

Knowledge Conversion Process in Managing Content Based on SECI Model and the Relationship Towards Product Development

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Abstract: Firms today have more effectively started to engage towards the process of managing knowledge inside the organization. Top management realizes that the importance of utilizing the available knowledge in gaining competitive advantages. The implementation of knowledge management in a firm has played a part on managing all the knowledge across the organization to generate new ideas and to apply it onto the development of product and services. The process of knowledge conversion by converting tacit knowledge into explicit knowledge vice versa can help organization to create new knowledge. The application of Socialization-Externalization-Combination-Internalization (SECI) model, introduced by Nonaka and Takeuchi, differentiates the whole process of knowledge conversion of an organization into four modes of knowledge management cycle, which are socialization, externalization, combination and internalization. The relationship between knowledge conversion in product development is then compared to see whether the new knowledge can give influence towards development process in terms of customer and supplier, product development strategy and innovation of new product. It is found that the correlation between knowledge conversion and product development process is positive and significant among these manufacturing firms.

Keywords: Knowledge Management, Knowledge Conversion, SECI Model, Product Development

1. Introduction

Knowledge is a tool that can be acquired from external into an individual through education or experience which can be used in future. Knowledge is described as confidence in understanding of a subject for a specified purpose (Yap, 2009). Tasmin and Woods (2007) strongly evinced that knowledge management approach influenced significantly toward innovation, among large manufacturers in Peninsular Malaysia. Among the key domain influential domains are knowledge leadership and

knowledge process (Tasmin and Woods, 2007). Organizations today view knowledge as an important source to increase organization performance and competitive advantages.

1.1 Research Background

As the competency of business is increasing each day, firms are now starting to implement knowledge management initiative to gain competitive advantages. This study seeks answer to the questions of whether the use of knowledge can influence the product development process. This study can give firms an insight of how to manage and convert their available knowledge in organizations and utilize it well on developing process using new knowledge approach.

1.2 Problem Statement

Nonaka and Takeuchi (1995) synthesised that knowledge transformation can flow between levels of organization as knowledge sharing is engaged. The interaction between tacit and explicit knowledge created in a working environment can create a new knowledge (Nonaka & Takeuchi, 1995). Therefore, the purpose of this study is to determine the level of knowledge conversion process among employees in manufacturing firm in Sungai Petani, Kedah.

The collaboration of product design is a kind of knowledge intensive activity at such successful collaborative design throughout the whole product life cycle depends on the project management and knowledge sharing effort (Chen *et al.*, 2009). Team members of product design play an important role in dedicating their effort on knowledge and experience sharing towards developing a high competitive product and continue gaining customer satisfaction. Hence, the study seeks insight to determine the relationship between knowledge conversion processes towards product development in manufacturing firms.

1.3 Research Questions

- (i) What is the level of knowledge conversion process among employees?
- (ii) What is the relationship of knowledge conversion process towards product development?

1.4 Research Objectives

- (i) To measure the level of knowledge conversion process among employees using SECI model.
- (ii) To determine the relationship of knowledge conversion process towards product development

1.5 Significance of the Study

The purpose of this study is to determine the process of knowledge conversion and the level of its conversion among employees in a manufacturing organization. By conducting this study, it allows us to have a better understanding of knowledge management and the conversion of knowledge under SECI model within an organization. On the other hand, we can also find out what is the significant relationship between knowledge conversion and product development process. This facilitates the organization to have a better view of knowledge management in their product development process so that they can build a more competitive product for the market.

1.6 Scope of the Study

This research has been conducted among manufacturing companies in Sungai Petani, Kedah which have a direct and indirect practice of knowledge conversion. They might have implemented a complete knowledge management system and might not. However, in general observation they strongly promote

product training, strong knowledge transfer bonding among departments and have clear training need analysis implementation in place.

2. Literature Review

Generally, knowledge is categorized into tacit knowledge and explicit knowledge. There are many definitions for knowledge, tacit knowledge and explicit knowledge. The literature has reviewed a well-known working model created by Nonaka and Takeuchi (1995) to discuss about knowledge conversion. Since many organizations have started to adopt knowledge management practice, the literature review has casted a look at how knowledge conversion can affect the process of developing a product.

2.1 Knowledge

Knowledge is a kind of skill and expertise acquired by a person through education or field expertise (Yap, 2009). Therefore, we can relate knowledge to a subject of knowing or something familiar with and in terms of industrializing it can be anything from products, culture to skills and experiences. It is important for organization to know where is their learning, formation of distinctions, awareness, social mediation and engagement in practice of the firm (Greg, 2004).

Davenport and Prusak (1998) describe the concept of knowledge transformation starts with data which will transform into information before turning into knowledge. Thus, we can say that data consist of numbers or words which after process can deliver information and become useful knowledge to the respective person.

2.2 Tacit Knowledge and Explicit Knowledge

Polanyi (1966) described tacit knowledge as sticky and embedded knowledge which is very subjective and experience based knowledge. It is hard and sometimes cannot be expressed in words or numbers. Sometimes it is difficult to extract and shared because it is embedded in a person's memory (Choo, 2000; Zack, 1999). Goguen (1997) stated that some people are more towards "know-how" than explaining the way of doing it. This is the situation organization need to face when most people only know how to handle a problem but they can't explain in words the way to solve it. Thus, tacit knowledge is difficult to code into a set of rules.

On the other hand, explicit knowledge is an information kind of hard data being documented in a formal and systematically way (Kidwell *et al.*, 2000; Pan & Scarbrough, 1999; Skyrme & Amidon, 1997). It is a collection of knowledge from inside out of a firm before combine, edit or process to a more complex and systematic set of information (Nonake & Takeuchi, 2004). Explicit knowledge can be described as data that has been captured, rearranged, analysed and organized in structure form for easier interpretation by user.

2.3 Knowledge Conversion in SECI Model

Knowledge can be created, transferred and integrated from an individual into a work team before transferring to become organization knowledge as a competitive advantage (Nonaka & Takeuchi, 1995; Zárrage & García-Falcón, 2003). The conversion of knowledge can influence the development of new product. Marsh and Stock (2006) stated that the retaining of knowledge can be done through articulation or codification of which tacit knowledge is converted into explicit knowledge by having formal way to collect knowledge. This can help to encourage employees to focus more on their projects with all kinds of sufficient information by the side.

SECI model is a continuous yet self-transcending process to create knowledge by transcends the boundary of the old-self into new-self by acquiring new context (Li, Zhan & He, 2007). The interaction

between tacit knowledge and explicit knowledge which create new knowledge is explained in four different modes below (Nonaka and Takeuchi, 1995).

Table 1: Four modes of knowledge conversion

To From	Tacit Knowledge	Explicit Knowledge
Tacit Knowledge	Socialization	Externalization
Explicit Knowledge	Internalization	Combination

(a) Socialization

Socialization is a process of sharing experiences to create tacit knowledge such as shared mental models and technical skills (Cannon-Bowers, Sales & Converse, 1993). The interaction between human can generate new knowledge when one party start expressing their words in an organized structure to another party. The key to acquire knowledge is quite difficult for a person to let others enter their mind without some form of shared knowledge (Nonaka *et al.*, 2000). Many people tend to look at their experience as a key to survive in organizational oriented environment because to them sharing of their experience can lead them into a disadvantaged position.

(b) Externalization

This is the process of tacit converting into explicit knowledge as it transforms knowledge into tangible form through discussion or documentation. Tacit knowledge can be converted into explicit knowledge through metaphors, deduction concepts and prototypes (Nonaka & Takeuchi, 1995). This step is important in transferring knowledge and creating organizational knowledge base. The concept of creation is a combination between deduction and induction process. Deduction is a process of deriving a subject from another subject while induction is inserting a subject into another subject. The source of both deduction and induction can be derived from company slogan, concept trips or concept clinics (Nonaka & Takeuchi, 2004).

(c) Combination

This mode is a process of systemizing concepts into a knowledge system which involves combination of several kinds of explicit knowledge (Nonaka & Takeuchi, 2004). The combination of this different knowledge makes the conversion of explicit knowledge turn into a set of more complex explicit knowledge (Nonaka & Konno, 1998). The set of information has become more structured and in more details. The combination of this complex information can be used as a source for value creation (Rice & Rice, 2005). The combination should be the best available and most creative knowledge within a firm which can be readily used on time (Rice *et al.*, 2005).

(d) Internalization

Internalization is a process of embodying explicit knowledge into tacit knowledge whereby it is related and closely to “learning by doing” (Nonaka & Takeuchi, 1995). An employee internalizes their new experience into tacit knowledge in the form of technical know-how (Nonaka & Takeuchi, 2004). Human tends to learn anything that favours them as they can “reuse” the experience and knowledge on their job. Nonaka *et al.* (1994) expressed that there are two dimensions in internalization which cover the transformation of explicit knowledge through action and practice or “learning by doing” through experiments or simulations.

2.4 Knowledge Management Practices in Malaysia

It is not easy in implementing a new concept in organization. In a study done by Tehraninasr & Raman (2009) on organizations in Malaysia, they found out that there is a lack of sharing knowledge among colleagues as many people tend not to share their experience with others. The study highlights the importance of human factor and organizational culture, as it is some potential obstacles.

Chong *et al.* (2009)'s study shows that organization culture is an important variable which associated with organizational performance. It is consistence with the findings of Syed-Ikhsan & Rowland (2004) which prove that there is a positive relationship between knowledge sharing culture and knowledge transfer performance. The organization culture plays an important role in motivating its employees' performance which indirectly shows the performance of a firm.

2.5 Product Development

Many firms have now increasing relying on the integrated product development process which includes some practices such as customer involvement, supplier involvement and the use of cross-functional team as members sit and think together on the development of the new product in order to improve project performance (Clark & Wheelwright, 1993).

(a) *Customers and Supplier*

Knowledge shared by customers enables firms to understand customers' needs and most importantly to create value-to-customer (Calantone *et al.*, 1996). Therefore, the development of a product must be built following the requirement of the customers. A continuous intellectual work across the organizational functional team can help in creating high customer satisfaction which is a fundamental aspect in product development (Deshpande & Webster, 1993).

A cross-functional team of a product development consists of both internal and external members whereby supplier too plays an important role in building a sustainable product. Therefore, firm has to know the design, process and manufacturing capabilities of their suppliers (Hong, 2000). Knowledge from suppliers can assist product development team in searching for the right one following the information on suppliers' technological and process capabilities and constraints (Koufteros *et al.*, 2005).

(b) *Strategy*

Clark *et al.*, (1987) describe product development process as information processes. There are four steps involved during new product development which are conception generation, product planning, product engineering and manufacturing engineering. From the stages mentioned, team members can have a detail discussion on every part of the process development thereby helping firm to build a high capability and competitive product.

(c) *Innovation*

Firms may choose between exploitation innovation and exploration innovation for new opportunities in developing new product and opening up new market (March, 1991). Firm has to make a choice of choosing either one to continue their development (Benner & Tushman, 2002). Somehow, researchers proved that firms can have a balance in managing both side by having a balance budget and schedules that have flexibility to enhance innovation (Brown & Eisenhardt, 1998; Argote, 1999; Mirone *et al.*, 2004). This shows that there is a balanced strategy in a limitation environment to create new ideas.

2.6 Previous studies on product development

There are many methods and working models introduced by researchers in enhancing product development processes using knowledge management such as via the use of team vision, the use of transactive memory, the correlation between knowledge management and new product development, collaboration with supplier, target-marketing oriented customer knowledge management model (E-CKM), role change of design engineers' concept and integrated product development. All these methods and working model have proven useful in developing sustainable products in a competitive business world.

3. Research Methodology

The part of the paper discusses on the method that has been applied in this study to collect relevant information, so that it can achieve the research objective. Since the problem statement has been constructed, therefore, a conceptual framework is being developed so that the research method applied can analyse the data that has been collected. Thus, this research has been conducted to check the validity and accuracy of the research objective and to prove whether there is any relationship between knowledge conversion and product development.

3.1 Research Design

This is a quantitative study in the form of descriptive and correlation research. This study acquired relevant data in terms of numbers so that it can be put into statistical test to analyze for results. Descriptive research describes the current situation of a phenomenon and correlation shows the relationship between two variables (Salkind, 2012).

3.2 Population and Sample

The selection of sample affects the validity and reliability of the study in the hope to generalize into the population (Chua, 2006). In this study, the population is consisting of engineers and technicians working in Exzone Plastic Manufacturing Sdn. Bhd., Sharp-Roxy Corporation (M) Sdn. Bhd., and Industrial Quality Management Sdn. Bhd. in Sungai Petani, Kedah. The samples are 30 engineers and technicians from operation department, quality assurance department, R&D department, engineering department, and sales department.

3.3 Data Collection Method

The primary data for this study are being collected by survey method using questionnaires which are developed based on the information from the secondary source. A total of 30 set of printed questionnaires are distributed to the respective companies.

3.4 Research Instrument

The research instrument used for this study is questionnaire which is distributed during the conducting of the survey. The questionnaires are divided into 3 sections. Part A of the questionnaires determined the demographic characteristic of the respondents which related to gender, age, years in the organization and level of education. Part B in the questionnaire is subjects on knowledge conversion. The questions are based on the component under SECI model which have been determine in the literature review in chapter 2. The last section or part C focuses on product development. The design of this part is to seek the linkage of knowledge conversion process towards product development whereby how the conversion of knowledge affects in product development. The questionnaire for knowledge conversion process (Part B) and product development (Part C) is defined with five point Likert-scales.

A pilot test is being conducted to test and verified whether respondents understand the question asked in the questionnaire to avoid confusion due to writing error or invalid sentences structure. This

test helps to improve the quality of questionnaire before it is distributed to the respondents. In addition, this test can evaluate the relevancy of question design to ensure it is relevant to this study.

3.5 Data Analysis

All the data collected for this study is analyzed using Statistical Package for Social Science (SPSS) version 20. The data obtained from the analysis is presented in table form and graphical charts such as pie chart or bar chart. The data collected from the survey were then analyzed quantitatively by using descriptive and inferential methods. Both of the methods can ensure that the data being analyzed can produce sufficient result in an understanding and organized structure and able to determine the relationship between the variables. These analytical processes come out with relevant and required data in terms of low, medium, high, mean, standard deviation while the used of correlation test can obtained result for the relationship between two variables.

4. Research Findings

4.1 Respond Rate

A total of 90 sets of questionnaires are distributed evenly to each of the firm and the total questionnaires that are successfully collected back were 82 sets. The respond rate for this research is considered quite high whereby most of the distributed questionnaires are being returned. Thus, making the overall respond rate is 91 percent.

Table 2: Questionnaire respond rate

Questionnaire	Total
Number of sets distributed	90
Number of sets returned	82
Return percentage (%)	91.1%

4.2 Reliability Test

Cronbach's alpha is used to determine and measure the reliability and internal consistency of all the items whereby the value should be greater than 0.70 but under certain condition, the value lesser than 0.70 can still be acceptable (Ferreira & Palhares, 2008). The total number of questions in the questionnaire tested is 40 questions. The Cronbach's alpha value for the pilot test is 0.863. This value is higher than 0.70 which shows that the questionnaire is reliable and therefore can be used for the real study. After the real study is being conducted, the Cronbach's alpha value is 0.884. This shows that the questionnaire used is consistent and stable throughout the research.

4.3 Demographic Analysis

The following sections are the results of the findings in terms of demographics of the respondents. This part consists of respondent's gender, age, years in the organization and level of education.

(a) Gender

Based on the table and figure, there is a clear-cut between male and female whereby the number of male is higher than female. Among 82 respondents, male employees have 59 people while female employees have 23 people. In terms of percentage, male stands at 72%, while the female at 28%.

Table 3: Respondent's gender distribution

Gender	Frequency	Percent
Male	59	72.0
Female	23	28.0
Total	82	100.0

(b) *Age*

From the perspective of age, most of the respondents are aged between 21 to 30 years old. There are 49 of them which stand 59.8% from the whole sample. There are 32 respondents whose age are between 31 to 40 years old or 39% in terms of percentage. From table 4.2, there is only 1 respondent whose age is between 41 to 50 years old and make up of 1.2% of total percentage. There are no respondent whom age is between 51 years old and above.

Table 4: Respondent's age distribution

Age Range	Frequency	Percent
21 – 30	49	59.8
31 – 40	32	39.0
41 – 50	1	1.2
Total	82	100.0

(c) *Years in the Organization*

Based on table and figure, most of the employees have been with the organization less than 5 years which make up of 72 percent. On the other hand, there are only 20 respondents works between 6 to 10 years or 24.4 percent, while only 3 of them whom work with the organization between 11 to 15 years. They are 3.7 percent from the total sample. There is no respondent who work 16 years or more with the same organization.

Table 5: Respondent's years in the organization

Working Years	Frequency	Percent
Less than 5 years	59	72.0
6 – 10 years	20	24.4
11 – 15 years	3	3.7
Total	82	100.0

(d) *Level of Education*

In terms of education level, there are no respondent holds a certificate whereby most of them are bachelor's degree holder. There are 68 of them or 82.9 percent have a bachelor's degree. 10 of the respondents are diploma holders which stands at 12.2 percent of the whole sample. The remaining ones are those who have other qualification. 4.9 percent or 4 of the respondents are master's holders.

Table 6: Respondent's level of education

Education level	Frequency	Percent
Diploma	10	12.2
Bachelor's Degree	68	82.9
Others	4	4.9
Total	82	100.0

4.4 Descriptive Analysis

Descriptive statistic describes the phenomenon of interest which includes frequency on certain occurring event, average score of certain set of numbers and variability or the central tendencies and dispersions of the independent and dependent variables (Sekaran, 2003). Examples of measuring central tendencies are the mean, median and mode. Test to measure dispersions includes range, standard deviation and variance. On behalf of this research, both mean and standard deviation are being chosen to analyze the collected data.

(a) Mean Score Distribution and Standard Deviation

An average is one of the property of distribution for score or an individual value that is most representative of that distribution or set of scores. As mentioned above, one of the example for central tendency that is applied in this analysis is mean which is defined as the sum of a set of scores divided by the number of scores (Salkind, 2012). Based on the mean obtained from the questionnaires answered, the level of knowledge conversion process using SECI model is then classified into a range of low, medium and high, based on the extent level of mean developed by Tasmin & Wood (2008).

The range is the difference between the highest and the lowest scores in a distribution which is the simplest, most direct measure of how dispersed a set of scores. Standard deviation is the average amount that each of the individual scores varies from the mean of the set of scores (Salkind, 2012). Standard deviation is largely used in measuring variability or dispersion. The smaller a standard deviation the closer the data points to the mean, whereas higher standard deviation indicates that the data is spread out over a large range of values.

Table 7: Extent level of mean (Tasmin & Wood, 2008)

Extent	Range
Low	1.0 – 2.3
Medium	2.4 – 3.7
High	3.8 – 5.0

(b) Mean Score Distribution and Standard Deviation for the Level of Knowledge Conversion Process Using SECI Model

In the socialization mode, there are two items that has the highest mean value of 3.80. The first is being encouraged to attend seminar, training, workshop, and conferences followed by understanding of company’s business and goals. The item that scores the lowest mean value of 3.34 is spending time on personal interaction aside from organized meeting with people from other departments.

This result shows that employees gain knowledge mainly from attending seminars, training, workshop or conferences. However, there is a slight lack of interaction from different department in the same company. The overall mean value is 3.60 which fall into medium category based on the extent level above while the overall standard deviation is 0.587 which is low. This indicates that the data points tend to be very close to the mean.

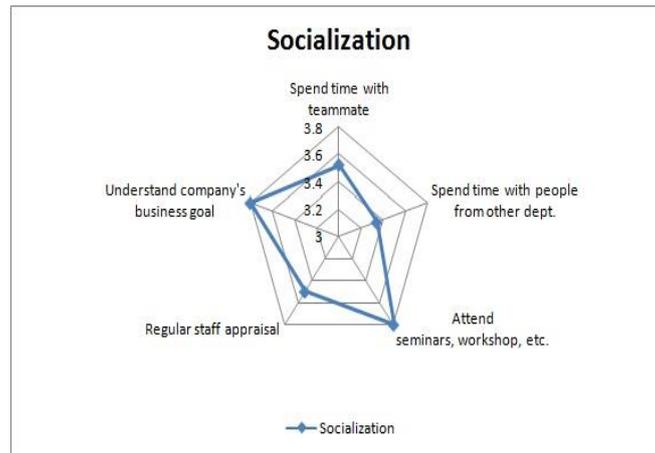


Figure 1: Level of knowledge conversion process (Socialization)

In externalization mode, the item that scores the highest mean is frequently used of internet as source of idea with a value of 3.99, while the item which scores the lowest is interviewing competent people on ideas or solution with regards to relevant technologies with mean value of 3.48. This result shows that most of the employees surf the Internet in order to search for ideas in developing a product.

However, when comes to technological issues there are only a small number of people use interview channel to search for ideas or solution. The overall mean is 3.73, which fall in the medium category while the overall standard deviation is 0.650, which is low. This indicated that the data is relatively close to the mean.

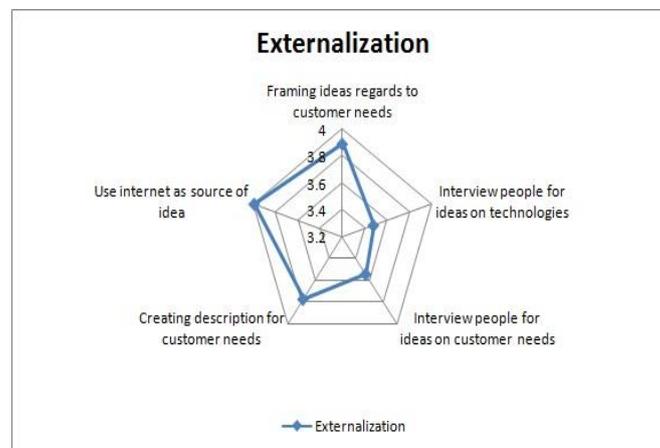


Figure 2: Level of knowledge conversion process (Externalization)

There are two items in combination mode that has the highest score of mean value of 3.88. The items are collection of information to develop rules, reports, and decisions and information classified into files, databases, network, and reports. Meanwhile, the item which scores the lowest mean is the information needed is clear and complete with mean value of 3.51.

This result shows that the organization collect relevant information in the process to develop rules, reports or even making decision. The overall mean is 3.74 which fall into high level of extent while the standard deviation is 0.730 which is high. This indicates that the data is spread out over a large range of values.

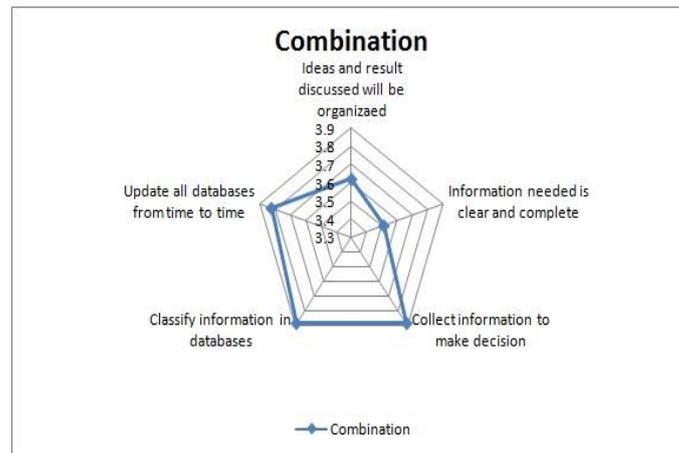


Figure 3: Level of knowledge conversion process (Combination).

The item in internalization which scores the highest mean is the use of inter-organizational network for information sharing and exchanging with the value of 3.71. Meanwhile, the item which scores the lowest value of mean is making a written summary of experience and subjects learned to suggest to related personnel with a mean score of 3.60. This means that the firm has an established internal network for their employees for sharing and exchange information. The overall mean is 3.66 which falls in the medium category while the overall standard deviation is 0.593, which is the lowest among all the modes. This indicates that the data point is very close to the scored mean.

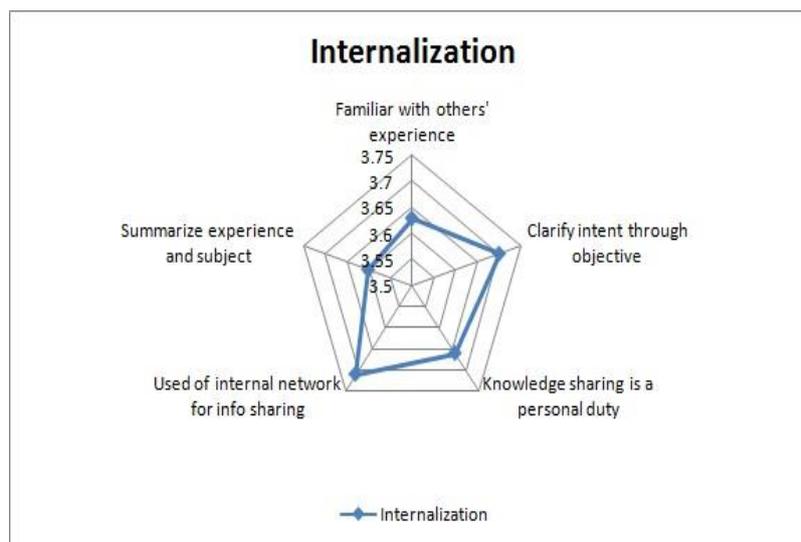


Figure 4: Level of knowledge conversion process (Internalization).

The overall level of knowledge conversion process has a mean value of 3.68 which is at medium level while the standard deviation is 0.549. Among the mode of knowledge conversion process, Combination has the highest mean score. This evinces that all the organizations have an organized system in collecting and keeping all the data. The firms itself are also established with a healthy inter-organization network for the use of sharing and exchanging information.

Table 8: Level of knowledge conversion process

KC Process	Mean	Standard Deviation	Extent
Socialization	3.60	0.587	Medium
Externalization	3.73	0.650	High

Combination	3.74	0.730	High
Internalization	3.66	0.593	Medium
Overall	3.68	0.549	Medium

4.5 Inferential Correlation Test

The analysis method that is being chosen to perform inferential test is bivariate analysis which is applied to determine the relationship between two variables and also to determine the strength and significant of the relationship (Palazzolo, 2010). In this study, the relationship that being determined are between knowledge conversion process and product development. Correlation is a necessary in providing a standard or fact of a research whereby the strength or intensity of a relationship can be measured. This provides a platform for assessment on how well two or more variables relates to each other. In order to determine whether a relationship exist between two variables, Spearman's rho (ρ) is used to test its existence. Based on the result for correlation coefficient obtained, the strength of correlation is then being categorized into an extent level suggested by (Dancey & Reidy, 2004).

Table 9: Correlation coefficient between knowledge conversion and product development

			SECI	PD
Spearman's rho	SECI	Correlation Coefficient	1.000	0.778**
		Sig.		0.000
		N	82	82
	PD	Correlation Coefficient	0.778**	1.000
		Sig.	0.000	
		N	82	82

** Correlation is significant at the 0.01 level (2-tailed).

Based on Table 9 above, the correlation between the levels of knowledge conversion and product development is 0.778 and according to the extent level of correlation, it strength is at high level. The correlation coefficient is being rounded up to one decimal place before squared and multiplied by 100 in order to get percentage value. Therefore, the levels of knowledge conversion shares about 64% of its variability with product development. This shows that there is an establish relationship between the level of knowledge conversion and product development. On the other hand, the significant level is 0.000 which is lower than the stated significant level which is 0.01. This evinces that this relationship is statistically significant.

Table 10: Extent level of correlation (Dancey & Reidy, 2004)

Extent	Range
Perfect	1
Strong	0.7 – 0.9
Moderate	0.4 – 0.6
Weak	0.1 – 0.3
Non – existent	0

5. Discussion and Conclusion

5.1 The Level of Knowledge Conversion Process among Employees Using SECI Model

The reason why the level of knowledge conversion is at moderate level is because most of the firms have just started to adopt KM approach, in their business operation and product development processes. Knowledge management is still a new concept to them whereby most of them are still in the early stage of implementation. According to Chong *et al.* (2006), many organization has just started to implement KM which they do not aware of the whole spectrum of KM implementation. Most of their employees are still not familiar with the actual function of knowledge management making knowledge management practices in Malaysia hardly successful, compared to other countries (Yap, 2009).

The second reason that could influence the practice of knowledge management is human factor. Firms should come out with a comprehensive plan that can integrate knowledge capability from all departments, in order to create value for the organization by letting the employees to understand what KM is and not afraid of their personal value to be affected after sharing of knowledge (Chong *et al.*, 2006). A strategic plan should be introduced, if an organization wish to run and establish such system.

Communication on the other hand is also one of the factors that affect the implementation of knowledge management, as language is one of the tools for communicating. From another perspective, language could be a factor that block communication among them, whereby the use of different languages could bring miscommunication that can cause problem in the process of knowledge sharing (Yap *et al.*, 2009). The richness in vocabulary is important when it comes to sharing as knowledge is shared using words to describe and if one party fails to describe a subject well, the whole knowledge conversion system could eventually fall due to lack in communication.

Management should promote a culture that encourages individuals to share their knowledge rather than keeping it to themselves. In order to begin a knowledge management program, the management has to identify their objective well, whereby what item or subject that they need and can be shared and the individual that is qualified and can access the knowledge system.

Organization could introduce new strategic initiative from time to time, which not only required human support but also financial assistance. Like almost all the strategic initiatives, knowledge management programs also required financial support. Since some of the organization is a medium or big scale company, it is still a challenge for them to implement such program whereby the organization would rather invest in other operation as they couldn't see a high value benefit of using the knowledge system. Therefore, knowledge management should be linked to an organization performance by finding a solution to illustrate the value-adding capability and return of investment (ROI) (Tehraninasr & Raman 2009).

There is a clear view that Malaysians are not outgoing, hardly proactive and they commonly feel inferior in comparison to other advanced nations. They are afraid that the knowledge they hold is not eligible enough to share and are scared that once they share their knowledge, others could find fault from the sharing and label the person as wrong and it became worst if that individual is a computer savvy (Yap, 2009). This may occur due to lack of confident whereby an individual doesn't have enough courage to admit that he or she knows a subject or face a correction by others. This inferiority complex occurs could be due to other extend of physical or psychological perspective.

5.2 The Relationship between Knowledge Conversion and Product Development

This study has evinced how knowledge sharing using SECI model has enhanced the product development processes namely customer – supplier, strategy, and innovation. This research shows that when a project team work under an environment that encourages sharing of knowledge can give impact on increasing value to customer and from supplier. The knowledge shared between customer and supplier can give guidance in product and process design efforts by focusing on the collaboration and development productivity through knowledge sharing and conversion in order to achieve product development goals (Hong *et al.*, 2004). The collaboration between customer and supplier can help to

improve the performance and operation of a product whereby one of them is the end user while the other has the technology that can help in providing material to create a product for the end user. This chain of supplier, manufacturer, and customer can guide the product development process in gaining value to customer and generating profit for the organization.

A good product development required a strategy that can cover all the areas whereby all departments need to contribute in developing a competitive product. The finding of this research is consistent with the previous research performed by Liu *et al.* (2005). It is proven significantly that the stronger the knowledge management method, the more complete new product development strategy, the better the new product development performance. A good product development strategy can differentiate a “good” product in a market which eventually helps to cut short product time-to-market and at the same time keep cost down, according to budget or able to save more cost. Therefore, to survive, organization must understand the market conditions before accessing a product development strategy (Liu *et al.*, 2005).

Innovation has an important role in a firm’s product development whereby it could be between exploitation or exploration innovation. Somehow, an organization can still focus on both by managing a balance and flexible budget and schedule practices (Mirone *et al.*, 2004). This research is in consistence with the result found by Wang *et al.* (2012) whereby there is a possible mechanism in which the practice of knowledge sharing can contribute to innovation and performance. This relationship between knowledge sharing and innovation can provide guidelines to organization in order to achieve a better performance in product development. Firms can focus on the importance that can lead to the explicit or tacit knowledge sharing in improving the speed and quality of innovation by giving a proper consideration on the strategies and implementation of programs (Wang *et al.*, 2012).

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