KNOWLEDGE MANAGEMENT AND INNOVATION IN PENINSULAR MALAYSIA

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ABSTRACT

Knowledge Management is frequently cited as one enabler of firm innovation especially among Western corporations. There is scant reported research that supports for such empirical links especially in the Malaysian context. There is a need for local research to address the KM practices, concepts, instruments, and effects. Using data from 149 Malaysian large manufacturing firms, a KM practices survey which comprises of five key domains are investigated. Measurement model analysis is engaged to confirm significant relationships between variables and their respective KM factors. Subsequently, structural model analysis is applied to test theory of structural relation between KM and innovation.

Keywords

Knowledge Management, Innovation, Manufacturing

1.0 INTRODUCTION

Knowledge management (KM) is increasingly recognized within manufacturing firms as a critical approach that can be harnessed to attain competitive position and superior performance. Managers realize that KM draws on principles, practices, and technologies from a wide spectrum of disciplines. These disciplines include management information system, computer science, behavioral science, organizational learning, research, and training. During the late 1980's, managers in several industries believed that advances in technology prepared them to manage knowledge effectively. However, they soon discovered that managing knowledge is not a simple issue of managing technology, but it also requires managing social relations and interactions in the firm. Gooijer (2000) defined knowledge management as "those actions which support collaboration and integration". Yahya and Goh (2002) described KM as a process to enhance knowledge application to achieve innovation for improving business performance. Although the above definitions carry their own perspectives, there is likely to be a consensus that KM as a socio-technological based system that supports collaboration and integration among interlocking organisational functions to create more innovative and value-added products and services for the market (Tasmin and Woods, 2007). Knowledge management practitioners and researchers alike support the view that KM requires the integration between the IT systems and people who run the firm as means to attain innovation.

1.1 KM and Innovation Research

The perceived link between knowledge management and innovation has been widely discussed by scholars and practitioners in KM literature (Darroch, 2005; Takeuchi and Nonaka, 2004; Darroch and McNaughton, 2002; Carneiro, 2000; Brand, 1998). However, many of these knowledge management-innovation studies are based on Western framework and setting. Furthermore, knowledge management studies in Malaysia are limited to investigating extent of KM awareness and practice, exploring perception of KM issue, and determining KM relation to competitiveness and employees attitudes. An empirical research on KM approach among electrical and electronic firms in Malaysia revealed that most organizations were lacking of clear KM strategy (Sharma, 2003). This study, however, is limited to only a segment of Malaysian manufacturing. Hashim, Mahajar and Ahmad (2003) reported on innovative practices among 50 small and medium enterprises. Chowdhury (2004) reported employees' perspective of KM issues which focused on a case study at a large petrochemical firm. Thus, the idea of researching KM practices and innovation based on the whole Malaysian manufacturing industry context took its shape.

2.0 RESEARCH QUESTION

The followings are the research questions that this study seeks to find the answers.

Research Question 1

What is the outlook of KM practices among large manufacturing firms in Peninsular Malaysia?

Research Question 2

Is there any significant difference in KM practices (leadership, culture, technology, process, and measurement) in terms of firm's demographics (operation years, annual sales, total employees, ISO)?

Research Question 3

Is there significant relationship between KM enabling practices and firm's innovation activity?

3.0 RESEARCH FRAMEWORK

Though practitioners and scholars differ in some of their KM approaches, they do project common knowledge practices in culture, technology, and process. However, they are on separate distance on KM practices of strategy, content, structure, and measurement. Since practitioners and scholars more often than not have their own perspectives, this research proposes the combination of both perspectives. This KM research proposition for knowledge management practices pivots around leadership, culture, technology, process, and measurement (Table 1). The argument here is that this proposition encapsulates the overall "best practices" of knowledge management in both worlds of practitioners and scholars alike. The next sections elaborate on research methodology and data analysis, prior ending it with discussion and conclusion.

4.0 RESEARCH METHODOLOGY

The study utilizes stratified random sampling in which firms are chosen based on 871 large manufacturers in Peninsular Malaysia, listed by a database directory of Federation of Malaysian Manufacturers (FMM), 37th edition. The KM survey consists of 31 questions with 5-point Likert scales which were adapted from Tovstiga and Korot (2000), namely organizational Knowledge Practices Survey. The innovation questionnaire was adapted from Johannessen, Olsen and Lumpkin (2001) of innovation as "newness" perspective. This study applies **SPSS** statistical tests and **AMOS5** structural equation modeling (SEM) software to determine relationship between KM enabling practices and innovation activities. Maximum likelihood estimation (MLE) is one most widely used estimation procedure under a structural equation modeling (SEM) approach. Hair, William, Babin, Anderson and Tatham (2006) suggested that minimum sample sizes between 100 and 150 are required to achieve stable MLE results. The research conceptual diagram shows the linkage between firms' demographics, KM practices, and innovation (Figure 1).

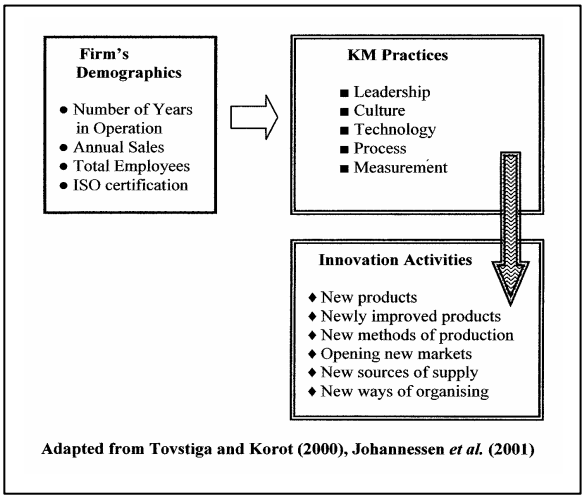


Figure 1: Conceptual study of KM and innovation

Table 1: Comparative matrix of KM practices and Research Proposition

Knowledge Enabling Elements	Tovstiga And Korot (2000)	Small and Tatalias (2000)	Gold *et al.* (2001) & Lindsey (2002)	Girard (2005)	**KM Research Proposition**
Leadership Culture	Culture	Culture	Culture	Leadership Culture	**Leadership** **Culture**
Technology	Insfrastructure	Technology	Technology	Technology	**Technology**
Strategy					
Process	Process	Process - capture - internalize - exchange - reuse	Process - acquisition - conversion - application - protection	Process - socialization - externalization - combination - externalization	**Process**
Measurement		Measurement		Measurement	**Measurement**
Others	Content	Content, Policy, Strategy	Structure		

5.0 DATA ANALYSIS

A total of 149 usable data received out of 871 large firms being surveyed. The rate of response is 17.1%. It is ascertained that the outlook of KM practices among Malaysian large manufacturing firms is at overall mean value of 3.06, which is considered at a moderate extent. This serves as the answer to the first research question. The outlook of KM practices can be better viewed in a radar chart (Figure 2). It shows both current and perceived importance perspectives.

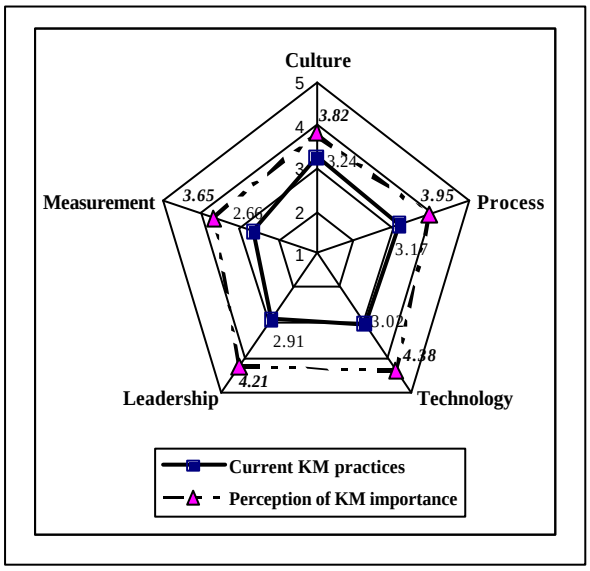


Figure 2: KM radar chart

Subsequent analysis involves the regression between firm's demographics and elements of KM practices to determine significant differences among them (Table 3). There is significant difference in knowledge technology between firms with ISO certification and those without (p=0.04). This signifies that ISO certified firms have higher level of knowledge technology. In sum, there is a significant difference in the overall KM practices (F=2.275, sig. f =0.05) particularly among firms with high annual sales of above RM151 million/year. This answers the second research question. The finding conforms to other research reports that claimed KM is widely practiced among large corporations (Takeuchi and Nonaka, 2004; Bhatt, 2001; Brand, 1998).

The last analysis was executed using the Structural Equation Modeling (SEM) technique, via software AMOS 5, to determine the relationship between KM practices and innovation. The SEM technique consists of two components also known as two-step approach (1) the measurement model and (2) the structural model. The measurement model is the first stage in the SEM approach. The measurement model analysis is in fact a multiple indicator approach which has tendency to reduce overall effect of measurement error of variables toward resulting output accuracy (Hair *et al.*, 2006). There are 6 measurement models, namely leadership, culture, technology, process, measurement, and innovation in this study. Measurement models for leadership, culture, technology, process, measurement, and innovation are shown in Figure 3, 4, 5, 6, 7, and 8 with good fit indices.

Table 3: Regression Analysis of KM practices with respect to firm demographics

KM Element Analysis		Leadership	Culture	Technology	Process	Measurement	Overall KM
T-Test	t	1.503	0.764	2.048	1.138	0.44	1.371
ISO	p	0.13	0.45	**0.04***	0.26	0.66	0.17
	Evaluation	NS	NS	S	NS	NS	NS
ANOVA	F	1.697	1.749	1.29	1.52	0.163	1.43
Years	Sig. f	0.17	0.16	0.28	0.21	0.92	0.24
	Evaluation	NS	NS	NS	NS	NS	NS
ANOVA	F	0.407	0.579	0.453	0.679	1.454	0.605
Employees	Sig. f	0.84	0.72	0.81	0.64	0.21	0.7
	Evaluation	NS	NS	NS	NS	NS	NS
ANOVA	F	2.639	1.833	3.474	1.412	0.674	2.275
Sales	Sig. f	**0.03***	0.11	**0.005***	0.22	0.64	**0.05***
	Evaluation	S	NS	S	NS	NS	S
Remark:		>$151mil/yr		>$151mil/yr			>$151 mil/yr

Note: S=significant; NS=not significant.

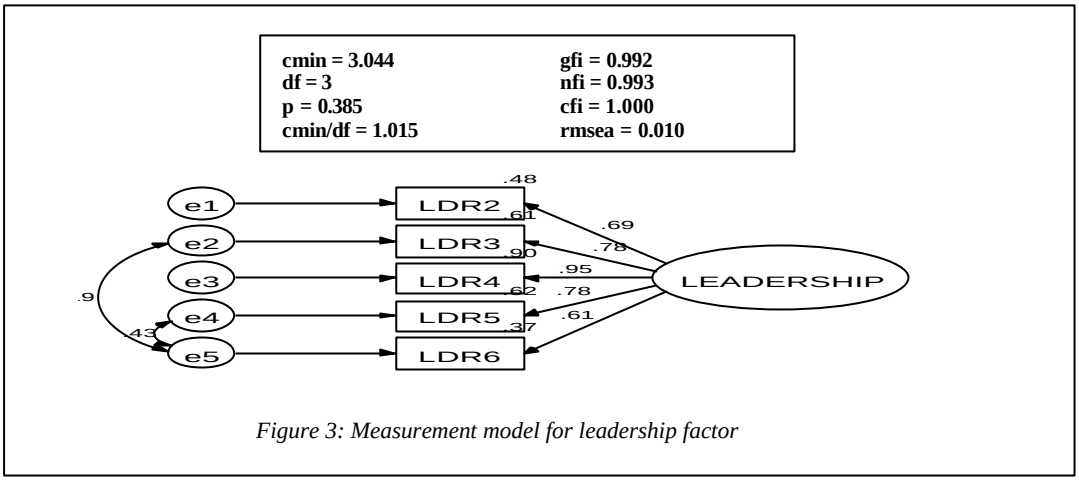


Figure 3: Measurement model for leadership factor

Figure 4: Measurement model for culture factor

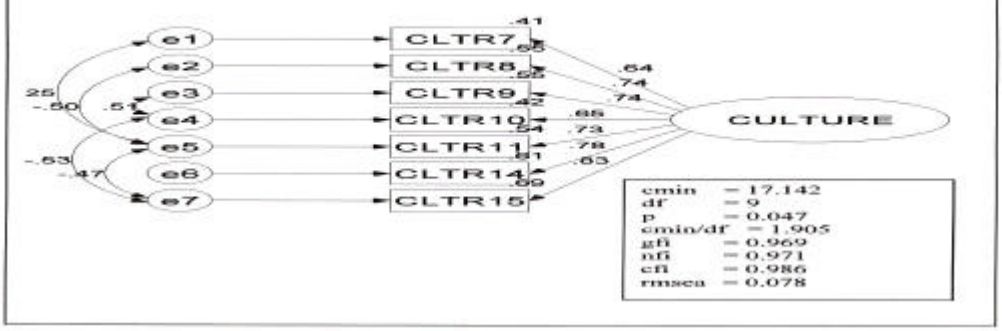


Figure 5: Measurement model for technology factor

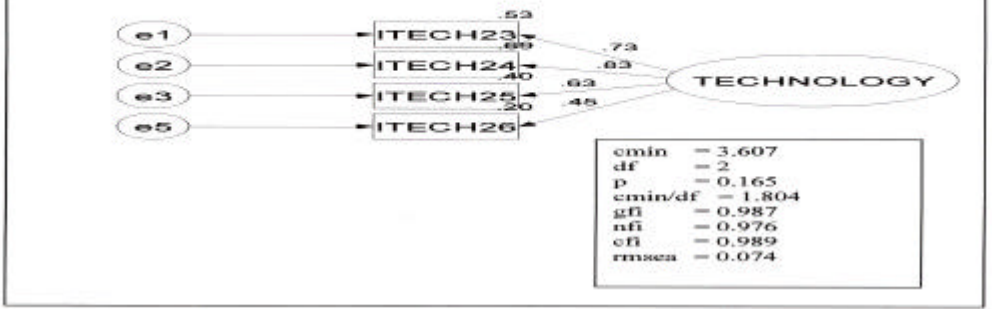


Figure 6: Measurement model for process factor

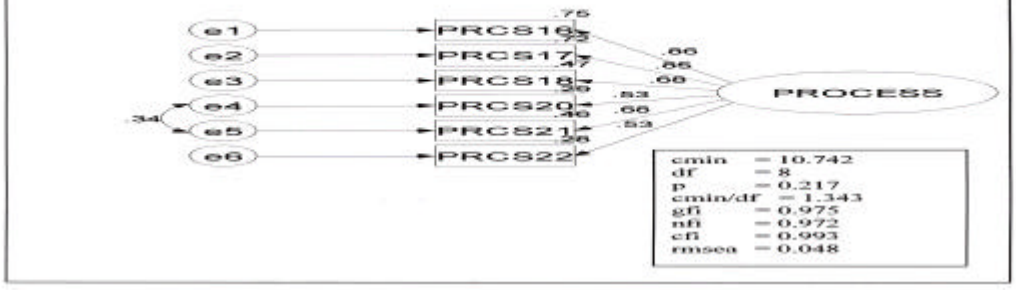


Figure 7: Measurement model for measurement factor

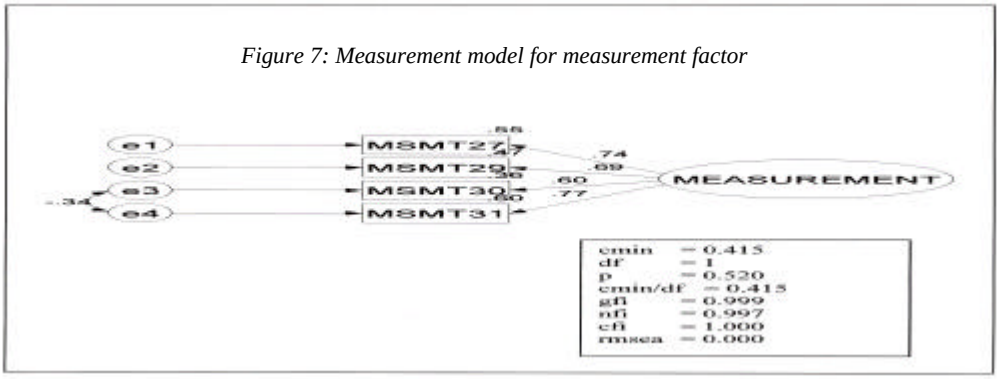


Figure 8: Measurement model for innovation factor

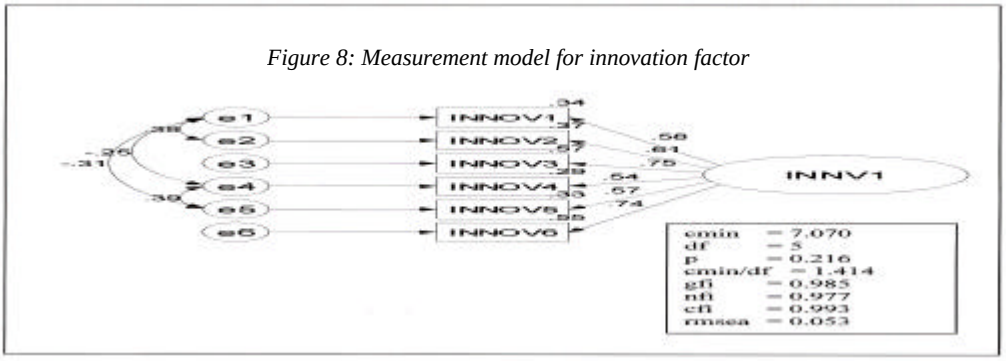
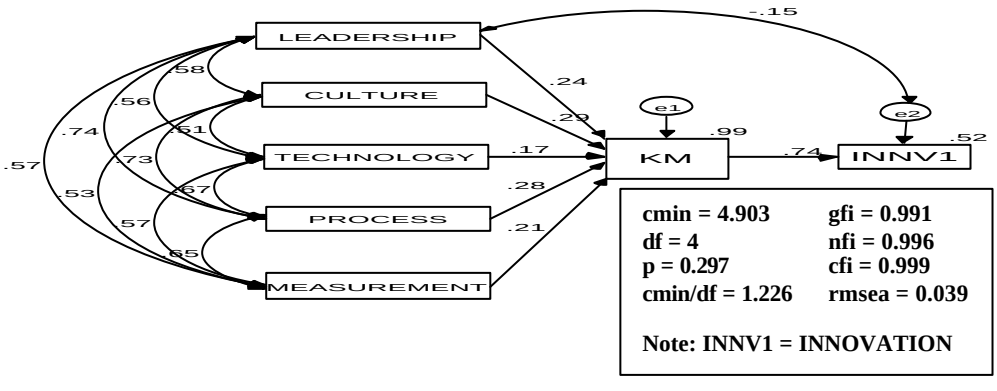


Figure 9: Structural model of KM and Innovation



The measurement model analysis of leadership (Figure 3) consists of 11 variables, namely LDR2, LDR3, LDR4, LDR5, LDR6, LEADERSHIP, e1, e2, e3, e4 and e5. The measurement model for knowledge leadership was evaluated using a covariance matrix of the five indicators. Modification indices (MI) were evaluated. Based on the MI values, the following two covariances of measurement errors were allowed to be correlated: (1) e5 and e2; and (2) e5 and e4. According to Hair *et al*. (2006), the five determiners are ratio of cmin-df, goodness-of-fit index (GFI), normed fit index (NFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). The model fit indices are all within specifications. Cmin/df is 1.015 (spec. < 2.0), GFI equals 0.992 (spec. > 0.9), NFI equals 0.993(spec. > 0.9), CFI equals 1.000 (the perfect level), and RMSEA equals 0.010 (spec. < 0.050). Suggested specifications are based on Hair *et al*. (2006). Similar analytical processes were applied to the other 5 measurement models. Results show that they complied with the required specifications.

Subsequently, the structural model is the second stage and last step in the SEM approach. This model integrates and correlates all factors to the KM construct. It also provides a structural link from the KM construct to the innovation factor (Figure 9). The full structural model result shows that there are 11 correlations and covariances to achieve stable model fit estimates. Figure 9 displays its indicators of fit: Cmin/df = 1.226 (Cmin = 4.903, df = 4); GFI = 0.991; NFI = 0.996; CFI = 0.999; RMSEA = 0.039. In sum, figure 9 empirically shows that KM has a highly significant influence (ß=0.74, p=.0001) on firm Innovation activity (R^2=0.52). Thus, relationship between KM and Innovation is well supported. This finding answers the third research question.

6.0 DISCUSSION

This research finding of KM significant and influential effect to innovation is consistent with prior study by Gloet and Terziovski (2004). The authors reported that an integrated human resource management (HRM) and humanist KM approach was correlated positively to innovation performance by applying Pearson correlation method. The authors also recommended that managers focus more attention on the HRM practices when designing organisational strategies for innovation. In another study based on 443 New Zealand firms, Darroch (2005) reported that knowledge acquisition, knowledge dissemination, and knowledge response were positively influencing innovation.

7.0 CONCLUSION

Knowledge Management has been regarded as one vital management approach in new era of k-based economy. Harnessing knowledge strength that a firm has leads to higher performance through innovation. Innovation is firm's life line for continuous survival and profitability. It has been shown empirically that large manufacturers in Peninsular Malaysia attain moderate extent of KM practices. The study has reported that there is a significance difference in KM practices especially among firms with high annual sales. As a conclusion, it is fair to state that high sales among large manufacturers do affect KM practices which are highly significant in influencing innovation.

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