

**KNOWLEDGE CREATION PROCESS  
IN THAI ENGINEERING TEAM  
CASE STUDY:  
FUJITSU SYSTEMS BUSINESS (THAILAND) LTD.**



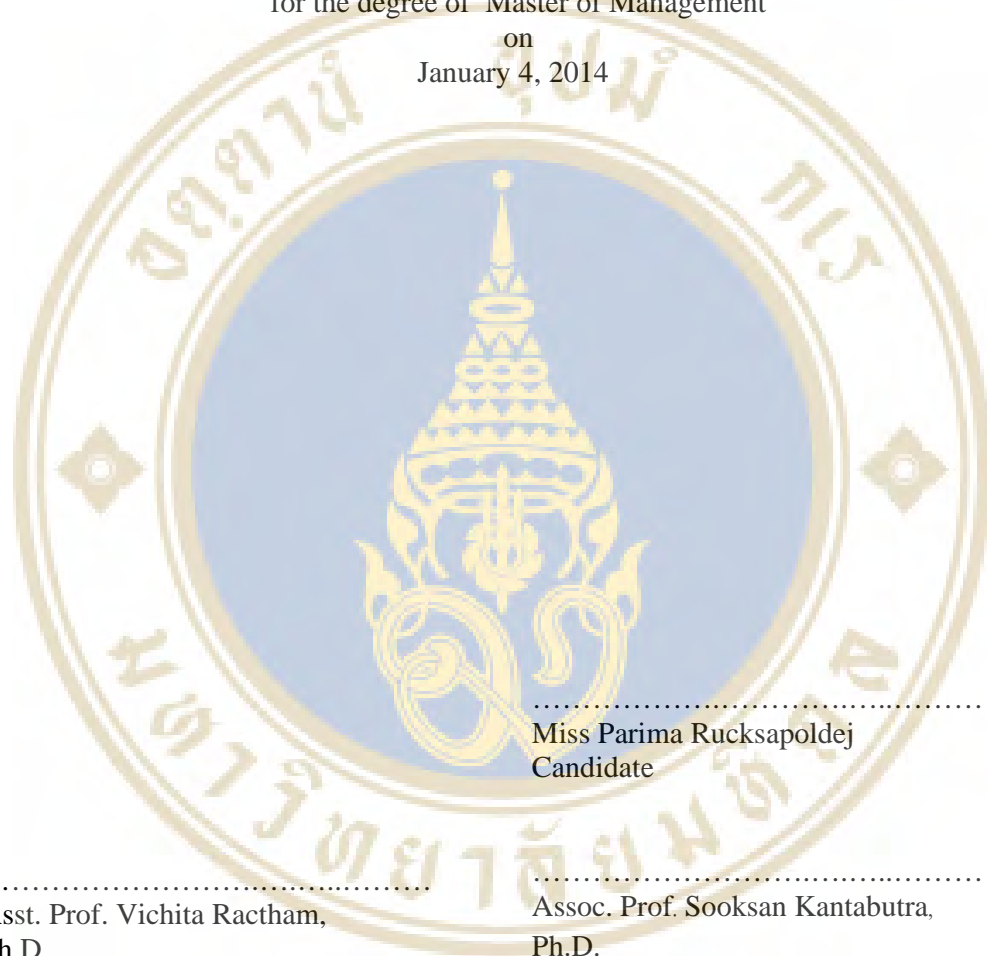
**A THEMATIC PAPER SUBMITTED IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR  
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Thematic paper  
entitled  
**KNOWLEDGE CREATION PROCESS  
IN THAI ENGINEERING TEAM  
CASE STUDY:  
FUJITSU SYSTEMS BUSINESS (THAILAND) LTD.**

was submitted to the College of Management, Mahidol University  
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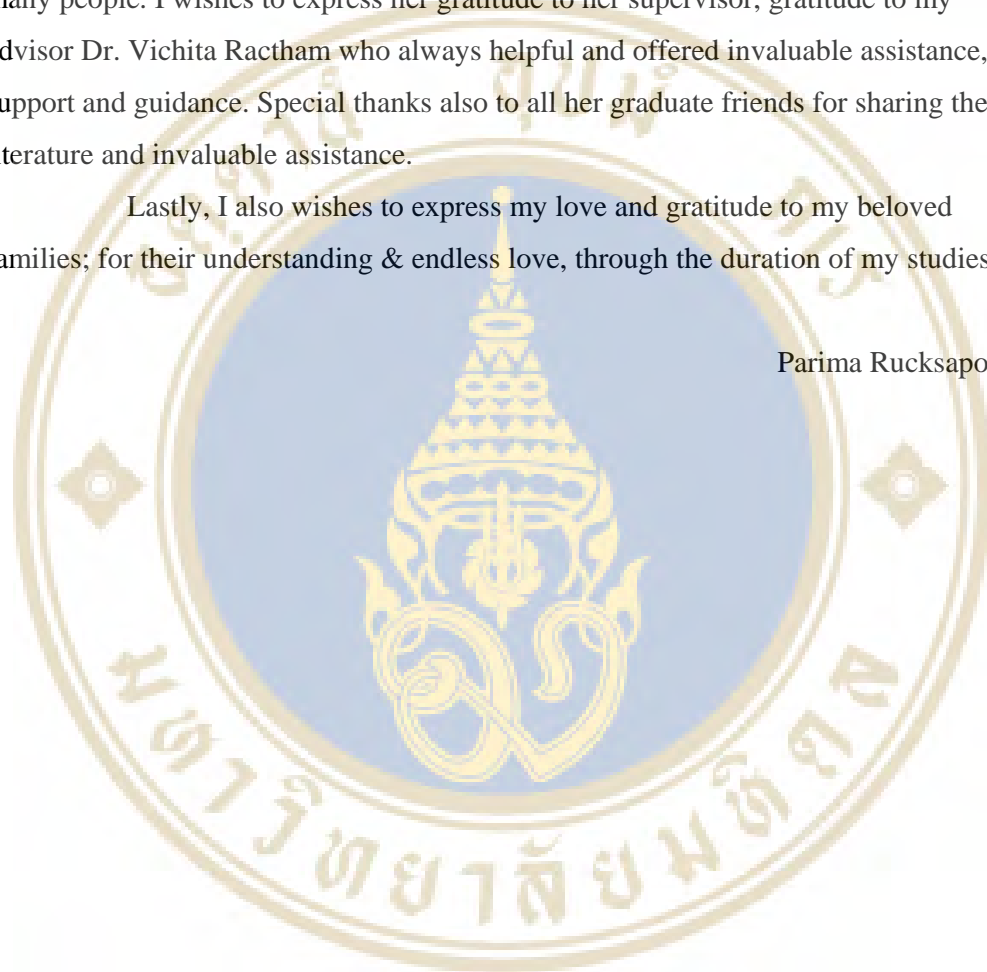


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Parima Rucksapoldej



**KNOWLEDGE CREATION PROCESS IN THAI ENGINEERING TEAM  
CASE STUDY: FUJITSU SYSTEMS BUSINESS (THAILAND) LTD.**

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M.M. (INNOVATION IN MANAGEMENT)

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**ABSTRACT**

This study analyzed the knowledge creation pattern initiated within the team of skilled engineers in Fujitsu systems business (Thailand) Ltd. Nonaka's SECI and Ba model were applied to analyze the knowledge creation process of the hardware engineer team. Interview method was conducted to collect in-depth data regarding the existing knowledge creation in the team. The collected data shows that the knowledge conversions in the team are mainly conducted in the tacit to explicit pattern through verbal communication. Furthermore, some of the explicit knowledge has not been proceeding further through knowledge creation spiral due to lack of participation and interest from the team members.

**KEY WORDS:** Knowledge Management / Knowledge Creation / Knowledge  
Conversion Process

31 pages

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# CHAPTER I

## INTRODUCTION

### 1.1 Abstract

This study analyzed the knowledge creation pattern initiated within the team of skilled engineers in Fujitsu systems business (Thailand) Ltd. Nonaka's SECI and Ba model were applied to analyze the knowledge creation process of the hardware engineer team. Interview method was conducted to collect in-depth data regarding the existing knowledge creation in the team. The collected data shows that the knowledge conversions in the team are mainly conducted in the tacit to explicit pattern through verbal communication. Furthermore, some of the explicit knowledge has not been proceeding further through knowledge creation spiral due to lack of participation and interest from the team members.

### 1.2 Problem Statement

Knowledge creation is a process of developing a new content in order to gain new knowledge that can be beneficial to an organization and help the organization gain its competitive advantage. Knowledge creation plays an important role as a beginning point of the knowledge management cycle. If no knowledge has been created, there will be nothing to store, retrieve, transfer or apply.

The process of knowledge creation or knowledge conversion spiral is also crucial. The continuity of the conversion from tacit knowledge to explicit knowledge and continued back to tacit knowledge in a higher level are the key points of an organization's sustainability and competitive advantage.

Particularly, organizations that have to rely on employees with specific fields of knowledge or expertise such as engineering work. This type of knowledge takes decades to gain and requires observation and practice. The knowledge

management can be applied to help organization create, store, transfer and apply knowledge to enhanced work force capability even further.

However, in order to start the knowledge management cycle one must know their current knowledge management position. The question such as, what types of knowledge are available in their organization? In what form the knowledge are available?

This paper adopted Nonaka's SECI and Ba theory in order to answer that question for the company that has not yet been applied the knowledge management in their organization. This study intended to serve as a starting point for an organization to proceed with their knowledge management journey that they have not yet experienced.

### **1.3 Research Objectives**

The objectives of this research are:

1.3.1 To study the knowledge creation pattern initiated within the team of skilled engineers in Fujitsu systems business (Thailand) Ltd.

1.3.2 To provide an overview and analysis of knowledge creation process of the hardware engineer team.

1.3.3 To characteristics of the knowledge creation pattern available within the team of skilled engineers.

1.3.4 To mapped the interview data into a flowchart for predictive purposes.

### **1.4 Scope of studys**

The scope of this study is limited to the knowledge creation pattern among the population of hardware engineer team in Fujitsu systems business (Thailand) Ltd.

## **CHAPTER II**

### **LITERATURE REVIEW**

The theoretical framework that has been examined and used as the foundation of this research studies are as follows;

1. Knowledge Management
2. Knowledge Creation

#### **2.1 Knowledge Management**

##### **2.1.1 Knowledge Management Definition**

Knowledge is not a mere collection of information and data, but information and data can later become knowledge through experience by learning and practicing. As Davenport, De Long, and Beers (1998: 43) pointed out that knowledge is information combined with experience, context, interpretation and reflection. It is a high-value form of information that is ready to apply to decisions and actions.

The most established paradigm is that knowledge is power. (Uriarte, 2008) It is widely accepted that the power of knowledge can benefit organization in various ways, as Alavi (1999) pointed out that “knowledge is the organizational asset that enables sustainable competitive advantage in hyper-competitive environments”

In order to gain the most benefit from knowledge in an organization, one must understand how to properly and effectively manage knowledge. Knowledge Management is a concept that arose approximately two decades ago, roughly in 1990. (Koenig, 2012: 1) The knowledge management concept has gained widespread attention in business society. The various definitions of knowledge management have been given by various scholars. A review of relevant research shown several definitions of knowledge and knowledge management as follows;

Davenport, De Long, and Beers (1998: 43) concluded that the knowledge management project are an attempt to “do something useful” with knowledge, to accomplish organizational objectives through the structuring of people, technology, and knowledge content. Under the same discussion topic, Skyrme (2007) have offered a similar idea with more specific suggestions regarding Knowledge Management concept. He pointed out that “Knowledge management is the explicit and systematic management of vital knowledge - and its associated processes of creation, organization, diffusion, use and exploitation - in pursuit of business objectives.” (Skyrme, 2007)

Likewise, Scarborough, et al (1999: 1) and Hedlund (1994) define Knowledge Management as any processes that involved creating, transferring, capturing, sharing and applying knowledge to enhance learning and performance in organizations.

To sum up, the commonality of knowledge management definition, the knowledge management is a process consist of creating, acquiring, capturing, sharing and using knowledge apply to enhance learning and performance in organizations in order to help organizations gain sustainable competitive advantage.

### **2.1.2 Type of knowledge**

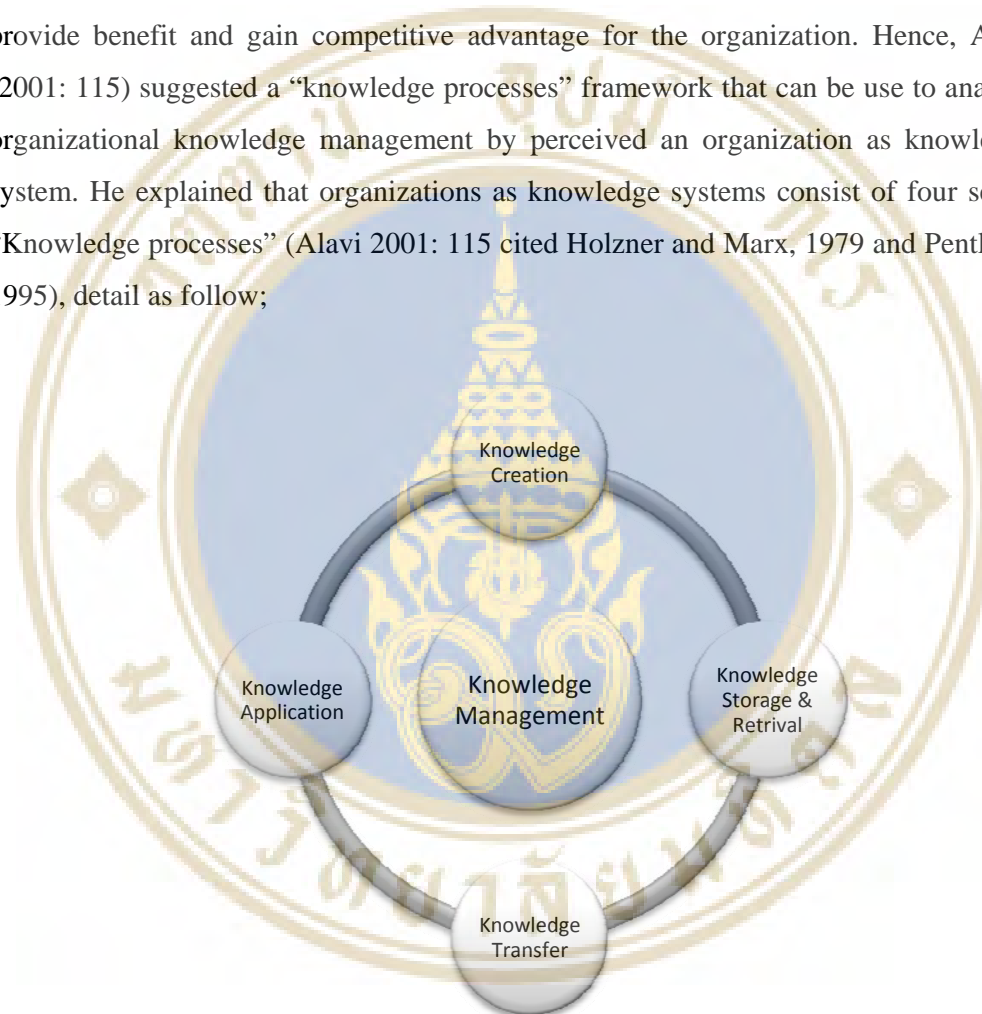
One of the most widely accepted concept of knowledge management is the type of knowledge: as Nonaka and Konno (1998: 42) pointed out that there are two kind of knowledge: explicit knowledge and tacit knowledge. Explicit knowledge can be expressed in words and numbers and shared in the form of data, scientific formulae, specifications, etc., while, tacit knowledge is the knowledge that knowledge resides in people's heads, highly personal and hard to formalized which make it difficult to communicate or share with others. Likewise, Davenport and Grover (2001: 7) have similar explanation that there are two types of knowledge: tacit, which is embedded in the human brain and cannot be expressed easily and explicit knowledge, which can be easily codified.

Based on several theories and frameworks mentioned above , this research studies have applied the concept of knowledge categorization and divided the knowledge into two type (1) Tacit knowledge which is a knowledge that held in

people's head and difficult to express, and (2) Explicit knowledge which is a knowledge that has been articulated and can be expressed

### 2.1.3 Organizational Knowledge Management

As mentioned earlier that knowledge is considered a valuable asset of the organization. This knowledge asset required to be properly managed in order to provide benefit and gain competitive advantage for the organization. Hence, Alavi (2001: 115) suggested a “knowledge processes” framework that can be use to analyze organizational knowledge management by perceived an organization as knowledge system. He explained that organizations as knowledge systems consist of four set of “Knowledge processes” (Alavi 2001: 115 cited Holzner and Marx, 1979 and Pentland, 1995), detail as follow;



**Figure 2.1 Knowledge processes**

#### 2.1.3.1 Knowledge Creation

The organizational knowledge creation is a spiraling process of interactions between explicit and tacit knowledge (Nonaka and Konno, 1998: 42) In other words, knowledge creation is a process of developing a new content in order

gain new knowledge that can be benefit to an organization and help organization gain its competitive advantage.

#### 2.1.3.2 Knowledge Storage and retrieval

Once the organization have create knowledge and learn, the knowledge will required to be efficiently store for future usage or knowledge retrieval. Most of the time this process will also involved an Information Technology system to enhanced organizational knowledge management. As Alavi (2001: 119) mentioned that “Advanced computer storage technology and sophisticated retrieval techniques, such as query languages, multimedia databases, and database management system, can be effective tools in enhancing organizational memory.”

#### 2.1.3.3 Knowledge Transfer

After the knowledge has been created and stored, the next step will then be the knowledge transfer process. Alavi (2001: 119) explained that knowledge transfer occurs at various level: transfer of knowledge between individual, from individual to explicit source, from individuals to group, between groups, across groups and from groups to the organization.

#### 2.1.3.4 Knowledge application

Knowledge application referred to the process of applying the organizational knowledge which has already been created, stored, retrieved and transferred, into practices. Since “the source of competitive advantage resides in the application of the knowledge rather than knowledge itself” (Alavi, 2001: 122). Furthermore, Alavi (2001: 122) pointed out the relationship of Information Technology and Knowledge application that “Technology can support knowledge application by embedding knowledge into organizational routines.

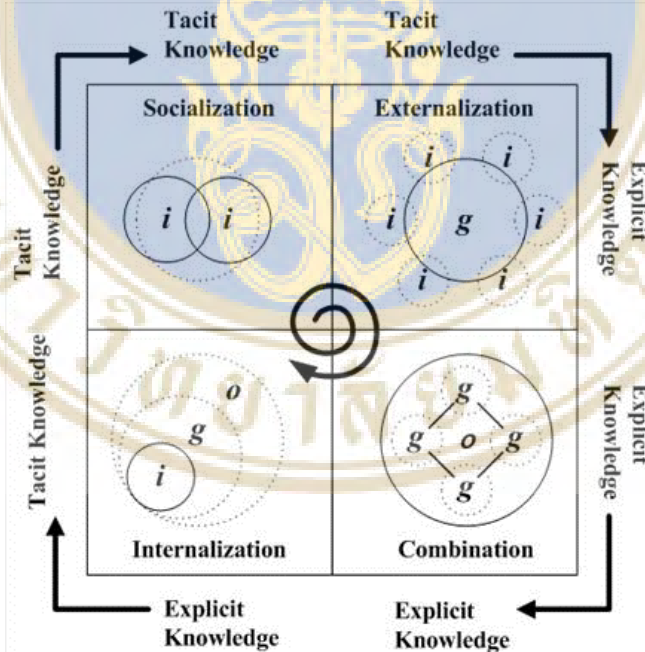
However, this paper will be focused on knowledge creation among four knowledge process. The further literature review of knowledge creation and knowledge creation process are provided in the next topic discussion.

## 2.2 Knowledge Creation

In today's highly competitive business environment, knowledge is one of the most important assets that can help organization gain their sustainable competitive advantage. As Nonaka (2007: 1) mentioned that “the one sure source of lasting competitive advantage is knowledge.” Nonaka and Konno (1998: 42) also suggested that the Knowledge creation is a spiraling process of interactions between explicit and tacit knowledge and the interactions between these kinds of knowledge lead to the creation of new knowledge. The outline of knowledge creation process can be illustrated using Nonaka’s SECI model, as per details below;

### 2.2.1 SECI Model

SECI Model is a concept of an interaction and combination of tacit and explicit knowledge leads to four conversion patterns (Nonaka and Konno,1998: 42). The characteristics of the four steps in knowledge conversion process illustrated as follow



**Figure 2.2 SECI Model: Spiral Evolution of Knowledge Conversion and Self-transcending Process**

**Source: Nonaka and Takeuchi (1998: 43)**

The SECI model above illustrated knowledge creation process into four quadrants started from tacit to tacit, tacit to explicit, explicit to explicit, explicit to tacit and then spiraling back to the first quadrants and start all over again but in a higher level. Nonaka and Konno (1998: 42) explained each quadrants of SECI model as follow;

#### 2.2.1.1 Socialization

The first quadrant is Socialization “involves the sharing of tacit knowledge between individuals” (Nonaka and Konno, 1998: 42). The process of tacit knowledge transfer required face to face communication. The interactions of persons are crucial to practice and spending time together rather than verbal or written narrative. An example of “Socialization” conversion process is the situation when one tries to learn by observing and imitating, such as, a person who try to learn how to cook by observing and imitating the chef or the on-job-training for the newly hired, etc.

#### 2.2.1.2 Externalization

The second quadrant is “Externalization” which “required the expression of tacit knowledge and its translation into comprehensible forms that can be understood by others.” (Nonaka and Konno, 1998: 43) Also, the conversion of tacit into explicit knowledge involves techniques that help express one’s ideas or images as words, concepts, figurative language, such as metaphors, analogies or narratives. (Nonaka and Konno, 1998: 43). An example of “Externalization” conversion process is the situation when one trying to communicate or explained their tacit knowledge to other people or group, such as a group discussion or group meeting, which later recorded in meeting minutes.

#### 2.2.1.3 Combination

The third quadrant is “Combination” which is a conversion process of explicit knowledge into explicit knowledge. As Nonaka and Konno (1998: 44-45) mentioned that the key issue of this process are communication, diffusion and systemization of knowledge. An example of “Combination” conversion process is the situation when one combines the knowledge from externalization process with explicit knowledge from other source in order to gain further knowledge, such as a student who attending the class and then doing further library research for class paper.

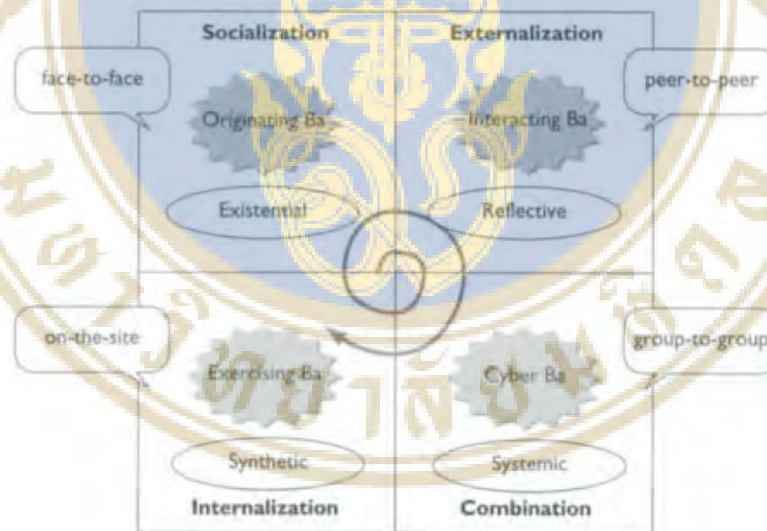


#### 2.2.1.4 Internalization

The fourth quadrant is “Internalization” which is a conversion process of explicit knowledge into tacit knowledge. The internalization required “the individual to identify the knowledge relevant to oneself within the organizational knowledge.” (Nonaka and Konno, 1998: 45) An example of “Internalization” conversion process is the situations when one has gain knowledge from learning, practicing, listening, reading, etc. until knowledge from external source become their own knowledge, such as a student who learn from various source of knowledge, practice and gain more knowledge internally from their experience.

#### 2.2.2 The Four Characteristics of “Ba”

Nonaka and Konno (1998: 45) also suggested the concept of “Ba” that related to the four stage of knowledge conversion or SECI model. “The Ba offered platforms for specific steps in the knowledge spiral process.” The characteristics of the four “Ba” illustrated as follow



**Figure 2.3 The Four Characteristics of Ba**

**Source: Nonaka and Takeuchi (1998: 46)**

The model of the Four Characteristics of Ba above illustrated the “Ba” or place that support the knowledge conversion process in SECI model. The Ba model

also divided into four quadrants as compare to SECI model the details of each quadrant are as follow;

#### 2.2.2.1 Originating Ba

The first quadrant is “Originating Ba” which is a “place” for face-to-face interaction. Originating ba provided space for interaction between two individual which required for transfer of tacit to tacit knowledge.

#### 2.2.2.2 Interacting Ba

The second quadrant is Interacting Ba which is a “place” for peer-to-peer interaction. Interacting ba provided space for interaction between individuals and group which required for transfer of tacit to explicit knowledge.

#### 2.2.2.3 Cyber Ba

The third quadrant is Cyber Ba which is a “place” for group-to-group interaction. Cyber ba provided space for interaction between group and group which required for transfer of explicit to explicit knowledge.

#### 2.2.2.4 Exercising Ba

The forth quadrant is Exercising Ba which is a “place” for group-to-group interaction. Exercising ba provided space for interaction between group and group which required for transfer of explicit to tacit knowledge.

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The purpose of this study is to examine the knowledge creation process of the team members in provider of business solution services.

This chapter intended to describe (1) the research methodology of this study, (2) explain the sample selection, (3) procedure used in designing the method to collecting the data, and (4) explain data analysis procedure.

#### **3.2 Research Approach and Design**

A qualitative approach was followed in this study. The interviews methods were administered to a selected sample from a selected engineering team member in order to collect in-dept information of their existing knowledge creation activities. According to Woods (2006: 10) formal interview or casual conversations is a methods that can helps researcher collect the great deal of qualitative material.

Since this study aimed to collect and analyze the data regarding the knowledge creation activities of an engineering team whose tasks are complex and technical oriented, the characteristics of data collected expected to be extremely varied in nature. For this reason, the unstructured interview methods and probing technique were adopted, as Mack et al. (2005: 4) explained that "...the use of open-ended questions and probing technique will gives participants opportunity to respond in their own words, rather than forcing them to choose from fixed responses..."

The in-dept interview applied for data collection in this study is divided into two phrases, detail as follow;

First phrase of interview was conducted with the team leader, the department manager, to gain overall information of an organization structure, business overview as well as in-dept knowledge of the team overall structure and regular work process.

Second phrase of interview was conducted with the several randomly selected team members. A topic guide used for second phrase of interview is based on the information gained from first phrase of interview with the team leader. The second phase of interviews was intended to define the existing knowledge creation activities that have been practiced in an actual team environment

### **3.3 The Study Population and Sample**

The populations selected as a sample of this study are members of hardware engineering team of Fujitsu Systems Business (Thailand) Ltd. According to Mack et al. (2005: 4) the purposive sampling should be conducted according to preselected criteria relevant to a research question. For this reason, the methodology for this study was a random sampling considering that all of the team members are possessed the criteria relevant to research question of this study.

### **3.4 Data Collection**

#### **3.4.1 Data collection method**

The in-dept interview and probing question technique was adopted for data collection. The interview was divided into two phrases;

First phrase of interview were applied to the department manager of the hardware engineering team to gain in-dept knowledge of the team structure and work process.

Second phrase of interviews were applied to the members of an engineering team to identify their existing knowledge creation and conversion process.

### **3.4.2 Data collection procedure**

The interviews for data collection are conducted as informal one-on-one interviews. The first phase of unstructured interview was conducted separately prior to the second phase of interview. First phase of interview aimed to gather in-depth knowledge of the overall operation of the team. Information gained from the first phase of interview has been adopted as a guideline to prepare for the second phase of interview. All participants have been informed that the interview will be recorded and used for the educational purposes.

### **3.2 Data Analysis**

The data analysis consists of the several tasks begin with the transcribing of recorded interviews. Data collected from first phase of interview were used to develop high-level understanding of overall structure and work process. The collected data are then analyzed and described in the form of work process chart. The work process chart will then be broken down into sub-activities according to work breakdown structure methods and use a guideline to help categorize the data collected from second phase of interview.

The data collected from second phase of interview will be broken down into sub-activities as a preparation for further analysis. An analysis of data collected from second phase of interview are based on (1) SECI model (Nonaka, 1998), this model applied to help explain and categorize knowledge creation activities that occur and (2) Ba theory (Nonaka, 1998), this theory applied to help explain and categorize the “place” in which knowledge creation activities occur.

## **CHAPTER IV**

### **DATA ANALYSIS AND FINDING**

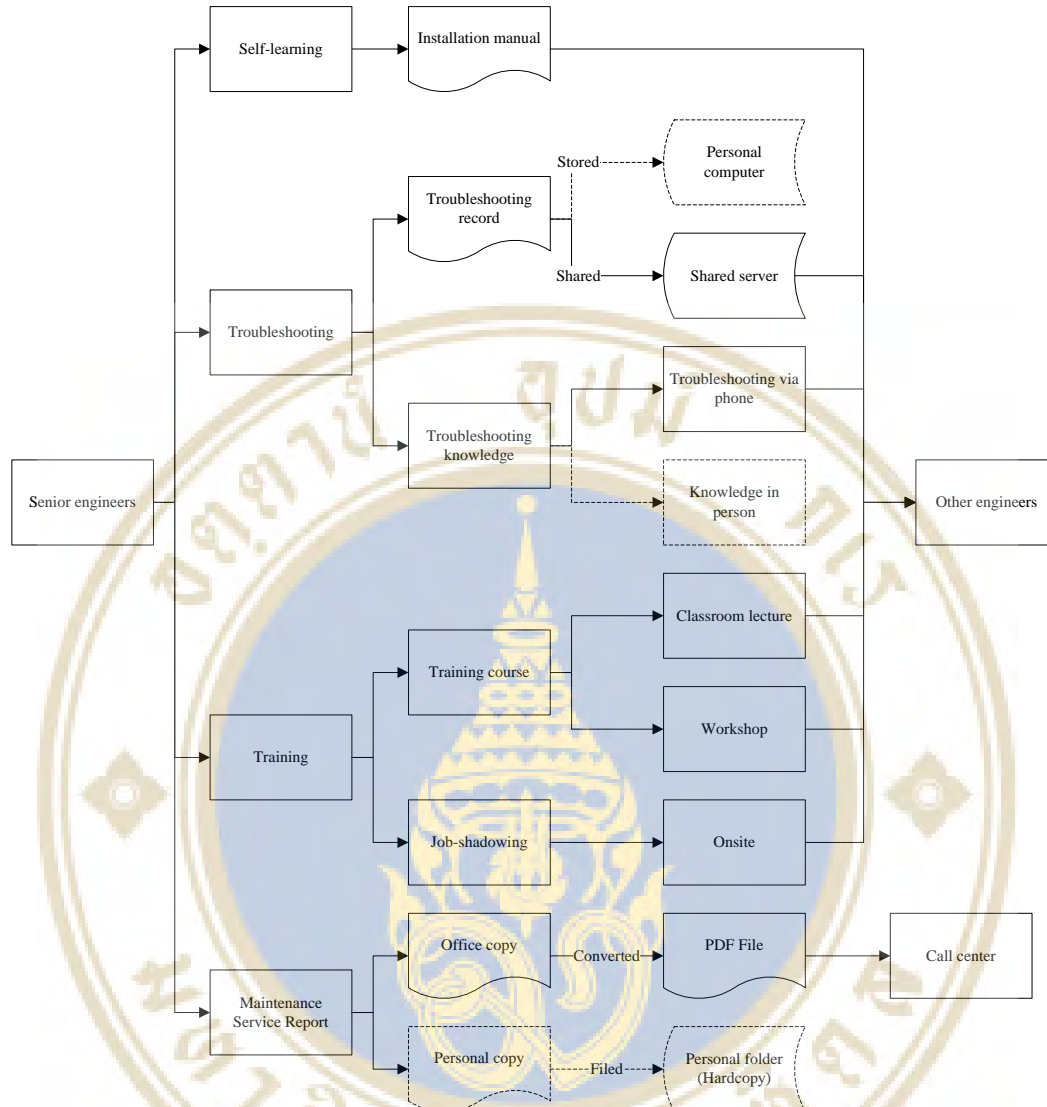
This chapter intended to present the result of the data analysis and finding of this study. The data were collected and processed based on the research question indicated in the first chapter of this paper. This chapter demonstrates the application of the knowledge creation theory to analyze the actual knowledge creation practice in the actual business setting of an international organization.

#### **4.1 Data analysis**

##### **4.1.1 Knowledge flow chart**

The collected the interview data showed that the several forms of knowledge are available in the hardware engineering team, the following chart illustrated the knowledge flow occurred started from the senior engineers to the junior or other engineers in the team.

The result show that there are four major activities that triggered knowledge conversion process (1) Self-learning activities, (2) Troubleshooting activities, (3) Training activities and (4) Maintenance Service Report activities. Each major activities consist of sub-activities, knowledge conversion pattern in each activities are varies, as per follow detail



**Figure 4.1 Knowledge Flow Chart in Hardware team of Fujitsu systems business (Thailand) Ltd.**

#### 4.1.1.1 Self-learning activity

Self-learning activity occurred when there are newly-hired engineers or new hardware involved. Self-learning activity triggered the conversion of knowledge which a person gained from reading and studying the manual.

#### 4.1.1.2 Troubleshooting activities

Troubleshooting activities occurred when the engineering team members assigned to install, maintain or repair company's hardware on customer's

site. Troubleshooting activities triggered the conversion of knowledge through work practice. The pattern of knowledge conversion occurred from this activities are varies from self-discovered troubleshooting technique, record of newly discovered troubleshooting technique to the sharing of newly discovered troubleshooting technique in the shared server.

#### 4.1.1.3 Training activities

Training activities usually occurred when there are newly-hired engineers joining the team. Training activities triggered conversion of knowledge through class room lecture, workshop training and job-shadowing on customer's site

#### 4.1.1.4 Maintenance Service Report activities.

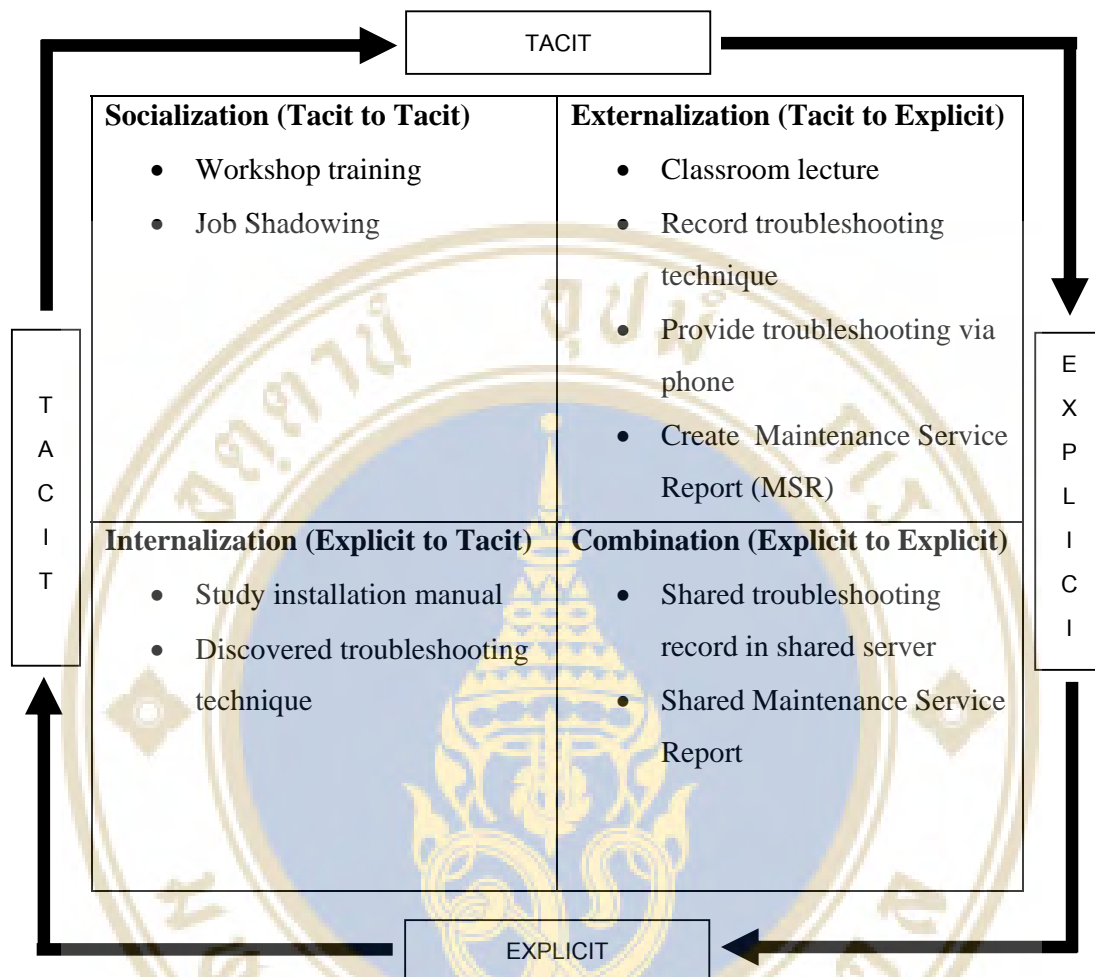
Maintenance Service Report activities is a required process to record information such as customer, installed hardware detail, technical issue along with case number for further reference. Knowledge conversion has been triggered during this activities through the record of technical issue occurred onsite and problem solving methods that has been applied to solve the issue.

## **4.2 Knowledge creation: knowledge conversion process**

Knowledge creation is a process of developing a new content in order gain new knowledge that can be benefit to an organization and help organization gain its competitive advantage. For this reason knowledge creation play an important role as a beginning point of knowledge management cycle. Nonaka's SECI model and Ba model were adopted to analyze the knowledge creation process in Fujitsu systems business (Thailand) ltd or FSBT, detail as follow;



### 4.2.1 SECI Model



**Figure 4.2 SECI Model, Spiral Evolution of Knowledge Conversion and Self-transcending Process in Hardware team of Fujitsu systems business (Thailand) Ltd. Based on Nonaka's SECI Model (Nonaka and Takeuchi, 1998: 43)**

#### 4.2.1.1 Socialization

Socialization is a conversion of tacit knowledge to tacit knowledge which required face-to-face communication. The activities that triggered the conversion of tacit knowledge to tacit knowledge are as follow;

### Workshop training

Workshop is a part of training activities that allow the newly-hired engineers to learn and be familiar with the hardware and tools. This training is conducted by experienced engineers. The workshop training triggered the conversion pattern of tacit knowledge from senior engineers to tacit knowledge of newly-hired engineers through demonstration, observation and imitation.

### Job Shadowing

Job Shadowing is also a part of training activities that allowed newly-hired engineers to gain job-related knowledge from the senior through the observation. This activity also has a knowledge conversion pattern of tacit knowledge to tacit knowledge through demonstration of senior engineer and observation of junior engineer. Due to the complex nature of their job, job shadowing is a preferred training method because they perceived that the knowledge the senior engineers required to teach to the junior engineers are hard to explain, but easier to demonstrate.

#### 4.2.1.2 Externalization

Externalization is a conversion process of tacit knowledge to explicit knowledge. The collected data show that the knowledge conversion activities of this working group are mostly occurred in externalization pattern. The activities that triggered the conversion of tacit knowledge to explicit knowledge are as follow;

#### Classroom lecture

Class room lecture is a part of training activities that triggered a knowledge conversion pattern from tacit knowledge held by experienced engineers to explicit knowledge through his verbal communication that explained technical knowledge to junior engineers.

#### Record troubleshooting technique

Record of troubleshooting technique is a conversion of tacit knowledge which is troubleshooting technique each engineers discovered during their work process to explicit knowledge which is a record written on their computer or notebook.

#### Troubleshooting via phone

Telephone communication for troubleshooting is a regular practice of this engineering team. Since all of their assignment are located on

customer's site and away from the office. If there are an issue that cannot be resolve, the engineer onsite will elevate the problem to their senior or supervisor via telephone for further advice or instruction. This activity triggered the conversion of tacit knowledge that held by senior engineer to explicit knowledge through the telephone conversation.

#### Create Maintenance Service Report (MSR)

Maintenance Service Report or MSR are the formal report required to be filled daily by engineers who oversee that particular project. The information required by MSR included the customer name, case number, problem and problem solving methods. One hard copy of completed MSR will be provided to company's call center as a reference record, and another copy of completed MSR will be filed in personal folder of the engineer responsible for that project. The process of creating Maintenance Service Report allowed engineers to converse their tacit knowledge of problem identification and problem solving methods that they have experienced during that particular assignment to explicit knowledge which is a written Maintenance Service Report or MSR

##### 4.2.1.3 Combination

Combination is a conversion process of explicit knowledge to explicit knowledge which required systematic diffusion of knowledge. The collected data show activities that triggered the conversion of tacit knowledge to explicit knowledge as follow;

##### Troubleshooting record in shared server

Troubleshooting record which individual intentionally shared in Company's shared server and retrieved by other engineer will trigger the conversion of explicit to explicit knowledge through the help of information technology.

##### Shared Maintenance Service Report

As mentioned earlier, Maintenance Service Report or MSR are documents that contained information such as customer name, case number, problem and problem solving methods. The PDF copies of MSR are provided to company's call center as a reference record. Call center can refer to customers' issue that has been occurred and solved through this MSR. This activity triggered the conversion pattern

of explicit knowledge which contained in MSR and combines with explicit knowledge such as customer knowledge that call center staff retrieved from other source.

#### 4.2.1.4 Internalization

Internalization is a conversion process of explicit knowledge to tacit knowledge. According to collected data, there are two sub-activities that triggered the conversion of explicit knowledge as follow;

##### Study installation manual

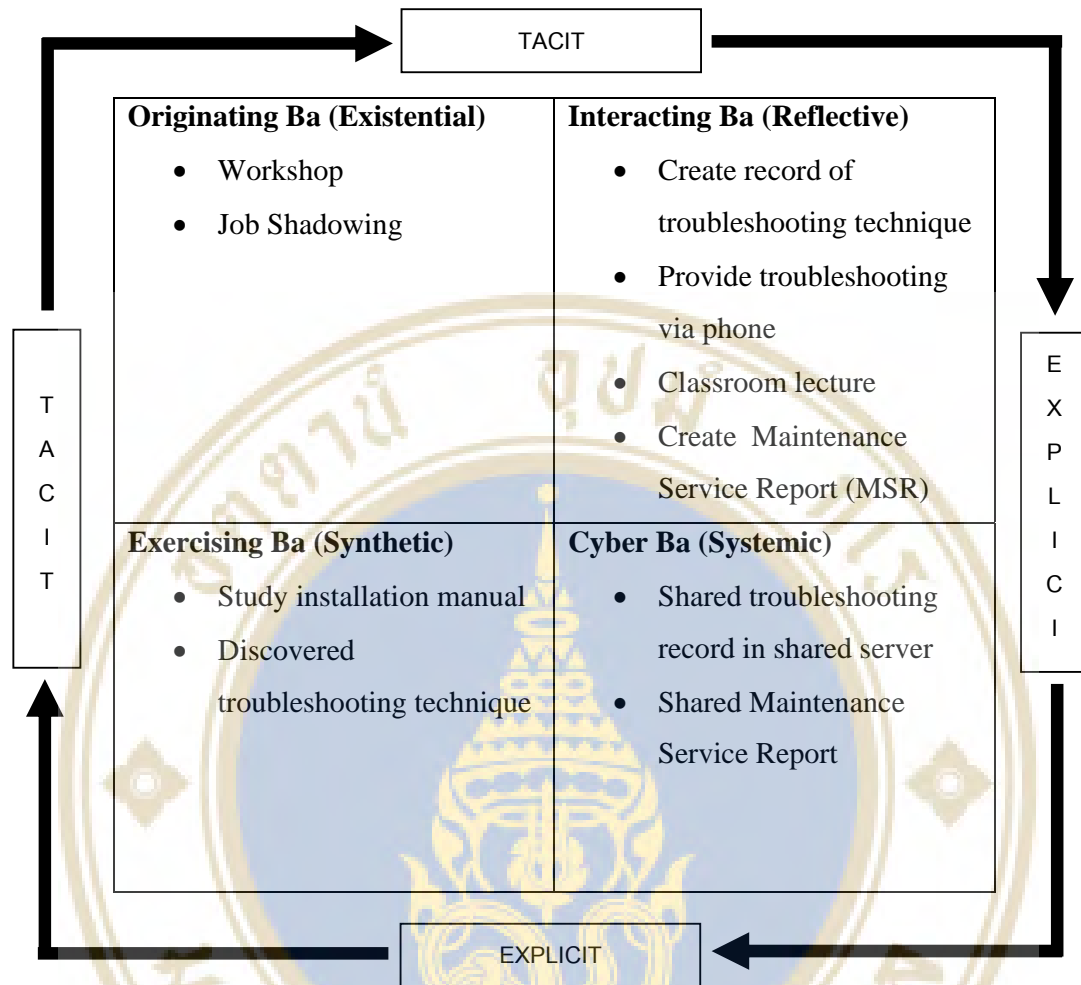
Study installation manual is an activity of self-learning through reading and studying of hardware installation manual. The explicit knowledge in the manual becomes tacit knowledge which a person gained from reading and studying the manual.

##### Discovered troubleshooting technique

This knowledge conversion pattern occurred during work practice when the external knowledge which is a knowledge that each person has learned from external source become their own knowledge. This activity occurred when each engineer using the knowledge they have learnt or received during their training to find solution for the technical issue occurred onsite.

#### **4.2.2 The Four Characteristics of Ba**

Nonaka and Konno (1998: 45) also suggested the concept of “Ba” that related to the four stage of knowledge conversion or SECI model. “The Ba offered platforms for specific steps in the knowledge spiral process.” The Ba model also divided into four quadrants



**Figure 4.3 The Four Characteristics of Ba in Hardware team of Fujitsu systems business (Thailand) Ltd. Based on Nonaka's Ba Model (Nonaka and Takeuchi, 1998: 43)**

#### 4.2.2.1 Originating Ba or Existential quadrant

Originating Ba provided space for interaction between two individual which required for transfer of tacit to tacit knowledge. The activities occurred in this quadrant is either happened on workshop or customer's site between senior whose perform a demonstrator role and junior whose perform an observer role.

#### 4.2.2.2 Interacting Ba or Reflective quadrant

Interacting Ba is a "place" for peer-to-peer interaction. Interacting Ba provided space for interaction between individuals and group which

required for transfer of tacit to explicit knowledge. Ba in which this activities occurred are varies from classroom setting to an interaction of individuals by phone..

#### 4.2.2.3 Cyber Ba or Systemic quadrant

Cyber Ba provided space for interaction between group and group which required for transfer of explicit to explicit knowledge. Ba in which these activities occurred is usually happened via cyber space through shared server and email.

#### 4.2.2.4 Exercising Ba or Synthetic quadrant

Exercising Ba provided space for interaction between group and group which required for transfer of explicit to tacit knowledge. Ba in which these activities occurred can be varies from mental space while individual studying manual to physical space such as customers' site during on-job practicing..

### 4.2.3 Knowledge type and form

To further analyze the knowledge available according to the knowledge flow chart illustrated above, two criteria has been applied (1) Type of knowledge and (2) Form of knowledge, detail as follow;

**Table 4.1 Analysis of knowledge available using type of knowledge and form of knowledge criteria**

Knowledge available	Type of Knowledge		Form of Knowledge		
	Tacit	Explicit	Hidden	Verbal	Written
Installation manual		X			X
Troubleshooting record		X			X
Troubleshooting via phone	X			X	
Troubleshooting knowledge	X		X		
Classroom lecture		X		X	
Workshop training	X		X		
Job-shaadowing	X		X		
Maintenance Service Report		X			X

The table above shows that knowledge available in the of Fujitsu systems business (Thailand) Ltd or FSBT mainly resides in person or in a verbal form which mostly required face-to-face communication in order to proceed with the conversion

pattern and further elevate the knowledge conversion to the next level. This may be due to the complex nature of their jobs and mobility nature of their assignment. The hardware engineering team of FSBT often has to work with complex hardware and system under a time constraint environment. Also, the locations of their work place often change from one customer's site to another. Generally, the locations they are working are not suitable to use computer and internet connection are not available. For this reason, there are not very high motivations for the team member to rely on written knowledge source. The complex nature of the knowledge that have to be converse from one person to another are also contribute to the fact that knowledge available in the team are often not in a written form, but available in verbal form or hidden in person. The knowledge conversion is often relying on demonstrating, observing and talking

### **4.3 Discussion**

There are several points arise from this data analysis that can be a topic of further discussion.

Firstly, the relationship between complexity of knowledge and knowledge conversion pattern, for example, the data collected from hardware engineer team of Fujitsu Systems Business (Thailand) shows that the complex nature of the knowledge that required to be convert between two engineers are effect to the conversion pattern they are using. Generally, the engineering team members of FSBT are preferred to use conversion pattern of socialization and externalization rather than combination. They founded that the knowledge they have to convert are better to be demonstrate and explain rather than using written communication.

Secondly, the continuity of knowledge creation spiral, from the analyzed data shows that the spirals of knowledge are often broken especially explicit knowledge. For example, the explicit knowledge that has been available in a written form, such as installation manual, Troubleshooting record and Maintenance Service Report are rarely used. Therefore the conversion process cannot be continued. For example, when one engineer has converted his tacit knowledge into explicit

knowledge by recording his troubleshooting technique in a written format, he has completed the process of externalization. The knowledge conversion process should then proceed to the next quadrant which is the conversion of explicit knowledge to explicit knowledge or combination quadrant. Unfortunately, if he not considered sharing his record with the team the conversion process cannot go further. Even if he share his record in the shared server but if there are no one retrieve and use his troubleshooting record from the shared server, the knowledge conversion also cannot be proceed to the next quadrant.

#### **4.4 Recommendation and suggestion**

In conclusion, since FUJITSU is an innovative organization. They are expert in information and communication technology, they sell product and services. They have expertise to be a consultant to organization or individual customer to support their product that's why they have to open FSBT in Thailand. FSBT is already has the processes and activities that supported knowledge management cycle, knowledge creation, knowledge transfer, knowledge storage and retrieval, and knowledge application but it still need to improving in some part.

According to the workflow within the organization, the company should implement the system that helps to connect every department together. This system should be able to store and retrieve information that each employee wants at the same time. Right now, the business support department use only file sharing which nobody use it. This is because they always follow the same work process which they get used to it. More importantly, the management didn't aware with the importance of the knowledge within the organization. The team would recommend Fujitsu to implement ERP system for the organization. This system will help the business support department and other department store and retrieve information easier with valid information. With the system, the company will be able to transfer information about customers and specification of hardware to employees that really need it. Moreover, everyone in the company can access and share the same information. Knowledge will be shared more which will improve work process to be faster. As a result, customer satisfaction and



productivity of the service will be increased. Employees will be able to perform different task with accuracy simultaneously. Hence, the company profits will be increased.



## **CHAPTER V**

### **RECOMMENDATION AND CONCLUSION**

#### **5.1 Recommendation**

The following recommendations are offered based on the finding of this study, the following recommendation are suggested:

##### **5.1.1 Knowledge creation process continuity**

The finding shows the knowledge creation spiral processes in the team are often discontinue, particularly, the explicit knowledge in the written form. The discontinuity of creation spiral process due to lack of participation of the team member. Most of the team members have converts their tacit knowledge to explicit knowledge in several formats. However, the converted knowledge has not proceeded further in the knowledge creation spiral because half of the knowledge owners never attempt to share their explicit knowledge to the rest of the team. On the other hand, some of knowledge owners attempt to share their knowledge by uploaded they knowledge record to company's shared serve; unfortunately, there are no receiver of the knowledge.

The recommendation for this particular finding will be for the team leader or management to encourage the sharing and receiving of knowledge among the team members. Particularly, the conversion in combination quadrant, since the knowledge in socialization and externalization pattern are continually generated through the training and verbal communication.

##### **5.1.2 Encourage conversion of tacit knowledge to explicit knowledge in storable form**

The finding shows the knowledge conversion from tacit knowledge to explicit knowledge are often occurred in verbal through informal communication, thus

difficult to be capture and stored. The non-storable knowledge also discourages further knowledge conversion process.

The suggestion is to encourage the conversion of tacit knowledge to explicit knowledge in storable form. However, the storable form of knowledge do not limited to written documents, the storable form of knowledge can be varies from the picture to recorded verbal instruction and VDO clip, etc. The storable explicit knowledge makes the further knowledge conversion more convenience for both sharer and receiver.

### **5.1.3 Start knowledge management planning**

As mention earlier, this study intended to serve as a starting point for further adaptation of knowledge management process. The finding shows that the team is doing considerable well in term of tacit knowledge conversion, but still required improvement in several area before proceed to the next process of knowledge management cycle.

However, in order to improve further the proper planning is required. This study has provided the analysis of existing knowledge creation as a starting point of further adoption of knowledge management culture.

Further recommendation is for the management to consider the knowledge management strategy and using analysis of this study as foundation to identify the knowledge gap and plan organization knowledge management journey to gain organization sustainability in the future to come.

## **3.2 Conclusion**

In conclusion, the findings in this study indicate that knowledge creation process cannot be complete with willingness and participation of sharer alone. The successful knowledge creation process also required equal willingness and participation from the knowledge receiver. Unawareness of the knowledge management benefit often leads to unwillingness to participate in knowledge management activities. In order start knowledge management for an organization,

management is responsible to analyze the existing knowledge position of an organization, create sensible target, plan the road map and leads the organization towards knowledge management culture.



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