as a capability along with strategy provides distinctive competencies to improve firm's performance in order to achieve competitive advantage. In additions, it also needs to understand the process of how these capabilities develop within the firms. According to the literature and analysis from business practices, there is a strong relation between strategy, KM infrastructure and process.

2.5 Strategy

Effective knowledge management should be coherent and grounded on the firm's strategy. More specifically, firm's knowledge management should be perfectly linked with the strategy in order to achieve competitive advantage and thus that increased performance is the consequence of this perfectly linkage between knowledge management and strategy.

2.6 Knowledge Infrastructure Capabilities

Implementation of strategy requires a solid foundation of KM infrastructure on which the strategy can be launched. Knowledge management infrastructure is the long-term foundation to develop knowledge and also supports and stimulates creation, sharing, protection and management of knowledge within the organization. In order to formulate and implement KM successfully, many researchers identified differnt indicators. Skyrme & Amidon,1997 presented one of the earliest studies of KM critical factors. Wong & Aspinwall, 2005 also identified seven key

success factors of KM such as strong link to business imperative, a compelling vision and architecture, knowledge leadership, knowledge creating and sharing culture, continuous learning process , a well-developed technology infrastructure and systematic organizational knowledge processes In this study, the following elements are used to find out the effectiveness of KM infrastructure namely: Technology, Structure, Culture, Leadership and Human Resource Management. In an organizational setting, KM infrastructure needs these components and they are interdependent on each other in a complex web of interrelations.

(1) Technology

Zaied, Hussein, & Hassan, 2012 identified Technology as a technical system of the firm and it determines how knowledge travels throughout the enterprise and how knowledge is accessed. It also needs to encourage experienced workers to transfer their knowledge faster to the now or less experiences workers. Technology that intends to collaboration and distribution allows individuals within the organization to work together and collaborate interactively (Sveiby, 1996). Collaboration is needed strongly in order to Transmit and create effective knowledge within the organization (Sveiby, 1996). Therefore, technology that intends to generate opportunities allows organization to generate and store knowledge about it customer, partners, employees and suppliers.

(2) Structure

Structure serves as extension of an organization's structural disposition to reinforce knowledge-related activities. (Zaied, , Hussein, & Hassan, 2012). It has multiple dimensions and formal structure may encourage or inhibit interactions among employees. Therefore, organization's structure must be flexible enough to encourage interactions as well as to adapt to changes in the external environment. In addition, it also needs to set up incentive system that can lead to encourage knowledge creation and sharing activities.

(3) Culture

Culture is a set of shared values, norms, and beliefs which is possessed by member members of organization and mainly implicit (Zaied, Hussein, & Hassan, 2012). It should serve as supportive role and needs to encourage knowledge- related activities. This can be achieved by stressing the interaction between employees for

building relationships and contacts that fosters sharing of different knowledge reside in individuals. This type of interaction is important when managing tacit knowledge. More importantly, organization should have open culture in order to implement KM successfully within the organization. In addition, it is important to set up and organizes workshops, conferences, seminars and symposium that enable knowledge to be shared on a person-to-person basis.

(4) Leadership

The Leadership focuses on identifying and providing an effective environment to share critical knowledge across the organization. Leaders need to encourage managers to include know management as a part of planning and provide needed support in order to implement successfully. Senior management support of KM within the organization is vital and it should be in the form of monitoring the knowledge within the organization in order to note and correct errors to take actions.

(5) Human resource management

Human resource refers as employees need to specialize in a particular domain and should demonstrate the capability of applying that knowledge in order to interact with others (Zaied, Hussein, & Hassan, 2012). Human resource management should motive people to share knowledge with each other and also need to provide incentives and rewards to those who do so. It also needs to give support by advising resourcing policies and resourcing services that ensure that valued employees who participate active role in creating and sharing process are attracted and retained in the organization. It needs to include the development of performance management processes, which is mainly focused on the development and sharing of knowledge.

2.7 Knowledge Management Process

In order to leverage infrastructure, KM processes must also be present in order to acquire, convert, protect, apply and transport knowledge throughout the organization. KM process enables the organization to capture, convert, apply and protect knowledge in an efficient and effective manner. Nonaka & Takeuchi, 1996; and Singh, 2008 identified KM as a process because it acts as systematic activity to capture and share knowledge in the organization. It is important for organization to

manage knowledge internally and also important to manage effectively external knowledge. Researchers have identified many dimensions of KM process in terms of capture, create, transfer, integrate, use, process, integrate and store. In this study, these various dimensions are grouped into four main categories as KM process capabilities; acquiring knowledge, converting them into useful and application form, applying or using it, and protecting it.

(1) Acquisition

Acquisition is the process that includes all the activities of accessibility, collecting and application of acquired knowledge Zaied, Hussein, & Hassan, 2012. It is mainly intended toward obtaining knowledge from both internal and external. Innovation is also another form of acquisition that creates new knowledge from the application of existing knowledge. Effective usage of existing knowledge and acquisition of new knowledge can be derived from benchmarking and collaboration. Through benchmarking, organization can identify outstanding practices to assess the current KM practices. Moreover, acquisition also needs sharing and dissemination of personal experiences from all participants.

(2) Conversion

Conversion is a process to transform knowledge gain form internal and external sources into useful and applicable form. (Zaied, , Hussein, & Hassan (2012). It is intended toward making acquired knowledge useful. Organization needs to have ability to organize, combine and convert and to develop standard procedures in order to get consistency to eliminate difficulties, redundancy by eliminating excess volume of data. This process should help organization to replace outdated knowledge and to integrate different knowledge of individuals.

(3) Application

Application is the process of actual usage of knowledge. The application of knowledge enables organization continuously to translate their organizational expertise into embodied products (Zaied, Hussein, & Hassan, 2012). It is intended towards the actual usage and application. Process characteristics that have been associated with the application of knowledge within the literature include storage, retrieval, application, contribution and sharing (Gold et al. (2001). Effective storage

and retrieval mechanism enable the organization to quickly access knowledge. Moreover, organizational knowledge and expertise must be shared. (Gold et al. (2001)

(4) Protection

Protection is the process of secure the knowledge asset and keeps it safe and accessed by authorized personnel (Zaied, Hussein, & Hassan, 2012). It is intended towards designing a system to protect knowledge from illegal or inappropriate use or theft. In order to maintain competitive position, organization's knowledge should be protected by developing incentive alignment, employee conducts rules, restriction or tracking. Without security-oriented processes, organization's knowledge cannot be met with the strategic quality of rare and inimitable. Although protecting knowledge is difficult to undertake, this should not be ignored in order to maintain competitive position in the long-run.

2.8 Organizational Performance

Effective developing and implementation of KM infrastructure and process can lead to numbers of positive impact on the organization. Start from the individual learning, acquiring and sharing important knowledge within organization, this process effectiveness might lead to a cumulative impact on increased performance for the organization. In particular, the organization should experience a learning effect in which it improves over time in its capabilities for creating strategic value. Similar to other resources, strategic value obtained from knowledge resources may contribute greatly to key improvment of organizational performance. Therefore, effective KM through strategy, infrastructure and process can have significant impact on the performance. The question here is that how to measure performance improvements that result from these KM oriented capabilities.

The measurement concerned with organizational performance can apply financial measures (Subramanian & Nilakanta), tangible and intangible benefits (Gopalakrishnan), and intellectual capital (Gopalakrishnan). In addition, there is no single measure that may fully explain all aspects of performance (Snow & Hrebiniak). As a result, the performance of organization can be measured objectively or subjectively. On the other hand, there are many research focusing on the performance

results of knowledge management. The underlying assumption is that all new knowledge is good knowledge that automatically brings improved performance (Kalling, T. (2003).

According to the (Gold et al.2001), the key contributions of KM capabilities may include; improved ability to innovate, improved coordination of efforts, and rapid commercialization of new product. Other contributions may include; the ability to anticipate surprises, responsiveness to market change, and reduced redundancy of knowledge (Joong Kim, Y., & Hancer, M. (2010). These all perspectives are not clearly connected to the financial indicators of the firms. However, these all provide a foundation for determining relative contribution of KM to organizational performance. On the other hand, the use of key organizational informants is an effective approach in many research contexts (Gold, Malhotra & Segars, 2001).

In my study, all the respondents are Top and Middle level managment positions in PTT and they have good understanding in areas of strategic managment, knowledge management and firm performance. Therefore, the can predict exactly the relaitve contribution of KM on performance. Based on these finidngs and assumptions, performance measurement in this study adopts some specific measures, which was tested in previous research of (Zaied, , Hussein, & Hassan, 2012), perceived KM benefits such as improved workers' productivities, foster collaboration, strengthen brand and another is organizational related performance in terms of innovation, new business opportunities, anticipating market trends, achieving more profit and market shares.

2.9 Proposed Framework

Therefore, overall findings from literature and assumptions are systemized and structured in a form of following research framework. Strategy, Knowledge management infrastructure and knowledge management process, when aligned and integrated, can lead to effective knowledge management in the organization in order to enhance organization performance.

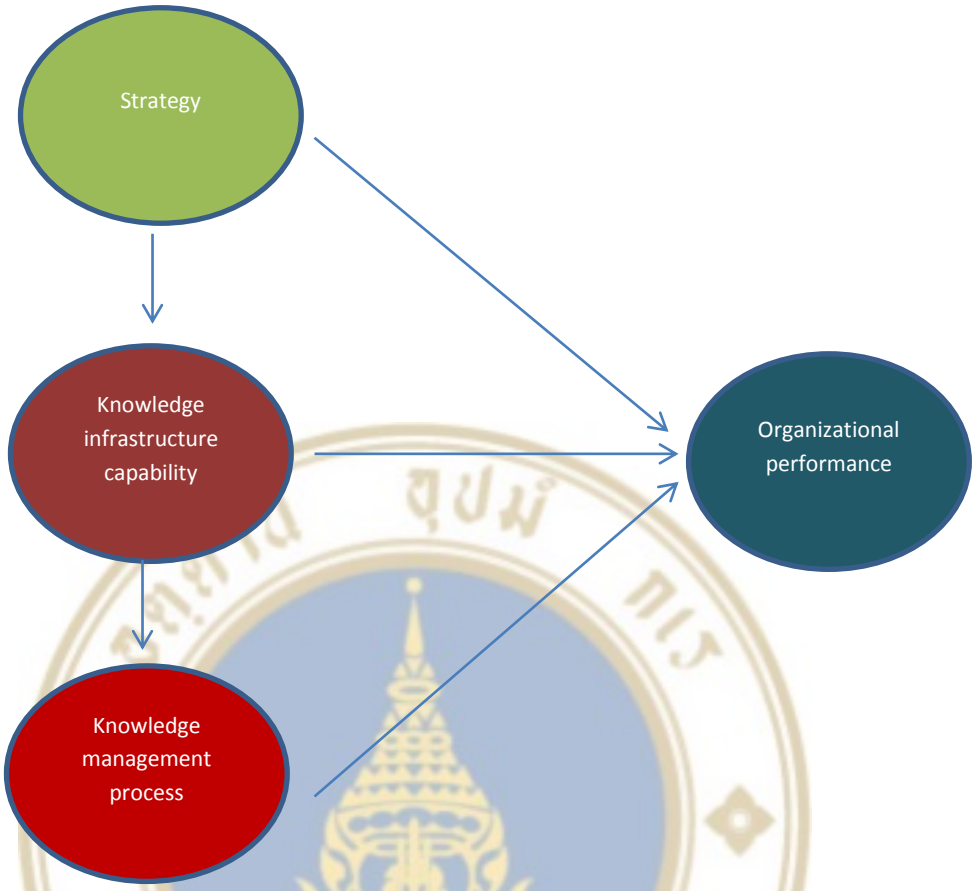

Figure 2.1 Proposed framework

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Design

This study aims to analyze the impact of knowledge management on the organizational performance based on the enablers of strategy, KM infrastructure and KM process. The conceptual framework and research process are derived from the literature review in order to analyze the impact of KM on the organizational performance. Afterward, the questionnaire is developed based on the literature review, previous research and sent to targeted group of sample.

Mean value analysis, Pearson's correlation analysis and multiple regression analysis are used to analyze the correlation, impact and statistical significance. The overall process of research consists of five stages such as literature review, questionnaire development, survey data collection, data analysis and conclusion and recommendation.

3.2 The Conceptual Framework Development

The structure of this research extracted from gathering and summarizing the factors of an organization through literature review. Based on the analysis, there are altogether 10 important enabling dimensions of KM are as follows: strategy, technology, culture, structure, leadership, HRM, knowledge acquisition, conversion, application, and protection. The following figure is the conceptual model showing strategy, KM infrastructure and KM process affecting organization performance of PTT.

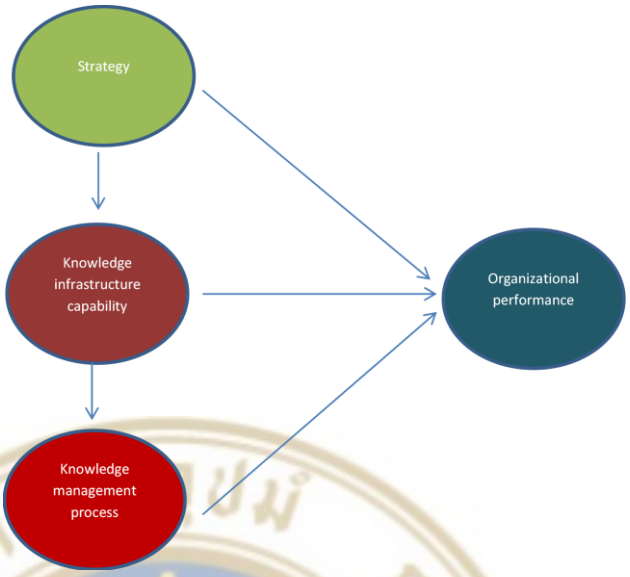

Figure 3.1 Conceptual framework

3.3 Sample Population

Based on the analysis from literature review, the impact of KM on organizational performance needs three enabling conditions of (1) organization's strategy especially knowledge management oriented strategy that is mainly focused to deliver distinctive competencies through effective KM to achieve competitive advantage, (2) KM infrastructure which supports to provide environment that can lead to and (3) effective KM process of acquisition, conversion, application and protection of knowledge among the employees.

Therefore, effective KM process is important to include employees' understanding, contribution and support to achieve intended results of organizational performance. There are approximately 4600 employees in PTT and it is impossible to collect all employees because of the time constraint. Therefore, the research has intended to select Top and middle management level employees because the scope of the study is intended to find out how planning and implementation of KM contribute to organizational performance. After ward, Paper-based questionnaires are distributed to targeted (150) employees which comprises two groups; (1) Top executive,

Executive Vice President (EVP) and Vice President (VP) and (2) middle level management who are working in Head office areas such as Oil business, Gas business, Trading business, etc. In addition, data collection is mainly focused on the employees from KM department that have high impact on the effective KM process and further development purpose. With the help of human resource managers, the questionnaires were disrtibuted to preidentified respondents. The data were collected during the period October 2016 to November 2016. 77 questionnaires were received out of 150.

3.4 Development of Evaluation Method

The development of research framework, questionnaire design and analysis consists of three steps as follow;

3.4.1 Literature Review

Literature review is to study, analyze and define the enablers and enabling conditions of effective KM in organization by studying research papers, KM theories and continual development.

3.4.2 Questionnaire Development

This research is a qualitative research and analysis from literature review results questionnaire, which consists of the following sections: Strategy, Knowledge Management (KM) Infrastructure, Knowledge Management (KM) Process, Organizational Performance and General Questions. In order to analyze understanding and difficulties of respondents concerned with answering questionnaire, pilot test with sample of (10) persons in Myanmar who have knowledge about KM, business management, organizational performance, strategic management and practical experiences. The preparation of final questionnaire is based on the findings from pilot test.

Questionnaire consists of fifth dimensions and the first part is concerned with organization’s KM strategy that is intended to improve organizational

performance based on effective KM infrastructure and process. It has 3 measuring statements.

1. PTT has a written knowledge management policy or strategy
2. PTT formulates and implements strategy based on KM initiatives
3. PTT implements KM in a way that clearly ties with the strategy

The second part is about KM infrastructure consists of culture, technology, structure, human resource and leadership. This section has (15) measuring statements

1. PTT uses technology that allows knowledge sharing through people networks
2. PTT uses technology that allows information searches about products, processes, markets and competition
3. PTT uses technology that allows search for new knowledge
4. PTT has a culture that values knowledge sharing
5. PTT has employees who understand the importance of knowledge to corporate success (information-sharing culture)
6. PTT is active in organizing workshops, conferences, seminars and symposiums to enable knowledge sharing
7. PTT's structure makes it easy to interact and sharing of knowledge
8. PTT's structure has processes to facilitate transfer of knowledge across structural boundaries
9. PTT's structure has a reward system for sharing knowledge
10. In PTT, KM practices are a responsibility of managers and executives
11. In PTT, KM practices are a responsibility of non-management workers
12. In PTT, senior management clearly supports the role of knowledge in firm's success
13. HRM in PTT advises on methods for motivating people to share knowledge
14. HR in PTT has policies and systems to recruit and attract employees who are proactive in creating and sharing knowledge
15. HRM in PTT helps in the development of performance management processes which focus on the development and sharing of knowledge

The third part is about KM process consists of knowledge acquisitions, conversion, application and storing. It has (20) measuring statements.

1. PTT has a process for acquiring knowledge about customers, suppliers, new products or process within industry
2. PTT has a process for generating new knowledge from existing knowledge
3. PTT has a process for setting performance benchmarks to aim for; for instance, benchmarks based on competitive performance
4. PTT has teams devoted to identifying best practices
5. PTT has a process for exchanging knowledge between individuals
6. PTT has a process for converting knowledge into the design of new product or process
7. PTT has a process for transferring organizational knowledge to individual
8. PTT has a process for absorbing knowledge from individual into the organization
9. PTT has a process for distributing knowledge throughout the organization
10. PTT has a process for replacing outdated knowledge
11. PTT has a process for applying knowledge learned from experiences and mistakes
12. PTT has a process for using knowledge to solve problems
13. PTT has a process for using knowledge in development of new products, /processes
14. PTT has a process for making knowledge accessible to those who need it
15. PTT has a process for quickly applying knowledge to critical competitive needs
16. PTT has process to protect knowledge from inappropriate use inside the organization
17. PTT has process to protect knowledge from inappropriate use outside the organization

18. PTT has incentives that encourage knowledge protection

19. PTT has technology that restricts access to some sources of knowledge

20. PTT clearly communicates the importance of protecting knowledge

The fourth part is about improved organizational performance comes from effective KM process with the help of KM infrastructure and has (9) measuring statements.

1. Using KM in PTT has improved worker productivity
2. Using KM in PTT has allowed us to increase the number of markets (more geographic location)
3. Using KM in PTT helped us add new products, processes or services
4. Using KM in PTT has increased flexibility in production and innovation
5. Using KM in PTT has made the company more responsive to information about the industry or market
6. Using KM in PTT has made more profitable
7. Using KM in PTT has allowed to grow market share
8. Using KM in PTT has allowed us to strength the PTT brand
9. Using KM in PTT has improved marketing and helped to response new market demands

The fifth part is about respondents' personal information, open-ended questions concerned with challenges and recommendations to get improvements in KM process and organization information.

. **3.4.3 Distributing Questionnaire and data collection**

Paper-based questionnaire is distributed to targeted sample and all processes took nearly 3 months (starts from September 2016 to November 2016) to contact responsible persons, distribute and collect all questionnaires to the target sample group in PTT.

3.5 Data Analysis

The Statistical Package for Social Science (SPSS) is used to analyze data by using following statistic methods.

1. Mean value is used to measure KM strategy, KM infrastructure and process in order to determine the extent of each element implemented in the PTT.
2. Pearson correlation is used to find out the correlation between the elements of strategy, KM infrastructure, KM process and organizational performance
3. Multiple regression analysis is a flexible method of data analysis and it is used to test the impact of KM on organizational performance in PTT.
4. Testing of normality, the linearity and the autocorrelation is used to test whether the data has normal distribution, the following characteristic should be considered in order to determine the normality (Dancy & Reidy, 2004) namely (1) it should be symmetrical about the mean, (2) the tails should meet the x-axis at infinity, (3) it should be bell-shaped. Histogram and the normal probability plots of residuals are one of the most frequently used tools in determining the normal distribution of data (Tamhane & Dunlop, 2000). According to Tamhane and Dunlop (2000), regression of independent and dependent variables is linear when the plot of ei and xi shows random scatter around zero.

CHAPTER IV
THE RESEARCH RESULTS

The overall analysis is based on the data and information gathered from the questionnaires. Descriptive and inferential statistics have been conducted by using SPSS program. Descriptive statistics includes the demographic profile of the respondents in terms of frequency and percentage. Inferential statistics includes multiple regression analysis, correlation and mean value analysis. The following section presents the findings of this study.

4.1. Respondent Demographic Profile

The demographic of respondent participated in this research (sample size=77) are described in the table 4.1:

Table 4.1 Demographic profile of respondents

Demographic	Frequency	Percent
1. Age		
- under 30 years	3	3.9%
- over 30 years	74	96.1%
2. Experience		
- under 3 years	3	3.9%
- over 3 years	74	96.1%
3. Has dedicated budget in PTT		
- Yes	60	77.9%
- No	13	16.9%
- Not sure	4	5.2%

Table 4.1 Demographic profile of respondents (cont.)

Demographic	Frequency	Percent
4. Has resistant in implementation of KM		
- No	71	92.2%
- Yes	6	7.8%

The respondents are comprised of top and middle-level management employees. The major age of respondents is over 30 years old (96%), and less than 30 years old is (4%). The same result is obtained in years of experiences question. Concerned with dedicated budget assigned for KM, the majority of respondents said "Yes" (77.9%), followed by "No" (16.9%), and "Not sure" (5.2%) respectively. Respondents also mentioned that organization experiences resistance in implementation accounts for (7.8%) of total respondents and (92.2%) said no resistance.

4.2 Descriptive Statistics of Variables

The data presented in table 4.2, 4.3 and 4.4 concerned with the level of respondents' agreement on strategy, KM infrastructure and KM process in PTT. The analysis is conducted by using mean and standard deviation of each item. Mean value is used to measure KM strategy, KM infrastructure and process in order to determine the extent of each element implemented in the PTT.

According to the data presented in table 4.2, the item one of "PTT has a written KM policy or strategy" was achieved the highest mean value and followed by item (2) "PTT formulates and implements strategy based on the KM initiatives". Therefore, formulating and implementing strategy in PTT takes account KM with well-written policy and top management also paid high attention on relative important of KM in business success.

Table 4.3 and 4.4 are concerned with respondents' opinions towards KM infrastructure and process elements. Elements showed the highest mean values are culture (4.10), as an infrastructure element, knowledge application (3.95) as a process element. The lowest values result in HRM (3.44) and knowledge protection (3.56).

Based on the mean values, PTT has strong culture in implementing KM in a way to utilize the knowledge assets and application of acquired knowledge to improve products and processes improvement. However, the mean values result low in other factors such as HRM, structure and knowledge protection.

On the other hand, the results showed that there is a small difference in implementation between strategy, KM infrastructure and process because of the range of standard deviation is 0.5 to 0.8.

Table 4.2 KM related strategy at PTT

Sr.	PTT:	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree	Mean	S.D
1.	Has a written KM policy or strategy	-	2	5	36	34	4.33	.7152
		-	2.6%	6.5%	46.8%	44.2%		
2.	Formulates and implements strategy based on KM initiatives	-	4	15	39	19	3.95	.8094
		-	5.2%	19.5%	50.6%	24.7%		
3.	Implements KM in a way that clearly ties with the strategy	-	2	20	41	14	3.87	.7318
		-	2.6%	26.0%	53.2%	18.2%		
	Total	-	2	15	42	18	3.99	.7343
		-	2.6%	19.5%	54.5%	23.4%		

Table 4.3 KM Infrastructure at PTT

Sr.	PTT:	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree	Mean	S.D
1.	Techno-logy	-	2	8	52	15	4.04	.6375
		-	2.6%	10.4%	67.5%	9.5%		
2.	Culture	1	1	9	44	22	4.10	.7537
		1.3%	1.3%	11.7%	57.1%	28.6%		
3.	Structure	1	2	17	50	7	3.78	.7001
		1.3	2.6%	22.1%	64.9%	9.1%		
4.	leadership	-	4	18	41	14	3.88	.7791
		-	5.2%	23.4%	53.2%	18.2%		
5.	HRM	1	7	30	35	4	3.44	.7863
		1.3%	9.1%	39.0%	45.5%	5.2%		
	Total	-	1	12	58	6	3.90	.5277
			1.3%	15.6%	75.3%	7.8%		

Table 4.4 KM Process at PTT

Sr.	PTT:	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree	Mean	S.D
1.	Knowledge Acquisition		4	17	47	9	3.79	.7133
			5.5%	22.1%	61.0%	11.7%		
2.	Knowledge Conversion		4	25	44	4	3.62	.6696
			5.2%	32.5%	57.1%	5.2%		
3.	Knowledge Application		2	11	53	11	3.95	.6261
			2.6%	14.3%	68.8%	14.3%		
4.	Knowledge Protection		5	28	40	4	3.56	.6976
			6.5%	36.4%	51.9%	5.2%		
	Total		2	14	52	9	3.88	.6277
			2.6%	18.2%	67.5%	11.7%		

4.3 Reliability Analysis

To determine the quality of the measurement items, the reliability test is carried out through Cronbach's Alpha test. Internal consistency reliability implies that multiple items inter-correlate with one another and measure the same construct. The result indicates that Cronbach's alpha of the construct is .93 which is higher than 0.80, the value equals 0.80 or above means that the collected data are consistent (Pallant, 2005). In addition, the eleven elements of strategy, KM infrastructure, knowledge management process and organizational performance are accepted as important elements as shown in table 4.6. So, the collected data are reliable and consistent.

Table 4.5 Reliability Output

Cronbach's Alpha	N of items
0.93	11

Cronbach's Alpha values

Table 4.6 Item total statistics

Items	Cronbach's Alpha if item deleted
Strategy	0.92
Technology	0.92
Culture	0.92
Structure	0.91
Leadership	0.92
HRM	0.93
Knowledge acquisition	0.91
Knowledge conversion	0.92
Knowledge application	0.92
Knowledge protection	0.92
Performance	0.92

Cronbach's Alpha values

4.4 Correlation Analysis

To find out the correlation between elements of strategy, KM infrastructure, process and organizational performance, Pearson's correlation is used. It is obtained by dividing the covariance of the two variables by the product of their

standard deviations. According to Tabachnick and Fidell (2007), correlation coefficients, which exceed .90, indicate multi-collinearity. Although some items independent variables suggested rather high inter correlation, none of them exceeded .80. Therefore, all the variables are acceptable and can be used in the analyses. Table 4.6 presents the analysis of correlation coefficient of the independent variables and dependent variables. According to the results of correlation analysis, factors have the high correlation with the organizational performance at 0.01 namely knowledge conversion, knowledge application, knowledge acquisition, technology, culture, and leadership. It shows that there is a significant relationship between KM elements and performance improvement measure, which in turn represents the quality of organizational knowledge that was utilized to improve organizational performance. By summarizing the above factors, if the quality of organizational knowledge is good, it can be confirmed that organization's performance improves significantly.

Table 4.7 Correlation analysis

Y	**Y**	**S^1**	**T**	**C**	**S^2**	**L**	**HRM**	**K-1**	**K-2**	**K-3**	**K-4**
Y	1	.50**	.61**	.60**	.48**	.55**	.24**	.63**	.73**	.72**	.47**
S^1		1	.67**	.57**	.63**	.56**	.36**	.66**	.54**	.55**	.48**
T			1	.67**	.71**	.53**	.25**	.65**	.61**	.61**	.57**
C				1	.63**	.48**	.29**	.60**	.61**	.57**	.44**
S^2					1	.60**	.44**	.62**	.56**	.63**	.58**
L						1	.34**	.60**	.49**	.60**	.44**
HRM							1	.38**	.29**	.25**	.33**
K-1								1	.75**	.67**	.62**
K-2									1	.81**	.52**
K-3										1	.52**
K-4											1

** Correlation is significant at the 0.01 level (2-tails)
Y (Organizational Performance)
S^1 (Strategy)
T (Technology)
C (Culture)
S^2 (Structure)
L (leadership)
HRM (Human Resource Management)
K-1 (knowledge Acquisition)
K-2 (knowledge conversion)
K-3 (knowledge application)
K-4 (knowledge protection)

4.4.1 Histogram and Normal Probability Plots Test

In order to determine the normality of the error term distribution of the study, histogram and the normal probability plot of residual are utilized. The plot can be considered as normal if it presents a straight line for a given set of data. In addition, the scatterplot is used to test the linearity of relationship between dependent and independent variables. According to the histogram of residuals, the data distribution is normal because the shape is bell curve and the ends of two tails meet the x-axis at infinity and it is symmetrical about the mean. In addition, the plot is normal since it shows a rather straight line. Besides, the linearity of the relationship between independent and dependent variables is satisfactory because the plot is scattered around zero value.

4.5 Multiple Regression Analysis

To explore the role of KM in enhancing organizational performance and to identify the best predictor of the organizational performance, multiple regression analysis was used to analyze the results. The result shows that the knowledge management capabilities (infrastructure, process) and strategy together explained 65 % (R^2 =0,652) of the variance in the organizational performance. This confirms the effect of strategy, KM infrastructure and KM process on the organizational performance. Also, there is a positive relationship between strategy, KM infrastructure, KM process and organizational performance (R= 0.807) as shown in table 4.7.

Table 4.8 Regression Results

Model	Sum of squares	df	Mean Square	F	Sig.
Regression	20.054	10	2.005	12.340	0.000
Residual	10.726	66	.163		
Total	30.780	76			
R=0.807			R^2= .652		

a. Predictors: (Constant), K_Protection, HRM, Culture, Leadership, K_Conversion, Strategy, Structure, Technology, K_Acquisition, K_Application
b. Dependent Variable: Y_Performance

4.6 Coefficient for testing Research Objectives

The beta value is used to test how strongly each predictor variable influences on the dependent variable (organizational performance). The value of beta signifies the increase in performance if the corresponding independent variable increases by 1 unit. According to the results, knowledge conversion has high significant influence on organization performance (Beta = 0.323, t= 2.122, p <0.05), followed by knowledge application (Beta= 0.316, t= 2.074, p <0.05) and structure (Beta = - .249, t = -2.011, p <0.05), whereas the other elements are not significant as shown in table 4.8. Also, the results of (t-test) showed that KM process elements have statistically significant effect on organization performance. Present study also uncovers strategy has indirect relationship with organization performance and not significant. Although it does not have direct impact on organizational performance, PTT has well written KM strategy according to the highest mean value obtained in table 4.2, thus it has significant impact and acts as an enabler along with effective KM infrastructure and process to improve organizational performance. In addition, the negative beta value of structure shows that the more organization's structure paid high attention in flexibility and reward for knowledge sharing, the less organization performance.

Table 4.9 Coefficient Results for all independent variables

Model	**Unstandardized Coefficients**			
	B	Std.Error	t	Sig
Strategy	-.037	.103	-.360	.720
Technology	.210	.131	1.596	.115
Culture	.172	.103	1.669	.100
Structure	-.249	.124	-2.011	.048
Leadership	.151	.090	1.687	.096
HRM	.025	.073	.346	.730
K_Acquisition	.016	.136	.115	.909
K_Conversion	.323	.152	2.122	.038
K_Application	.316	.152	2.074	.042
K_Protection	.037	.102	.359	.721

a. Dependent Variable: Y_Performance

After removing non-significant independent variables with significance level .115 and above, the new results show that the value of R^2 is 63% and culture,

knowledge conversion and application are statistically significant. Leadership is marginally significant.

Table 4.10 Regression Results (Selected Independent Variables)

Model	Sum of squares	df	Mean Square	F	Sig.
Regression	19.54	5	3.91	24.69	0.000
Residual	11.24	71	.16		
Total	30.78	76			
R=0.80			R^2= .63		

Table 4.11 Coefficient Results (Selected Independent Variables)

Model	Unstandardized Coefficients			
	B	Std.Error	t	Sig
Culture	.22	.10	2.26	.027
leadership	.16	.08	1.96	.054
K_Conversion	.38	.13	2.82	.006
K_Application	.32	.15	2.16	.034
Structure	-.16	.11	-1.51	.135

a. Dependent Variable: Y_Performance

CHAPTER V
CONCLUSION AND RECOMMENDATION

This chapter presents analysis and recommendations based on the key findings results from statistical methods and questionnaires. Moreover, it also includes challenges concerned with KM implementation, managerial implication, limitations and suggestions for future research.

5.1 Discussion of Research Findings

As pointed out earlier, KM process, especially knowledge conversion and application have significant impact on the organization's performance rather than strategy and KM infrastructure in PTT. The detailed explanations concerned with key KM process and other factors are presented as followed;

5.1.1 Knowledge Management Process

The aim of KM process is mainly intended to enable organization to capture, convert, apply and protect knowledge obtained from internal and external in an efficient and effective manner in order to utilize knowledge assets. Based on the findings, PTT's KM process has high impact on the organization performance especially in conversion and application of knowledge. In addition, KM process needs to ensure organization's knowledge-related assets are improved and effectively employed with the support of KM infrastructure and strategy.

5.1.1.1 Knowledge Conversion

Knowledge conversion is greatly important because it enters organization's memory in a manner that can maximize its reusability after new knowledge is created or acquired. This process should transform acquired knowledge into applicable forms like printed documents such as patents and manuals, best practices database that is stored in electronic repositories, and lessons learned obtained

from projects and employees about the best way to do the jobs, best experiences and problems found in previous projects.

5.1.1.2 Knowledge Application

The objective of knowledge application is utilizing knowledge assets to effectuate better knowledge practices, improved organizational behaviors, better decision makings and improved organizational performance. This process is a great contributor in shifting knowledge from “know what” into “know-why” that is the highest level of knowledge. Without the application of obtained knowledge, employee may not achieve a deep understanding of interactive effects and casual relationship in uncertainty situations. Therefore, this process can help employees to get deeper understanding of underlying KM practices, range of experience in respective areas and practical implications to improve process and products.

Present study uncovers these two aspects of KM process have significant impact on organizational performance and the discussion is mainly taken on people aspect rather than technology perspective. Because the underlying believe here is that knowledge management system (community of practice) includes self-organizing groups of people who need to share knowledge through networks that allow sharing of knowledge from experts to less expertise. This process is important because the nature of knowledge itself is initially exists in the mind of an individuals. In order to utilize KM efficiently, acquired knowledge should be transmitted through social groups, teams and network. Therefore, KM process is quite people-intensive and less technology intensive although most people might believe large contribution of information technology in business performance.

5.1.2 Knowledge Management Infrastructure

The primary objective of KM infrastructure is to facilitate the flow of information and knowledge in support of the myriad tasks based on the combination of technology, culture, structure, human resource management and leadership. Hence, KM infrastructure does not just mean IT oriented infrastructure, it encompasses human, social and organizational elements. Technology is important to acquire new knowledge and also needs to provide rapid retrieval of knowledge resources for real time use. Structure should provide necessary capability and flexibility to adapt to a

knowledge intensive environment. The role of culture should be supportive for knowledge-related processes. Leadership is vital to monitor knowledge within the organization in order to monitor the process and encourage knowledge sharing. HRM should set appropriate policy in order to retain and utilize knowledge resources.

The IT infrastructure plays a key role in KM, but it is not a solution in itself; it requires a preexisting knowledge-sharing culture (Milovanovic, 2011). Technology plays an important but limited role in KM, particularly when dealing with tacit knowledge. Chua and Lam (2005) found that an over-emphasis on KMS led to a neglect of tacit knowledge. Botha, Kourie, and Snyman (2008: 132) warn that tacit knowledge is still best transmitted from person to person and "the more tacit the knowledge, the less high-tech the solution". The authors (2008) also point out that although IT is an enabler of KM, it is not sufficient by itself. Therefore, all the elements of infrastructure need to be strengthened in order to implement KM efficiently. Although coefficient values in current study did not show significance in factors except structure, IT and culture have high mean values and results of correlation analysis also revealed high values (r= 0.690 , r= 0.598) respectively. Therefore, it can be concluded that PTT has well-developed technology infrastructure and strong culture.

After analyzed with multiple regression analysis, the result showed that structure has negative Beta value (- 0.234, $p < 0.05$) and statistically significant. This result is consistent with findings from previous research of Zaied, Hussein, & Hassan, (2012). Apart from a minority of studies that demonstrate a positive impact of centralization on organizational effectiveness (Ruekert et al., 1985), many studies have recognized that a decentralized organizational structure is contributive to organizational effectiveness (Burns and Stalker, 1961; Dewar and Werbel, 1979; Floyd and Wooldridge, 1992; Rapert and Wren, 1998; Schminke et al., 2000). It is possible because structure can influence organizational performance through channels rather than knowledge management. As Zheng, , Yang & McLean, 2009 stated, it can influence organizational effectiveness through non-knowledge related functions such as routinized processes, tasks and systems because it involves minimum in knowledge management process.

5.1.3 KM Strategy

The result obtained from correlation coefficient, there is negative relationship between KM related strategy and organizational performance. So, KM related strategy has no direct impact on organizational performance rather than business strategy. Instead, it provides "intermediate outcomes" of KM such as improved organizational behaviors, innovation, individual learning, collective learning, and decision-making. Many literature and researchers cited that the linkage between KM initiatives (KM strategy) to organizational strategy as an important success factor. In addition, Zack (1998) suggested that KM strategy must be developed in order to support business strategy. Huang (1997) mentions that there are four parts of KM strategy: (1) making knowledge visible taxonomy of expertise, corporate yellow pages, (2) building knowledge intensity-competence centers, communities of practice; (3) building a knowledge infrastructure; and (4) developing a knowledge culture-knowledge sharing values and norms. Therefore, the role of KM strategy is mainly to provide supportive KM infrastructure to get performance improvement and needs to link business strategy.

Based on the findings, KM process elements of knowledge conversion and application are the key factors to enhance organizational performance. Previous findings also pointed that human beings are unable to apply full potential of their brains and most of the organizations cannot fully utilize the knowledge they possess. So, the role of KM is to create and acquire critical knowledge and to make it available to those who can use in a real time situation in order to improve performance. Besides, it also mentioned that only a small percentage of effective knowledge utilization can result great benefits. Therefore, organization should pay high attention in improving these factors and related environment to maintain competitiveness and business success.

5.2 Challenges concerned with Effective KM Implementation in PTT

Based on the open-ended questions and respondent's recommendation section, it is found that the main barriers in implementing effective KM in PTT are largely concerned with employees' attitudes toward the relative important of KM,

effective communication channels, team involvement, embedded knowledge sharing culture, measurements concerned with KM effectiveness, top management's attention, support and insufficient resources to update and structure contents in repository. The main challenge is that employees' attitude toward KM is only for the individual KPIs and see as an extra workload. Most of them did not see the importance of individual recorded documents and lessons learned from previous experiences. This may lead to insufficient and lack of individual contribution to resources in repository system. In addition, some employees feel lack of support from immediate supervisors concerned with transformation of idea to obtain innovative outcomes and it may result fail to generate economic value and lack of driver to implement this idea. Also, the cooperation from different business units and holding regular KM session to share knowledge between units is insufficient and regarded less important. As a whole, the main challenge is that employees' awareness and attitude about relative important of KM and that may result difficult in maintaining momentum in creating knowledge sharing culture in the organization.

5.3 Managerial Implication

Many organizations still regarded KM as only a launching some software programs and do not take account the importance of people participation in this process. Most of them view KM as a system oriented and pay high attention on using information technology. Therefore, this study is primarily intended to include the impact of other factors namely strategy, KM infrastructure and KM process. Through analyzing these factors, this study brings important findings about creating knowledge sharing environment that is made up of supportive organization's strategy, structure, culture, leadership, technology, HRM and KM process of acquisition, conversion, application and protection. Findings indicate that these factors can influence organizational performance when there is alignment. By focusing on KM process that is great contributor to improve performance, and get supporting environment conditions, would help the impact of knowledge assets to the bottom line. Therefore, knowledge transferring, sharing and application processes should be paid high attention. King, 2005 stated that once knowledge is transferred to, or shared with

others, it may be utilized through elaboration (the development of different interpretation), infusion (the identification of underlying issues) and thoroughness (the development of multiple understanding by different individuals or groups).

On the other hand, as demonstrated in this study, all of these strategy, infrastructure and process together predict performance. Therefore, managers should be careful not to optimize in using one of these aspects. Emphasizing only one aspect may decrease entire efforts. According to the Davenport et al, this tendency to optimize one aspect of knowledge management can cause these projects to produce detrimental effects in customer service and innovation. Therefore, solely focus on either one of strategy, infrastructure and process aspects can undermine the effective utilization of rich knowledge resources. Organization's attempt to over codify tacit knowledge and, in doing so, can result in incapable sources of knowledge. Likewise, firms may likely suffer from an overemphasis on infrastructure capability, thereby losing efficiencies in capturing, transferring, and application of knowledge. Specifically, managers should establish a balance between KM process and infrastructure. Moreover, KM oriented strategy should not be overlooked. So, organizations that show expertise in these dimensions of strategy, KM infrastructure and process will tend to be conductive to adopting and utilizing knowledge assets. Clearly, managers should understand alignment of these three aspects is crucial element for the success of KM initiatives and should strive to balance the efficiencies of process capabilities and effectiveness of infrastructure capabilities.

Based on the new multiple regression result, culture and leadership have significant impact on performance and therefore, this study helps top management to get better understanding of how supportive KM infrastructure especially culture and leadership contribute in overall efforts. Shaping knowledge sharing culture is central in organization's ability to manage its knowledge more effectively. Through an explicitly stated vision including well-articulated value statement can help to promote employee's interactions both formally and informally. This interaction is important in transition of tacit knowledge between individuals or conversion of tacit into explicit knowledge, thereby transformation of individual knowledge into organizational knowledge. Besides shaping knowledge sharing culture, leadership is important in identifying and providing supportive environment in order to facilitate critical

knowledge across the organization. So, top management should exercise both of directive and supportive style of leadership along with rewards and incentive system to foster employees' motivation. Argote, L. & Epple, D (1990) and O'Dell, C. & Grayson, C (1983) suggested that incentive systems should be structured so that workers are motivated and rewarded for taking the time to generate new knowledge (i.e. learn), share their knowledge, and help others outside their own divisions or functions.

Based on the challenges discussed in previous section, employees' attitudes towards the important of KM should not be ignored and it plays greatly in shaping knowledge sharing culture. Therefore, leaders should act as a role model to mold employees' attitudes, behaviors and mindsets and should transform healthy KM culture by focusing both of competitiveness and employees' well-beings. Also, top management should provide necessary support concerned with communication channels to facilitate decision making and participation from employees, to set clear objectives on KM implementation, to assign budgets and rewards to effective contributors. Knowledge sharing should not be regarded only for KPIs improvements and focus group needs to be formed in order to utilize KM effectively. These processes can help employees understand contribution of KM in maintaining business success in competitive environment.

5.4 Limitations and Suggestions

There are several limitations in this study. One of the limitations is that the study was only conducted in PTT Company (Thailand) and not included PTT Myanmar (PTTEP). It would be possible to get another insight of employees' attitudes result from different cultural settings if the study conducts comparative analysis. Also, the analysis is based on 77 respondents because of the limitation of time constraint. Moreover, it was conducted in large organization and did not include small and medium sized companies, which can be different in organizational structure, managerial styles, KM practices, KM related strategy and the way they perform to improve organizational performance. If the study conducts in different sizes of companies, the additional insights of KM might have generated. Because the sample

size is smaller than ideal, there is a good chance that with a larger sample size would result current study of marginally significant p-value below.05. Further research should be conducted by doing in-depth analysis on KM related strategy, support from KM infrastructure and should include companies from different industries. Although the analysis was taken by including different aspects of KM with questionnaires, it could be restrained the respondents' in-depth opinions and attitudes towards KM improvements. Therefore, future research should conduct the study by doing interview to get in-depth insights of employees 'attitudes and needs to extend the scope of KM.

5.5 Conclusion

There are many research papers conducted mainly on the topic of KM by focusing on KM infrastructure and process aspects. However, most current research has focused mainly on the relationship between these aspects in isolation. Therefore, my study is intended to point out the impact of three dimensions of strategy, KM infrastructure and KM process on organizational performance and would like to claim that they have significant influence when there is alignment. This is the starting point to conduct this study and findings indicated there are two factors that have high impact on the organizational performance. This may be due to the fact that knowledge conversion and application are the important processes regarding the way of knowledge conversion, sharing and utilization contributes greatly on organizational performance than other factors examined.

These findings can strengthen the attention of management to creating and supporting KM process that has significant impact on performance. Also, the role of supportive KM infrastructure should not be overlooked because the inherent nature of knowledge is embedded in different facets of organization. Alan Frost (2010) said that knowledge could exist in the different levels namely individual, group, structural and organizational. Understanding different forms that knowledge can exist in is essential to manage knowledge effectively and help knowledge conversion and application at all levels and facilitate the diffusion of knowledge to individuals, groups and across the organization.

Therefore, the role of KM culture plays high importance because KM is embedded not only in documents or repositories but also in the organization's routines, process, practices and norms. Knowledge sharing largely depends on the organization culture because it helps to reinforce "building trust". Trust is important and makes employees feel worth in sharing knowledge without feeling waste of their times. Hence, top management should create KM culture by getting cooperation from employees. From doing so, employees will be seen KM is beneficial for both individuals and organization. Based on the findings, it would help management to set appropriate strategies, provide supportive KM infrastructure and process to enhance performance. Although KM-related strategy did not show positive relation and impact on performance, it affects greatly on the organizational performance together with KM infrastructure and KM process.

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APPENDICES

APPENDIX A: Questionnaire

Knowledge Management Survey

Knowledge management involves any systematic activity related to the capture and sharing of knowledge by the organization The questionnaire is developed specifically for Top and middle level management employees who contribute at least somewhat to strategy formulation and implementation from PTT (Thailand). The questionnaire will be interpreted and summarized by Miss Phyo Wai Lwin, under the guidance of Professor Peter De Maeyer, Marketing Management, College of Management Mahidol University, towards completion of Master's Degree.

In view of this, I would like to request your cooperation. The usefulness of the questionnaire survey highly depends on the frankness and honesty with which you answer the questions. **PLEASE NOTE THAT ANY INFORMATION YOU PROVIDE WILL BE TREATED "STRICTLY CONFIDENTIAL".**

Please complete it without discussing your answers with anyone else and do not omit any questions. Once you have completed the questionnaire, put it into envelope and place in the box. However, if you have any difficulties in completing the questionnaire, do not hesitate to contact me on Mobile phone (0992127852) and email (phyowl.ster@gmail.com)

Thank you for your contribution and cooperation.

Miss Phyo Wai Lwin
Student ID:5749183
Leadership and Human Resource Management
College of Management Mahidol University

The questionnaire consists of the following sections: (1) Strategy, (2) Knowledge Management (KM) Infrastructure, (3) Knowledge Management Process, (4) Organizational Performance, (5) Open-ended questions and (6) General information Please answer the followings whether you agree or disagree with each statement by ticking in the appropriate box.

Part (1) Knowledge Management

1.1 Strategy

	PTT:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Has a written knowledge management policy or strategy					
B	Formulates and implements strategy based on KM initiatives					
C	Implements KM in a way that clearly ties with the strategy					

Part (2) Knowledge Management Infrastructure

2.1 Technology

	PTT uses technology that allows:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Knowledge sharing through people networks					
B	Information searches about products, processes, markets and competition					
C	Search for new knowledge					

2.2 Culture

	PTT:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Has a culture that values knowledge sharing					
B	Has employees who understand the importance of knowledge to corporate success (information-sharing culture)					
C	Is active in organizing workshops, conferences, seminars and symposiums to enable knowledge sharing					

2.3 Structure

	PTT's structure:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Makes it easy to interact and sharing of knowledge					
B	Has processes to facilitate transfer of knowledge across structural boundaries					
C	Has a reward system for sharing knowledge					

2.4 Leadership

	In PTT:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree

A	KM practices are a responsibility of managers and executives					
B	KM practices are a responsibility of non-management workers					
C	Senior management clearly supports the role of knowledge in firm's success					

2.5 Human resources management (HRM)

	HRM in PTT:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Advises on methods for motivating people to share knowledge					
B	Has policies and systems to recruit and attract employees who are proactive in creating and sharing knowledge					
C	Helps in the development of performance management processes which focus on the development and sharing of knowledge					

Part (3) Knowledge Management Process

3.1 Knowledge Acquisition

	PTT:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Has a process for acquiring knowledge about customers, suppliers, new products or process within industry					
B	Has a process for generating new knowledge from existing knowledge					
C	Has a process for setting performance benchmarks to aim for; for instance, benchmarks based on competitive performance					
D	Has teams devoted to identifying best practices					
E	Has a process for exchanging knowledge between individuals					

3.2 Knowledge Conversion

	PTT has a process for:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Converting knowledge into the design of new product or process					
B	Transferring organizational knowledge to individual					

C	Absorbing knowledge from individual into the organization					
D	Distributing knowledge throughout the organization					
E	Replacing outdated knowledge					

3.3 Knowledge Application

	PTT has a process for:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Applying knowledge learned from experiences and mistakes					
B	Using knowledge to solve problems					
C	Using knowledge in development of new products,/processes					
D	Making knowledge accessible to those who need it					
E	Quickly applying knowledge to critical competitive needs					

3.4 Knowledge Protection

	PTT:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Has processes to protect					

	knowledge from inappropriate use inside the organization					
B	Has processes to protect knowledge from inappropriate use outside the organization					
C	Has incentive to encourage the protection of knowledge					
D	Has technology that restricts access to some sources of knowledge					
E	Clearly communicates the importance of protecting knowledge					

Part (4) Organizational Performance

	Using KM in PTT:	Strongly disagree	Disagree	Neither	Agree	Strongly Agree
A	Has improved worker productivity					
B	Has allowed us to increase the number of markets (more geographic location)					
C	Helped us add new products, processes or services					
D	Has increased flexibility in production and innovation					
E	Has made the company					

	more responsive to information about the industry or market					
F	Has made PTT more profitable					
G	Has allowed PTT to grow market share					
H	Has allowed us to strength the PTT brand					
I	Has improved marketing and helped to response new market demands					

Part (5)

1. Are there any knowledge management practices that your firm or organization uses that we have not included in this survey?

☐ No

☐ Yes, please specify----------

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2. Does your organization have a dedicated budget for KM?

☐ No

☐ Yes

☐ Not sure

3. Did your organization experience significant resistance to implementing any of the KM practices currently in use?

☐ No

☐ Yes, what groups resisted the implementation of KM practices currently in use, please specify----------
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4. What would be the main challenge to implement KM in organization? Please provide your views on obstacles or difficulties of developing and implementing KM.

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5. Please feel free to provide other comments or recommendations concerning KM

General Information

In order to effectively and accurately analyze the data in the questionnaire, please provide your information below

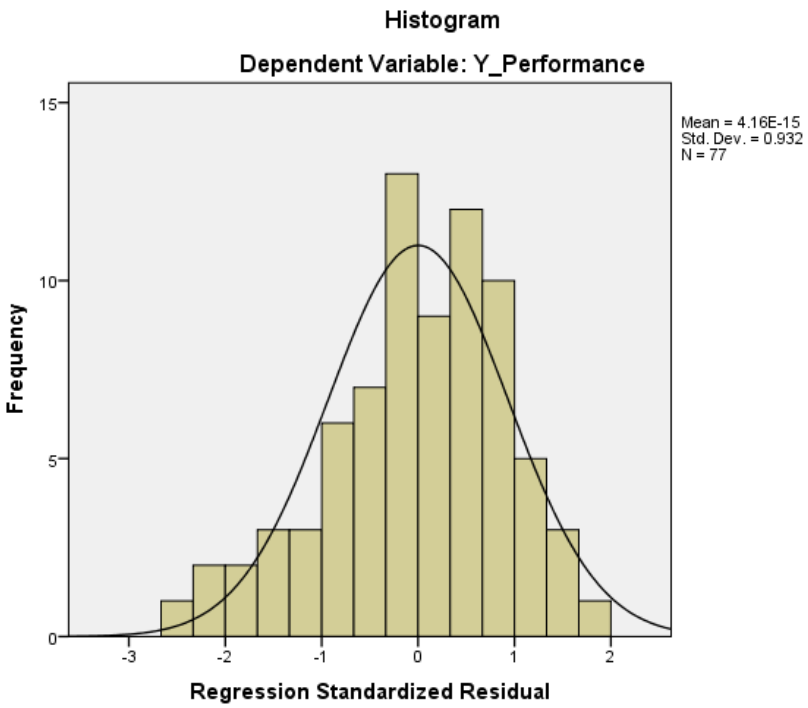
1. Age ☐ under 30 years old
   ☐ over 30 years

2. My job deals mostly with making strategic decisions for the company or my department.(Top Management level)
   ☐ No
   ☐ Yes
3. My job is a combination of strategy and tactical implementation. (Middle Management Level)
   ☐ No
   ☐ Yes
4. My job is mainly implementing strategy. (Line Management- Implementation level)
   ☐ No
   ☐ Yes

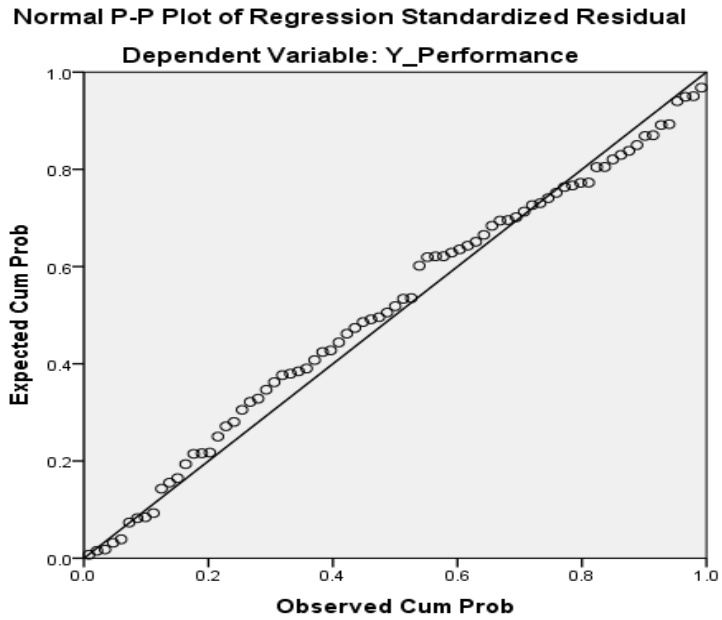
5. How long have you been working for PTT?
   ☐ Less than 3year
   ☐ More than 3 years

APPENDIX B: Statistical Results

(1) Histogram of residuals



(2) Normal plot of residuals



(3) Scatterplot of residuals