



Knowledge management practices and performance: are they truly linked?[†]

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Abstract

Knowledge management (KM) has often been claimed to be an essential ingredient in building competitive advantage. Yet, KM adoption is relatively slow, especially in the Malaysian context. Most organizations are unsure if the promised performance improvement is just a passing fad. This study intends to provide empirical verifications to support the link between KM practices and performance outcomes for organizations. Responses from 180 knowledge-based organizations were analysed. The analysis indicated that knowledge acquisition and knowledge utilization positively influenced strategic and operational improvement in organizations, whereas the positive effect of knowledge dissemination was only evident in the case of strategic improvement. Organization size had some interesting moderating impact on the tested relationships.

Knowledge Management Research & Practice advance online publication,
12 March 2012; doi:10.1057/kmrp.2012.5

Keywords: knowledge management practices; knowledge acquisition; knowledge dissemination; knowledge utilization; performance; organization size

Over the past years, knowledge management (KM) has gained impetus as the key ingredient for success. KM practices have been strongly advocated by most researchers in building the organization's competitive advantage and delivering improved performance (Davenport & Prusak, 2000; Ming Yu, 2002; Syed-Ikhsan & Rowland, 2004; Zack *et al*, 2009). Businesses are expected to espouse and employ KM practices to facilitate their endurance in an increasingly dynamic and competitive business environment.

However, numerous organizations are not aware of the positive implications that KM practices may have (López-Nicolás & Meroño-Cerdán, 2011). This is especially true of several Malaysian organizations. Although Malaysian organizations are generally found to be highly conscious of KM and its imminent benefits (Chong, 2006), they are yet to be convinced. These organizations are not sure if this is just a momentary fad. Hence, they tend to adopt a 'wait and see' approach (Woods, 2005), which has evidently contributed to the sluggish implementation of KM. Several researchers (e.g., Toh *et al*, 2003; Rahman, 2004; EPU, 2009) reported that KM in Malaysian organizations is still in its formative years.

Vetting through the list of winners of The Global Most Admired Knowledge Enterprises (MAKE) award from the year 2006 until now, one would notice that most Malaysian companies are not keeping pace with their global and Asian counterparts. The research by EPU (2009) has also reported similar findings in which Malaysian organizations were found to be lagging behind their foreign counterparts from leading economies. It was disheartening to note that no Malaysian organizations were listed as a

[†]A previous version of this article was presented at the IBIMA Conference, Kuala Lumpur, Malaysia, June 2009.

Received: 18 June 2010

Revised: 29 November 2011

Accepted: 23 January 2012

winner of the award. Only Petronas (Malaysia) was nominated and emerged as one of the finalists. On the contrary, organizations from Asian counterparts such as India (e.g., Wipro Technologies, Eureka Forbes, Satyam Computers), Indonesia (e.g., Astra International), Japan (Honda Motors), South Korea (Samsung Advanced Technologies), Singapore (Singapore Airlines), and Australia (e.g., Westpac Banking Corporation) managed to bag the award and have been found to be narrowing the gap with their European and North American counterparts. Although the MAKE award report may not be an ideal measure to conclude that Malaysian organizations have limited application of KM, it does raise an interesting question on why these organizations were not noted for their KM practices. The results appear to lend support to the notion that although Malaysian organizations may be familiar with KM, the implementation of KM is still at the initial stage – hence failing to garner sufficient attention in the global arena.

We believe the lack of empirical substantiation of the connection between KM practices and KM project performance fueled this hesitancy among most organizations to adopt KM. Several researchers (e.g., Zaim *et al*, 2007) who obtained empirical support emphasized that although positive associations were found between KM practices and performance, the findings could not be generalized to a wider population. Similarly, Zack *et al* (2009) also highlighted that although positive associations were noted among KM practices and performance, the findings based on North American and Australian companies cannot be generalized to countries in other geographic, economic, and cultural settings.

Thus, the objective of this research is two-fold. First, the study intends to fill the abovementioned gap by providing empirical evidence that there is indeed a link between KM practices and performance using Malaysian organizations. Second, this study intends to explore if the abovementioned relationship is contingent upon the size of an organization. In essence, it is important for organizations to understand how various KM practices influence organization performance as this knowledge will encourage them to accelerate the rate of KM implementation in their respective organizations.

Theory and hypotheses

KM practices and performance

Knowledge management (KM) is defined as the organized process of creating, capturing, storing, disseminating, and using knowledge within and between organizations to maintain competitive advantage (Nonaka, 1994; Davenport & Prusak, 2000; Darroch, 2003; Kakabadse *et al*, 2003; Mason & Pauleen, 2003). An analysis of the various classifications of KM practices readily reveals that KM practices consist of three major interdependent parts: knowledge acquisition, knowledge dissemination, and knowledge utilization (Darroch, 2003; Janz & Prasarnphanich, 2003; Tiwana, 2003).

Knowledge acquisition (creation) is an ongoing and dynamic process that involves the capability to devise novel ideas, insights, and solutions, and incorporates it within the organization (Bhatt, 2001; Tiwana, 2003; Bose, 2004). *Knowledge dissemination* involves the distribution and sharing of explicit and tacit knowledge among employees throughout the organization (Bhatt, 2001; Tiwana, 2003; Bose, 2004). *Knowledge utilization* involves the practical use of knowledge acquired into new situations or context that centres on the organization's products, processes, and services (Bhatt, 2001; Tiwana, 2003).

In order to ensure their KM projects bore fruit, it is vital for an organization to measure the performance of their KM projects (Bose, 2004). Essentially, measures of KM projects' performance should be viewed as indicators of the organization's development, not as the end by themselves (Bose, 2004). A variety of methods or perspectives have been recommended as a systemic metric that measures the performance of KM projects. Ahmed *et al* (1999) proposed that KM projects' performance can be measured from four basic perspectives that include customer perspective, organization matrix, suppliers' perspective, and the technology matrix. In addition, the outcomes of KM projects can also be evaluated based on typical managerial objectives (such as innovation, cost reduction, and productivity) and intellectual capital perspective, which includes human capital, innovation capital, process capital, and relationship capital (Diakoulakis *et al*, 2006). Desouza & Raider (2006) suggest that KM metrics should include customer retention, employee retention, innovation rates, customer evaluation, and speed to market.

Tiwana (2003) and Bose (2004) reviewed various popular KM metrics such as the Skandia Navigator, Knowledge Management Balanced Scorecard, Economic Value Added, and Universal Intellectual Capital Report. With reference to their extensive review, it is evident that each method reviewed and presented (see Table 1) recommended overlapping measurement perspectives. Although different terms may be used by different methods, these measurements are essentially measuring similar dimensions. An overall observation of the aforementioned metrics readily reveals that there are four distinct measurement perspectives that can be derived – the customer, the human capital, the financial, and the process or technological perspective. These four dimensions encompass all the measurement models and dimensions reviewed thus far. A summary of models and its inclusion in any of these four dimensions is shown in Table 1.

The *customer perspective* covers such aspects as customer satisfaction, customer retention, customer relations, and average time from customer contact to sales response (Ahmed *et al*, 1999; Tiwana, 2003; Bose, 2004; Diakoulakis *et al*, 2006).

The *human capital perspective* looks at KM performance in terms of head count of workers in quality control circle (Ahmed *et al*, 1999), competencies and capabilities of employees (Bose, 2004; Diakoulakis *et al*, 2006), the

Table 1 Four major knowledge management project performance measurement dimensions

Reviewed KM measurement models	Skandia navigator	KM balanced scorecard	ICM	CMA	Roos <i>et al</i> (1998)	Universal Intellectual Capital Report	Economic Value Added (EVA)
<i>Derived measurement dimensions</i>							
Customer perspective	✓	✓	✓	✓	✓	✓	
Human capital perspective	✓	✓	✓	✓	✓	✓	
Process and technology	✓	✓	✓	✓	✓	✓	
Financial perspective	✓	✓	✓	✓		✓	✓

Note: ✓ = Measurement dimension was included in the KM measurement matrix.

solutions suggested by employees (Bose, 2004), the number of workers rotated (Ahmed *et al*, 1999; Bose, 2004), and many other similar measurement components related to human resources.

Process and technology perspective is measured through the number of patents filed (Bose, 2004; Diakoulakis *et al*, 2006), ratio of new products to the firm's product range (Bose, 2004), process improvement (Bose, 2004; Diakoulakis *et al*, 2006), number of times the system was accessed, and the relevance of information (Ahmed *et al*, 1999; Bose, 2004).

The *financial perspective* measures KM performance through the financial health of a firm such as return on net assets (Bose, 2004), cost reduction (Bose, 2004; Diakoulakis *et al*, 2006), and increase of investment in research and development (Tiwana, 2003; Bose, 2004).

'A survey by Reuters revealed that 90 percent of companies which deploy KM solutions benefit from better decision making while 81 percent say they noticed increased productivity' (Malhotra, 2001, p. 1). Several companies such as BP Amoco, Xerox, and Dearborn experience great levels of cost savings by leveraging knowledge they had (Ambrosio, 2000; Lam & Chua, 2005). Enhanced competitive advantage, improved financial performance, increased innovation, and the effective use of information are but some of the common performance outcomes of KM projects (Darroch, 2005). Marques & Simon (2006) highlighted that KM is a source of competitive advantage that eventually leads to capital profitability, growth, operational and financial efficiency, stakeholder satisfaction, and improved competitive position. In a nutshell, KM projects are said to have a prolific influence on propelling organizational performance (Carneiro, 2000; Axelsen, 2002; Karlenzig & Patrick, 2002). Thus, most organizations are in the race of implementing the best KM systems to avoid being left out and to reap the promised benefits (Lam & Chua, 2005).

Increased market value of many companies can be attributed to the contribution of intangible assets such as knowledge (Lin & Tseng, 2005). Ong (2003) found that the greater the extent of knowledge acquisition and protection, the greater the level of organizational effectiveness. The case study analysis of Zaim *et al* (2007) further lends support to this finding when they reported

that KM processes – mainly knowledge transfer and sharing, generation, utilization, and codification – had a significant positive impact on KM performance. Despite the lack of substantiated empirical verification that is generalizable, the link between KM practices and KM project performance has been frequently highlighted in the literature (Carneiro, 2000; Axelsen, 2002; Karlenzig & Patrick, 2002). In summary we developed the following hypotheses:

H1: *Knowledge acquisition practices positively influence KM project performance.*

H2: *Knowledge dissemination practices positively influence KM project performance.*

H3: *Knowledge utilization practices positively influence KM project performance.*

Boundary condition on KM practices

It would be interesting to determine if organization size functions as a moderating variable affecting the relationship between KM practices and performance. Fundamentally, the distinction in size and span of operation of smaller firms compared with large firms could result in variation in these organizations' needs for KM practices and systems (Lim & Klobas, 2000). Therefore, it would be interesting to know if indeed organization size has an impact on the relationship between KM practices and KM project performance. To add, we predict organization size to moderate only the relationship between two KM practices – knowledge acquisition and dissemination – and performance. Thus, we offer a general hypothesis as follows:

H4: *The impact of KM practices (knowledge acquisition and dissemination) on KM project performance is moderated by organization size.*

The rationale for the above general hypothesis is that small organizations are generally constrained by several factors. For example, the small number of employees and limited sources of funds increase the tendency to acquire knowledge rather than the focus on internal knowledge

generation (Lim & Klobas, 2000; Desouza & Awazu, 2006). Hence, we hypothesize:

H4a: *The positive impact of knowledge acquisition practices on KM project performance is greater in smaller organizations than in their larger counterparts.*

Next, smaller organizations seem to have the added advantage in knowledge sharing or dissemination. With the smaller number of employees, understanding of organizational issues is based on a common ground as each employee is exposed to a very much parallel groundwork of knowledge (Desouza & Awazu, 2006). This in turn, promotes easier sharing of knowledge and improves the extent of knowledge sharing (Connelly & Kelloway, 2003; Desouza & Awazu, 2006). A similar scenario is not common in large organizations. Large organizations are found to have asymmetrical distribution of knowledge – making it an uncommon commodity in organizations (Desouza & Awazu, 2006). Such a situation impedes knowledge sharing practices and hence reduces the positive impact of knowledge dissemination practices in large organizations. Thus, we state the following hypothesis:

H4b: *The positive impact of knowledge dissemination practices on KM project performance is greater in smaller organizations than in their larger counterparts.*

Finally, with reference to the relationship between knowledge utilization and performance, we believe organization size may not moderate the aforementioned relationship. Knowledge utilization focuses on competition where the survival of the organization is pertinent regardless of whether the organization is small or large. Therefore, it is possible that the impact of knowledge utilization would be the same across both – small and large – kinds of organizations. Hence, no moderator hypothesis is offered for this relationship.

Method

Research site, participants, and procedure

The sample of this study was drawn from the pool of organizations listed with Multimedia Super Corridor (MSC) status. These organizations were deemed fairly representative of knowledge-based firms in Malaysia for two major reasons: concentration of knowledge workers and inclusion of knowledge-intensive industry sectors.

As organization size was considered to be a moderating variable in this research, a stratified random sampling method was adopted to collect data that would assist in the assessment of variations in KM practices among small or medium and large organizations. The population of MSC status companies was divided into subpopulations of 'small or medium' and 'large' organizations based on the categorization by Multimedia Development Corporation (MDeC). A simple random sample procedure was then adopted for each stratum of size. On the basis of the information

provided by MDeC, approximately 40% of the MSC status companies were small and medium companies (50 or less employees) and the others were large companies (more than 50 employees). An approximately equal proportion was selected within each stratum, making the sample a proportionate stratified random sample.

The complete set of the questionnaire (consisting of five different sets of survey – Set 1 measuring the extent of KM practices in the organization and Set 2 – Set 5 measuring KM project performance from four different perspectives) was distributed to 650 organizations. Only 180 organizations had completed the five sets of survey as requested – with an effective response rate of 27.7%. The study drew responses from a total of 402 knowledge workers (Set 1) and 180 responses for each category of KM project performance evaluator (Customer, Human Resource Manager, Finance Manager, and Research and Development Manager). A review of the demographic profile of the organizations that participated in this study shows that the sample was representative of the population. A fair distribution among various industry sectors was noticed. Over half (66.7%) of the organizations were Malaysian owned and about 48% of the participating organizations had 50 or fewer employees (small and medium).

Measures

The survey used five different sets of study materials – one dealing with KM practices and the other four measuring performance outcomes of KM projects from four different perspectives (customer, human capital, financial, and process or technological). The questionnaire also included a section on demographic information.

We carefully ensured that different sources of data were used for the criterion (performance) and predictor (KM practices) variables to protect the study's internal validity (Podsakoff *et al*, 2003). This was also done to avoid any possible serious threat of common method bias that could arise from the use of common raters for both the predictor and criterion measures (Podsakoff *et al*, 2003).

KM practices

The first set of the questionnaire included the KM scale developed by Darroch (2003). It was used to measure KM practices employed within the organizations studied. The respondents representing knowledge workers were carefully selected using the high and moderate knowledge workers categorization provided by Withey (2003). Only employees that fell within the high (e.g., researchers, scientists) and moderate (e.g., manager, coordinators, planners, designers) category of knowledge workers were requested to complete the survey. Each organization was expected to get at least two respondents – who fit the description of a knowledge worker – to respond to this set of questionnaire. In addition, only participants who have served their organization for at least 1 year were asked to complete this survey to ensure they had sufficient knowledge about the organization's practices.

The respondents were asked to describe, on a 7-point Likert scale (1 = never; 7 = always), their degree of agreement or disagreement with each item that best corresponded to their view about the extent of KM practices in their respective organizations – primarily – knowledge acquisition, knowledge dissemination, and knowledge utilization.

The knowledge acquisition practices scale comprised of 21 items that encompassed six sub-dimensions. The items focused on practices associated with acquisition of ideas and solutions from internal and external sources. Sample items measuring knowledge acquisition practices include: '... Real market needs drive new product development'.

Knowledge dissemination, on the other hand, measured the extent to which explicit and tacit knowledge was shared among employees throughout the organization. The scale had 19 items comprising of items such as '... Meetings between departments to discuss market trends and developments'.

Finally, the knowledge utilization scale set out to measure the application of knowledge acquired to improve the organization's products, processes, and services. Sample items include '... Respond to technological changes immediately'.

KM project performance

As KM outcome is difficult to measure, this study focused on the performance of KM projects as perceived by individuals who were in the position to observe improvements resulting from KM projects rather than adopting objective measures. Questionnaires related to specific perspective (customer, human capital, financial, and process or technological) were distributed to respondents who were responsible in controlling the abovementioned areas and who had access to the relevant information needed. Our respondents – to achieve the aforementioned perspectives – included the major customer of the organization, human resource manager, finance manager, and finally the research and development manager.

The respondents were asked to describe, on a 10-point scale (1 = 0–10%; 10 = 91–100%), the extent of improvement observed in the KM projects' performance. As KM projects were ongoing and continuous projects, measures of performance outcomes would be viewed as indicators of the organization's development and not as the end by themselves (Bose, 2004). Therefore, the extent of improvement was employed as performance measurement rather than the level of achievement.

The vignette measuring performance from the customer's point of view was distributed to the primary customer who had the highest level of sales for the organization. The customer also had to meet the prerequisite of having had business dealings with the organization for a minimum of 1 year. They were asked to respond to items such as '... The average time from customer contact to sales response has reduced by ...'.

Performance ratings from the three remaining perspectives involved the organization's internal respondents.

The human resource manager was approached to respond to the vignette on performance of KM project from the human capital perspective. The vignette included items such as '... The number of workers involved in quality control circles or similar teams has increased by ...'.

The financial managers were requested to respond to the survey measuring performance from a financial perspective. They were asked to employ their expert opinion related to the impact of KM practices on the financial performance of the organization when responding to items such as '... The percentage of increase in revenues earned from patents/ software/ data / databases is ...' (financial perspective).

Finally, the vignette on process and technology perspective was assigned to the research and development managers. The managers were requested to indicate the extent of improvement noted in organizational processes and products. Sample item includes '... The number of time the system (knowledge repositories) assessed has improved by ...'.

Performance data were gathered from different sources in order to obtain a more accurate depiction about these performance outcomes. Instead of relying upon a generalized view of the extent of performance improvement in organizations, getting experts in these areas could provide a better, clearer picture as to what is the current state of performance in these specific areas. It would be interesting to determine if KM practices brought about improvement to all four aspects of organization performance or is limited to only some of them.

Aggregation of data

The unit of analysis of this study was the organization. However, the unit of measurement for KM practices was the individual. Since the organization is the unit of analysis, data gathered from knowledge workers from each organization needs to be aggregated at the organization level. Prior to aggregating data to reflect a higher level of analysis, a test of agreement must be conducted (James, 1982; James et al, 1993). In this study, a method known as the within group inter-rater reliability (r_{WG}) specifically the multi-item estimator (r_{WGI}) suggested by James et al (1984) was used to assess the agreement on judgements made by multiple raters (knowledge workers). The data sets had acceptable level of agreement ranging from 0.62 to 0.98. As an acceptable level of inter-rater agreement was established, the scores were aggregated to the organization level by calculating the group mean score. Subsequent analyses were based on the aggregated scores.

Results

Psychometric properties of measures

KM practices

We conducted exploratory factor analysis (EFA) to ascertain the distinctiveness of the three KM practices.

One of the purposes of EFA is to determine if measurements used in different conditions affected the number of factors (Conway & Huffcutt, 2003). Hence, as this is the first time these measures are used in the Malaysian business context, EFA was chosen over confirmatory factor analysis (CFA) to see if the factor configuration differed from the original pattern.

As the three dimensions of KM practices were closely interrelated theoretically, a principal axis factor analysis with direct oblimin rotation was conducted. The initial framework had three main KM practices that included knowledge acquisition, knowledge dissemination, and knowledge utilization. The factor configurations obtained for KM practices from the EFA did not deviate much from the proposed theoretical framework. However, an important variation in the knowledge acquisition variable was noted. The results of the factor analysis delineated two forms of knowledge acquisition, which were named knowledge acquisition (existing employees) and knowledge acquisition through hiring.

The total variance explained by the four subscales was 68.77%. The Kaiser-Meyer-Olkin (KMO) – a measure of sampling adequacy – was found to be 0.90 demonstrating adequate inter-correlations while the Bartlett's Test of Sphericity was significant ($\chi^2 = 3672.90$, $P < 0.01$). Descriptive statistics, inter-correlations among factors, and reliability coefficients for the subscales are shown in Table 2. The four subscales were highly reliable with reliability coefficients ranging between 0.86 and 0.94.

The mean scores revealed that the level of KM practices in MSC status companies were relatively moderate. All KM practices have a mean score ranging from 4.10 to 4.61. The trend suggests that these organizations had the highest level of knowledge acquisition through hiring ($M = 4.61$, $SD = 1.26$) followed by knowledge utilization ($M = 4.40$, $SD = 1.04$). Knowledge dissemination ($M = 4.10$, $SD = 1.17$) was the least performed KM practice.

KM project performance

KM project performance was measured based on four major perspectives – customer capital, human resource, financial capital, and process and innovation. Again EFA was chosen over CFA due to the relative novelty of these measures in the Malaysian business context. Two factors – strategic improvement and process improvement – were identified through the results of the EFA. The KMO measure of sampling adequacy was found to be 0.95 demonstrating adequate inter-correlations, whereas the Bartlett's Test of Sphericity was significant ($\chi^2 = 4046.94$, $P < 0.01$). The two factors were highly reliable with reliability coefficients above 0.90. Descriptive statistics, correlation between the two factors, and reliability coefficients for the subscales are shown in Table 2.

Although a similar categorization was not common in the literature, the manner in which these items have grouped together reflects the level of measurement suggested by Zaim *et al* (2007). Fundamentally, KM performance can be assessed at three different levels, which includes strategic, operational, and employee level (Zaim *et al*, 2007).

Tests of hypotheses

A summary of the hierarchical regression analysis results is presented in Table 3. Given that the level of KM practices has been reported to differ by the country of origin of the organization (Toh *et al*, 2003) and could possibly affect the extent of performance improvement, we controlled for the effect of organization ownership (foreign/local ownership) in the hierarchical regression analysis at the first step.

Knowledge acquisition (existing employee) had a positive influence on strategic and process improvement measures. On the contrary, knowledge acquisition (hiring) had no significant impact on either of the performance measures. This finding partially supports H1. Knowledge dissemination only influenced strategic improvement but did not influence process improvement in

Table 2 Descriptive statistics, coefficients alpha, and zero-order correlations of knowledge management practices measures

Knowledge management practices	1	2	3	4	5	6	7	8
1. Knowledge acquisition (existing employees)	0.94							
2. Knowledge dissemination	0.47**	0.86						
3. Knowledge utilization	0.71**	0.55**	0.94					
4. Knowledge acquisition (hiring)	0.48**	0.50**	0.52**	0.90				
5. Strategic improvement	0.69**	0.54**	0.67**	0.45**	0.98			
6. Process improvement	0.56**	0.31**	0.65**	0.33**	0.64**	0.92		
7. Organization size	-0.07	0.09	-0.09	0.17**	-0.18*	-0.20**	— ^b	
8. Organization ownership ^a	-0.27**	-0.08	-0.17*	-0.09	-0.32**	-0.07	-0.06	— ^b
<i>M</i>	4.23	4.10	4.40	4.61	3.76	3.53	331	—
<i>SD</i>	1.16	1.17	1.04	1.26	2.03	2.31	676	—

^aCoding: Foreign = 1, Local = 2.

^bSingle item/categorical measure.

* $P < 0.05$; ** $P < 0.01$.

Note: $N = 180$; diagonal entries in boldface indicate coefficients alpha.

Table 3 Organization size as a moderator in the knowledge management practices – knowledge management performance relationships

Variable	Strategic improvement	Process improvement
<i>Step 1: Control variable</i>		
Organization ownership	-0.32**	-0.07
<i>Step 2: Predictors</i>		
Knowledge acquisition (existing employees)	0.35**	0.24*
Knowledge acquisition (hiring)	-0.02	-0.02
Knowledge dissemination	0.20**	-0.09
Knowledge utilization	-0.27**	0.54**
<i>Step 3: Moderator</i>		
Organization size	-0.17**	-0.13*
<i>Step 4: Interaction terms</i>		
Size × Knowledge acquisition (existing employees)	1.21**	0.47
Size × Knowledge acquisition (hiring)	0.04	1.35*
Size × Knowledge dissemination	-0.29	-0.02
Size × Knowledge utilization	-0.84	0.88
<i>R² change</i>		
Step 1	0.10	0.00
Step 2	0.50	0.45
Step 3	0.03	0.02
Step 4	0.03	0.04
<i>F change</i>		
Step 1	19.96**	0.79
Step 2	53.53**	35.23**
Step 3	12.46**	5.18*
Step 4	3.84**	3.60**

Note: * $P < 0.05$; ** $P < 0.01$.

organizations – thus partially supporting H2. Finally, H3 was fully substantiated from the results showing a significant positive relationship between knowledge utilization and both performance measures.

H4 was only partially supported with only two significant interactions terms (see Table 3 and Figure 1). The analysis showed that the impact of knowledge acquisition practices had a greater effect on strategic improvement in smaller organizations (see Figure 1a). Surprisingly, although knowledge acquisition (hiring) had no significant direct effect on either KM performance measures, organization size was found to significantly moderate the relationship between this practice and process improvement (see Figure 1b). Interestingly, at low to moderate level of hiring practices, the positive effect upon process improvement was only evident in small organizations.

Discussion

Several conclusions can be drawn from the results of this study. First, the absence of a significant relationship between knowledge acquisition (hiring) and performance can be attributed to socialization theory (Filstad, 2004). Newly hired experts may possess relevant knowledge.

However, they have yet to familiarize themselves with the management's expectations and organizational goals and values (Robbins, 2003). New recruits need some time to familiarize themselves with the organization system before being able to make significant contributions to performance improvement (Robbins, 2003).

Second, knowledge dissemination was not found to have a positive influence on process improvement. Evidently, sharing and storing of knowledge does not directly guarantee process improvement. For example, dissemination of knowledge through circulation of reports or meetings would not increase access to the information system. Only when specific knowledge or information is needed, would knowledge workers access the system. Similarly, knowledge dissemination may not directly drive workers to consistently improve the system. Only when the knowledge shared is relevant, it would encourage process review and improvement. In brief, it is possible that knowledge dissemination may not have a direct relationship with process improvement but is still needed to channel beneficial knowledge to important others.

Third, the impact of knowledge acquisition upon strategic improvement was found to be greater in smaller organizations. Low to moderate levels of these practices

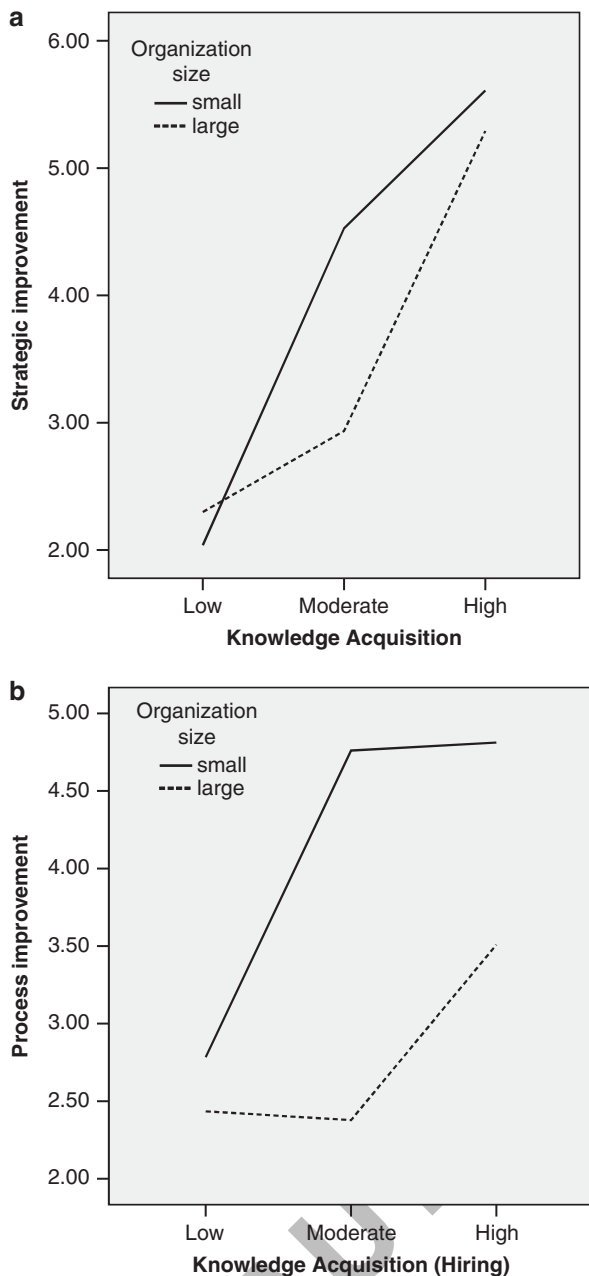


Figure 1 Moderating effects of organization size on the relationship between knowledge management practices and knowledge management project performance.

had minimal effect in large organizations. On the contrary, when small organizations increased the level of knowledge acquisition to moderate levels, the magnitude of performance improvement was much greater. This finding could be associated with the level of complexity that characterizes small and large organizations. In general, larger firms are characterized by high complexity (Kuan & Aspinwall, 2004; O'Regan & Ghobadian, 2004). Probably, to remain competitive and handle the increased complexity, larger organizations

need greater heights of knowledge acquisition practices in order to experience positive outcomes upon performance. Unlike them, even a moderate level of involvement in knowledge acquisition practices can make a big difference in small organizations.

Fourth, although knowledge acquisition (hiring) did not have a significant effect on either performance yardstick, an interesting interaction effect was evident. We found that moderate levels of recruitment practices were sufficient to augment process improvement at a greater scale in small organizations but not in large organizations. On the contrary, large organizations needed at least moderate to high levels of expert recruitment in order to experience the impact on process improvement. However, this impact was still less in comparison to their smaller counterparts. We again associate this finding to socialization theory (Filstad, 2004). As discussed earlier, new recruits need some time to familiarize themselves with the organizations' practices and background before being able to contribute their expertise for the betterment of the organization. However, the familiarization process can be accelerated in smaller organizations, as the systems, processes, and procedures are generally less complicated and simpler (Kuan & Aspinwall, 2004). To add, employees in smaller firms will be able to cultivate personalized relationships with each other (O'Regan & Ghobadian, 2004). This facilitates the adaptation process and hence, it would be easier for new employees to adjust to the operational system in smaller organizations and contribute to process improvement.

On the other hand, larger firms are characterized by high complexity and reduced flexibility (Kuan & Aspinwall, 2004; O'Regan & Ghobadian, 2004). This causes these organizations to lean towards greatly bureaucratic and centralized structures, high degree of formalization and legitimacy (O'Regan & Ghobadian, 2004; Aramburu *et al*, 2006; Yukl, 2010) to manage a good number of dispersed departments and employees. Due to the wider span of control, large organizations are unable to foster personalized relationships between management and employees (O'Regan & Ghobadian, 2004). Learning and familiarizing oneself with such complex systems and the lack of personalized interaction drives a time consuming socialization process. It is a lengthy process to learn which systems and databases are relevant and accessible, what the processes within the organization are, what information is the system lacking, and what are the weaknesses of the system. Only after understanding these operational aspects within large organizations, can a new recruit contribute to process improvement. Hence, this could be the underlying reason why the greater levels of recruitment are needed to experience a small level of increase in process improvement.

Finally, although we hypothesized the positive effect of knowledge dissemination to be greater in smaller firms, that was not the case. Although large organizations were found to be at a disadvantage with regard to knowledge sharing, the effect of knowledge dissemination on performance was not reduced in any way. This could be

attributed to the formalization in large organizations that leads to the systematic storing and sharing of data and information in repositories and databases (Bock, 1999). Such practice augments the practice of knowledge dissemination, which includes access and transfer of information and knowledge (Sveiby & Simons, 2002; Kuan & Aspinwall, 2004; Metaxiotis *et al*, 2005). In short, the formalization of knowledge sharing practices coupled with the use of relevant technology has probably helped these large organizations to reduce the negative effect their size could have on the extent and ease of knowledge sharing in their organization.

The findings of this study have bridged the gap between KM practices and KM project performance by means of conducting a survey study. Furthermore, as the case study approach was not used and various organizations were selected to participate in this study, the findings are relatively more generalizable. Finally, some interesting insights were derived from this study when we found smaller firms to have some added advantage from KM practices in comparison to their larger counterparts. We hope the findings of this study could ease the uncertainty that plagued most organizations and drive them to embark on KM projects to experience improved performance.

Our findings also highlight one important lesson for Malaysian organizations. Currently these organizations are attempting to rope in knowledge through hiring of experts. However, as evident from the results of this study, knowledge acquisition through hiring is not the ideal solution to improving performance. Hence, these

organizations must begin focusing on other KM practices such as knowledge acquisition through existing employees, dissemination, and utilization. The extent of these practices must be improved in order to experience the promised performance improvements.

However, this study is not without potential limitations. First, although over 40% of the variance in KM project performance is associated with the three major KM practices identified in this study, there could be other variables that could influence the extent of performance improvement within an organization that were beyond the scope of this study. There are other KM-related factors that could be considered in future studies such as knowledge protection (Awad & Ghaziri, 2004; Fernandez *et al*, 2004), the availability of KM systems, and the KM team. These variables could further contribute some useful insights to improve the level of KM project performance of organizations. Next, we only considered organization size as a moderating variable in the model of our study. There are other potential moderators such as organization culture, nature of business, and organization ownership that should be given due consideration in future studies.

All data limitations aside, the findings of this research still have important implications for theory and practice. This study has provided empirical validation for the link between KM practices and KM project success. It does suggest that organizations should embark on KM initiatives in order to experience improved performance and enhanced competitive advantage. This study also reveals an edge for smaller organizations when they implement KM.

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