



# Influence of SME characteristics on knowledge management processes

Influence of SME  
characteristics

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## The case study of enterprise resource planning service providers

Varintorn Supyuenyong and Nazrul Islam

*School of Management, Asian Institute of Technology, Klong Luang,  
Pathumthani, Thailand, and*

Uday Kulkarni

*Department of Information Systems, W.P. Carey School of Business,  
Arizona State University, Tempe, Arizona, USA*

### Abstract

**Purpose** – Much of the literature on knowledge management (KM) has focused on KM practices in large organisations where KM seems to encompass every KM process from capture of knowledge to its eventual reuse. Small and medium-sized enterprises (SMEs) practise KM processes to a lesser degree or differently owing to their special characteristics and limitations. The purpose of this study is to understand how the special characteristics of SMEs influence their KM processes.

**Design/methodology/approach** – An in-depth exploratory research study using a multi-case design was conducted in four SMEs in Thailand. Four enterprise resource planning (ERP) service providers – two locally owned and two subsidiaries of multinational companies – participated in this qualitative study.

**Findings** – The analysis demonstrates that, in general, ownership and management structure as well as culture and behaviour characteristics of SMEs seem to have a more positive effect than other SME characteristics on KM processes. System, process and procedure, and customer and market characteristics have a more moderate effect. Human capital management seems to hinder somewhat rather than facilitate KM processes.

**Research limitations/implications** – The study covers four organisations; all are ERP service providers. Hence, the results may not directly apply to other types of business such as manufacturing or trading.

**Originality/value** – The findings may be used as prescriptions for improving KM practices in SMEs. Further, this study may also serve as a basis for future quantitative research studies constructed to generalise these findings.

**Keywords** Knowledge management, Knowledge management systems, Knowledge processes, Small to medium-sized enterprises, Manufacturing resource planning, Thailand

**Paper type** Research paper

### 1. Introduction

In today's economy, knowledge is one of the most important resources in creating a competitive advantage for the organisation (Hitt, 1998; Hitt *et al.*, 1999). Knowledge

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management (KM) has become an essential component of an organisation's arsenal, and organisations are beginning to pay more attention to it. However, most KM research is focused on large organisations and addresses perspectives such as KM strategy, KM implementation, or performance based on KM, etc. (Apostolou and Mentzas, 2003; Handzic and Agahari, 2004; McCampbell *et al.*, 1999; Kim *et al.*, 2003). McAdam and Reid (2001) found that large organisations recognised knowledge and its various aspects and had more resources to develop a KM strategy and systems. SMEs, however, have less available resources, and their KM practices are divergent and less advanced when compared to large organisations.

The practice of KM in small and medium-sized enterprises (SMEs) differs from that of a large organisation because SMEs are not "a little big business" (Lim and Klobas, 2000; Wong and Aspinwall, 2004). Firstly, their specific characteristics lead to a unique disposition for KM; the principles that apply to large organisations cannot easily be scaled down and translated to SMEs. Secondly, they are a source of innovation in products and services; they supplement a variety of products and services by operating in niche markets (Organization for Economic Co-operation and Development, 2002; Thompson and Leyden, 1983; Acs, 1996; Storey, 1994). They are an integral part of the overall value chain in almost any industry. Thus, SMEs are an important and indispensable part of a country's growth. Thirdly, some of the widely cited potential benefits of KM apply aptly to SMEs. These are improvements in efficiency, decision-making, competency, learning, innovation, and responsiveness, among others (uit Beijerse, 2000; Skyrme and Amidon, 1997; Jarrar, 2002; Frey, 2001; Civi, 2000). As global competition further intensifies, SMEs will increasingly be forced to compete in that market; it is therefore inevitable that they will adopt KM practices. Moreover, as more and more large corporations implement KM strategies, they will demand a higher level of knowledge integration from SMEs who are their value chain partners.

SMEs' understanding of the KM concept and its adoption differs from that of large organisations (Desouza and Awazu, 2006; Wong and Aspinwall, 2005; Egbu *et al.*, 2005; Koh and Maguire, 2004). One important dimension that has an effect on the practice of KM in SMEs is their special characteristics – management structure, markets, systems, culture, etc. – that differentiate them from large organisations. SME characteristics are likely to influence all activities in the life-cycle of knowledge – from the acquisition and capture of knowledge, its organisation and storage, and its dissemination/transfer, to its ultimate application. However, there is little research available on the relationship between SME characteristics and KM processes; they are studied independently. Our study explores these two dimensions together. We attempt to answer the question "How do the special characteristics of SMEs affect their knowledge management processes?"

The context of this study is the SME population comprising enterprise resource planning (ERP) service providers in Thailand. These companies provide an array of professional services, including consulting, implementing, training, integrating, providing technical support, and project outsourcing. We chose them as a basis for this investigation of KM practices in SMEs because this is a thriving group of entrepreneurs performing knowledge-intensive work (Dingsoyr and Royrvik, 2003). ERP implementation projects require the effective integration of various types of within-project and cross-project knowledge, such as ERP applications, business processes, and government policies. KM helps to leverage this knowledge to develop

and improve individuals' skills and capabilities, one of the critical success factors of ERP implementation projects. Moreover, some characteristics of ERP projects demand specific treatment: ERP projects are implemented in a scattered environment – project teams work at the customer's premises on temporary assignments in time-bound tasks. All new knowledge thereby gets embedded within individual project teams, leading to knowledge fragmentation after completion of the project. Under this environment, KM can effectively facilitate the capture and sharing of knowledge within the enterprise (Weiser and Morrison, 1998; Plessis, 2005).

In a developing country like Thailand, KM is at an embryonic stage. However, KM is gradually drawing the attention of many SMEs, as can be seen from the increasing number of KM-related forums[1]. Thailand is experiencing a healthy growth in enterprise software systems. The software market value in Thailand is expected to grow by almost 18 per cent in 2007, to 62,174 million baht. A large part of this growth can be attributed to the widespread acceptance of enterprise systems and the growth of small and medium-sized companies that provide these services. Because of the knowledge-intensive nature of this work, KM can be a source of tremendous competitive advantage to such companies.

We chose four ERP service providers in Thailand as a basis for the investigation of KM practices. These companies match the Thai Ministry of Industry definition of SMEs (fewer than 200 employees or less than 200 million baht of asset value)[1]. ERP service providers form a majority of all enterprise software service providers. Hence studying their KM phenomenon may shed some light on how other similar organisations practise KM. We believe that although our results may not be fully generalisable, they may apply to other types of SME service providers.

Our paper is organised as follows. Section 2 presents the framework used for the study, while Section 3 presents our exploratory multi-case study research methodology. Section 4 presents the analysis and Section 5 concludes the paper.

## 2. Study framework

We followed a positivist case study methodology (Dubé and Paré, 2003) which prescribes *a priori* specification of constructs. Our constructs are designed along two dimensions:

- (1) SME characteristics; and
- (2) the KM process.

This allows exploration of the influence of an individual SME characteristic (independent variable) on each of the KM sub-processes (dependent variable). Figure 1 shows the study framework. Each arrow depicts a potential influence of an SME characteristic on a KM sub-process.

### 2.1 SME characteristics

Prior business research in the SME domain has studied specific SME characteristics including organisational culture, human resources (HR), systems processes and procedures, and organisational structure (uit Beijerse, 2000; Lim and Klobas, 2000; Dingsoyr and Royrvik, 2003; Macpherson *et al.*, 2003). One of the most comprehensive set of SME characteristics is described in Wong and Aspinwall (2004). We adopted their characteristics and grouped them into five broad categories discussed below.

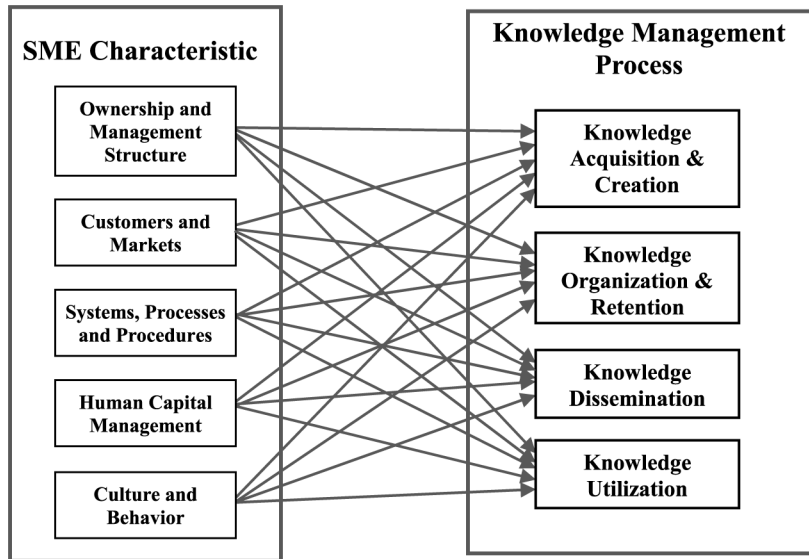


Figure 1.  
The study framework

*2.1.1 Ownership and management structure.* Most SME owners act as owner-managers and also play the part of the company’s strategic initiator. Their intention to adopt KM systems, including formulating the vision, allocating resources to facilitate KM processes, setting up organisational procedures, etc., may set the tone for KM (Senge, 1990b; Nonaka and Takeuchi, 1995; Wickert and Herschel, 2001; Lee and Kim, 2001; Drucker, 1988; Cook, 1999). Management support is proposed to be the most important factor in successful KM adoption (Cook, 1999; Wickert and Herschel, 2001; Wong and Aspinwall, 2005; Egbu *et al.*, 2005).

A flatter organisational hierarchy in SMEs leads to greater flexibility in work but with a limited or less clear division of responsibilities. There is lower degree of job specialisation with more generalists. Communication lines are shorter, which allows for easier and more direct information flow. This structure leads to higher levels of coordination and cooperation.

*2.1.2 Customers and markets.* SMEs depend on a small customer base and focus on local or regional markets, with a few international markets. They usually have limited product/service lines and sometimes cater to niche markets. Employees have close relationships with their customers. Customer satisfaction is one of the main criteria in measuring performance because SMEs use word-of-mouth as their primary mechanism for growth. Moreover, because of the closeness of relationships, specific requirements of the customer are more easily understood.

*2.1.3 Systems, processes and procedures.* SMEs have simple planning and control systems, and informal rules and procedures. There is less standardisation of work processes. The operations are less complex. Processes are more fluid and are adaptable to various situations. SMEs also have a narrow scope and mostly focus on operational, rather than strategic, processes. Rather than creating knowledge repositories, they are more adept at sharing tacit knowledge (Nonaka and Takeuchi, 1995; Desouza and Awazu, 2006).

*2.1.4 Human capital management.* Owing to limited number of expert personnel, human capital is an important resource and high turnover rates can severely affect operations (Huin, 2004). An ERP service is a complex task; the project team needs to possess diverse expertise and knowhow. Since SMEs have less clear employee responsibilities, a lower degree of job specialisation occurs, leading to greater employee versatility. Human capital development is done according to specific needs in an *ad hoc* manner. Employee performance evaluation is not standardised.

*2.1.5 Culture and behaviour.* SMEs usually have an informal, organic, and unified culture. The (small) size of the organisation fosters recognising the company as a whole instead of looking at single departments or functions. The behaviour of employees is more easily influenced by the owner-managers' philosophy and beliefs. An open culture that allows employee to work independently not only enables the knowledge creation process, but also allows knowledge to flow easily among participants, a phenomenon that Cook (1999) called "the shadow system" of the organisation for knowledge sharing.

## 2.2 Knowledge management process

Researchers have viewed KM from different perspectives. Regardless of these differences, there is a general consensus that KM divides the overall KM process into various sub-processes. Table I shows the various nomenclatures used for the classification of KM sub-processes under four main sub-processes, i.e.:

- (1) Knowledge acquisition and creation.
- (2) Knowledge organisation and retention.
- (3) Knowledge dissemination.
- (4) Knowledge utilisation.

As observed by prior researchers, most small and large organisations practising any KM would need to participate in each of these KM processes, at least to some extent.

*2.2.1 Knowledge acquisition and creation.* This sub-process includes knowledge identification, capture, acquisition, and creation (Currie, 2003; Kucza, 2001; Rao, 2004). It starts with understanding a company's tasks and the knowledge required for these tasks. The company then sets up a KM strategy that defines the ways of obtaining knowledge via internal knowledge capture and/or creation, and external knowledge acquisition (Kucza, 2001; Probst *et al.*, 2000).

*2.2.2 Knowledge organisation and retention.* Required knowledge in tacit form may be codified in an understandable form to the extent possible (Millar *et al.*, 1997). After checking for consistency, knowledge needs to be categorised, and stored in organisational repositories in a standard format for later use. The company may analyse usage behaviour and design a retrieval system to ensure easy access.

*2.2.3 Knowledge dissemination.* This sub-process involves knowledge sharing among employees within the company. Employees share both tacit and explicit knowledge; however, different forms of knowledge need different methods, tools and techniques. A combination of incentives and a cooperative culture are the main supporting factors of knowledge dissemination (Morris and Empson, 1998). IT-based communication helps the process of dissemination to a great extent.

**Table I.**  
Sub-processes of  
knowledge management

Integrated knowledge management processes	Knowledge management processes from the literature											
	Wiig (1993)	Meyer and Zack (1996)	Ruggles (1997)	Liebowitz and Beckman (1998)	McElroy (1999)	Burk (1999)	Alavi and Leidner (2001)	Bukowitz and Williams (2000)	Currie (2003)	Wong and Aspinwall (2004)	Lee <i>et al.</i> (2005)	Daghfous and Kah (2006)
Knowledge acquisition and creation												
Contribute												
Identification				×				×				
Generation			×									×
Creation	×								×	×		
Acquisition		×										
Capture				×								
Compilation	×											
Learning												
Sourcing	×											
Transformation	×											
Value realisation	×											
Get												
Knowledge claim												
validation												
Validation					×							
Refinement					×							
Select		×										
Organisation												
Codification												
Store/retrieve		×										
Update/divest												
Accumulation												
Integration												
Transfer												
Share/distribute	×											
Assess												
Apply/application	×											
Use/utilisation												
Sell												
Presentation												
Build/sustain		×										

*2.2.4 Knowledge utilisation.* Knowledge utilisation is defined by some researchers as the application and use of knowledge in an enterprise's value-adding process (Alavi and Leidner, 2001; Currie, 2003). It includes the deployment of knowledge to create or develop an organisational capability. It also includes adapting, integrating, and applying knowledge to the organisation's processes and products (Wong and Aspinwall, 2004; Lee *et al.*, 2005).

Normally, all sub-processes are needed to ensure the efficient management of organisational knowledge. Large organisations typically have more knowledge assets, both in extent and variety, and their knowledge sources and needs are also scattered in more dispersed locations. Hence, their need to implement the four KM sub-processes is more than that of SMEs. This does not mean that SMEs, because of their size, do not need these processes. Their workers do need appropriate and up-to-date knowledge, but their processes are governed by their specific limitations.

### 3. Research methodology

We undertook an exploratory multiple-case research methodology (Dubé and Paré, 2003). From a list of ERP service providers that we have professional contacts with, we selected four companies that matched the criteria and were willing to participate in the research study by allowing the researchers to get in-depth and detailed information. As can be seen below, the extensive time commitment needed from various personnel required top-level buy-in. The top management also needed to appreciate academic research in order to allow such investment of their employees' time. Hence, the set of companies we studied was what may be called a "convenience sample". We do not believe that these companies were atypical in any way, i.e. they did not represent a population that was more or less likely to participate in KM or had significantly different characteristics to an average ERP service provider SME.

These four companies are diverse in organisational ownership and management structure. Two of them are local Thai companies and two are subsidiaries of multinational (European) companies. This SME characteristic is very important because it is the initiator of organisational strategy and policies/procedures, and also influences other SME characteristics. The subsidiaries may inherit some aspects of the structure, systems and procedure, and culture from their parent company and also enjoy its support and customer base, whereas the local companies do not. Of the four companies, three are ERP business partners, i.e. companies that form an alliance with an ERP application owner to sell and implement the ERP application instead of developing the ERP application themselves. Only one company develops, sells, and implements its own product. This diversity helps to better generalise the findings. Due to confidentiality reasons, the names of the companies and the ERP application owners are not disclosed. We refer to the four companies as Companies A, B, C, and D.

The protocol for the case studies was as follows: data collection was conducted at the company offices in order to directly observe people working in their workplaces, understand the processes, study policies/procedures, and the environment at the operational level. There are four main data sources:

- (1) semi-structured interviews;
- (2) informal discussions;
- (3) review of documents; and
- (4) observations of the working environment.

The data from these sources was triangulated to arrive at a common understanding of each company.

Researchers began the data collection process by making appointments to visit the company and to interview the management personnel. When at the premises, researchers had informal discussions with operational staff before meeting with management personnel. The discussion focused on everyday processes and activities in dealing with the ERP service tasks. No prior appointments were made with the operational staff; hence, the data collected from these discussions is spontaneous and unbiased.

Following this, we formally interviewed the SMEs' top management, which accounted for the majority of the data. These were face-to-face semi-structured interviews with prepared open-ended questions. We selected one key top management person in each company because these people understand their companies from all perspectives and were therefore most suitable for gathering the required data from. These persons are accountable for all ERP application projects and lead all employees on their teams. The guideline questions were intended to elicit information in five broad areas:

- (1) general information about the interviewees and the companies;
- (2) the perception of knowledge and knowledge management;
- (3) acquisition of external knowledge, industry best benchmarking/best practices, customer/market knowledge, etc.;
- (4) management and development of employee skills/capabilities; and
- (5) current organisational policies, procedures, and practices of performing tasks for managing organisational knowledge.

Interviews with the management personnel lasted for 2-3 hours each. The general information about management persons interviewed is shown in Table II.

The working environment was observed to see the facilities that different managements said they provided to support daily collaborative work. The observations of the daily working activities and work environment, office layout, meeting places, etc., also helped in understanding the cultural and social aspects within the organisation.

Working documents such as project documents, training manuals, document templates, etc., were reviewed. In addition to the interviews and observation, different companies provided access to their information systems and procedures, with some presenting the entire company database system to show how the company stored information, what information was stored (e.g. employees, customers, vendors information, project documents and reports), and how the company used that information to create value for the daily tasks. Several days were spent in document review, and in observations of the workplace, the daily working activities, and the company database system.

All the interviews were tape-recorded and notes were taken. All interviews were conducted in Thai and transcribed. Follow-up phone calls were made to get more information when needed and to clarify understanding on some issues. It took two months to complete the data gathering process from the initial appointment to transcription. The data collected from all sources were categorised according to SME



Position Expertise and experience	Local companies		Subsidiaries of multinational companies	
	Company A	Company B	Company C	Company D
	<p>Director/Product Manager One of the founding team members of the company Has experience with ERP consulting for 14 years Familiar with six ERP application systems Handled around 14 projects Used to work for one of the big five professional services firms prior to joining this company</p>	<p>General Manager One of the founding team members of the company Has experience with ERP consulting for 15 years Familiar with four ERP application systems Handled around 12 projects Used to work for one of the big five professional services firms prior to joining this company</p>	<p>Project Manager In charge of multiple projects for one of the three ERP application systems Has experience with ERP consulting for 15 years Familiar with four ERP application systems Handled around 20 projects Used to work for one of the big five professional services firms prior to joining this company</p>	<p>General Manager Responsible for the entire company Dutch, but familiar with the Asia-Pacific region for more than ten years Has extensive experience in manufacturing application software</p>

**Table II.**  
Interviewee information

characteristics. Common practices and activities found in the four cases within each SME characteristic were analysed to see whether they facilitate or hinder KM sub-processes. Due to space considerations, we have omitted the extensive data; interested readers can request the data from the authors.

#### 4. Findings and analysis

Using the framework presented earlier, we analysed the relationships between the SME characteristics and the individual KM processes to see if the characteristics encourage or hinder the processes. In our findings below, we highlight only those KM processes that appear to be significantly affected by SME characteristics. All data from transcribed interviews, notes, documents, and physical observations were used for our analysis.

##### 4.1 Ownership and management structure

**4.1.1 Knowledge acquisition and creation.** Owners and managers of both local and subsidiary companies are more concerned with the day-to-day activities of the company and immediate profits. Therefore, the focus for acquiring knowledge is concentrated specific knowledge and skills required for immediate operational and project completion tasks, rather than the long-term strategy.

Irrespective of its ownership characteristic (local or subsidiary), each firm has a flat and less complex organisational hierarchy compared to a large company. This structure facilitates easy communication. Friendly interactions lead to the creation of knowledge (through socialisation and internalisation), especially tacit knowledge (Nonaka and Takeuchi, 1995). Thus, we observe that the ownership and management structure of SMEs enhances their abilities to acquire and create new knowledge.

**4.1.2 Knowledge dissemination.** A short communication line, because of the flat organisational structure between the management and operational level, helps in transferring and sharing knowledge easily. The ERP implementation tasks are project-based with a small number of members in each project team. Low hierarchy together with a project-based structure helps to share or transfer knowledge *within* project teams efficiently. Hence we can conclude that the ownership and management structure of SMEs enhances their abilities to disseminate available knowledge.

**4.1.3 Knowledge utilisation.** In all cases, we found that management likes its employees to utilise the available knowledge to the fullest extent. They do not want to keep a large number of employees. Subsidiaries can get support from parent companies and other subsidiary companies when needed. For example, Company B rotates skilled employees among projects. Companies C and D first look for a skilled employee in the organisation and then in other subsidiaries when they lack required knowledge.

The strategy of the management seems to utilise internal knowledge for providing complete services to serve customers. For example, Company A uses HR/payroll service personnel in ERP service tasks to optimise the existing knowledge. Thus, we conclude that the ownership and management structure of SMEs encourages the utilisation of available knowledge.

##### 4.2 Customer and market

**4.2.1 Knowledge acquisition and creation.** The firms focus on several service lines or ERP application systems to serve different customers' demands. To serve these

demands, they have to continuously learn or seek new knowledge and/or adapt their working procedures. The close relationship, and nimble and informal nature of these firms, also allows them to more easily align themselves with customer needs. Firms conduct both formal and informal customer surveys to understand customer demands and perceptions. So we can conclude that the characteristics of customers/markets of SMEs positively affect the acquisition and creation of new knowledge.

*4.2.2 Knowledge dissemination.* The firms have project-based teams working at the customer site with a few team members assigned to each project. Once the project is completed, they are moved to another project at a different site. Formal meetings people from other projects are rare. So knowledge is shared only within a small group of people within the same project. As a result, dissemination of knowledge throughout the organisation does not take place very smoothly. Thus, the characteristics of customers/markets of SMEs are not conducive to the dissemination of available knowledge.

*4.2.3 Knowledge utilisation.* Owing to their small customer base, SMEs would like to retain their market share and a long-term relationship with their existing customers. Hence, they need to mobilise their existing knowledge to satisfy customers. Past experiences are used as a guideline and to help them understand clearly the conditions and limitations of the work environment. For example, Companies A, B, and C integrate their knowledge to provide solutions that serve many industries and to build their own customised products. So, we conclude that the characteristics of customers/markets of SMEs encourage the utilisation of available knowledge.

### 4.3 Systems, processes, procedures

*4.3.1 Knowledge acquisition and creation.* Project-based tasks with compressed time schedules drive employees to seek new knowledge because the details of work differ from project to project. For example, employees of Company A search for new knowledge when required in their work and employees of Company C are required to discover new issues to discuss in meetings. On-the-job training is used for knowledge capture and creation, especially tacit knowledge.

Kim *et al.* (2003) proposed that formal systems and procedures are needed to support knowledge management practices. However, in all cases, we found that the informal systems and procedures of the firms also facilitate the capture internal knowledge when needed, without any formal rewards and incentive systems. Thus, we conclude that the informal systems/processes/procedures of SMEs are conducive to the acquisition and creation of new knowledge.

*4.3.2 Knowledge organisation and retention.* None of the four companies has a procedure and standard for codifying the available knowledge. However, they do have standard document templates used to prepare the project documents. Project knowledge documentation is rarely done because the project teams are forced to finish the task within the time schedule.

Standard procedures for the storage and retrieval of organisational knowledge do not exist in all cases. Everyone can put anything into a simple central database. The quality of individual documents depends on the contributor. However, Company D has some procedures for organising knowledge into its systems.

Tacit knowledge can be organised more easily by SMEs because they have a smaller number of known experts in the organisation. So, the systems/processes/procedures of

SMEs are more conducive to the organisation and retention of existing tacit knowledge than explicit knowledge.

*4.3.3 Knowledge dissemination.* Reward and recognition systems are one of the motivational factors for knowledge sharing. None of the firms have a formal system for knowledge sharing. Project and individual performance evaluation procedures require employees to attend more to daily work activities than to any supporting activities. Project team members mainly work and move around at the customer's site. Knowledge sharing occurs only between employees who work together within the same team. Hence, the systems/processes/procedures of SMEs are not conducive to the dissemination of available knowledge.

*4.3.4 Knowledge utilisation.* In all cases, we found that the firms do not have a formal procedure for assigning tasks to their employees. However, the firms try to utilise internal knowledge effectively in "putting the right man on the right job". They move people internally around projects or subsidiaries to fit with the project requirements. For example, Company B rotates employees between projects. Thus, the systems/processes/procedures of SMEs are conducive to utilising existing knowledge.

#### *4.4 Human capital management*

*4.4.1 Knowledge acquisition and creation.* Out of the four cases, two companies have non-standard employee performance appraisals. There are no employee development plans or training schedules. They rarely hire new employees. This leads to difficulties in acquiring and creating organisational knowledge.

Another alternative is to acquire new knowledge from external sources via training courses. All the companies rarely send employees to external training, and do so only if the knowledge is imminently required for a job at hand. Hence, the HCM characteristics of SMEs do not encourage the acquisition and creation of new knowledge.

*4.4.2 Knowledge organisation and retention.* Management feels that it knows its employees' skills and knowledge. Management does not find it necessary to organise the existing organisational knowledge in the database. In addition, there is no clear job specification. Employee appraisals are heavily biased towards performance on project-related duties. In addition, there is no incentive for the employees to investing in knowledge organisation/retention activities. Therefore, the HCM characteristics of SMEs do not encourage the organisation and retention of existing knowledge.

*4.4.3 Knowledge dissemination.* All the companies studied prefer relying on internal knowledge transfer. They seem to rely on internal training delivered in an informal or formal manner and also on coaching. This is a relatively low cost activity for SMEs with substantial payback. These structural activities promote dissemination of expert knowledge to a broader set of employees. So, the HCM characteristics of SMEs facilitate the dissemination of tacit knowledge.

#### *4.5 Culture and behaviour*

*4.5.1 Knowledge acquisition and creation.* The firms have an open work environment. This work environment mostly supports knowledge sharing. But when employees interact with each other, they not only exchange knowledge, but also create new knowledge via synthesis. New knowledge gets created from the merging of experience and individual expertise. However, most such new knowledge is tacit because it is not

stored in an explicit form. So, the culture/behaviour characteristics of SMEs encourage the creation of tacit knowledge.

**4.5.2 Knowledge dissemination.** The informal consultation culture of SMEs allows person-to-person knowledge sharing, which is one of the best ways to disseminate knowledge, even without a formal reward system. Social activities such as gatherings and outings seem to promote team-building and the trust that serve as the basis for sharing valuable knowledge.

The unified corporate mindset of SMEs makes employees feel that they belong to the company and have goals that are closely aligned with those of the company. This allows employees to value trust and openness. Thus, the culture/behaviour characteristics of SMEs enhance the dissemination of available knowledge.

**4.5.3 Knowledge utilisation.** Because of the small size of SMEs, employees can have a strong sense of belonging to the company. They know that their performance directly affects the bottom line and that the company's success can directly affect them. The ERP implementation task is very team-oriented. This, together with the sense of trust, can prompt an employee to utilise all the tacit knowledge that they have, look for others who can bring their knowledge to tasks, and provide knowledge to others who need it. So, the culture/behaviour characteristics of SMEs facilitate the utilisation of available knowledge.

## 5. Discussion and conclusion

This qualitative study explored the influence of SME characteristics on the knowledge management practices of SME ERP service providers in Thailand. Figure 2 summarises our findings: SME characteristics, shown in the rows, potentially influence KM sub-processes, shown in the columns – “+” indicates a positive influence, a “-” indicates a negative influence, and “N/I” indicates either no influence or insignificant influence of the SME characteristic on the corresponding KM sub-process. Asterisks indicate influence on tacit knowledge only.

It can be seen that ownership and management structure, and culture and behaviour have positive effects on the three KM sub-processes – i.e. knowledge acquisition and creation, knowledge dissemination and knowledge utilisation – and insignificant or no influence on knowledge organisation and retention. Management support and commitment is critical to the success of adopting KM practices (Egbu *et al.*, 2005; Senge, 1990b; Cook, 1999, Lin and Tseng, 2005; Hung *et al.*, 2005). Although these researchers discussed the positive influence of ownership and management structure on the overall KM process, they did not look into its influence on each of the KM sub-processes. Our study shows that ownership and management structure have insignificant or no influence on knowledge organisation and retention. SMEs' knowledge is mostly embedded in the owner or management personnel. They do not pay attention to codifying or storing knowledge (Desouza and Awazu, 2006). An informal culture creates trust in the working environment and knowledge is easily shared (Senge, 1990a).

Systems, processes and procedures have positive influences on three KM sub-processes – i.e. knowledge acquisition and creation, knowledge organisation and retention, and knowledge utilisation. However, this characteristic has a negative influence on knowledge dissemination. We find that the systems, processes and procedures encourage the organisation and retention of tacit knowledge only. Because

SME characteristic	KM Process			
	Knowledge Acquisition & Creation	Knowledge Organization & Retention	Knowledge Dissemination	Knowledge Utilization
Ownership and Management Structure	+	N/I	+	+
Customers and Markets	+	N/I	-	+
Systems, Processes and Procedures	+	+*	-	+
Human Capital Management	-	-	+*	N/I
Culture and Behavior	+*	N/I	+	+

**Key:**  
 + : Positive influence  
 - : Negative influence  
 \* : Specific to tacit knowledge

**Figure 2.**  
Summary of the influence of SME characteristic on KM process

of the absence of incentives or rewards systems in SMEs, the systems, processes and procedures have a negative influence on knowledge dissemination.

Customers and markets have positive influences on two sub-processes – i.e. knowledge acquisition and creation and knowledge utilisation. They have insignificant or no influence on knowledge organisation and retention and a negative influence on knowledge dissemination. ERP service providers have to provide services under a time-bound environment, generally at the customer’s site. Different customer requirements for each project force ERP service providers to update their knowledge and use it to develop products and services to satisfy their customers’ demands.

The human capital management characteristic of the enterprise has a positive influence on knowledge dissemination only. It helps to share only tacit knowledge. It has insignificant or no influence on knowledge utilisation. Interestingly, it has negative influences on two KM sub-processes – i.e. knowledge acquisition and creation, and knowledge organisation and retention. SMEs have a specific intention that focuses on markets rather than internal business improvement (McAdam and Reid, 2001), and they are less concerned about their human capital directly. However, the small number of employees leads to easy sharing of existing tacit knowledge.

This study gives an insight into the influence of each SME characteristic on each of the KM sub-processes. From the management perspective, owners/managers of these

organisations should pay more attention to those characteristics that have a negative influence on KM sub-processes. Owners/managers should take the action that is required to ensure that the situation supports instead of hinders the KM sub-processes. Efforts could also be made to improve those characteristics which have insignificant or no influence on the KM process so that they also become supportive.

In conclusion, we have found that a given SME characteristic may have different influences on each of the KM sub-processes. Although Wong and Aspinwall's (2004) study presents the influence of SME characteristics on each of the KM sub-processes, their study was based primarily on the literature. Our research complements Wong and Aspinwall's (2004) work by conducting an in-depth qualitative study of multiple SME organisations.

One of the limitations of this study is that it covers only four organisations, all ERP service providers belonging to the information technology (IT) sector. ERP service providers have some distinctive features. Hence, our findings may not be directly applicable to all SMEs, such as those in manufacturing or trading. Another limitation is that all four cases are from Thailand; hence, a country- or region-specific culture may have influenced our findings. However, two of the SMEs were subsidiaries of European companies, which may afford some degree of external validity to our study. We believe that our study could help management and decision makers within the rapidly growing IT industry towards better management knowledge in their organisations. Further, this study may also serve as a basis for future quantitative research studies constructed to generalise these findings.

#### Note

1. See, for example, [http://cms.sme.go.th/cms/c/portal/layout?p\\_l\\_id=22.293](http://cms.sme.go.th/cms/c/portal/layout?p_l_id=22.293) (accessed 10 March 2008).

#### References

- AcS, Z.J. (1996), "Small firms and economic growth", in Admiraal, P.H. (Ed.), *Small Business in the Modern Economy*, Professor Dr F. Vries Lectures in Economics, Oxford, pp. 1-62.
- Alavi, M. and Leidner, D.E. (2001), "Review: knowledge management and knowledge management systems: conceptual foundations and research issues", *MIS Quarterly*, Vol. 25 No. 1, pp. 107-36.
- Apostolou, D. and Mentzas, G. (2003), "Experiences from knowledge management implementations in companies of the software sector", *Business Process Management Journal*, Vol. 9 No. 3, pp. 354-81.
- Bukowitz, W. and Williams, R. (2000), *The Knowledge Management Fieldbook*, Prentice-Hall, London.
- Burk, M. (1999), "Knowledge management: everyone benefits by sharing information", *Public Roads*, Vol. 63 No. 3, available at: [www.tfrc.gov/pubrds/novdec99/km.htm](http://www.tfrc.gov/pubrds/novdec99/km.htm) (accessed 10 March 2008).
- Civi, E. (2000), "Knowledge management as a competitive asset: a review", *Marketing Intelligence & Planning*, Vol. 18 No. 4, pp. 166-74.
- Cook, P. (1999), "I heard it through the grapevine: making knowledge management work by learning to share knowledge, skills and experience", *Industrial and Commercial Training*, Vol. 31 No. 3, pp. 101-5.

- Currie, W.L. (2003), "A knowledge-based risk assessment framework for evaluating web-enabled application outsourcing projects", *International Journal of Project Management*, Vol. 21 No. 3, pp. 207-17.
- Daghfous, A. and Kah, M.M.O. (2006), "Knowledge management implementation in SMEs: a framework and a case illustration", *Journal of Information and Knowledge Management*, Vol. 5 No. 2, pp. 107-15.
- Desouza, K.C. and Awazu, Y. (2006), "Knowledge management at SMEs: five peculiarities", *Journal of Knowledge Management*, Vol. 10 No. 1, pp. 32-43.
- Dingsoyr, T. and Royrvik, E. (2003), "An empirical study of an informal knowledge repository in a medium-sized software consulting company", *Proceedings of the IEEE International Conference on Software Engineering*, pp. 84-92, available at: <http://portal.acm.org/citation.cfm?id=776827> (accessed 20 March 2008).
- Drucker, P.F. (1988), "The coming of the new organization", *Harvard Business Review*, January/February, pp. 45-53.
- Dubé, L. and Paré, G. (2003), "Rigor in information systems positivist case research: current practices, trends and recommendations", *MIS Quarterly*, Vol. 27 No. 4, pp. 597-635.
- Egbu, C.O., Hari, S. and Renukappa, S.H. (2005), "Knowledge management for sustainable competitiveness in small and medium surveying practices", *Structural Survey*, Vol. 23 No. 1, pp. 7-21.
- Frey, R.S. (2001), "Knowledge management, proposal development and small businesses", *The Journal of Management Development*, Vol. 20 No. 1, pp. 38-54.
- Handzic, M. and Agahari, D. (2004), "Knowledge sharing culture: a case study", *Journal of Information and Knowledge Management*, Vol. 3 No. 2, pp. 135-42.
- Hitt, M.A. (1998), "Twenty-first-century organizations: business firms, business schools, and the academy", *Academy of Management Review*, Vol. 23 No. 2, pp. 218-24.
- Hitt, M.A., Ireland, R.D. and Hoskisson, R.E. (1999), *Strategic Management: Competitiveness and Globalization*, 3rd ed., South-Western College Publishing, Cincinnati, OH.
- Huin, S.F. (2004), "Managing deployment of ERP systems in SMEs using multi-agents", *International Journal of Project Management*, Vol. 22 No. 6, pp. 511-17.
- Hung, Y.C., Huang, S.M., Lin, Q.P. and Tsai, M.L. (2005), "Critical factors in adopting a knowledge management system for the pharmaceutical industry", *Industrial Management & Data Systems*, Vol. 105 No. 2, pp. 164-83.
- Jarrar, Y.F. (2002), "Knowledge management: learning for organisational experience", *Managerial Auditing Journal*, Vol. 17 No. 6, pp. 322-8.
- Kim, Y.G., Yu, S.H. and Lee, J.H. (2003), "Knowledge strategy planning: methodology and case", *Expert Systems with Applications*, Vol. 24 No. 3, pp. 295-307.
- Koh, S.C.L. and Maguire, S. (2004), "Identifying the adoption of e-business and knowledge management within SMEs", *Journal of Small Business and Enterprise Development*, Vol. 11 No. 3, pp. 338-48.
- Kuczaj, T. (2001), "Knowledge management process model", VTT Publication No. 455, Technical Research Centre of Finland, Espoo, available at: [www.vtt.fi/inf/pdf/publications/2001/P455.pdf](http://www.vtt.fi/inf/pdf/publications/2001/P455.pdf) (accessed 20 March 2008).
- Lee, J.H. and Kim, Y.G. (2001), "A stage model of organizational knowledge management: a latent content analysis", *Expert Systems with Applications*, Vol. 20 No. 4, pp. 299-311.
- Lee, K.C., Lee, S. and Kang, I.W. (2005), "KMPI: measuring knowledge management performance", *Information and Management*, Vol. 42 No. 3, pp. 469-82.



- Liebowitz, J. and Beckman, T. (1998), *Knowledge Organizations: What Every Manager Should Know*, St Lucie/CRC Press, Boca Raton, FL.
- Lim, D. and Klobas, J. (2000), "Knowledge management in small enterprises", *The Electronic Library*, Vol. 18 No. 6, pp. 420-32.
- Lin, C. and Tseng, S.M. (2005), "The implementation gaps for the knowledge management system", *Industrial Management & Data Systems*, Vol. 105 No. 2, pp. 208-22.
- McAdam, R. and Reid, R. (2001), "SME and large organization perceptions of knowledge management: comparisons and contrasts", *Journal of Knowledge Management*, Vol. 5 No. 3, pp. 231-41.
- McCampbell, A.S., Clare, L.M. and Gitters, S.H. (1999), "Knowledge management: the new challenge for the 21st century", *Journal of Knowledge Management*, Vol. 3 No. 3, pp. 172-9.
- McElroy, M. (1999), "The knowledge life cycle", paper presented at the ICM Conference on KM, Miami, FL, April.
- Macpherson, A., Jones, O., Zhang, M. and Wilson, A. (2003), "Re-conceptualising learning spaces: developing capabilities in a high-tech small firm", *Journal of Workplace Learning*, Vol. 15 No. 6, pp. 259-70.
- Meyer, M. and Zack, M. (1996), "The design and implementation of information products", *Sloan Management Review*, Vol. 37 No. 3, pp. 43-59.
- Millar, J., Demaid, A. and Quintas, P. (1997), "Trans-organizational innovation: a framework for research", *Technology Analysis and Strategic Management*, Vol. 9 No. 4, pp. 399-418.
- Morris, T. and Empson, L. (1998), "Organisation and expertise: an exploration of knowledge bases and the management of accounting and consulting firms", *Accounting, Organizations and Society*, Vol. 23 Nos 5/6, pp. 609-24.
- Nonaka, I. and Takeuchi, H. (1995), *The Knowledge Creating Company*, Oxford University Press, New York, NY.
- Organization for Economic Co-operation and Development (2002), *OECD Small and Medium Enterprise Outlook*, Organization for Economic Co-operation and Development, Paris.
- Plessis, M.D. (2005), "Drivers of knowledge management in the corporate environment", *International Journal of Information Management*, Vol. 25 No. 3, pp. 193-202.
- Probst, G., Raub, S. and Romhardt, K. (2000), *Managing Knowledge: Building Blocks for Success*, Wiley, Chichester.
- Rao, M. (2004), "Review: knowledge management: concepts and best practices", *Journal of Information and Knowledge Management*, Vol. 3 No. 2, pp. 123-5.
- Ruggles, R. (1997), *Knowledge Management Tools*, Butterworth-Heinemann, Oxford.
- Senge, P.M. (1990a), *The Fifth Discipline: The Art and Practice of the Learning Organization*, Doubleday, New York, NY.
- Senge, P.M. (1990b), "The leader's new work: building learning organizations", *Sloan Management Review*, Vol. 32 No. 1, pp. 7-23.
- Skyrme, D. and Amidon, D. (1997), "The knowledge agenda", *Journal of Knowledge Management*, Vol. 1 No. 1, pp. 27-37.
- Storey, D.J. (1994), *Understanding the Small Business Sector*, Routledge, London.
- Thompson, J.H. and Leyden, D.R. (1983), "The United States of America", in Storey, D.J. (Ed.), *The Small Firm – An International Survey*, Croom Helm, London, pp. 7-45.
- uit Beijerse, R.P. (2000), "Knowledge management in small and medium-sized companies: knowledge management for entrepreneurs", *Journal of Knowledge Management*, Vol. 4 No. 2, pp. 162-79.

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- Weiser, M. and Morrison, J. (1998), "Project memory: information management for project teams", *Journal of Management Information Systems*, Vol. 40 No. 4, pp. 149-66.
- Wickert, A. and Herschel, R. (2001), "Knowledge management issues for smaller businesses", *Journal of Knowledge Management*, Vol. 5 No. 4, pp. 329-37.
- Wiig, K.M. (1993), *Knowledge Management Foundations*, Schema Press, Arlington, TX.
- Wong, K.Y. and Aspinwall, E. (2004), "Characterizing knowledge management in the small business environment", *Journal of Knowledge Management*, Vol. 8 No. 3, pp. 44-61.
- Wong, K.Y. and Aspinwall, E. (2005), "An empirical study of the important factors for knowledge-management adoption in the SME sector", *Journal of Knowledge Management*, Vol. 9 No. 3, pp. 64-82.

#### About the authors

Varintorn Suppyuenyong is a PhD candidate at the School of Management, Asian Institute of Technology, Thailand. She received her Master's degree from Thammasart University, Thailand, and her Bachelor's degree from Chulalongkorn University, Thailand. Her research areas are knowledge management, small and medium enterprises, and enterprise resource planning. Varintorn Suppyuenyong is the corresponding author and can be contacted at: varintorn.suppyuenyong@ait.ac.th

Nazrul Islam is a Professor at the School of Management, Asian Institute of Technology, Thailand. He obtained his PhD from the Asian Institute of Technology. His research interests include strategic management of technology, technology transfer, technology policy, knowledge management, and energy. Professor Islam serves as an Associate Editor of the journal *International Technology Management Review* and is a Member of the Editorial Board of the *Asia Pacific Management Review*.

Uday Kulkarni is an Associate Professor of Information Systems at the W.P. Carey School of Business at Arizona State University. He obtained his PhD from the University of Wisconsin-Milwaukee. Professor Kulkarni teaches graduate courses in MBA and MSIM programs and has received several teaching awards. His research interests lie in the areas of knowledge management, capability assessment, and knowledge-intensive business processes. Professor Kulkarni serves as an Associate Editor for the *International Journal of Knowledge Management*.

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