KM implementation in a public sector accounting organization: an empirical investigation

Siong Choy Chong, Kalsom Salleh, Syed Noh Syed Ahmad and Syed-Ikhsan Syed Omar Sharifuddin

Abstract

Purpose – This study aims to investigate how accountants working in a large public sector accounting organization perceive KM implementation issues in their organization. An integrated KM framework that interconnects KM enablers, knowledge sharing process, and organizational performance derived from the literature is proposed and adopted in this study.

Design/methodology/approach – The accountants working at the Accountant-General's Department (AGD) under the Ministry of Finance, Malaysia are selected for an in-depth study through the use of a self-reporting questionnaire. The model's validity was confirmed through factor analysis. The data were then analyzed using multiple regression analyses.

Findings – The statistical results provide strong support for the KM framework. There are positive effects of KM enablers and knowledge sharing process towards organizational performance. When both the variables are regarded as antecedents of organizational performance, knowledge sharing process and technology resources are among those of highly significant enablers.

Research limitations/implications – This research was conducted in only one organization among the lower echelon accountants, thereby limiting the generalizability of the results obtained. This paper provides a framework for developing an instrument for assessing the AGD, which has drawn plans to institutionalize KM. As a knowledge nexus of public sector accounting knowledge and practice, the AGD has to place serious emphasis on the significant KM enablers in drawing up its KM implementation strategy in order to effectively manage and leverage the intellectual assets of its professional intellects. This will enable it to reap better performance.

Originality/value – This study has extended knowledge in KM, especially concerning KM implementation issues in public sector organizations. Moreover, this research is among the first empirical works to address KM implementation in a public accounting organization.

Keywords Knowledge management, Public sector accounting, Accountants, Malaysia

Paper type Research paper

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Introduction

It has been widely acknowledged that knowledge is a critical organizational resource for any firm – irrespective of location, size (small, medium, or large organization) and type (public or private) – in order to survive and succeed in this knowledge-based economy (k-economy). For this, effective management of knowledge has been recognized as an important strategic tool in achieving specific objectives of an organization and even that of a country so as to sustain economic growth and to gain competitive advantage.

Notwithstanding the values brought about by KM, the field has yet to mature. While KM has been the focus of many studies some 25 years ago when Wiig coined the term, researchers are still struggling to reach a consensus on the definition of KM. This is due to the multi-disciplinary nature of KM where researchers tend to view KM from their backgrounds and interests (Chong, 2006). As a result, different definitions emerged. Consequently, an observation on the myriad of definitions yields a conclusion, that a systematic and successful KM implementation involves a cyclical model of processes (i.e. knowledge creation, capture, organization, storage, dissemination, and application). These processes

are labeled as KM primary factors, as evident from their inclusion in many of the KM definitions proposed. Among these processes, knowledge sharing, which is defined as the process through which explicit and tacit knowledge is communicated to other individuals (Becerra-Fernandez *et al.*, 2004), has been widely regarded as the cornerstone of KM (Lam and Lambermont-Ford, 2010; Reychav and Weisberg, 2010).

These KM processes are, in turn, supported by a series of enablers (i.e. culture, information systems infrastructure, process, organizational structure, top management leadership and commitment) which are often referred to as KM secondary or critical success factors by many researchers that facilitates the KM processes to be effectively carried out and managed (Chong, 2006). Central to the issue that determines KM success is people where both the KM processes and success factors interact to create values for organizations that subscribe to such an innovation. The specific values, however, may generate different outcomes between the public and private sector organizations. While the corporate sector values profitability and sustainable competitive advantage, KM implementation in the public sector is usually aimed at enhanced delivery to other public sector agencies and the public at large.

This study attempts to address the absence of KM study in a public sector accounting organization. In general, the need for such a study is amplified by the fact that implementing KM in public sector organizations can be a more challenging undertaking due to their hierarchical and highly political in nature compared to introducing the same initiatives among the commercial enterprises. Although there is considerable number of studies on KM in the public sector, very little is found in the public accounting sector. It can be justified that successful implementation of KM can help bring stability to, specifically in the case of this study, the public sector accounting organization to support the smooth operation of meeting vigorous month-end deadlines, the need to provide accurate and timely reporting of financial results, and to comply with the regulatory requirements (Whitmore and Albers, 2006).

This study considers the Accountant-General's Department (AGD) of Malaysia because the AGD is known for its expertise in government accounting and a knowledge provider of accounting services, looking at the large volumes of financial transactions with accounting operations greatly diversified and decentralized with offices spreading all over the country. It has a large pool of professionals and skilled personnel in performing various accounting functions and providing quality and timely financial information and services to all the agencies of the Federal Government. Since professional intellects such as accountants are known as the primary source of knowledge for most organizations, the future implementation of KM at the AGD can help the department to take advantage of KM as a strategic management tool by leveraging on the highly tacit experiences, ideas, and expertise of its professional intellects for enabling the effective flow of tacit and explicit knowledge to improve the performance of the AGD. The outcomes may include improvement in the accounting process, financial reporting practice, quality decision making process, and subsequently enrich the value of the AGD's embedded knowledge assets or intellectual capital.

Added to the dearth of KM studies in the public accounting organization is the fact that very few attempts have been undertaken to research on organizational readiness towards KM (Chong *et al.*, 2009), particularly in the case of this study where the AGD is in the planning

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stage to embark on a departmental-wide KM initiative. To address the gaps, the current study proposes an integrated KM model that interconnects KM enablers and knowledge sharing process as antecedents to organizational performance. The model, which integrates KM solution through learning, leadership, technology, culture, and knowledge sharing process, is empirically tested on the public sector accountants through the use of a survey questionnaire. The resulting relationship will reinforce the importance of KM enablers and knowledge sharing process as antecedents to organizational performance in which the AGD could use as a guide when implementing a full-fledged KM program.

The next section presents the research framework by which a series of hypotheses are developed to be tested in this study. This is followed by a description of the methodology utilized and a presentation of the results. The subsequent section discusses and provides implications of the results before the paper is concluded along with the limitations and suggestions for future research.

Research framework and hypotheses development

The research framework for this study is derived from the KM framework proposed by Stankosky (2005), and an empirical study on KM processes by Edwards *et al.* (2005). Stankosky (2005) suggests that successful implementation of KM requires the integration and balancing of four KM pillars, i.e. leadership, learning, organization structure, and technology in an organizational-wide setting. On the other hand, Edwards *et al.* (2005) identify people solutions, process solutions, and technological solutions as critically important KM solutions to improve KM processes. People solutions are concerned with staff retention, motivation, training, and networking. Technological solutions are concerned largely with making effective use of databases and intranet access. Process solutions are concerned partly with paper based specification and process instructions such as better manual documentation of procedures and also finding the right balance between formal and informal internal communication and knowledge sharing.
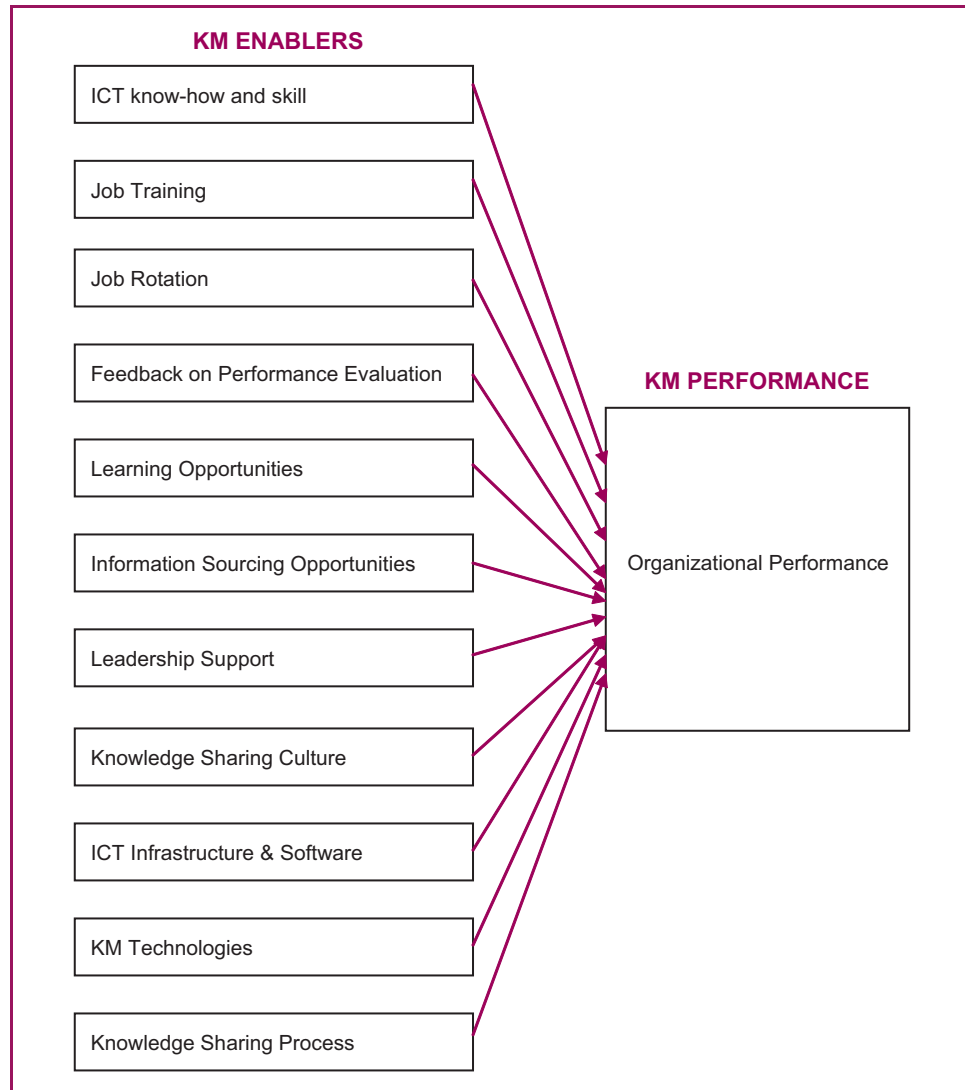
From the seminal works of Stankosky (2005) and Edwards *et al.* (2005), it is apparent that the influencing factors of leadership and learning are considered critical KM enablers to leverage on the accountants' learning experiences, knowledge, and expertise for the embedded organizational knowledge in addition to technology infrastructure and organizational infrastructure such as processes, performance measurement, and culture. As a result, this study identifies 11 independent variables as KM enablers. These include six factors of employee learning, two factors of ICT infrastructure and KM technologies, and three factors of leadership support to nurture knowledge sharing culture. It is posited that, if these enablers can be efficiently and effectively managed, the tacit accounting knowledge can be easily shared and electronically codified and that the explicit accounting knowledge can be effectively transferred. These in turn will enable the accountants – people central to the success of KM implementation at the AGD – to make informed decisions and derive at appropriate solutions to problems. Subsequently, this will lead to improved overall performance of the AGD which serves as the dependent variable of this study.

Figure 1 depicts the effect of KM enablers on organizational performance when both the KM enablers and knowledge sharing process are treated as antecedents of organizational performance. Based on the framework, specific hypotheses are formulated to be empirically tested in this study.

Organizational performance

Although knowledge and its management have been linked to organizational performance dating back to 1982, the linkage has become even more critical in this k-economy era. Accordingly, knowledge must be measured because an organization's intellectual capital includes the brains of its employees, their know-how, the processes, and the customers' knowledge that they create. For this purpose, many studies have integrated the use of both financial and non-financial measures (Chong and Chong, 2009). This is in view of the fact that financial measures alone cannot measure the values of organizations in this k-economy

KM ENABLERS

| ICT know-how and skill |

| Job Training |

| Job Rotation |

| Feedback on Performance Evaluation |

KM PERFORMANCE

| Learning Opportunities |

| Information Sourcing Opportunities |

| Organizational Performance |

| Leadership Support |

| Knowledge Sharing Culture |

| ICT Infrastructure & Software |

| KM Technologies |

| Knowledge Sharing Process |

which is largely based on intangible assets (Drucker, 1995). In this regards, the literature suggests that among the most widely used non-tangible measurement tools include:

■ improved internal process;

■ improved communication and learning process;

■ enhanced collaboration and teamwork; and

■ enhanced knowledge sharing process (Salleh *et al.*, 2006).

KM enablers

Stankosky (2005) suggests that there are four enabling KM factors:

1. learning;

2. leadership;

3. organization structure; and

4. technology.

Accordingly, KM activities must have the visible support and follow-through by the leadership and the organization must nurture the environment which promotes open knowledge sharing, collaboration, and learning, enabled by the power of leading-edge technology tools and methods. Technology infrastructures, another KM pillar, should promote the efficient and effective capture of both tacit and explicit knowledge and to support knowledge sharing in the entire organization through quality decision making and effective problem solving. Finally, the role of learning in leveraging knowledge is to manage information in order to build organizational knowledge and use that knowledge to promote organizational learning and performance improvements.

Guided by Figure 1, the following are the 11 KM enablers posited to contribute to the KM performance outcomes.

ICT know-how and skills. Literature has shown that the more training provided for information and communications technology (ICT) skill upgrading, the more knowledgeable the individuals would be in utilizing the ICT tools and KM technologies. Hence, more knowledge can be transferred and shared within and outside the organization (Syed-Ikhsan and Rowland, 2004), which resulted in improved organizational performance. Therefore, it is posited that:

H1. There is a positive relationship between ICT know-how and skills of public sector accountants and performance outcomes of the AGD.

Job training. According to Holsapple and Singh (2003), knowledge gained by employees through job training will enable them to translate their knowledge into the organization's routines, competencies, job descriptions, and business processes, plans, strategies, and cultures. This suggests that employees should be provided with continuous training in order to enrich their knowledge and improve their capabilities. Based on this argument, it is hypothesized that:

H2. There is a positive relationship between job training programs received by the public sector accountants and performance outcomes of the AGD.

Job rotation. As Bogdanowicz and Bailey (2002) opined, employees bring to their new organization/division their prior education, experiences, knowledge, and skills which adds value to the human capital of the organization/division. Through job rotation programs, part of the knowledge and experience acquired from a prior department may be transported to the new department. As such, job rotation program plays an important role in knowledge transfer process as it increases the growth in the employee learning/knowledge as well as organizational learning/knowledge. The following hypothesis thus ensues:

H3. There is a positive relationship between job rotation programs among the public sector accountants and the performance outcomes of the AGD.

Feedback on performance evaluation. Performance evaluation provides the opportunity for coaching, continuous learning, encouraging strong performance, and strengthening weak performance (Shapero, 1985). Thus, feedback on performance evaluation is an important motivator to professionals as it is a means of receiving information required to develop greater expertise and advancement within their profession (Taylor *et al.*, 2002). Failing to provide professional workers with learning opportunities can lead to their deficiency in facilitating organizational growth of intellectual assets. This argument leads to the following hypothesis:

H4. There is a positive relationship between feedback on performance evaluation provided to the public sector accountants and the performance outcomes of the AGD.

Learning opportunities. The concept of nutrient information was introduced by Shapero in 1985. This concept refers to information that furnishes nourishment or promotes growth and repairs the natural wastage of an individual's knowledge base. Demonstrated interests in career planning, financial resources or incentives provided to attend conferences or

opportunity to pursue lifelong learning are examples of professional staffs' needs for nutrient information. Such provisions of learning opportunities can provide continuous employee learning or knowledge growth and hence can help to support KM principles. Thus, the following proposition ensues:

H5. There is a positive relationship between learning opportunities available to the public sector accountants and the performance outcomes of the AGD.

Information sourcing opportunities. Brown and Starkey (1994) introduced the concept of information consciousness to be created within an organization. This concept concerns the organization's attitude towards valuing information as a resource and the consequent processes of making organizational learning/knowledge available by facilitating knowledge transfer and sharing among the professional staff. Information sourcing opportunities or ease of obtaining information is essential to the accountants' own renewal of nutrient information. Regular access or communication network to expert information or the extent of technical and professional information is easily available and accessible by accountants are examples of information sourcing opportunities. Based on these arguments, it is hereby anticipated that:

H6. There is a positive relationship between information sourcing opportunities available to the public sector accountants and the performance outcomes of the AGD.

Leadership support. Leadership is responsible for practicing strategic planning in making the best use of resources and fostering knowledge sharing and learning culture. Top management and leaders need to bring about an egalitarian culture and to sustain a knowledge-sharing environment. Further, top management must provide sponsorship to articulate the value of KM and provide financial support to those demonstrating knowledge sharing attitudes. More importantly, top management and senior executives must demonstrate the sharing of their own knowledge, using others' knowledge in their action taking, and giving credit to accountants who share their knowledge (Barnes, 2001). As a result, it is postulated that:

H7. There is a positive relationship between leadership KM support rendered to the public sector accountants and the performance outcomes of the AGD.

Knowledge sharing culture. Knowledge sharing culture will not occur in an organization unless its employees and workgroups display a high level of trust and co-operative behaviour (Salleh and Goh, 2002). Change in culture and individual behaviour must aim towards encouraging the use of knowledge not for individual advantage but for the benefits of the organization as a whole (Barnes, 2001). It is thereby hypothesized that:

H8. There is a positive relationship between knowledge sharing culture among the public sector accountants and the performance outcomes of the AGD.

ICT infrastructure and software. ICT infrastructure and software should promote the efficient and effective capture of both tacit and explicit knowledge and to support knowledge sharing in the entire organization. In fact, effective KM depends on people sharing their knowledge

through computer facilities together with the users of knowledge throughout the organization being able to have access to the organization's knowledge base (Martin, 2000). It is hereby anticipated that:

   H9.   There is a positive relationship between the availability of ICT infrastructure and software and the performance outcomes of the AGD.

KM technologies. Communication networks, electronic mails, intranet, data warehousing, and decision support systems are some of the basic elements of KM technology infrastructure (Stankosky, 2005). Technologies that have been designed with KM in mind would include workflow and document management systems, advanced knowledge bases, and expert systems employed in developing corporate memory, data mining, and filtering systems and also those technologies such as groupware, intranets, and Internet that link organization to intra- and inter-organizational level and to the outside world (Martin, 2000). Thus, the following propositions ensue:

   H10.   There is a positive relationship between the availability of KM technologies and the performance outcomes of the AGD.

Knowledge sharing process. The effective transfer and sharing of both tacit and explicit knowledge is clearly an important KM process in enhancing organizational performance and innovativeness (Becerra-Fernandez *et al.*, 2004). Both the terminologies of knowledge transfer and knowledge sharing are interrelated and the goal of knowledge transfer is to promote and facilitate knowledge sharing, collaboration, and networking for better decision making and effective problem solving. For this study, speed and reliability of knowledge transfer are used to measure the transfer process of explicit knowledge. To measure the sharing process of tacit knowledge, it must be shared and made explicit (formalized) in order to have a significant value to the organization. This is because only formalized knowledge can be represented electronically and be stored, shared, and effectively applied by the people in mind. Based on the arguments, it can be anticipated that:

   H11.   There is a positive relationship between the availability of knowledge sharing process and the performance outcomes of the AGD.

The next section presents the methodology used in this research.

Methods

Survey instrument

A self-administered survey questionnaire was used as the main research instrument for data collection. The questionnaire was designed and developed based on various sources as contained in the literature (Davenport and Prusak, 1998; Edwards *et al.*, 2005; Stankosky, 2005; Syed-Ikhsan and Rowland, 2004), exploratory interviews with the AGD officials, and previously tested and validated variables from prior empirical studies (Salleh and Goh, 2002; Salleh *et al.*, 2006; Taylor, 2004; Taylor *et al.*, 2002). It has two sections. Section one solicits demographic profile information of the respondents such as gender, age, tenure, position, and whether the AGD gives opportunity to the respondents to attend KM related seminars and conferences to enhance their awareness and understanding of KM. Section two consists of 81 items that specifically address the hypotheses formulated in this study. A seven-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree is utilized. The definitions of knowledge and KM were included in the questionnaire in order to provide respondents with a consistent understanding of KM.

Sampling and demographic profile of respondents

All the public sector accountants employed by the AGD constitute population of interest of the study. This is due to the fact that they are primarily responsible for the accounting knowledge, accounting processes, computerized accounting system, and preparation of financial reports. In addition, they also engaged in the operational and strategic decision

making process. Therefore, their responses to the issues raised in the questionnaire can render a high level of credibility and can have long-term consequences for the future success of KM implementation in the AGD.

In total, 365 questionnaires were distributed and usable responses totaled 203 (56 percent) were received. The majority of the respondents are female (57 percent). The respondents range in age from 24 to over 50 years old, with 60 percent of them between the age of 24 and 37 years old. On an average, the respondents have been in the AGD for ten years. About 56 percent of them are junior accountants, followed by senior accountants (30 percent) and the remainder is in the top management level. However, only 35 percent of the respondents were given the opportunity to attend KM-related seminars and conferences to enhance their awareness and understanding of KM.

Determining the validity and reliability of the survey instrument

Prior to the full administration of the questionnaire for data collection, a pilot testing was undertaken and some revisions were made. To determine that all respondents to the survey questionnaire are representative of the research population, a non-response bias test was carried out using t-test for differences in mean of the independent and dependent variables to compare the survey responses between early replies (representative group for replies) and late replies (representative group for non-replies). The results indicate that the respondents are indeed representatives of the sample population.

In addition, this study has also examined the construct validity of all the variables using principal component analysis with a varimax rotation. With Kaiser-Meyer-Olkin (KMO) value of 0.903 (more than 6), and large and significant Bartlett's test of sphericity (p-value < 0.05), the data were deemed appropriate for factor analysis. With eigenvalues greater than 1.00, factor loadings of 0.40 and above given the sample size (Hair et $al.$, 1998), and individual item reliability value greater than the recommended level of 0.70, the factor analysis extracted 12 factors with 68 items that explained 76.57 percent of the total variance explained. About 13 attributes with similar loading on two factors and attributes with loading less than 0.40 were removed.

As shown in Table I, factor analysis has generated two factors for a hypothesized variable originally labeled to as KM technologies ($H10$). The two new hypotheses under KM technologies, i.e. knowledge sharing technologies and communication technologies therefore need to be tested separately. In addition, the factor analysis results have also resulted in three out of 11 hypotheses generated earlier to be dropped from further statistical analysis. The three hypotheses are:

1. learning opportunities ($H5$);

2. information sourcing opportunity ($H6$); and

3. knowledge sharing culture ($H8$).

On the basis of the factor loadings, the extracted factors are re-labeled accordingly in conformity to the survey literature. The attributes of job training ($H2$) and learning opportunities ($H5$) are grouped together, labeled to as training and learning opportunities. All the items under information sourcing opportunity were dropped. The items under leadership support ($H1$) and knowledge sharing culture ($H8$) were found to group together, and was relabeled to as leadership support in knowledge sharing culture. An item on incentive originally intended under leadership support was found to fall under the domain of feedback on performance evaluation ($H4$), thus, a new name – performance evaluation and incentive – is created for this factor.

Table I	Summary of factor analysis results, factors and Cronbach's alpha scores				
Factors		Items	Factor loadings	Eigenvalue	Cronbach's alpha
F1 – Leadership support in knowledge sharing culture		15	0.828-0.433	29.405	0.958
F2 – Sharing process of tacit knowledge		8	0.791-0.406	4.496	0.921
F3 – Organizational performance		10	0.767-0.443	3.475	0.932
F4 – Speed transfer of explicit knowledge		4	0.790-0.692	3.086	0.937
F5 – Training and learning opportunities		6	0.638-0.474	2.832	0.871
F6 – Reliable transfer of explicit knowledge		5	0.795-0.579	2.581	0.900
F7 – ICT infrastructure and software		5	0.685-0.622	2.199	0.863
F8 – Performance evaluation and incentives		4	0.685-0.437	1.689	0.779
F9 – Job rotation		3	0.921-0.900	1.609	0.950
F10 – ICT skills		3	0.867-0.586	1.490	0.835
F11 – Knowledge sharing technologies		3	0.653-0.576	1.442	0.804
F12 – Communication technologies		2	0.731-0.683	1.427	0.870

Due to the factor analysis results, the initial hypotheses were re-structured as follows:

H1. There is a positive relationship between leadership support in creating a knowledge sharing culture and the performance outcomes of the AGD.

H2. There is a positive relationship between training and learning opportunities available to the public sector accountants and the performance outcomes of the AGD.

H3. There is a positive relationship between the availability of knowledge sharing process and the performance outcomes of the AGD.

H4. There is a positive relationship between the availability of ICT infrastructure and software and the performance outcomes of the AGD.

H5. There is a positive relationship between performance evaluation and incentives and the performance outcomes of the AGD.

H6. There is a positive relationship between job rotation programs among the public sector accountants and the performance outcomes of the AGD.

H7. There is a positive relationship between ICT know-how and skills of the public sector accountants and the performance outcomes of the AGD.

H8. There is a positive relationship between knowledge sharing technologies and the performance outcomes of the AGD.

H9. There is a positive relationship between communication technologies and the performance outcomes of the AGD.

The overall items of the survey instrument used in this study has a reliability coefficient of 0.973, with the Cronbach alpha coefficient for subscale items for each independent and dependent variable range from 0.804 to 0.958 as shown in Table I. The scores are therefore an authoritative source to justify that the variables and measures in the questionnaire were reliable.

A preliminary test of multicollinearity shows that the correlation coefficients were within the acceptable limit where the tolerance values are more than 0.20 and that the values of Variance Inflation Factor (VIF) are less than 5 (see Tables II–III). As such, the attributes and scales are deemed fit to be included for further analysis.

The next section presents the results of hypotheses testing.

Results

A correlation matrix of all the study variables indicates that all the independent and dependent variables were positively and significantly correlated to each other.

Table II	The effects of KM enablers on organizational performance						
Coefficients regression model	Unstandardized coefficients		Standardised coefficients			Collinearity statistics	
Predictors	B	Std. error	Beta	t	Sig.	Tolerance	VIF
(Constant)	0.230	0.324		0.710	0.479		
Control variables							
Work experiences	− 0.002	0.005	− 0.019	− 0.415	0.678	0.836	1.196
Learning							
Training and learning opportunities	− 0.021	0.061	− 0.024	− 0.345	0.731	0.356	2.808
Performance evaluation and incentives	0.078	0.054	0.087	1.426	0.156	0.455	2.198
Job rotation	0.075	0.044	0.075*	1.715	0.088	0.882	1.134
ICT skills	− 0.079	0.041	− 0.096*	− 1.928	0.055	0.683	1.463
Technology							
ICT infrastructure and software	0.192	0.056	0.201***	3.404	0.001	0.490	2.042
Knowledge sharing technologies	0.117	0.042	0.165***	2.797	0.006	0.492	2.033
Communication technologies	0.094	0.034	0.144***	2.729	0.007	0.617	1.621
Leadership							
Leadership support in knowledge sharing culture	0.116	0.064	0.129*	1.831	0.069	0.345	2.895
Process							
Knowledge sharing process	0.383	0.061	0.369***	6.286	0.000	0.495	2.020

Notes: Dependent variable: organizational performance; * Significant at 10 percent (0.10) level; ** significant at < 5 percent (0.05) level; ***Significant at < 1 percent (0.01) level

Table III	The effects of KM enablers on organizational performance					
Model summary				Anova		
Model	R	R square	Adjusted R square	Std error of estimate	F	Sig.
	0.823	0.677	0.660	0.52278	39.693	0.000

Note: Dependent variable: organizational performance

Specifically, correlations between the KM enablers and organizational performance are positive and significant, providing some insights on the impact of KM enablers on KM performance outcomes. It appears that leadership support in creating and nurturing knowledge sharing culture is one of the most important independent variables that have a strong and significant relationship with organizational performance as well as other independent variables.

Tables II–III also present the multiple regression analysis results. In conducting the analysis, knowledge sharing process is considered as an aggregated variable where the transfer process of explicit knowledge and sharing process of tacit knowledge (factor 2 and 4) were grouped together. This resulted in R-value of 0.823 and R-square value of 0.677 when both KM enablers and knowledge sharing process are regarded as antecedents to organizational performance. The results indicate that 67.7 percent of the variances in KM performance outcomes have been significantly explained by the independent variables.

Specifically, the multiple regression results show that seven out of nine KM enablers have positive and significant relationships with organizational performance. Among them, knowledge sharing process, technological resources such as ICT infrastructure and software, knowledge sharing technologies, and communication technologies are highly

significant KM enablers to organization performance. As such, *H3*, *H4*, *H8* and *H9* are supported.

In terms of learning factor of the professional intellects surveyed, job rotation is positive and marginally significant compared to ICT know-how and skills, which was significant but in negative direction in their relationship with organizational performance. As such, H6 is supported but *H7* is rejected. Training and learning opportunities, as well as performance evaluation and incentives have shown not to be significantly related to organizational performance. As such, *H2* and *H5* are not supported.

Under the domain of leadership, leadership support in nurturing a knowledge sharing culture has been found to be marginally significant to organization performance at 0.01 significance level, and hence, *H1* is accepted.

Figure 2 summarizes the relationships between the KM enablers and organizational performance from the multiple regression analysis.

Discussion and implications

This study makes important contributions in several ways. The integrated model proposed and used in this study for the purpose of developing a KM enabling environment in a public sector accounting organization is perhaps one of the most important contributions to KM literature and accounting literature. The model was validated in both the face and construct aspects. The results also indicate that the model explains 67.7 percent of the variances in organizational performance outcomes. With the fairly high representation from the accountants who took part in this study, the integrated framework can therefore serve as an important guide to the AGD and perhaps other public sector accounting organizations when they embark on KM programs. Specifically, the empirical evidence could lend support to the AGD in assessing its readiness for KM implementation. In this respect, the KM enablers provide important insights on what are the areas that the AGD should prioritize in order to make its KM efforts work towards achieving better organizational performance.

Some interesting patterns were discovered in this study. First, the knowledge sharing process, which includes speed of transfer of explicit knowledge and reliable transfer of tacit knowledge, has been found to be highly significant to the performance of the AGD. This confirms the notion that knowledge sharing is the cornerstone of KM. The finding implies that an effective knowledge sharing process with people in mind is an immediate goal of the AGD's KM initiative towards achieving better organizational performance.

Second, the multiple regression results reveal that technological components such as ICT infrastructure and software, knowledge sharing technologies, and communication technologies have been found to be the highly significant KM enablers. This is not difficult to understand as effective and efficient KM is unthinkable without information systems (Ryan and Prybutok, 2001). The findings demonstrate the accountants' beliefs that technology is one of the most important aspects that facilitate effective KM implementation. As a matter of fact, such realization is manifested in the AGD's current move to develop its ICT infrastructure in preparation for KM implementation. The findings suggest that proper development and maintenance of ICT infrastructure is a crucial enabler for successful development of a KM program.

The significant negative relationship between ICT know-how and skills, and organizational performance can be explained by the fact that the accountants perceive themselves as professionals in their field of expertise and therefore, their exposure to ICT should be limited to performing their jobs. Since many of them are new to KM, judging from the fact that only 35 percent of them have attended seminars or training related to KM, the majority of accountants cannot see what are the additional skillsets required for knowledge sharing to occur. They may probably view KM as beyond their responsibility and therefore, by training them to acquire ICT skills for the use of specific KM systems may take their time off from their
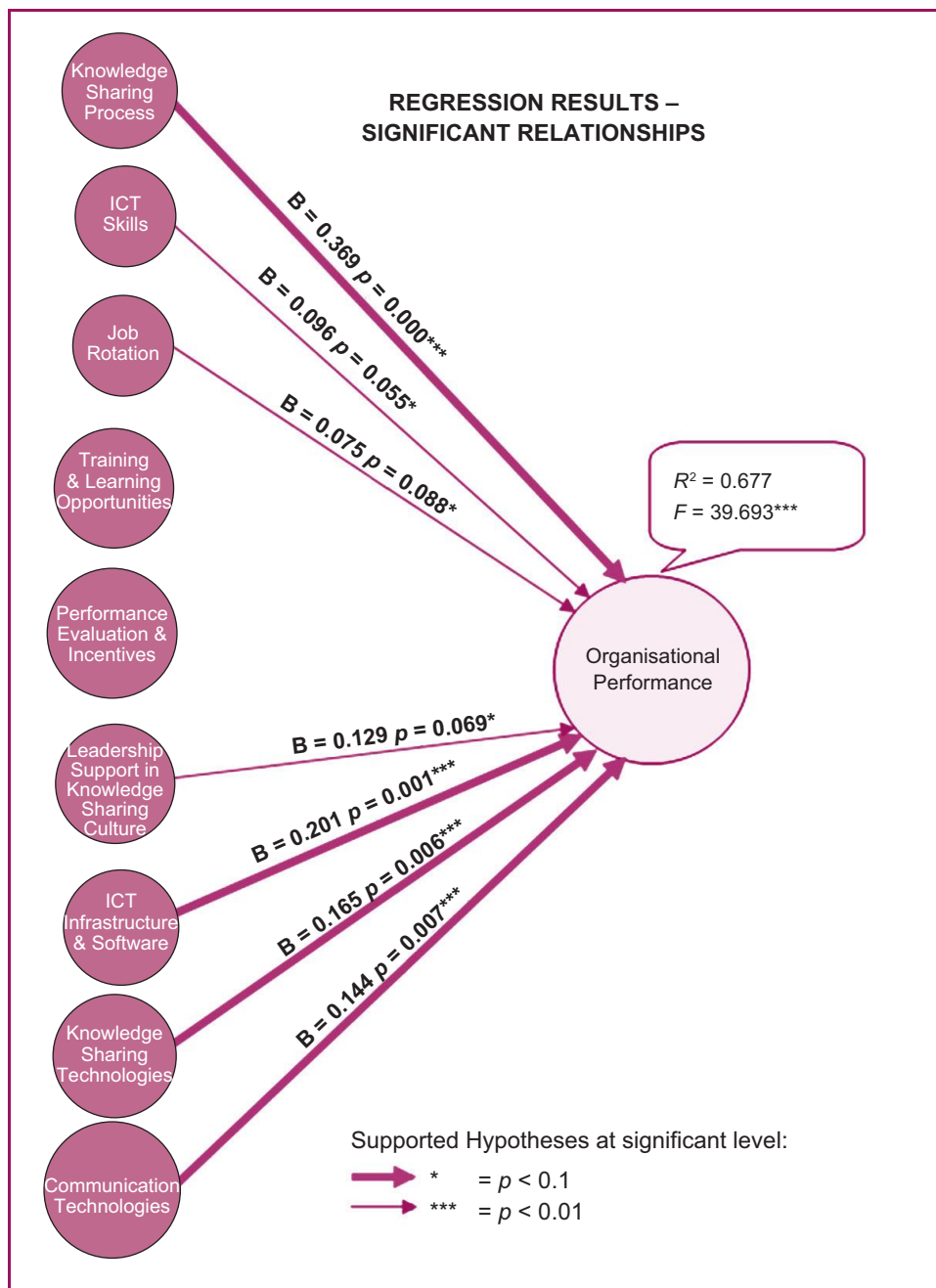
usual responsibility, on top of the mandated training programs that the accountants are required to attend. As such, they perceive such an exposure will reduce the ability of their department to effectively serve its constituents.

Third, it is evident from this study that leadership support and knowledge sharing culture are intertwined. This is not surprising, given the fact that top management leadership support and commitment towards a KM program, particularly in creating a knowledge sharing culture has been documented (Tseng, 2010). Since KM is a radical innovation that changes the operations of an organization, it is regarded as an intervention to an organization's culture (Gooijer, 2000). It has in fact been identified that the biggest challenge in KM is not a technical, but a cultural one (Chase, 1997).

Forth, job rotation has been found to be positively and significantly related to organization performance. This is a common trend in public sector where employees are transferred or rotated on a frequent basis and the public sector accounting organization surveyed is no exception. The findings imply that experiences gained from job rotation programs in terms of the accumulated work experiences gained by the public sector accountants in their different engagement of accounting tasks can potentially contribute to the AGD's KM implementation success.

Two KM enablers, training and learning opportunities, and performance evaluation and incentives have been found not to be significantly related to the performance of the AGD. This is not unexpected, given the fact that the AGD is yet to implement KM and therefore the accountants cannot see how KM affects the performance of their organization. Further, only 35 percent of the accountants are given the opportunity to attend KM related seminars and conferences related to KM. It is difficult to establish a balance and effective performance evaluation mechanism to judge KM activities before the program is even institutionalized. The same goes to the incentive system where the accountants will not be able to see such a system in place until KM has been implemented for a considerable period of time.

The findings call for the following recommendations. It is important for the top management of the AGD to have a clear, well-planned KM strategy before implementation can take its course. Management must keep in mind that KM is imperative for improving its overall performance, particularly the intangible outcomes brought about by KM as arising from servicing the various government agencies. As such, the accountants must be made aware of KM and its value propositions through news, updates, and training provided by the department (Salleh and Goh, 2002) in various areas such as KM, leadership, managing change, company values, to name a few. The performance outcomes documented in this study can serve as a basis to convince the management and employees on the need for KM and its proper implementation.

Above all, a successful KM program requires top management support and commitment. The top managers of the AGD must create the knowledge vision of the organization, communicating that vision, and building a culture that regards knowledge as the most valuable company's resources. As knowledge sharing becomes the cornerstone of the AGD's KM efforts, such a knowledge activity must be mandated across the organization with people in mind. In order to encourage voluntary than mandatory adherence, a knowledge-friendly culture built on trust and confidence must be nurtured. The accountants must be convinced that knowledge sharing is power which will help them learn from each other's experience, expertise and skills. To the very best extent, the leaders must eliminate whatever constraints faced by the AGD in implementing a KM program. This is because organizational constraints, such as those inherited by public sector organizations, lead to inefficiency, ineffectiveness, and powerlessness, which slow down response and provide few incentives to innovate.

The tacit and explicit knowledge gained from job rotation as well as from other sources must be effectively captured, documented and shared. This is especially critical for tacit or mission-critical knowledge as it is the main determinant of quality decision making and even improved organizational performance. While information systems can play a role for tacit and explicit knowledge transfer to take place, the best way of transferring tacit knowledge is not through database but human interaction. Some forms of knowledge externalization

> "Technological components such as ICT infrastructure and software, knowledge sharing technologies, and communication technologies have been found to be the highly significant KM enablers."

include the formation of communities of practice, overlapping span of trust through creation of collaborative project teams, training programmes, and the use of matrix structure where people work in open space environment. In achieving these, proper planning and investment by the AGD is necessary. For internalization purpose, rather than building a new KM system, the AGD can capitalize and build upon the existing infrastructure that they currently possess. It is equally important for the personnel of the AGD to be trained on how to best utilize the KM system that have been put in place. This is based on the premise that people are the cornerstone of KM, not the systems or software.

Once KM is implemented, the AGD must consider establishing a performance measurement system in order to keep track of how employees are supporting the KM principles and activities. At the employee's level, a comprehensive performance measurement system must be developed to capture the impact of knowledge sharing on organizational performance. At the organizational level, although there is no universally acceptable method of measuring KM performance, the AGD can consider some of the currently available methods such as the KM Assessment Tool (KMAT) (APQC and Andersen, 2001), the Knowledge Audit (Liebowitz *et al.*, 2000), and the Systematic Knowledge Audit Approach (Cheung *et al.*, 2007). Since each of these methods suffers from some form of weaknesses, a combinative use of these methods is necessary.

Conclusion

This study has investigated KM implementation issues in a public sector accounting organization using an integrated KM framework. This study serves as a foundation for building a cumulative tradition of research concerning KM implementation in a sector which is yet to receive due attention. In addition, this research serves as a guideline for the AGD to get a good grasp of KM and to undergo a self-check to help the department to rethink and reposition its KM strategy in light of the findings. It helps to ensure that the essential KM enablers are adequately covered when the AGD draws up its future KM implementation strategy for continued organizational learning and performance improvement.

Due to the limitations inherent in this study, the findings have to be interpreted cautiously. This research is conducted only on a single organization from the perspective of the mostly lower echelon professionals and therefore, generalizability of the findings could be a main issue. Although it provides interesting and valuable insights into what might be required to pursue KM, an extension of the study using qualitative method is a future possibility in order to validate the recommendations made in terms of whether they will indeed work in the AGD. More importantly, the identification of what is required to make people share and use available external and internal knowledge through various possible pathways can provide the AGD with specific recommendations to make its KM program works. Alternatively, a larger sample size with a more balanced representation (top and middle management, and senior and junior accountants) and possibly across different public sector organizations will also be interesting in order to determine whether the findings are consistent or otherwise.

It is also worth highlighting that this paper does not focus on the cyclical model of KM processes, a promising area in which future research should address. Future studies are indeed needed to identify other KM enablers and performance outcome metrics so that the model could be improved upon. Since KM takes time to be implemented, a longitudinal rather than cross-sectional study is needed to capture the details.

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