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Groupware for knowledge management in SMEs: the case of a developing country

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GROUPWARE FOR KNOWLEDGE
MANAGEMENT IN SMES: THE CASE OF A
DEVELOPING COUNTRY

Jessada Panyasorn

A thesis submitted for the degree of Doctor of Philosophy

University of Bath

School of Management

March 2006

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Jessada Panyasorn

Dedicated to my parents for their love, sacrifice and support.

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ABSTRACT

This study explores the potential of groupware as a knowledge management (KM) tool in small and medium sized enterprises (SMEs) in developing countries. It argues that, though the use of Notes, a groupware system, has been studied, emphasis has remained primarily on large firms in developed countries. The researcher develops a conceptual framework of Notes use by taking into account different features of Notes within the context of different KM processes; notably communicating, co-ordinating and collaborating. Following from the conceptual framework, the main research objectives of the study are outlined. These include an investigation of how groupware supports the processes of KM and an examination of the various factors of the context of SMEs in developing countries that may influence the use of groupware for KM. The study uses Thai SMEs as research sites. In particular, IT consultancy firms are the target because these employ highly-qualified scientists and technologists and rely heavily on the integration and synthesis of their specialist knowledge to create novel products and processes in response to clients' problems. For this purpose, an interpretive approach using the case study method is employed. The main methods of data collection are documentation, non-participant observation, and interviews with forty key people in four companies in Thailand. The first phase of data collection started in December 2003, while the second phase was in summer 2004. The findings show that Notes provides different uses within the four case studies which entail some form of KM. Notes is used as a tool to support interactions among staff in which the outcome is either individual or organizational knowledge. In each of these cases, four different identities of Notes have been found, namely Notes as a unique and integrated business application, Notes as a replaceable communication tool, Notes as a reporting tool and Notes as complementary tool to other IT tools. Hence, this study explores further the emergence of an IT-related identity and argues that this influences Notes diffusion and use in different organizations. Analysis shows that several factors have contributed to the development of these different types of identities; factors such as the organizational context, including sector and size of the firm, mediators' role, and the availability of other IT applications that may replace or complement Notes. Overall, the contributions of this study include an understanding of how technologies such as groupware can facilitate managing

knowledge and of the key factors which drive and inhibit SMEs in developing countries to adopt technology for KM.

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Chapter 1

INTRODUCTION

In the modern and highly changing marketplace, organizations need to find strategies to achieve sustainable competitive advantage. Knowledge is important to help organizations quickly respond to the market demands in productions or services. Knowledge management (KM) is vital since creativity and innovation are based on knowledge (Gurteen, 1998). KM is employed in many different functions and business processes in organizations. Organizations realize that by identifying, extracting and capturing the 'knowledge assets' of the firm, they can be exploited and protected as a source of sustainable competitive advantage (Newell et al., 2002). Suggestions that specialized knowledge has become an essential ingredient for business success are becoming commonplace since productivity is dependent on the application and development of new knowledge, and on the contributions of specialist knowledge workers (Blacker, 1993; Drucker, 1993; Zack, 1999). Knowledge is vital for knowledge intensive firms, but it has implications for all organization. The restructuring of work and occupations in the 'Information Age'; changing organizational structures; necessitates a discussion as to why knowledge workers and knowledge work are now considered central across all industrial sectors (Newell et al., 2002).

Whereas Information Technology (IT) is considered as a basic requirement for individuals and organizations to enable flexibility and responsiveness in competitive and dynamic business environments, organizations are increasingly compelled to invest in IT that enable them to manage knowledge-based resources as these enable sustainable competitive advantage (Alavi and Leidner, 1999). A variety of ITs have been designed and implemented to facilitate KM. IT enables access to broader information and knowledge which increase creativity and innovation (Gurteen, 1998). The advancement of IT leads to boundless co-operation. New technologies are making it possible for organizations to operate relatively independently from geographical location, thereby blurring the boundaries between one organization and

another, and freeing internal communications within organizations (Blackler, 1995). Hence, information systems (IS) research, which examines organizational and social aspects in the use of IT (Avgerou, 2001; Walsham, 1993), plays a critical role in shaping organizational efforts in KM by leveraging IT to enable creation, storage, transfer, sharing, integration, and utilization of organizational knowledge assets.

Groupware is an exemplar of these technologies (Ciborra, 1996; Hayes, 2001) since it supports communication, collaboration and coordination (Orlikowski, 1996). This study advances the debate on the potentials of groupware in KM. It posits that although groupware has been the focus of research, a paucity of studies has examined the use of groupware in relation to KM in the context of small and medium-sized enterprises (SMEs) in developing countries. At present, there is interest in KM in large organizations but little take up in SMEs. Further, there is a number of challenges in the SME market, namely the need to improve their clients' experience; optimize value; improve responsiveness to clients, suppliers and partners; drive product and service differentiation; improve employee productivity; analyze and use information to make better business decisions; increase business flexibility; and get the most out of their IT investment (Brimble et al., 2002). Hence, there is a need for SMEs to adopt IT.

As argued by Sparrow (2000), the issue of KM in SMEs may not be simply a scaled-down replica of large firm experiences. Comparing the role of KM to IS, SMEs need to develop their KM because: (a) they need to effectively respond to customers' demands, (b) keep up with the rapid changes occurring in the domestic and global market, (c) survive and (d) compete with regional competitors (Abdullah, 2002; Brimble et al., 2002), whereas information systems (IS) enable SMEs to respond effectively to the market (Levy et al., 2003). In addition, several KM frameworks are argued to include the influence of context in which KM is adopted. Similar to other management issues, effective organizations, or more specifically effective management, cannot implement management theories wholesale from abroad (Komin, 1990). Hence, a study of KM in an SME context will lead to another perspective of KM.

Further, little scholarly attention has been paid to the developing country context and the use of groupware. It has been assumed that groupware is culture-free and universally valid, and given they are mostly developed by Western companies, often embody Western values (Davison and Martinsons, 2002). In addition, Sahay and Avgerou (2002) argued that the study of IS 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. Therefore, a study of groupware use in developing countries is needed as IT is seen as one of the most significant forces of modernization in the context of developing countries (Nair and Prasad, 2002).

Recognizing that there are many unresolved issues and that there is considerable interest in a variety of research areas, the objective of this study is to provide an opportunity to bring together the various perspectives in order to understand the role of IT in KM. By focusing on groupware, this thesis proposes a study on the use of Lotus Notes (Notes), a groupware system, for SMEs in a developing country to support KM. Such organizations aim to share and disseminate organizational knowledge among staff members.

The following section provides the details of context in which this research will focus on.

1.1 The context of developing countries

The benefits of IT come at a high price and are not always manifested quickly, especially in developing countries which have a multitude of pressing needs (Krishna and Walsham, 2005). However, since there is a need to improve the management of large bureaucratic institutions and corporations and the SMEs in developing countries, IT is becoming an increasingly familiar feature of organizations in all countries (Avgerou and Walsham, 2000). In terms of the potential use of IT in SMEs in developing countries, IBM (Thailand), for instance, attempts to change perceptions in the market that its solutions are only for large organizations by putting more resources into the Thai SME sector. The sales of IBM

in other countries in the same region (ASEAN) had 11.5 percent growth each year, with the total revenue of US\$4.2 billion, while SMEs are the fastest growing sector of every country. SMEs account for around 20 percent of IBM's worldwide revenue, while in Thailand this sector contributes more than 20 percent (Source: Bangkok Post 6 July 2005). Hence, it appears that there is a lot of potential in developing and enhancing the capabilities of IT tools for SMEs in developing countries. Meanwhile, KM in developing countries seems to be different to developed countries since developing countries are endogenously endowed with under-utilised human capital with diverse cultural, intellectual and linguistic inheritance (Abu-Rashed and Bertaux, 2005). Many of these countries have the necessary but untapped variables to acquire and produce the needed knowledge in order to position them in the global knowledge economy (Abu-Rashed and Bertaux, 2005).

Since Thailand is classified as a developing country (www.worldbank.org), it is chosen as the research context of this study. The use of IT in Thai SMEs is interesting as they start to realize the benefits of IT in order to compete with local firms and others from abroad. The website of the Ministry of Industry mentions that the Thai economy has been supported by SMEs (www.industry.go.th). However, Thai SMEs face several obstacles such as lack of technology, lack of modern management techniques, and poorly standardised products. Therefore, the Thai government in the early 2002 decided to develop the economy using SMEs as the main vehicle for strengthening the foundation of Thai economy (www.smethai.net). Thailand appears to be a suitable case which may be generalizable to other developing countries. This is because the Thai context provides the dominant Thai working practices which are mostly derived from Thai work-related values (Komin, 1990), whereas some cultures and contexts embedded in other developing countries may be similar to Thailand.

In the following section, the context of Thailand in terms of IT and SMEs as an economic foundation is outlined.

1.1.1 ICTs and KM in Thailand

Due to the fast development of IT, information becomes the main factor in economics and social policy development of any country (Thajchayapong et al., 1997). In order to increase the speed and efficiency of communications in business and Thai society life, the Royal Thai government realized the importance of IT in improving the quality of life of Thai people and strengthening government and public sectors. This led to the foundation of the Ministry of Information and Communication Technology (Ministry of ICT) in Thailand on 3 October 2002.

The level of IT infrastructure in Thailand is poorer than other countries, especially those in the same region. For instance, the number of landline and the access to the Internet per population in Thailand are much lower than those in Singapore and Malaysia (Thajchayapong et al., 1997). Hence, the Thai government set up a national policy to improve ICT in Thailand for 2001 to 2010. At the launch of the policy, the importance of KM to Thailand was first raised and KM concerned the government and the Ministry of ICT, as one of the main policies is to improve learning in Thai society as a foundation for development in other aspects. The investment by the Ministry of ICT in education and electronic government are, therefore, aimed at helping Thailand become a “knowledge based economy” (Ministry of ICT website). There are several organizations promoting KM in Thailand, such as knowledge management institute (KMI) and Thailand Productivity Institute. Recently, the Thailand Knowledge Centre (TKC) was founded as a national virtual knowledge centre, which houses both Thailand’s knowledge and also the centre for a KM networking expertise. Following this, the first “Thailand International Conference on KM 2004: KM for innovation and change” was held in November 2004. The objectives of this event were to exchange, share and gain better understanding of KM strategy, to illustrate how KM can play an important role in innovation and improve private and public sectors and encourage participants to pioneer KM processes in their organizations. Therefore, research on KM within the Thailand context, in particular, is vital in order to yield a better understanding and framework which fits local organizations rather than adopting existing ones developed by western countries.

1.1.2 Background to SMEs in Thailand

After the Thai financial crisis in 1997, many Thai companies have been delisted from the stock exchange. SMEs have become the majority of companies in Thailand. The Thai government realises that the dynamic growth of the SME sector has been the chief factor driving economic growth. The number of Thai SMEs, where the number of employees is fewer than 200, is 0.8 million which is 99.7% of the total company registered with the Ministry of Commerce in Thailand (www.industry.go.th). Moreover, there are other Thai SMEs, which mainly operate without any registration.

One of the most effective approaches which could enhance the development of SMEs is KM. This is because there is high market competition as international companies tend have branches in Thailand. Whereas the international companies are directed by management from abroad, Thai companies need to find strategies which fit well with the local context in order to compete with competitors. In addition, education alone may not help to support organizations to catch up with a fast-changing world. As a result, KM may be an approach which Thai organizations can adopt in order to enhance performance.

1.2 Personal motivations

As the researcher has a background in Telecommunication Engineering, he has been fascinated with communications technology. Having studied technical developments in software and hardware, it is of interest to the researcher how to manage the use of the existing tools. As mentioned by Walsham (1993), IT may be implemented in a technical sense but problems remain in data validity and system usefulness for example. Despite the fact that technology is claimed by vendors and manufacturers to provide great benefits, implementation without considering social aspects in which human behaviour is related may lead to failure. As Thailand is attempting to develop its IT infrastructure, the need for expertise in understanding both technical and social issues of IT may be crucial. The researcher perceives that the real experiences of humans being in a socio-technical environment where IT becomes an unavoidable part in any society, is vital. In order to understand the relationship

between IT and organizations, it is necessary to draw from disciplines such as IS since it includes both technology and human aspects. As Lowry (1997, p.192) pointed out:

“IS research is difficult because it always involves people, technology and the linkages and the interactions between them. If we remove technology, we are no longer studying IS but are working in reference disciplines such as psychology, sociology, human communication, organizational behaviour, philosophy, epistemology, ethics, logic, anthropology and theology. Similarly, if we remove the human aspects, we position ourselves in computer science, electronic engineering, communication technologies, physics, chemistry and other technological reference disciplines.”

Hence, the researcher realized the need for further IS research in Thailand. This is because whereas most technology in Thailand has been imported and much of the implementation has been done by technicians, programmers and engineers, rather than considering only the technical issue, human aspects need to be considered in order to effectively utilise them.

In addition, none of which previous studies have investigated the impact of the Thai context to the use of IT developed in Western countries. Being a native researcher enables the study to reveal more insights into the context. As mentioned by Schein (1994), without such in depth exposure, outsiders who are not well-versed in a given culture may draw false conclusions about its members' beliefs and behaviour. Therefore, apart from the expectation that this thesis will make significant contributions, it is an outcome of a learning process to become an expert in this field.

1.3 Expected contributions

The research theme investigated is the potential of groupware to support KM in the context of SMEs in developing countries. Consequently, the main objective of this thesis is to contribute to the utilization of IT in general for KM in SMEs in

developing countries in terms of the functionality of IT in relation to KM and the influence of the context in which it is implemented. The findings of this study are expected to provide a better understanding of groupware implementation and use. The context of developing country SMEs will yield implications which existing studies in groupware have not investigated. Since Notes is the main tool, this study is expected to gain an understanding on how collaborative tools in general can be used to support KM. The study also aims to reveal advantages and disadvantages of existing use of groupware in developing country SME environments. Since many studies have proposed the role of IT in maintaining information or knowledge in large organizations, it is expected that the findings of the study will provide significant assessment of groupware for KM in SMEs.

As discussed later, a number of views towards KM entail different interpretations and usages as the concept seems to be widely used as an umbrella term for a variety of organizational activities, which are not solely concerned with the management of knowledge (Wilson, 2002). Hence, this study is expected to contribute to the literature on the use of IT in KM. Whilst many researchers (e.g. Sherif et al., 2004; Galliers and Newell, 2003; McDermott, 1999; Walsham, 2001; Wilson, 2002) have argued that IT is not the core of KM, it is apparent that modern organizations in which KM is initiated tend to adopt IT as a tool to support KM. Hence, this study aims to reveal the position and functionality of IT for KM.

Based on the thorough conceptual discussion on KM, this thesis then aims to establish an empirical base for KM in a specific context from an IS perspective. As the focus is Thailand as a developing context, it is expected that the factors deriving from the context of Thai firms in this study would point out enabling and inhibiting factors for KM. The implications on the use of Notes for KM in other developing countries may arise since this study will be carried out by case research which takes into account the details of the study phenomenon (Alavi and Carlson, 1992; Yin, 1994; Stake, 2000). As a result, researchers and practitioners from different developing countries can understand the context of this study and replicate it in their future research or application in any business setting.

1.4 Structure of the thesis

This thesis is structured as follows:

Chapter 2 provides a literature review from fields related to this study. This includes the concept of KM from the perspective of IS, using a groupware system as the focal technology, the relationship between IT and organizations, and the study of IS in the SMEs in a developing country context in which this study is focused. The research objectives and questions are also provided in this chapter.

Chapter 3 discusses the research methodology adopted in order to investigate empirically the research questions. Since there are several methods which can be used in social sciences, explicitly defining a methodological choice of study is of paramount importance. Descriptions of research sites including company background and Notes implementation are also provided in this chapter.

Chapter 4 provides the analysis on the use of Notes as far as KM processes are concerned following the conceptual framework in Chapter 2. This chapter compares the use modes for each organization in order to give rise to understanding the meanings of each use mode to the organizations in relation to KM. By adopting the grounded theory approach, the concept of Notes identity emerged from the analysis.

Chapter 5 attempts to investigate the identity and implementation of Notes, which the members of each organization perceive. This chapter proceeds further analysis on the identity concept by investigating the factors which influence the creation of identities of Notes in the four cases.

Chapter 6 places the findings explained in the previous chapter within the broad existing literature. The aim of this chapter is to compare the findings to those in the literature and to search for logical arguments to support the research questions of

how Notes is used to support KM and to clarify the influences of a developing country context and specific organizational contexts on the use of Notes for KM.

Chapter 7 gives the conclusions to the thesis, describes theoretical and practical implications, and discusses the limitations of this study and future directions of the study of groupware for KM in developing country SMEs.

In summary, this chapter gave an overview to this study by discussing the reasons why research on groupware for KM in developing countries is needed. This includes the background of IT, KM and SMEs in the context of developing countries, particularly Thailand, as it is the research setting. Personal motivations explained why the researcher is particularly interested in this topic. Finally, expected contributions and structure of the thesis are explained.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides a literature review from fields related to the study in order to introduce the key concepts and identify gaps to research. It includes the concept of KM from the perspective of IS, groupware system as a focal technology, and the study of IS in the context in which this study is conducted. Section 2.2 describes how the relationship between IT and organizations can be viewed. Section 2.3 discusses different definitions of knowledge and offers an overview of KM in general and from an IS perspective. Section 2.4 provides the definitions and capabilities of 'groupware' and 'Lotus Notes' as it is a focal technology of this study. The functionalities of Lotus Notes towards KM are reviewed in Section 2.5 and hence a conceptual framework of Notes use is developed, based on the previous studies. Section 2.6 discusses the definitions of SMEs. Section 2.7 and 2.8 provide the background of previous IS studies in the context of SMEs and developing countries respectively. Section 2.9 offers the research objectives and questions. Finally, Section 2.10 concludes with a summary of the literature.

2.2 Relationship between IT and organizations

As this study focuses on the use of groupware systems in organizations, this section provides perspectives on the relationship between IT and organizations in order to introduce how IT-use and impact in organizations may be viewed. Technology has always been a central variable in organizational theory (Orlikowski, 1992). Thus, the study of relationship between IT and organizations has been paid attention so as to develop and use it effectively. Several researchers have studied the relationship between IT and organizational change. Markus and Robey (1988) is among those who proposed how to view the relationship. They stated that to support reliable generalisations about the relationships between IT and organization change, the evaluation of theories about why and how IT affects organizational life needs to be

focused. The study examined theories in terms of the structures which are theorists' assumptions about the nature and direction of causal influence. Three dimensions of causal structure include causal agency, logical structure and level of analysis. Figure 2.1 shows the overall three dimensions of causal structure. The following description mainly concentrates on the work of Markus and Robey (1988).

Causal agency	Logical structure	Level of analysis
<ul style="list-style-type: none"> ▪ Technological imperative 	<ul style="list-style-type: none"> ▪ Variance theory 	<ul style="list-style-type: none"> ▪ Macro
<ul style="list-style-type: none"> ▪ Organizational imperative 	<ul style="list-style-type: none"> ▪ Process theory 	<ul style="list-style-type: none"> ▪ Micro - micro - mixed
<ul style="list-style-type: none"> ▪ Emergent perspective 		

Figure 2.1 Dimensions of causal structure (Markus and Robey, 1988)

To make assumptions about the causal relationship between technology and organizations, causal agency refers to analysts' assumptions about the identity of the causal agent and the direction of causal influence. Causal agency comprises three conceptions: the technological imperative, the organizational imperative and the emergent perspective. In the technological imperative, IT is viewed as a cause of organizational change. This perspective implies that organizations have little choice but to adapt their skills and work organization to the requirements of technology (Scarborough and Corbett, 1992). In other words, IT as an external factor determines or constrains the behaviour of individuals and organizations. On the other hand, from the organizational imperative, the technology is primarily shaped by actors within the organizations. IT is the dependent variable caused by the organization's information processing needs and manager's choices about how to satisfy them (Markus and Robey, 1998).

However, the relationship between technology and organizations will always evolve and overlap together rather than separately or in opposition to each other (Scarborough and Corbett, 1992, p.3). Therefore, the emergent perspective argues

that the uses and consequences of IT emerge unpredictably from complex social interactions. Unlike the technological and organizational imperatives, prediction in the emergent perspectives requires detailed understanding of dynamic organizational processes in addition to knowledge about the intentions of actors and the features of IT (Markus and Robey, 1988).

Further, to understand the nature of the relationship between technology and organizations, logical structure in theory refers to the nature of the relationship, static versus dynamic, between elements identified as antecedents and those identified as outcomes, namely variance and process theories. The main distinction between two theories may be analogous to the distinction between cross-sectional and longitudinal research methodologies. Variance theories are concerned with the predicting levels of outcome from levels of contemporaneous predictor variables. On the other hand, process theories depend heavily on the specification of temporal relations among theoretical elements. It provides richer explanations of how and why the outcomes occur when they do occur. In connection with causal agency, Markus and Robey (1988) proposed that emergent theories could not effectively be cast as variance models. This is because it is not possible to differentiate one 'variable' from the other and looking for the causal relationships between them (Scarborough and Corbett, 1992, p.2). While both variance and process models are available to analysts from either the technological or the organizational imperative perspectives, it may be concluded that process theories tend to be more advantageous in that the predictions may correspond more dependably to actual events in organizations than do the typical predictions of variance formulations.

Finally, level of analysis refers to the focus of analysis (e.g. individuals, groups, organizations, and society). Level of analysis is divided into macro-level and micro-level theories. The concepts in macro-level theories are properties of large-scale collectives (e.g. organizations, population), while the concepts in micro-level theories are properties of individuals and small groups. In conclusion, Markus and Robey (1998) have recommended the adoption of emergent perspective rather than deterministic models of causal agency, using the logic of process theory rather than

a dependence on variance theory, and linking multiple levels of analysis. The emergent perspective has been adopted in the study of IT such as Barley (1986) and Ngwenyama (1998). IT is treated as social objects capable of triggering dynamics whose unintended and unanticipated consequences may nevertheless follow the context of their use (Barley, 1986). In his studies, Barley (1986) investigated how identical CT scanners occasioned similar structuring processes in two radiology departments and yet led to divergent forms of organization. Ngwenyama (1998), on the other hand, found the continuing emergence of the groupware application and the organizational process it supports.

However, Orlikowski and Robey (1991) criticized that the emergent perspective tends to focus on temporal stages that technology triggers organization change, and view physical form of technology as it is fixed and standardized functions and features across time. It was argued that objective forms and functions of technology at one point may be varied by different users, by different contexts of use, and by the same user over time. In addition, Orlikowski and Hofman (1997) argued that technological change management cannot be decided beforehand. Rather, it is an iterative and ongoing cycle of anticipated, emergent and opportunity based changes that enable an organization to learn from practical experience, respond to unexpected outcomes and capabilities, and adapt both the technology and the organization as appropriate.

Relatedly, several studies in IS implementation have considered 'time' as the main aspect of IT implementation. As argued by Orlikowski (1992), it is important to recognize the ongoing social and physical construction of technology that occurs during its use because technologies are recognised as products of their time and organisational contexts. Orlikowski (1992) used the term 'interpretive flexibility' to refer to the degree to which users of a technology are engaged in its constitution during development or use. She emphasized that there is flexibility in how people design, interpret and use technology, but that this flexibility is a function of the material components including the artefacts, the institutional context in which a technology is developed and used, and the power, knowledge, and interests of

human actors. It is found that time also influences the interpretive flexibility of technology as the interpretation and use of technologies in organisations tend to be routinised over time which becomes less open to operational modification. This gives rise to the idea that different applications should be modified by users over time in order to be interpreted and used more flexibly. Tyre and Orlikowski (1994) attempted to answer the question as to whether the process of technology adaptation is gradual and continuous. The study found that: (a) technological adaptation in organisations is discontinuous, (b) the full integration of new technology may take several years, (c) adaptation attention and effort may not be consistent over the testing period, and (d) adaptation attention and effort seemed not to decrease gradually. In addition, Sahay (1997) proposed that different assumptions that people have about time and space, and the time and space context within which technology is implemented also contribute to these interpretive flexibilities around IT. It was argued that meanings of time-space are deeply embedded within social structure, and IT through its capability to create new time-space conditions for social interaction.

Therefore, Orlikowski (1992) and Orlikowski and Robey (1991) extended the emergent perspective of IT and organizations by constructing a theoretical framework based on the theory of structuration developed by Giddens (1976, 1979, 1984). In this framework, organizations are not only shaped by IT but they are also strongly influenced by social and political processes and by the actions of members of the organization. The focus of Orlikowski and Robey's framework is on IT, and how IT is created, used, and becomes institutionalised within organizations. Rather than differentiating between the subjectivists and objectivists studying IT, Orlikowski and Robey (1991) argued for an integration of these positions. They proposed the concepts of duality of IT to understand the relationship between organizations and IT. This duality expresses that IT is the social product of subjective human action, simultaneously IT is an objective set of rules and resources involved in facilitating and constraining human action. As stated by Orlikowski (1992), human actions and structure are not independent. Rather, there is a continuous process of human agents in habitually drawing on technology that objectifies and institutionalises it. In other words, if human actions on technology

change, which are considered as a process, this may affect technology both physically and interpretively. Conversely, if technology changes, this also affects human actions, which occurs as a continuous flow of conduct. The structuration framework follows the logic of process theory as it represents occasions for organizational change, where the actions facilitated by the different technology may, over time, institute a new way of doing things and a new sensibility about what technology is appropriate (Orlikowski and Robey, 1991).

There are a number of research studies that examined the dynamic relationships between groupware and organizations from a structural perspective such as Karsten (1995), DeSanctis and Poole (1994) and Orlikowski (1992, 1993, 1996). This is because there is an emphasis toward the use of more integrative approaches in which understanding how IT gets integrated into work and organizational systems is key (Sahay, 1997; Pozzebon and Pinsonneault, 2001). In this study, groupware technology, which is adaptable and evolved over time, is investigated. The introduction of new technologies such as Notes normally has a major effect on the work practices of employees, and the management of the work practices of employees, and the management of the emergent nature of the change process is a crucial factor in facilitating a successful transition (Barrett et al., 2004). Therefore, this study employs the structuration model underlying the relationship between groupware and organizations. Rather than using Giddens' structuration theory which focuses on social structure as a theoretical analysis lens, this study employs the structuration model of IT by Orlikowski in which the concept of duality of IT is emphasized as a sensitizing device for thinking about the role of groupware in organizations. In addition, process theory is regarded as the nature of relationship between technology and organizations because the study intends to address how and why the phenomenon occurs rather than predicting outcomes from predictor variables. Finally, a mixed-level strategy of level of analysis is adopted as this study attempts to investigate the process of group work via groupware in organizations, while individual behaviour in terms of their participation through groupware is also the main concern. By addressing each of these dimensions of causal structure, the relationship between groupware and SMEs in this study can be viewed. The next

section introduces the concept of KM which is an impact of IT use in organizations focused in this study.

2.3 An overview of knowledge management

Organizations know that a clear competitive advantage lies with those who can effectively manage and exploit their intellectual assets (Lotus Development Corporation, 1995). The knowledge-based theory of the firm suggests that knowledge-based resources are the organizational assets that enable sustainable competitive advantage (Alavi and Leidner, 1999), because they are difficult to imitate and likely to be enablers of adaptation (Miller and Shamsie, 1996). Thus, KM has become a vital concept for modern organizations in maintaining organizational knowledge and leveraging the knowledge of employees. This section provides an overview of KM. The discussion starts with definitions of “information” and “knowledge”. Then, various IS perspectives on KM are identified.

2.3.1 Data, information and knowledge

To understand knowledge, a distinction between the three terms which have been widely embraced by the IS community, namely data, information and knowledge is discussed here. According to Zack (1999), data represents observations or facts out of context that are not directly meaningful, whilst information results from placing data within some meaningful content, often in the form of a message. On the other hand, knowledge is information combined with experience, context, interpretation, and reflection. It is a high-value form of information that is ready to apply to decisions and actions (Davenport et al., 1998). Checkland & Holwell (1998) provides the view that information is a service that supports decision making within organisations. Data are facts and a starting point for mental processes. They introduce the concept *capta*, which is the result of selection of certain data. This signifies that turning data into information is done through a mental process. Selection and conversion of data into meaningful information can lead to larger structures of related information, or knowledge. Galliers and Newell (2003)

distinguished between the terms data, information and knowledge by identifying their key characteristics or dimensions as provided in Table 2.1.

Dimension	Data	Information	Knowledge
'Knowledge'	Explicit	Interpreted	Tacit/embrained
Application	Exploit/use	Explore/build/construct	Create/rebuild/reconstruct
Personal change	Accept	Confirm	Disconfirm
Organizational change	Prescriptive	Adaptive	Seminal
Creativity	Follow old recipes	Amend old recipes	Develop new recipes
Learning	No learning	Single-loop learning	Double-loop learning
Communicating	Direction	Communication	Sense-making
Efficiency-innovation	Efficiency	Effectiveness	Innovation
Assumptions	Predetermined	Constrained	Flexible
Networking	Technical systems/networks	Socio-technical systems/networks	Social networks
Contextualization	Context-free	Outer context	Inner context

Table 2.1 Key characteristics of data, information and knowledge (Galliers and Newell, 2003)

The concept of information and knowledge has been broadly discussed. The terms “information” and “knowledge” are often used interchangeably. Nonaka (1994) identified that information is a flow of messages, whereas knowledge is created and organized by the very flow of information, anchored on the commitment and beliefs of its holder. This implied knowledge is rather considered as ‘personal beliefs’ and thus resides in a person’s mind (Alavi and Leidner, 1999). Nonaka (1994) described the relationship between information and knowledge that in order to create knowledge, it is important to concentrate on the semantic aspects of information as it focuses on conveyed meaning.

Several classifications of knowledge have been proposed such as the nature of knowledge and types of knowledge (Storey and Barnett, 2000). A variety of knowledge definitions and taxonomies are provided in Table 2.2. Each definition and philosophical perspective requires reflection over the ideological nature of knowledge, as they are a critical part of well-informed and consensus scholarship

(Kakabadse, et al., 2003). Among those classifications, Polanyi (1966) classified types of knowledge into two categories. Explicit refers to knowledge that is transmittable in formal & systematic language. On the other hand, “tacit knowledge” has a personal quality, which makes it hard to formalise and communicate. However, the boundary between the explicit and tacit types of knowledge is both porous and flexible (Spender, 1996b). Hence, Nonaka (1994) further explained that tacit knowledge can be shared to build mutual understanding between individuals when they communicate, whilst explicit can be captured in records of the past such as libraries, archives, and databases. The conversion of tacit to explicit knowledge and, vice versa, leads to four modes of knowledge conversion; socialization, externalization, internalization and combination. Each one is characterised by a particular content. However, the studies by Nonaka (1991, 1994) were criticised by a number of researchers such as Blackler (1995) and Spender (1996b) on the grounds that knowledge is not considered as a specific entity, formed in the minds of individuals. Tsoukas (1996) criticized that tacit knowledge is not explicit knowledge, ‘internalised’ as Nonaka and Takeuchi claimed, rather tacit knowledge is the necessary component of all knowledge. Spender (1996b) also mentioned that the interaction between the explicit and the tacit is evolutionary in that the choices made by individuals are selected in or out according to their utility in a specific historical and economic reality, and eventually embedded in organizational routines which then shape and constrain further individual choices. Tsoukas (1996) also argued that tacit and explicit knowledge are mutually constituted, and they should not be viewed as two separate types of knowledge.

Moreover, it has been argued that knowledge emerges in practice. Brown and Duguid (1998) contended that trying to move knowledge without the practice involves moving the know-what without the know-how. They explained that successful spread of knowledge needs an implicitly shared sense among members of a community of what practice is. Hence, specialized groups are capable of producing highly specialized knowledge. Further, Blackler (1995) attempted to develop the concept of knowledge and its relevance to organization theory. He contended that knowledge is analysed as an active process that is mediated, situated, provisional, pragmatic and contested. According to Tsoukas (1996), the human’s understanding

resides, first and foremost, in the practices in which he participates. The locus of the human's knowing how to follow a rule is not in his head but in practice, or his understanding is implicit in the activity in which he engages. In addition, Badaracco (1991) argued that knowledge can be 'embedded' in tacit skills, established team working, organizational routines, broader professional and affiliative networks, and in geographical locations.

Knowledge can be held by an individual or a collectivity (Tsoukas, 1996). Accordingly, to appropriate and codify knowledge is not just from the specificities of individual experience but also the reflexive meditation of workgroups on their collective activities and perceptions (McKinlay, 2002). However, it was argued that the meaning of all knowledge is tied up with the context of its development and use (Spender, 1996a). Galliers and Newell (2003) have pointed out the importance of context in making sense of data and information in order to be individuals' knowledge within a particular problem/opportunity domain. It was argued that a firm has no control over its members' dispositions, which are derived from their past socializations in contexts outside the firm. Thus, organizational knowledge may not be possessed by a single agent (Tsoukas, 1996). Having said that knowledge emerges with practice, organizational knowledge is not defined in a positivist way as a corporate asset, rather it is a qualitative aspect of the activity system they shape as managers (Spender, 1996b). As mentioned by Spender (1996b), social organizations, firms, species and societies evolve by adapting the body of knowledge shared by their members, and that much of the process takes place at the tacit level. According to Nonaka and Takeuchi (1995) organizational knowledge is the knowledge shared by individuals and the four dimensions of knowledge conversion are the means of communicating knowing around the firm. Spender (1996a) mentioned that collective knowledge is the most strategically important feature of organizational knowledge since being embedded, it is both relatively immobile and historically contingent and, therefore, relatively inimitable. Similarly, Nonaka and Takeuchi (1995) contended that collective knowledge becomes the basis of human meaning and communication, what the receiver must know to comprehend the semantic content of the business age. Further, individuals cannot be proficient until they are 'socialized' into an organization, that is until they have

acquired much of the collective knowledge that underpins the way things are done (Spender, 1996b).

In short, knowledge is socially constructed. This emphasizes the interplay of actions, language, technologies, social structures, implicit and explicit rules, history and institutions (Blackler, 1993). Individuals use their knowledge to perform actions such as creating information for other individuals, while knowledge is created in practice, in the activities of and interactions between individuals (Stenmark, 2002). In addition, Blackler (1993) argued that individuals and organizations express their knowledge more in their actions than in their articulations. Hence, organizations need to manage knowledge both as object and process (Zack, 1999). Table 2.2 presents the different definitions of knowledge which gives rise to the idea that the meanings of knowledge are subjective. Hence, the meaning of knowledge in this study needs to be investigated.

Authors	Types, forms of knowledge and level of embodiments
Bacon (1605)	<ul style="list-style-type: none"> • “Pure knowledge of nature and universality, a knowledge by the light where of man did give names unto other creatures in paradise...” • “Proud knowledge of good and evil, which give intent in man to give law unto himself...”
Boswell (1979)	<ul style="list-style-type: none"> • “We know a subject ourselves” or • “We know where we can find information about it”
Polanyi (1958, 1996)	<ul style="list-style-type: none"> • Tacit (awareness of things that we may not be able to tell; all knowledge is either tacit or rooted in tacit knowledge) • Explicit (capable of being clearly stated)
Schank and Abelson (1977)	<ul style="list-style-type: none"> • General knowledge – information about, and interpretation of, human intention, disposition and relationships (satisfaction, enjoyment, achievement, preservation, crisis, instrumental) and “themes” (role themes, interpersonal themes and life themes) • Specific knowledge – a “script”, a representation of the expected sequential flow of events in a particular situation (cooking, applying for a job) • Expert knowledge – “factual knowledge” (extensive data base about life matters) and “procedural knowledge” (mental procedures, heuristics)
Frantzich (1983)	<ul style="list-style-type: none"> • Resident knowledge insider knowledge residing within networks and gatekeepers • Access knowledge- readily transferable information
Anderson (1985)	<ul style="list-style-type: none"> • Declarative knowledge or describing something • Procedural or how something occurs or is performed • Causal or why something occurs
Holiday and Chandler (1986)	<ul style="list-style-type: none"> • Knowledge as a general competence (a dimension that overlaps with local intelligence or technical ability) • Pragmatic knowledge – experience based • Knowledge as a reflective or evaluative meta-analytical skills and abilities
Blacker et al. (1993)	<ul style="list-style-type: none"> • Embrained (conceptual skills and abilities) • Embodied (acquired by doing) • Encultured (acquired through socialization) • Embedded (organizational routines) • Encoded (signs and symbols)
Nonaka and Takeuchi (1995)	<ul style="list-style-type: none"> • Technical (“know-how”) • Cognitive (“mental models”)
Heron (1998)	<ul style="list-style-type: none"> • Propositional – theoretical ideas about things • Practical – action related know how • Experiential – things as actually experienced • Presentational – a feedback loop from experiential to propositional knowing in a form of a creative output
Tsoukas (1996)	<ul style="list-style-type: none"> • “Taxonomic” knowledge – knowledge that makes distinction between explicit and tacit knowledge
Edvinsson and Malone (1997)	<ul style="list-style-type: none"> • Product knowledge • Routine knowledge • Process knowledge

Table 2.2 Taxonomies of knowledge (Source: Kakabadse et al., 2003)

2.3.2 Knowledge management

Similar to knowledge itself, knowledge management (KM) tends to be difficult to define. It was argued that knowledge is an ambiguous, unspecific and dynamic phenomenon, intrinsically related to meaning, understanding and process, and therefore difficult to manage (Alvesson and Karreman, 2001). There are a variety of disciplines that have influenced and informed the field of KM (Kakabadese et al,

2003). KM can be defined as a strategy for managing knowledge that includes people, processes and technology for creating, capturing, categorizing, disseminating and using knowledge to generate value to the organization (Davenport et al., 1998; Massey et al., 2001; Zack, 1999; Gurteen, 1998). KM is also a “conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance” (O’Dell and Jackson, 1998, p.4). KM is practically seen to be central to product and process innovation and improvement, to executive decision-making, and to organizational adaptation and renewal (Earl, 2001). Having considered different definitions, it is often the challenge to identify what can be done to improve the creation, protection and use of knowledge (Earl, 2001). Earl (2001) proposed a taxonomy of KM schools in order to help managers identify alternative KM initiatives or solutions, understand what is required to make them work, sense of and improve the effectiveness of any existing, inherited, or early KM projects. This includes the schools of systems, cartographic, engineering, commercial, organizational, spatial and strategic. The attributes of each school - namely focus, aim, unit, success factors and philosophy - do stand out and there are implications for the contribution that IT can make. Most literature pointed out that KM can incorporate the interactive relationship between IT, business strategy, processes, structure, and people both within and between organizations that will be evident, and means by which the surfacing of knowledge can be facilitated become more crucial (Eschenfelder et al., 1998; Galliers and Newell, 2003). Hence, the main theme of KM is to provide a framework that builds on past experiences and creates new mechanisms for exchanging and creating knowledge (Kakabadse et al, 2003).

It was suggested by Barret et al. (2004) that when implementing IT for KM, it is necessary to clarify and detail some of the ‘soft’ issues of context and the ‘hard’ issues of technological systems when trying to support effective learning in and between knowledge communities. IT is not the answer to improve knowledge-sharing within and between people and organizations (Walsham, 2001). Markus (2001) also argued that repositories created by one group for one purpose are unlikely to be successfully reused by other groups for different purposes without considerable rework or other kinds of intervention. In addition, Mitev and Venters

(2004) argued that knowledge practices are seen as difficult and far from the managerial ideal inherently implied in the concept of KM due to various obstacles. These obstacles could be reluctance to share knowledge across departments and individuals, and across time; tendency to keep information for oneself rather than disseminate; non-acceptance of someone else's expertise; resistance to changing and learning; preference for personal communication; lack of time; staff and resources; passing on the learning task to someone else.

A number of factors influencing KM, both enabling and inhibiting, were investigated in the literature. For example, Barrett et al. (2004) and Thompson and Walsham (2004) contended that a supportive context and culture for knowledge sharing is a necessary condition for thriving communities, where individuals contribute voluntarily or willingly. The perception of the reward structure or incentives are likely to support KM (Barrett et al., 2004; Markus, 2001; Walsham, 2001; Davenport et al., 1998). The intermediaries play a major role in the creation and maintenance of repositories and the facilitation of their use (Markus, 2001). As visible and high-status subjects, senior managers are often in a comparatively strong position to influence how people develop ideas, solve problems, adapt frameworks, give priority to certain tasks and construct certain kind of social relations and experiences of community (Alvesson and Karreman, 2001). In addition, work monitoring may be welcomed by employees who feel that they are performing well, since they are likely to gain financial and promotional rewards (Orlikowski, 1996). Organizational culture is an important precondition, and constraint, for KM. Initiatives regarding knowledge are not something that can be planned or imposed, but must be fine-tuned in accordance with cultures and social practices (Alvesson and Karreman, 2001).

A further condition for a supportive context is that individuals must perceive themselves as having the freedom to learn from others, for example through lateral communication of issues and problems with their peers (Barrett et al., 2004). Organizations may support KM through communities-of-practices (Lave and Wenger, 1991; Brown and Duguid, 1991). A community-of-practice develops “a

shared understanding of what it does, of how to do it, and how it relates to other communities and their practices” (Brown and Duguid, 1998, p.96). In addition, there is a need for ‘safe’ enclaves, where individuals in a community-of-practice may share views, knowing that their organizational superiors have no access to their exchanges (Hayes and Walsham, 2001). Knowledge sharing between communities is often harder than within communities due to the lack of shared symbols such as professional language, job purpose, and norms of behaviour (Barrett et al., 2004). Hence, there is a need for taking other cultures seriously by adaptation and compromise (Walsham, 2001). In addition, Davenport et al. (1998) suggested factors such as standard or flexible knowledge structure, clear purpose and language, multiple channels for knowledge transfer that each adds value in a different way.

2.3.3 Knowledge management and IS

Several models have been devised so as to understand KM, such as intellectual capital models (Edvinsson and Malone, 1997), knowledge category models (Blacker, 1995; Nonaka and Takeuchi, 1995; Boisot, 1998), and KM processes (Alavi and Leidner, 2001). Schultze (1998) applied a framework developed by Burrell and Morgan (1979) in order to locate theories of KM by broadly categorising those models of KM as either “functionalist” or “interpretivist”. Venters (2002) proposed that these terms represent the approaches underlying philosophy, based either on a belief in knowledge as a potentially tangible, understandable asset, or on a belief that knowledge is emergent and linked to human cognition. In other words, the functionalist perspective proposes that knowledge exists as an objective representative of the world and is waiting to be discovered. On the other hand, the interpretive perspective argues that knowledge cannot be located in any one place because knowledge is continuously shaping and being reshaped by human experience and social practices of communities (Venters, 2002).

Researchers have dealt with KM from various perspectives such as organizational learning (e.g. Spender, 1996b; Cheng and Van de Ven, 1996), resource-based view of strategic management (e.g. Miller and Shamsie, 1996; Scarbrough, 1999) and human resource management (e.g. Scarbrough, 1999; Currie and Kerrin, 2003). The

role of IT has been one of the focal point in organizational KM. This is because IT can enhance knowledge integration and application by facilitating the capture, updating, and accessibility of organizational directives and routines (Alavi and Leidner, 2001). For instance, workflow automation systems reduce the need for communication and coordination and enable more efficient use of organizational routines through timely and automatic routing of work-related documents, information, rules, and activities (Alavi and Leidner, 2001). In addition, Davenport et al. (1998) proposed three basic types of knowledge repositories: 1) external knowledge, for example, competitive intelligence; 2) structured internal knowledge, such as research reports, product-oriented marketing materials, and techniques and methods; and 3) informal internal knowledge, like discussion databases full of know-how, sometimes referred to as “lessons learned”. However, the idea that ‘knowledge’ can ever be simply transferred through an IT system is misplaced (Galliers and Newell, 2003). The document and KM technologies merely repackaged that information for easier use (Schultze and Boland, 2000) or referred to no more than data processing systems (Galliers and Newell, 2003). However, if the climate is good, then technology has a central part to play in providing the media and infrastructure for learning in and between knowledge communities (Barrett et al., 2004). Unlike IT that automates formal, hierarchical data flows, such network technology as groupware introduced horizontal conversations between much broader organizational constituencies (Boland and Schultze, 1996; Hayes, 2001; McKinlay, 2002). Hence, IT can assist implicitly in providing information to support the processes and circumstances that enable knowledge creation and KM (Kautz and Thaysen, 2001). Relatedly, Sherif et al. (2004) proposed that KM systems play a major role in the accumulation of social capital which leads to the effect on the creation and transfer of knowledge. This is because social capital which is defined as “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships processed by an individual or social unit” (Nahapiet and Ghoshal, 1998, p.243), supports human interaction where knowledge is occurred.

This present study considers the interpretive perspective of KM. Venters (2002) contended that the role of technology cannot be seen as simply processing

knowledge but rather in support of social activity. According to this view, the technological action is shifted from a belief that technology can aid in ‘managing knowledge’ to a belief that KM technology may improve the various complex activity individuals are engaged in. Gurteen (1998, p.6) defined KM from an IS perspective as “an emerging set of organizational design and operational principles, processes, organizational structures, applications and technologies that helps knowledge workers dramatically leverage their creativity and ability to deliver business value”. Management of both technology and context needs to be emphasized in order to provide effective support for learning and knowledge sharing (Barrett et al., 2004). Therefore, instead of looking at only the functionality of IT for KM, the context of which the technology is implemented will also be taken into account in this study.

When investigating KM from an IS perspective, several types of IT such as intranet (e.g. Damsgaard and Scheepers, 2001; Stenmark, 2002) and Enterprise Resource Planning system (ERP) (e.g. Newell et al., 2003) have been explored. This research proposes an investigation of a specific KM tool, that of groupware.

2.4 Groupware: Lotus Notes

The term ‘groupware’ was originally coined by Johnson-Lenz and Johnson-Lenz in 1978, for the systems that support the work efforts of groups in achieving common tasks (Ramarapu et al., 1999). Orlikowski and Hofman (1997) defined the term ‘groupware’ as technologies providing “electronic networks that support communication, coordination and collaboration through facilities such as information exchange, shared repositories, discussion forums, and messaging” (p.12). Groupware was found to be a potential tool for KM in a number of studies (e.g. Orlikowski, 1993; Ehrlich and Cash, 2004; Hayes, 2001; Hayes and Walsham, 2001; KPMG, 2000). For instance, in an empirical study of the use of groupware by Hayes and Walsham (2001) in a pharmaceutical company, the political and normative context was seen as being fundamental to shaping the KM process of a groupware system. Orlikowski (1993) also found that groupware was used to share

their knowledge and experience in order to aid consultants in conducting their work in a consulting company.

However, groupware seems to be a slippery term. Using definitions by Orlikowski and Hofman (1997), a variety of technologies can be considered as groupware. Hence, a specific groupware application was chosen for the purpose of this study. Lotus Notes (Notes) is one of the most well-known groupware products in the market and is investigated by several scholars (e.g. Karsten and Jones; 1998, Orlikowski; 1996, Vandenbosch and Ginzberg; 1996, Brown; 2000) as it comprises groupware features. This study, therefore, focuses on Notes as a groupware system. What follows is an explanation of Notes as a groupware system.

Notes started to evolve from the ideas of a distributed conferencing application (many-to-many communication) and a bulletin board (one-to-many communication) to provide information sharing services by replicating databases over networks (DeJean, 1990). According to Vandenbosch and Ginzberg (1996, p.67), Notes is 'a combination document creator and indexer, database generator and manager, and messaging platform. The design of Notes is based around the sharing of 'Notes databases' held on a network of connected server computers. Notes allows information to be distributed between different users, using these shared databases in a structured or semi-structured way (Brown, 2000). Databases can store and retrieve free-form and tabular text, numerical data, graphs, images, video and sound, in any combination (Whitehead, 1996). Notes provides directly accessible additional functions, namely an editor, full text search capabilities, and macros to run background operations (Bannon, 1993). In developing applications in Notes, a database is defined by the forms used to create the documents within it and the views of those documents. In other words, to design a database is to design an application (Whitehead, 1996). Many of the classic collaborative applications such as collaborative writing, discussion groups and workflow systems can be implemented using Notes databases. Notes has rapid development tools, and a straightforward programming language similar to that used in spreadsheets such as Microsoft Excel, in developing databases (Brown, 2000). Beyond the database

features and the fact that it is easy to use, an attraction of Notes is the integration of document databases with email. Email messages can be forwarded onto the document databases, and information from document databases can be forwarded as email messages (Vandenbosch and Ginzberg, 1996). As the email databases act as the equivalent of individual mail folders, Notes is sometimes used solely as an email platform, ignoring its other functionalities (Brown, 2000). Figure 2.2 illustrates the different features of groupware and its purposes.

Notes has invariably been updated by its supplier, IBM. By May 2004, the latest version, 6.5.1, was launched. The highlight of this new version is an instant messaging function which provides presence awareness and enables users to initiate chats with colleagues, without launching a separate application (IBM Corporation, 2004).

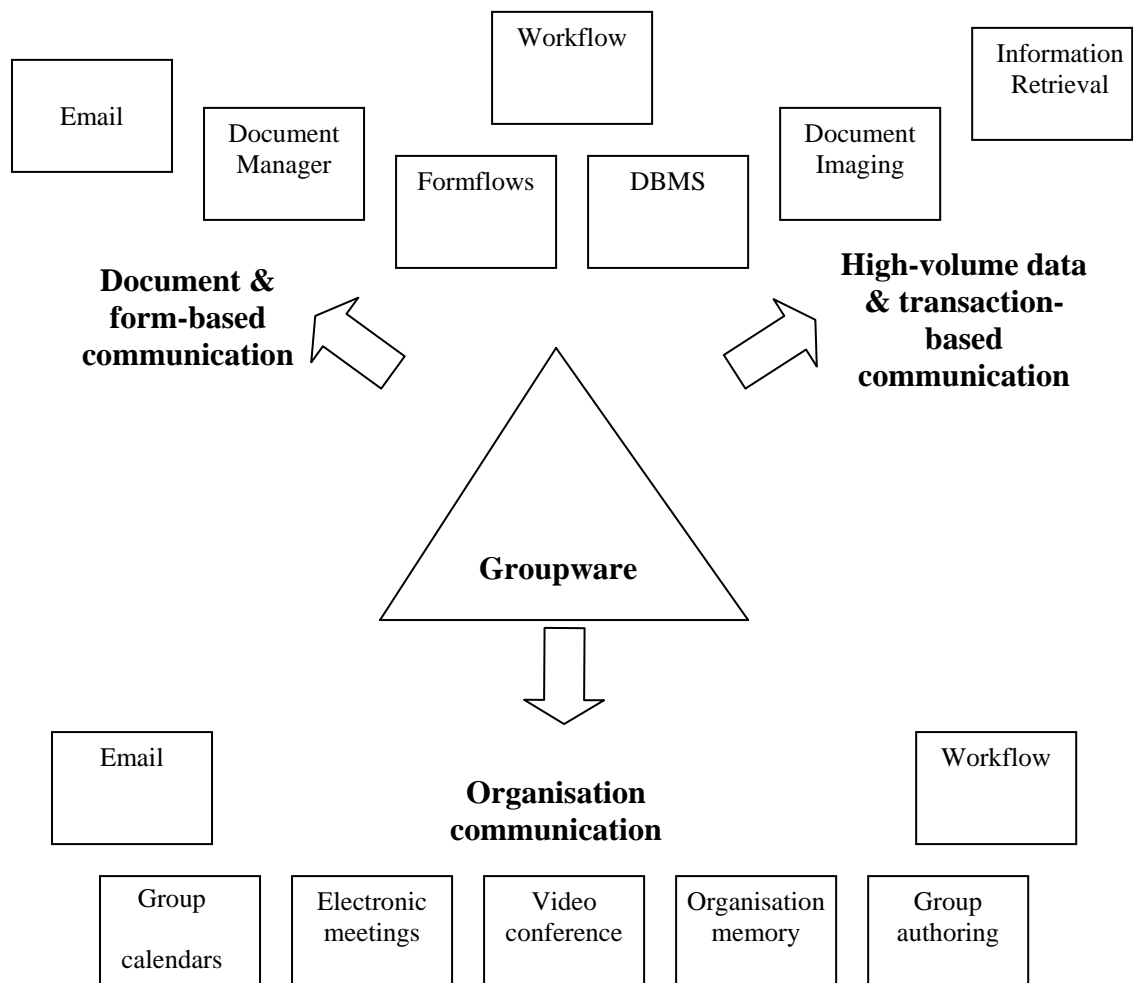


Figure 2.2 Groupware applications (Source: From Khoshafian and Buckiewicz, 1995)

2.5 Conceptual framework of Notes

By adopting the interpretive perspective of KM, Notes is considered here as the medium which facilitates the process of human action and interaction, which the outcome being that of knowledge. Therefore, in order to investigate the interaction processes of Notes in facilitating KM, this study develops a conceptual model illustrating the patterns of human interaction processes with Notes. The discussion starts with the use modes of Notes as these are found in the literature. These use modes are, then, taxonomised on a newly formed model, called here the “interaction richness model”.

2.5.1 Notes use modes

The use of Notes for KM processes has been studied in different types of organizations. Drawing upon the existing literature, this section presents the main functions of Notes in KM. Nine major case studies discussing the use of Notes and its potential to KM are reviewed (Robertson et al., 2001; Vandenbosch and Ginzberg, 1996; Orlikowski, 1993; Hayes, 2001; Brown, 2000; Ciborra and Suetens, 1996; Ciborra, 1996; Orlikowski, 1996; Karsten and Jones, 1998). The selection of these studies is based on the rich descriptions of how Notes was implemented and used for facilitating information and KM in the organizations. Table 2.3 provides a synopsis of these studies by taking into account the research site, the functions of Notes that were used, methods for collecting data and length of the study. This information is important for comparative purposes.

Study	Site and size	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	Notes databases	Interviews Surveys	Ten months (began after decision to expand use of 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 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 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 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 Notes was implemented)

Ciborra (1996)	Roche: Large Diagnostic division of multinational pharmaceutical	Cosis applications: multidisciplinary knowledge base	Interviews	Over 2 years (began after 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 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 Notes implementation)

Table 2.3 Summary of the previous studies of the use of Notes

Based on this review, Notes has been developed and used in different ways for supporting KM processes. Table 2.4 synthesises these different use modes of Notes in KM. The researcher has named the use modes based on the different uses of Notes which have been identified in the literature. The distinctive meanings of each use mode were looked for from the descriptions. Five use modes were categorised here in order to provide a set of Notes functionality in which people can utilise. The five use modes are explained next.

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 information (e.g. full text search capabilities, document indexer).	Robertson et al. (2001), Orlikowski (1993, 1996), Ciborra and Suetens (1996)
Retrieving	retrieving 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, experiences, 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' knowledge (e.g. shared databases within homogeneous group).	Hayes (2001)

Table 2.4 Summary of use modes of Notes

First, Notes in its simplest form, 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, a software company (Orlikowski, 1996). Meeting minutes were published to allow those not present in the meeting of CCC to be kept informed (Karsten and Jones, 1998).

The second use mode of Notes is “searching”. Notes comprises capabilities such as full text search and document indexer in searching information. In Universal consulting (Robertson et al., 2001), project leaders used the indexing and search facilities of 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 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 Notes for organization database browsing.

The third use mode of Notes is “retrieving”. This mode focuses on using Notes to retrieve and use 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 Notes for discussion on project work across countries, was maintained and retrieved from Notes databases by the staff of Universal consulting (Robertson et al., 2001).

The fourth use mode is “sharing”. With this mode, individuals and groups in the organization use Notes to discuss and share ideas, experiences, information and knowledge with each other. This use mode exists in all the cases as Notes provides several mechanisms including email, discussion databases and public fora. In American insurance company (Vandenbosch and Ginzberg, 1996), employees 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. Sharing use mode is distinct from the publishing use mode because the information and knowledge are to be retrieved and used by someone rather than just letting them know what is done or happens. In other words, the purpose of sharing use mode is to post information by taking into account whether and how the receivers can use the information subject to their interpretation.

The final use mode of Notes is “creating”. This use mode addresses the potentialities of Notes for creating individuals’ and groups’ knowledge. This mode is different to the other modes in that it provides the opportunities for individuals and groups for learning. Having shared information on Notes, people have more opportunities to

create knowledge when they understand the information they share. This may be done through discussion forum of groupware. Hence, new knowledge is created since people engage with each other. The knowledge within groups allows them to understand the subtleties that underlie the meaning expressed on the shared database (Hayes, 2001). However, the creating mode of Notes is likely to depend on the organizational context. For instance, within the same functions in Compound UK, employees could draw on their shared knowledge to interpret skilfully and make judgements concerning the views recorded on the shared databases by members of their own functions (Hayes, 2001).

2.5.2 Interaction richness model of use modes

This section presents the “interaction richness” model that taxonomises the use modes of Notes presented in the earlier section on two dimensions. The purpose of this taxonomy is to make distinctions among each use mode and to provide an analysis framework of how Notes functionalities can support KM processes. The first dimension entails the types of interaction that may take place in a Notes environment which may either be human-Notes interactions or human-human Notes-mediated interactions. The human-Notes interactions refer to the interactions between the users and Notes features or items maintained on Notes, whilst the human-human Notes-mediated interactions emphasize the interactions among users in which Notes acts as a medium. The second dimension involves the types of KM processes experienced in a Notes environment namely co-ordination, communication and collaboration (3Cs). These processes were originally proposed by Ellis et al. (1991) and were found in the study of Notes by Karsten (1995) and Orlikowski (1996).

Co-ordination is regarded as the direction of individuals’ efforts towards 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 a 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 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). 'Retrieving' and 'sharing' use modes can be put into this category. As the 'retrieving' use mode focuses on records of information and knowledge retrieved by users, databases act as an agent which communicates the information maintained to individual receivers. Therefore, retrieving 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 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 IT (Orlikowski, 1992) it is argued here that users will, over time, learn to explore the potentialities of Notes contributing to a collaboration between humans and technology where each benefits from the other. Based on this, the researcher adds another use mode, 'exploring', which implies that humans can consult and collaborate with Notes to achieve a goal.

It is important to note that the definitions of 'cooperation' and 'collaboration' are differently viewed in the literature. For example, Fuks et al. (2005) proposed that collaboration may be seen as the combination of communication, coordination and cooperation. However, both collaboration and co-operation tend to characterize the

production taking place on a shared space. The distinction between the two terms is that co-operation refers to the process which is accomplished by the division of labour among participants, as an activity where each person is responsible for a portion of the problem solving (Roschelle and Teasley, 1995). Collaboration, on the other hand, implies a shared end result which is achieved by mutual effort of different parties such as individuals, teams and organizations. Collaboration also emphasizes interdependent mutual engagement (Kotlarsky and Oshri, 2005). As communication and co-ordination identified in this study do not focus on such mutual engagement among individuals as defined in collaboration, this study employs ‘co-operation’ as a broader term for the 3Cs processes.

	Co-ordination	Communication	Collaboration
Human-Human mediated interaction	Publishing	Sharing	Creating
Human-Notes interaction	Searching	Retrieving	Exploring

Figure 2.3 Interaction richness model of Notes use modes

Having reviewed the use of Notes in the literature in the nine studies presented earlier, it is evident that seven of these 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 most frequently mentioned sector is consulting (Robertson et al., 2001; Orlikowski, 1993; Karsten and Jones, 1998). The main benefit identified of using Notes is that shared information and knowledge on 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 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). These previous studies have guided the research design of this study. However, this study attempts to take step filling the gap in the literature that the study of Notes use

within SMEs in the context of a developing country has still been neglected. This is because the issue of KM in SMEs may not be a scale-down replica of large firm experiences (Sparrow, 2000), whereas the diversity of cultures and socio-economic conditions were found to influence the use of IT in developing countries (Avgerou and Walsham, 2000; Rohitratana, 2000). The next section discusses the definitions of SMEs.

2.6 Defining SMEs

Many criteria have been used to define the term 'SME' such as employment, turnover, assets, etc. Definitions based on a number of people employed in the enterprise are favoured by researchers (e.g. Levy and Powell, 2000; Sillince et al., 1998; Fink, 1998). This is because the differences in organizational structures occur with size (Storey, 1994). In addition, most SME definitions in different countries tend to consider financial criteria such as turnover and invested capitals. For example, SMEs in the UK are considered as firms with less than 250 employees and turnover not more than £11.2 million (Small Business Service, 2002), whereas SMEs in Thailand are defined as firms with fewer than 200 employees and fixed assets less than 200 million baht (£3m). The definitions based on a number of people employed and financial criteria tend to vary in different economies. However, the main difference of the SME definitions based on quantitative values is likely to depend on the economic situations, differing in developed and developing countries. Dhingra (1991) proposed that developed country SMEs could be viewed as a medium or large-sized firm in a developing country. For example, developed countries such as Australia, Canada and USA define SMEs as firms with up to 500 employees, while developing countries such as Thailand, Philippines and Indonesia adopt the range 100 and 200 employees (APEC documents, 1994).

Since an SME is variously quantitatively defined in different countries, it becomes imperative to qualitatively examine some of the general characteristics of SMEs in order to set internationally accepted definitions of SMEs (Dhingra, 1991). Dhingra proposed the characteristics which will help to explore the particular patterns of international investment behaviour of SMEs as the following:

- Most are owner-managed and are independent in the sense that they are not linked to other firms and groups.
- They operate under a relatively more flexible, personalized management, and informal decision making system.
- They have a limited range of products and/or services.
- They lack a significant position in their domestic market, but in the specific segment of their market, they may have very specialized and/or unique products/know-how and therefore they may enjoy a dominant position as leaders or “differentiated oligopolies”.
- They have a low tolerance for risk and are highly sensitive to changes in social, political or economic conditions.

Since there is a consensus that the firm size is quantitatively measured in several countries, this study adopts the definition of SMEs by using the number of employees and financial criteria. Meanwhile, the qualitative characteristics of international SMEs which distinguish SMEs from large organizations will also be considered to confirm the boundary between the types of organizations in Thailand.

2.7 IS and knowledge management in SMEs

Because of the unique characteristics of SMEs, there is a need to examine whether models of IS adoption in large-business context can be equally applied to SMEs (Thong, 1999). The study of IS in SMEs has been a focal point by a number of researchers (e.g. Levy et al., 2003; Levy and Powell, 2000; Duhan et al. 2001; Fink, 1998; Doukidis et al., 1994). This is because the use of IS is a mechanism by which SMEs can respond to the market effectively (Levy et al., 2003), and SMEs are the foundation of all economies (Fink, 1998). Blili and Raymond (1993) showed that planning IS in SMEs becomes more critical as technology becomes more central to the SMEs’ products and processes, and that planning needs to be integrated with business strategy. There are several factors which drive SMEs to adopt IS. Thong (1999) found that while CEO characteristics (innovativeness and level of IS

knowledge) and innovation characteristics (relative advantage, compatibility, and complexity of IS) are important determinants of the decision to adopt, they do not affect the extent of IS adoption. The extent of IS adoption is mainly determined by organizational characteristics (business size and level of employees' IS knowledge). Cragg and King (1993) found that the strong inhibitors for IS adoption in SMEs are a lack of IS knowledge, lack of managerial time, poor support, and limited financial resources. Therefore, the importance of educational programs and affordable extra-organizational support (e.g. external training and support) and training to increase users' familiarity with computer applications need to be emphasized (Igbaria et al., 1998). Further, external reasons driving IS adoption in SMEs include pressure from customers, competitors, suppliers; external support from vendors or consultants; availability of a solution for a specific IS need; and image issues (Mehrtens et al., 2001; Iacovou and Benbasat, 1995; Woerndl et al., 2005). With regard to the SME context itself, internal factors (e.g. internal infrastructure and controls) and external factors (e.g. highly competitive environments) are likely to drive SMEs to adapt over time to be survival and successful (Schindehutte and Morris, 2001). This leads to adoption of IS which increases survival rates of SMEs, supporting the contention that IS is vital to SMEs (Agarwal, 1998).

According to Corso et al. (2001), SMEs need to improve their products and processes, providing customers with adding value innovation and learning capabilities in order to achieve competitive advantage. This drives SMEs to create, maintain and share knowledge. It has been recognised that SMEs need specific support in KM. Due to their limited personnel and know-how capabilities, KM in SMEs need to amplify human capital (Chattell, 1998). Different approaches have been introduced in order to support and promote KM in SMEs. For instance, Kailer and Scheff (1999) proposed that SMEs need to collaborate with external know-how experts such as training, consulting and research institutions, while Sparrow (1999) promoted the ideas of organizational learning and communities of practice in developing the process of KM in SMEs. The use of IT is perceived to support KM in SMEs. As proposed by Sparrow (1999), SMEs with more advanced IS may be more committed to the principles of KM and more willing to address KM issues. In addition, Thong and Yap (1995) found that business size is the most significant

discriminator in determining the use of IT. However, few studies (e.g. Levy et al., 2003; Sparrow et al., 2000) have emphasized the role of IT in KM in SMEs. Therefore, this study aims to explore the potential of a KM tool, groupware, within the SME context.

2.8 IS in developing countries

Though IS is claimed to offer significant potentialities for organizations, there has been little investigation in developing countries. The implementation and use of IS in developing countries is uncertain. Sahay and Avgerou (2002) noted two key interrelated problems in successful IS implementation in developing countries: “First, many organizations have difficulties in nurturing and cultivating complex technology projects over the long periods of time that are typically required. Second, the resulting ICT-based systems may have little impact on the organizational weakness they were intended to alleviate.” (p.73). Avgerou and Walsham (2000) identified two polarised views towards the relationship between IT and developing countries. The positive view emphasizes the potential of IT from the richer countries to promote the development of the developing countries. Yet, attention is directed to the significance of context, in terms of the diversity of cultures, socioeconomic conditions and the appropriation of technologies by people in their local work situation. For example, Rohitratana (2000) found that when a computer system is introduced and implemented in a Thai organization, the systems can be shaped by the Thai social context. Lind (2000) discussed the high level of unreliability and unpredictability characterizing contexts of SMEs in developing countries, and argued that management information systems must be designed starting from an understanding of how local managers use their experience, insight and intuition to deal with these conditions. Similarly, Volkow (2000) described the ‘ad hoc processes of survival’, driven by a combination of common sense and personal inspiration from the director, carried out by a particular Mexican company over a 20 year period to cope with abrupt and unanticipated changes in its market context. On the other hand, the alternative polarized view focus on “technology transfer” arguing that there is the gap between the assumptions inscribed in the technologies developed in the context of industrialized countries and the social and cultural conditions in the developing countries to which the technologies were being

transferred (Sahay and Avgerou, 2002). As a result, IT transfer can cause damage to the local societies. For example, Malling (2000) discussed how the active externalization of meaning, common in Western countries, and enacted in IS, is not a desired feature in the context of a Nepalese organization.

As suggested by Krishna and Walsham (2005), implementers of IS systems in developing countries need to address the specific contextual characteristics of the organization, sector, country or region within which their work is located. Walsham (2000) pointed out that it is crucial to explore the complexities of specific cultural contexts in developing countries and the way in which these affect the process of IS implementation. Culture can impede the implementation of IS because of differences in the way the systems are interpreted and understood (Robey and Rodriguez-Diaz, 1989). Further, indigenous cultures appear to be an element which make the IS adoption in developing countries different from those encountered in developed countries (Walsham, 2000). For instance, Walsham and Sahay (1999) found that three dimensions of Indian values which are rational decision making, a map-based culture, and coordinated action influence the use of geographical information systems (GIS) created by Western countries. In addition, Krishna and Walsham (2005) found that detailed effort and attention to the involvement of multiple groups, innovative organizational structures, a people-orientation in project selection; and persistence over time, backed by committed and knowledgeable leadership are the main factors for successful IS projects implemented in the state of Andhra Pradesh in India. The study by Thanasankit and Corbitt (2000), for example, has focused on the broad concept of Thai culture and provided Thai systems analysts with a warning about how Thai culture could impact during requirements elicitation, whilst understanding Thai culture should be an emphasis, because Thai culture lies deeper than a simple list of local etiquette (Holmes and Tangtongtavy, 1996).

In addition, Hofstede (1991) categorised society into individualist and collectivist. He explained that “individualism pertains to societies in which the ties between individuals are loose and collectivism as its opposite pertains to societies in which people from birth onwards are integrated into strong, cohesive groups, which

throughout people's lifetime continue to protect them in exchange for unquestioning loyalty" (P.51). By considering this cultural issue, individualism could then be a reason why an incentive structure is needed in those organizations in developed countries which adopt groupware in sharing information and knowledge. In contrast, most developing countries such as Thailand, Malaysia and Indonesia tend towards collectivism. Thus, this cultural aspect may influence how people co-operate with each other through groupware.

This study, therefore, aims to contribute to the literature of IS in developing countries by exploring various factors that influence the interaction between technology and organizations in a developing country.

2.9 Research objectives and questions

Having reviewed the literature, the potential of Notes for KM is found. This study has identified six use modes existing in the previous 9 studies on Notes. However, it was argued that the success of KM depends not only on the technology, but also on organizational context. Therefore, the researcher proposes an exploratory study of the use of groupware for KM within a specific context of developing country firms since there is a paucity of investigation of groupware in such context. Meanwhile, several studies have paid much attention to the use of IT in SMEs since its use can be distinguished from IT adoption in large firms, and SMEs represents a major part of modern economies (Storey, 1994). There has been a need for SMEs to survive in the competitive market, while an IS implementation is necessary. This study attempts to identify the potential of Notes in supporting KM in the context of SMEs by comparing to the large firms in which some similarities of the firms are found. Hence, the research objective of this study are to identify the potentials of Notes to support KM in SMEs in developing countries, and to create a theoretical and practical implications which will help SMEs in developing countries to adopt and utilise groupware as a tool to support KM.

To fulfill the objective of this research, three key research questions are posed.

The first research question is to explore the role of groupware in supporting KM.

RQ1: How does groupware support KM processes?

The second research question is to investigate the impact of contextual factors on the use of groupware for KM. For the purpose of this study, the second research question is phrased as follows:

RQ2: How does the context of the firms in a developing country influence the use of groupware for KM?

The third research question is to explore whether the size of the firm has an impact on the use of Notes for KM in developing countries.

RQ3: How different are the adoptions of groupware supporting KM between SMEs and large firms in Thailand?

2.10 Conclusions

This chapter reviewed the concept of KM. In particular, literature on KM from an IS perspective was emphasized. IT has been considered as a potential tool for KM. Groupware is among those popular tools implemented in organizations and studied in the literature. This study focuses on Notes as a groupware system. Having reviewed the use of Notes, its potential use modes for KM were found. These are publishing, searching, sharing, retrieving, and creating. This chapter, therefore, developed a taxonomy of Notes use modes called ‘interaction richness model’. The model involves all the use modes within the context of different KM processes; notably communicating, co-ordinating and collaborating and their types of interaction which are human-human mediated interactions and human-Notes interactions. According to the structuration model of IT (Orlikowski, 1992), ITs are recognized as products of their time and organizational context and are both an antecedent and a consequence of organizational action. Hence, the implementation of Notes to support KM has to consider the organizational contexts. There is still a paucity of the study of Notes in the context of SMEs in developing countries, whilst

a number of considerations about the influences of context in which IT for KM is implemented have been raised. Therefore, this study aims to explore the role of Notes for KM within SMEs in a developing country.

The next chapter discusses methodology adopted in order to fulfil this study.

Chapter 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology of this study. Methodology refers to “the overall approach to the research process, from the theoretical underpinning to the collection and analysis of the data” (Hussey and Hussey, 1997, p.54). Since there are several methods which can be used in social science, explicitly defining a methodological choice of study is important. In order to justify the methodology employed in this research, the research philosophy adopted needs first to be addressed. Understanding philosophical issues helps to clarify research designs and provide good answers to the questions being investigated in the research (Easterby-Smith et al., 2002; Crotty, 1998).

Section 3.2 discusses research philosophy and its classifications. Then, the research paradigms in IS in particular are identified in Section 3.3 and compared, in order to justify the research paradigm of this study. Section 3.4 provides the research strategy including comparison of strategy choices, justification of the choices, and unit of analysis. Section 3.5 provides details about research site selection and sampling. The method of data collection is explained in Section 3.6 and Section 3.7 offers the data capturing techniques. Section 3.8 deals with the analysis techniques of this study, whilst ensuring validity and reliability, and generalizability of the study are discussed in Section 3.9. A detailed description of each case study is outlined including company background and Notes implementation in Section 3.10. Finally, Section 3.11 provides concluding remarks of this chapter.

3.2 Research philosophy

A research philosophy is a set of basic beliefs and represents a worldview that defines, for its holder, the nature of the world, the individual’s place in it, and the

range of possible relationships to that world or its part (Guba and Lincoln, 1994). Hussey and Hussey (1997, p.47) define 'epistemology' as "the study of knowledge and what we accept as valid knowledge". Epistemology is a general set of assumptions about the best ways of inquiring into the nature of the world (Easterby-Smith et al., 2002). Guba and Lincoln (1994) classified three categories of epistemology guiding research paradigm in social science. First, objectivism is the epistemological view "that things exist as meaningful entities independently of consciousness and experience that they have truth and meaning residing in them as objects, and that careful research can attain that objective truth and meaning" (Crotty, 1998, p.5-6). Second, modified objectivist is the epistemological view "that objectivity remains a regulatory ideal, but it can only be approximated, with special emphasis placed on external guardians such as the critical tradition and the critical community" (Manunta, 2000, p.22). Third, subjectivism is the epistemological view that findings are literally created as the investigation proceeds when the relationship between the investigator and the investigated object is assumed to be interactively linked (Guba and Lincoln, 1994). The acceptance of a particular epistemology leads the researcher to adopt methods that are characteristic of that position (Easterby-Smith et al., 2002).

Ontological assumptions are not addressed separately here because ontological issues and epistemological issues tend to emerge together (Crotty, 1998). Ontology is connected to epistemology informing the research paradigm, for each paradigm embodies a certain way of understanding what is (ontology) as well as a certain way of understanding what it means to know (epistemology) (Crotty, 1998).

Research philosophies can be classified into two main categories based on epistemological and ontological assumptions (Table 3.1), namely positivism and social constructionism or interpretivism (Manunta, 2000; Crotty, 1998; Bryman, 2001; Jankowicz, 1991; Easterby-Smith et al., 2002). Positivism rely on the basic belief that reality is objective and is driven by immutable natural laws, whereas interpretivism stems from the view that 'reality' is not objective and exterior, but is socially constructed and given meaning by people (Easterby-Smith et al., 2002).

	Positivism	Social constructionism
Ontology	Realist- reality exists ‘out there’ and is driven by immutable natural laws and mechanisms. Knowledge of these entities, laws and mechanisms is conventionally summarised in the form of time-and-context-free generalisations. Some of these generalizations take the form of cause-effect laws.	Relativist- realities exist in the form of multiple mental constructions, socially and experimentally based, local and specific, dependent for their form and content on the persons who hold them.
Epistemology	Objectivist- it is possible and essential for the inquirer to adopt a distant, non-interactive posture. Values and other biasing and confounding factors are thereby automatically excluded from influencing outcomes.	Subjectivist- inquirer and inquired into are fused into a single (monistic) entity. Findings are literally the creation of the process of interaction between the two.

Table 3.1 Positivism and Social constructionism (adapted from Manunta, 2000)

3.3 Research paradigms in IS

The research philosophy has developed into a distinctive paradigm over the last one and a half centuries (Easterby-Smith et al., 2002). The term ‘paradigm’ has become popular among social scientists, particularly through the work of Kuhn (1962) in describing the progress of scientific discoveries in practice. To justify the choice of methodology in this study, research paradigms in IS are discussed. Orlikowski and Baroudi (1991) proposed three classifications of IS research paradigms: positivist, interpretive and critical studies. These are presented briefly below:

Positivist IS researchers assume an objective physical and social world that exists independent of humans. The researchers can objectively evaluate or predict actions or processes, but they cannot be involved in judgements or subjective opinion. It is argued that positivism is often found in natural sciences (e.g. Habermas, 1970; Crotty, 1998). Inquiry is assumed to be value free, so that the researcher remains detached, neutral and objective. Positivist research is concerned with the empirical testability of theories in order to discover the general principles or laws which govern the natural and social world (Orlikowski and Baroudi, 1991). Positivist approach may refer to such procedures as those associated with inferential statistics,

hypothesis testing, mathematical analysis, and experimental and quasi-experimental design (Lee, 1991). However, research has shown that the design and use of IS in organizations is intrinsically embedded in social contexts, marked by time, politics and culture. Neglecting these influences leads to an incomplete picture of IS phenomena (Orlikowski and Baroudi, 1991).

Interpretive researchers, on the other hand, argue that the world is not conceived of a fixed constitution of objects, but rather as “an emergent social process, an extension of human consciousness and subjective experience” (Burrell and Morgan, 1979, p. 253). The interpretivist approach is based on an ontology in which reality is subjective, a social product constructed and interpreted by humans as social actors according to their beliefs and value systems (Darke et al., 1998). Accordingly, interpretivist research rejects the notion of value-free research, but it attempts to “understand phenomena through accessing the meanings that participants assign to them” (Orlikowski and Baroudi, 1991, p.5). In exploring IS phenomena, Sahay (1997) proposed that interpretive research does not assume either human actions or technologies to exert direct causal impacts, but consequences are seen to result from the interplay of computing infrastructures, conflicting objectives and preferences of different social groups and the operation of chance. In other words, interpretivists argue that organizations are not static and that the relationships between people, organizations, and technology are not fixed but constantly changing (Klein and Myers, 1999). Furthermore, interpretive researchers assert that the language humans use to describe social practices constitutes those practices (Orlikowski and Baroudi, 1991). Walsham (1995) suggested that human interpretations concerning computer-based IS are of central importance to the practice of IS, and thus to the investigations carried out by IS researchers.

The last paradigm of IS research identified by Orlikowski and Baroudi (1991) is the critical paradigm. The critical perspective is offered to transcend limitations of both positivist and interpretivist view (Chua, 1986). Habermas (1978) argued that the interpretive researcher is unable to evaluate critically the forms of life which he/she observes and is, therefore, unable to analyse forms of “false consciousness” and

domination that prevent the actors from knowing their true interests. Critical perspective, on the other hand, believes that social reality is characterized by objective, real relations which are transformed and reproduced through subjective interpretation (Chua, 1986). Critical researchers, therefore, attempt to critically evaluate and transform the social reality under investigation. It is concerned with critiquing existing social systems and revealing any contradictions and conflicts that may inhere within their structures. However, Putnam et al. (1993) argued that the critical research insights are largely idealistic and despite its theoretical and moral appeal there is hardly much realisation of its missionary goals.

To justify the appropriate paradigm, the structuration model of IT introduced by Orlikowski (1992) has guided this study. As a meta-theory, it informs the researcher about the relationship between humans and IT as discussed in Section 2.2. The present study intends to investigate the interaction between human and technology in a specific context of organizations in a developing country in which the need for detailed understandings of human actions and meanings within specific contexts is emphasized. Therefore, it follows the interpretive paradigm of research because its focus lies on the subjective meanings that human actors ascribe to IT, and the social processes whereby inter-subjectivity is achieved (Sahay, 1997). In addition, the interpretive epistemological approach is dominant in the nine studies of Notes (Table 2.3). For instance, Robertson et al. (2001) adopted an interpretive approach to study more complex interactions between individuals, groupware and organizational context for processes of knowledge creation. Similarly, Hayes (2001) conducted an interpretive case study to understand the opportunities and limitations that surrounded the use of Notes to work within and between the functional, geographic and temporal boundaries that separated employees.

3.4 Research strategy: Case study approach

This section illustrates the research approach adopted in this study. This is defined as ‘a way of going about one’s research, embodying a particular style and employing different methods’ (Cavaye, 1996). The discussion begins with several approaches in IS studies. This section also provides justifications for using multiple interpretive

case studies and identifies some limitations of the case study research as the empirical inquiry method of this research. Since there is a wide variety of approaches applied under the headings of case study research (Cavaye, 1996), the alternatives of case study research as a research approach and its applications in the field of IS needs to be discussed. This section also describes in details how the case study approach has been employed.

3.4.1 Comparing case research with other strategies

The research design of this project is exploratory because of the shortage of relevant previous studies. Rather than aiming to verify pre-defined theoretical constructs concerned with specific issues, this study aims to generate new theories and concepts from the data collected in the field. Hence, the need to use qualitative research methods is emphasized. A number of qualitative research approaches such as action research, ethnography and case study research which focus on understanding social phenomena in their natural setting and cultural context (Myers, 1998) are popular among qualitative researchers. These approaches share one or more of the other characteristics of case research (Cavaye, 1996). It is therefore important to be aware of the similarities and differences of case study research with these related research strategies. Cavaye argued that apart from the shared characteristics, each of these approaches is quite distinct from case research which can be described in turn as follows.

3.4.1.1 Action research

The most quoted definition of action research, perhaps, came from Rappoport (1970: 499): ‘Action research aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework. The distinguished characteristics of action research from case study research are: first, the researcher does not define a research problem and its constructs in advance but allows the problems to be defined by the site (Cavaye, 1996) and second, the social phenomena studied in action research are continually changing rather than static. Action

research and the researcher are then seen as part of this change process itself (Easterby-Smith, et al., 2002).

3.4.1.2 Ethnographic research

Ethnographic research seeks to understand the meaning of phenomena that participants at a site assign to the phenomenon (Sanday, 1979; Van Maanen, 1979). The goal of ethnographic research is to improve our understanding of human thought and action through interpretation of human actions in context (Myers, 1998). The distinguished feature of Ethnographic research includes a longitudinal approach with the use of participant observation (i.e. presence in the field as a participant of at least a year) (Cavaye, 1996). Klein and Myers (1999) also argued that the principle differences between case study and ethnographic research are the length of time that the investigator is required to spend in the field and the extent to which the researcher immerses himself or herself in the life of the social group under study.

3.4.1.3 Case study research

The case study research is the most widely employed qualitative research approach in IS research (Orlikowski and Baroudi, 1991; Myers, 1998), and is well-suited to understanding the interactions between IT and organizational contexts.

A case study is ‘an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident’ and ‘it relies on multiple sources of evidence’ (Yin, 1994, p. 13). Case studies involve the examination of a phenomenon in natural settings. Researchers have no control over the phenomenon, but the scope and time of the examination can be controlled. Case study research is considered to be particularly useful where ‘research and theory are at their early, formative stages’ (Benbasat et al., 1987, p.369). Case studies appeared to be the most appropriate for this study as the researcher is interested in the relation between context and the phenomenon of interest (Pinsonneault and Kraemer, 1993).

Benbasat et al. (1987) proposed three reasons why case study research is a viable IS research strategy. First, the researcher can study IS in a natural setting, learn about the state of the art, and generate theories from practice. Second, the case study research allows the researcher to answer “how” and “why” questions in order to understand the nature and complexity of the processes taking place (Benbasat et al., 1987; Yin, 1994). Third, a case study approach is an appropriate way to research an area in which few previous studies have been carried out.

Although case study approach is useful in the IS field, there are practical difficulties associated with attempting to undertake case studies as a rigorous and effective method of research (Darke et al., 1998). First, it is not possible to generalize case study research findings statistically to a population. Second, during case study research one has no control over independent variables and this may limit the internal validity of any conclusions. Third, case study research may establish relationships between variables, but cannot always indicate the direction of causation (Cavaye, 1996). As a result, case study research has often been considered to be lacking in rigor (Yin, 1994, p.9).

However, having considered the nature and weighted the associated strengths and weaknesses of the case study research approach, case study research is adopted in this study as a research strategy of empirical inquiry. As with other previous studies, the case study research 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 (Eisenhardt, 1989; Benbasat et al., 1987; Orlikowski and Baroudi, 1991; Alavi and Carlson, 1992; Yin, 1994; Stake, 2000; Myers, 1997) and ‘the focus is on understanding the dynamics present in single settings’ (Eisenhardt, 1989, p.534). The decision was based on the following reasons. First, this study aims to answer how Notes supports KM processes and how the context of developing countries influences the use of Notes. This type of research question is pertinent for case study strategy as Yin (1994) proposed that “how” or “why” questions are likely to favour the use of case studies. Second, case study research does not require the researcher to pre-define all variables prior to the

study and this allows the flexibility of variables emerging through the phases of data collection and analysis. Therefore, a number of variables can be analyzed. Such a strength brings advantage to this research since this research is exploratory in nature and it is essential to permit the emergence of new variables during the research process in order to grasp the reality and the complexity of interactions between the users and Notes in the particular context of developing countries. Finally, case study research is also appropriate in the condition where the available literature is limited and existing knowledge is far from mature. In Chapter Two, the researcher identified the gap in the literature where the study of Notes use for supporting KM in the context of developing countries still remains unexplored and exploratory case study serves well to deal with this problem.

Having distinguished the use of case research study from other approaches, further considerations need to be made regarding the type of case study approach to be adopted. The case study is not a monistic concept, but it allows flexibility and individual variation (Cavaye, 1996). There can be disadvantages associated with the use of the case study research approach regardless of the philosophical perspective adopted or the particular way in which the case study strategy is employed (Darke et al., 1998). Therefore, the following section aims to point out the variation of case research study and justify how this study can adopt it as the research strategy.

3.4.2 Case study research epistemology: Interpretive case study

The case study research strategy is particularly well-suited to IS research in general because the technology is relatively new and interest has shifted to organizational rather than technical issues (Benbasat et al., 1987). However, such exploration is not the only reason for applying the case study research. Much of the discussion of case study research within IS has focused on the different philosophical stances which may be adopted, as it implicates the data collection and analysis methods (Cavaye, 1996; Darke et al, 1998; Doolin, 1996). According to Cavaye (1996), case study research can be adopted from either a positivist or interpretive stance. It depends on how the researchers perceive the way in which knowledge is constructed. Case study research from a positivist perspective aims to understand a social setting by

identifying individual components of a phenomenon and explain the phenomenon in terms of constructs and relationships between constructs (Cavaye, 1996). Case study research within positivist perspective is also designed and evaluated according to the criteria of the natural science model of research: controlled observations, controlled deductions, replicability and generalizability (Lee, 1989). On the other hand, case study research in the interpretive tradition can be used to understand the nature of a phenomenon and to elicit meaning from seemingly irrational behavior within a social setting (Cavaye, 1996). Rather than focusing on the repeatability of an explanation, the value of an explanation in interpretive case study research is judged in terms of the extent to which it allows others to understand the phenomena (Walsham, 1995).

As the paradigm underpinning this study is interpretive as identified in Section 3.3, the interpretive case study approach appears to be most appropriate for this research. 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. Walsham also described that from an interpretive position, the validity of an extrapolation from an individual case or cases depends on the plausibility of the logical reasoning used in describing the results from the cases, and in drawing conclusions from them. Similarly, Orlikowski and Baroudi (1991) argued in favour of the use of case studies that the interpretive researcher attempts to derive his or her constructs from the field by in-depth examination of, and exposure to, the phenomenon of interest.

3.4.2.1 Multiple cases

Case studies can involve either single or multiple cases, and numerous levels of analysis. Yin (1994) mentioned that single case studies are appropriate if 1) it is a revelatory case, i.e. it is a situation previously inaccessible to scientific investigation; 2) it represents a critical case for testing a well-formulated theory; 3) it is an extreme or unique case. Single cases allow researchers to investigate phenomena in depth in order to provide rich description and understanding (Walsham, 1995). Benbasat et al. (1987) proposed that a single case used for

exploration may be followed by a multiple case study. Multiple cases are desirable when the intent of the research is description, theory building, or theory testing. Multiple cases allow cross-case analysis and comparison, and the investigation of a particular phenomenon in diverse settings (Darke et al., 1998) which lead to more general research results. Multiple cases can also enable the researcher to verify that findings are not merely the result of idiosyncrasies of the research setting (Miles and Huberman, 1984).

The number of cases to be studied in multiple case design is, however, not predetermined. The appropriate number of cases depends, first, on how much is known about the phenomenon after studying a case and, second, on how much new information is likely to emerge from studying further cases (Eisenhardt, 1991).

Multiple case studies are suitable in the present study because it helps to produce literal and theoretical replication and increase generalization of case study research findings (Lee, 1989; Yin, 1994). In order to achieve replication, cases must be carefully selected to produce similar results (a literal replication) or contrasting results with predictable reasons (a theoretical replication), which provide substantial support for the propositions (Yin, 1994). Due to the fact that this study attempts to develop a theoretical framework in understanding the use of Notes towards KM in organizations in a developing country, multiple cases improve the likelihood of accurate and reliable theory, and investigators may capture new findings existing in the data (Eisenhardt, 1989).

3.4.2.2 Unit of analysis

The unit of analysis identifies what constitutes a case, and a complete collection of data for one study of the unit of analysis forms a single case (Darke et al., 1998). The unit of analysis can be an individual, a group, an organization, or an event (Darke et al., 1998; Markus and Robey, 1988), and it generally informs questions about the appropriate levels of analysis in the social sciences (Markus and Robey, 1988). The research questions inform the selection of the level and scope of the unit of analysis (Darke et al, 1998).

There has been a need for the researcher to determine the unit of analysis most appropriate for the project prior to searching for sites (Benbasat et al., 1987). This is because the unit of analysis provides for sufficient breadth and depth of data to be collected to allow the research question to be adequately answered (Darke et al., 1998) and the unit of analysis needs to be identified in order to avoid problems of inference that arise when concepts are defined and data are collected at units of analysis inappropriate for the theoretical propositions being examined (Markus and Robey, 1988). Markus and Robey (1988) also suggested that it is vital for researchers who study the relationship between IT and organisational change to state explicitly the choice of an appropriate unit of analysis. As identified in Section 2.2, unit of analysis is divided into macro-level and micro-level theories. Each theory reflects research questions, methodologies and conventions for reporting results (Markus and Robey, 1998). However, Markus and Robey (1988) argued that mixing levels of analysis may be useful in research and theory on IT and organisational change because both macro-level theory and much micro-level research tend to ignore human intentions. Mixed-level strategy grounds the concepts of macro-level theory in individual purposes and behaviour.

Mixed level analysis is most appropriate for this study because it allows the researcher to explore the dynamic relationship among individuals, technology and larger social structures (Markus and Robey, 1988). In addition, Leonard-Barton (1990) noted that the research methodology needs to slice vertically through the organization, obtaining data from multiple levels and perspectives so as to understand all the interacting factors. Therefore, multiple case studies in this research project examine both macro and micro levels of analysis. First, analysis at the macro level comprised an exploration of structure and contexts related to organizational activities via Notes. Second, analysis at the micro level will include an understanding of group and individual behavior. The group level included an analysis of how different groups (units or departments in an organization) participate in the use of Notes. The individual level examined how individuals use and perceive the use of Notes. In this case, the experiences of the organizational members were also examined. This multi-level analysis added significant opportunities for enhancing the insights into each single case (Leonard-Barton, 1990; Yin, 1994;

Mohr, 1982). Table 3.2 summarises the type of case study research adopted in this study.

Research concept	Adoption of this study	Example in IS
Epistemology	Interpretivism	Walsham (1995); Hayes and Walsham (2001); Hayes (2001); Jones and Nandhakumar (1993); Karsten and Jones (1998); Bansler and Havn (2004)
Research design	Multiple case	Orlikowski (1993); Horton et al., (2001); Karsten (1995)
Research method	Use of qualitative data: interviews, direct observation and archival document	Orlikowski (1993); Hayes and Walsham (2001); Hayes (2001); Karsten and Jones (1998); Bansler and Havn (2004)
Unit of analysis	Mixed level	Orlikowski (1993), (Hayes and Walsham (2001); Hayes (2001); Karsten and Jones (1998)

Table 3.2 Justified case study research as an approach of this study

3.5 Research site selection and sampling

Having considered the nature of the topic focusing on groupware technology and defined groupware in Section 2.4, the researcher looked for research sites in which Notes was implemented. As the main aim of the thesis is to identify the potentials of Notes to support KM in firms in developing countries, Thailand was chosen as the research context since much Thai culture is distinguished from other countries in which Notes use has been investigated. In the beginning of this research [December 2002], preliminary contacts were made with several SMEs in different sectors in order to find out whether groupware is utilised. No groupware system was found in those SMEs. The choice of industry then influenced the research site selection, however the selection was still based on the study's research theme and objectives.

This study has selected organizations in Thailand with fewer than 200 employees utilising Notes which, in addition, can be described as ‘knowledge-intensive firms’; these are organizations such as R&D labs, high technology and consultancy firms which employ predominantly highly qualified individuals who are engaged primarily in work of an intellectual nature (Alvesson, 1995).

3.5.1 Pilot study

As suggested by Benbasat et al. (1987), a single case may be useful as a pilot study in order to determine the appropriate unit of analysis and familiarise the researcher with the phenomenon in its context. This case may be considered as “drift stage” of case study research proposed by Bonoma (1985) in which the researcher learns first hand the relevant jargon and context in which the phenomenon will be studied. This is a stage in which the context is observed to get a better perspective on modifications necessary to the basic research question in order to ensure fruitful investigation (Van Maanen, 1982).

Before entering the companies which are adopted as the case studies for this study, a pilot study was conducted in a partner of IBM in which Notes has been implemented. The interviews were carried out with 4 managers in the company. The purpose of the pilot study was to investigate whether the company could be used as a case study, to test whether the questions prepared were understandable to the interviewees, and to give the general idea how the system could be used in this business context. The case was later discarded from this research since the large size of company made it unsuitable to the main aim of the thesis. In addition, Notes was implemented throughout the company only as an email platform which did not characterise other features of groupware. However, this study has shaped the focus of fieldwork in other companies in terms of the questions, the selection of interviewees and document collection.

3.5.2 IT company cases

For the purpose of this study, three cases of Notes use have been selected from the

IT consultancy sector. The consultancy sector generally employs highly qualified technologists and relies 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). Therefore, the researcher contacted IBM (as the Notes provider) to seek companies implementing Notes. The three companies which are IBM partners were selected because they are more likely to use the full potential of Notes in order to be a reference for customers, as Notes is one of their products.

The three companies are independent of IBM, but the analysis also investigates whether there are influences of IBM on the use of Notes. The three cases are appropriate for this study because they have similar characteristics in terms of the industry and organizational processes. However, they are different in terms of the structure and management policy.

The first two cases, namely ComNotes and Procom can be considered as Thai SMEs as the companies are independent and their characteristics lie under the definitions of SMEs in Section 2.6. ComNotes sells Notes and its applications as the main products of the company whereas Procom provides both software and hardware.

Having analysed the first two cases, the third case of Comtech was chosen. Comtech is a dependent division of a large IT company selling software. The main reason for adopting Comtech as a case study is because the boundary of the use of Notes and its KM activity is limited to only Comtech. Therefore, the purpose of this case study is to investigate whether the size and dependency of the firm adopting Notes is a matter in influencing the use of Notes to support KM.

As argued by Lee (1989), the theory concerning IS would be generalizable to other settings only on the basis of actually being confirmed by additional case studies that test it against the empirical circumstances of those other settings. Having gained access to all the IT companies, a fourth organization was chosen outside the IT section in order to increase generalizability. Chemhouse (Thailand) is a subsidiary of

a multi-national company in Construction chemicals industry. The purpose of this case study is to investigate the influence of the national context in which the organizational context is controlled by the European headquarters and IS strategy is clearly stated, and whether other industries than IT industry may apply Notes to support KM in which the context is influenced by Thai culture.

Overall, the purpose of the selection of these cases is to compare and explore the impact of organization size as well as other factors such as developing country and organizational contexts on the use of Notes in supporting KM, and ultimately to increase generalizability.

The summary of the characteristics of each case can be identified in Table 3.3

Company	IT industry	Non-IT industry	Size		Organization context	
			Small	Large	Independent	Dependent
ComNotes	X		X		X	
Procom	X		X		X	
Comtech	X		X			X
Chemhouse		X		X		X

Table 3.3 Comparison of the characteristics of cases

As shown in figure 3.1, the four companies can be presented into 2 dimensions. The first dimension describes the boundary of Notes implementation in terms of the number of users involved; small or large group. The second dimension refers to the organization contexts which influence the use of Notes in terms of independent and dependent companies. This classification of the organizational types enables this study to compare the findings across cases.

		Organizational context	
		I	D
Notes implementation	S	ComNotes Procom	Comtech
	L	Pilot case	Chemhouse

Figure 3.1 2 dimensions of the characteristics of cases (I=independent, D=Dependent, S=Small and L=Large)

The fieldwork was conducted in a total of seven months (December 2003 to January 2004, and August 2004 to January 2005). During the course of the data collection, it was decided in the first phase to focus on the two companies in which Notes was utilised throughout the organization. These were ComNotes and Procom. Initial contact with both companies had been made with people in top management, such as the director and manager. After the researcher introduced himself and interviewed the key people, staff of the companies were assigned to introduce the researcher to the users of Notes. The key informants were selected from different functions for interviews subject to their availability. Both companies also provided documentary data such as user-manuals of Notes applications and organization structures, and organization information can be retrieved from their website.

During the second phase of research, the first two cases (ComNotes and Procom) were re-visited for more interviews. In addition, two new research sites were approached. One of these companies, Comtech, is a partner of IBM. The initial contact to this company has been made through a personal contact who works in the company. The researcher was then introduced to other interviewees. The fourth company was Chemhouse which is a construction chemicals company. The initial contact was a manager who assigned a human resource staff to introduce the other interviewees. This company also provided documentary data such as organization structure and information about IT implementation. This section aims to explain the data collection methods used in these companies in detail.

3.6 Methods of data collection

A method is defined as a systematic and orderly approach taken towards the collection of data so that information can be obtained from those data (Jankowicz, 1991). A case study can be drawn from multiple sources of evidence (Yin, 1994). It can include data from archives, interviews and observation (Leonard-Barton, 1990). As proposed by Jick (1979), triangulation, using different data collection methods within one study, ensures that occurring variances do not result from a single chosen method. The data collection may be inseparable from data analysis and interpretation as this study does not have a predefined constructs, but allows the new theme to emerge from the data. However, a separation is made here simply to allow a presentation of the data collection techniques that were employed in this study.

“Unlike the physical reality such as atoms and molecules examined by natural science, people create and attach their own meanings to the world around them and to the behaviour that they manifest in that world” (Schutz, 1973, p.59). Therefore, interpretivist researchers are urged to collect facts and data describing not only the purely objective and observable aspects of human behaviour, but also the subjective meaning this behaviour has for the human subjects themselves (Lee, 1991). This leads to the adoption of the different ways in which qualitative data can be collected in this study.

3.6.1 In-depth interviews

Interviewing is one of the most common and most powerful ways that have been used to try to understand human beings (Fontana and Frey, 1994). Interviews are “essential sources of information for case study research” (Yin, 1994, p.84). Walsham (1995) contended that interviews are the primary data source, since it is through this method that the researcher can best access the interpretations that participants have regarding the actions and events which have or are taking place, and the views and aspirations of themselves and other participants. Interviews were conducted with different people in the research sites of this study in order to extract valid and reliable data from interviewee in response to conversational questions which allows the researcher to find out interviewees’ historical perspective (Rubin

and Rubin, 1995) and what they feel and how they use Notes. Whereas interpretive researchers try to elicit interviewees' views of their worlds and their work (Rubin and Rubin, 1995), interview helps uncover the meanings people attribute to their experiences and social worlds (Miller and Glassner, 1997). The degree of interaction between the researcher and subjects depends on whether the interviews are structured or unstructured. The lower the degree of structuring of the interview, the more chance the researcher may have to explore the respondent's answers and to assess their trustworthiness and non-standard use of terms (Nandhakumar and Jones, 1997). Fontana and Frey (1998:56) described the difference between structured and unstructured interviews: "the former aims at capturing precise data of a codable nature in order to explain behaviour within pre-established categories, whereas the latter is used in an attempt to understand the complex behaviour of members of society without imposing any a prior categorisation that may limit the field of inquiry."

This study employed the semi-structured format as it is used when the interviewer introduces the topic, then guides the discussion by asking specific questions (Rubin and Rubin, 1995). Semi-structured interviews also give the opportunity to direct the discussion. According to Easterby-Smith et al. (2002) semi-structured interviews are appropriate methods when it is necessary to understand the constructs that the interviewee uses as a basis for her opinions and beliefs about a particular matter or situation. In addition, semi-structured interviews provide opportunities for the staff to elaborate their experiences and to express their opinions in a manner that is not permitted by the pre-established interview questions. By this technique, the researcher was able to capture what he set out to explore with the established questions, as well as minimise the restrictions on grasping other rich interpretations within the topic of investigation. The researcher established a set of questions for different staff (Table 3.4) that related to the theoretical framework of this study (See Appendix for pre-arranged interview questions).

Interviews with	Purposes
Director of the company	To understand the background of Notes use and the broad view of Notes use within and across the organization.
Managers of different departments	To understand the use of Notes within group/departments and between groups/departments of the company.
Notes users in different departments	To understand how individual uses Notes and their perceptions towards Notes.
Notes developers of the company	To understand the technical background of Notes implementation and use in the company.

Table 3.4 Purposes of different interviewees

Identifying the interviewees in each case, in which the decision on what data to collect next and where to find it was based on theoretical relevance of the data in relation to the emerging concepts from data. As Glaser and Strauss (1967) suggested, “beyond decisions concerning initial collection of data, further collection cannot be planned in advance of the emerging theory. The emerging theory points to the next steps-the sociologist does not know them until he is guided by emerging gaps in his theory” (Glaser and Strauss, 1967, p.47). The process of identifying and selecting interviewees was not entirely controllable but largely dependent upon the interviewees’ own personal networks and their function in the organizations. In each interview session, the researcher was constantly introduced by the interviewee to new people seen as appropriate for the interview objectives from the point of view of the interviewees. Most of them were their friends, colleagues, and previous and current business partners. Therefore, the researcher could efficiently find new candidates to interview. Overall, the total number of interviews was forty (Table 3.5). Each interview was 45-90 minutes long. All the interviews were tape-recorded and transcribed and then translated into English. Further, informal conversations and discussions with the interviewees and other staff were conducted during each visit to the research sites.

In each interview session, the researcher explained to the interviewee the objective of the research and pointed out the benefits to the organization participating. The

researcher also asked for the interviewees' contact details in order to keep contact once further data is needed. The interviews took place in the office, a meeting room, or even outside the company. The interviews in the interviewees' office gave the researcher the chance to observe the characteristics of workplace and Notes systems; however the interview in the office was sometimes distracted by other people in the office, and also leads to poor quality of record. After the researcher familiarised himself with the workplace, interviews in a meeting room were conducted. The interviews in a meeting room allowed for a more formal way for interviewing and a good quality of record. Some interviewees proposed to have a meeting outside the company since they were always away or busy in their office. The researcher started to analyse the interview records and field notes simultaneously as the process of data collection was conducted in order to modify data collection instruments such as changing and adding interview protocols, and even cases to gain more insights and information about the focal issue.

Company	Participants involved	Phase			
				Sale admin	2
ComNotes	Managing director	1		Pre-sale consultant	2
	Sales & Marketing director	1		Sale manager	2
	Assistant sale manager	1		Sale consultant	2
	System Administration supervisor	1	Total Procom's interviewees 12		
	Customer Services manager	1	Comtech	Account executive (sale) 1	2
	Customer Services supervisor	1		Technical consultant (Developer)	2
	Software development supervisor	1		Account executive (sale) 2	2
	Software development staff 1	2		Technical consultant (Developer)	2
	Software development staff 2	2		Technical specialist (infra)	2
	Customer Services staff	2		Technical specialist (infra)	2
	Sale staff	2		Technical specialise (support & MA)	2
	Marketing staff	2		Support manager	2
	System Administration staff	2	Total Comtech's interviewees 8		
Total ComNotes's interviewees 13			Chemhouse	Finance manager	2
Procom	Operation diirector	1		Human resource manager	2
	Assistant software consultant manager	1		Personnel supervisor	2
	Software consultant	1		Operation manager	2
	Marketing director	2		IT supervisor	2
	Marketing coordinator	2		Lab manager	2
	Director's secretary	2		Purchasing manager	2
	System support engineer	2	Total Chemhouse's interviewees 7		
	Senior service engineer	2	Total	40	

Table 3.5 The list of the informants

3.6.2 Archival documents

Archival documents can be described as “documents made or received and accumulated by a person or organization in the course of the conduct of affairs and preserved because of their continuing value” (Ellis, 1993, p.2). The common types of archival documentation used by researchers include meeting minutes, chairmen’s statements and public speeches, memos, briefing and policy papers, correspondence files such as emails, staff records and financial statements (Armstrong and Jones, 1987).

This study collected archival documents such as website, company brochures, company newsletters, organization charts, and IT manuals. Such documents can be used to increase familiarity with the research site, and some information can be easily accessed and may not be available in spoken form (Hodder, 1994). In addition, it also helped the researcher to spend the valuable time in the interviews for only information that cannot be obtained in any other way (Darke et al., 1998). This review of papers and electronic documents also supported the other methods in several ways. The researcher accessed the website of the organizations prior to the interview in order to understand the context and history of the organizations. Further, documents provide longitudinal data identifying the histories of the development of organizations, and thus allow the researchers to understand how organizations function (Atkinson and Coffey, 1997). Useful sources such as internal magazines and other organizational bulletins can supplement information obtained from other sources and often reflect the culture within an organization and the issues which are currently of interest or concern to both management and employees (Darke et al., 1998). Archival documents are not distorted by the effect of social interaction occurring in interviews due to its ‘unobtrusive’ and ‘non-reactive’ nature of data (Welch, 2000). As a result, archival documents are needed to complement, strengthen and challenge data gained from interviews.

However, Hodder (1994) argued that there is no “original or true” meaning of a text outside specific historical contexts, as the text is reread in different contexts it is given new meanings, often contradictory and socially constructed. Thus, it is

important to approach them as texts which are constructed according to conventions that are themselves part of a documentary reality (Atkinson and Coffey, 1997). Atkinson and Coffey proposed that a dense network of cross-referencing, and shared textual formats, creates a powerful version of social reality. In addition, texts should be used alongside other forms of evidence so that the particular biases of each can be understood and compared (Hodder, 1994). Table 3.6 exhibits the archival documents collected from each company.

Company	Documents collected
ComNotes	Company website (25 January 2004)
	Organization chart
	Sales application user manual
	Call log application user manual
Procom	Company website (25 January 2004)
	Organization chart
Comtech	Company website (12 October 2004)
	Organization chart
	Marketing brochures
Chemhouse (Thailand)	Company website (2 November 2004)
	Organization chart
	IS newsletter (No.2 July 1999)

Table 3.6 The list of collected documents

3.6.3 Direct observation

Observation can be defined as “the act of noting a phenomenon, often with instruments, and recording it for scientific or other purposes” (Morris, 1973, p.906). Observation is appropriate for case study research because it yields personal experience of the research context under ‘normal’ conditions and to observe processes continuously over time (Nandhakumar and Jones, 1997). Observation may also lead to the emergence of a theory instead of working with predetermined categories (Adler and Adler, 1994) because observation has the flexibility to yield insight into new realities or new ways of looking at old realities (Kidder, 1981).

Observation can be classified to two roles ranging from the passive participant, to the active participant (Adler and Adler, 1994; Nandhakumar and Jones, 1997).

Passive or direct observation means that the researcher is present at the research site and not involved in the setting (Yin, 1994), whilst active or participant observation means that the researcher becomes more involved in the setting's activities, assuming responsibilities that advance the group, but without fully committing themselves to members' values and goals (Adler and Adler, 1994). This study adopted the direct observation approach. Direct observations, of how staff use Notes for example, could be made throughout a field visit, including those occasions during which other evidence is being collected (Yin, 1994) so as to provide further insights into the functions of Notes applications. As the researchers do not direct or impose their views on the participants observed, thus there is "non-interventionism" (Adler and Adler, 1994), which is considered to be the main strength of the direct observation.

Observation was mixed with the interview methods in this study, as Barley and Kunda (2001, p.84) supported, that although the interviews are especially useful for "understanding how people make sense of their work and the issues they believe are important," they are, however, "not credible sources of information on what people actually do or how they do it". Therefore, the use of Notes and other tools at each site was observed in a mode that had the user "talk through" their various applications and their functionalities as the author asked them to demonstrate how they use the system during the interviews. The researcher also observed the context in which Notes was implemented in addition to what the interviewees described about their work place. In this way, he was able to gain first-hand knowledge about the system and its use in the organizational context.

3.7 Data capture and recording

Audio tape recording of interviews was undertaken with participants' permissions since recording takes up a substantial part of fieldwork. It allowed the researcher to gain large amount of data; however, much effort was spent on transcribing. Strauss (1987) advised recording especially when the research aims demand accuracy of wording. All interviews were, therefore, tape-recorded, since it was impossible to

know in advance the importance of an interviewee's responses in relation to the research objectives.

In order to ensure that the interviewees would not mind the researcher using the tape recorder, the researcher asked the interviewee whether the tape recorder can be used during the interview prior to each interview, as well as told them that the tape recorder could be turned off at any stage of the interview if they become uncomfortable about expressing their opinions with its presence. The researcher found that most interviewees were very relaxed and communicative over the interviews. Therefore, the audio tape recording became the main procedure of data capturing in this study.

In addition to audio tape recording, field notes were continuously used as it is the medium for recording observational data. Field notes were taken during observation soon afterwards to preserve episodes and contextual settings (Morse, 1994). Field notes were also used to capture the data from informal conversations and discussions.

3.8 Data analysis techniques

As this study follows the interpretivist perspective, the analysis in interpretive studies in IS aims to produce an understanding of the contexts of IS and the interactions between these systems and their contexts (Darke et al., 1998). Therefore, qualitative techniques are adopted to analyze the data in this study. Qualitative analysis techniques seek to make convincing sense out of the data, requiring "detailed, intensive, microscopic examination of data in order to bring out the complexity of what is in those data" (Strauss, 1987, p.10). The researcher started to analyze the interview records simultaneously with the ongoing data collection process. The data was not directly analyzed on the written form, however the analysis of the researcher during the data collection processes had an impact on how the interview protocols could be changed and directed to the interviewees as the researchers adopted semi-structured interview methods. Such analysis has enabled

also the researcher to add new cases to gain more insights and information about the focal issue. As argued by Miles and Huberman (1984), data collection and data analysis should overlap to allow for flexibility in data collection procedures and so that the researcher remains open to new ideas or patterns which may emerge. The analysis throughout the data collection processes also helps the author to justify how much data needs to be collected. The data collection ended when the study reached theoretical saturation in which the research questions could be answered. Even if the data collection and data analysis processes are inseparable in this study, the following section aims to illustrate more procedural analysis techniques adopted.

After finishing the data collection processes, the analysis of this study has been divided into 2 phases in order to answer the research questions. In the first phase, the analysis began with the within case study analysis in which the background of the company and Notes implementation were characterised. Then, the researcher has identified the use modes in each case in order to understand how each organization has employed Notes to support KM. This was to give an overview of the functionality of Notes in the case studies. This phase involves a deductive approach guided by the conceptual framework developed earlier in Section 2.5.2. In the second phase, the analysis aimed to find the reasons underlying the use of Notes for KM in each organization. This phase took an inductive approach in which the data is speaking for itself and the researcher is helping this process by way of systematically analysing, comparing questioning and allowing concepts to emerge (Whiteley, 2004).

This study follows the qualitative analysis technique suggested by Miles and Huberman (1984) who described data analysis as consisting of three concurrent activities, which are data reduction, data display and conclusion drawing/verification. The first two activities were used in the first phase of analysis. However, this study also follows the suggestions of Miles and Huberman (1984) that qualitative data analysis is a continuous and iterative process in which each activity follows each other. Data reduction refers to the process of selecting, simplifying, abstracting and transforming the raw case data. The researcher decides which data

chunks to code within each research site in connection with the use modes identified in the conceptual framework. The author also converted the data into ranks, namely low medium and high, for the sake of comparison among the different cases. Data reduction leads to new ideas on what should go into data display. Data display refers to the organized assembly of information to enable the drawing of conclusions. Data displays include narratives, matrices, graphs, tables and various charts. The reasons of why Notes is used to support KM in such contexts were also coded in order to find a main theme in the next phase of analysis. Having illustrated the whole picture of the use of Notes in individual case, cross case comparison of the Notes use mode are conducted in order to investigate the similarities and differences of the use modes among the cases. Comparison across cases relies on relating variability in context to constancy in process and outcomes (Pettigrew, 1985) using the logic of literal and theoretical replication (Lee, 1989; Yin, 1989). The purposes of cross case comparison in this study are to understand the meaning of use modes to the different organizations, their implications to the organizations and individuals as far as KM is concerned. Where appropriate, presentation of data in tabular form acts as a useful means of summarising and compressing data. It also facilitates comparisons either between cases or between features or aspects of a single case (Darke et al., 1998; Miles and Huberman, 1984).

Having compared the use of Notes in the different organizations, in the second phase, the study aimed to explore why and how Notes is used to support the processes of KM and what aspects of the organizational contexts in developing countries influence the use of Notes for KM. At this stage, this study utilized grounded theory.

The grounded theory approach comprises a set of analytical processes which aims to develop theory from data (Charmaz, 1995). Thus, grounded theory is widely employed and can be very helpful in analysing qualitative data where there is no or limited theory (Hussey and Hussey, 1997). As an interpretive approach which emphasizes the social construction of reality through the communicative action of human is adopted, grounded theory is an appropriate technique for this study. This is

because data is derived from the concepts and categories used by social actors themselves to interpret and organize their worlds rather than forcing data within deductively derived assumptions and categories (Jones, 1987). Grounded theory has been developed in many different ways (e.g. Glaser and Strauss, 1967; Glaser, 1978; Strauss, 1987; Strauss and Corbin, 1990). It is argued by Darke et al. (1998) that several techniques of Miles and Huberman (1984) are similar to those of grounded theory. These include coding of data segments into categories identified from the study's initial conceptual framework or hypotheses, subsequent pattern coding to identify patterns or repeatable regularities in the data, and making notes as a step towards producing a conceptually coherent explanation of the phenomenon being studied. Therefore, this study follows the third activity of data analysis, conclusion drawing/verification as this was suggested by Miles and Huberman (1984) as it concerns the emerging or inducting of meanings from the data and testing for their plausibility, their sturdiness and their validity. Conclusion drawing/verification involves drawing meaning from data and building a logical chain of evidence (Darke et al., 1998). From the first phase of data analysis, the reasons of why Notes is used to support KM in the different organizational contexts were coded. However, initially the conclusions were still vague and incomplete at first. Therefore, the analysis then uses Miles and Huberman's (1984) technique for across-site pattern comparison which involves the specific use of Notes in each organization, enablers and inhibitors for use and its impacts.

This study then attempts to place the findings in the context of relevant literature. Whiteley (2004) proposed 'theoretical sensitivity' where researchers need to "gather evidence from established theory that confirms, refutes or challenges the story that is being uncovered" (p.32). This phase of analysis is considered to be an inductive approach as the theory is 'directed' by respondents through their responses (Whiteley, 2004).

The next section will discuss validity, reliability and generalizability of this study.

3.9 Ensuring validity and reliability and Generalizability of the study

Many scholars have noted the threats to validity and reliability in qualitative research and provide suggestions on how to overcome or mitigate the impact of such threats (e.g. Kirk and Miller, 1986; Hammersley, 1992; Miles and Huberman, 1994; Silverman, 2001). From an interpretive perspective, validity reflects the extent to which a researcher's account accurately or faithfully represents the social phenomena that it seeks to describe, explain or theorise (Hammersley, 1992). Reliability, on the other hand, is defined as "the degree to which the finding is independent of accidental circumstances of the research" (Kirk and Miller, 1986, p.20). Reliability reflects on the transparency in how meaning is drawn from the raw data (Easterby-Smith, 2002). This section discusses the strategies which are used to deal with the threats to validity and reliability.

In designing research, multiple case studies were adopted to enhance the validity of research. Multiple case studies allowed not only greater representativeness but also variation across cases. As argued by Walsham (1993), the validity of the inferences drawn from one or more cases does not depend on the representativeness of cases in a statistical sense, "but on the plausibility and cogency of the logical reasoning used in describing the results from the cases, and in drawing conclusions from them" (p.15). The use of multiple sources of data (triangulation) was employed in this study as a strategy for data collection. Data triangulation (Easterby-Smith et al., 2002) was achieved by collecting data over different time frames or from different sources, and mixed methods of data collection, including interviews, observation and archival documents were employed. Ensuring the accuracy of data capture is critical to the reliability of any study. Audio tape recording of all interviews and writing of observation notes enhanced data credibility in this research. Documentary data from all sources were collected and copied.

In ensuring the credibility of data analysis, this study employed multiple data coding which allowed the researcher to first absorb the data and then to refine the emerging concepts in the next coding. As the codes emerge progressively during data

collection, the first preliminary analysis of interview and observation data was completed within the 24-hour rule (Gioia and Thomas, 1996) to get the most data closeness. Respondent validation was conducted prior to the beginning of the second research site access. Respondent validation took the form of feedback where the researcher sent a report from the first visit to the research site for comments. As suggested by Reason and Rowan (1981), good research goes back to the subjects with tentative results, and refines them in the light of the subjects' reactions. Strauss and Corbin (1998) also suggested testing and checking major propositions of the emergent theory against understandings and experiences of hosts as a validity-enhancing course of action.

Generalizability of research is a quality describing a theory that has been tested and confirmed in a variety of situations (Lee, 1989). The notion of generalizability is similar to the traditional definition of external validity (Easterby-Smith, 2002), which refers to the degree to which findings can be generalized across social settings (Bryman, 2004). Generalizability has been a main critical issue of research in interpretive tradition (Walsham, 1995; Darke et al., 1998). However, Walsham (1995) contended that generalizability in social sciences should be viewed as 'tendencies', which allow "explanations of particular phenomena derived from empirical interpretive research in specific IS settings, which may be valuable in the future in other organizations and contexts" but are "not wholly predictive for future situations" (p.79). Walsham also summarised four types of generalizations, namely developments of concepts, generation of theory, drawing of specific implications and contribution of rich insight. Table 3.7 illustrates those types of generalizations.

Type of generalization	Examples in IS literature
Development of concepts	Zuboff (1988) developed the concept of 'informat' which can be part of a broader network or an integrated clustering of concepts.
Generation of theory	Orlikowski and Robey (1991) constructed a theoretical framework concerned with the organizational consequences of IT which could be used to guide studies in the area of systems

	development and the organizational consequences of using IT.
Drawing of specific implications	Walsham and Waema (1994) provided implication such as the relationship between the design and development process and business strategy.
Contribution of rich insight	Suchman (1987) discussed the problems of human-machine communication. She developed various concepts and theories about human-machine interaction which provide a rich insight on a wide range of topics, including the limits of machine intelligence, the inherent differences between plans and practical actions, and the need for more thoughtful machine design.

Table 3.7 Four types of generalizations and examples from IS case studies (Source: Walsham, 1995)

As the analysis in this study derives from the explanation of the phenomena based on the interpretation of data, this research does not aim to use the case study to validate or statistically test a theory or hypothesis. However, the potential to arrive at generalizability based on these directions of generalization by Walsham (1995) is considered in this study. This study aims to provide a framework for understanding the use of groupware for KM in general as Notes should characterise the features of other groupware systems. In particular, it offers implications of the use of Notes for KM in knowledge intensive firms. In addition, the use of Notes in the specific context of organizations in Thailand can offer a wide range of implications to the use of groupware in similar cultural contexts in developing countries, rather than to provide applicable findings to the global context, though lessons could be learned for managing groupware systems in the global context.

3.10 Case study background

As this study focuses on the relation between context and the use of Notes to support KM, each case study is outlined here including company background, and Notes implementation. All company names are pseudonyms but none of the other

identification characteristics have changed. The description below is subjected to detailed analysis in the chapters that follow.

3.10.1 ComNotes case

ComNotes background

ComNotes is one of IBM's distributors in Thailand. The company provides business solutions based on 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 Notes developer. With around 30 highly experienced members who are specialised and dedicated to Notes Technology, ComNotes is now regarded as one of the leading Notes specialists in Thailand.

ComNotes's aim is to assist its 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 (Company's website). Its customers are varied from international enterprises to SMEs both in Thailand and neighbouring countries.

ComNotes structure has been divided into three departments (Figure 3.2 organizational chart), Sales & Marketing, Technical Support, and Customer Services. The Sales & Marketing department is responsible for getting to know customers' requirements and maintaining customers' satisfaction. The Technical Support department integrates two responsibilities, System Administration and Development. The role of System Administration is to implement the system and settings for customers in 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.

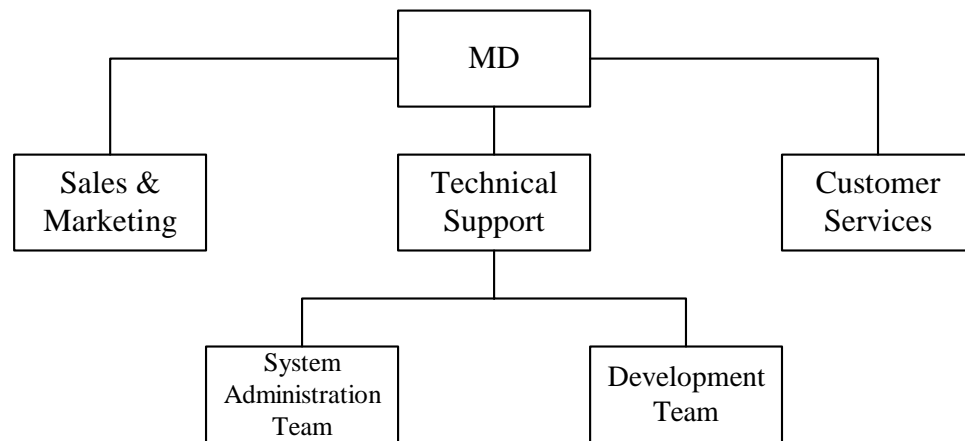


Figure 3.2 ComNotes: organizational chart

Notes implementation

Notes has been implemented throughout the company since this was founded by the director. Simultaneously however to Notes, SameTime, an IBM e-messaging application that enables synchronous communication, has been implemented to enable communication between employees in the Head office and a branch in Cambodia. In general, users of both Notes and SameTime are authorised to access and share the same resources in most of the databases. However, some applications are designed to meet the needs of different departments. The purposes of such applications (Sales application, document library, call log and application control) in the three departments are described as follows:

The sales application of Notes is used in the Sales & Marketing department. This application is mainly implemented in the department for daily sales planner, sales activity tracking, sales policy and document repository, and mobile access to information such as customers' details and requirements.

A document library is the standard KM database which is utilised by the Technical Support department to support their activities. Technical knowledge is maintained on the document library and categorised for several purposes such as programming scripts, security, troubleshooting, and software specifications. This recorded knowledge is based on employees' direct experience or is found in external

resources (e.g. website, interactions with customers). The document library acts as a roadmap for all members. The staff can learn from what others have experienced or found from other sources. Moreover, the document library is regarded as ‘the centre of information’ where staff take notes in and remind themselves.

The call log and application control application of Notes is designed for the Customer Services department. It is utilised for maintaining information in order to support the customers. Calls from customers kept in call log can be identified into two main categories. The first category monitors how many errors occurred with the applications launched to customers. The second category, the call log, maintains the complaints from customers in order for company to assess customers’ satisfaction, why the customer complained, or used for calculating charge rate for the next service. Systems other than Notes were not implemented in ComNotes. Figure 3.3 shows the user interface of ComNotes document library.

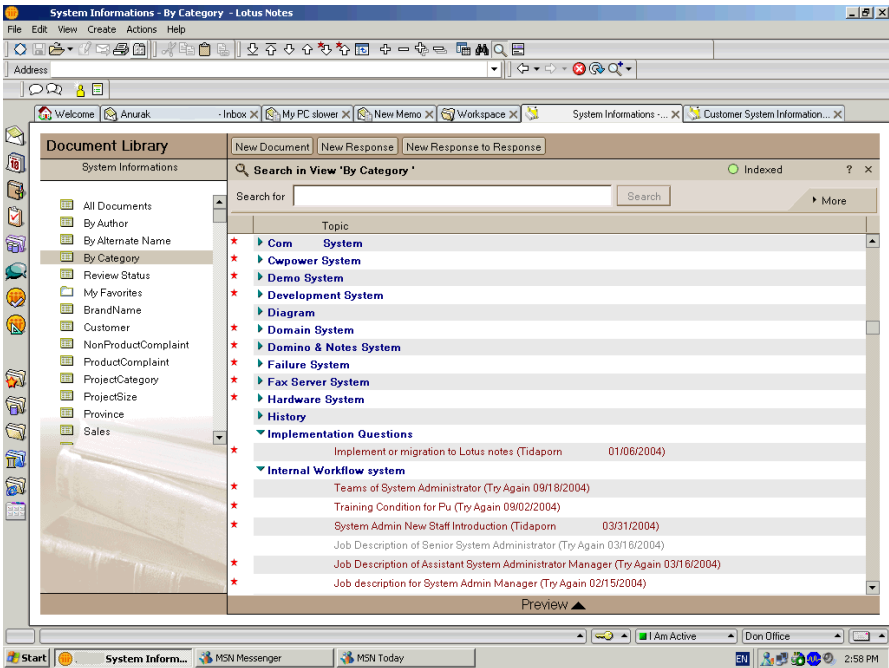


Figure 3.3 User interface of document library employed in ComNotes

3.10.2 Procom case

Procom Background

Procom is another IT organization founded in 1989. It provides hardware, software and integration services to satisfy all types of business needs. Procom customers are from various industries such as manufacturing, finance and securities trading, and education. It maintains a high standard in these areas at all times for the benefit of customers; including a determined and consistent investment in hardware and software development, and customer support. Procom represents a complete range of hardware from several vendors. This broad product line ranges from powerful workstations ideal for mechanical design to mission-critical symmetric multiprocessing (SMP) servers for solutions such as ERP, CRM, transaction processing, and Web serving. Procom also provides PCs, servers and storage systems and networking solutions from Cisco and Intel to complete a solution for its customers. Procom supports a wide range of software products to help customers implement IT infrastructure. It offers solutions such as Lotus Notes for communication and document management; Cognos for business intelligence solutions; and LANSA for application development.

Procom's hardware and software offerings are complemented by a complete range of services. Services such as installation and setup of software and hardware, network cabling, and configuration are complemented by a complete range of educational services for advanced systems.

Procom employs forty staff. The company is divided into two main departments (Figure 3.4 organizational chart), Operations and Sales & Marketing. The Operations department comprises of Systems Engineering and Technical Support, Purchasing and Administration, Presale and Support and OA products. The Sales & Marketing department includes Presale and Support, hardware and software Sales and Administration. Responsibility of the Operations department is to implement the solutions for the customers and support customers after implementation, whereas Sales & Marketing promotes products and services and acquires customers' requirements.

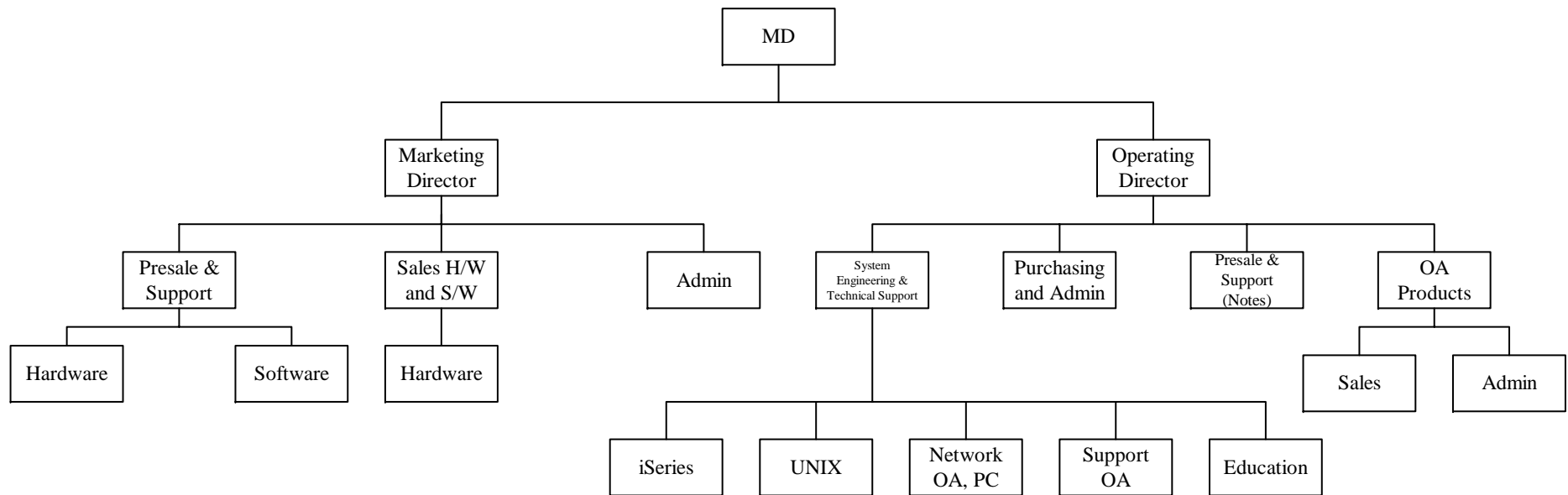


Figure 3.4 Procom: organizational chart

Notes implementation

Notes was implemented in Procom in 1998 as Procom is a partner of IBM (Thailand). Hence, the company has the privilege of utilising the system for free. The main purpose behind Notes being implemented was to enable the staff to use Notes and to become a site reference for the customers. At the beginning, Notes was initially used by only the heads of departments and Notes support team. However, since 2000 Notes has been used by every staff at Procom as the email feature on Notes has become the main communication tool. In addition to this email feature, Notes databases are utilised differently in the two main departments for different purposes. In 2001, a KM database was employed by the System Engineering and Technical Support unit for maintaining solutions so as to help staff resolve technical problems and to better advise customers. A service record application is used to report the activities of each member in the Operations department. In 2004, a sales application was mainly employed for sale tracking in Sales & Marketing. This is to keep customers' contact name and details, activity and appointments with the customers, status of projects and history, whether and why a project has failed so that the Marketing director can improve sales and marketing. In addition, the purpose of this application is for top management to see salespeople's activities and prospects about customers.

3.10.3 Comtech case

Comtech background

Comtech is an organization that belongs to the software business group of Thaitech. Comtech was set up to serve a comprehensive infrastructure technology and solution ready for online business that can help its customers optimise their core business, better serve their customers and approach a new market at all time. In particular, it provides software solutions and IT consultancy services for better operation efficiency, for example, backup solution, database management, document management, solutions for e-business operation, web application, e-mail, software for network security, solutions for corporate IT management or system management, outsourcing service, and training for IT (Company's website). The products of Comtech are mainly non-Microsoft. The latter are provided by another team in the

software business unit. For its consulting services, Comtech develops solutions for different industries and work processes. The main clients that Comtech is targeting are ranging from small to large enterprises, and financial institutions.

Comtech comprises around fifty members within three main functions; Sales & Marketing, Infrastructure and Developers. Infrastructure is responsible for network and anti-virus software. The Infrastructure team can be divided into 4 sub-teams which are Operating System (OS), Network, Application, and Support and Maintenance (Support & MA). The team of OS, Network and Application focus on implementation systems for customers, whereas Support & MA follows and supports customers after implementation. The Developers team is responsible for developing applications on Notes and other IBM products such as web portal. The Infrastructure and Developers teams also work as a support team including both pre-sale and after sale services. The Sales & Marketing team is responsible for promoting its products and services, and getting customers' requirements.

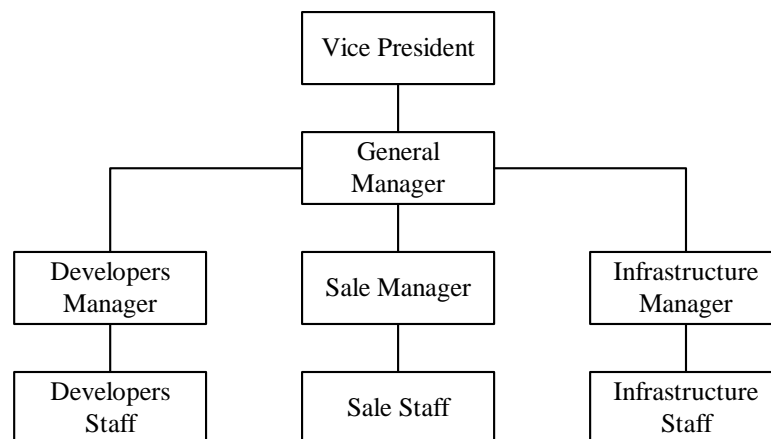


Figure 3.5 Comtech: organizational chart

Thaitech background

In this section, some information about the parent company is provided. Thaitech Corporation is a large IT company in Thailand. Thaitech was founded in 1986. Since then, Thaitech has expanded its business to offer fully integrated IT solutions & services, covering a wide range of the world's leading IT products namely IBM, HP,

Canon, Microsoft, Lotus, Oracle etc. In 2003, Thaitech was certified ISO 9001:2000 Quality Management System by performing good business process and service level to international standard. Thaitech is subdivided into three business units, namely hardware group, software group and office supply group. Comtech belongs to the software group, which are divided into Microsoft and non-Microsoft products. Figure 3.6 illustrates the structure of Thaitech.

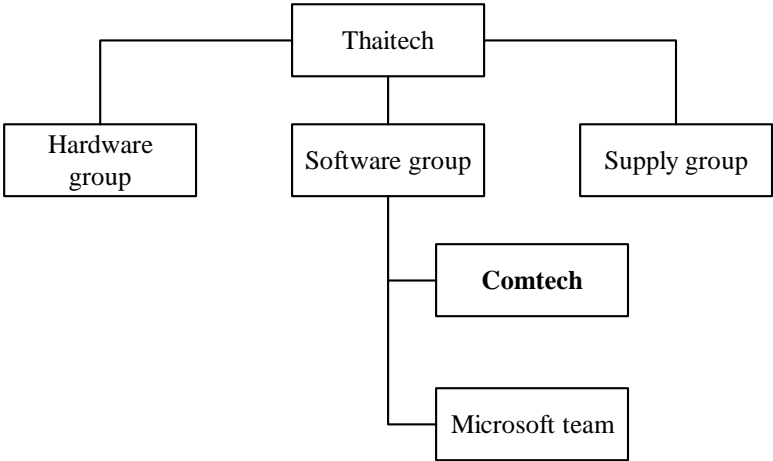


Figure 3.6 Thaitech structure

Notes implementation

In 1999, Notes was implemented in the Comtech business unit of Thaitech only since it is responsible for IBM software and products other than Microsoft’s. Comtech has a free license of Notes from IBM as Comtech is one of the partners. The initial purpose of Notes implementation was for Comtech to test and familiarise itself with Notes. Since then, Notes has mainly been utilised for email communication. Notes is maintained, developed and designed by the administrator within Comtech. Several Notes applications have been designed and employed in different functions of Comtech. The “Sales application” is utilised in the Sales & Marketing department in order to initiate the processing of orders. The “Sign-off” project application is used by the implementation team to record the status of work done for customers. The “Work order” application consists of a database of customers and is used by individuals or teams to inform their visits to customers’ site and to facilitate meetings among Comtech staff. This is also useful for other

staff to track customers when the one who is responsible for is away. The SameTime application is also used to facilitate intra-organization communication. A “Customer quiz” database is utilised for Support & MA. It is used to record information about customers, their problems, the person who picks up the phone, time of call and solution status. In 2003, the general manager initiated the plan for KM. The reason was that Comtech has to maintain ISO 9001 standards in providing central information about customers’ requirements and work process status. KM databases were then implemented and utilised by all the functions. Each function has its own KM database. The KM databases are also accessible within different functions. Systems other than Notes were not implemented in Comtech. Figure 3.7, 3.8, 3.9 and 3.10 illustrate user interface of various Notes applications utilised in Comtech.

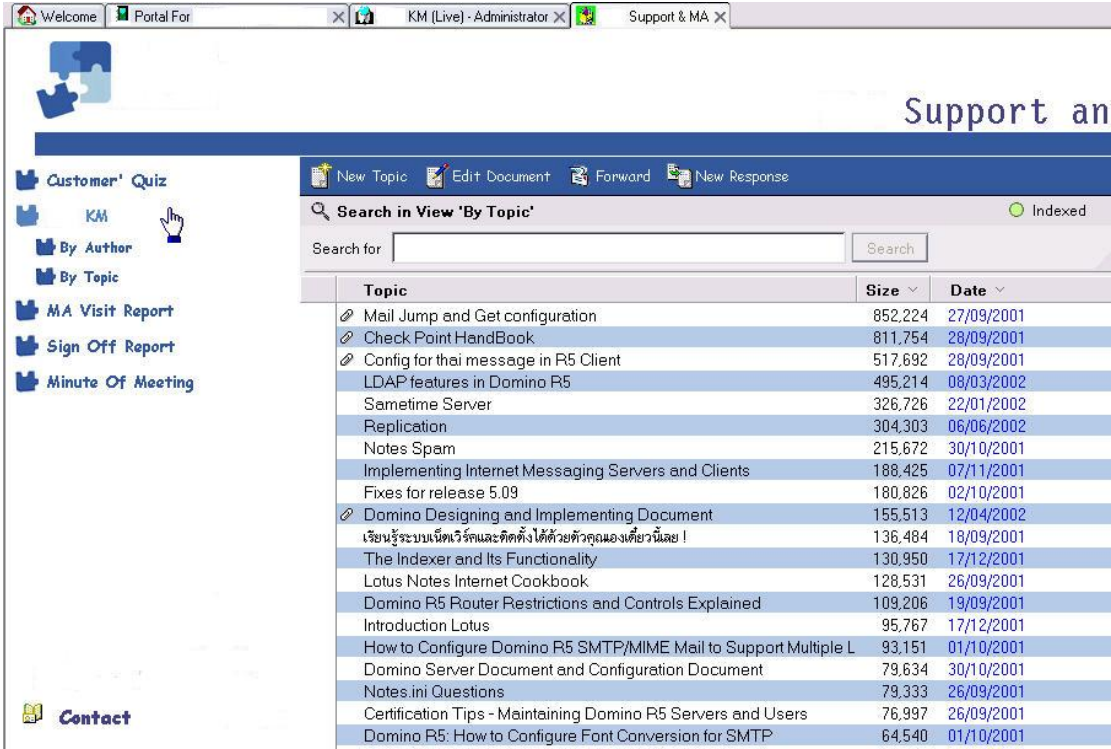


Figure 3.7 User interface of Support & MA Notes application utilised in Comtech

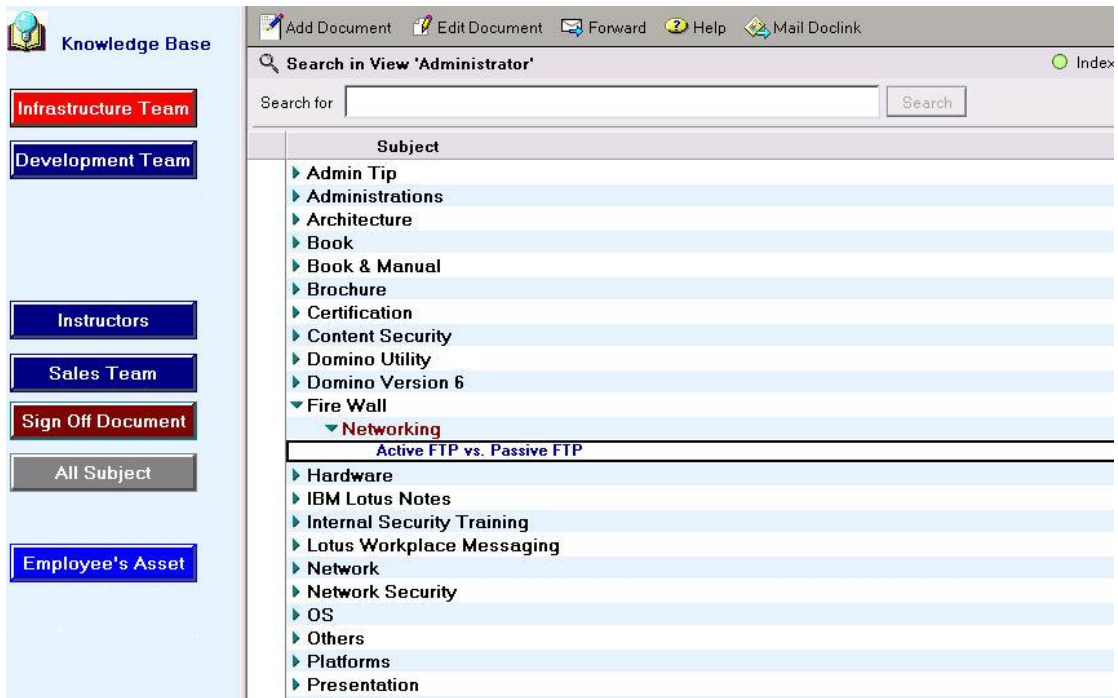


Figure 3.8 User interface of KM database access through web portal in Comtech

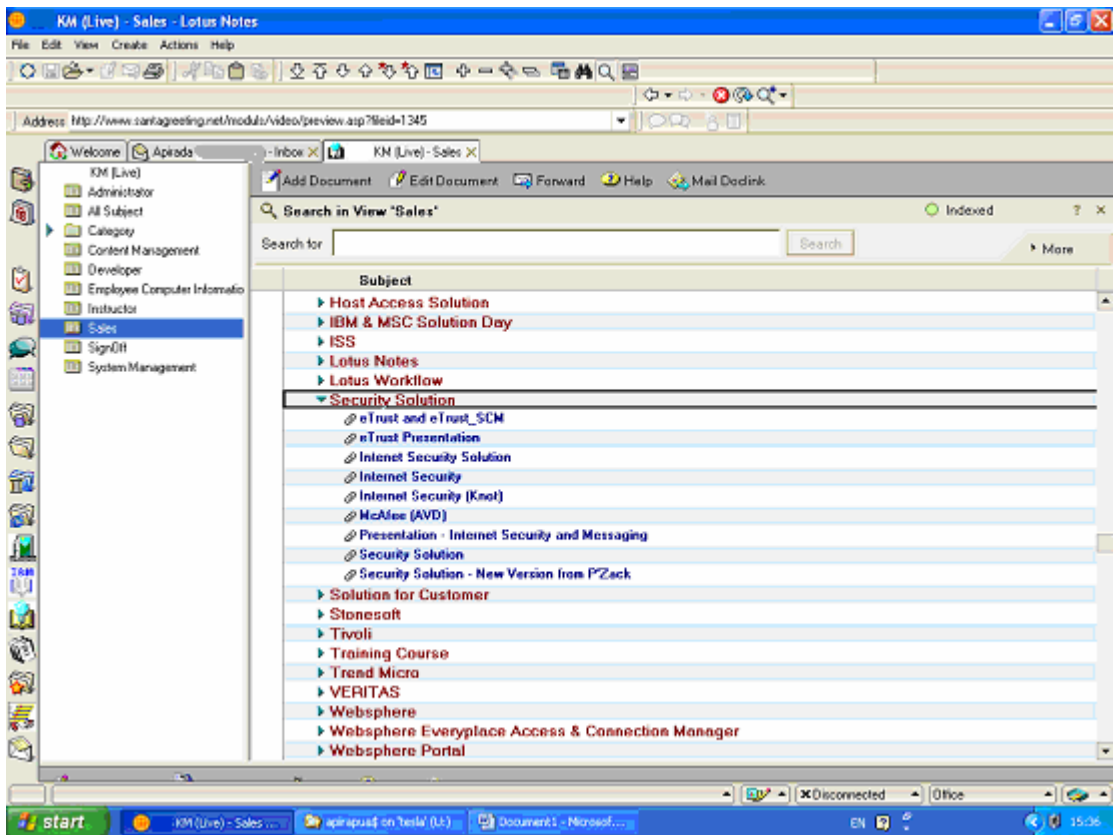


Figure 3.9 User interface of Sales & Marketing KM database and the topics in Comtech

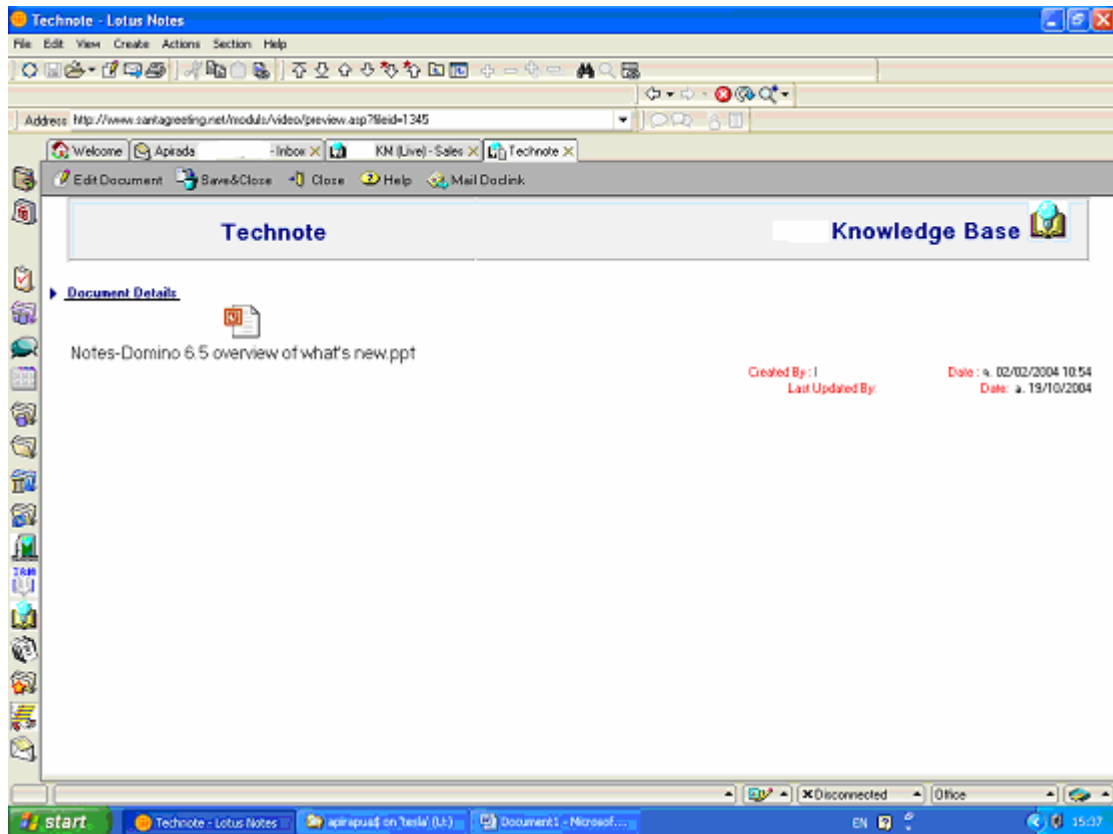


Figure 3.10 illustrates the document maintained on KM database in Comtech

3.10.4 Chemhouse (Thailand) case

Chemhouse (Thailand) background

Chemhouse (Thailand) is a subsidiary of a multinational company, Chemhouse group, in Thailand. It is one of only sixty-seven Chemhouse companies worldwide. Established in 1989, Chemhouse (Thailand) is a construction chemicals company. In October 2003, Chemhouse (Thailand) achieved ISO 9001:2000. The Chemhouse (Thailand) core competencies are chemicals product such as structural strengthening solutions, steel protection, industrial flooring systems, grouting and fixing systems, waterproofing products, water and solvent-based adhesive. The marketing targets of Chemhouse (Thailand) are in three groups, construction, industry and DIY.

Chemhouse (Thailand) has around one hundred and forty members in Operations including the factory. The firm is divided into six departments - Operations, Industry, Sales & Marketing, Human Resource, Customer Service, Technical Lab,

and Finance (Figure 3.11 organizational chart). The company also has Sales & Marketing branches in 5 areas in Thailand.

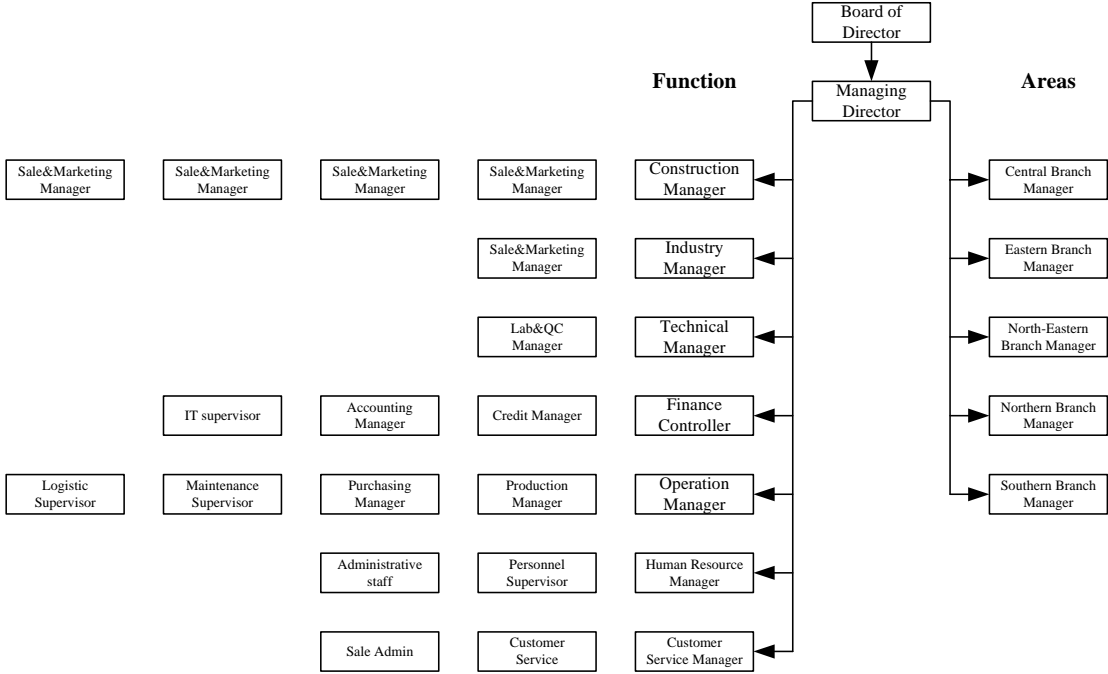


Figure 3.11 Chemhouse (Thailand): organizational chart (Chemhouse group’s IS newsletter, 2 July 1999)

IS implementation in Chemhouse group

The goal of the IS implementation in general throughout Chemhouse group is to enforce communication between Chemhouse companies, since they need to have information at the right time (Chemhouse group’s IS newsletter, 2 July 1999). An information highway would enable all the companies to use applications such as the intranet and the email system.

In 1998, an intranet was implemented by the IS department of Chemhouse headquarters. It is used by all the companies in the group. The system has been built on the basics of Internet technology, so that everybody from companies in the group could be able to use it. Within the intranet, users can find information about corporate legal, insurance and trademarks, technical datasheets in multiple

languages, references, test reports, a new business news service, information from the corporate marketing construction, global news board where news and new information in the system will be announced, subscribing system for the news board, MIS data from Chemhouse Finance, Corporate address book and graphic gallery with Chemhouse logos.

In May 1998, to optimise the accessibility and global collaboration within the Chemhouse group worldwide, group management decided to introduce a global worldwide mail system based on Notes. The goal was to have the same client software on all PCs, accessibility on a national and international level, optimal usage of the Chemhouse network, one global address book in the group with phone numbers, addresses and other information, use of the mail system by mobile clients, the mail system must be economic and manageable, grant secure and trusted information.

Regarding the main issues like security, usage and performance of the global network, security of the manufacturer, availability of national language and more, Notes has been recommended by IS department as the Chemhouse email standard.

The roll-out of Notes was planned in three phases (according to Chemhouse group's IS newsletter):

In Phase 1: the basic mail functions were focused on. This meant that all companies should have at least one mail server with a couple of PCs connected or a few PCs connected to a "central mail server" located at the Headquarters. It was expected that by the end of 1998, more than 30 companies should be connected to the mail system.

In Phase 2: value added functions were to be implemented for the second quarter 1999. This meant, standard tools for global calendaring, group and team calendars, room planning and so on.

In Phase 3: the Notes environment was expected to be a platform for other applications, based on Domino/Notes. It was planned to start in the third quarter 1999.

IS implementation in Chemhouse (Thailand)

In order to meet the accounting standard as required by headquarters, Chemhouse (Thailand) implemented the Cognos system for operational reporting and the Hyperion system for financial reporting to the international level in early 2003. Moreover, Sirius has been utilised as an ERP system in Chemhouse (Thailand) since 1999. During the second phase of fieldwork, the Sirius system was being replaced by Axapta for ERP systems. The purpose of the implementation of these tools is to standardise the software tools worldwide to facilitate and manage work processes such as supply chain, sale, finance and human resources. A file sharing server is also utilised to maintain important files. The users are differently authorised to read and write files to the server.

Notes implementation in Chemhouse (Thailand)

Having been enforced from headquarters, Chemhouse (Thailand) started implementing Notes in November 2003. The system was implemented by the IT supervisor of Chemhouse (Thailand) alone. The company bought a Notes license from IBM (Thailand) for thirty-two users. Thus, Notes is used by only key people in each department and Sales & Marketing branches. The main purpose of Notes implementation is to be used as a communication tool among the different departments and branches of Chemhouse (Thailand), with the Chemhouse headquarters and with external parties such as suppliers.

Apart from the email use, there is an application of Notes called “global and management industry” (GAMI). GAMI has been utilised throughout the Chemhouse Group since April 2004. GAMI contains the list of Notes databases in Chemhouse group. GAMI acts as a corporate address book which contains all the specialist records within Chemhouse group. The purpose is for the Notes users to initiate the

contact with the specialists when important information or knowledge is required. The applications in particular areas are sent to the people who requested them after they have been authorised.

Since the products of Chemhouse (Thailand) require several raw materials in manufacturing, the information about these materials is shared among all Chemhouse companies. Therefore, in the Purchasing Department, a Notes application called 'purchasing page form' is already in place and is utilised to record information about purchasing, raw materials, suppliers, the price and agreement with the suppliers.

3.11 Summary

This chapter began by explaining the research paradigms in IS. The interpretive perspective was adopted which guides the methodology of this study because human interpretations concerning Notes in organizations are of significant importance to the nature of the study. Alternative research strategies were identified and compared which led to the adoption of multiple case studies as a research strategy for this study. The mixed level is chosen as the unit of analysis. The characteristics of the research site were described, which are three IT companies and one chemical company in Thailand. The methods of data collection including semi-structured interviews, archival documents and direct observation were explained as well as the data capturing techniques. Data analysis techniques were also identified which comprise the three activities of qualitative data analysis, namely data reduction, data display and conclusion drawing/verification suggested by Miles and Huberman (1984) and grounded theory. The techniques for ensuring validation, reliability, and generalizability of this research were given. Finally, this chapter provided the descriptions of individual case studies adopted for the purpose of this study.

In the following chapter, the results of the case study research are presented.

Chapter 4

CASE DESCRIPTIONS AND ANALYSIS OF NOTES USE MODES

4.1 Introduction

Having provided the descriptions of case studies in Chapter three, this chapter aims to analyse the use of Notes in the four cases adopted in this study subjected to company background, the context of Notes implementation, and the context of IS implementation. To answer the research question of how groupware supports KM processes in organizations, each case is analysed using the KM processes identified in the conceptual framework (Figure 2.3), i.e. the six use modes of Notes. Then, this study compares the use modes from each case in order to understand the significance of the Notes use modes in relation to KM. Having found the different use modes in each case, the reasons underlying the differences are investigated by drawing upon the use of Notes in each organization. This finally will lead to the investigation of why Notes is exploited by staff in supporting KM activities.

4.2 Use of Notes in ComNotes

In order to investigate how the use modes facilitate KM in organizations, this section analyses the ComNotes case material in terms of the six use modes identified in the interaction richness model (Figure 2.3). In particular, it explores the role of Notes applications in the ComNotes case in terms of the interaction richness model's types of KM processes, i.e. co-ordination, communication and collaboration.

4.2.1 KM Process Type: Co-ordination

The researcher will first analyse the ComNotes case data in terms of the two Co-ordination oriented use modes of the interaction richness model; publishing and searching.

4.2.1.1 Co-ordination Interaction Type: Publishing

Publishing is a human-human mediated coordination, with senders using Notes as an information sending channel, provoking an exchange of knowledge. For example, with the email feature of Notes, users added a document link to any database:

“...people live with their email. They work from their email at most and 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...So, I can see all the information about this sale...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”. (Director)

4.2.1.2 Co-ordination Interaction Type: Searching

In ComNotes, users could find important documents maintained in Notes by using the search function which enabled access to a wide range of information posted by different people:

“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”. (Sales director)

4.2.2 KM Process Type: Communication

Notes was used as the main mechanism for communication in ComNotes. As the system was widely employed throughout the company, it was particularly noted that: *“Notes is very convenient for human to human communication”* (Technical Development supervisor), although, according to the interaction richness model information may also be exchanged from human to Notes. The researcher will now analyse the ComNotes case data in terms of the two Communication oriented use modes of the interaction richness model; sharing and retrieving.

4.2.2.1. Communication Interaction Type: Sharing

Discussion databases were used in ComNotes to enable the sharing of resources. They are regarded as shared space that anyone could access. They were used to post information in terms of both problems and summaries after company meetings:

“...For example, when we have meetings with customers, we will keep it under each section of discussion database, or any forward mail will be shared in databases”. (Technical Development supervisor)

In the Customer Services department, the call log application was used to share information both within the department and between the Customer Services and other departments,

“When we receive calls from customers, we will keep these 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”. (Customer Services manager)

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

4.2.2.2. Communication Interaction Type: Retrieving

Retrieving refers to the use mode that Notes is used to acquire a computer-based ‘organizational memory’ such as best practices, business processes and frequently asked questions where users can retrieve them. The Customer Services supervisor explained that:

“I keep my presentation file in the discussion database. Anyone can access it... and use at his disposal”.

4.2.3 KM Process Type: Collaboration

Collaboration entails the process by which two or more individuals create a shared understanding of what has been maintained on databases. Collaboration comprises

two use modes, namely creating and exploring. The following is an analysis of the ComNotes case data in terms of these two use modes.

4.2.3.1. Collaboration Interaction Type: Creating

Creating is the use mode according to which Notes is used to create individual and group knowledge used to complete a task. In ComNotes, though some knowledge was widely accessible, individuals did not make use of them if they did not have the right background knowledge or understanding of the information maintained. For example, the Technical Support department had their own ‘language’ to describe problems and solutions or technical language which could be posted on Notes discussion databases, whereas other departments used Notes to maintain information required for day-to-day operations. This is because the Technical Support department invariably anticipated problems from customers. On the other hand, information in other departments were recorded as references or used for decision making:

“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”. (Customer Services manager)

4.2.3.2. Collaboration Interaction Type: Exploring

In addition to the five use modes of Notes identified in the literature, the framework developed presents an additional mode which does not completely fit with the previous five. This has been called ‘exploring’. There is evidence of this in ComNotes. The decision was taken to link a new communication tool, SameTime, to Notes to improve collaboration using synchronous communication across different departments and organizations in ComNotes. Accordingly, SameTime in the case study was not merely a tool that enabled sharing of knowledge but also a tool that

further explored the potentialities of Notes for efficient intra and inter organizational communication.

In addition, the web portal was linked to Notes databases and applications in order for staff who were away to access their applications on Notes from other locations and retrieve the information on databases. The use of Notes, therefore, tended to be integrated with other systems which facilitated the users in exploiting Notes features even if they worked remotely:

“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... We also keep the solutions on Notes databases”.

(Technical Development supervisor)

4.2.4. Summary

Overall, Notes had different uses within ComNotes which entailed some form of KM. It appears that the first four use modes were found to be useful within this organization for distributing, accumulating and capturing mainly structured information, and were in fact only enablers for knowledge creation for staff. Furthermore, evidence of knowledge creation was found though this was limited at the departmental level. ‘Exploring’ use mode of Notes was found when Notes was integrated with other systems such as SameTime which enhanced interactions among staff.

4.3 Use of Notes in Procom

Similarly to the previous section, the interaction richness model’s six use modes (Figure 2.3) are drawn on to analyse the *Procom* case material.

4.3.1 KM Process Type: Co-ordination

4.3.1.1. Co-ordination Interaction Type: Publishing

Notes was used as a tool for publishing information. Email was the main feature of Notes, which afforded the publishing of news in Procom:

“We have a person who’s got the information from somewhere. Then it is forwarded by email. The information is about IT. I personally don’t learn much from outside. Mostly, other people will tell me. Sometimes, staff reads newspaper and give it to others to read in the department.” (Presale consultant)

Notes was used to publish information in order to co-ordinate people so as they gather together for different purposes or to update information about products. The schedule function of Notes was used by the Marketing co-ordinator to arrange a meeting as she acted as a person who informed others about organizational events. In addition, the staff could use the schedule function to post their availability for other colleagues to see if they are away:

“Someone taught me how to use schedule function. It’s difficult to set up a meeting since I had to call individuals...I can now send an email to everyone as a group for a meeting...I use Notes to set up meeting. I can use schedule function of Notes to call everyone for meeting. I can use schedule in Notes to arrange everyday activities.” (Marketing co-ordinator)

The email feature worked together with the discussion database of the Technical Support team. An automatically generated email was sent to all the relevant people in order to inform them what had been posted onto the database. Similarly, information posted onto the customer contact database was also automatically emailed to managers upon update:

“There are few people who post knowledge to this database. So we should have read it. It has sometimes been sent to me by mail. When people post it to databases, there will be a message alert. We check emails everyday, so we should have come across this knowledge.” (Software consultant)

4.3.1.2. Co-ordination Interaction Type: Searching

Notes was used as a search tool for solutions which were kept on the databases, i.e. to find out if problems had been faced before:

“...if the customers asked for problems that we experienced. For example, the server is down...the support people will open the database called knowledge management database...look up at software, hardware index which have been maintained. They will look up for the keyword...” (Software consultant manager)

The search feature was likely to be used when the users were reminded of the information which had been seen on databases or emails:

“For example, someone posts knowledge and I checked it. I didn’t read it thoroughly but I know approximately that this knowledge happens...So, when customers ask and I can remember I will search from index to retrieve.” (Software consultant)

In addition, each member of staff created folders in their email account in order to categorize types of emails and thus it was convenient for them to look up important documents. Scheduling features of Notes were exploited by some members to search for other people’s availability. As a result, they could co-ordinate with the people needed for meeting or help on doing something:

“...there is a calendar function which we can use to see other people’s availability...It’s useful when we need someone who is a specialist on something to meet with customers. Sometimes we can’t reach that person by phone. But, when we checked with the timetable, we will know whether that person is available. There won’t be any excuse, unless he has other businesses in the organization. If we go out, we will post it on the timetable.” (System Support engineer)

Further, email features of Notes were used by individual staff to search for important emails which they could refer back to when needed as the quotation below shows:

“...I can create new folders in my email account...apart from the existing folder such as inbox and sent, I established a folder for emails about marketing, support, question and replied emails...I just search emails from the folder categorized by months...” (Marketing co-ordinator)

4.3.2 KM Process Type: Communication

4.3.2.1. Communication Interaction Type: Sharing

Email was recognized as the initial mechanism for information and knowledge sharing in Procom. Discussion databases were used as a supplement for the sharing of resources. The users used the databases to share information and resources which had been found from other resources such as emails and websites:

“When I face a question from customers and I can’t answer. I never faced it before...I will have a look from help online, from internet...When I found it I will share it by posting it to database.” (Software consultant)

However, the sharing mode was limited within the same departments because the information was not related to other departments and the access to some databases was limited to the relevant department. A news database was created for all the departments to access, however, it seemed that it was not used by the staff:

“Mostly, we will share knowledge in the same department because some information or knowledge related to, for example, Marketing, Support department can’t access it...It’s exactly separated. What we share between the department is absolutely absurd information.” (Software consultant manager)

The information on customer contact database was sometimes shared by different users so as to fulfill the project of a customer. However, staff mostly saw only the information regarding customers they were dealing with:

“Mainly, individual account will be used by individual salespeople. We will know who deals with which customers. Sometimes, we see each others’ account. For example, software salespeople need to see an account of others when customers order both hardware and software. This is because it might be the same people or different ones...” (Sale administrator)

New information or solutions were shared on databases when the users could not find existing solutions to problems by searching. However, this was not a step by step solution. The information guided a broad view of what constituted the problem, the reasons and what needed to be inspected. This could also be photos describing the problems:

“If they don’t find the keyword, they will put a new topic. But they will ask others for solutions. If it is solved, the solution will be maintained. If not, the solution will be pended and asked from the others later... If the solution has been kept, they can use it because mostly they will keep the solutions...” (Software consultant manager)

4.3.2.2. Communication Interaction Type: Retrieving

The Notes databases were used as a shared space since they were used to maintain different information in different departments. This information was useful for colleagues to follow up work in progress, and to learn from others’ experience:

“...if someone went to meet customers, it will appear in service record. He will type in whether the problems have been solved or whether they continue. For example, there is sales tracking in Marketing. This is to show who are our prospective customers. We can follow if the sale is successful or the potential to close the sale... We keep it, then new salespersons can follow rather than start learning again” (Software consultant manager)

In addition, some important files were kept on an individual member’s account in order to be retrieved for the next use. As a sale administrator pointed out:

“There is a form for quotation. The form has our company logo on it. There is a name of sales. It’s based on an excel file. However, these files can be kept on Notes as folders.”

4.3.3 KM Process Type: Collaboration

4.3.3.1. Collaboration Interaction Type: Creating

Email was used for collaboration purposes. Therefore, it was a tool which supported knowledge creation among individuals in order to satisfy customers’ needs. For example, after meeting with the customers, Sales would send emails to update their manager and relevant teams:

“... my account will be related to sale, presale and my boss. We will cc: email to each other. If we get that project, we will also cc:, Bcc: email to support in order to start implementing.” (Marketing co-ordinator)

Notes has, thus far, been found to facilitate sharing information and information could then be organised as knowledge. The software consultant manager explained the difference between information and knowledge, and the relationship between them:

“I think knowledge is information which has been distilled and can be used directly. For example, new staff don’t know the process yet. They can read some information which they can make use of it. This should be called knowledge and where knowledge is from... It can be from several directions. It can be chatting...meeting we have knowledge exchange...but if it is email, it’s an ad hoc knowledge which the senders know and send to others. It’s not knowledge which is kept for searching. It’s not index but it’s a scattered knowledge. Later, we collect and manage this as knowledge. In short, knowledge is information which have been organised and can be used instantly.” (Software consultant manager)

Knowledge creation was limited within this same department. Notes databases were particularly designed to support operations within the technical department:

“...Knowledge for support is more apparent because it can be shared and in the same department or across department the databases can be used to support or solve problems for customers...” (Software consultant manager)

In particular, it was noted that the KM database of Notes tended to be the most favourite in IT sector:

“...Each partner of IBM tends to have the same knowledge management database such as support because the companies are similar. Knowledge management database for support...customer databases for Marketing department. Knowledge tends to be IT hardware and software products...” (Software consultant manager).

4.3.3.2. Collaboration Interaction Type: Exploring

Although Notes was not fully utilised in Procom, it was pointed out by the interviewees that Notes could be developed to integrate with other systems within the company. As a result, the users could get more benefits from the systems. In doing so, more capabilities of Notes could be recognised and utilised when integrated into other systems:

“Notes has a limitation that it’s not suitable for relational databases...We have to maintain this in other databases and use Notes to retrieve it...We’ve tried with customers by maintaining all the data in DB2 (An IBM relational database management system)...” (Software consultant manager)

“... We could develop Notes to retrieve database from DB2, but we don’t really need it because we already have tool to retrieve it. We use SQL for Solomon, DB2 for BPCS...Notes could be linked to these applications but we didn’t do it.” (Senior service engineer)

In addition, the operation director mentioned the potential of Notes which in the future may contribute to organizational learning:

“...I think the latest version of Notes has interactive function which links with the e-learning facility of Notes...Now, there is a learning space which facilitate learning or command of company to the lower level....”

Hence, this could be potentially an additional feature of Notes for ‘exploring’ use mode in Procom, even if it does not currently happen.

4.3.4. Summary

In short, five use modes were found in Procom. These use modes were more likely to deal with information than knowledge. However, individuals and some groups generated knowledge if they shared the same background of work. Even if the ‘exploring’ use mode was not utilised, there was evidence showing that ‘exploring’ mode could work with further development of Notes in Procom. However, the discussion why ‘exploring’ use mode was not used remains to be discussed in the next chapter.

4.4 Use of Notes in Comtech

This section intends to discuss the use of Notes to support KM in the case of Comtech following the six use modes identified in the interaction richness model.

4.4.1 KM Process Type: Co-ordination

4.4.1.1. Co-ordination Interaction Type: Publishing

Email was used as a tool to co-ordinate with other business units of Thaitech Corporation and external parties. However, the Notes server was only used in Comtech as an email platform, while other units used the MS Exchange server or other email platforms. Within Comtech, Email was also used as a tool to co-ordinate people to the content of knowledge which is maintained on Notes databases.

“when someone posted knowledge, he will send a link to me. But, the real content is maintained on a knowledge management database... When I opened the link, it will tell me that there is a new virus...the link will come by email. It’s a little icon...The content will come up after I click on it. The link will lead us to the whole content rather than sending big files and clogging up other people’s mail box...” (Sale staff)

All staff used the work order application in order to post their activities and inform others. The information was intentionally used by their boss for monitoring staff. The boss also evaluated whether staff should receive incentives based on the work order applications. He could check the details of customers whom staff visit each month:

“...When we visit a customer, there is a professional report for the customer to sign after finishing and what time we finish. My boss will check if we do it on time, so he can give me the incentive. He will also see whether the pending happens. He will see whether I follow up the customers after they call...why it’s still pending.” (Support & MA staff)

In addition, the staff would know each others’ availability in case they needed to make contact. Thus, work order was an application of Notes that co-ordinated people in carrying out an activity within Comtech:

“the purpose of [work order] application is to tell others when I’m not at my desk. When customers want to contact me, someone will pick it up and can tell them where I go. It can be used to record my history... where I was on that day if I didn’t swipe the card.” (Developer)

Top management used the databases of Notes to post issues on management policy. This was to inform the staff what the objectives and targets of the organization were.

Thus, the databases acted as a co-ordinator in shaping the same work practise for everyone and driving the organization to the same goal:

“It’s not all about programming. Sometimes, the management team sets up new company policies. For example, the policy of this year has been changed, they will post on knowledge management database for everyone to see...how the new policy is...what the targets are...” (Developer)

There is an application which was used to maintain customers’ details about the contact. Each salesperson was responsible for different customer accounts. The application could be used to make notes about the requirements of the customers and the topics which had been discussed with the customer. As a result, other colleagues followed up the work with the customers.

“...I can sometimes send an email to technician in order to ask for help when I got requirements. The technician can see from the central database what topics I have talked to the customer. I give the technician some background so he can go to talk to the customer. This follows the standard of ISO...” (Sale staff)

The information on the customer contact database was made available to everyone in Comtech in order to contact the customers:

“I mainly use Notes for customer databases. I always lose name cards of people so I post them on knowledge management database...It facilitates searching. When there are many people to be contacted, it is a single point for everyone to see. It helps everyone to find contact details of the customers.” (Sale staff)

4.4.1.2. Co-ordination Interaction Type: Searching

As Notes was used to inform about individuals’ activities and availability, other colleagues used Notes to search for a person who might be able to help them carry out a task. Thus, Notes co-ordinates people to carry out an activity which specific expertise is needed:

“Sometimes I need to find another one to help me about a technical issue and I know who can help. If I look from the scheduling and he/she is not available. I will have to wait for him until he’s available because no one is as specialised as him.” (Sale staff)

Members of Comtech also used an application to search for a customer's contact details. Therefore, individuals used Notes to search for, and co-ordinate themselves with the right people they need to contact:

"...There is a record of customer list; company A,B,C... In company A,B,C record, it keeps the contacted person name...What is his responsibility? Is he a decision maker or an IT manager? It's a database of our customers..." (A sale staff)

A keyword search feature of Notes was used by individuals to look for the documents, information and knowledge that they needed:

"...We can input keyword into the search function. Then, the document we want will come up..there will be a list...it works like search engine on the internet." (Developer)

The categories which created and identified when staff posted information or knowledge allowed others to search for the information and knowledge easier. When staff accessed the KM databases, there was a form to fill in regarding the kind of knowledge, the topic, to which team it belonged and what they wanted to attach:

"we categorise knowledge by ourselves. We know before we post what the topic is about. We will see from the existing topic and post into it. If the existing topic is not what we want, we will create a new topic... Developers team will sometimes re-categorise if they think what's been posted is a mess." (Sale staff)

However, it depended on individuals' skills in recalling what had been posted when he wanted to search for a particular solution to customers' problems:

"The next time another person receives a call from customer, he may recall that this problem has been faced. He can search whether it has been posted. Then, he can support that customer faster." (Support & MA staff)

Some specialist details of each member were posted on the database to enable effective skill searching. However, this feature was not used much in Comtech:

"... we keep information on certificates on the knowledge management database. It is to see who's got which certificate, graduated from where. But, it's not really updated. It depends on individuals whether they want to update" (Developer)

4.4.2 KM Process Type: Communication

4.4.2.1. Communication Interaction Type: Sharing

Notes was considered as a tool for sharing information and knowledge among each other with the purpose that someone can retrieve the information and knowledge for subsequent use in Comtech:

“...what I have found from several websites. I post them on the knowledge management database in order to be useful for others when developing applications...I can attach code, documents, pictures everything on the databases. But, it needs to be knowledge which we would like to publish to let others use it.”
(Developer)

The information posted onto the KM database may have been found from external resources such as the Internet, which the person who found it deemed appropriate to share with others. As a result, several people can retrieve and use such information and knowledge:

“The documentation is useful for the next customers because when we get requirements from customers, there will be many systems. However, most systems are similar. We can see from the knowledge management database whether there has been a similar application so that we can modify for another customer. Some codes can be applied to new applications.” (Developer)

However, whereas Comtech databases tended to be used as a shared space which someone posted knowledge for others to retrieve, these were not used as discussion fora where individuals could share their opinion and have discussions in order to achieve the best solution or result:

“It’s like an internet webboard...it’s free post...who knows whatever knowledge is will post on it...however, there should be a discussion which others can reply whether it works or not, or even something better”. (Developer)

4.4.2.2. Communication Interaction Type: Retrieving

Notes databases were considered to be the main features for KM since knowledge could be maintained in order to be retrieved for subsequent use. For example, the KM database was used by sales people to retrieve brochures about products which

had been downloaded so that other people do not need to search from external sources and it reduced time expended. Thus, other salespeople could retrieve the brochures maintained on the databases when needed:

“When I go to meet a customer, I need to prepare brochures. I will print from the files maintained on knowledge management database.” (Sale staff)

Several databases of Notes were utilised by the staff to post important documents, presentation and important files:

“...I use knowledge management database to post or announce important documents...It’s like attachment. When I have documentation, I can publish on it. There is a kind of document form, signed off document, for a single phase of work...” (Developer)

Furthermore, for the Developers team, the KM database was used to retrieve technical knowledge such as programming codes:

“...I have found (programming) codes from somewhere, I can post on the databases in order to be used for the next time...No one can remember all the codes...we have to retrieve from the previous codes...” (Developer)

4.4.3 KM Process Type: Collaboration

4.4.3.1. Collaboration Interaction Type: Creating

Notes was used as a collaboration tool among team members in making a decision or achieving the best solution for customers. Such a process was asynchronous as the staff could collaborate through Notes applications at different times and places for some purposes such as price quotation for customers. As a sale staff pointed out:

“For sale, we have different rate on reduction for customers. We might make mistake that the reduction can be too much. I have to give it to my boss to approve again if the price quoted is reasonable. After my boss approves, I will initiate the sale order so that we know the service or product we have to send to that customer and make a plan.”

Notes was also used to collaborate between teams in that the teams need to support each other’s work:

“... We [Support & MA staff] must always follow the problems...If the firewall team updates new products, they will train support & MA team too. This is because support & MA team has no chance to try out new products. So, we will know how to support when the customers ask. Or sometimes the implement team got something new when they go to implement for the customers. They will add to the knowledge management database as well and support & MA team can learn from there.”
(Support & MA staff)

“Actually, sale is not only responsible for selling products, but also we’re the centre for everyone to finish off a project. We have to make a diagram when we plan for a new system. Where is the firewall? How many zone of the system? Everyone needs to request for information or contract that we have done for scope of work...” (Sales staff)

The KM database of Notes helped individual staff create their personal knowledge or skill in carrying out a task:

“At least I know what we have to prepare. It’s very useful for new-comers. When I was new, I didn’t have to ask much from others. I can study from those files how to do this and that. How we should carry out ours” (Sale staff)

Though the staff could access KM database to retrieve know-how, it also depended on the background of individuals whether that knowledge could be applied:

“...if I copy code exactly from the database of the Developers, the system can work. However, if the customers ask me in details about it, I can’t answer.” (Support & MA staff)

A developer also mentioned that the codes in KM database helped her in customising an application for new customers:

“Though the codes need to be modulated for new customers, it’s still good because we can use the major part which has been structured. We just re-customize it.”
(Developer)

The KM database of different teams was accessed by people from other teams in order to respond to customers’ needs:

“...I have my own right to read technical databases. For example, technical knowledge will be details in terms of protocol. When I present to customers, they

don't want to listen to these details. However, I need to learn a lot just in case they ask me." (Sale staff)

4.4.3.2. Collaboration Interaction Type: Exploring

The exploring use mode of Notes was found to be utilised in Comtech. Several features or applications were linked to Notes in order to facilitate their KM. For example, a KM database would be timely archived to another database in order to organize outdated information to an appropriate database. This implies that staff found more potentialities of Notes when integrating into other systems. As defined in Section 2.5.2, 'exploring' use mode implies that users learn to explore the potentialities of Notes contributing to a collaboration between humans and technology where each benefits from the other. Such collaboration between human and Notes over time will help individuals to be familiar with and utilize Notes for KM. As a result, organizations gain more benefits from Notes as a tool for KM.

"if the knowledge is getting old and too much ...we need to create a code to archive to another database. Then, we name the databases...in the databases, there is application which act as an agent. Agent is processing the archive..there should be time duration when to archive." (Developer)

In addition, the web portal was linked to Notes databases so that absent staff could access their applications on Notes and retrieve information. The web portal also enabled the user to access the information important to the individual user:

"Portal is like a website...it knows the role of each person, then it can access the application that I use everyday. For example, salespeople will have email, calendar and sales application. I can access them through website. It can be customised. I can just login only once in order to access all the applications rather than individual login...Individuals have different requirements in accessing different information. It helps to deal with information overload..." (Sales staff)

Comtech also planned to use a new system 'workplace' in the future instead of Notes. Workplace allows users to access the same application of Notes through the website:

“If we use ‘workplace’ application, we will access databases through website. There won’t be license fees. The website could be used instead of Notes client.” (A support & MA staff)

Hence, by integrating other systems in order to explore the further potentials of Notes, it would provide a better collaboration between human and IT for KM.

4.4.4. Summary

In summary, all the six use modes identified in the interaction richness model are found in Comtech entailing some form of KM. It appears that all the use modes have a direct impact on how knowledge can be created in individuals and organizations. This is because the use modes of Notes are found to be the main interaction processes in Comtech.

4.5 Use of Notes in Chemhouse (Thailand)

This section explores the use of Notes in supporting KM in Chemhouse (Thailand).

4.5.1 KM Process Type: Co-ordination

4.5.1.1. Co-ordination Interaction Type: Publishing

Email was used as a main feature of Notes in communicating within and outside Chemhouse (Thailand)

“...I often use Notes to contact with supplier. Also I use it to contact people within organization. I always use email for contacts. I use it to communicate and co-ordinate at work...” (Purchasing manager)

Rather than using the schedule function of Notes, email was still used as a means of making an appointment; for arranging a meeting for example.

“...When we need to make an appointment for meeting, we just use email...I think it’s not different between calling for meeting though Notes and emailing to make an appointment...I can email to 20 people. It’s not different to the call meeting function of Notes or making room reservation...” (Finance manager)

4.5.1.2. Co-ordination Interaction Type: Searching

GAMI application was used by Chemhouse (Thailand) members for searching a variety of topics. Each application, such as the purchasing page form application which had been developed by the people in Chemhouse group worldwide, was advertised on GAMI. Hence, GAMI acted as an advertisement for people in Chemhouse group to contact with the owner.

“GAMI is like an advertising...When someone creates something new, it will be shared on this application...I will see from this application [GAMI] who is managing it. If I think it’s about what I want to know, I can just go to Notes and email him that I want to access it...” (Finance manager)

Notes was also used as an individual application in filing the document received by emails in order to facilitate searching when the past emails need to be referred to.

4.5.2 KM Process Type: Communication

4.5.2.1. Communication Interaction Type: Sharing

GAMI application was considered as an information sharing tool between people in the Chemhouse group. The application allowed the users to contact the owner of a database that they wanted to know more about:

“...If a company [such as a car company] is to open a factory in Thailand, we need to investigate it. This is to share information, but it’s different to the intranet. The intranet is to look for different information. We can’t post anything. We can just read it. It’s like a library. GAMI is like a group of people who creates and shares information within groups.” (Finance manager)

On the other hand, a user could create a database and post a message on GAMI if they had some information or knowledge to share:

“...If I had an excel file which is very good for calculations, I would do it and leave it on this database. Who wants the calculation procedure of employees’ tax can access it. However, we’re not interested in this so much so we don’t do it...”. (Finance manager)

The purchasing page form application was used by the Notes user to share information about purchasing raw materials among the Chemhouse companies:

“...I will key in the top 30 outstanding raw materials. It’s top raw materials of Chemhouse (Thailand), but it might not be 1 of 30 top materials of other countries’ Chemhouse...so If I key in and the information is repeated, it will be automatically prioritised in the system... This is like information sharing...”. (Purchasing manager)

4.5.2.2. Communication Interaction Type: Retrieving

Notes databases were used to retrieve information or references to projects made in other Chemhouse companies, in order to guide Chemhouse (Thailand) on how to proceed with a similar project:

“...For example, I never heard of this material. One day, Chemhouse (Thailand) is manufacturing a new product which this raw material needs to be used. I can retrieve information from this application. It will tell me the characteristics of the products, the suppliers and the price...” (Purchasing manager)

Some PowerPoint files, which were manuals for the Purchasing department, could be retrieved from the Notes database as well as other information about purchasing such as news when it was needed instead of using email to distribute this information:

“...There are also procurement, purchasing and supply chain manuals which have been maintained as powerpoint files...In the past, when our Purchasing director abroad has got some useful information, for example, a supplier gives us a discount because of global agreement, he informed us by email. This is replaced by a purchasing page form.” (Purchasing manager)

4.5.3 KM Process Type: Collaboration

4.5.3.1. Collaboration Interaction Type: Creating

The GAMI application was used to initiate collaboration amongst the relevant people. The person who requested access to the database was validated, i.e. whether his responsibility was related to that information before authorization:

“The person we contact is the owner of individual GAMI...It’s like an application or database that you share so it’s knowledge transferring within groups... He [an author in GAMI] will send me the icon which is a gate to access. When I click on it, I can access. That means I’m allowed to access...If I’m the owner of one application, when am I gonna allow someone? I have to check who he is. If he’s not relevant, I won’t allow him to see...” (Finance manager)

A cc email was sent to the relevant people so they could either learn the work process or how to deal with a particular situation. Email also allowed different people to send, receive and edit electronic documents in the organization. Hence, those people could contribute and help in the drafting of the company’s policies.

4.5.3.2. Collaboration Interaction Type: Exploring

Notes was used in connection with other software in Chemhouse group as a means of sending information or results. The results analysed by other software was used by top management in decision making or planning. However, the potentialities of Notes itself had not been explored further to enhance the collaboration process. Therefore, no evidence of the ‘exploring’ use mode was found in Chemhouse (Thailand).

4.5.4. Summary

In conclusion, the use modes of Notes within Chemhouse (Thailand) was found to be more related to the co-ordination process of KM rather than the others. This is because Notes was implemented in order to mainly facilitate the interaction between Chemhouse (Thailand) and other companies in the group. Thus, all the use modes, except exploring, were likely to depend on the department and responsibilities of individuals who had to interact across the companies.

4.6 Cross case comparison of the use modes of Notes

Having discussed the use of Notes in the individual cases, this section compares the use modes from each case so as to give meaning to each use mode to the organizations in relation to KM. Tables 4.1, 4.2 and 4.3 exhibit a comparison of the use mode by giving the degree to which Notes use modes were found from each case. Figure 4.1 illustrates the degree of use modes, which are low, medium and high. The degree of use modes is identified following to the staff's opinion towards their use of each Notes feature.

	Low
	Medium
	High

Figure 4.1 Degree of use modes

The comparison of each use mode is discussed, in turn, as follows.

4.6.1 Co-ordination

'Publishing' appeared to be the most utilized use mode in all the cases. This is because the use mode was mainly evident in the email feature that all the companies used to distribute news and information. Email was also used in connection with the database in ComNotes and Comtech where the users post information into it in order to notify others what has been updated. Notes' standard features, such as scheduling, were most likely to be used by the people in Comtech to inform others about their availability.

'Searching' was sometimes used in relation to 'publishing'. This is because Notes enables the users to search for the information published into the database and applications. Staff could recognize whether the activities occurred in the past. For example, the staff of ComNotes and Comtech could use Notes to search for solutions or documents from the databases. In addition, 'searching' also referred to expertise finder. It appeared in ComNotes, Procom and Comtech that the staff used Notes to search for a colleague's availability. The staff of Chemhouse (Thailand) also utilized the GAMI application of Notes to search for an expert in the same area to share information across companies.

Therefore, publishing and searching supported the co-ordination processes in that the staff were directed to the data or could search for data in carrying out a task since human do not have to make sense or interpret them in order to use.

Company	Publishing	Searching
ComNotes	<ul style="list-style-type: none"> - All the staff can add a document link to any databases. - Email was used to announce news and information in the company. - Email with a document link used to inform others when something had been updated. 	<ul style="list-style-type: none"> - The search function enables access to a wide range of information posted by different people. - Notes was used to search for a colleague who might help them carrying out a task. - The contact application was used to search for people in the customer company.
Procom	<ul style="list-style-type: none"> - Email was the main feature of Notes for publishing news. - The schedule function of Notes was used by the Marketing co-ordinator. 	<ul style="list-style-type: none"> - A searching tool for solutions was only used by Notes developer teams. - Some staff utilised scheduling to search for people available for meetings or help in doing something.
Comtech	<ul style="list-style-type: none"> -Email was used as a tool to co-ordinate with other business units of Thaitech Corporation. -Top management used the databases to post information about management policy in order to inform staff about the objectives and targets of the organization. - Work order application is for all staff to post their activities to inform others about their activities. - The information on customer contact database was shared for everyone in order to contact the customers. 	<ul style="list-style-type: none"> - Staff used Notes to search for a colleague who might help them carrying out a task. - Staff used a customer contact application to search for someone who can be contacted in that company. - A keyword search feature of Notes was used by individuals to look for documents, information and the knowledge they need.
Chemhouse (Thailand)	<ul style="list-style-type: none"> - Email was used as a means to ask for an appointment. - Email was used to announce company policy and news. 	<ul style="list-style-type: none"> - Staff used the GAMI application by searching for the topic and author which they were interested in. - Notes was used as an individual application in filing the document received by mails in order to facilitate searching when needed.

Table 4.1 Comparison of the use modes in co-ordination processes between the case studies.

4.6.2 Communication

‘Sharing’ occurred through applications such as sales which were specifically designed and used to share information about customers in ComNotes and Comtech. The application allows other colleagues to follow up with the customers’ requirements. Notes databases, such as customer contact details, solutions to the customers and important documents, were utilized in ComNotes and Comtech to share information among staff to help them fulfill a project. Technical knowledge was also shared among the staff. Such knowledge may be from the staff’s experience or from external resources such as a website, which were proven as useful by the staff. As a result, the databases became knowledge for those who shared a project. Similarly, sharing was found in the Notes support team in Procom. Though the ‘sharing’ use mode was not apparent in Chemhouse (Thailand), it appeared that GAMI may be used as a tool to initiate the sharing of information. The purchasing application was also used to share information about raw materials with other companies.

‘Retrieving’ occurred in ComNotes and Comtech when the staff retrieved presentation files or other documents. The staff also retrieved information regarding the history of the implementation, the solution or sales for learning purposes. Retrieving was not utilized much in Procom and Chemhouse (Thailand).

As a result, Notes supported the communication process in the case studies through ‘sharing’ and ‘retrieving’ in which people could either interact with each other through Notes or interact directly with Notes for information they required in their work.

Company	Sharing	Retrieving
ComNotes	<ul style="list-style-type: none"> - Salespeople had to put in all the correspondence with their customers to the sales application so that the director can monitor their activities. - Tricks & tips of the Technical department were shared on Notes databases. 	<ul style="list-style-type: none"> - The databases were used to maintain presentation files or other important documents about customers for staff to retrieve to use. - The databases were used to retrieve brochures for Sales & Marketing.

	<ul style="list-style-type: none"> - In the Customer Services department, the call log application was used to share information both within the department and from Customer Services department to other departments. 	<ul style="list-style-type: none"> - History about implementation for customers was maintained for other users to study.
Procom	<ul style="list-style-type: none"> - Sharing mode was found to be limited within the same departments e.g. the information on customer contact database was sometimes shared by different users so as to fulfil the project of a customer. Notes support team staff also share information and resources which have been found from other resources such as emails and websites. 	<ul style="list-style-type: none"> - Email was used by individual staff to maintain important emails which they can refer back when needed.
Comtech	<ul style="list-style-type: none"> -Notes was considered as a tool in sharing documents, information and knowledge among each other with the purpose that someone can retrieve the information and knowledge for the next use. - The information posted on KM database may be found from external resources which the person who found it deemed appropriate in sharing to others to know. 	<ul style="list-style-type: none"> -KM database was used by salespeople to retrieve brochures about products. -KM database was used in the Developers team to retrieve for technical knowledge such as programming codes. -Several databases were utilised by the staff to retrieve important documents about customers, presentation and important files.
Chemhouse (Thailand)	<ul style="list-style-type: none"> - A user may create a database and post on GAMI if they have some information or knowledge to share to other Chemhouse people. - Purchasing page form application was used by the Notes user to share information about purchasing raw materials among the Chemhouse companies. 	<ul style="list-style-type: none"> - Notes databases were used to retrieve information or references to the projects which have been done in other Chemhouse companies in order to guide Chemhouse (Thailand) how to proceed with a similar project. - Some power point files which are manuals for Purchasing department could be retrieved from Notes database as well as other information about purchasing such as news when it was needed instead of using email to distribute this information.

Table 4.2 Comparison of the use modes in communication processes between the case studies.

4.6.3 Collaboration

‘Creating’ refers to the interaction that staff need in order to collaborate through Notes of which individual knowledge is important in fulfilling a project. Notes applications were likely to be used by staff who had been involved with the project. Though the KM databases of different departments are accessible for all the staff in ComNotes and Comtech, only the staff who were involved collaborated through Notes with other staff (e.g. Sales and Developers) to complete a project. For example, KM databases were accessed by only the members of the Technical department in ComNotes to exploit knowledge to support customers’ requirements. The information and knowledge may not have been understandable to the members in other departments as they did not share the job context in the Technical department. Similarly, the GAMI application in Chemhouse (Thailand) was used to initiate collaboration with people in the same area from other companies and authorized people. In most cases, email was a basic feature of Notes which the staff used to collaborate and create knowledge among staff. For example, Chemhouse (Thailand) managers helped draft company policy together, or CC mail was sent to other colleagues to make them aware of what was going on in a project.

‘Exploring’ occurred in the case studies of ComNotes and Comtech when Notes was adjusted or integrated with other tools. This refers to the collaboration between humans and Notes in which the outcome is knowledge. As a result, Notes potentialities could have been better perceived and used by the staff. For example, the web portal was used to facilitate staff of ComNotes and Comtech to access Notes applications while they were away. In addition, the web portal provided tools to extract, analyze and categorize both structured and unstructured information, and revealed the relationship between content, people, topics and user activities in the organization. As a result, users ideally received information and knowledge that best suited their needs based on their past profile (Wagner et al., 2003). SameTime was also used in enhancing synchronous communication either within the organization (as in Comtech) or across different branches (as in ComNotes). However, such an integrated system may dominate and finally replace the use of Notes for collaboration. Hence, this could be an obstacle for the ‘exploring’ use mode of Notes which is difficult to expedite on Notes itself as this use mode is defined as

exploring further the potential of Notes itself, contributing to a collaboration between humans and technology where each benefits from the other.

In short, Notes supports a collaboration process either between humans or between human and Notes. Accordingly, knowledge is generated through these interactions and becomes useful to the staff and organizations as a whole. The previous four use modes tend to be the enablers for the collaboration processes. This is because the data and information are used through Notes within the organization where the staff create their own tacit knowledge in carrying out work and explore for more potentials of Notes in utilizing and organizing data and information in which knowledge of individual could be better articulated through IT tools.

Company	Creating	Exploring
ComNotes	<ul style="list-style-type: none"> - Knowledge on the databases was widely accessible, individuals could not make use of them if they did not have the right background knowledge. - The Technical Support department has their own language to describe problems and solutions or technical language which can be created on Notes discussion databases, whereas other departments used Notes to maintain information required for day-to-day operation. 	<ul style="list-style-type: none"> - SameTime was added to Notes as a new communication tool to improve collaboration using synchronous communication across different departments and organizations. - Web portal was linked to Notes databases so that for absent staff could access their applications on Notes and retrieve the information on databases.
Procom	<ul style="list-style-type: none"> - Email was used to collaborate among relevant people. Therefore, it is a tool which supports the nurturing of knowledge regarding how to deal with and satisfy customers. - Knowledge creating of individuals was apparently found in the Notes team where three people shared technical tips and tricks on Notes use and development. 	<ul style="list-style-type: none"> - The use of Notes with other IT systems was not found in this case since there are different systems for different functions and management team has no plan to integrate those systems.
Comtech	<ul style="list-style-type: none"> - Notes was used to collaborate between teams in that the teams need to support each other's work. - The KM databases helped staff to create their personal knowledge or skill in carrying out a task. - KM database of different teams 	<ul style="list-style-type: none"> - KM databases were timely archived to another database in order to organize outdated information to an appropriate database. - Web portal was linked to Notes databases so that absent staff could access their applications on Notes and

	was accessed by people in other teams in order to respond to customers' needs.	retrieve the information on databases.
Chemhouse (Thailand)	<ul style="list-style-type: none"> - The GAMI application was used to initiate collaboration among relevant people. The person who requested for access the database was validated as to whether his responsibility was related to that information before authorisation. - A CC mail was sent to the relevant people in order for them to learn the work process or how to deal with a particular situation. - Email allowed different people to send a soft copy in the organization to contribute and help draft company policy. 	- No evidence of 'exploring' use mode is found in Chemhouse (Thailand).

Table 4.3 Comparison of the use modes in collaboration processes between the case studies.

Even if some applications include similar functionalities, different degrees of use modes, namely low, medium and high have been identified in different case studies. Therefore, an investigation of why such differences occur becomes necessary. The researcher realized that the use modes of KM were caused by the different applications and human actions on Notes in each case. The following section, therefore, analyses in general the use of Notes in each case.

4.7 The use of Notes in general in the case studies

Having found the different meanings of the use modes in each company, the reasons underlying the differences need to be investigated. This is mainly because several Notes applications were found to be utilized in these organizations. Thus, there is a need to discuss how the different applications were used by the staff. In particular, the discussion focuses on how Notes applications are identified and how it might be related to other IT systems being utilized in each organization.

4.7.1 Notes identity in ComNotes

Notes applications were designed and integrated into the different business processes of ComNotes. Some applications of Notes were shared by the different departments. No other IT system apart from Notes was applied and adopted in ComNotes for their business processes. Hence, Notes was perceived as a unique

system which other systems could not replace. For example, the call log application was used to record the problems which had been requested from the customers and the application passed on the request to the people responsible for solutions. Having integrated Notes into all the business processes in ComNotes, the role of Notes was deemed inevitable for the ComNotes staff in facilitating their routine work. Notes was based on a shared environment, where it could help manage information in the same place and everyone could access and share the same information rather than keeping information separately on individual computers. Consequently, Notes was perceived by individual staff as a tool which they could use for different information related to their work. For example, they needed to service product warranty and hardware to customers. They could check from the product warranty database whether the warranty had expired.

“...They don’t allow me to use my account to directly send email to customers. We’ll use this database [contact management system] to create and send email...Everything such as quotations will be sent to customers from this central database and will be maintained there...” (Sales staff)

Different perceptions of Notes in the various teams in ComNotes emerged as particular applications were designed for different business processes. For example, the staff of Technical Support department identified Notes as a KM database tool because they used Notes to record tricks and tips from their experience so as to support the customers. On the other hand, the staff of the customer service department recognises Notes as a tool to record about customers’ history and their requirements.

Although ComNotes used Notes databases as a KM database in the Technical Support department, the KM database was not utilised as Q&A where the staff could correspond to overcome space and time boundaries. This may have been because the small size of ComNotes had an impact on the perception of staff towards the knowledge database for KM. The staff tended to have face-to-face meetings in order to discuss problems because there was no need for them to wait for reply electronically. In addition, as the main business process of ComNotes was to provide

service about IT implementation for customers, Notes was considered as a tool to help responding customers' requirements rather than a KM tool. Therefore, Notes was not directly seen as the main tool for KM but it supported people in learning and doing work.

Since all the business processes were conducted electronically through Notes, Notes was perceived as a tool for the director to control and monitor staff. The director could see individuals' performance, whereas the staff needed to report their activities by using Notes.

“Here we go, this is the call centre for Customer Services department. These are all the calls in process so the call at company...[A customer] and it was on the 23rd of December and I can see what is going on. So, we will check with the developer. Here I can see who is the person responsible for insuring this. So that lady then I can see what the result is. She hasn't yet put the result in there. Here she's saying that she's checking with the developer. So I know exactly what's going on. What I could do I could click on here notify by email and it generated an email with the doc link then I can just send it to who involves.” (Director)

In summary, ComNotes identified Notes as a unique and integrated business application. This meant that there was no other IT tool utilized similarly in the organization. Notes was designed and applied to all the business processes and became a tool which was unavoidable to use.

4.7.2 Notes identity in Procom

Notes was seen as an efficient tool to broadcast information to all the members in Procom since Notes had been implemented throughout the organization. The staff could get the same information. Despite there being a news database for the company on Notes, it was not known by the users. This was because the staff were more likely to inform others instantly about news by using emails.

Apart from being a communication tool, a distinct identity of Notes was developed in Notes Support team and Sales & Marketing, where Notes applications were designed for the KM database and customer contact database respectively. Though the KM database was found to be useful for Notes Support team, Notes was not utilized in other Technical Support teams of different products as there may have been only one member in the team. Each staff tended to be responsible for different products and was not involved with each other. Thus, Notes was not used to share information or knowledge across teams.

As Notes was utilized in the Sales & Marketing department, salespeople could report their activities to the Director. The sales application was used to maintain the information about the customers such as the status of project, the customers' interests and the prospects. Notes was perceived as a tool for the top management to keep track of salespersons. Therefore, it appears that Notes was seen mainly as a tool for the Director to monitor and control the salespeople. The information maintained on the database could not be retrieved and used by other salespeople. This may be because the salesperson was not aware that they had learnt something new from the customers and they did not maintain it systematically. Although they had to write a report about the customers, the information was not distilled and well organised for future use.

"...They [sale staffs] don't know that they got some knowledge from the customers. Their written report is just like speaking and is not distilled. When other people read it, they wouldn't understand where the knowledge is. This is because the writer didn't understand about what they type in whether it's just a normal report or knowledge. Knowledge is information which has been distilled. So, if it's possible there should be a main person who distills the information. He might have contacted with the person who met the customer and type in the report to summarise what's the problem and how to solve it. We need to brief the main content of the information...It's like making information become knowledge in order to be ready to retrieve and use..." (Software consultant manager)

As the email feature of Notes appeared to be used by all staff, Notes was perceived as a personal tool for some staff. Emails on Notes were categorised by the account owner. This enabled them to trace back to what has been done or corresponded with the others.

In short, Notes was identified as a replaceable communication and monitoring tool in Procom. This is because Notes was only implemented for the purpose of communication within the organization. Hence, users may not have perceived other distinctive characteristics of Notes and adopted other similar systems instead.

4.7.3 Notes identity in Comtech

Similar to the previous case, Notes appeared to be a tool for the managers to control and monitor people's activities- but not solely, as with Procom. The staff of Comtech used Notes to report and record their history of work due to the fact that they could be monitored once they had been away from the office. The purpose of the work order application of Notes was to tell others when a staff was not in the office or to check their availabilities.

In order to co-operate among different people from the different departments in Comtech, Notes was seen as a shared database for co-operating on the same project. This is because their work could be related to several people. For example, sometimes the Infrastructure team did not know whether their server implementation was compatible with the applications which had been developed by the Developers team. The KM database played a major role for Infrastructure staff to report and look for the solution. In addition, Notes was recognised as an inevitable resource since the company was involved with the development of software and applications where programming codes are important. Notes databases were found to be accessed by the developers for the previous programming codes. However, in the case of web portal Developer team, they used other software in sharing programming rather than using Notes. This may be because the software was more specialized in dealing with programming codes in which many re-versioning of programming needed to be done.

“I don’t use the knowledge-base of Notes. The Developers team has CVS which is a software for re-versioning and sharing programming codes...It came with websphere studio...It’s difficult to use knowledgebase of Notes for this since the codes are always changed almost every single minute. CVS is better.” (A websphere developer)

Not only were the KM databases as used by different departments recognized as the KM tool in Comtech, but other databases based on other applications such as sales application were also recognized as important databases of Comtech. For example, in the customers’ contact application, there was a comment section which the salespeople could put in any message. It was used to maintain the information about what topics had been discussed with the customers. Therefore, it became a report for other salespeople to access. In addition, the staff needed to do an online document called a sign-off document for a single phase of work in order to become a record for other colleagues, who could then follow up the work with the customers. As a consequence, staff may have referred to the sign-off documents to find out what had been done in the past projects.

It follows that since KM databases were employed in all the departments in Comtech and other applications were used to report and record the work processes, the staff could access and learn from the information or make a record of the previous projects in facilitating their work. Therefore Notes was identified in general as a reporting tool.

4.7.4 Notes identity in Chemhouse (Thailand)

Notes was mainly recognised in Chemhouse as a new email system. It is likely that the email feature of Notes increased the security in communication between Chemhouse (Thailand) and other companies of Chemhouse. This is because Chemhouse’s products are mainly chemicals. Therefore, the techniques and chemical formulation of the company appeared to be important and confidential. Meanwhile, the Chemhouse companies needed to communicate and share information among different locations. Hence, Notes was employed as the main tool

for communication by prioritising the security reason and it was used as a basic tool to integrate other IT tools such as Cognos and ERP systems among companies worldwide. Notes was also used as a tool to control and monitor by the headquarters. This is because the Notes server was linked to the main server in the headquarters. The server could be connected by using virtual private network (VPN). Therefore, all the emails from Chemhouse (Thailand) had to go through a VPN in order to be verified before sending it out to other companies.

Notes was used in connection with the existing intranet system in Chemhouse. The GAMI application of Notes was used to co-ordinate people in their sharing of information, whereas the intranet had been adopted to disseminate general information to all the Chemhouse people. Having used GAMI to contact people in Chemhouse group, Notes acted as a tool to verify whether the right people were being contacted. This is because the owner of GAMI controlled an application or database they shared. Therefore, it became a knowledge sharing tool within a particular group. The owner of GAMI would not allow other people who were not relevant in a particular area to access his/her database. The GAMI owners only sent a database access after the person who contacted them had been authorised. Therefore, Notes was seen as a tool from which Chemhouse (Thailand) could get updated news and information from headquarters or key people in specific areas. This is because the information was synchronised by Notes to all key persons such as Finance and Purchasing managers within Chemhouse (Thailand). As a result, Chemhouse (Thailand) got the same information as other companies in the group at the same time:

“...There is a database of account owners which are mail accounts. However, there are some people like me, we can have something like bulletin boards. Other people send it to me....when there is something updated, it will be sent into this database. Only me can see it because I added it alone. Other people [in Chemhouse (Thailand)] can't see it. It's a database which information is sent from the Chemhouse abroad to update me. There is a person who creates this database and send it to worldwide companies. It's just sent to the IT people. If it's about the industry, there is another name which the link will be related to some other people...” (IT supervisor)

In summary, Notes was identified as a complementary tool to other IT tools in Chemhouse (Thailand). This is because the Notes implementation was planned to integrate with other systems which allowed Chemhouse (Thailand) to report about its business to the headquarters in Europe. Notes is globally standardised as a co-ordination and communication tool when the issue of security is the main concern.

4.7.5 Summary of the use of Notes in general in the cases

Having analysed the different designs and purposes of implementation in the four case studies, the issue of how the applications and features of Notes are used and perceived in different organizations has been an essential aspect of this investigation. Therefore, the concept of ‘identity’ of Notes emerged from the data analysis and is considered as a key theme of this study which underlies the use of Notes for KM. This is because different organizations have either intentionally or unintentionally perceived the different identities of Notes which has resulted in the different uses of Notes to support KM. Ericson and Haggerty (1997) implies the potential impact of identity of technology that:

“The material technology of computers, cellular telephones, video, radio and telecommunications infrastructures determines nothing. It does provide new technical means for sensing and representing the environment... However, it is only its particular uses within culturally specific interpretive frameworks and visions of social organization that result in cultural and social effects.”
(1997: 411)

By proposing the concept of IT identity, this study attempts to investigate how and why different organizations create the identity of Notes in each case which has an impact on the use of Notes for KM. The analysis of Notes identity in the case studies will thus be discussed further in the next chapter.

4.8 Summary

In this chapter, analysis of the use modes of Notes in relation to KM was carried out in each case. Notes provides different uses within the four case studies which entail

some form of KM. The use modes were more likely to deal with information than knowledge. However, knowledge is exploited by individuals and some groups if they share the same background of work. It appears that in most cases, the first four use modes are found to be useful for distributing, accumulating and capturing mainly structured information, and they are in fact only enablers for knowledge creation of staff. The 'exploring' use mode of Notes was evident in ComNotes and Comtech, i.e. when Notes was integrated with other systems such as SameTime which enhances staff interactions. Hence, it may be concluded that Notes is used as a tool to support interactions among staff in which the outcome is either individual or organizational knowledge. Different meanings attached to the use modes in each company were discovered; mainly because several Notes applications were found to be utilized in these organizations. Thus, the further analysis emphasized how Notes applications were used in general and identified by the staff which led to the different Notes identities in different organizations. The discussion on the concept of Notes identity is carried out in the next chapter.

Chapter 5

ANALYSIS OF NOTES IDENTITY

5.1 Introduction

Having uncovered the different uses of Notes in the four case studies, this chapter attempts to investigate the identity of Notes as perceived by staff in each organization. Since different applications of Notes can be designed and implemented, people tend to have different perceptions of Notes which reflect their use. Not only have different systems been designed and implemented that lead to different Notes identities, but also the context in which Notes is employed has an impact on how staff perceive Notes. This gives rise to the different outcomes of the use of Notes supporting KM. Therefore, this chapter takes the analysis further by investigating the factors which influence the emerging identities of Notes in the four cases. The discussion begins with the literature on identity in management studies in order to demonstrate that identity is important, then the importance of the IT identity concept is introduced. Next, the emerging factors influencing the Notes identity creation of each case is discussed. Then, in order to specify why such identities were developed, cross case comparisons are carried out. This is to discover the similarities and differences among the creation of different identities from the four case studies. The implications of Notes identities are also compared in order to explore the outcomes of the Notes identities found in this study on KM particularly.

5.2 Identity concept in management studies

Identity may be defined as “the qualities of a person or group which make them different from others” (Cambridge dictionary). Identity has attracted overwhelming attention in management studies over the last few years (e.g. McGuire et al., 2001; Foreman and Whetten, 2002). This is because studies of various types of identity yield significant implications for organizational management. Identity has initially been conceptualized at the individual level. Mead (1934) proposed the idea of identity as a relational construct which “arises in the process of social experience

and activity, that is, develops in the given individual as a result of his relations to that process as a whole and to other individuals within that process.” (p.135). Personal identity is, “an individual’s knowledge that he or she is different from other people (group members) together with some emotional and value significance to him or her of this sense of individuality” (Haslam, 2001). Personal identity has become an interesting construct in organization studies. For example, Beyer and Hannah (2002) argued that personal identities provide mental representations of personal characteristics and attributes that are relevant to individuals’ work. Personal identities serve as repositories of a range of attributes that have been developed and enacted in past work experiences. Beyer and Hannah (2002) found that newcomers tend to carry forward their personal identities derived from past experience in sense making to their new jobs and organizations. Likewise, Maguire et al (2001) analysed identity in a study of trust and control. They argued that trust can be generated between actors who do not share an identity, if their different identities are complementary and mutually understood to imply normative controls on behaviour that evoke predictability and goodwill. It was noted that whereas the traditional ‘essentialist’ approaches to identity tended to portray race, gender, age etc as “innate characteristics that define the essence of the individual” and “reflect essential differences in attitude, personality and behaviour” (Litvin 1997, p.201, 204), Maguire et al’s approach to identity focused on the socially-constructed meaning attached to categories of identity. This is because identity is produced from many biographical and autobiographical acts that contradict, dominate and subvert each other (Czarniawska-Joerges, 1996).

On the other hand, social identity is different from personal identity, which is derived from personal characteristics and individual relationships. Scholars in social identity (Tajfel 1982; Turner, 1982, 1984; Ashforth and Mael, 1989) begin with the premise that people classify themselves and others based on various social or demographic groups, e.g., age, gender, race, ethnicity, religion, occupation, and so on. Social identity is defined as “the individual’s knowledge that he [or she] belongs to certain groups together with some emotional and value significance to him [or her] of the group membership” (Tajfel, 1972, p.31). Social identity has become the main issue in organization studies in that an organization is a group with social

identity (Statt, 1994) and it has psychological meaning for all the individuals who belong to it. Therefore, in the organizational context it is social, rather than highly individualised, identities that are of greatest relevance (Alvesson, 2000), though the latter should not be neglected.

Most organizational identity research is based on the social identity theory (Hatch and Schultz, 2002). Organizational identity, therefore, refers broadly to what members perceive, feel and think about their organizations (Hatch and Schultz, 1997). In other words, Albert and Whetten (1985) argued that an organization has an identity to the extent there is a shared understanding of the central, distinctive, and enduring character or essence of the organization among its members. Whereas the self concept in social identity theory is comprised of a personal identity encompassing idiosyncratic characteristics (e.g. bodily attributes, abilities, psychological traits, interests) and a social identity encompassing salient group classifications (Ashforth and Mael, 1989), organizational identity has been combined with social identity theory to shed light on the process whereby individuals identify with organizations (Foreman and Whetten, 2002). In addition, Hatch and Schultz (2002, p.1004) argued that “organization identity is not an aggregation of perceptions of an organization resting in peoples’ heads, it is a dynamic set of processes by which an organization’s self is continuously socially constructed from the interchange between internal and external definitions of the organization offered by all organizational stakeholders who join in the dance.” Similarly, Albert and Whetten (1985) concluded that organizational identity is formed by a process of ordered inter-organizational comparisons and reflections upon them over time. Research has explored the utility of the identity construct as the identity has been employed in a variety of ways to explore and explain a range of organizational phenomena. For example, Alvesson (2000) discussed various sources of social identities in knowledge intensive companies and how management may act in order to safeguard the right identity in order to attain the loyalty of employees. Some organizations are constituted as a particular type of multiple-identity organization (Foreman and Whetten, 2002). Multiple-identities are defined as an organization whose identity is composed of two or more types that would not normally be expected to go together (Albert and Whetten, 1985). By investigating in

a multiple identity organization, Foreman and Whetten (2002) found that organizational members cognitively compare their identity perceptions and expectations where the identity congruence affects the level of organizational commitment.

The individual's social identity may be derived not only from the organization, but also from his or her work group, department, union, lunch group and so on (Ashforth and Mael, 1989). Several scholars have focused on the shared identity as an important construct in team management (e.g. Moore et al., 1999; Mortensen and Hinds, 2001). Mortensen and Hinds (2001) studied whether shared identity can mitigate conflict in geographically distributed teams. They found that shared team identity may reduce conflict within distributed teams and a shared identity may be particularly helpful to the developments of integrative communications that allow distributed teams to overcome situations with the potential for conflict. On the other hand, they also found that conflict may disrupt the development or maintenance of shared identity and that the disruption in shared identity could be the source of reduced performance. Furthermore, it also appeared that there may be identity boundaries when team members are part of multiple projects or teams (Espinosa et al., 2003). Hence, identity is an important consideration in any study of team management where identification can have powerful effects on behaviours such as satisfaction, turnover and performance (Espinosa et al., 2003).

Having reviewed the various types of identity, processes relating to the construction and adaptation of identities are now considered since they are important for understanding organizational studies. Identity is best understood as something which is not monolithic and robust. Identities are rather multiple and contextual, therefore they must be constructed and secured (Alvesson, 2000). This issue is discussed in the following section while taking a focus on IT identity.

5.3 Conceptualizing IT identity

Similar to other types of identities discussed above, the identity of IT is not static or monolithic. Rather, it is socially-constructed, i.e. during the interaction between IT, its members and the organization itself. Therefore, an investigation into how the identity of some IT is cultivated in different organizational contexts is warranted as it may yield several implications to the use of IT in organizations such as increasing user acceptance and promoting usability of the system across the organizations.

According to the structuration theory view on IT (Orlikowski, 1992), IT is not simply seen as a technical device. Based on this, Orlikowski and Gash (1994) introduced the concept of technological frames. Technological frames are “the understanding that members of a social group come to have of particular technological artefacts, and they include not only knowledge about the particular technology but also local understanding of specific uses in a given setting” (p. 178). To interact with technology, people have to make sense of it; and in this sense-making process, they develop particular assumptions, expectations, and knowledge of the technology. People’s technological frames then serve to shape subsequent actions toward the technology. Orlikowski and Gash (1994) also posited that technological frames are shared by members of a group having a particular interaction with some technology. Different groups may have incongruent technological frames, which could lead to difficulties around technological use and change.

Based on the definition of organization identity which refers to what members perceive, feel and think about their organization (Hatch and Schultz, 1997), and the concept of technological frames by Orlikowski and Gash (1994), the concept of IT identity is defined here as the shared perception, feeling and thought of organizational members as a whole about the specific IT being adopted in their organization. In other words, IT identity is seen as a collective set of technological frames embedded within an organization.

With this study, we explore whether and how Notes has been perceived and established its own distinct identity as an IT within the organizations studied. As discussed in Chapter four, different identities of Notes were categorised in each case resulting in different KM practices. This is because Notes was differently designed and promoted to use depending upon the organizational contexts and their work processes. The notion of identity provides significant implications for the use of Notes for KM since IT identity, which is derived from interpretation of organizational members, would drive the process of design and use of IT for a particular purpose rather than the role of IT which may be imposed by people who implement it. In addition, IT identity is embedded and more strongly established in the organizations than the role of IT which may be changed by individuals. Table 5.1 summarizes the identity type of Notes in each case study. These will be discussed in the following sections which examine how particular organizations construct Notes identity and why different identities of Notes exist. The evidence from each case study is discussed by focusing on the reasons for the emerging identity of Notes and the implications of Notes identity for the staff, organization and the customers. The degree of homogeneity of perceptions amongst organizational members towards Notes identity may be checked based on the three domains which characterize people technological frames and have been used in the study by Orlikowski and Gash (1994). The three domains are outlined as follows:

- 1) Nature of technology – refers to people’s images of the technology and their understanding of its capabilities and functionality.
- 2) Technology strategy – refers to people’s views of why their organization acquired and implemented the technology. It includes their understanding of the motivation or vision behind the adoption decision and its likely value to the organization.
- 3) Technology in use – refers to people’s understanding of how the technology will be used on a day-to-day basis and the likely or actual conditions and consequences associated with such use.

The data collected was explored based on these domains. When these technological frame domains were put together, the researcher was able to uncover the identity types of Notes in these organizations.

Case	Identity type
ComNotes	Notes as a unique and integrated business applications
Procom	Notes as a replaceable communication tool
Comtech	Notes as a reporting tool
Chemhouse (Thailand)	Notes as complementary to other IT

Table 5.1 Identity type of Notes in each case study

5.4 ComNotes case: Notes as a unique and integrated business application

5.4.1 Reasons for perceived identity of Notes in ComNotes

In Chapter four, it was found that the identity of Notes as a unique and integrated business application was evident in ComNotes. This section investigates the reasons why Notes was perceived as such in ComNotes.

Although ComNotes is a partner of IBM, the company is independent. The company needs to have a tool to support its business processes as they have a number of customers to follow up and their products and services are custom-made. The decision to implement Notes applications or other IT tools in general in ComNotes was left to the Director who had been a programmer and had experience with the use of Notes. While there were many opportunities in the IT industries, the Director wanted to be a specialist in one particular technology in order to compete in the IT industry in Thailand. As he perceived the versatility of Notes, he decided to focus on business about Notes and its applications. Since the company was established, Notes was then promptly designed and implemented to integrate with ComNotes's business processes:

“...I’ve been using Lotus Notes since 1990. I’m not sure actually it is a conscious decision... As a company, I believe in specialising in subject that you need to specialise because the company market is so big, so many areas, If you don’t specialise, then you end up with many problems. So, we just decide to specialise in Notes.” (Director)

The development of Notes was aligned with the changes of business processes. Therefore, another possible reason that Notes was well integrated with the business processes is that ComNotes also developed its own applications to support business processes which were frequently changed since it is a high-tech organization. There were two approaches to Notes development. First, the applications were developed at the requests of customers, and second, the applications were developed based on the users’ experience within the organization who developed it as a product for sale.

“We often improve Notes in the company. This is because the software couldn’t fit business processes all the time. When our business processes have changed, we will improve the applications that we employ but it won’t be a major change.” (Assistant sale manager)

Individual staff needed to use different applications of Notes for the different responsibilities. This is because Notes was variously designed and widely implemented in ComNotes. As the type of organization is an IT company, Notes databases were likely to be recognised as the main tool to facilitate its work processes in ComNotes. For example, knowledge about technology was important and needed to be updated. Therefore, a Notes database was used and regarded by the technical people in ComNotes as a KM database. It was found that the ComNotes staff had good skills in IT from their education background. Therefore, it was relatively easy for them to learn how to use Notes.

The IT nature of ComNotes also had an impact on the use of Notes in that the staff needed to learn more about Notes in order to support their customers. Therefore, Notes was regarded as an important tool which they had to learn and familiarise themselves with. The staff were trained since they first started working in

ComNotes. Therefore, Notes basic functions such as schedule and calendar were utilised. In addition, even if there were different applications of Notes, it was still an integrated environment using a single technology. The staff did not need to learn entirely new things once a new application was developed and implemented in ComNotes. They just needed to learn the specific features of that application. Therefore, people were likely to easily recognise the functions and roles of Notes. As one staff of the software development pointed out:

“I felt bad with Notes at the beginning. I think it happens to everyone who uses other software and then start using Notes. If compared to other applications and tools, Notes is very different. First, it’s not a relational database. Second, there are several limitations which are different to other client applications... For example, someone who is used to Microsoft might say ‘when I used Microsoft application, it shows such pop-up and so on...why Notes doesn’t have.”

Notes became the main communication tool in ComNotes since staff were forced to turn on Notes at all times in order to receive emails from management. Notes also became the main databases which the staff of ComNotes used to record their work processes. The use of Notes was unavoidable since the records could be monitored and checked by their boss. Therefore, the staff of ComNotes were likely to recognise the important roles of Notes and the potentialities that Notes could be applied to several environments in order to facilitate their work processes. Staff also found that there was no need for them to start learning and using other software as they were familiar with Notes environment in ComNotes and felt that no other IT systems would replace Notes. Furthermore, human resources were vital to ComNotes. The company did not have many staff and each of them was a specialist. The company invested in staff training and thus Notes was used to capture and maintain knowledge of staff who may leave the company. Therefore, Notes was perceived as a central database because ComNotes needed to keep its information and knowledge within the company.

“When someone resigns, there will be a problem for the person that takes over. This is because the person who resign has worked here for 2 years. To transfer knowledge within one month can’t be 100% success...[With Notes] All the

information is maintained on central database. So, 100% of information is maintained there for anyone to access. Newcomers can see the database..."
(Customer Services supervisor).

Further, the small size of ComNotes was one of the factors which drove Notes identity to become a sharing tool in the organization. Notes created a community which the staff perceived as a place that they could formally and informally share information. In addition, some staff shared stories which were not relevant to work such as jokes and tips for good health on a Notes database. This is because the staff knew each other in person. Therefore, the culture of sharing was extensive among the people to access and share from one database to another.

5.4.2 Implications for staff, organization and customers

Since Notes' identity was developed as an integrated business application in ComNotes, Notes had several implications for the organization, its staff and the customers. By recording all the work processes through Notes, Notes afforded staff the opportunity to learn about work processes and the customers. While there was a high rate of turnover, new staff could refer to records on Notes regarding what had been done at customers' sites. With a basic introduction to the newcomers, they could look up records on the databases prior to their site visit. Notes also helped staff to check the status of the work process or to keep tabs on what they had to do in order to follow up on pending problems of customers which had not been responded to or dealt with:

"...There are 2 statuses of work, finished project and working project... I can track whether there is any problem which has not been solved or anything pending. I'll see from this application [call log]. It helps Customer Services department to follow pending problems of customers which haven't been responded or dealt with."
(Customer Services supervisor)

Notes helped the Director to monitor all the business processes in ComNotes. The Directors will timely get the information from the staff. For example, the sales

power application which records all the sale activities such as meetings with the customer, any comments or progress of the project or forecasting when the project could be sold, helped the management team forecast the income and decide on organizational strategy.

Notes indirectly provided support for ComNotes staff's actions in managing knowledge within ComNotes by utilising various features of Notes rather than directly setting it up as a KM tool. Notes was used to capture different types of knowledge. The basic knowledge was in the form of email that the people in the organization sent and received every day. Staff could then use the email feature of Notes to capture knowledge that was systematically embedded in emails. In addition, the call log and application control system was especially designed for the Customer Services department in order to monitor the applications after they had been launched to the customers. However, it was also accessed and utilised by other departments for different purposes. As a result, different information was shared through this application. For example, the call log application was used to keep records about customers, and other people could track what work had been done for that customer. Marketing also had to check requirements. When the project manager visited the site and found some problems, he informed Customer Services that this had occurred. If it was a problem that was not directly dealt with, Customer Services would put in a call log application that they have this problem and send to the team responsible, who would investigate and resolve it. It then also became a record that the customer application had been changed or modified after the customers had installed it. Therefore, Notes enabled ComNotes staff to collaborate and share knowledge about customers and technical solutions.

“We record the details we’ve done in each site so that when we have new staff and we want him to look after this site. He’ll see what’s going on with this site... We don’t have to tell him step by step. He can just look from this database and when he enters the site he can investigate more... Admin team will solve the problem. Sale or Customer Services team will inform us about the problems by sending call log... We’ll answer in the section for admin...whether we can solve it, how did we solve it...then we’ll notify the Customer Services team and our manager that we’ve solved it.” (System Administration staff)

However, it was particularly noticeable in the Technical Support department that the utility of Notes for KM was directly perceived, although Notes was not actively promoted as a KM tool in the organization. This may be because the technical knowledge maintained on the database was more likely to be coded and explained.

“...in Maam’s [System Administration supervisor] department this is a knowledge base or things that they are doing. So, requirements to work are kept. There is information. Here is a step to set it up. That took people through what to do. This is looking at IP addresses for particular customers.” (Director)

Not only did ComNotes and its staff benefit from Notes, but the customers also indirectly benefited from such ComNotes Notes applications. Notes enabled the ComNotes Customer Services department to check for the error rate in the application how many customers call back. ComNotes could assess customers’ satisfaction from the complaints they had received. As a result, the Directors could plan for organizational development and identify the problems underlying the complaints. The Director also considered the call rate of customers in order to calculate the charges for the services to the customers in the future. Furthermore, Notes helped reduce time in Customer Services. Sometimes the customers could not spend a long time waiting for the solutions. By maintaining tricks and tips and solutions faced by the staff’s experience and found from external resources such as the internet or contact with IBM, the staff could retrieve the right information regarding solutions which had been tried and verified to respond to the customers.

“For support, call log application is employed to monitor the applications after we launch it. We will check the error rate in the application how many customers call back. For complaints, we will see customer satisfaction...because if they complain, that means they have problems with the use. We separate types of complaints to different departments... The directors can see these complaints so that they can plan for organization development... why the customer complain. Is it about service or product...If it is problem from the applications, staff will check for the error and solve it. The director can also consider the calling rate of customers in order to calculate for the charges of customers for the next services. We will charge less if they rarely call us...It’s good for both customers and us. If they don’t call much, that

means we provide good quality of support. They can save money also.” (Customer Services supervisor)

In short, in ComNotes where Notes was the main product and tool in the organization, several Notes applications were developed to facilitate its business processes. Notes was, therefore, integrated into almost every process in ComNotes. The identity of Notes in ComNotes was clear to the staff. Though Notes was not intentionally promoted as a KM tool, it appears that Notes supported several business processes that allowed the organization and its staff to record and retrieve information for future use. These processes supported co-ordination, communication and collaboration processes which have been regarded in this study as KM processes.

5.5 Procom case: Notes as a replaceable communication tool

5.5.1 Reasons for perceived identity of Notes in Procom

This section discusses several reasons why the identity of Notes was perceived as a replaceable communication tool in Procom. Initially, rather than adopting other email products, the decision to implement Notes as an email platform in Procom was made by the Directors since Procom is a partner of IBM. Notes was adopted and promoted as the tool for communication in Procom because they also sold it to clients. Therefore, they needed to use Notes for reference purposes. Being specialised in the IT field, staff of Procom were likely to study and understand the use of Notes by themselves, rather than having a trainer. The decision to develop and implement the application of Notes was rather informal. For example, the decision to implement the sales application was based on only the Marketing Director and the development of the application followed his requirements. However, Notes identity had not been developed further except for the communication tool. Even though Notes was one of the products of Procom, the development of Notes in Procom itself was very limited. This may be because Notes was not the main product of the company as Notes lost market share to such competitors as Microsoft.

“Most of our customers are manufacturing and finance...Notes is not our main product. Our main product is ERP. Notes is a supplementary product to ERP. Notes will be connected to the purchasing system and human resource system...” (Sale manager)

Also, there was nobody who directly responsible for the development of Notes in Procom. Further, the Director did not see the importance of Notes development in the company; such development might have required increased financial and human resources, which may have been unnecessary for the company. Moreover, when there were new staff, there was no proper training about how Notes could be used. The Notes support team tended to support customers rather than provide support internally.

“When there are new staff, there is no training how Notes can be used. Someone will tell them only how to click and use basic function, but didn’t teach other advance use of Notes...If they don’t learn how to use by themselves, they might not know the real potentials of Notes. So, they just know it as an email.” (Marketing coordinator)

In addition, as Procom is an IT company selling several IT tools, it appeared that various types of IT had been implemented for different purposes. The development of Notes was seen as unnecessary. Notes was recognised as the only communication tool. For example, they had implemented BPCS as an ERP system for all the processes such as purchasing and the shared file server was simply utilised in Procom in order to share information. Thus, the potential capability of Notes as a shared space was unseen. Though Notes had been a product of Procom for several years, the implementation of Notes throughout the company was not done in the first instance. The purpose for implementation was initially for facilitating communication among the senior people within and outside the company. However, Notes identity as an internal communication tool had become more apparent when everyone had to use Notes in the company. The implementation in the whole company was initiated when the staff required it as a means of communication. As a result, Notes became a new tool to the staff and they had to adapt themselves to use

the new tool. Notes was simply seen as a tool which distributed information to everyone in the organization instead of using the previous notice board which someone may have not read the information or news on it.

“...We use ERP here. We both sell and utilize it. That means, for all the processes such as purchasing and so on, we use this tool. However, for purchasing we had previously used the Solomon software and later we utilized BPCS... For email, workflow and knowledge, we use Notes. These are the main tools. There are some databases utilized for purchasing. It’s about SQL...Mainly we utilize 2-3 tools, but for the operations that we contact customers or send emails or knowledge base, we only utilize Notes.” (Software consultant manager)

The data showed that, in the past, Notes was used as a tool to share information between Procom and the Lotus company. Procom was more dependent on Lotus as it was a partner. Lotus provided a server for all the partners. The information from the Lotus database was replicated to the Notes databases of Procom. The databases were synchronized with Lotus’ servers. Each server was a KM database which was confidential for partners. The information included news about seminars or case studies. Since Lotus was taken over by IBM, the support from IBM has decreased and Procom has been more independent. As a result, the use of Notes as an information sharing tool across the organizations reduced and then disappeared. The company needed to support itself. Procom developed its own KM database in the Technical Support team to support customers. However, the resignation of the person responsible for it discouraged the use of KM database in Procom.

“... Previously, Lotus hadn’t been merged with IBM. Lotus provided a server for all the partners... They will replicate this information to our Notes databases... We used Notes as an interface...We’ll replicate everyday. But since Lotus merged with IBM, it seemed that they didn’t have much staff left. There are only 3 support people I guess, so they didn’t support any company. Previously, they would have staff who were responsible... We stop using Lotus resources. Partners have to work on their own. We also have to pay for the phone line. So, we stop replicating the databases...” (Software consultant manager)

The policy on the use of IT in Procom was directed by its management. The identity of Notes even as the sales database was not well developed in Procom because there was no enforcement from the management team. The database was not regularly updated by the salespeople. It tended to be updated only once the administrators requested it from the salespersons. Furthermore, the Director himself did not really recognise the important role of Notes in Procom. Only some basic features of Notes such as email and time schedule are acknowledged by the Directors. Therefore, the development and use of Notes in Procom was not given attention and was limited. Other people could not identify the role of Notes since the top management did not urge them to use it:

“...Administrators work as secretaries. They will control the databases but our databases need to be updated by account managers which we haven’t set the exact date for them to do it... We do have guidelines what they have to do but we do not have a mandate that they have to do. We attempt to do it. At the moment it depends on the administrators whether they request it from the account managers.”
(Operation director)

“It depends on the top management. If they think it’s important, the staff will follow. If the boss doesn’t really force us, the staff are unlikely to use it...” (Software consultant manager)

5.5.2 Implications for staff, organization and customers

Since Notes’ identity in Procom was created as the main tool for communication, it had several meanings for staff, organization and customers. Notes enabled internal communication because the staff were likely to be away from their office. Further, the use of Notes fitted the virtually distributed character of Procom as there were a number of employees who could not be reached by telephone or meet face-to-face. Since Notes was not utilized as an email platform throughout the organization in the beginning, people perceived it as a new tool to replace sending and receiving paper documents. As a result, they found that Notes helped update information faster. The resources maintained on KM databases appeared to be wasted. As there was no person responsible for the KM database, people in Procom did not make use of it. This was because the information maintained on the databases became unmanaged

and futile. As a result, apart from the staff in the Notes Support team, other staff in Procom could not understand and utilize such resources. However, Notes was used to facilitate the work processes of individual salesperson in order to keep track of the activities they have been doing. Notes also helped staff in recognizing the transactions which had been conducted through Notes. Transactions on Notes could be evidence in case someone forgot who and what they had been dealing with. Sometimes they got lots of prospects and jobs which had been processed, and Notes helped them to follow up. However, such use of Notes depended on individual staff as there was no obligation to update the transactions with customers on Notes. Hence, Notes became an individual tool, rather than a collective one which constrained other colleagues to use Notes to help follow up work:

“This application [sales application] is good for me because in the past, I used to use excel to create and print out a monthly report. When we use this application, we just update new prospect information into it. I can update on it. I don’t need to print it out. Another advantage is that sometimes I’ve got lots of prospects and I can’t remember how far this customer has been processed and what I’ve been processing with them. So, Notes helps me to follow up.” (Presale consultant)

As reports on sales activities was done through the sale application, Notes was used by the Directors to monitor and control the activities of the salespersons in Procom. The schedule functions of Notes facilitated the monitoring of activities of the staff when they were away from the office. The staff sent their schedule to the Director to keep him/her posted about their daily activities.

“I will send a report to my boss by email. There is another application which is like a daily report for everyday activities. I will type in this application and there would be an automatic mail to my boss.” (Software consultant)

Notes was mainly used as a customer contact database. As a result, this made the company agile in its response to customers. There was a corporate website where customers could contact anyone in the company through the website and the information came directly to Notes. The message was directed to the person

responsible. As a result, Notes became an easy access tool to Procom for the customers:

“...we’ve got a website where customers can contact through the website and it will come directly to Notes. I developed it. It’s like a form and will be sent directly to Notes...” (Software consultant manager)

In conclusion, the identity of Notes in Procom was mainly as a communication tool. Even if the KM database and sales application were developed and implemented, it was not recognised by most people in Procom. This may be because Notes was not their main product. Therefore, the management team did not perceive the value-added benefits of Notes development apart from using it as an email platform. However, Notes was unintentionally used to support KM, although the staff were likely to use more features of Notes when controlled and monitored by the top management.

5.6 Comtech case: Notes as a reporting tool

5.6.1 Reasons for perceived identity of Notes in Comtech

Several reasons are expounded in this section as to why the identity of Notes in Comtech formed as a tool for reporting information and knowledge within the organization. As a partner of IBM, Notes was initially implemented throughout Comtech since Comtech was founded as a unit of Thaitech and co-operates with IBM and other products apart from Microsoft. Therefore, the management and policy of Comtech was directed from Thaitech. Since Thaitech achieved ISO 9000 standard, Notes was used to monitor the activities of staff and to assign work to individual staff by the managers. Thus, Notes helped the organization to keep track of work processes. No other IT systems were found to facilitate these processes. As a result, it made the staff in Comtech perceive Notes as a main tool, unique and not easily replaceable:

“The problem was that we don’t know when staff met with the customers. When we record it on paper we may lose it...There is work order which tells us who are the customers, when did they call, what topics and what they want...so, everyone in our

organization can check for these information. It follows the ISO standard... After that, there will be approval from account manager who decides which staff will be responsible for the customer... which one will be support, and engineer. Every process is maintained on this application, so we can track the work process...”
(Technical manager)

Since Notes was used throughout the organization from the first implementation, all the people in Comtech got used to Notes from the beginning. All the new staff were introduced to Notes when they first entered the organization. Due to the fact that Comtech sells Notes, each individual staff member was likely to practise and familiarise themselves with the system in order to be able to explain and sell to customers. Therefore, various potentialities of Notes were perceived. Furthermore, the use of the KM database was initiated by the manager who had seen the important role of Notes for all business work processes. The KM database of Notes was also utilized in Comtech since the beginning of Notes implementation. However, the initial use was not very successful until the whole work processes were forced to follow the ISO standard. The KM database was used by the people in Comtech as the manager urged them to post useful information there which had been shared by other means, such as emails, so that people in the organization could learn and retrieve the information:

“...We need to follow the ISO standard. That means we need to achieve a target. For example, in my department, the target is to respond to the customers within the limited time period. Sales & Marketing also have its own target...Notes can help tracking and keeping information. It facilitates us to achieve the targets. We can use that information to analyse what we have to do next. We need to assess quarterly... What’s wrong in this quarter...” (Technical manager)

Even if the ISO standard did not directly require KM practices, it enforced Comtech to have a database that the staff could keep track on the work done for customers. The staff had to use Notes everyday by posting their activities and referring back to other past projects. By recording the activities, staff could learn from previous

practices. Therefore, the identity of Notes was instantly recognised as a reporting tool, in which information and knowledge could be gleaned by the staff in Comtech.

Apart from being monitored by the managers, staff in the Support & MA team also used Notes because they were given incentives. Incentives were used to motivate staff in the Support & MA team to provide best service to the customers. Support & MA staff used Notes to post customers' problems onto customer quiz databases and their boss could then investigate whether the customers' problems had been resolved. In order to improve their chances of being rewarded, the staff were very likely to post this information into the Notes databases.

“My team has Mr. A. [technical manager] as a boss. Mr.A. will see our activities from work order... It will record where we go to service, how long we spent on that site. After visiting the customers, there will be a professional report for the customers to sign after we finish... Mr.A. will check whether I finish on time so he can give us incentives. If we work until late night, he will give special money. He will check whether project is completed, why it's still pending. Sometimes, the customers will call to complain that there is no one dealing with their requests.”
(Support & MA staff)

The size of Comtech appeared to be appropriate for the staff to use Notes as a learning tool (where people are related in the same background i.e. IT). As the size of Comtech was around 50 staff, the company was competent in organizing large amounts of information such as Sales & Marketing documents which had been posted by the different people. Therefore, it was easier for the staff to retrieve the information to be used in the future. Moreover, they tended to share the same background about the products. Even if there are several kinds of products offered by Comtech, the main product lines are from IBM and companies other than Microsoft which the products need to be compatible with. As a result, the KM database was recognized as a good resource for the staff to look up information about the work they were responsible for.

“Only a group of people can't manage knowledge of large volume. It has to be co-operated from several parties... This seems to be successful as a KM of a small

organization... If I don't know anything, I'll search from knowledge base.” (A sale staff)

“It's a small group here... it's a small number of people who always do the same thing... If it's getting bigger like TKC (Thailand knowledge centre website), it's not going to be people in the same field... it makes difficulty in searching for what we want to know.” (Developer)

5.6.2 Implications for staff, organization and customers

The identity of Notes as a reporting tool had many implications for the organization, its people and customers. The staff of Comtech were likely to categorize all the information by themselves since all the staff shared the perception of the Notes KM database as a tool for which the information had to be organized in order to be retrievable by the other people. As a result, all the staff of Comtech were likely to contribute to the KM database and help in organizing the information.

Not only was Notes used in Comtech to deal with information about IBM products, but it was also used to deal with other products which Comtech was a partner. This is because Comtech was responsible for all the software other than non-Microsoft products in Thaitech. Moreover, it is recognized that the information about these products maintained on Notes databases were related to technical issues to enable others to resolve them. For instance, information about viruses was regularly updated to the KM database. When the customers informed Comtech about viruses, the staff could offer diagnoses and retrieve the solution from the KM database.

Notes was also seen as a KM database which helped staff to support customers' problems. Sometimes, the staff needed to search for the solutions for customers from external resources, unless the Notes databases provided them. Notes enabled the people in Comtech to respond to the customers faster because the solutions they provided to the customers had been tried and tested by the staff several times. For example, most systems that Comtech developed for customers were similar. The staff could see from the KM database whether there had been a similar application

so that they could modify for another customer. Some codes could be applied to new applications. As a consequence, the customers were more likely to have their requirements ready rather than starting from scratch:

“if we don’t have Notes, it could be chaotic... We would need to search from the websites again for customer’s problems. There will be several websites which we have to try again which one works. Since, we use knowledge base, it’s quicker. The knowledge was tried and verified before that it works.” (Support & MA staff)

Having promoted the importance of Notes as a tool for KM by the manager, the staff of Comtech used to a high degree the six use modes of Notes for KM. Notes was seen as a tool which facilitated them in learning how to work in the organization. The staff could exploit and learn from information, documents and presentations created by other people. For example, before presenting to a customer, the staff could prepare brochures or presentations from the KM database for customers. As a result, the new members were likely to perceive Notes as a tool to facilitate their learning in Comtech and KM databases had become the major tool for them.

In conclusion, Notes was mainly recognised in Comtech as a reporting tool. This is because Notes was used as a tool to record and keep track on the staff’s activities following by the ISO standard which had been adopted by Thaitech. Further, since there was a high rate of staff turnover, Comtech needed to use Notes to retain information within the organization. Therefore, there was a need for the company to maintain what they had already done on the databases for others to continue their work. Notes identity was intentionally perceived as a tool for KM since the importance of Notes for KM was pointed out by the management team. However, it is likely that the problem of information overload occurred and thus it may not be picked up by staff for use in the future. The management team of Comtech played an important role in motivating and training the staff to utilize and manage the KM database of Notes. As a result, the staff had to post information and knowledge, and also used KM database to learn from other colleagues’ activities.

5.7 Chemhouse (Thailand) case: Notes as complementary to other IT

5.7.1 Reasons for perceived identity of Notes in Chemhouse (Thailand)

There are several reasons behind Notes' identity in Chemhouse (Thailand), which are identified in this section. As Chemhouse (Thailand) is a subsidiary of Chemhouse group, management of the company tends to be influenced by the European board. Notes was implemented in Chemhouse (Thailand) because it had to follow the IT plan directed from the headquarters in Europe. The IT infrastructure of the whole Chemhouse group was planned in order to centralise the information from all around the world to the headquarters, which could then be used to make plans for managing the worldwide companies. As a result, it reflected the adoption of Notes in Chemhouse (Thailand) for communication and information distribution.

“Notes is also set on the same standard. They want IT infrastructure on a single standard. They want this software to be aligned with different departments so that they can get reporting. It helps to manage purchasing, selling, stock so we have to plan for this infrastructure. When we know it, how can we change this in all 60 countries. They start at accounting, then selling department. We do department by department. Meanwhile, in abroad, they set up a new department which is HR. HR will analyse how to improve staff of Chemhouse...” (Finance manager)

Notes was not used as the main communication tool within the company. This may have been because Notes was implemented only for use by some senior people and managers. Also, apart from telephone, there was a pop-up message system based on a Microsoft application that was used for communication in Chemhouse (Thailand). As a result, the role of Notes as a communication tool was avoidable in Chemhouse (Thailand). Furthermore, the use of computers in Chemhouse (Thailand) was limited. Not everyone had a computer. Therefore, Notes was used by only key people in Chemhouse (Thailand) because they were responsible for receiving information from other companies for use within the company. As Chemhouse (Thailand) is not an IT company, the skills of people in utilising IT tools was limited. This also influenced how people perceived Notes identity in the company in which several IT tools had been adopted. As a result, Notes did not develop its own

identity when compared to other tools. The lab manager explained how information and knowledge was maintained on other systems:

“Know how of the company such as chemical formulae will be maintained in a specific drive. It is authorised for some people to access... It’s a shared file server...I upload the chemical formulation onto SIRIUS which we use in the production. However, we keep the original document on file sharing server.” (Lab manager)

The staff of Chemhouse (Thailand) were likely to be afraid of using new IT as their experience with IT tools was limited. This may have been down to the natural initial reaction of people towards new technology as they have been working within the organization for a long time and got used to certain practices. As a result, it was difficult to change people’s perceptions towards new technology.

“... We’re the organization which is 15 years old. Most of the staff have been in the company for several years. So, it is likely that most people here weren’t educated about IT from the classroom. They just learn by themselves. So, they’re more likely to be afraid of new technology than the younger generation.” (HR manager)

In addition, there was no one who could direct the use of Notes in Chemhouse (Thailand). Although there was an IT supervisor responsible for IT in the company, his role was to control and maintain the IT system of Chemhouse (Thailand), and to receive the IS policy from the headquarters rather than to develop applications on his own or teach other people how to use the systems. Moreover, since Notes was not a personal software for home users, it was difficult to find a handbook of Notes in Thailand. Due to the limited skills in IT of the staff, they were therefore unlikely to perceive other features of Notes and to develop the use of Notes in the company.

“...I’m not that industrious to teach other people. Mostly, when the users are struggling, I will teach them or solve the problems. Who uses it and has no problem won’t get anything but who’s got the problems most will know most. It’s not convenient for me to open a course because someone hasn’t used it. Someone uses only Sirius... They don’t use even word and Excel. Individuals tend to use software differently... I don’t know how to open a course.” (IT supervisor)

Despite the fact that Notes could be used to maintain and categorise files on databases, its potential was not recognised by the people in Chemhouse (Thailand). This may be because they had already been using a different file sharing system within the company. Since the shared file server had been utilised for some time, it was recognised by the staff as a tool to support KM within the company. In addition, other tools such as an ERP system were used in order to maintain the formulation or process which the company has to follow in the production. Therefore, Notes has not developed its own identity as a KM tool within Chemhouse (Thailand).

“Know how of the company such as chemical formulae will be maintained in a specific drive. It is authorised for some people to access...It’s a shared file server”
(Lab manager)

5.7.2 Implications for staff and organization

The use of Notes in Chemhouse (Thailand) has several implications for staff and the organization. As Chemhouse is a multinational company, it is impossible for all members to know each other in order to share useful information. It is apparent that Notes acted as a co-ordinating tool which enables people in different countries to become acquainted. Notes also allowed people in Chemhouse group to get in touch with the right people across the companies worldwide. Since Notes accounts were assigned to only key people in Chemhouse group, it helped share the information securely by identifying the responsibility of people in the organization. As a result, the people from Chemhouse (Thailand) knew who to contact in the Chemhouse worldwide. On the other hand, the person contacted could decide whether he/she should authorise access to the information.

“...I use Notes to get to know people in Chemhouse. I know everyone in Chemhouse (Thailand), but for Corporate Chemhouse which are in different countries, I don’t know who is responsible for a particular job. In Notes, there are usernames and personal data of each username which is formal data. So, I know the name of people and where they are and what they work for...I have sometimes sent emails to people who are in my field. So, I can share information with them...” (HR manager)

A purchasing page form, an application of Notes, was specifically designed and utilised by the Purchasing team in Chemhouse (Thailand). The application allowed the key purchasing people to key in or look up the information about the products and raw materials. Also, this application had topics relating to purchasing knowledge and rules, and best practises where users could learn what and how to deal with the suppliers. Notes was therefore, specifically, considered as an information sharing tool in the Purchasing team, though the use of this application was still limited because it was very new to the users. As a result, Notes was not a system which helped to distribute information from the headquarters to everyone, but rather it was used by a particular group that had the same background and responsibilities in Chemhouse group.

As the Chemhouse business was not related to the IT industry, people in Chemhouse (Thailand) did not fully appreciate the need of IT.

“...I think Thai people don't fancy technology as the western people do. We still want to touch something else rather than using Notes...” (Finance manager)

Other groupware features such as scheduling or resources reservation were not utilised in Chemhouse (Thailand). The focal use of Notes was indeed to facilitate communication among Chemhouse group.

In addition, since there was no training about Notes formally in the organization, the users did not perceive the capabilities of Notes which may have been different to other systems. Hence, the use of Notes was not fully and successfully utilized in Chemhouse (Thailand). The Purchasing manager expressed her confusion on how Notes was different to the intranet system.

“Email is one feature of Notes. As far as I know, Notes is similar to the intranet that provide information. I think that's the uniqueness of Notes. I'm not sure if I'm right. I have never seen other systems. Perhaps, I have got little experience with other systems...” (Purchasing manager)

In summary, Notes was used as a complementary system to other systems in Chemhouse (Thailand). Therefore, in Chemhouse (Thailand), the identity of Notes was blurred. Two main reasons were found to blur the use of Notes to the users. The first is that Notes had been implemented in order to replace the previous email system. Users who had just started using Notes did not perceive other capabilities of Notes apart from the email feature. Notes was considered as a new email platform which replaced a previous email system for security reasons in communication within Chemhouse group, but not within Chemhouse (Thailand). The second reason is that as Chemhouse (Thailand) had implemented several IT tools and applications for different functionalities such as file sharing server to share important files and intranet to share news and information, the full capabilities of Notes as a tool to support business processes and KM were not appreciated.

5.8 Cross case comparison of Notes identity

Having identified the different identities of Notes in the case studies, this section attempts to investigate further why such identities emerged. Therefore, it aims to compare the similarities and differences of the Notes identities from the case studies. The following discussion starts with the comparison among Notes identity definitions from the case studies. Then, the analysis of the creation of Notes identities focuses on different organizational contexts.

5.8.1 Differences and similarities among the definitions of Notes identity in each organization

Since there can be some overlapping underlying the definitions of each identity, Notes identity from each case is compared here. Table 5.2 presents a cross-case comparison of Notes identities. This includes what each identity means as far as the 3Cs (coordination, communication and collaboration) of KM processes are concerned, and the functions of each Notes identity in collocated and dispersed teams.

Site & its Notes identity characteristics	The 3Cs of KM processes in the whole company	Notes identity in collocated teams	Notes identity in dispersed teams
ComNotes: Notes as a unique and integrated business application	Co-ordination, Communication and Collaboration	Different Notes applications were used to facilitate work processes in different departments. The KM database was used in Technical Support department.	Notes was used to communicate between the main office and a branch in abroad
Procom: Notes as a replaceable communication tool	Communication	A sales application was only used in the Sales & Marketing department to report work status to the director. The KM database was used in Notes support team.	N/A
Comtech: Notes as a reporting tool	Co-ordination, Communication, Collaboration	Identity of Notes as a KM database was perceived and used by all departments.	Notes applications were linked to web portal to allow access for off-site staff.
Chemhouse (Thailand): Notes as complementary to other IT	Co-ordination and Communication	Notes was perceived as a tool for the head of the team or responsible persons. In the Purchasing team, Notes was used to input information about raw materials by the Purchasing staff who shared the manager's Notes account.	Notes was seen as a co-ordination tool to the right people for the right information.

Table 5.2 Comparisons of Notes identities in the case studies

There are similarities between Notes identity in the case studies of ComNotes and Comtech, in which Notes applications were solely used within these organizations rather than adopting other software applications. In other words, Notes was well-integrated into their business processes. Hence, the staff of both organizations agreed that Notes applications were unavoidable and well-embedded in their work. The 3Cs of KM processes (Co-ordination, Communication and Collaboration) were

found to be carried out by the majority of staff in ComNotes and Comtech through the different features of Notes.

Even if several other IT applications were similar such as document library in ComNotes and KM database in Comtech, there was a slight difference in how Notes was promoted by top management which affects the identity of Notes from the staff's perception. Notes was created to facilitate in the operation of ComNotes among the people in different departments. Staff referred to what had been maintained on Notes or interacted through Notes for a particular project. The KM databases appeared to be additional resources which the staff could look up. However, Notes was identified by the manager in Comtech as a tool to share resources such as sales resources or technical KM database where everyone was forced to access them first before throwing questions to other people. The staff of Comtech learned from what had been done in their company. Therefore the distinctions between the Notes identities in the two cases are that Notes was promoted by the directors as a tool to support business processes in ComNotes, and in Comtech Notes was presented as a tool to maintain resources for the staff to learn how to work.

In contrast, the Notes identities in Procom and Chemhouse (Thailand) were perceived in relation to other IT tools since there are other tools existing prior to the implementation of Notes. Notes therefore had not been seen as a main tool in these companies and as a result it was seen as easily replaceable by other tools to provide for its specific functions. The use of Notes did not cover all the work processes in the organizations. Therefore, all the 3Cs KM processes were not well-embedded in these organizations. Further, the main difference of Notes identity between the two companies is that Notes was mainly seen as a communication tool within Procom, whilst Notes was used as a supplement of other IT tools in Chemhouse (Thailand); Notes was used as a communication and co-ordinating tool for co-operative work and management between Chemhouse group. In other words, communication was found to be the main KM process in Procom whereas inter-organizational co-ordination and communication were the KM processes through Notes in Chemhouse

(Thailand). Therefore, Notes was differently identified in these two cases. This depended on how Notes was integrated with other tools and the boundary of staff who interact.

In the following section, comparisons of the reasons why the Notes identities are created across case studies are conducted.

5.8.2 Factors that affect the development of Notes identity for KM

Even if the same technology is implemented, the same outcomes cannot be guaranteed in all organizations. The organizational context has an impact on the use of technology. As argued by previous studies, the use of Notes should be aligned with the key features of the organization such as structure, culture, and policies (Vandenbosch and Ginzberg, 1996; Orlikowski, 1993) in order to be used as a tool to facilitate co-operation. Further, since the technology itself may not by itself fulfill KM, the support of other factors such as strategies, organizational structure and processes need to be taken into account, as several other researchers have suggested (Boland and Tenkasi, 1995; Sherif et al., 2004; Robertson et al., 2001; McDermott, 1999). In addition, the use of Notes is more strongly influenced by aspects of the organizational context, internal social structure and the users' capabilities than by any intrinsic logic of the technology (Karsten and Jones, 1998; Orlikowski, 1993). Due to the limitations of case availability, this study may not be generalised on the issue of the organizational context. This is because the characteristics of the cases were not all the same. However, the data collected in this study can still proceed to the discussion of the influences of the organizational contexts on the use of Notes for KM. Hence, this section discusses the influence of organizational context on Notes identity and the factors influencing the use of Notes supporting KM in the four organizations studied. The discussion attempts to point out the distinction between the context of this study and those of earlier studies in the literature. In addition, other factors such as IT availability and different characteristics of individuals are discussed as they influence the users' perception towards Notes.

5.8.2.1 Influence of IT and non-IT organizations on Notes identity and its use for KM

As all of the IT companies that have participated in this study are partners of IBM, this has an impact on the identity of Notes in these organizations since the staff need to adopt Notes so as to be a reference site for their customers. Nevertheless, clearer identity of Notes is more likely to be perceived by the staff of ComNotes and Comtech than the staff of Procom. This may be because these companies focus on IBM software as their main products, whereas Procom does not deal with only software products but also hardware. As a consequence, the staff of ComNotes and Comtech were more specialised in software adoption than Procom. Since Notes was the main product that they promoted to their clients, ComNotes and Comtech chose to implement it and adapt it into their business processes. On the other hand, Procom did not focus on Notes as its main product. Hence, Notes was not developed fully nor well-integrated into business functionality.

However, the reason for Notes implementation in the three IT companies are different to the non-IT case that was examined in this study, that of Chemhouse (Thailand), in which license fees of Notes had to be paid per individual account to IBM. Thus, Notes was not used throughout Chemhouse (Thailand), but only in key departments such as Finance, HR and Purchasing managers in order to co-ordinate their work. In addition, individual staff in the IT companies had their own PCs, while the number is limited to some staff in Chemhouse (Thailand). Having considered the different implementation in these cases, Notes identity was then developed as a tool for communication within the IT companies, but it was not realised as a communication tool between staff within Chemhouse (Thailand).

The nature of an organization also influences staff when using Notes to support KM. In comparing the use of Notes between the three IT organizations and Chemhouse (Thailand), it appears that the use of Notes in Chemhouse (Thailand) cannot be supported by other social interactions since it is used to co-operate with other companies rather than within organizations. Hence, staff were reluctant to engage in knowledge interactions through Notes with others whom they have previously had

little contact with. As Hayes and Walsham (2001b) suggest, in safe enclaves, where employees feel able to express their own underlying views of an activity, and are open to discussion and reflection surrounding on-going activities and events, the staff of ComNotes, Comtech and Procom were more likely to perceive Notes as a safe tool to express underlying views than those in Chemhouse (Thailand). Unlike the study by Robertson et al. (2001) where consultants constituted a hostile rather than hospitable environment, the IT consulting nature of ComNotes, Procom and Comtech also engendered the co-operation between consultants through Notes, whilst Chemhouse (Thailand) did not focus on co-operation within organization. This may be because the technologists appeared, not being subject to a competitive culture, to have been able to use the technology to conduct their work, namely, solving technical problems (Orlikowski, 1993). Having scrutinized such comparison, it seems that Notes can be used to facilitate the work only within IT companies which are consulting firms, but it is less important in Chemhouse (Thailand) which focuses more on manufacturing and products. However, the types of companies do not confirm the successful use of Notes for KM. As this study found, the use of Notes in Procom is less efficient than the other IT companies. In addition, the study by Orlikowski (1993) found that the use of Notes in a large consulting firm did not improve collaboration in an organization. In contrast, Brown (2000) found that the use of Notes was successful in a commercial organization, in that staff used the record kept within the system to make actions seem orderly and sensible to others. Hence, even if the types of organizations affect the types of knowledge being utilised, it may not be concluded that the types of organizations may affect the co-operation processes with Notes which lead to KM practices and this section further proceeds to discuss other characteristics of organizational contexts.

5.8.2.2 Influence of SMEs and large organizations on Notes identity and its use for KM

Most of the IT organizations adopted in this study were SMEs, with the exception of Chemhouse (Thailand), which is a large subsidiary organization to an international company. Having compared the difference between the impact of SME and large organizations on Notes identity, it seems that the staff in such a large organization

did not share relevant information across different departments through the same applications of Notes. This may be due to it being divided into several functions which is more difficult to find and therefore share relevant information. In addition, most users of Notes in Chemhouse (Thailand) were departmental managers. Thus, they tended to work with Notes independently, rather than sharing information. In contrast, in the SMEs ComNotes and Comtech, where the structure was simple, users were likely to perceive Notes as a sharing tool in their group for co-operation. However, though Procom is also an SME, its structure consists of several subgroups. Hence, staff did not find it useful to use Notes as a co-operation tool since the information is unlikely to be of relevance to others:

“There is an obstacle in sharing knowledge with colleagues. Though, we’re in the same department, we focus on different products... If the knowledge is relevant to each other, we will share it.” (System support engineer)

In comparing large and SME organizations, several factors deriving from the different contexts are found to influence the different uses of Notes for KM. First, Notes is more likely to be used as a tool to build relationships among staff in large companies. In other words, Notes impacts the pre-existing formative context questioning the hierarchical structure and the functional division of labour (Ciborra and Patriotta, 1996). For example, the use of Notes in Compound UK (Hayes and Walsham, 2001a), Unilever (Ciborra and Patriotta, 1996), Roche (Ciborra, 1996) and Alpha (Orlikowski, 1993) facilitated work across boundaries which allowed staff an increased familiarity with individual personalities, as well as opening up a forum of discussion surrounding the assumptions and perspectives of experts from different functions (Hayes and Walsham, 2001a). Similarly, this present study found that the use of Notes in Chemhouse (Thailand) is connected to other companies worldwide in order to create relationships among individuals who share the same job responsibilities. Therefore, in large organizations Notes seems to be used to bridge the gap of time and space in connecting several people together and this could lead to the obstacles in co-operation on Notes since the norms for co-operation are limited prior to the implementation of Notes. In addition, since Chemhouse (Thailand) could be characterized in this study as a “virtual organization” due to its geographical dispersion, the same as EDF, an international distribution part of a

French energy provider (in Ciborra and Suetens, 1996), it tends to be difficult to reconcile the style of working and knowing with prescriptions to share information (Ciborra and Suetens, 1996). However, this does not mean that virtual organizations influence the structure; this would rather depend on the type of virtual organization (Burn et al., 2000; Panteli and Sockalingham, 2005). The staff in Chemhouse (Thailand) do not rely only on the information and database as it has not been supplemented by other means of co-operation. Similarly, Ciborra (1996) found that no one fully trusted the centralised databases in a large pharmaceutical company.

Unlike large companies, this study found that, due to the close relationship in SMEs between the staff, such interpersonal relationships are likely to drive them to interact through Notes. Hence, the size of organizations in which Notes is implemented is found to have an influence on the use of Notes for KM. This may be because the smaller organizational context affords more opportunities for staff to collectively learn and foster joint understanding and expectations. As argued by Orlikowski (1993), since individuals are used to personal computing environments, shared technology use is difficult to grasp in large organizations. This, as a result, could inhibit the learning on how to use Notes in large organizations which results in less co-operation on Notes than in a smaller firm context. In addition, in large organizations such as Compound UK, many employees were not confident that they could make their views on a particular issue clear on the databases, and feared offending others or writing something stupid or irrelevant to other employees (Hayes and Walsham, 2001a). In contrast, this is not the issue in the cases of SMEs focused on in this present study. This may be because the size of the organizations in which everyone knows each other engenders friendly environments for sharing ideas and opinions. Further, the relationships among the people in ComNotes and Comtech are likely to motivate members to interact with each other through Notes as the organization size also helps to form in-depth relationships between staff in different departments and functions in working together by other means such as meeting around coffee break periods as the staff are in the same place. Though the users are from different departments in ComNotes and Comtech, in which Notes is implemented within the organization but not integrated with Thaitech, they do not construct their understandings from their use of Notes, but this had to be

supplemented by the development of in-depth social relations between the people involved (Hayes and Walsham, 2001b), which in turn enables sharing of organizational knowledge.

However, not only does the size of an organization enable the use of Notes for co-operation, but the use of Notes, on the other hand, is also found to enhance co-operation among staff in small organizations. This is because the staff are likely to be away from their office and Notes acts as a medium in their co-operation. As found by Karsten and Jones (1998), a small computer consultancy company employed Notes to increase co-operation among individual consultants which previously appeared to be decentralized, with each consultant pursuing their own approach. Similarly, the staff in ComNotes, Procom and Comtech were likely to use Notes to increase participation on co-operation when they worked remotely. It also enabled a more centralized form of organizational structure where the top management could control their staff who were always away. Further, the findings of this study are consistent with the study of Karsten and Jones (1998) in that Notes supports horizontal and vertical co-operation. For example, the staff can use Notes for horizontal co-operation for joint projects where different departments are needed. Notes is also used for vertical co-operation by providing the history of a task if a project had to be transferred to another consultant (Karsten and Jones, 1998). This may be because the structure of SMEs is not as complicated as in large organizations. Therefore, Notes is more likely to be used for co-operation in SMEs.

5.8.2.3 Influence of dependent and independent organizations on Notes identity and its use for KM

Having classified the organizational contexts into dependent and independent contexts in Section 3.5, the distinction of the identity of Notes between the two contexts can be found. In Comtech and Chemhouse (Thailand) which are dependent companies, all the policies were directed from the headquarters of its corporate group. As a result, both companies had to follow the policies introduced by the top management outside its own company with regards to the implementation of IT tools and Notes in particular. However, the difference between the two cases is that

the management of Comtech pays more attention to the use and development of Notes in the organizations, whereas the management within Chemhouse (Thailand) does not take further step in improving the use of Notes.

On the other hand, the context of ComNotes and Procom are independent. The policies of these companies are developed by their directors. This is similar to the cases of Comtech and Chemhouse (Thailand) where the development and use of Notes depends on the management team within the company. As a result, it implies that the contexts of organizations whether it is dependent or independent do not have an impact on how Notes is used in the organizations. However, the role of top management within each company plays a major role on how Notes could be developed which results in different identities. In ComNotes and Comtech where the directors and managers perceived the potentialities of Notes, they forced the staff to use Notes in order for them to control their activities. It appears that Notes became an important tool for all the staff (management and employees) for reporting performance to the top management. On the other hand, the top management of Procom and Chemhouse (Thailand) did not recognise Notes as an important tool. Subsequently, the staff did not pay attention to the use of Notes. Furthermore, despite the fact that several applications exist, the people of both companies perhaps felt that using Notes was an additional burden to their day-to-day activities. However, Notes was used more by people in Chemhouse (Thailand) than in Procom as they were forced to share information by the headquarters with other companies in the Chemhouse group.

Even if there was a formal strategy of Notes use from the headquarters as in the case of dependent companies, Comtech and Chemhouse (Thailand), it did not guarantee that the use of Notes for KM would be successful. Rather, the structure within the organization using Notes had a significant impact on how Notes was utilized.

As the findings have illustrated, both independent and dependent companies (i.e. ComNotes and Comtech) can achieve the same level of Notes use. This may be because their organizational structure is designed to relate the functionalities of

individual members, where the members from different departments need to engage in discussions and reflect on how they go about their work without the fear of being misunderstood, which allows for the strengthening of perspectives within functions (Hayes and Walsham, 2001). In addition, such structure would increase the understandings of the whole organization as Zack (1999) argued that effective use of IT to communicate knowledge requires that an organization share an interpretive context. On the other hand, the functionalities of members in Procom and Chemhouse (Thailand) are not of much relevance among the different departments. This may lead to a receptive environment for the use of Notes. For instance, different products in Procom were controlled by different members, while Notes was used in Chemhouse (Thailand) by a key person in a particular field in co-operating with members of other companies. So, staff may feel that sharing information or knowledge with others is not necessary and that Notes is not a shared space among colleagues. Thus, they are reluctant since their message would not be useful to other colleagues. This resonates with Hayes and Walsham's (2001) study in which they found that the contributions which the staff make to the cross-community discussion databases might be misunderstood or seen as irrelevant, resulting in not contributing or only contributing in a limited way by the staff. The influence of organizational structure on Notes was also pointed out by Robertson et al. (2001) in that the flat organizational structure of Universal where equal standing of the consultants is maintained resulted in co-operation.

Furthermore, since the implementation of Notes was not aligned with all the business processes in Procom and Chemhouse (Thailand), Notes appears to be an additional burden on their routine work which left little time for staff to use Notes to co-operate. On the other hand, the implementation of Notes in ComNotes and Comtech was well integrated to the business processes resulting in the effective use of Notes for co-operation, as suggested by Ciborra and Patriotta (1996) that the use of groupware should be aligned with the existing organizational structure. This implies that where individuals are not given specific or client-related applications that are relevant to their work, they tend to be limited by the time in learning and practicing use of new technology (Orlikowski, 1993).

In summary, this section addressed the influences of organizational context on Notes identity and the use of Notes for KM. Organizational size, type and structure have impacts on Notes identity and the use of Notes for KM. The following section analyses the role of IT availability within organizations on Notes identity.

5.8.2.4 IT availability within organizations

The boundary of Notes implementation had an impact on how Notes was perceived by the staff. In the case of ComNotes, Procom and Comtech, Notes applications were shared only within the company, whereas Chemhouse (Thailand) shared Notes applications with other people or teams in other companies worldwide. As a result, Notes can be viewed as a tool that supports social interactions through coordination, communication and collaboration for either within or between organizations. The interaction can be for both informal (i.e. entertainment and social activities) and formal purposes within ComNotes, Procom and Comtech. On the other hand, Notes was mainly utilised for formal purposes between staff and other key people in other companies. As a result, the types of interactions affected how the staff perceived Notes which the staff of ComNotes, Procom and Comtech tended to have more interactions than in Chemhouse (Thailand). This implies that the size of organizations in which Notes is implemented could affect the use of Notes. In the organizational contexts where the people are familiar with each other, the interactions through Notes tend to be more friendly than interactions through Notes among staff who do not know each other, as in the case of Chemhouse (Thailand). In other words, the staff of ComNotes, Procom and Comtech knew well who they were interacting with, whereas the people in Chemhouse (Thailand) perhaps did not know the person with whom they are interacting from other companies.

In addition, in the cases of Procom and Chemhouse (Thailand) Notes identity was blurred. In these organizations Notes was not seen as particularly unique or different from other IT tools. Rather, its features of Notes were seen as overlapping with other tools such as ERP systems, and the file sharing server. This was the case with Procom and Chemhouse (Thailand), where Notes had been implemented after other IT tools. Thus, a unique identity of Notes became more difficult to develop and the

staff may not clearly have seen how they could benefit from Notes apart from using other existing tools. In contrast, in ComNotes and Comtech, from an early stage in its implementation, Notes had been clearly promoted by management or other mediators (e.g. trainers). Hence, Notes became the main tool of these organizations for different aspects whilst the former two companies (Procom and Chemhouse Thailand) may have been utilising other systems.

In summary, this section pointed out that the boundary of Notes implementation and the availability of other IT tools have impacts on how Notes identity may be perceived in the organizations.

5.8.3 Implications of the identities of Notes on KM

This section compares the similarities and differences of the implications of Notes identity across cases. This is to explore the implications of Notes identities created in the case studies for the parties involved with Notes use. Table 5.3 provides a comparison of Notes implications for staff, organizations and clients in the case studies.

Company	Implications of Notes identity for the staff	Implications of Notes identity for the organizations
ComNotes	Notes seen as a tool by which the user can be monitored and controlled by the Director. Notes helps to facilitate co-ordination, communication and collaboration between staff.	ComNotes can keep record of activities done to the customers in order for other people or newcomers to follow.
Procom	Notes regarded as a tool by which the user can be monitored and controlled by the Director. Notes facilitates staff in communication within Procom.	Notes enhances the communication within Procom. The Director can access sale records to make a plan or decision.
Comtech	Notes seen as a tool by which the user can be monitored and controlled by the Director. Notes helps to facilitate co-ordination,	Notes facilitates KM in the organization. Staff can learn work processes quicker. It is also used to respond to customers' requirements

	communication and collaboration between the staff. Notes also facilitates staff in learning.	efficiently and effectively.
Chemhouse (Thailand)	Notes helps to facilitate co-ordination and communication between the users across different companies.	Notes enhances the security in communication. It is used to co-ordinate the right people for the right information across the companies. Notes is used in connection with other IT systems.

Table 5.3 Comparison of Notes implications for the staff, organizations and clients

The email feature of Notes was used across all the cases; it enhanced the communication channel and security in information distribution. In ComNotes, Procom and Comtech, where the staff were often away from the office, other staff could still reach him/her by email. Notes also enhanced the security in distributing information because the staff could identify from the email account who they were contacting. In particular, the evidence of security aspect appeared in Chemhouse (Thailand) in which they needed to use Notes for inter-organizational communication with other companies in Chemhouse group. For example, Notes helped ensure that the email account belonged to the right people.

Whereas email was used within organizations, the information embedded may be captured and categorised into databases or KM database if the staff or directors found it useful, since this information could be found and retrieved from the databases. The strong evidence is found in the case of ComNotes and Procom in which several databases and KM databases are employed. Little use was found in Procom where Notes Support team utilised KM database to maintain information about Notes. Staff in Procom used Notes as an individual tool rather than collective tool where they personally kept and categorized their emails so that they could search for and retrieve for the information when needed. No such database was used within Chemhouse (Thailand).

As Notes was used to take account of all the business processes in ComNotes and Comtech, it benefited the organization in that other staff could learn from the history of what had been done in the past projects if a new project was in hand, or the staff who were in charge of the projects had resigned or were away. The staff needed to use Notes to record feedback from customers such as the call log application and customer quiz database, thus it facilitated ComNotes and Comtech to provide and improve services and products for customers. In contrast, Notes was linked to the website of Procom where customers could put messages on. The messages could be directly sent to the relevant person because the customers identified the specific purpose for which they want to contact. As a result, there was no feedback or comments maintained for other staff to see.

Notes applications were used by top management to monitor and control staff. Thus, Notes helped to collect information from the staff in order to improve decision making in the organizations. For example, the call log application in ComNotes assisted the director in considering the service rate for the next service, whereas the customer quiz database in Comtech was used by the manager to consider rewarding Support & MA staff. Further, a sales application was implemented in Procom in order for the staff to report their activities to the director. This may be because Notes was implemented throughout the whole organization in ComNotes, Procom and Comtech. This implies that the use of Notes can help top management to control staff activities. Notes was not used to monitor and control activities of staff in Chemhouse (Thailand) since Notes was used among the directors and managers. Rather, the headquarters of Chemhouse used Notes to control correspondence among companies in the Chemhouse group. In addition, a sale application was employed in ComNotes, Procom and Comtech for salespeople to keep track of what they have corresponded with customers. Therefore, the identity of Notes was created as a tracking system and a system which the top management could use to monitor sales activities and make a decision on sale strategy.

In the meantime, different Notes databases were open to everyone in ComNotes, Procom and Comtech to access, staff could look up information or learn from Notes,

whilst Notes databases in Chemhouse (Thailand) were limited to key people in different departments. However, staff from different departments in ComNotes and Comtech were more likely to access across applications and databases of different departments than in Procom. This may have been because the staff of ComNotes and Comtech were forced to refer to Notes when they needed to co-operate in a project, especially staff of Comtech also learned from Notes KM databases from different departments because their managers forced them to contribute and look up information from KM databases. In addition, the staff of ComNotes and Comtech were more likely to co-operate in their work than Procom and Chemhouse (Thailand). For example, Developers and Infrastructure team staff in Comtech needed to co-operate when they implemented a project for customers, whilst staff from different departments in Procom and Chemhouse (Thailand) had distinct responsibilities according to the different departments and they just passed on their work to the relevant department. Therefore, staff of ComNotes and Comtech appeared to have more understanding about the work processes as a whole than those in Procom and Chemhouse (Thailand).

“...Call log application is for all the departments...For example, when the project manager visited the site and had some problems, he informed Customer Services that this problem occurred. Customer Services may test it or if it is some problem that was not directly dealt with, they will put in call log application that they have this problem and send to the team responsible. The team responsible will have a look and solve it...” (A software developer, ComNotes).

When the scheduling feature of Notes was utilised as a shared tool, it enabled ComNotes and Comtech to link the right expertise to the right job. On the other hand, Procom used the scheduling functions to report their activities to the director rather than keep others posted about their availabilities. The scheduling feature was used by the managers in Chemhouse (Thailand) to account for their personal activities and remind them of those activities.

Notes databases were particularly used as KM databases in the technical departments of ComNotes, Procom and Comtech. This may have been because technical information is more easily described, i.e. may appear in the form of instructions that can be drawn on by staff with the relevant background knowledge. In the meantime, they also needed to keep up-to-date about new IT products in the marketplace. By utilizing KM databases, it allowed the people in these companies to interact with each other in order for them to respond timely to customer requirements. The KM databases of technical departments tended to be recognised by only the staff of these departments as they shared the same background of the knowledge being shared and maintained. However, Notes KM databases were utilised for all the departments in Comtech and staff from the different departments could liberally access the different databases. As a result, the staff of Comtech could learn from the KM database of Notes which supports the skills they used to support the customers. No technical KM database was found in Chemhouse (Thailand) since it is not an IT company. However, several databases of Notes containing a variety of information existed but these could be accessed only by managers in Chemhouse (Thailand). Managers transferred information received from other companies by other means such as meetings and notice boards. The databases of Notes, then, acted as a tool which the Chemhouse group could get the same information, timely and securely. In addition, in the Sales & Marketing department of ComNotes and Comtech, the KM database was used to maintain sale resources such as brochures and presentation files. The use of Notes aided the staff in categorising the resources for subsequent use. As a result, Notes was perceived by the staff of these departments as a shared resource.

For the dispersed team, Notes was differently adapted to overcome the long distance barrier. In ComNotes, SameTime was used to communicate between staff at the head office and its branch abroad. A web portal was designed and used in Comtech to enable the off-site staff to use the Notes application as though they are at the office. In Chemhouse (Thailand), the GAMI applications were implemented to maintain all the contact details of key people from the global companies in the Chemhouse group in order to initiate the contact with the right people as there were many staff in different places. However, the contact seemed to occur between the

staff of Chemhouse (Thailand) and other companies' staff who were involved in the same responsibility. Thus, Notes can be seen as a tool to co-ordinate the members of dispersed teams in Chemhouse (Thailand). Having considered the evidence from the three cases, Notes identity has been created as a tool to facilitate the work of dispersed team members.

In comparing IT and non-IT types of organizations, the staff of Chemhouse (Thailand) did not favour the technology as IT companies, because the staff realised that Notes could lead to conflicts in communication. This may have been because the staff were not used to the use of technology and they were less likely to rely on the technology as a mediating tool in the interactions among staff than the staff in IT companies. As a result, Notes was believed to inhibit, rather than to improve, the interactions within Chemhouse (Thailand).

"...I also feel that we tend to have arguments when we use email. Especially, when we write in English, it can be misinterpreted. For example, one of my staff uses 'must be' to inform me. Is he my boss that he ordered me to do?... we can type in Thai but there is sometimes one foreign director that I have to CC..." (Finance manager)

As the business focus of most IT companies that participated in this study is to provide products, services and support to their customers, Notes provides useful implications for customers. This is because the companies have a record of history of their services to the customers on Notes applications such as the call log and application control of ComNotes and the customer quiz database of Support & MA team in Comtech. Therefore, the IT companies could follow up what had been done for them in order to solve problems or provide future services and implementation. The record also helped the IT companies to evaluate whether the implementation was successful or to improve the services and products. In addition, since any staff could look up from the record, the customers did not have to initiate new contacts with new staff and ensured that their requirements could be followed up and fulfilled.

5.10 Summary

This chapter discussed the concept of Notes identity that emerged from the analysis in chapter four. Firstly, the reasons underlying Notes identity creation and its implications on individual case studies was discussed. This aimed to give an overview of the different reasons and the impact of the interactions through Notes on organizations. Secondly, a comparison between the definitions of Notes identities in each case was conducted in order to explore the similarities and differences among the Notes identities. Thirdly, the discussion proceeded to the comparison of the reasons which influenced the creation of Notes identities among the four cases. Notes identity was perceived as a tool for communication within the IT companies, but it was not realised as a communication tool between staff within Chemhouse (Thailand).

The comparison implies that the organizational contexts whether it is IT or non-IT companies, SMEs or large organization, dependent or independent influence the creation of Notes identity and the use of Notes for KM in these organizations. Top management within the company plays a major role on how Notes identity can be developed. In addition, the boundary of Notes implementation and whether other IT tools have been used has an impact on how Notes is perceived in organizations. The individual characteristics, including the age of the staff, working experience in the organizations and positions of the people were found to influence their perceptions towards Notes. The implications of Notes identities were compared in order to give rise to the idea of how Notes could be utilized with regard to enhance KM in organizations.

In the next chapter, the findings of this study will be discussed in relation to the relevant literature. This is to corroborate the findings of Notes functionalities for KM and the influences of Notes identity which is derived from several factors regarding the context in which Notes is implemented.

Chapter 6

DISCUSSION

6.1 Introduction

This chapter places the findings developed in the previous chapters within the broad existing literature of KM; the use of Notes, the relationship between IT and organizations, IS in SMEs and in developing countries. The aim of this chapter is to compare the findings to those in the literature and to search for explanation to support the research questions of how Notes is used to support KM and to clarify the influences of a developing country and of the specific organizational contexts on the use of Notes for KM. Such comparison increases the cumulative knowledge of the phenomenon of Notes use by offering new scope and context. The findings of this study can also embellish insights if any contradictions can be explained. The discussion begins with the way in which Notes enables KM in organizations and the sorts of knowledge that may be managed through Notes. Then, the influences of the developing country contexts, the Thai context in particular, are expounded by comparing them to the previous studies. The concept of Notes identity as the emergent theme in this study is corroborated in order to indicate plausibility of the influence of Notes identity on KM. Finally, the dynamic relationship between Notes and organization is discussed based on the principles of the structuration model of IT (Orlikowski, 1992).

6.2 Use of Notes supporting KM

This study found that, though Notes was not intentionally implemented in the organizations such as Procom and Chemhouse (Thailand) as a strategy for KM, it did facilitate KM activities which the users may not have recognized. The creation of new knowledge may also occur unintentionally, rather than through planned combinations and exchanges, reflecting emergent patterns of accessibility to knowledge and knowledge processes (Nahapiet and Ghoshal, 1998). This was also

argued by Grover and Davenport (2001) that emergent KM processes are tied into the work processes themselves which may not be visible to participants. In Procom and Chemhouse (Thailand) where Notes was not recognized as a tool to support KM, the findings show that, to some extent, Notes supported the KM activities through the human actions that the staff pursue on Notes. Unsurprisingly, this could be considered as “unintended consequences of action” (Giddens, 1979). This is because Notes was implemented in these organizations in order to improve co-operation in their business processes, whilst the outcomes have turned out to be different from those anticipated. Similarly, Orlikowski (1996) contended that the use of Notes leads to changes which are enacted both intentionally and opportunistically and are accompanied by some unanticipated consequences. For example, she found that the establishment of channels for disseminating technical knowledge in a software company emerged opportunistically from the use of a Notes application after Notes has been implemented for some time. On the other hand, deliberate KM processes (Grover and Davenport, 2001) occurred in ComNotes and Procom since the organizations were aware of KM initiatives.

Having found that KM is either an emergent or deliberate outcome of Notes use, discussions on the question as to whether information or knowledge is processed through Notes are in line with much literature which have argued that technology in itself lacks the capability of KM (e.g. Sherif et al., 2004; Galliers and Newell, 2003; McDermott, 1999; Walsham, 2001; Wilson, 2002). However, based on the existing literature on Notes, this study conceptualized the use modes of Notes explaining the relationship between the human interaction processes with IT and knowledge is a result of the interactions. The first four use modes of Notes, including publishing, searching, sharing and retrieving are not only used in order to manage information, but they are also enablers to the creation of knowledge of organizational members and hence to the other two features of Notes, ‘creating’ and ‘exploring’ use modes. This is because information is important in providing a basis for action (Coleman, 1988).

Having said that knowledge is not an object which by itself resides in such technology as Notes, this study contends that Notes supports human actions in relation to the KM activities where knowledge of individual can be exploited and knowing or know how emerges from human actions in a particular context (Sambamurthy and Subramani, 2005). The 'Creating' use mode was utilized by the staff to create their tacit knowledge in order to work for organizations. However, the attempt to utilize 'exploring' use mode was not manifested in the case studies. This may be because the organizations studied still lack speciality in KM practice, which they have to realize that "without the ability to seamlessly collect, index, store and distribute explicit knowledge electronically whenever and wherever needed, an organization will not fully exploit its capabilities and incentives" (Zack, 1999, p.55). Therefore, they might not put in much effort to explore and develop the use of Notes for KM.

As the literature identifies that knowledge is created in practice (Brown and Duguid, 1998; Blackler, 1993; Stenmark, 2002), the interaction among people needs to be emphasized in KM. In arguing that Notes supports human interaction, it may be said that Notes acts as a tool that gives support to social capital which leads to KM activities. This is because social capital resides in relationships, and relationships are created through exchange (Bourdieu, 1986), which contributes to the creation and sharing of knowledge (Sherif et al., 2004). Nahapiet and Ghoshal (1998) proposed that social capital facilitates the development of knowledge and knowing of an organization by affecting the conditions necessary for exchange and combination to occur. For example, when the organizational members trust each other more, they are likely to share more knowledge. Nahapiet and Ghoshal identified three dimensions of social capital which impact KM. First, the structural dimension refers to the overall pattern of connections between actors. Second, the relational dimension refers to the kind of personal relationships people have developed with each other over time such as respect and friendship. Finally, the cognitive dimension refers to a shared understanding and interpretations among parties through the interactions. This study found that Notes supports the structural dimension of social capital in that Notes helps people in most cases to get better connected to other colleagues and especially those who work within the same department and across

departments. As a result, social relations constitute information channels that reduce the amount of time and investment required to gather information (Nahapiet and Ghoshal). Notes especially helps to support the structural dimension of social capital in large organizations since there are more people and organizational hierarchy than in SMEs. For instance, the staff in Chemhouse (Thailand) sought or contributed knowledge to the members of companies in Chemhouse group they had never met before. Information channels, such as the GAMI application, have created strong ties between members that helped them establish a sense of identity to the sector and level of trust to share and reuse (Sherif et al., 2004). In a similar vein, in another study (Ciborra, 1996), MedNet, a groupware application in a large company, was used to enhance international co-operation among members in different countries, whilst Notes enabled the staff in a pharmaceutical company to generate opportunities for discussion and reflection to ensue concerning the ways that other functions worked, and how they could best interact with them (Hayes and Walsham, 2001). On the other hand, the evidence of Notes supporting the relational dimension of social capital can be found in the case of ComNotes, Procom and Comtech where the staff utilized Notes for informal purposes such as social activities which result in the development of personal relationships within the organizations over time. Hence, it leads to high level of trust which increases the willingness of people to exchange knowledge (Nahapiet, 1996; Ring and Van de Ven, 1992; Panteli and Sockalingham, 2005). This is because trust resides in the quality of the personal relationships that binds the parties through shared values and expectations rather than the intrinsic plausibility of the message (Boisot, 1995). In addition, the use of Notes also created norms of co-operation in ComNotes and Comtech, where the staff were in consensus on the use of Notes as a shared tool. As a result, norms of co-operation can establish a strong foundation for the creation of knowledge and knowing as it opens up access to parties for the exchange of knowledge and ensures the motivation to engage in such exchange (Nahapiet and Ghoshal, 1998). The norms within organizations created obligations within the virtual community that members needed to leverage knowledge that already exists and ask for assistance if they cannot locate meaningful information (Sherif et al., 2004).

The cognitive dimension is also found to be supported by Notes in the case studies. The frequent uses of Notes specifically designed for each department and organization lead to the emergence of shared languages among the staff involved in particular Notes applications. For example, technical departments in IT companies share their common technical knowledge on Notes about tricks and tips through KM databases, whereas the sale application is utilized among sale staff in understanding the history of relationships between the organization and their customers. This is because knowledge and meaning are always embedded in a social context - both created and sustained through on-going relationships in such collectivities (Nahapiet and Ghoshal, 1998). However, rather than using Notes to support KM in a specific department, Notes applications were found to be shared in ComNotes and Comtech where the members of different departments have some overlap in knowledge as they are co-operating in the same tasks. Similar to other knowledge-intensive firms, ComNotes and Comtech are composed of multiple communities with specialized expertise, and are characterized by lateral rather than hierarchical organizational forms (Boland and Tenkasi, 1995). Boland and Tenkasi (1995) also argued that electronic communication such as groupware can mediate how communities of knowing interact and their capacity for perspective-taking, which refers to the process of collaboration between experts working across boundaries, by enabling shared vocabularies.

6.3 Data, information and knowledge on Notes

Having said that the use of Notes supports human interaction where KM can be either an emergent or deliberate outcome, this study argues that data and information is posted and retrieved on Notes instead of knowledge directly. Rather, Notes may act as a tool supporting social capital which leads to KM activities; this is an indirect effect. Thus, there is a need to clarify the relationship between data, information and knowledge that is generated by using Notes, how knowledge is created and the types of knowledge which Notes is used to support in this study.

Having identified the six use mode in the interaction richness model, the implications of each use mode are different in terms of data, information and

knowledge being generated based on the definitions in Section 2.3.1 The two use modes of coordination process which are publishing and searching may be considered as a process which deal with data rather than information or knowledge. This is because these use modes yield the data which are explicit and do not require contextualization for understanding. Staff publishes data such as customers' details, news and figure onto Notes for others, whilst data may be searched by other staff and used without the need to interpret it. As mentioned by Galliers and Newell (2003), when the contexts are very similar and stable then the data can more readily be reused without much reinterpretation. On the other hand, sharing and retrieving use modes of the communication process yield information in which an interpretation is needed. By sharing use mode, the receivers need to interpret the meanings of messages provided by the senders. Similarly, the retrieving use mode focuses on information which staff has to interpret from what have been maintained on Notes databases. Finally, the collaboration process focus on the knowledge which is tacit and individuals tend to utilize in practice. It is based on what staff learn from data or information on Notes and make sense of them in practice. In addition, human use their knowledge and explore further the potentialities of IT to articulate what they know onto Notes which becomes information. Having discussed the relationship between the 3Cs processes and their outcomes, the first four use modes are the enablers for knowledge which is generated when individuals take action. Figure 6.1 presents the interaction richness model of Notes use mode and their implications for data, information and knowledge.

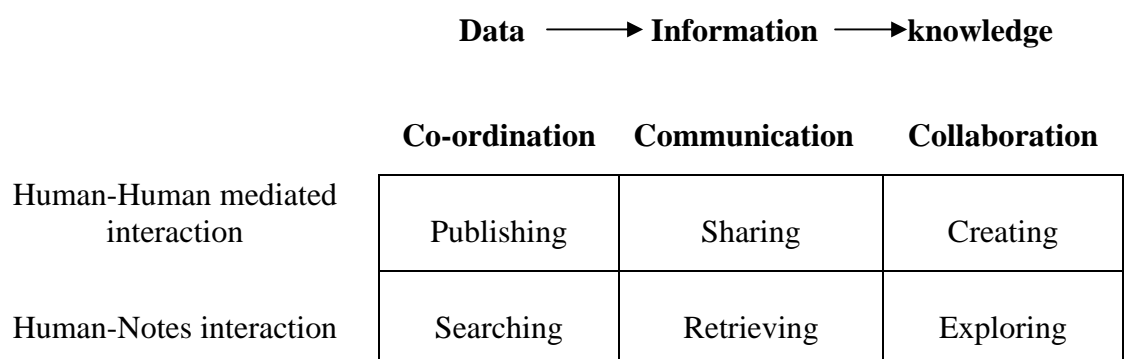


Figure 6.1 Interaction richness model of Notes use modes and their implications for data, information and knowledge

Therefore, the six use modes of Notes are employed in order to support interaction processes in managing organizational knowledge as knowledge can be conceived of as information put to productive use (Kakabadse et al., 2003). It was also argued by Grover and Davenport (2001) that knowledge processes lie somewhere between information and the firm's source of revenue, its products and services. Therefore, knowledge is the information, which is processed by individuals who are related in the same context (i.e. same group or project). This is because knowledge is subjectively determined by several factors such as socio-economic, cultural and psychological issues as well as language and context (Kakabadse et al., 2003; Alavi and Leidner, 2001; Galliers and Newell, 2003; Glisby and Holden, 2003; Spiegler, 2000). Knowledge is likely to be generated as individuals' tacit knowledge, identified earlier in this study as 'creating' use mode, whilst tacit knowledge refers to knowledge that has a personal quality that makes it hard to articulate or communicate (Sambamurthy and Subramani, 2005).

The organizational context influences the types of information and knowledge required for the work processes of different organizations. For example, such hi-tech organizations as IT companies need to use information and knowledge to support and respond to the customers' requirements and problems effectively, whereas a manufacturing firm context influences the individuals to follow knowledge and instructions embedded in the manufacturing processes. In other words, the storage structures and processes for managing product knowledge in rapidly changing markets may differ significantly from managing that knowledge in stable markets (Zack, 1999). Following the case findings, information which is technical, such as the technical solutions in IT companies and manufacturing processes in Chemhouse (Thailand), is more likely to be codified and articulated in Notes than other personal skills such as preparing documentation or selling negotiation skills. This is because it is procedural information, where individuals who share the same understanding can perform their actions in following such explicit knowledge on Notes databases. In addition, knowledge that can be posted and maintained on Notes is likely to be 'how to' information which enables the staff to learn and adopt as their skills. Similarly, Ciborra (1996) found that a knowledge-base allowed engineers to cooperate, share knowledge and learn about different technical problems, organization

and capacity of the systems for a wider range of instruments in a pharmaceutical company. However, in order to perform action in the organizations, staff evaluate and interpret information about several issues which are maintained on Notes. They have a realization of knowledge that requires validation and internalization as knowledge realization refers to the process involved in creating value for the recipient of knowledge and ultimately for the firm (Kakabadse et al., 2003; Grover and Davenport, 2001). Therefore, any documents or files about the business of organizations in the past can be realized and learned by the staff and become *their* knowledge which they use to take actions, since knowledge can be viewed as action or enactment in which progress is made through active engagement with the world on the basis of a systematic approach to knowing (Nahapiet and Ghoshal, 1998).

Whether or not the information can be utilized by other people also depends on its categorization. As argued by Zack (1999), when indexed using appropriate concepts and categories, the repository can provide the organization with meaningful access to its content and would enable the firms to reapply that knowledge across the enterprise and to new circumstances. Groupware applications can help researchers gather comprehensive and focused information through the ability to store and manage large text-based documents (Ciborra, 1996), hence the information can be meaningless if it is not well categorized by the Notes users. Based on the information richness theory (Daft and Lengel, 1986), groupware is considered as a fairly lean medium which is potentially useful for the exchange of explicit information and knowledge across time and space but inappropriate and problematic for the exchange of more complex tacit knowledge. However, the choice of communication media suggested by information richness theory is justified regardless of context. In organizations where information is well organized and staff share the same background and understanding, such as ComNotes and Comtech, in which information is categorized under specific topics by the staff themselves or an administrator of the databases, other staff are likely to retrieve or refer to these information. Then, they process the information in their mind and information becomes individual knowledge in relation to the specific context. On the other hand, there was no one in Procom who controlled the categorization of the information, which over time, other people cannot retrieve and use as they do not recognize or

understand the context of that information. This is consistent with what Lee (1997) asserted that the most appropriate communication medium will depend on individuals' familiarity and skills with different media and their willingness, opportunities and resources available (e.g. time) to support learning of the capabilities of particular media, innovating uses for it etc. Therefore, the context of organizations is of importance in using Notes as a groupware to support KM activities. In particular, the types of organizations can influence how a tool such as groupware support different types of information and knowledge.

Though this study argued that Notes can be used to share and maintain information in organizations and knowledge is, in fact, generated in individual minds, Notes may also be considered to support collective knowledge. This is because such knowledge and knowing capacity may remain relatively hidden from individual actors but be accessible and sustained through their interaction (Spender, 1994) or be articulated and amplified by organizations (Nonaka, 1994). In addition, Tsoukas and Vladimirou (2001) argued that knowledge is the individual capability to draw distinctions within a domain of action, whilst organizational knowledge is the capability that organizational members have developed to draw distinctions in the process of carrying out their work, in particular concrete contexts, by enacting sets of generalizations whose application depends on historically evolved collective understandings. When Notes is used to record the history of project in the form of best practices, document, picture, or narratives, it enables the staff to capture past experience in order to transfer it to the other members and possibly apply it to future projects (Ciborra and Patriotta, 1996). Zack (1999) identified this as integrative applications where the databases provide a means to integrate and build on their collective knowledge.

The present study found that the collective knowledge is more likely to be created through the interaction with Notes once the staff has shared the same understandings of the context to which the information is related. Further, the findings give rise to the idea that Notes for KM is mostly utilized within the same departments or same job responsibilities rather than the whole organization. This may be due to

employees' long-established histories of working closely together and undertaking similar activities, they could draw on their shared tacit knowledge to skillfully interpret and make judgements concerning the views recorded on the shared databases by members of their own functions (Hayes and Walsham, 2001). Boland and Tenkasi (1995) referred to this process as perspective-making whereby a community develops and strengthens its own knowledge domain and practices. Perspective-making benefits from the tacit knowledge within groups, which allows them to understand the subtleties that underlie the meanings expressed on the shared database (Hayes and Walsham, 2001). In contrast, using Notes for KM across different teams may have difficulties for perspective-taking, due to the organizational members having no history or mastery with employees in other functions (Hayes and Walsham, 2001), and different lexicons which naturally emerge from different parts of an organization (Zack, 1999). However, the organizational knowledge can be managed through Notes by a perspective-taking process since working across functional boundaries was not about becoming an expert in all business areas in which there were interactions, rather it involved becoming proficient enough to be able to appreciate and synergistically utilize the perspectives of another community in their day-to-day activities (Boland and Tenkasi, 1995). Perspective-taking is vital to KM in improving the performance of organization because the staff need to observe the manner of how competent practitioners in other communities go about their business (Brown and Duguid, 1991). Hence, explicit knowledge maintained on Notes would be considered as organizational knowledge which provide important values to organizations. As argued by Zack (1999), although explicit knowledge represents only part of an organization's intellectual landscape, it is crucial in a firm's overall knowledge strategy.

6.4 Influences of a developing country context on the use of Notes for KM

This study has thus far attempted to point out the influences of context in which Notes is implemented to support KM. Rather than focusing on only the organizational context influencing the use of Notes as discussed in section 5.8.2, this

study attempts to investigate whether the developing country context, which is a broader context of this study, has an impact on the use of Notes for supporting KM. As it was put, it is useful to consider broad differences in the contextual features of IS implementation from those of similar IS in developed country contexts (Krishna and Walsham, 2005). The following section discusses influences of a developing country context on IT implementation and the use of Notes for KM in particular. As with the discussion of influences of the organizational contexts, the difficulties of finding representative cases limit the conclusions of whether Thailand as a developing country can influence organizations when using Notes for KM. Nevertheless, the study has findings which are significant for the topic under investigation.

6.4.1 Influences of a developing country context on IT implementation

Several issues have been found in this study which influence Notes implementation and use in general and hence, it affects the use of Notes for KM. As hardware and software are relatively more expensive in developing countries (Krishna and Walsham, 2005; Wagner et al., 2003), Thai organizations, especially SMEs, find it is not worth implementing IT in their business. This is evident in the Chemhouse (Thailand) case in which a Notes license had to be paid. As a result, Notes was not implemented throughout the whole company and this limited the co-operation processes within the company. This study also found in the initial phase of fieldwork when a number of SMEs in Thailand were accessed that their decision to implement an IT is mainly based on the costs of implementation. Exceptionally, the main reasons for Notes adoption in the organizations participating in this study are that in the cases of IT companies, they are partners of IBM which license fees are not required, and Chemhouse (Thailand) is forced by the parent company in Europe. However, as the costs of IT are dropping, it is expected that there will be more opportunities for organizations in developing countries to implement IT tools such as Notes.

Further, the inscriptions of Western values in technology may also negatively influence the adoption of IS in developing country (Walsham and Sahay, 1999).

This is because there is the gap between the assumptions inscribed in the technologies developed in the context of industrialized countries and the prevailing way and state of organizational life in the countries to which the technologies were being transferred (Sahay and Avgerou, 2002). Similar to the GIS technology studied by Walsham and Sahay (1999), Notes may embed the assumption of co-ordinated action in the developed country. For example, the workflow capability of Notes enables the user to co-ordinate with several departments throughout organizations. However, the findings of this study appeared that Notes is mostly utilized as a specific tool for each department. This may be because of the rigid functionality and unco-ordinated action (Walsham and Sahay, 2005) that tend to occur in Thai organizations. Staff do not use Notes to interact with people in other departments. Hence, the use of Notes to co-operate between different people in Thai organizations is limited.

6.4.2 Influences of a developing country context on KM

An inhibitor in doing KM may result from Thai educational system as the education sector is responsible for delivering a work force skilled in the use of IT for KM in developing country (Abu-Rashed et al., 2005). As discussed above, Thai educational institutions play an important role in driving user acceptance of technology. In addition, the Thai educational system has a significant impact on how people exploit knowledge. The Thai educational system does not emphasize discussion style between lecturers and students in classrooms. Lecturers act as the centre of teaching and students are passive recipients of existing knowledge, whilst in the Western education system, lecturers appear to be more facilitators and students have more contributions in the classroom. Hence, people lack skills in debating by which new knowledge can be created and innovated. Students mostly learn from text books in which knowledge may be outdated and may not be applicable in organizations. This affects the skills of staff in organizations. They are likely to follow what have been done in companies in the past and it is unlikely for Thai staff to invent or create new knowledge to enhance the performance of organizations in which individual staff knowledge is the key to achieve competitive advantage. For that reason, this indirectly affects the use of Notes in supporting KM as people lack skills in contributing new knowledge.

“In Thailand people are actually not very good at sharing because as a developing country 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, ComNotes)

Regarding the IT infrastructure in Thailand, Notes appears to be an appropriate tool for KM in developing country since it uses email as a main mechanism in all the co-operation processes. This is because emails require less bandwidth at every user, which is a welcome feature in developing countries where bandwidth is often limited (Wagner et al., 2003). Hence, staff do not need to send large-size files, which contains enormous knowledge to others as they can be maintained in several forms such as pictures on the central server which is directed by emails.

6.4.3 Influences of a developing country culture on the use of Notes for KM

Similar to the findings of Orlikowski (1992) and Vandenbosch and Ginzberg (1996), this study found that organizational culture plays an important role in engendering co-operation. Hence, the use of Notes for supporting KM varies from one organization to another. Hofstede (1994) defined organizational culture as “the collective programming of the mind which distinguishes the members of one organization from another” (p.180), and argued that organizational culture is also an entry point for societal influence on organizations. In the context where co-operative culture is vital, such as in ComNotes and Comtech, the use of Notes appears to be successful. This may be because the relationship which has been created between managers and employees in Thai organizations, in particular, is more likely to play a major role than formal rules and regulations. This implies that organizations where managers operate under a personalized and informal system are more likely to be successful in using Notes than those who adopt an impersonal management style. In contrast, previous studies on Notes in developed countries showed that consulting

firms share a rather competitive culture which has an impact on the use of Notes for co-operation (Orlikowski, 1993; Hayes, 2001; Hayes and Walsham, 2001).

Therefore, the national culture of a developing country is another important aspect which influences the organizational context. This is because organizations cannot change the common values and beliefs which emerge from people's shared experiences which are embedded in national cultures (Smircich, 1983). The terms 'organizational' and 'national' cultures are different. Hofstede argued that organizational culture is more related to practices which are learned through socialization at the workplace, whereas national culture is relevant to values which have been programmed into its individual mind since childhood. In addition, national culture is defined as the collective programming of the mind which distinguishes the members of one country from another (Hofstede, 1991). The national cultural traits can be seen as part of the web of meaning that constitutes organizational culture (Hatch, 1997). It was also argued that, in order to successfully develop and implement IS, analysts need to understand that local culture (Thanasankit and Corbitt, 2000; Walsham, 2000). This study, therefore, contends that some Thai cultural values have an impact on the use of Notes which leads to different findings to previous studies of developed country contexts. As proposed by Rohitratana (2000), when a computer system is introduced and implemented in an organization, Thai cultural values could be used to explain in a complex analysis of 'how' the system could be shaped by the Thai social context, in particular, and 'why' the Thailand context has to be considered when the computer system was implemented.

Many researchers assume that identifying the country in which subjects live is a sufficient definition of culture and, in some cases, they neglect to mention specific cultural beliefs or practices that influence IT-related beliefs and behaviour (Gallivan and Srite, 2005). Specific cultural values need to be addressed. There are several models of national culture suggested in the literature (e.g. Kluckhohn & Strodtbeck, 1961; Hall, 1977; Trompenaars and Hampden-Turner, 1997; Hofstede, 1991), which are structural and prescriptive constructs (Thanasankit and Corbitt, 2000). However,

such constructs may not be sufficient enough to frame all aspects of cultural differences since “cultural dimensions were never intended to provide a complete basis for analyzing a culture” (Hofstede and Peterson, 2000, p.404). Therefore, rather than accept structured concepts created by any models of national culture, this study discusses those specific values and cultural practices which influence the use of Notes for KM in Thailand. This discussion draws out the distinguishing Thai values which could impact the use of Notes for KM, then the literature of the use of Notes in developed countries and the use of IT in Thailand and other developing countries are compared.

6.4.3.1 Role of leadership

The power of leadership has a significant influence in any Thai organizations. The power-oriented Thai culture usually tends to create respect for the leader as the father figure of the organization (Thanasankit and Corbitt, 2000; Rohitratana, 1998). A person’s power normally comes with his/her title, rank and status in Thai organizations and society (Komin, 1990). The seniority in any social and professional setting in Thailand cannot be ignored (Welty, 1996; Goodman, 1991). This argument recounts the study of power distance by Hofstede (1991) that organizations in high power situations such as the context of Thailand centralizes power as much as possible in a few hands, whereas superiors and subordinates consider each other as existentially unequal. The role of leadership on the use of IT in the developing countries, where there tend to be higher power distance than those developed countries, could be an important factor which drives and enforces the subordinates to utilize Notes. Without superior’s directions and guidance, effectiveness may be reduced (Thanasankit and Corbitt, 2000). This study also supports the previous findings that a leader with a certain technology understanding would encourage that technology type use within Thai business (Chieochan et al., 2000; Gray and Campbell, 2003) and in Singapore (Thong and Yap, 1995). In similar vein, in the study of an IS implementation in India by Krishna and Walsham (2005), the leadership of Chief Minister has been the most important factor in successful implementation of IT projects. The Chief Minister made a long-term commitment to the change process needed to introduce IT successfully. Crucial actions of the leader were the setting of long term objectives and goals,

experimentation and learning, and a personal example in terms of dedicated effort (Krishna and Walsham, 2005). In addition, conflicting with superiors may be translated as not saving or respecting their superior's face (Thanasankit and Corbitt, 2000). Therefore, the staff are likely to follow instructions from their managers in Thai organizations. In contrast, this behaviour is uncommon in developed countries, where criticisms are more acceptable. Even if Notes enables surveillance and control for managers which motivate staff to participate for learning (Hayes and Walsham, 2001), it showed that Notes was then perceived and used by the staff to further their career aspirations in a developed country context. Hence, it leads to a competitive environment, not to co-operation (Orlikowski, 1992). However, Thai managers tend to avoid an impersonal-oriented managerial style. This is because straightforward, ambitious and aggressive personalities similar to the West, although highly capable, are not tolerated and are hardly ever successful (Komin, 1990). Therefore, a rigid enforcement does not guarantee the successful use of Notes, but the personal relationship between managers and subordinates may be more important.

Power distance may be recognized as an inhibitor in using Notes to share knowledge from the superiors to subordinates. It appears that managers, who are hired in the companies, in most cases do not want to share all the information or knowledge with subordinates as they are afraid of losing their power and position which they could use to control the other members. This may be because of SME types of case studies where positions are limited and people find it difficult to get a promotion to a higher position. This is consistent to the findings of Orlikowski (1992), even if it was a study in a context of developed country, large firm, that senior consultants and managers within an office feel little incentive to share their ideas for fear that they may lose status, power and distinctive competence, whereas principals, having attained tenure and the highest career rank, in Alpha were willing to co-operate on Notes. Therefore, rather than using Notes to share information with the subordinates, managers uses Notes to increase central surveillance and control. Even if the size of the organizations studied in this study is smaller than those in the previous studies, Notes allows the top management to be informed more of the subordinates' day-to-day activities. This finding is also similar to the study of the use of Notes in a large organization by Hayes (2001) and Hayes and Walsham (2001) in which the

authority of senior management was increased and the autonomy of the regional management was reduced after Notes was implemented to Compound UK. Therefore, the role of power relations may inhibit knowledge sharing in any context. In addition, the use of Notes for KM may not be successful in the organizations if the subordinates rather than the top management perceive its usefulness. This is because Thai culture does not encourage subordinates to dare to make mistakes, or to take initiative (Thanasankit and Corbitt, 2000). Hence, such culture may significantly discourage subordinates from exploring or initiating the potentials of Notes if they are not supported by the top management.

6.4.3.2 Collective culture

The high power of the leader in Thai organizations alone cannot lead to the successful use of Notes. It was pointed out that high power distance does not mean that employees always agree with their leaders (Rohitratana, 2000). A resistance to the leader may occur as the employees try to release the pressure they feel by talking to other employees who share the same opinion and it leads to informal groups in Thai organizations which express concern with each other (Rohitratana, 2000; Thanasankit and Corbitt, 2000). This is because Thai society constructs its reality as group or social interests rather than individual interests (Thanasankit and Corbitt, 2000). Being collective culture has dilemma for the use of Notes for KM. It depends on the top management to make the staff to perceive the usefulness of Notes. If the staff know what it is and how it works, they are likely to help each other to contribute to Notes. Hence, it does not depend on only the managers who can enforce the employees but it also depends on the group of employees whether they are convinced by the managers to use Notes. On the other hand, if some staff feel there is no benefit from using Notes, it may lead to resistance from other staff.

Thais prefer to have stable social relationships and maintain surface harmony (Rohitratana, 1998). Therefore, as Thailand pertains collective culture, this cultural dimension may reflect on the use of Notes in that Thai people are more likely to cooperate in their work. Instead of hailing a few star performers, the entire team shares the successful result of their total effort. That is what is meant in Thai

philosophy by co-operation. Even though Thai people are competitive, even intensely sometimes, there is this rich vein of co-operation that connects everybody (Welty, 1996). The evidence of this can be seen from the Thai IT companies where most staff feel that they need to co-operate in their work.

Having investigated the use of Notes in the developed countries, individualism tends to influence the use of Notes. Vandebosch and Ginzberg (1996) found that there is no change in the collaboration level within an organization in the US they studied following the implementation of Notes. Those who collaborated most before Notes implementation continued to do so on Notes, whereas those who had not collaborated before continued not to do so. Similarly, Orlikowski (1993) contended that Notes is able to enhance collaboration in organizations that have an inherently collaborative culture. Even worse, Ciborra and Patriotta (1996) pointed out that the career system, the role of the hierarchy and the conflicts between competing functions, tend to discourage a real commitment to the use of Notes in Unilever. As a result, the competitive or individualistic nature of the organization's culture, where there are few incentives or norms for co-operating, limited interest in a technology to support co-operation (Orlikowski, 1993). Incentives may also lead to competitive environment among the colleagues. As argued by Hayes and Walsham (2001), aligning IT-enabled participation with competitive-based reward systems, reflecting both financial and career aspirations, is likely to lead to political rather than genuine forms of participation. This may be because incentives are linked to individual's performance in individualist societies, whereas in a collectivist society, incentives and bonuses are more likely to be given to the groups, not to individuals (Hofstede, 1991). For example, Hayes and Walsham (2001) found that the contact recording application of Notes used in Compound UK was used by ambitious employees as a means to be noticed by their managers rather than sharing useful information. In contrast, managers tend to use a fair merits system, and with a 'soft' approach when dealing with their employees since they know that through good relations and fair treatment with their Thai employees, they can elicit higher job performance from them (Komin, 1990). For example, extra money was given to Support & MA staff in Comtech when they worked extra time and gained good feedback from the customers. The manager tends to give such incentive equally to his staff.

6.4.3.3 Relationship-oriented behaviour

Having said that the managers have significant influence on the use of Notes in organizations, whereas collective culture is the key as to whether Notes will be accepted and be used to co-operate by employees in the Thai organizations, personal relationship between the managers and employees, or among colleagues in Thai organizations is another key factor. Relationship-oriented behaviour happens more commonly than work-oriented behaviour in Thai society and its organizations (Thanasankit and Corbitt, 2000; Sorod, 1991). This cultural dimension leads to the different findings of the study of Notes by Hayes and Walsham (2001) where Notes appear to be a tool for the careerist and hence a competitive environment was created in the organization. This is in line with what Hofstede (1991) proposed that trespassing on others leads to shame and loss of face for self and group in a collectivist society. It can be the reason why the use of Notes in developing countries such as Thailand is different to the use of Notes in those developed countries where incentives are employed in order to motivate the staff to use the system. Interaction through Notes is more favoured in organizations where Notes is utilized for entertainment which leads to good personal relationships among the staff. This may be because fun-pleasure value which is characterized by “the seemingly easy-going, fun-loving pleasant interactions, joyful behaviours, and the light approach towards things and events” (Komin, 1990, p.694). Komin also mentioned that the fun-pleasure value functions as the imperative mechanism, as the means to support and maintain the more important smooth interpersonal interaction value, which yields a friendly environment in the organization. Thais are also preferred to be smooth, kind, pleasant, conflict-free, non-assertive, polite and humble (Rohitratana, 2000; Komin, 1990). However, being non-assertive may lead to an obstacle for using Notes for KM. This is because it is not a matter that the staff have to be ambitious by learning or working more in order for career advancement. This is evident in Procom and Chemhouse (Thailand) where Notes was not implemented as the main tool and integrated with the business processes, even if some staff expressed their interests in using more potentialities of Notes. Therefore, people perceive Notes as it is additional work which is not necessary for them despite the fact that the tool is already available for them for co-operating and learning among the colleagues.

In addition, principles and laws are, in practice, ever-adjustable to fit different people and situations (Komin, 1990). Therefore, top management seems to play a major role in forcing organizational members to use Notes successfully for work processes rather than put into effect by written rules. The comparison between dependent and independent organizations in this study may support this argument because the written strategy from the corporate management or the headquarters does not lead to the successful use of Notes for KM. However, it depends on the style of those who manage these organizations. In comparing the use of Notes between ComNotes and Comtech, in which the use of Notes was rather imposed by the top management, and Procom and Chemhouse (Thailand), in which the use of Notes was more flexible, the staff in ComNotes and Comtech were more likely to use Notes in order to co-operate in their work.

The relationship between the superiors and subordinates may have an impact on how they perceive sharing knowledge with each other. The superiors may be willing to share knowledge if they have a good personal relationship with subordinates and think that the subordinates can help. For example, Thanasankit and Corbitt (2000) found that the skills and techniques for requirements elicitation are passed down to junior systems analysts, who work closely with the senior systems analysts team on many projects, and most of the Thai systems analysts are likely to use previous projects as their base for current projects, such as for documentation, elicitation and validation.

In short, this section discussed the influences of the developing country context on the use of Notes for KM. In addition to the influences of organizational contexts, the developing country context including developing country culture, education, and education systems also influence people in using Notes for KM in organizations. Hence, these may yield different results of Notes use for KM to those developed countries where personal relationship is not as important as in developing countries and impersonal management style is more favored. In addition, such impacts of cultural differences may also influence the different use of Notes between SMEs in developed and developing countries.

6.5 Notes Identity from a sensemaking perspective

Having considered the different factors enabling and inhibiting the use of Notes in Thai firms, it may be concluded that no single key factor is more important than others. Rather, it depends on how people are capable of adjusting the use of Notes in different ways subject to the environment they belong to. Due to the interpretive flexibility identified in the structurational model of technology (Orlikowski, 1992), the technology is appropriated in several ways and comes to have different meanings and effects for different users. Hence, understanding how people make sense of a technology is critical to understanding how they interact with it (Bansler and Havn, 2004b). The user of the technology will fit the operation of a new technology into their own framework for understanding technologies (Vandenbosch and Ginzberg, 1996). This leads to the use of technology as their perceptions or frames and they may use it in less effective ways if they do not appreciate the premises and purposes of a technology (Orlikowski, 1993). For example, Vandenbosch and Ginzberg (1996) suggested that users must understand how technology can support collaboration in order for technology to foster collaboration in an organization. While these frames are held by individuals, many assumptions and values constituting the frames tend to be shared with others depending upon common educational and professional backgrounds, work experiences, and regular interaction (Orlikowski, 1993). From the point of view of this study, the identity of Notes plays a major role in explaining how people make sense of Notes in order to interact with it. The findings illustrated how different identities are created concerning the role of mediators such as manager or trainer and the organizational structures such as policies, norms and work processes either to drive or inhibit the staff to use Notes. This study also found that individual background, organizational and national contexts have an impact on how Notes identity is created which result in the use of Notes for KM. This supports earlier research findings regarding the IT identity concept (e.g. Bansler and Havn, 2004a,b). Having clarified why Notes identity is different and what type of Notes identity is in the four case studies in previous chapter, this section attempts to dig deeper the meanings of IT identity.

To address the creation of Notes identities further, this study adopts the sensemaking perspective (Weick, 1995) which focuses on how people in organizations construe

the situations in which they find themselves and examines how those interpretations or constructions are enacted through their everyday activities. Sensemaking is a process in which action and thought continually interact and condition each other (Bansler and Havn, 2004b). In other words, sensemaking emphasizes that people attempt to make things sensibly accountable to themselves and others and that action is crucial for understanding. In doing so, people act and create the environment they face and this environment then constrains and enables their actions (Weick, 2001). Hence, the concept of IT identity may be drawn primarily on the theoretical framework of Weick's sensemaking. Weick (2001) referred to the flexible and customisable technologies as "equivokes" to indicate that they "admit of several possible or plausible interpretations" (p.148). Humans try to make sense of their action either by modifying the technology or transforming the organizational environments such as working processes and communication norms (Bansler and Havn, 2004b). Hence, the findings of Notes identity in this study can be expounded by adopting the sensemaking theory since Notes is equivocal and open to many different interpretations by its users which result in either success and failure of Notes use to support KM. However, Bansler and Havn (2004a) argued that the systems identity in an organization changed continuously because the applications are used in ways not foreseen and to which it has to adapt to survive (Fonseca, 2002; Orlikowski, 1996; Taylor and Van Every 2000; Truex, et al., 1999; Weick, 1993; Ciborra, 2002). Therefore, rather than viewing identity as a discovered object, it should be viewed, according to sensemaking as an "on-going retrospective development of plausible images that rationalize what people are doing" (Weick, 2001, p.460) by focusing on and elaborate a limited sets of cues into an identity for actions. In the study of how a group of mediators in a large company adapted a new web-based computer-mediated communication to the local context, Bansler and Havn (2004b) implied that there were different identities on ProjectWeb which can be viewed as either a broadcast medium or groupware system. However, Bansler and Havn (2004b) focused on how the individual mediators may develop different interpretations of the "same" technology in the same organizational context depending on their identity, previous experience, and local conditions. Having found that Notes identities have different influences on the use of Notes for KM, this present study focuses on the identity of Notes which has been created in different organizations and clarifies how the identity of Notes is created as a result of the

organizational sensemaking processes on the adoption of Notes. What follows therefore attempts to discuss the factors which are involved in sensemaking of human action towards Notes in organizations.

Having found several factors such as the role of managers and Notes developers in the case studies which drive or inhibit the different identities, the findings support the study by Bansler and Havn (2004b), Yates et al. (1999) and Orlikowski (1995) on technology-use mediation which suggested that the use of such equivocal technology as an electronic medium is strongly influenced not just by users but also by those individuals who provide training, propose usage guidelines, and alter the technology to adapt it to changing conditions of use. Mediators are actively involved in defining the technology, how to use it, its purposes and people who use it, and hence, the role of the mediator is to make sense of the technology (Bansler and Havn, 2004b). From the case studies presented, it appears that Notes is implemented for similar functions in different organizations, but it could be interpreted and used very differently by different people. This is, as it was found in this study, because Notes is open to multiple, and even conflicting interpretations which result in different identities. However, shared identity of Notes becomes apparent as the mediator influences users' interpretations by providing them with understandings, images, concepts, knowledge and heuristics about Notes. Therefore, the mediator is found to influence the adoption of Notes in the case studies as the mediator has to make sense of the technology in relation to the specific needs and circumstances generated by the local context in order to adapt the local context of use by modifying features of the technology, promoting use, or establishing appropriate communication norms (Bansler and Havn, 2004b).

The role of mediator also influences other staff to have the same perception of Notes identity within the organization since a training programme can introduce the new technology and its potential to the users, and support the on-going use of the technology (Vandenbosch and Ginzberg, 1996). This is because the kind and amount of information about the product communicated to them, and the nature and form of training they receive on the product can influence how users change their

technological frames in response to a new technology (Orlikowski, 1993). This assertion can be found in ComNotes and Comtech where the directors and managers acted as the mediators in directing their staff how Notes must be used. On the other hand, it appears that the person in Procom who initiated the KM database resigned and nobody seems to drive its use again. In Chemhouse (Thailand), there was no one person who acted as a mediator in making sense of Notes and instructing its use to other staff. As a result, the users were more likely to have their own understanding of Notes from their on-going use and experience and this did not lead to the cooperative use of Notes. In addition, Orlikowski et al. (1995) characterized technology-use mediation as “deliberate, on-going and organizationally-sanctioned intervention within a context of use which helps to adapt a new communication technology to that context, modifies the context as appropriate to accommodate the use of the technology, and facilitates the on-going effective use of the technology over time” (p.424). As a consequence, it may be argued that the role of manager as a mediator is the key driver for organizational sensemaking process about IT. This is because while the organizational interpretation process is something more than what occurs by individuals, a piece of data, a perception, a cognitive map is shared among managers who constitute the interpretation system (Weick, 2001). As a result, the thread of coherence among managers is what characterizes organizational interpretations (Weick, 2001) towards the technology. The role of manager as a mediator may be, however, significant only in SMEs and the developing country context such as Thailand in which managers, as discussed in 6.4.3, grasp high power in Thai SMEs.

Accordingly, the mediators’ sensemaking of technology is found to influence the adoption and development of Notes since the mediators can convert such equivocal technology into a “technology-in-practice” (Orlikowski, 2000). Yates et al. (1999) combined the notion of genre, defined as “socially recognized types of communicative actions-such as memos, meetings, expense forms, and training seminars-that are habitually enacted by members of a community to realize particular social purposes (Yates and Orliowski, 1992), with that of technology-use mediation. As seen in the case of ComNotes and Comtech where the managers acted as mediators in motivating staff to use Notes, explicit structuring of genres, which

refers to the process that mediators devise guidelines and policies, educating users and setting an example through their own use of the medium to influence actors' knowledge, expectations and habits in the new electronic medium, can be drawn. As argued by Yates et al. (1999), explicit structuring of genres may result in faster and more extensive structuring, the realized outcome of explicit structuring in general depends on the goals of the mediators and their success in achieving them, as well as the unintended consequences of their actions. In contrast, implicit structuring, which refers to the process that is either unreflective action that reproduces genres established in one medium or community within another medium or community (migration), or emergent action that arises tacitly from people's situated use of a technology over time (variation) (Mintzberg and Waters, 1985) may be drawn in Procom and Chemhouse (Thailand). As the staff get more accustomed to using Notes, their understanding of Notes are changed over time depending on their on-going experiences with the technology (Orlikowski, 1993). In contrast to ComNotes and Comtech, there is no one who acts as a mediator in these organizations to enforce or motivate staff to use Notes. Although there are Notes developers in Procom and an IT supervisor in Chemhouse (Thailand), they may act as only designated support staff, who work in a reactive mode, rather than proactively facilitating on-going adaptation to the context of use and chauffeurs, who relieve users of the need to interact directly with the technology (Orlikowski et al., 1995). These act as mediators and rarely play an on-going role in technology adaptation (Orlikowski et al., 1995).

In addition, since Notes had been introduced to and adopted by Procom and Chemhouse (Thailand) for some time, Notes was not perceived as a distinctive tool to other IT such as email and file sharing server. This may be because the staff are more likely to transfer existing norms and established habits from familiar media to a new medium, without much active deliberation of what kind of genre or usage norms they hope to enact within it (Yates et al., 1999, p.100). Hence, this could inhibit the perception of Notes identity in these organizations and staff may simply apply ineffective habits of use from old technologies to new ones (Yates et al., 1999; Ciborra, 1996). However, the use of Notes among staff is gradually influenced by implicit structuring of genres, whilst factors such as the nature, size and age of

organizations may affect the speed of implicit structuring (Yates et al., 1999). In comparing the three IT organizations with the non-IT organization, Chemhouse (Thailand), the latter is clearly older than the IT organizations and this may have constrained the process of implicit structuring as well as the nature of Chemhouse (Thailand) which is more related to manufacturing process rather than consulting services in the IT organizations where implicit structuring is more likely to reinforce and change the use of Notes to interact socially with each other within the organization. Such findings support the notion of genre repertoire in that staff then use a community's genre repertoire to reflect the common knowledge, expectations and norms, derived from the organizational and broader cultural context, that members of a specific community share about communication (Orlikowski and Yates, 1994).

The size of an organization has an impact on how the identity of Notes is created through the sensemaking process. The evidence can be found in ComNotes and Comtech where Notes was utilized by a small group of people, or even the identity which had been shared among the people in the same departments in all IT organizations, whereas it was more difficult for the members of Chemhouse (Thailand) to share their local sensemaking processes with distributed group of people. Similarly, Ciborra (1996) contended that successful applications in a large organization stay local, and do not affect the whole business; while traditional logics may stifle new concepts and processes in adopting the technology. As argued by Bansler and Havn (2004a), the creation of a new identity goes well, as long as it is confined to a small group of people since sensemaking involves local activities. In addition, not only does the organization size affect the perception towards Notes identity, but also other technologies implemented may minimize the efficiency of Notes use. In both cases of small (Procom) and large (Chemhouse Thailand) organizations in this study, the findings yielded that the perception of Notes identity may be blurred when other IT are in place. Ciborra and Patriotta (1996) also found that the presence of traditional communication tools, with which the staff are more familiar, allows users to by-pass the new applications in Unilever, a large consumer business. In addition to the size of organizations, the context of Thailand as a developing country in this study may influence the shared identity of Notes. As

argued in section 6.4.3, top management has more power to play, whereas collective culture and relationship-oriented behaviour may enable the shared perception of Notes identity in organizations.

6.6 The use of Notes over time

As discussed in Section 2.2, this study has adopted the view that the relationship between organization and IT is not deterministic and imperative, but it is reciprocal over time. From the perspective of structuration theory, organizational change is the effect of the actions of individuals interacting with institutional structures. Orlikowski (1992) proposed the structuration model on IT explaining that organizations are not only shaped by IT but they are also strongly influenced by social and political processes and by the actions of the organizations. In other words, IT must be adapted to the organizational context and appropriate practice must be established. This study extends the discussion of the use of structuration theory in the IS field in that the organizational structure in terms of organizational contexts and developing country context, which influences the users' perception towards Notes, have an impact on how Notes is designed and used over time. When an organization deploys a new technology with the intent to make substantial changes to business processes, people's technological frames and the organization's work practices will likely require substantial change (Orlikowski, 1993). For example, Hayes and Walsham (2001) found that constant renegotiation and fine-grained improvisations lead to fuller participation in using Notes. On the other hand, because the characteristic of Notes that is flexible for organizations to apply its use in different ways, Notes allows organizations to change over time as user is familiar with Notes use. For example, Notes influences the organizational structure in that it facilitates co-operation within and across departments in the organizations where knowledge can be both expected and unexpected outcomes among the people involved.

The relationship between human actions with Notes and Notes identity needs to be discussed. Having discussed the implications of Notes from the case studies, it is realised that Notes identity influences the use of Notes, whereas the findings in

Chapter 4 give rise to the idea that the different applications of Notes shaped the different Notes identities. Evidence from the case studies can be drawn to support such mutual relationship. For example, in ComNotes, the design and use of Notes was aligned with the business processes. Notes identities are created and perceived by the staff who attempted to integrate Notes as a unique tool in business processes of ComNotes. Conversely, as Notes is perceived as the only tool utilised and integrated to business processes, the staff need to use it in their routine work to facilitate business processes. In Procom, Notes identity was perceived as a communication tool which is used by the staff to replace other means of communication, such as notice board. In addition, Notes identity is not developed further as there are other IT tools such as ERP, file sharing server implemented. As a result, it influences the limited use of Notes. For instance, Notes is seen rather an individual tool in utilising scheduling features or categorising personal emails. This may be because the perception of “shared tool” is not perceived, whilst the staff can use file sharing server and ERP to maintain the organizational resources.

It may be concluded from this evidence that the relationship between the human actions on Notes and Notes identity is reciprocal. This relationship can also be dynamic in which the human actions and Notes identity can be developed over time as well as one can have an impact on another. To make use of Notes, the staff make sense of technology based on their environment and background. This leads to the different identities of IT which are varied from one context to another. However, at an organizational level such identities may be created through the process of organizational interpretations, rather than individual interpretations as organizations preserve knowledge, behaviors, mental maps, norms and values over time (Weick, 2001). As with other types of identities, the identity of Notes is developed over time. The revised interpretations are what guide action, and not the initial decisions (Weick, 1993). This leads to the notion of improvisation which implies that attention and interpretation rather than intention and decision making drives the process of designing and using technology (Bansler and Havn, 2004).

Such an evolving relationship can be drawn from the evidence that the new applications such as sale application of Procom and purchasing application of Chemhouse (Thailand) had just been implemented and the staff needed some time to get used to its functionalities and realise its identity. In addition, the developing country context plays a major role in how shared perception of Notes identity may be developed over time because the role of culture where people are more likely to be under controlled of top management and to co-operate with each other in their work. As found in Procom, Notes becomes the main communication tool within the organization when Notes has been implemented throughout the organization and policies and information from the top management are likely to be distributed through Notes. On the other hand, since the staff who had been responsible for Notes development and had initiated the use of KM database in the Technical department has resigned, Notes identity as a KM database seems to fade away from the staff's perceptions. However, it appears in the case where Notes had just been implemented, like Chemhouse (Thailand), that a clear identity of Notes could not be developed as the managers and staff did not have much experience on the use of Notes. Therefore, the length of Notes use in organizations is found to influence top management and staff's perception of Notes identity as they can recognise the potentialities of Notes and adapt the use of notes to fit with their business processes. For example, at the beginning of Notes implementation in ComNotes and Comtech, not many applications of Notes were utilised or the staff did not use them. However, after implementing Notes for some time, senior management in these companies could initiate and direct the use of Notes to the staff as a unique and integrated business application, and reporting tool respectively.

Further, as argued in section 6.2, Notes acts as a tool which supports social capital, as a mediator for interaction processes. However such a relationship between social capital and the use of Notes cannot be viewed as a unidirectional cause and effect, but rather a two-way causality. For example, the information on Notes is more likely to be shared among the staff who share the same background or projects. This may be because the individual identity when they see themselves as one with another person or group of people influence the use of Notes to interact with other colleagues. It is argued that there are significant barriers to information sharing,

learning and knowledge creation where identity is not present (Nahapiet and Ghoshal, 1998). On the other hand, the use of Notes, over time, facilitates the relational dimension of social capital by enhancing co-operation. In addition, a cognitive dimension is developed through Notes as the people are getting more familiar with the language use on Notes.

6.7 Conclusions

This chapter encapsulated the relevant conceptual framework and the emerging concepts which influence the use of Notes for KM in this study and sought to explore the connections between the findings in this study and the existing literature. The objective was to understand why the phenomena studied appeared as they were. There are some aspects of findings that reconcile the existing literature. For example, the impact of Chemhouse (Thailand) context on the limited use of Notes is similar to other studies in which Notes was adopted in a virtual organization (e.g. Ciborra and Suetens, 1996), but there are also differences that reveal interesting insights into the use of Notes in SMEs within a developing country context.

The chapter highlighted that Notes may be used to support KM as either an emergent or deliberate process. Rather than being used to manage knowledge, Notes was used to manage information. However, as Notes supports the 3Cs of KM activities, it can be argued that Notes supports social capital in organization which drives the relationship among people and contributes to knowledge creation and sharing. The types of information and knowledge which Notes is used for were discussed. The successful use of Notes to support KM does not depend on only Notes but also the context in which Notes is implemented. In connection with the organizational context, the influences of a developing country context on IT implementation and KM were also investigated. By drawing on specific Thai cultural values, the role of leadership, collective culture and relationship-oriented behaviour, these together are likely to influence the use of Notes for KM in Thai SMEs in terms of both enabling and inhibiting factors. In addition, this allowed the comparison between the influences of Thai culture on the use of Notes to other

previous studies of Notes in developed country contexts, and on other IT use in other developing country studies.

The emerging concept of Notes identity was discussed by employing a sensemaking perspective (Weick, 1995) in which people make sense of Notes in order to interact with it. The role of mediators was discussed as the main factor which Notes identity has been created, while size of organizations has an impact on how Notes identity is shared through their local sensemaking processes within organizations. Finally, the dynamic relationship between the use of Notes and the SME in developing country context was developed on the foundation of structuration theory. The use and adjustment of Notes are influenced by the contexts including developing country context and organizational context. The interactions of humans with Notes, on the other hand, change the context of organization, namely norms, rule and work processes of the organization. The interactions of humans on Notes over time will change the IS context in the organization such as familiarity with the technology which leads to the adjustment of Notes and the clear identity of Notes in the organizations. As a result, the relationship between the human actions and Notes identities as described as reciprocal in which one has an impact on another and the relationship can be viewed as dynamic. Having discussed the findings of this study with the relevant literature, the research questions posed in chapter 2 could be answered as well as the contributions to several areas such as the use of groupware for KM, IS in developing countries and SMEs were made. The next chapter provides details on contributions, implications, and limitations of this study.

Chapter 7

CONCLUSIONS

7.1 Introduction

This study has identified a variety of issues concerning the use of groupware for KM within the developing country SME context. This study aimed to, 1) explore the role of groupware for KM and 2) the influence of a developing country SME context on the use of groupware for KM. Through the literature on KM, groupware, IS implementation and use in SMEs, developing countries, and the detailed fieldwork on Notes use in four Thai organizations, the researcher intended to delve into real life experience of Notes users in developing country SMEs and to extract the essence of Notes functionalities in KM. The findings of this study suggested that such groupware as Notes may be used to support KM schemes in organizations. The organizational context plays a major role in shaping the users' view of Notes identity, which in turn influences the use of Notes for KM. Due to a broad literature related to this study, the contributions and implications extended across a wide range of research areas such as collaborative technology, IS research in SMEs and developing countries, KM and organizational studies. This chapter summarises the main arguments submitted in the thesis and its contributions, describes theoretical and practical implications, and discusses the limitations of this study and future directions of the study of groupware for KM in developing country SMEs.

7.2 Overview of the thesis

Chapter 1 introduced the general background of this thesis regarding the use of IT for KM and its need for this study. The researcher also set out the context of Thailand in which this study was carried out. The personal motivations and the expected contributions were also provided.

Chapter 2 discussed the existing literature on issues in KM, groupware, the relationship between IT and organizations, and IS in developing countries and SMEs. The structuration model of IT was introduced and reviewed in order to provide the perspective of this study towards the relationship between IT and organizations over time. The researcher then examined the distinctions between the terms ‘information’ and ‘knowledge’. The potentialities of IS for KM in the literature were described. Previous studies of the use of Notes as the most well-known groupware were reviewed to illustrate the main IT focused in this study. Next, the researcher explored and identified the use of Notes in the literature as far as KM is concerned into five use modes. This study developed and taxonomised the use modes into the interaction richness model which entails the 3Cs processes. Having developed the model, the researcher proposed a sixth use mode, the ‘exploring’ use mode which has not been identified in the literature. This signifies the opportunity to further explore the potentialities of Notes which contributes to a collaboration between humans and technology. The literature on the use of IS in SMEs and developing countries was also reviewed to set out the need for a study of IS in such a context. Having reviewed the relevant concepts in the literature, specific research objectives and questions were provided.

Chapter 3 presented and discussed the research methodology. The chapter first discussed the choices of research paradigms in IS and then justified why the interpretive perspective was chosen as the foundation of this study methodology. The research design was explained including the adoption of multiple case studies as a research strategy, mixed level as the unit of analysis. Detailed information about fieldwork was given regarding research site, methods of data collection and data capturing techniques. The chapter also examined the validity, reliability and generalizability of the study. Finally, the background to the case studies was described.

Chapter 4 provided the analysis of the use modes of Notes in relation to KM. Both within case and cross case analyses were conducted. The different uses within the four case studies which entail some form of KM were found. The findings showed

that the first four use modes are found to be useful for distributing, accumulating and capturing mainly structured information, and they are, in fact, only enablers for knowledge creation of the organizational members. Some evidence of 'exploring' use mode of Notes was found when Notes was integrated with other systems such as SameTime which enhanced the interaction of the members. This chapter concluded that Notes is used as a tool to support interactions among staff in which knowledge is created between individuals through their interactions. The different meanings of the use modes in each company were identified because several Notes applications were found to be utilized in these organizations. Thus, this led to the further analysis on how Notes applications were used in general and identified by organizational members which resulted in the different identities of Notes in different organizations.

Chapter 5 discussed the concept of Notes identity which has emerged from the analysis in chapter 4. This chapter aimed to give an overview of the different reasons and the impact of the interactions through Notes on organizations. The analysis of Notes identity was conducted within and across cases. The influence of organizational context on Notes identity was discussed. Top management within these companies played a major role on how Notes identity had been developed. In addition, the context of Notes implementation, whether other IT tools have been utilised, and individual characteristics all had an impact on how Notes was perceived in the organizations. The implications of Notes identities were compared in order to give rise to the idea of how Notes could be perceived and utilized with regard to enhancing KM in organizations.

Chapter 6 explored the connections between the findings of this study as compared to existing literature. This chapter showed some aspects of findings that reconcile the existing literature as well as the differences that reveal interesting insights the use of Notes in SMEs within a developing country context. The influence of contexts were discussed with reference to previous studies of Notes, and the literature of IS in a developing country and SMEs. The emergent concept of Notes identity was discussed in connection with the sensemaking perspective by Weick

(1995) and argued that people make sense of Notes in order to interact with it. Finally, the emerging concepts which influence the use of Notes for KM in this study was discussed based on the structuration model of IT so as to explain the dynamic relationship between the use of Notes and the context of SMEs in developing country. The relationship between human actions and Notes identities was argued to be a reciprocal one in which one has an impact on another and the relationship can be viewed as dynamic over time.

7.3 Research contributions

This section summarises the key findings of this thesis which are considered to denote what contribution has been made. Despite the limitations of this study in terms of the case selection which may also mean that the second and third research questions have not been fully tested, this study does make the following contributions.

- Proposal of a taxonomy of use modes for KM. The purpose of this taxonomy is to explain how different Notes use modes derived from the existing literature can support KM processes. The use modes may be applied to the use of other collaborative technologies for KM. This study also contributes to the literature on KM from an IS perspective.
- Clarification of the influence of the organizational context on the use of groupware. It was found that the study of groupware use in SMEs has been neglected in the previous studies. This study, therefore, focused on the use of Notes in SMEs and attempted to compare between the use of Notes in SMEs and a large organization within the same national context. The findings lead to a better understanding of the different use of groupware in SMEs and large organizations.
- Elucidation of the influence of the developing country context on the use of groupware. This study yielded some influences of the Thailand context, as a developing country, on the use of Notes for KM, which has been neglected in previous studies on groupware. Though the developing country context is diverse, the case studies in Thailand, as it provides the dominant Thai

working practices (Komin, 1990), may be replicated to other developing countries where the cultural dimensions and other contexts are similar.

- Revelation of the influence of IT identity perceived by human on the use of IT for KM. The empirical understandings of IT identity generated in this study have implications for adopting and using IT which is adaptable and customised over time. It is important for organizations implementing IT to define the technology and how to use it, its purpose and potential so as to be successful in promoting it and increase its usability and acceptance levels among users.

In summary, this study makes a contribution of significant assessment of groupware for KM in SMEs in developing countries by providing Notes functionality for KM and the influences of the context and IT identity on the use of Notes for KM which may be changed over time.

7.4 Implications

Having discussed broad issues concerning groupware and KM in developing country SMEs, this study provides both theoretical and practical implications.

7.4.1 Theoretical implications

The main concern of this research was on the use of groupware for KM in general. ‘Knowledge management’ is one of the most popular terms and a buzzword among academia and consultancy companies (Wilson, 2002). As discussed in chapter two, the actual meanings of ‘knowledge’ used are diverse and the term ‘knowledge’ tends to confuse the debate on the issue of KM. Having considered this, the researcher attempted throughout this thesis to deal with a variety of understandings of knowledge from theoretical perspectives and to grasp the meanings of knowledge under the support of IT. Especially, in chapter two, dealing with the concept of knowledge and KM from general studies and in IS in particular, can serve as a conceptual foundation on which various discussions relating to knowledge in this study can be made. As some might say that KM is nonsense (e.g. Wilson, 2002), this

study attempted to argue that KM is vital in particular types of organizations in order to enhance its performance and serve customers' needs timely. By focusing on the use of Notes which is flexible and adaptable, this study contended that the tool may be used in different ways to support KM activities of knowledge intensive firms and the organizations in which time and space in connectivity among staff needs to be overcome for the sake of knowledge capturing and disseminating within organizations.

Based on the theoretical discussions on the use of Notes for KM, the researcher conducted a field study to answer the specific research question of "How do groupware systems support KM processes?" Qualitative data of the users of Notes in Thai companies aimed to explain the potential of Notes for KM through the interaction richness model which was discussed in chapter two as a conceptual model. Through the iterative process between data analysis and the conceptual model consideration, this study identifies how information and knowledge can be utilised and captured by the use modes. Although the 'exploring' use mode has not been identified in the literature, this study found some evidence of how Notes could be more beneficial to the organizations and staff in terms of KM as understanding where Notes is useful, and how it actually enables the design of future groupware systems to better fit business processes of an organization.

Based on the discussion in the literature, it is important to realize at first that 'knowledge', in fact, cannot be directly managed. However, the context in which knowledge resides needs to be managed. In addition, since the people who use IT carry values, perceptions, and attitudes influenced by their own culture, it would be beneficial to consider their cultural perspective so as to overcome many possible difficulties which may occur during and after the implementation period (Rohitratana, 2000). Therefore, as the context of developing country SMEs was focused, this study also attempted to reveal the influence of organizational contexts in terms of the structure, processes, culture and strategy which can enhance or deteriorate the capabilities of Notes in supporting KM. By focusing on Thai SMEs, this study gave rise to the influence of specific Thai values which influence the use

of Notes as well as the context of developing country SMEs which have not been investigated in the literature. Even if this study is subjective to the developing country context, by using case study research, it enabled the researcher to take into account the detailed understandings of the context which other researchers or practitioners in other developing countries may replicate the findings. This study may be relevant for the use of groupware in developing countries such as Malaysia, Indonesia and India where their cultures have some similarities to the cultural aspects (Hofstede, 1991) discussed in the previous chapter.

It is apparent that the organizations which are successful in using Notes to support KM in this study are IT consultancy firms where they have to provide consulting from their experience and expertise. Therefore, knowledge becomes very important for their performance in terms of speed and quality of services they offer to customers. On the other hand, the organization which is not a consultancy firm seemed not to be successful in utilizing Notes since it might not have an organizational value or culture which enhances KM. However, the evidence in this study is not sufficient to draw such a conclusion as only one of the four companies is characterized as a manufacturer.

One of the main contributions of this study to the IS field emerged from the data by using grounded theory analysis techniques that led to the discovery of the concept of IT identity. Whereas the term 'IS identity' (Agarwal and Lucas, 2005; Benbasat and Zmud, 2003) emphasizes the identity of IS community and discipline, this study uses the term 'IT identity' in order to focus on the identity of IT artifacts. The findings of this study yielded that IT identity plays a major role in enabling or deteriorating human actors in the use of IT in an organization. Therefore, it is argued that in order for the success of IT implementation, it is important to realize how to cultivate a shared perception and understanding of the identity of IT in organizations, especially for the collaborative tools where people need to share the tool. Regarding organizational context, it is likely that SMEs in developing countries collectively make sense of IT as sensemaking is a social process where individuals enact with similar environments in order to perform an action. In addition, the

collective cultural dimension of the developing country may influence their joint perceptions towards Notes. Therefore, this study raised the concern that only a single framework may not wholly deal with groupware implementation and use in all the different contexts. Defining the scope of research in using Notes for KM is of paramount importance. This means that the researcher must examine the interaction between national and organizational cultures and their joint effect upon the use of groupware.

Having found that the perception of Notes identity is important in influencing the use of Notes for KM, the study also implies that a mediator plays a significant role in making staff perceive in a positive way the use of Notes. This approach may be more practical in the contexts of SMEs rather than large organizations where a formal rule is enforced and the staff may resist the use of IT. As suggested by Hirschheim and Klein (1989), the developer should work from within the users' perspective and help them to find their preferred views. He or she should ease the transition from one viewpoint to another, thereby alleviating possible resistance to change. Rather than using a rigid enforcement, a more informal and personal management approach, which is more likely to occur in SMEs, may be easier to change the perspectives of users towards the use of Notes and lead to wholehearted participation of staff. Such difference of the perception of Notes identity between SMEs and large organizations can be seen in the case of Chemhouse (Thailand), a large organization in this study, where all the policies on the use of IT are directed from abroad and no one within the company acts as a mediator to drive staff using Notes. As a result, Notes identity in Chemhouse (Thailand) seems to be unclear in staff perception. This thesis discussion of the IT identity is still exploratory but it is expected to be a starting point for further debate.

The interpretive research acts as a roadmap of all the data collection and analysis technique which may be methodological implications of this study. As the methodology adopted is similar to several previous studies of groupware, the interpretive approach enables the researcher to view two aspects of "knowledge" in this study. First, having accepted that knowledge is "socially constructed", this study

made sense of what individuals give meanings to the phenomenon around them and this becomes the new knowledge contributing to the field. Second, the study interpreted how people view 'knowledge' from their perspectives and experiences which helps to argue how IT supports KM. The case study research fits well here as it aims to reveal the specific context in which individuals have given meaning to what they mean by knowledge and their actions towards Notes in the organizations.

Finally, this thesis has presented the findings of the use of Notes for KM based on the principles of the structuration model of IT (Orlikowski, 1992) which argue that IT and organizational contexts may over time influence each other. By taking into account the existing organizational contexts and the top management's intention, they play a major role in making the staff perceive and capture IT identity which result in the co-operation for KM. The findings presented in this study have implications for both the research and practice as is explained in the following section of groupware development and implementation.

7.4.2 Practical implications

This thesis aimed not only to fertilise the theoretical implications on the use of groupware for KM in developing country SMEs, but it has also provided practical implications for two main issues, namely the functionalities of Notes towards KM in organizations and the factors which the developing country SMEs have to consider when Notes is implemented for KM.

This study can be of benefit to organizations in terms of providing them with detailed qualitative data on how they can use Notes to manage organizational knowledge. Each use mode identified in the interaction richness model could enable the organizations implementing Notes to realize the potentialities of Notes for KM in either emergent or deliberate KM processes, whilst it was argued that data and information are maintained on Notes and the first four use modes are enablers of knowledge creating and exploring use modes. Therefore, organizations may employ the interaction richness model to recognize the use modes they utilize and to assess the extent to which Notes brings them benefits. The staff may recognize the type of

their interactions with Notes in which different outcomes may be generated. Hence, it will enable them to develop the use of Notes to achieve KM whilst the different interactions on Notes through use mode distinguishes outcomes between data, information and knowledge. In addition, this will affect the future development and use of Notes and other similar KM systems or collaborative tools in the organizations and enable the promotion of use modes which are most effective for those organizations. For example, knowledge intensive firms where their competency is based on knowledge, the last two use modes, creating and exploring are important. On the other hand, in non-knowledge intensive firms, the first four use modes may be sufficient and they do not have to reach the last two use modes. This will urge organizations to use Notes to support the 3Cs processes which lead to knowledge created in individuals' actions rather than to use it to maintain 'data' or 'information' which provide less value to the organizations. It may also be worthwhile for the organizations that have already implemented Notes and need to find an approach to develop its use for KM since the use modes are recognized as the staff interact with Notes. Having found that Notes can be used to support the knowledge creation of individuals when they share the same understanding or background, organizations may extend KM through Notes by nurturing an environment to support staff regardless of their position. This should be a network of individuals who have similar interests as suggested by researchers on "community of practice" (Wenger, 1998; Brown and Duguid, 1991). The staff then can exchange their knowledge and experience where they can also use Notes to learn once they understand the meanings of information on the databases.

This study also provided various implications of the context in which Notes is implemented in terms of the factors which lead to successful or failed KM. Through the detailed case study research, this study can inform the design practice of Notes with empirical data about what factors are enabling or inhibiting the use of Notes for KM. The implications and discussions presented in this study suggested the influence of Notes identity on KM which may be practical specifically in the context of SMEs in developing countries. The distinct identities of Notes, which emerged from the findings in chapter four and analyzed in chapter five, can be highly beneficial for managing the use of Notes to be practical for KM in various

processes. Such influence may particularly occur in a small group of people utilizing Notes. Mediators such as top management and the developers seem to play a major role in driving or inhibiting the staff in SMEs to perceive and use Notes as a tool to support KM as the context of SMEs allows more opportunities for the staff to collaboratively learn and understand Notes functionalities. It is important for managers to realize the creation of Notes identity and to promote the same technological frames of individuals in order to improve co-operation through Notes. This is because, as found in this study, the organizational context also influences how the identity of Notes is created in the organizations. Hence, this is relevant to what underlying the relationship between technology and organization from the structuration model. The identity emerges when technology is designed and used by human and the context also influences how the identity is viewed. This is different to the role of IT where the emphasis is on the purpose and impact of technology in an organization. In addition, since IT identity is embedded within the context of use and it is more difficult to change than the role of IT, managers need to find ways to cultivate the identity of technology by taking into account different factors which contribute to the creation of IT identity. In addition, this thesis has shown that local culture has implications on the use of Notes for KM. Hence, different strategies to manage the use of Notes for KM in developing countries may be needed.

By drawing on the broad context of Thai national culture, several cultural dimensions are unique and different to the western cultures, including collective and high power-distance on Hofstede's index. This resulted in how staff in the case studies were influenced by the top management and more likely to share the identity of Notes. The staff or Directors need to bear in mind that a technology such as Notes may be developed and embodied with the assumptions of western culture. As a result, they need a different strategy to form co-operation and to motivate the use of groupware for KM in a developing country such as Thailand. A soft and informal approach which promotes personal relationships among staff at all levels such as entertainment activities is sensible and effective for using groupware for KM rather than hard enforcement which the personal relationship is neglected.

The relationship between groupware, knowledge and organizations should be taken into account as an on-going cycle which in this study, the mediator who has more power is needed in guiding the perceptions towards groupware for the staff in organizations. Therefore, for practical discussion, it is essential for Directors or managers to reinforce and support the use of groupware for KM continuously. Using groupware for KM is not just a strategy or policy that can be given to the staff. It is rather and mostly related to change management as winning commitment for knowledge management initiatives needs to be recognized and managed at an organizational level (McKenzie et al., 2001; Davenport et al., 1998). Further, knowledge repositories have a life cycle which tends to grow, reaching the point at which they begin to collapse under their own weight (Zack, 1999). Hence, organizations and IT must be aligned and whether the staff will make use of it to disseminate or capture knowledge depends on their views towards groupware in the organizations. The top management should point out the clear roles and purposes of using groupware. In addition, by controlling and monitoring the staff's activities through Notes, it will make them collectively get used to Notes in routine work over time. Overall, for successful KM, organizations need to proactively manage and reorganize their repositories as an on-going activity (Zack, 1999).

7.5 Limitations of research

While much effort has been put to gain the achievements of the contributions, as with other research, the study has inevitable limitations that should be honestly recognized. As this study is exploratory and subjective, the issue of bias arising from researcher-effects at the site may be unavoidable (Darke, et al., 1998). Such bias may occur as the interpretive researcher is implicated in the phenomena being studied, where he was attempting to describe, interpret, analyze and understand the situation from the participants' perspectives, and was creating and enacting the reality being studied through the constructs used to view the world (Orlikowski and Baroudi, 1991). The concept of Notes identity, proposed in this study as an emergent theme from the data, would offer significant contributions into the IS field. Hence, more research on IT identity is still needed to corroborate the role of IT identity and

to clarify the extent to which IT identity influences its implementation and use in organizations.

A further limitation is due to the limited amount of data collected which results in the robustness of the findings. Having interviewed forty people from four organizations, it might be questioned by other researchers whether the information gained from the interviews leads to theoretical saturation. Hence, whether more interviews are required in order to gain a more understanding of the use of Notes for KM and the influence of the context investigated remain to debate, though it is not the aim of interpretive research to increase the size of sample. However, the researcher has to acknowledge that such limitation was also caused by the limited access to those organizations and the time allowed in the PhD process. The specific context of this study led to the difficulty in searching for SMEs in Thailand which utilize the same groupware system. Due to this limitation, the second and third research questions have not been adequately answered and tested. Although the researcher provided the discussion on the influences of organizational and cultural context based on the data available in this study, these issues may not be generalized at this stage and may still need more exploration.

As the study aimed to shed new light on the complex issues concerned with organizational knowledge, and the effective use of groupware within a specific context, this study sought to explore the relationship between the use of Notes, organizational contexts and organizational knowledge over time. The research design was then divided into two phases over a period of one year. However, it is argued that the period of one year does not seem to be long enough to show clearly distinguishable changes in the organization (Karsten and Jones, 1998), especially when the researcher needs to investigate the influence of culture, i.e. which values and practices (important elements of culture) are stable in nature but change over time, thereby reflecting changes in culture (Karahanna et al., 2005). The drawback may also be because some organizations have just recently implemented Notes in the organization such as Chemhouse (Thailand). In addition, whilst there is high turnover in IT companies which are SMEs, the researcher may not be able to gain

experience over a number of years towards the use of Notes in their organizations from the same staff.

This study also focused more on KM processes, and not on the outcomes. The outcome of the use of groupware for KM may be determined in the long period of time and not within the time frame of this study. The outcome of KM is difficult to measure explicitly, but could be measured against the criteria assessing the effectiveness of other business change projects such as a) growth in the resources attached to the project, including people, money etc., b) growth in the volume of knowledge content and usage, and c) the likelihood that the project would survive without the support of a particular individual or two, that is, the project is an organizational initiative, not an individual project (Davenport et al., 1998). However, such KM outcomes need to be measured regularly and over a longer period of time since it is not predictable whether current indicators of performance will persist (Davenport et al., 1998). This implies that the measurement of KM outcomes over time was a significant limitation in this study.

One of the most prominent limitations is the types of companies in this study since the IT companies were focused on as they are knowledge intensive firms. IT companies tend to be more advanced in utilizing IT, whilst other types of firms may find it difficult to harness Notes for KM. This study included the case of a chemical manufacturing firm in order to generalize the use of Notes to support to other types of companies. Since Chemhouse (Thailand) is a subsidiary of a multinational company, it may not accurately represent the context of Thai SMEs. However, since Notes is utilised only by key people within Chemhouse (Thailand), it was worthwhile to investigate whether Notes helped support KM in organizations other than IT companies.

All these limitations present further challenges for future research endeavors into the use of groupware for KM in developing country SMEs.

7.6 Future research

Several directions for further research of the use of groupware for KM in developing country SMEs need to be addressed. As one of the main aims of this study is to clarify how Notes is used to support KM in SMEs in developing countries, future research can explore its use in other contexts since the developing country cultures are diverse (Sahay and Avgerou, 2002) which may result in the different interplay between Notes and the organizational contexts as discussed in Section 6.6. This study may be treated as a research framework for other studies.

Future studies of groupware use in other types of consultancy firms or knowledge intensive firms, which are situated in developing country SME contexts are needed for a greater and deeper understanding of how Notes supports KM in this specific context. As this study was carried out in IT and manufacturing in particular, it would set out the practical use of Notes in other industries. However, a detailed understanding of a specific organizational context cannot be neglected in order to bring a successful implementation of groupware for KM. Hence, another implication for further research is due to the limited degree of generalization. As the focus is the use of Notes in SMEs, researchers can conduct additional research in other industries apart from IT and Chemicals manufacturing industries. This is because the definitions of SMEs in several countries tend to be varied upon the types of organizations (APEC documents, 1994). Working towards a more focused approach for different sectors of industry with particular emphasis on SMEs is needed because it may be useful to investigate whether and to what extent Notes can be used to support KM in other knowledge intensive firms such as consultancy in other areas except IT, or R&D companies since cultural conditions within the firm will be at least as important in ultimately facilitating knowledge work processes that are largely conducted autonomously in knowledge-intensive firms (Newell et al., 2002).

Future research may also investigate other collaborative tools, whether and to what extent it can be used to support KM in developing country SMEs. This would help to increase generalizability of the interaction richness model and to clarify more potentials of each use mode in relation to KM presented in this study. The researcher

may compare the use of such collaborative tools or other groupware to Notes to see if it leads to more or less efficiency of KM in developing country SME context.

Since the concept of IT identity is an emergent theme from a grounded theory approach, its empirical evidence relies on plausibility of the descriptions. Suggestions for future research, therefore, need to encourage researchers to investigate the IT identity in other settings by choosing the organizations in which the same groupware or other collaborative tools are implemented in order for the emergent theme to be credible in IS academia. Researchers may explore how specific contexts and the role of mediators influence the perception of Notes identity, its use for KM and impact on the organizations and individual organizational members. It may be interesting to investigate whether a shared identity of Notes is perceptible in large organizations and whether it results in the co-operation activities which support KM. In addition, apart from the identity of a specific tool (e.g. Notes), the issue of IT identity in general such as the use of IT tools as a whole in an organization needs to be investigated in order to effectively manage their corporate use within an organization. According to the structuration model of IT (Orlikowski, 1992) where IT is the social product of subjective human action and become institutionalized within organizations, it is interesting to recognize and further investigate whether the IT identity emerges as the organizational members begin to share the same subjective perceptions and use of IT depending upon particular organizational contexts.

A deeper understanding of developing country culture's influence on the use of Notes for KM could provide prescriptive insight to guide the developer and organizations that intend to implement Notes. Further, because this study was limited to Thailand as a developing country, a more geographically diversified sample of developing countries would strengthen the generalization of the outcomes. National cultural influence on the knowledge should also be investigated. It seems plausible that intangible assets of organizations such as service offerings, which are more individualized and culturally sensitive, may be more influenced by national culture than are tangible product goods (Dwyer et al., 2005). Future researchers

should give greater attention to the association among cultural dimensions and the use of collaborative tool. Other approaches (e.g. Kluckhohn & Strodtbeck, 1961; Hall, 1977; Trompenaars and Hampden-Turner, 1997; Hofstede, 1991), all of which have some common elements, to culture and its measurement should be undertaken to validate the results of this study.

Ideally, future research should be conducted in an environment where the researcher may get involved in the on-going processes of organizations. As the successful implementation of KM depends on assessments on a regular basis, by involving immensely in the field, it would allow the researcher to investigate whether and to what extent groupware for KM is useful to the organizations. A more engaged approach, whereby the researcher tries to become a part of the group under study (Easterby-Smith et al., 2002), such as action research may be needed. However, the possibility of creating such research could be argued to be idealistic. This is because the cost of implementation is quite high, while the organizations such as SMEs would prefer implementing a technology or exploiting other KM scheme which are ready for them to replicate.

Concluding remarks

Organizations need to understand that knowledge cannot be straightforwardly managed. People are not able to produce all knowledge which is embedded in their skills and action to be available on IT. However, it is important to create the environment which leads to KM processes. Therefore, not only IT is the focus, but also the organizational contexts in terms of size, culture, structure and management must also be taken into account. The researcher expects that this study fills the gap identified in the previous studies where the study of groupware use for KM in developing country SMEs is neglected. This research leads to a better understanding of what factors are enabling or inhibiting the use of Notes for KM in such context. As a result, this understanding may result in an improvement in the development and application of groupware for the SMEs in Thailand or other similar developing countries which plan to effectively implement and use groupware for successful KM.

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Appendix

Interview Protocol

Interviews with:

- A. Director of the company (**To understand the background of Lotus Notes use and the broad view of Lotus Notes use within and across the organization**)
- B. Managers of different departments (**To understand the use of Notes within groups/departments and between groups/departments of the organization**)
- C. Notes users in different departments (**To understand how individual uses Notes and their perceptions towards Lotus Notes**)
- D. Lotus Notes developers of the organization (**To understand the technical background of Lotus Notes use in the organization**)

A. Interviews with the directors

1. **General information about the company (Some of them can be found on the website)**
 - 1.1 Company name
 - 1.2 Location of interviewee (**Place**)
 - 1.3 Who owns the company? How many directors? (**Owner**)
 - 1.4 When was the firm founded? (**Existence**)
 - 1.5 How many locations do you have? (**dispersion of organization**)
 - 1.6 How many employees are there in your organization? (**size**)
 - 1.7 How many employees are there at your location? (**size at the location**)
 - 1.8 How many departments are there at your location? (**function complexity of the company**)
 - 1.9 How much are fixed assets in your company (Approximately)? (**size by Thai SME definition**)

1.10 What are the services or products of the company? (**Market**)

1.11 Who are your customers? (**target**)

1.12 What is your business strategy?

1.13 How important is knowledge or innovation in the company?

(Ask for company's brochure/prospectus for the information about the company)

2 Demographic information about Interviewee

2.1 Name

2.2 Gender

2.3 How long have you been in the company?

2.4 What have you been doing in the company?

3. IS strategy of the company

3.1 What is the role of information technology in your company?

3.2 What kinds of IT investments have been done over the past year?

3.3 What is your company's IT strategy?

3.4 How important is IT in your company?

3.5 What other systems have been used for communication?

3.6 Why do you need groupware?

3.7 What systems existed prior to the use of Lotus Notes? (**asking them to compare Notes with other systems**)

3.8 Why do you choose to adopt Lotus Notes?

4 About Lotus Notes implementation

4.1 When was Notes first implemented? (**History of Notes implementation**)

4.2 What were the main purposes of Lotus Notes in the first instance? (**Reasons for implementation**)

4.3 In which department of your organization was Lotus Notes adopted? (**first implementation coverage**)

4.4 How many locations of your company adopted Lotus Notes? (**Dispersion of first Notes implementation**)

4.5 How many Lotus Notes users did you have? (**Notes users**)

4.6 What were the Notes applications? (**First Application types of Notes**)

4.7 What kinds of Notes discussion databases did you have? (**First discussion databases**)

4.8 Who were the implementers and developer? (**In-house/outsource**)

4.9 Who involved in the implementation?

4.10 Who actions Lotus Notes user training?

5. About Lotus Notes in use

5.1 What are the main purposes of Lotus Notes now? (**Reasons for use**)

5.2 In which department of your organization are Lotus Notes adopted now? Who use Lotus Notes in your organization? (**departments using Notes**)

5.3 How many locations of your company use Lotus Notes now? (**Dispersion of Notes use**)

5.4 How many Lotus Notes users do you have now? (**Notes users at present**)

5.5 What are the Lotus Notes applications now? (**Application types of Notes in use**)

5.6 How does your company use Lotus Notes? (**The use of Lotus Notes**)

5.7 What kinds of Notes discussion databases do you have now? (**Discussion databases in use**)

5.8 How are the discussion databases used in your organization? (**The use of discussion databases**)

5.9 Who are the developers? (**Lotus Notes developers**)

5.10 What is your company's IT strategy in terms of the use of Notes? (**Lotus Notes strategy**)

5.11 Why is Lotus Notes adopted as your IT strategy? (**Reasons for Notes as a strategy**)

5.12 How is Lotus Notes used for cooperative work between the different departments? (**Lotus Notes use between departments**)

5.13 What are the benefits of using Lotus Notes? (**consequences of using Notes**)

5.14 What do you expect from the use of Lotus Notes? (**Opinion towards the use of Notes**)

6 About Knowledge Management of the company

6.1 How do you define knowledge in your organization? (**type of company knowledge**)

6.2 If knowledge is important in your company, How does your company manage and utilise the 'knowledge'? (**knowledge management of the company**)

6.3 What are the knowledge management strategies of your organization? (**knowledge management mechanisms of organizations?**)

6.4 Why do you adopt that strategy? (**Reasons for that strategy**)

6.5 What applications of Lotus Notes do you use to facilitate knowledge management in your organizations? (**Lotus Notes applications for knowledge management**)

6.6 How is Lotus Notes used to support knowledge management? (**Lotus Notes use for knowledge management**)

7 About Lotus Notes adaptation over time

7.1 What applications have been created and added since first implementation of Notes? (**Change of Lotus Notes applications**)

7.2 How is Lotus Notes used differently since the first implementation? (**Difference between previous and present use of Lotus Notes**)

7.3 Who are the persons who decide to create or change a new application? (**Authorised people to change**)

7.4 Why Lotus Notes has to be adapted? (**Reasons for Lotus Notes adaptation**)

7.5 How has your organization changed as a result of implementing Lotus Notes? (**Impacts of Lotus Notes changes on organization**)

7.6 How did you expect your organization to change as a result of implementing Lotus Notes? (**Intended consequences of Lotus Notes changes**)

8 About managerial and cultural effects on Lotus Notes

- 8.1 How does your organization motivate employees to use Lotus Notes? (**Motivation for use of Notes**)
- 8.2 What are the obstacles of the use of Lotus Notes? (**Obstacles of Notes adoption**)
- 8.3 What aspects of organizational culture influence the use of Notes? (**Impacts of organizational culture on Lotus Notes use**)
- 8.4 How does the organizational culture influence the use of Notes? (**Impacts of organizational culture on Lotus Notes use**)
- 8.5 If you were to implement it again now, what would you do? Was your approach correct or anything to be changed?
- 8.6 What other advice would you give to other knowledge intensive firms about implementing groupware? (**Give them opportunity to identify other types of groupware**)

9. About your alliance

- 9.1 Who are your business partners? (**Company's business partners**)
- 9.2 What kind of knowledge do you share with your partners? (**knowledge sharing with partners**)
- 9.3 How does your organization share knowledge with the partners? (**Knowledge sharing mechanisms with partners**)
- 9.4 How does your company use Lotus Notes to support knowledge sharing with the partners? (**Lotus Notes to support knowledge sharing**)
- 9.5 What are the benefits of Lotus Notes for sharing knowledge with your partners? (**Consequences of using Notes to share knowledge across organization**)

10. About future plan of Lotus Notes use

- 10.1 How do you view the use of Lotus Notes in your company in the future? (**Future view of Lotus Notes use in the company**)
- 10.2 How do you plan to develop and use Lotus Notes in the near future (Next couple of years)? (**Plan for future use of Lotus Notes**)

10.3 Why do you think that plan is important to your organization? (**Reasons for the plan**)

10.4 What would be the effects of the future plan of Lotus Notes use? (**Expectations for future use of Notes**)

B. Interviews with the managers

Demographic information about Interviewee

- Name
- Gender
- How long have you been in the company?
- What have you been doing in the company?

1. What does your department do? (**Functions of the department**)

2. How many people are in your department? (**No. of people in the department**)

3. How many people are using Lotus Notes? (**No. of Notes users in the department**)

4. When did your department start using Lotus Notes? (**First implementation of Lotus Notes**)

5. How did your department use Notes when it was first implemented? (**Previous use of Lotus Notes**)

6. What functions of Lotus Notes does your company use now? (**applications of Lotus Notes use**)

7. How does your department use Lotus Notes? (**Lotus Notes use in the department**)

8. How do you define knowledge in your department? (**knowledge types of the department**)

9. What mechanisms do you use to share knowledge to others? (such as telephone, email, face-to-face meeting, Lotus Notes)? (**knowledge management mechanisms in the department**)

10. How do you use Lotus Notes to support knowledge management within your department? (**Lotus Notes use to support KM within the department**)

11. How do you use Lotus Notes to share knowledge with other departments? (**Lotus Notes use to support KM across the department**)
12. What are the benefits of using Lotus Notes? (**consequences of using Lotus Notes**)
13. What do you expect from the use of Lotus Notes? (**Opinions towards the use of Lotus Notes**)
14. If you were to implement it now, what would you do? Was your approach correct or anything to be changed?
15. What other advice would you give to other knowledge intensive firms about implementing groupware?

C. Interviews with the users

Demographic information about Interviewee (Also ask them to show how to use Lotus Notes)

- Name
 - Gender
 - How long have you been in the company?
 - What have you been doing in the company?
 - Position- What is your responsibility in the company?
1. How long have you been using Notes? (**Experience with the use of Lotus Notes**)
 2. How often do you use Lotus Notes? (**Experience with the use of Lotus Notes**)
 3. How did learn about the use of Notes? (**Experience with the use of Lotus Notes**)
 4. How is training facility help to encourage the use of Lotus Notes?
 5. How did you feel when you first use Notes? (**Feelings when started using Lotus Notes**)
 6. What are the purposes you use Lotus Notes for? (**Purposes of using Lotus Notes**)
 7. How do you use the Lotus Notes in day-to-day activities? (**The individual use of Lotus Notes**)
 8. What are the benefits of using Lotus Notes? (**Consequences of using Lotus Notes**)

9. What mechanisms do you use to communicate and share knowledge with your colleagues (such as telephone, email, face-to-face, Lotus Notes, etc.)? (**Mechanisms for individual knowledge sharing**)
10. How do you use information or knowledge maintained on Lotus Notes databases in conducting your work? (**Individual use of Lotus Notes for knowledge management**)
11. How successful do you use Lotus Notes to communicate and share knowledge with your manager and colleagues? (**Consequences of using Lotus Notes for knowledge sharing**)
12. What do you expect from the use of Lotus Notes? (**Opinions towards the use of Lotus Notes**)
13. If you were to implement Lotus Notes now, what would you do? Was your approach correct or anything to be changed? (**Future view of Lotus Notes use in the company**)
14. What other advice would you give to other knowledge intensive firms about implementing groupware?

D. Interviews with Notes developer

Demographic information about Interviewee

- Name
 - Gender
 - How long have you been in the company?
 - What have you been doing in the company?
 - Position- What is your responsibility in the company?
1. How long have you been developing Lotus Notes applications? (**Experience with Lotus Notes**)
 2. What kind of Notes application do you develop? (**Types of applications**)
 3. When do you need to develop a new application of Notes? (**Purposes of the development**)

4. What are the capabilities of these applications you aim for? (**Purposes of the applications**)
5. How do you develop the applications of Notes? (**The development of applications**)
6. How do you train the people to use the application you develop? (**Training to users**)
7. If you were to implement Lotus Notes again now, what would you do? Was your approach correct or anything to be changed?
8. What other advice would you give to other knowledge intensive firms about implementing groupware? (**Give them opportunity to identify other types of groupware**)