LOTUS NOTES FOR KNOWLEDGE MANAGEMENT IN SMEs: THE CASE OF A DEVELOPING COUNTRY

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Abstract

This paper explores the potential of Lotus Notes as a knowledge management tool in small and medium sized firms (SMEs) in developing countries. It argues that, though the use of Lotus Notes has been studied, emphasis has remained primarily on large firms in developed countries. This study employs an interpretive approach using the case study method. It develops a taxonomy of Lotus Notes use involving publishing, searching, maintaining, sharing, creating and exploring within the context of different knowledge management processes; notably communicating, co-ordinating and collaborating. For the purpose of this paper the case of ComNotes is presented. The key findings suggest that publishing, searching, sharing and maintaining are the use modes for enabling sharing and storing information. Evidence of knowledge creation was found at the departmental level and not at the organizational level. However, the study also finds that small firms may explore more groupware potentials than large organizations. It is argued that this reflects the context of small organizations; implications for further research are identified.

Keywords: Developing Countries, Groupware, Knowledge Management, SMEs.

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1   Introduction

Complex, competitive and dynamic business environments necessitate adaptive, flexible and responsive organizations. Accordingly, organizations are often compelled to invest in information technologies that enable access to a wider pool of resources and, in particular, knowledge sharing. A variety of information technologies has been designed and implemented to facilitate the management of knowledge. Groupware is an exemplar of these technologies (Ciborra, 1996; Hayes, 2001) since it supports communication, collaboration and co-ordination (Orlikowski, 1996). This paper focuses on the use of Lotus Notes, a well-known groupware application studied in the literature. It advances the debate on the potentials of groupware in knowledge management. It posits that although Lotus Notes has been the focus of existing research, a paucity of

studies has examined the use of Lotus Notes in relation to knowledge management in the context of SMEs and none in developing countries.

The paper is structured as follows: first it reviews existing studies on Lotus Notes and identifies its uses for knowledge sharing. Then a framework of Lotus Notes use modes is developed which will be examined within the context of a specific organization in Thailand.

2 Theoretical foundations

The use of Lotus Notes for knowledge management activities has been studied in different types of organizations. Lotus Notes, a combination of document creator and indexer, database generator and manager, and messaging platform (Vandenbosch and Ginzberg, 1996), allows information to be distributed between different users in a structured or semi-structured way (Brown, 2000). Drawing upon the existing literature, this section presents the main functions of Lotus Notes in knowledge management. Nine major case studies discussing the use of Lotus Notes and its potential to knowledge management are reviewed. The selection of these studies is based on the rich descriptions of how Lotus Notes was implemented and used for facilitating information and knowledge management in the cases. Table 1 provides a synopsis of these studies by taking into account the research site, the functions of Lotus Notes that were used, methods for collecting data and length of the study.

Seven cases were carried out in large organizations, whereas the other two cases (Robertson et al., 2001; Karsten and Jones, 1998) were conducted in SMEs. The sectors are diversified, however, the major sector is consulting (Robertson et al., 2001; Orlikowski, 1993; Karsten and Jones, 1998). In terms of research approach, these studies employ an in-depth case study approach of which interview is the main method of data collection. The main benefit identified of using Lotus Notes is that shared information and knowledge on Lotus Notes can be accessed and retrieved by users regardless of time and location. Most studies found that factors embedded in the organizational context have a major influence on the successful use of Lotus Notes: collaborative culture (Orlikowski, 1993), incentive structure (Robertson et al., 2001; Orlikowski, 1993), homogeneous group (Hayes, 2001), management style (Karsten and Jones, 1998) and dispersion of organization (Ciborra and Suetens, 1996).

Table 1. Summary of the previous studies of the use of Lotus Notes

Study	Site and size	Lotus Notes functions	Method	Length
Robertson, Sorensen and Swan (2001)	Universal consulting: Medium	Email Discussion databases	Interviews Non-participant observation Documentation	Over 2 years (1996 - Spring 1998)
Vandenbosch and Ginzberg (1996)	American insurance firm: Large	Lotus Notes databases	Interviews Surveys	Ten months (began after decision to expand use of Lotus Notes from 200 users to whole firm)
Orlikowski (1993)	Alpha: Large consulting firm: competitive culture	Electronic mail, discussion database, some databases for browsing	Unstructured interviews Documentation Participant observation	Five months (began prior to Lotus Notes installation)
Hayes (2001)	Compound UK: Large multinational pharmaceutical	Email Strategic selling databases Discussion databases Contact recording databases	Semi-structured interviews Informal discussions and interactions	Two-and-a-half year period (18 months after first Lotus Notes implementation)
Brown (2000)	Narajo: Large oil firm	Public forum databases: firm notice board and 'challenge' database Workflow database Tracking database	Participant observation Interviews	3 months (began after Lotus Notes implementation)
Ciborra and Suetens (1996)	EDF: Large, an international distribution part of a French energy provider	Email Discussion forum and databases such as world culture, news forum, expert databases.	Interviews	Over a year and a half (began after Lotus Notes was implemented)
Ciborra (1996)	Roche: Large Diagnostic division of multinational pharmaceutical	Cosis applications: multidisciplinary knowledge base	Interviews	Over 2 years (began after Lotus Notes was implemented)
Orlikowski (1996)	Zeta: Large software firm	Incident Tracking Support System Training database six firm-wide bulletin boards with electronic mail	Unstructured and semi-structured interviews. Non-participant observation Documentation	6 months (began two years after the ITSS developed on Lotus Notes.)
Karsten and Jones (1998)	CCC: Small computer consulting firm	Discussion and news databases, project databases	Participant observation Interviews Documentation	3 years (began prior to Lotus Notes implementation)

Based on this review, Lotus Notes has been developed and used in different ways for supporting knowledge management activities. Table 2 synthesises these different use modes of Lotus Notes in knowledge management as identified in the literature; the five use modes are explained next.

Table 2. Summary of use modes of Lotus Notes

Use Mode	Use Description	Source
Publishing	publishing information (e.g. newsletter, technical documents, product catalogues, employee directories).	Orlikowski (1996), Ciborra and Suetens (1996), Karsten and Jones (1998)
Searching	searching for or acquiring organization information (e.g. full text search capabilities, document indexer).	Robertson et al. (2001), Orlikowski (1993, 1996), Ciborra and Suetens (1996)
Maintaining	recording and maintaining a computer-based 'organizational memory' (e.g. best practices, business process, frequently asked questions).	Robertson et al. (2001), Vandenbosch and Ginzberg (1996), Orlikowski (1993, 1996), Hayes (2001), Brown (2000), Ciborra and Suetens (1996), Ciborra (1996), Karsten and Jones (1998)
Sharing	discussing and sharing ideas, experience, information and knowledge with other individuals and groups in the organization (e.g. via Email, discussion databases, public fora).	Robertson et al. (2001), Vandenbosch and Ginzberg (1996), Orlikowski (1993), Hayes (2001), Brown (2000), Ciborra and Suetens (1996), Ciborra (1996), Karsten and Jones (1998)
Creating	understanding and creating individuals' and groups' tacit knowledge (e.g. shared databases within homogeneous group).	Hayes (2001)

First, Lotus Notes is used to publish information. Published information is disseminated in different forms and for different purposes. For example, an interactive newsletter was published to disseminate news within an international department of the French energy provider, **EDF** (Ciborra and Suetens, 1996). Technical documents were published and disseminated outside the customer support department of **Zeta** (Orlikowski, 1996). Meeting minutes were published to allow those not present in the meeting of **CCC** to keep informed (Karsten and Jones, 1998).

The second use mode of Lotus Notes is searching. Lotus Notes comprises capabilities such as full text search and document indexer in searching or acquiring information. In **Universal consulting** (Robertson et al., 2001)**,** project leaders used the indexing and search facilities of Lotus Notes to acquire specific information found in email and discussion databases. In **Zeta** (Orlikowski, 1996), the provision of a powerful search

capability within the Incident Tracking Support System (ITSS), an application on Lotus Notes, allowed the specialists to search quickly and easily their database of well-documented incident histories. Searching ITSS provided potentially reusable problem resolutions as well as knowledge about problem-solving processes. Similarly, expertise in **Alpha** (Orlikowski, 1993) used Lotus Notes for organization database browsing. Using Lotus Notes for searching information was also found in **EDF** (Ciborra and Suetens, 1996). Managers at **EDF** could search for others' experience about foreign cultures before they left for missions abroad.

The third use mode of Lotus Notes is maintaining. This mode focuses on using Lotus Notes to record and maintain a computer-based 'organizational memory' such as best practices, business process and frequently asked questions. For example, in **Compound UK** (Hayes, 2001), contact recording database enabled employees to record the views, interests and requirements of particular doctors which could be retrieved for future use. Training database in **Zeta** (Orlikowski, 1996) maintained sample problems extracted from the ITSS database which new hires worked with to try and resolve problems. Quality project documentation, which is a valuable by-product of using Lotus Notes for discussion on project work across countries, was maintained on Lotus Notes databases of **Universal consulting** (Robertson et al., 2001).

The fourth use mode is sharing. With this mode, individuals and groups in the organization use Lotus Notes to discuss and share ideas, experience, information and knowledge with each other. This use mode exists in all the cases as Lotus Notes provides several mechanisms including email, discussion databases and public fora. In **American insurance company** (Vandenbosch and Ginzberg, 1996), people who were geographically dispersed participated in discussions about process change aimed at standardising the company's key activities across its several regional divisions. Similarly, a strategic selling database was created in **Compound UK** (Hayes, 2001) to enable employees in different functions to input their views and information in a structured way with the aim of bringing together the employees' shared knowledge so that they might contribute to a successful sale.

The final use mode of Lotus Notes is creating. This use mode addresses using Lotus Notes to understand and create individuals' and groups' tacit knowledge. This mode is different to the other modes in that individuals' tacit knowledge is made explicit on shared database of Lotus Notes, whereas others can use the shared knowledge database, as the tacit knowledge within groups allows them to understand the subtleties that underlie the meaning expressed on the shared database (Hayes, 2001).

Hence, tacit knowledge is created in individuals' mind. However, the creating mode of Lotus Notes is likely to depend on the organizational context. For instance, within the same functions in **Compound UK**, employees could draw on their shared tacit knowledge to interpret skilfully and make judgements concerning the views recorded on the shared databases by members of their own functions (Hayes, 2001). On the other hand, the attempt to create a common knowledge pool for the global organization of **EDF** was not satisfied due to their misalignment to virtual organization context with a highly scattered structure and based on the strong competence and autonomy of the agents and experts. As a result, it is difficult to reconcile the style of working and knowing with prescriptions to share information (Ciborra and Suetens, 1996).

3   Interaction richness model of use modes

This section develops the interaction richness model that taxonomises the use modes of Lotus Notes on two dimensions. The first dimension entails the types of interaction that may take place in a Lotus Notes environment which may either be human-Notes interactions or human-human Notes-mediated interactions. The second dimension involves the types of knowledge management processes experienced in a Lotus Notes environment namely coordination, communication and collaboration.

Coordination is regarded as the direction of individuals' efforts toward achieving common and explicitly recognised goals (Blau and Scott, 1963). The use modes which fall into the coordination category are 'searching' and 'publishing'. Searching leads to human-Notes interactive coordination process as individuals search for information and knowledge on databases in order to complete their individual tasks such as answering customers' enquiries. Publishing is concerned with human-human mediated interactive coordination since human uses Lotus Notes as an information sending channel to receivers, contributing to the exchange of knowledge.

The communication process emphasises the exchange of information between dispersed individuals and it mainly includes increasing connectivity, bandwidth and protocols for the exchange of many types of information such as text, graphics and voice (Ellis et al., 1991). 'Maintaining' and 'sharing' use modes can be put into this category. As the 'maintaining' use mode focuses on records of information and knowledge retrieved by users, databases act as an agent which communicate the information maintained to individual receivers. Therefore, maintaining is regarded as the use mode stimulating human-Notes interactive communication process. On the other hand, the sharing mode emphasises the exchange of knowledge between

individuals who are both senders and receivers, thus it is an exemplar of human-human mediated interactive communication process.

Finally, collaboration is a process of shared creation: two or more individuals with complementary skills interacting to create a shared understanding (Schrage, 1990). Thus, the fifth use mode of Lotus Notes, 'creating', belongs to the human-human mediated interactive collaboration process as it refers to understanding the shared knowledge database by drawing on individuals' shared tacit knowledge. From the existing literature, it is not possible to identify a use mode that belongs to the human-Notes interactive collaboration process. However, due to the interpretive flexibility embedded in information technology (Orlikowski, 1992) it is argued here that users will, over time, learn to explore further the potentials of Lotus Notes contributing to a collaboration between humans and technology where each benefits from the other. Thus, this study adds another use mode, 'exploring', which humans can consult and collaborate with Lotus Notes to achieve a common goal.

	Coordination	Communication	Collaboration
Human-Human mediated interaction	Publishing	Sharing	Creating
Human-Notes interaction	Searching	Maintaining	Exploring

Fig. 1. Interaction richness model of Lotus Notes use modes

4   The present study

This study investigates how these use modes facilitate knowledge management in SMEs and whether and how the use modes relate to one another over time. Further, most studies on Lotus Notes focus on large organizations whereas the use of Lotus Notes in SMEs has been largely neglected. This study, therefore, takes a step towards filling this void by focusing on the use of Lotus Notes as a knowledge management tool in the context of SMEs.

As with other aspects of business and management, the issue of knowledge management in SMEs may not be simply a scaled-down replica of large firm experiences (Sparrow, 2000). Some characteristics of SMEs lead to the unique challenges in knowledge management. Within the constraints and opportunities afforded by their internal and external environment, SMEs need to develop their knowledge management practices that address the knowledge needs of employees

and organizational learning (Sparrow et al., 2000). Moreover, the knowledge that SMEs utilise does not lie within its own boundaries. SMEs need to share resources within alliances in order to encourage innovation, expand product portfolios, and forge new supplier relationships (Levy et al., 2003).

In addition, all the previous studies on Lotus Notes were carried out in developed countries. No study has examined the use of Lotus Notes or groupware in general within a developing country. As argued by Sahay and Avgerou (2002), the study of information systems in developing countries is important as it provides rich and meaningful problem domains as they are diverse in contexts, situations, work cultures and interests groups.

SMEs in developing countries need to effectively respond to customers' demands and keep up with the rapid changes occurring in the domestic and global markets in order to be survival and compete with regional competitors (Abdullah, 2002; Brimble et al., 2002). This drives SMEs to manage their knowledge to improve their products and processes, providing customers with adding value innovation and learning capabilities (Corso et al., 2001). As proposed by Sparrow (1999), SMEs with more advanced information systems such as Lotus Notes may be more committed to the principles of knowledge management and more willing to address knowledge management issues. As Lotus Notes enables employees to communicate, coordinate and collaborate within and across organizations, it may also provides opportunities to SMEs to manage their knowledge more effectively.

Having identified the gaps in the literature, this research investigates how Lotus Notes is used in supporting knowledge management activity within the context of a small firm in a developing country.

5   Research methodology

The interpretive epistemological approach is dominant in the nine studies (Table 1). The need for detailed understandings of human actions and meanings within specific contexts was emphasised while an in-depth case study approach was adopted in all. Accordingly, this study follows the interpretive approach (Walsham, 1993) as its focus lies on the subjective meanings that human actors ascribe to Lotus Notes technology in a specific context of SMEs in developing country.

The case study method appears to be the most appropriate approach here as it is a well-accepted approach to study the complex phenomena of technology

implementation in an organizational setting (Alavi and Carlson, 1992). According to Walsham (1993), in-depth case study, where research involves frequent visits to the field site over an extended period of time, is most appropriate for conducting empirical research in the interpretive tradition. The specific research site and data collection methods adopted are discussed next.

5.1   Research site and data collection

As the main aim is to explore the use of Lotus Notes in SMEs in developing country, Thailand is chosen as the research site. Thai SMEs are defined by the Ministry of Thai Industry (www.industry.go.th) as the firms with less than 200 employees and with fixed assets less than 200 million Thai Baht (£3 million).

For the purpose of this study, a case of Lotus Notes use is selected in IT consultancy firms, described as knowledge-intensive firms, as they employ highly qualified technologists and rely heavily on the integration and synthesis of their specialist knowledge to create novel products and processes in response to clients' problems (Robertson et al., 2001).

ComNotes (Pseudonym) is one of IBM distributors in Thailand. The company provides business solutions based on Lotus Notes and Domino infrastructure and the professional services, consulting, support, and training. ComNotes was founded in March 1998 by a director who had been a Lotus Notes developer. With around 30 highly experienced staff who are specialised and dedicated to Lotus Notes Technology, ComNotes is now regarded as one of the leading Lotus Notes specialists in Thailand.

The data collection took place in January 2004 within ComNotes. A variety of qualitative data collection methods were used: interviews, review of firm industry and project documentation, and non-participant observation. The study involved semi-structured interviews with 7 key persons across different organizational layers, managing director, sales & marketing director, sales assistant manager, system administration supervisor, technical development supervisor, customer services manager and customer services supervisor. Each interview was forty-five to sixty minutes in length. Most of the interviews were tape-recorded and transcribed and then translated into English. Manuals of Lotus Notes applications and marketing promotion materials such as brochures and posters were collected. Further, informal conversations and discussions with the interviewees and other staff members in the company were conducted during each visit in ComNotes. Non-participant observations of how members use Notes were conducted so as to provide further insights into the

functions of Lotus Notes applications.

6 Results and discussion

6.1 Company background

ComNotes's aim is to assist the customers to improve their productivity, efficiency and organization effectiveness through the use of productivity-driven applications. These applications contain a collection of standard business applications e.g. Customer Relationship Management (CRM), Human Resources Management (HRM), call centre, e-procurement, document management. Its customers are varied from international enterprises to SMEs both in Thailand and neighbour countries.

ComNotes structure has been divided into 3 departments, including sales & marketing department, technical support department, and customer services department. The sales & marketing department is responsible for getting to know customers' requirements and maintaining customers' satisfaction. The technical support department integrates 2 responsibilities, namely system administration and development. The role of system administration is to implement the system and settings to its customer at the first instance, while development is involved with application design and maintenance. The customer services department is responsible for after sales services and receiving calls from customers.

Lotus Notes has been implemented throughout the whole company. SameTime, another IBM product, was used to complement Lotus Notes to enable communication between company's employees in the Head office and a branch in Cambodia. SameTime is an e-messaging application that enables synchronous communication. In general, users were authorised to access and shared the same resources in most of the databases. However, some applications were designed to meet the needs of different departments. The purposes of such applications in the 3 departments are described as follows:

- A sales application on Lotus Notes was used in sales & marketing department. This application was mainly implemented in the department for daily sales planner, sales activity tracking, sales policy & document repository, and mobile access to information.

- Document library was the standard knowledge base which was utilised by the technical support department to support their activities. The technical knowledge was maintained on the document library and categorised for several

purposes such as programming scripts, security, troubleshooting, and software specifications. This recorded knowledge was based on employees direct experience or was found in external resources (e.g. website, interactions with customers). The document library acted as a roadmap for all staff. The staff could learn from what others have experienced found from other sources. Moreover, document library was regarded as 'the centre of information' where staff takes notes in and wants to remind themselves.

- Call log application was designed for the customer services department. It was utilised for maintaining information in order to support the customers. Calls from customers kept in call log can be identified into 2 main categories. First, it was used to monitor how many errors occurred with the applications launched to customers. Second, call log was employed to maintain complaints from customers in order for company to see customers' satisfaction, why the customer complained or to be used for calculating charge rate for the next service.

6.2   The use of Lotus Notes in ComNotes

This section focuses on the concept of the six use modes identified in the interaction richness model and the case material in order to investigate how the use modes facilitate knowledge management in SMEs and how the use modes relate to one another over time. In particular, in what follows we explore the role of Lotus Notes applications used in ComNotes for coordination, communication and collaboration respectively.

6.2.1   Coordination

Coordination appears to be the main knowledge management process used by ComNotes. With the email feature of Notes, all employees can add a document link to any databases. With regards to the interaction richness model, this may be considered as publishing use mode because the senders would like someone to be informed or to be told to do something. As the director explained:

"…people live with their email. They work from their email at most and Lotus Notes is very good like that because you can automatically generate documents that get emails to people and within those documents there are the links [that would enable them to access additional information]".

"…[for example] this email. It's an order required approval on 9ᵗʰ January. There is a doc link on that. I click on that and it opens up the e-procurement system. So, I can see all the information about this sale.…That's everything I need to know so I'm happy with that. So, I click on approval. I can even enter any comments and now notification has been sent to the accounts department for them to issue the purchase order".

Similarly, the system administration supervisor said that:

"…We use email to run information flow between department rather than an application. We attached any information in a database, then we send an email with the link to that database to the people we need to communicate to".

Searching is another use mode of the coordination process. Users can acquire important document maintained in Notes by using the search function enabling access to a wide range of information posted by different people. The sales director explained:

"What we correspond everyday is a kind of knowledge. Knowledge is embedded in emails. It is being kept systematically. If we want to refer to what we have mentioned, we search for that email. This is a kind of searching for knowledge".

Moreover, the search facility is used for locating expertise:

"We have a human resource application to keep employee's profile and history. Lotus Notes is very good at searching. We use this function. For example, I want to search for a person good at technical skills and tennis. I can search on this application rather than looking it up from paper documents by myself. This is expertise location. It's also a type of knowledge management. So, we can put the right man in the right job in our company"

Even if everyone knows each other due to the small size of the company, the nature of business which is dynamic and knowledge intensive drives the company's need for such a tool. This is because different projects require different skills of people and it needs a record of profile to refer to. Therefore, this facility was found to be important for small company as well as large firm.

6.2.2   Communication

Lotus Notes was utilised as the main mechanism for communication in ComNotes. As the system was widely employed throughout the company, it was particularly noted that: *"Lotus Notes is very convenient for human to human communication"* (technical development supervisor).

Communication has been defined, in the interaction richness model, as the process whereby the information is exchanged either between human to human or human to Lotus Notes. The 'sharing' use mode of communication process takes place when human uses Lotus Notes applications to correspond to each other and this was evident in the case study. The technical development supervisor pointed out that SameTime was used mainly to enable synchronous discussions across different departments rather than within department:

"SameTime is mostly utilised across departments. Within department, we prefer face-to-face meetings as we are in the same place…We're sometimes at customer's site or abroad. Someone might ask us through SameTime about technical problems. So, we tell them the solutions or techniques through SameTime. We act as both inquirer and solving persons".

SameTime was regarded as a tool for efficient intra and inter organizational communication. As the director put it:

"…We can conduct several conversations simultaneously on SameTime… We got a small office in Cambodia. We got customers all around the region. I will be conducting the same time conversation with our people in Cambodia, customers in Vietnam and staff in Thailand…If you 're on telephone, then it's gonna be sequential".

The communication on SameTime can also be recorded in any relevant databases in order to be retrieved by other users:

"…The discussion on SameTime is a knowledge base. For example, we're consulting about a technical problem and solution through SameTime. We can save it into a database" (sales director).

Discussion databases were used to share knowledge within the technical support department.

"System administration and development have our own knowledge. Anyone's got a knowledge will post in the databases to share it to everyone" (systems administrator).

In the customer services department, call log application was used to share information from customer services department to other departments. The customer services manager said that:

"When we receive calls from customers, we will keep it in call log. It will identify different problems of the customers…I can choose whom I want to send the complaints

to. When they receive my email, they will make comments and …I can [then] send it to the customers for approval".

Further, the 'maintaining' use mode means the use of Lotus Notes applications to retrieve information and knowledge from databases. Discussion databases were used in ComNotes for everyone to share resources. They were regarded as shared space that anyone can access.

"Discussion databases are used to post information in terms of both problems and summary after company meetings. For example, when we have meeting with customers, we will keep it under each section of discussion database, or any forward mail will be shared in databases". (technical development supervisor)

"I keep my presentation file in discussion database. Anyone can access it… and use at his disposal". (customer services supervisor)

The sales application was also employed for maintaining information. Salespeople had to put in all the correspondence with their customers to the application so that the director can monitor their activities. This also enabled other people to take over the responsibility when the employees who dealt with customers initially are away or left the company.

6.2.3 Collaboration

Collaboration entails the process by which two or more individuals create a shared understanding of what has been maintained on databases. 'Creating' use mode is understood by drawing on individuals' shared tacit knowledge was found in the case of ComNotes. Though, Lotus Notes was used for information sharing throughout ComNotes, shared understanding remained limited due to specific knowledge hold by individuals in different departments. For example, the technical support department has their own language to describe problems & solutions or technical language which can be created on Lotus Notes databases, whereas other departments used Lotus Notes to maintain information required for day-to-day operations. The customer services manager noted that:

"In the technical support department, they have their own knowledge because they have solutions which are linked to programming codes. In my department, we keep only requirements from customers. They're just information. It's required for our day-to-day work. Knowledge will be used to do that work. Knowledge is any 'how to' [For example] our knowledge would be how to write a report or how to respond to mail…We

do not have online document for this. We prefer face-to-face meetings to transfer this knowledge".

"Everyone is allowed to read our knowledge base... However, if they're not involved in the job, they won't read it. There are thousands of records. No one will see all the department databases. So, we mainly use our own department's databases" (System administration supervisor)*.*

This implies that though some knowledge is widely accessible, individuals may not make use of them if they are not involved in that knowledge or not understanding information maintained.

In addition, knowledge of the technical support department was systematically categorised so that it can be easily retrieved to use when needed. Otherwise, it appeared to be junk boxes. The customer services manager mentioned about the problem:

"We used to allow everyone to create Lotus Notes databases. They were used for a couple of times and no one continue using them, then they became junks. Now, we have our administrator to control any database creation".

The last use mode which is 'exploring' has not been found in ComNotes. Exploring is the use mode of Lotus Notes that could be developed further in order to drive a collaboration between humans and technology where each benefits from the other. This means Lotus Notes may act as a consultant which leads the users to achieve a common goal.

6.3   Discussion

As argued by Vandenbosch and Ginzberg (1996), groupware systems such as Lotus Notes enable organizations to create intra-organizational memory in the form of both structured and unstructured information and to share this memory across time and space.

The aim of this study was to explore the different use modes of Lotus Notes within the context of a small organization in a developing country. The case of ComNotes, an IT consultancy organization in Thailand was presented for this purpose. It was found that Lotus Notes has different uses within the organization which entail some form of knowledge management. Overall, all the five use modes existing in the literature, publishing, sharing, maintaining, searching and creating, were found in the case of the organization presented here. In large organizations, not all the five use modes have

been found in a single organization. It may be because only limited functions of Lotus Notes were utilised in those large organizations or Lotus Notes was implemented only in some departments within these large organizations. In contrast, ComNotes utilised various applications on Lotus Notes as they were needed by all the 3 departments for day-to-day operations.

In ComNotes it appeared that the first four use modes were found to be useful for distributing, accumulating and capturing mainly structured information, and they are in fact only enablers for knowledge creation. Furthermore, evidence of knowledge creation was found though this was limited at the departmental level.

Even if Lotus Notes has been utilised in all departments, knowledge creation occurs when a group or department coordinate and communicate between each other in order to develop richer understandings of the issues that affect their function. In essence therefore, knowledge creation remains within certain areas of the organization and is not widely available across departments. One explanation for this is that the databases were designed to meet the needs of specific departments (e.g. document library, call log) despite the fact that access was permitted to other organizational members. In relation to this, the language use by different departments could not encourage other members to read the data recorded. For example, the knowledge base in the technical support department mainly focuses on technical issues, such as troubleshooting and solutions. Therefore, those without the relevant technical knowledge even though they can access the databases cannot understand nor contribute in the discussions. The technical development supervisor noted that:

"Between department, if they do not have basic background, they can't read this database".

Figure 2 illustrates the relationship between the six use modes as these were found in the ComNotes case. The figure is divided into 2 parts. The first part comprises four use modes of Lotus Notes which act as enablers for information sharing and storing. The second part shows the use modes that support knowledge creation.
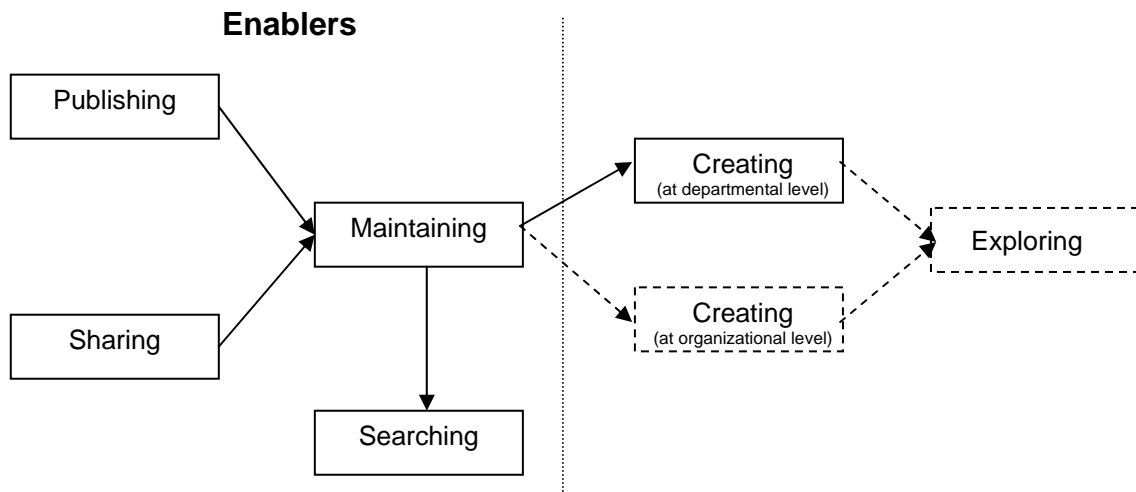
Fig. 2. The relationship between the six use modes

Further to the above, a factor that was found to inhibit knowledge sharing, was the culture of the country:

"In Thailand people are actually not very good at sharing because as a newly developed culture, there is only a small number of people who have knowledge… So, people who actually have knowledge jealously thought then that often they are not willing to pass all of their knowledge…

"…one thing with the Thai education system. It does not teach people to question. They are taught to do what you are told and repeat after me…Because people don't question. If they see something stupid, they just carry on, don't say anything". (director)

Despite this, in the specific organization knowledge sharing was enabled by the organization's own efforts:

"We made them get used to sharing information on Notes. We create an organizational culture that sharing information to others will be useful for oneself too when they need information from others. We show them [other employees] first. We also force them to report work they've been doing on Lotus Notes" (System administration supervisor).

This implies the good interpersonal relationship among employees and managers in a small company. As a result, sharing culture in ComNotes was created in order to support work of each other.

7   Conclusions

This paper investigates the potentials of Lotus Notes as a knowledge management tool in ComNotes in Thailand. It employed an interpretive case study approach which

comprises qualitative data collection methods, namely semi-structured interviews, analysis of documentation and non-participant observations within ComNotes. The study identifies six modes which facilitate knowledge management and its relationship towards knowledge management. It was found that publishing, searching, sharing and maintaining are the use modes for sharing and storing information. Therefore, they are enablers for the knowledge creating use mode of Lotus Notes. Dialogue and debate among specific user groups were found to be enablers of knowledge creation at the departmental level but inhibitors at the organizational level. The study also found some factors which act as enablers and inhibitors of information sharing in organization such as policy making, perception of Thai people in information sharing and education system. The empirical understandings generated in this study have implications for using Lotus Notes to support knowledge management and identifying the factors which influence knowledge sharing and creating on an IT-based knowledge management system in the context of SMEs in developing country. More research is required from different companies in order to contribute to a better understanding of the use of Lotus Notes for knowledge management in SMEs in developing country and increase generalizability. As Lotus Notes is adaptable and customised over time, the temporal dimension needs to be taken into account in order to examine this influences the interaction between technology and organizations in terms of improvement and deterioration and thus contributing to the 'exploring' potential of Lotus Notes. This therefore should be in the agenda for future research.

References

Abdullah, M. (2002). An overview of the macroeconomic contribution of SMEs in Malaysia. In C. Harvie, & B.C. Lee (Eds.), *The role of SMEs in national economies in East Asia: Studies of small and medium sized enterprises in East Asia Volume II.* Edward Elgar: Cheltenham, UK.

Alavi, M., & Carlson, P. (1992). A review of MIS research and disciplinary development. *Journal of Management Information Systems*, 8 (4), 45-62.

Blau, P.,& Scott, W. R. (1963). *Formal organizations: A comparative approach.* London: Routledge & Kegan Paul Ltd.

Brimble, P., Oldfield, D., & Monsakul, M. (2002). Policies for SME recovery in Thailand. In C. Harvie, & B. C. Lee (Eds.), *The role of SMEs in national economies in East Asia: Studies of small and medium sized enterprises in East Asia Volume II*. Cheltenham: Edward Elgar.

Brown, B. (2000). The artful of groupware: an ethnographic study of how Lotus Notes is used in practice. *Behaviour & Information Technology*, 19 (4), 263-273.

Ciborra, C. U. (1996). Mission critical: Challenges for groupware in a pharmaceutical company. In C. U. Ciborra (Ed.), *Groupware and teamwork: Invisible aid or technical hindrance?*. Chichester: John Wiley & Sons.

Ciborra, C. U., & Suetens, N. T. (1996). Groupware for an emerging virtual organization. In C. U. Ciborra (Ed.), *Groupware and teamwork: Invisible aid or technical hindrance?* Chichester: John Wiley & Sons.

Corso, M., Martini, A., Paolucci, E., & Pellegrini, L. (2001). Information and communication technologies in product innovation within SMEs-The role of product complexity. *Enterprise and Innovation Management Studies*, 2 (1), 35-48.

Ellis, C. A., Gibbs, S. J., & Rein, G. L. (1991). Groupware: some issues and experiences. *Communications of the ACM*, 34 (1), 38-58.

Hayes, N. (2001). Boundless and bounded interactions in the knowledge work process: the role of groupware technologies. *Information and Organization*, 11, 79-101.

Karsten, H., & Jones, M. (1998). The long and winding road: Collaborative IT and organisational change. *In Proceedings of the CSCW'98*, Seattle, USA.

Levy, M., Loebbecke, C., & Powell, P. (2003). SMEs, co-opetition and knowledge sharing: the role of information systems. *European Journal of Information Systems*, 1, 1-15.

Orlikowski, W. J. (1992). The duality of technology: rethinking the concept of technology in organizations. *Organization Science*, 5 (3), 398-427.

Orlikowski, W. J. (1993). Learning from Notes: Organizational issues in groupware implementation. *The Information Society*, 9 (3), 237-250.

Orlikowski, W. J. (1996). Evolving with Notes: Organizational change around groupware technology. In C. U. Ciborra (Ed.), *Groupware and teamwork: Invisible aid or technical hindrance?* Chichester :John Wiley & Sons.

Robertson, M., Sorensen, C., & Swan, J. (2001). Survival of the leanest: Intensive knowledge work and groupware adaptation. *Information Technology & People*, 14 (4), 334-353.

Sahay, S., & Avgerou, C. (2002). Introducing the special issue on information and communication technologies in developing countries. *The Information Society,* 18, 73-76.

Schrage, M. (1990). *Shared minds.* New York: Random House.

Sparrow, J. (1999). *Supporting knowledge management in small and medium sized enterprises.* Birmingham: Knowledge Management Centre.

Sparrow, J. (2000). *Knowledge features of small firms.* Birmingham: Knowledge Management Centre.

Sparrow, J., Matlay, H., & Bushell, M. (2000). Knowledge management: The challenge for small business support. Birmingham: Knowledge Management Centre.

Vandenbosch, B., & Ginzberg, M. J. (1996). Lotus Notes and collaboration: Plus ca change. *Journal of Management Information Systems*, 13 (3), 65-81.

Walsham, G. (1993). *Interpreting information systems in organizations.* Chichester: John Wiley & Sons.