

Analyzing the Impact of Knowledge Management on Technological Innovation: An Empirical Study of Electrical and Electronics Industry in Malaysia

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ABSTRACT

Knowledge and technology have gradually been regarded as a strategic asset and the key sources of competitive advantage for growing number of organizations. Due to the acceleration of the global economy, the rapid progress of information technology, and the various expectations of customers, today's business environment is rapidly changing and competition has intensified. By looking to this, the drive of this empirical study is to assess the impact of knowledge management on technological innovation. This research was conducted with a sample of 287 electrical and electronics (E&E) companies from Malaysia. A technique of partial least square (PLS) properties of structural equation modeling (SEM) is used to test the obtained data. The findings indicate a significant relationship between knowledge management and technological innovation. Therefore, this study provides understanding the importance of knowledge management on technological innovation. This study is then contributing theoretically, managerially and methodologically with an increase of understanding on the importance of knowledge management on technological innovation in Malaysia's E&E industry.

KEYWORDS: Knowledge Management, Technological Innovation, Electrical and Electronics (E&E) Industry, Malaysia, Manufacturing Industry

1. INTRODUCTION

Since the 1980s, Malaysia remained as an upper middle-income country. From this, Malaysia government is looking to advance the country to high-income country by the year 2020. It is undertaking to figure out the root cause of this long stagnation so that the issue can be handled effectively. According to Dutta, Lanvin and Wunsch-Vincent (2015), the main reason for the slow pace of nation Gross Domestic Product (GDP) growth since 1997 is largely a result of poor performance on the productivity proportion of inputs and outputs of innovation. Despite

Malaysia was ranked in the ten highest-ranked in the Global Innovation Index (GII) among those upper middle-income country, where Malaysia was ranked in the place of 35th in the world in the year of 2016. Undeniably, this is a key element that the government concern the most, and struggled to increase innovation performance in our country.

Nowadays, the use of knowledge and information has been increasing everyday in all types of organizations in order to simplify all the activities and enhance the process decisions making (Nawab, Nazir, Zahid, & Fawad, 2015). According to Rasiah (2010), the E&E companies have progressed at different levels of innovation activities. Nevertheless, only a small number the companies engaged in high value added activities, and it is found that this industry is slow in catching up with innovation activity which involved knowledge intensive that related to creative accumulation (knowledge path that leads to the innovation path). The importance of managing the organizations information and knowledge becomes very vital. This kind of activity is significant since it is required to generate new cycles of innovation which would encourage companies to compete in the global economy (Rasiah, Kanagasundram, & Lee, 2011). Due to this situation, it might create barriers to hold back of this industry.

Moreover, the industry seems to have reached saturation level and innovative effort is needed to be expanded to more companies. Despite, recent encouraging signs of upgrading the technological and value-added activities at the company level, however, it is still not clear if the change in this industry is coming fast enough in the scale that can trigger large externalities and furthermore the innovation agenda remains driven by multinational companies (NEAC, 2010). Additionally, there were also little studies which focused specifically on the relationship between knowledge management and technological innovation. Thus, the goal of the study is to highlight the relationship between knowledge management and technological innovation of E&E industry in Malaysia. Consequently, this will further enrich our knowledge on the knowledge management and technological innovation in the context of E&E industry as it is still rarely discussed in literature.

2. LITERATURE REVIEW

2.1. Knowledge Management

Knowledge management is a sensible effort to provide the right people with the right knowledge at the right time, this will enable the knowledge to be shared and put into action (Scarborough, 2003). With the complexities of knowledge composition in nature of the formation of knowledge, knowledge management is aim to improve the competence and efficiency of managing knowledge asset (Inkinen, Kianto, & Vanhala, 2015). Nnabuiife (2009) argued that “since people have different types of knowledge from different backgrounds and fields of study and, of different quality and form, information gathering process is seen as very important to decision quality”. It is also worth noting that internal source of information is usually cheaper (Nnabuiife, 2009).

Moreover, knowledge management is a concerted effort to capture the critical knowledge of the organization, share the knowledge within the organization, and highlight the knowledge in the collective memory of the organization to improve decision making and increase productivity and innovation (Spreitzer, 1997). Knowledge management involves acquire the valuable

knowledge, wisdom, and experiences of employees and facilitating the retrieval and maintenance of knowledge as an asset of the organization. Knowledge management is an effort to convert the knowledge of employees (human capital) to the common organizational asset (structural intellectual capital) (Golmoradi & Ardabili, 2016). Knowledge management is a set of processes that convert information within the organization into valuable knowledge.

2.2. Technological Innovation

With regards to technological innovation, the increasing pressure from global competitiveness, decreased product life cycle and ease of imitation, make it necessary for the companies to continue their innovation in order to remain competitive. Such pressures are also urging companies to create and innovate to improve their product competitiveness in terms of design, quality and service reliability. As such, companies have to advance their innovation capability to develop and commercialize new technologies effectively and bring about the development of technological innovation throughout the organization to reinforce their competitive advantage (Aljanabi & Noor, 2015; Börjesson, Elmquist, & Hooge, 2014; Wang, Lu, & Chen, 2008). The implementation of technological innovation and new technologies is an important part of development processes. The literature suggests that the success of each organization is rooted in the technology of its own localization efforts. Indigenous technological innovation can be produced from the reinventing of historical technology or the adaptation of local technology from advanced industrialized countries (Letangule & Letting, 2012).

2.3. Relationship between Knowledge Management and Technological Innovation

Companies will use different mechanisms to seek external knowledge throughout various sources for the purpose to enhance levels of innovation (Jung-Erceg, Pandza, Armbruster, & Dreher, 2007; Meinschmidt, Foerstl, & Kirchoff, 2016; Weigelt & Sarkar, 2012). Manufacturing companies are likely to create and manufacture high-end products by the high dependence of technological innovation (Ke-xin, De-hua, Ren-feng, & Bai-zhou, 2006). The essential of knowledge management with linkage to innovation is that it gives an endeavor to create and enhance their capability of organization capability to innovate. The organization existing “knowledge base” set up its degree and scope to understand and apply new knowledge in the process of decision-making, critical problem solving or developments (Ahuja & Katila, 2001). Knowledge which “based on the experience learned implicitly and internalized by individuals is known as tacit knowledge, and that which you learn in a rational manner and exteriorized form is known as explicit knowledge” (Nonaka, 2008). From a strategic perspective, the internal resources of a company play a double role in innovation because they determine the possibility of use and external knowledge (W. Cohen & Levinthal, 1990; W. M. Cohen, 2010).

Rapid changes in the environment and the specialization required by technological advancements are pushing companies to use primarily external knowledge (Zhu, Wittmann, & Peng, 2012). Damanpour and Aravind (2011) inspire study on the effect of innovation on technological capabilities. Technological innovation is demarcated as the application of noteworthy changes in corporate structure or governance strategies that are planned to enhance an organizations utilization of knowledge, the nature of products and services, or the

proficiency of work processes. Knowledge management will assist the business organization to express tacit knowledge in explicit knowledge form which is a powerful foundation for technological innovation. Therefore, the following hypothesis is formed:

H1: *Knowledge management will have significant and positive effect on technological innovation of electrical and electronic industry in Malaysia.*

3. METHODOLOGY

The present study employs a quantitative approach research design. This study intends to gather data to answer research questions and explore objective research. In this study, a self-administered survey was distributed to E&E companies in Malaysia. The unit of analysis selected is the organization (company), where data was collected from the targeted respondent which is from mid-level managers. One of the respondents was chosen to represent a company only. Considering this matter, the targeted respondent should be someone who is familiar with the operations of the company and someone that manage the operation in the company. Moreover, with their knowledge, skills and experiences, their perceptions are more valid. In this study, there is adaption of measurement items from past surveys or questionnaires. Consequently, 287 primary data have been acquired from mid-level managers which the data are then investigated by utilizing both Statistical Package for Social Sciences version (SPSS) 20.0, and the further analysis results through Partial Least Squares Structural Equation Model (PLS-SEM) of SmartPLS 2 M3 software. The present study seeks to measure all variables by using a 5-point Likert scale where survey question is referred to agreement degree such like “1= strongly disagree, 2= disagree, 3= neutral, 4= agree and 5= strongly agree”.

4. RESULT

Since the measurement items for these variables are 5-points for the Likert scale, the interpretation of the mean score is divided into low, medium and high. The mean score of 1.00 to 2.33 is dispensed with as low, the mean score of 2.34 to 3.67 is dispensed with as moderate, and the mean score of 3.68 to 5.00 is dispensed with as high (Lopes, 2012). Thus, this section is concerned with the descriptive statistic for the latent variable in the present study.

Table 1: Descriptive Statistics for Knowledge Management and Technological Innovation

Construct	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Knowledge Management	287	4.02	0.025	0.425
Technological Innovation	287	3.83	0.037	0.623

Descriptive analysis of the means and standard deviations of constructs are shown in Table 1. The descriptive statistics for the constructs used in the study to figure the overall mean for a

range of latent variables between 3.83 and 4.02 which showing the high mean score. Among the constructs, knowledge management had the highest mean with the value of 4.02 and technological innovation with the value of 3.83. Moreover, both construct having a very small standard error for mean of the value of 0.025 and 0.037. The standard deviation for both constructs are 0.425 for knowledge management, and 0.623 for technological innovation. These results indicate that middle-level managers having high ability to manage knowledge in E&E industry, and the organization can perform the technological innovation at a substantial level.

The confidential intervals of path coefficients were determined through the bootstrapping technique. The bootstrapping technique utilizes the repeated random sampling by replaced with the original sample. This technique is used to generate a bootstrap sample of the standard error of the final hypothesis test (Hair, Ringle, & Sarstedt, 2011; Hair, Hult, Ringle, & Sarstedt, 2014). Moreover, the number of cases of the usable sample (n = 287) was set before running the bootstrapping in PLS 2.0 and the number of bootstrap samples was set to 5,000 based on the recommendation of some researchers (Hair *et al.*, 2011; Reinartz, Haenlein, & Henseler, 2009). The result is shown in Figure 1 below:

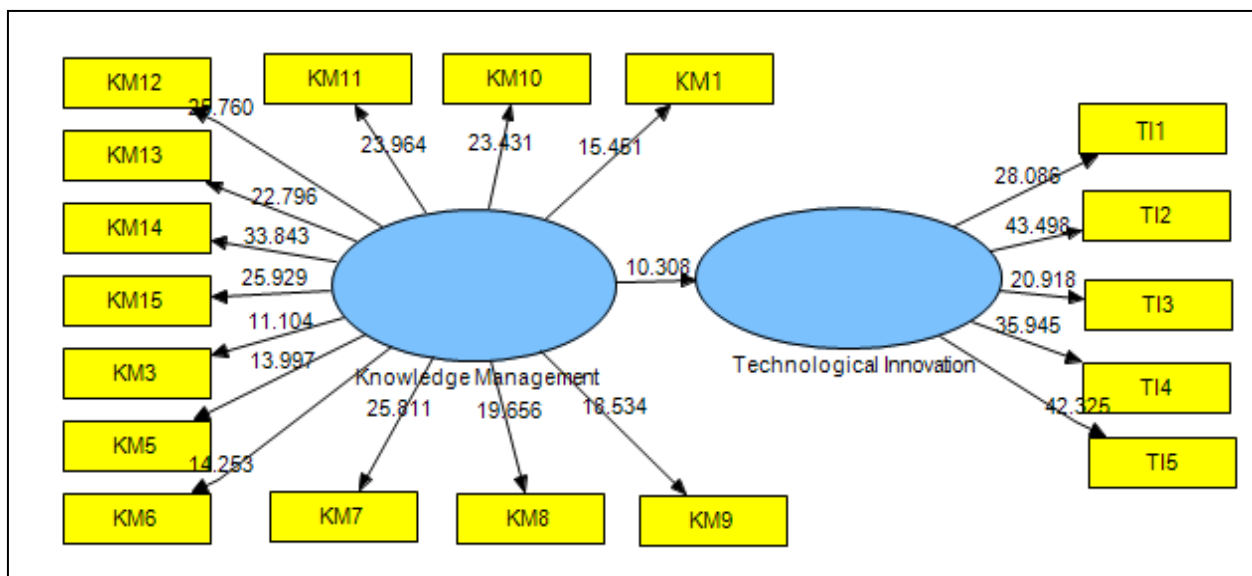


Figure 1: Hypothesis Testing

Additionally, Table 2 below presents the results generated from the hypotheses testing on the influence of knowledge management on technological innovation. The results reveal that knowledge management has positive influence on technological innovation at significant level of $p < 0.01$ with T value 10.31. Hence H1 is supported in this study.

Table 2: Hypothesis Testing

Hypotheses	Relationship	Beta Value	Standard Error	T Statistics	Supported
H1	Knowledge Management → Technological Innovation	0.485	0.047	10.31	Yes

5. DISCUSSION

As indicated by the results of H1, this study attests that knowledge management significantly influence on technological innovation of E&E industry in Malaysia. The study notes that knowledge management and technological innovation of E&E industry have a strong positive relationship. Thus, this result is parallel to the results obtained by Lai and Lin (2012). This indicates that, when business organization improves the way of managing its knowledge resources can lead to technological innovations in their organization. The employing of knowledge management in their organization will enhance their efficiency of technological innovation. In order to initiate innovation, the organization should classify richness of knowledge. Organizations that able to assess and use new knowledge more quickly can help in enhancing innovation compared those organizations not do so on these aspects.

6. CONTRIBUTION OF STUDY

The findings of this study have several contributions to theory, methodology and practice. The following subsections discuss each contribution.

6.1. Theoretical Contribution

Even though the knowledge management is playing an increasingly large role in organizational development, there is a very limited amount of empirical studies that look at the influence of knowledge management towards technological innovation. In relation to theoretical impacts, the present study contributes additional knowledge to the relationship between knowledge management and technological innovation. Specifically, the positive linkage between the between knowledge management and technological innovation that indicated in this study has proved that the two of these variables are important in an organization.

6.2. Managerial Contribution

Our findings are especially valuable for managers, as we examined the influence of actual managerial practices on technological innovation. Thus, this study relates to the managers' daily work and could spark interest and actions among them. The finding reveal that knowledge management was a related challenge that will bring significant implications for managers. The findings of this study indicate that managers should take into account how the current knowledge management can help to influence the technological innovation of an organization.

It is necessary to managers to be knowledgeable about how the current knowledge management can help to manage the change of new technology in the market. This is especially important in businesses which are about to change radically. For example, as this study implies, it is not an easy task to change to a service oriented value proposition if the roots of the organization are deeply in manufacturing.

6.3. Methodological Contribution

This study provides methodological contribution to the scholarly discussion on knowledge management and technological innovation. This study provides value to the proposed requests by the literature about the empirical evidence of the knowledge management and technological innovation concept. Moreover, the application of the PLS-SEM analysis in the present study is also considered to be a methodological contribution. This is because the PLS-SEM analysis promotes better quality and gives useful features of research with more accurate results. Furthermore, to date there are only a few previous studies in the knowledge management field that used PLS-SEM analysis for testing hypotheses.

7. LIMITATION AND FUTURE RESEARCH RECOMMENDATION

This study includes knowledge management as the only predictor of technological innovation which included this study scope. Future researchers may take in other predictors of technological innovation which this study took into consideration such as psychological empowerment, organizational learning, organizational culture, and absorptive capacity. Moreover, technological innovation is also recommended to be used as mediating role in the future study. An outcome of organizational business performance can be used as the outcome in future research. Additionally, all of these variables can be further group by different dimension to increase their explanatory power. For example, knowledge management can be divided into knowledge creation, knowledge acquisition, knowledge sharing, knowledge utilization, and knowledge storage and knowledge protection.

8. CONCLUSION

This study identified the vital role of knowledge management in technological innovation of Malaysia's E&E industry. The results of the study show that knowledge management has a significant and positive effect on technological innovation of E&E industry in Malaysia. The role of knowledge management is important in improving the efficiency of technological innovation. The presented study contributed to the previous studies through empirical evidence. The research also contributes to academics and practitioners. The further studies are recommended to reexamine these variables to strengthen the results. Besides, the findings can help management to understand the benefit to implement knowledge management and justify strategic investment in knowledge management. The insights obtained from this research will help managers to have better understanding on how and why knowledge management is effective at improving technological innovation. In summary, this research provides much-needed insights and guidance to help the organization's managers maximize the benefit from knowledge management in future.

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