Chapter 5 : DISCUSSION

Below this study discusses five major findings of our investigation into ERP systems implementation and use at the four companies. The first finding is the previous proposition this study proposed. Since it is difficult to demonstrate with such a limited set of resources, a preliminary discussion is provided the section below.

5.1 More iterations of the cycle of absorptive capacity leads to greater benefits gained

As prior research observes, on a post-implementation basis, a company must ensure the *continuity* in the skills and knowledge acquired during the implementation process in order for the system to be used effectively and provide anticipated benefits (Nicolaou 2004). Continuous learning can facilitate development of the firm's ability (core capacity) and the future ability to acquire new knowledge (Schilling 1998), and can provide firms with the strategic flexibility and the degree of freedom to adapt and evolve in a high-velocity environment (Zahra and George 2002). Continuous learning can facilitate adaptation to the environment, while continuous exploitation of newly acquired knowledge can create intangible benefits for companies. Thus, this study concludes that the greater the number of iterations of the cycle of absorptive capacity (Figure 5.1), the greater the benefits.
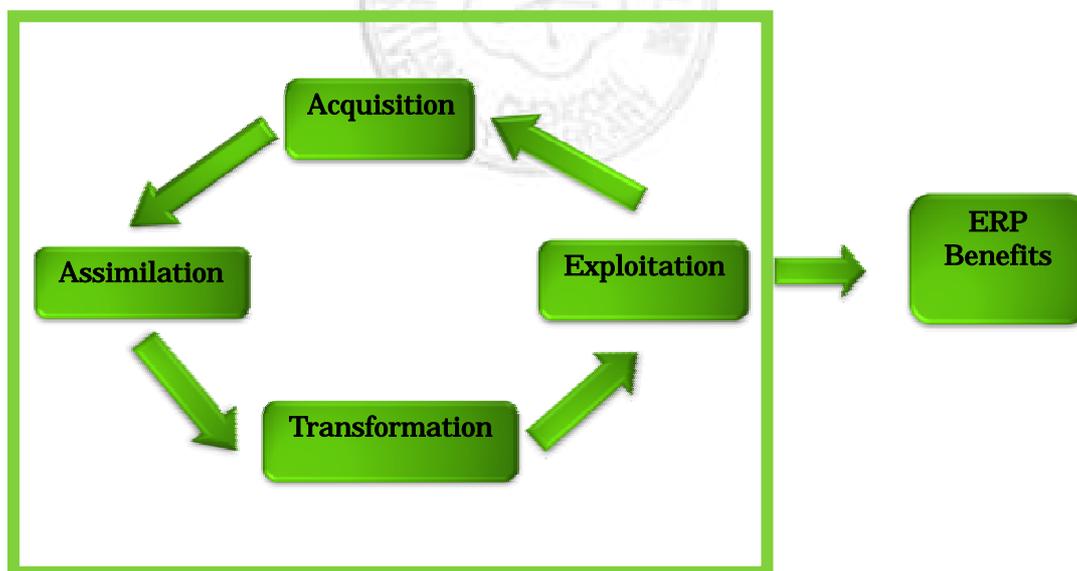

Figure 5.1 Cycle of absorptive capacity

The continuing success of the ERP systems relies on the organizational skill and knowledge in running, supporting, maintaining, and upgrading its ERP systems. Therefore, companies must upgrade their abilities by iterating the absorptive capacity cycle. Failure to do so means that companies will, at some point, fail to keep pace with environmental and technological

changes.

Company D establishes projects for employees to exploit the knowledge and skills they have learned. In carrying out such projects, team members may share what they have learned, as well as identify what they lack for advanced use of ERP systems. For example, in a supply chain management (SCM) integrated ERP systems project, the employees identified that they needed to acquire more knowledge of EDI and XML, and then set out to find such resources. Next, company D had them (acquired knowledge) attend classes and study material which they had gathered and if needed, another project could be set up to exploit what they had learned. Exploitation after learning, and learning after exploitation, is the company's cycle of ERP systems use. This cycle of activity strongly resembles the absorptive capacity cycle. As knowledge accumulates, new knowledge and skills are more easily learned, enabling greater exploitation of the ERP system.

Company B has many opportunities to obtain external support to exploit its ERP systems and benefit from such exploitation. If they absorb knowledge from consultants and IT professionals provided by the parent company headquarters, they may have greater potential ACAP to help them recognize needs and facilitates ERP systems exploitation.

5.2 Knowledge retention

In the ERP systems implementation cycle, the key driver of success is knowledge transferring and knowledge retaining (Gable et al., 2003; Sedera et al., 2004) which are in essence included in the potential ACAP dimension. In order to keep the ERP systems 'live' and relevant, the companies must either draw from their ERP systems capabilities gained during the implementation period or seek expert support (knowledge) externally. Such external support is usually available from the vendor, the implementation partner and other third parties. Companies gain the knowledge from external support, retaining what they want.

Companies acquire vendors and consultants who have accumulated theoretical knowledge and practical experience which companies lack. They gain much from cooperating with the consultants. But the most important thing is what is left after consultants leave.

Companies can acquire knowledge including explicit and tacit knowledge from consultants. Explicit knowledge usually means codified knowledge such as education and training materials. As for tacit knowledge, is more personal, difficult to communicate, rooted in action and experience and resides within the minds of people (Nonaka, 1994). ***Consulting firms can also be facilitators of clients' ERP knowledge creation and discovery***. They help firms implement ERP systems, not only through technical expertise support but also by 'facilitating' client knowledge exploitation. Consulting firms use techniques such as guided learning, formal training and knowledge creation activities to direct clients to the necessary knowledge required for a successful implementation. This guidance saves the client

considerable time and effort in knowledge search costs (Gable, 2003).

Thus, the companies should not only complete projects with consultants but also acquire knowledge and technique from consultants for future applications.

For instance, company D, implements plans to obtain consultant knowledge and discusses differences between its proposals and consultant suggestions. They not only learn by doing but also acquire as much external knowledge as possible. Explicit knowledge, such as training materials and documentation, is absorbed through study. Tacit knowledge, such as consultant knowledge, or general solutions provided by consultants, is assimilated by discussion among team members and face-to-face communication.

When company D wants to learn and understand new applications such as business intelligence (BI) and e-procurement system integrated with ERP systems, it collects resources including software, reading materials and consultants, and then establishes projects to further understand and exploit the new knowledge and tools. After projects have finished and the consultants have left, company D does not close the projects. It reviews the development of projects and discuss what they have learned. Since different employees may have different findings from the same projects and same consultants, this leads to interesting discussions and brainstorming sessions. It sees these reviews and discussions as the most valuable "product" and document these findings for future reference.

The next time they meet, the employees exploit what they have gained from previous projects. In this way, project members can successfully acquire and assimilate external knowledge and put new knowledge and skills into practice. Thus, company D can actually retain external knowledge for exploitation.

By contrast, company B has more opportunities to contact external consultants and IT professionals. They said that they have learned by doing and observed how consultants and other IT professionals have implemented and used ERP systems. But they do not have well-planned mechanisms to absorb external knowledge. They seek support for specific problems, and request consultants and IT professionals to solve such problems by exploiting the ERP system. But company B apparently does not review the entire processes and ask whether it knows how to exploit ERP systems to solve similar problems after the consultants have left.

Knowledge retention not only refers to consultant knowledge but also includes internal knowledge, which is employee knowledge. How to retain well-trained IT professionals is a crucial topic for all companies. Employees also have tacit knowledge and have accumulated unique knowledge about the company. As employees leave, valuable knowledge is lost.

Company C for example, in a period of transformation, has a high turnover rate. After employees with knowledge leave, a company needs to recruit new employees and train them from the beginning. If a company like company C cannot stabilize its situation, the cycle of

loss will not stop, and knowledge may be lost again and again. Under such conditions, company C cannot benefit from training.

Knowledge retention is the first step and the most important part of knowledge exploitation. Companies need to find out what they want to learn and then set up well-planned mechanisms to retain the valuable and unique knowledge they have gained. Furthermore, they should transform and employ knowledge for beneficial and useful exploitation.

5.3 Educational program planning

Based on the interviews conducted for this study, this study concludes that training is the first step to successful ERP systems implementation and use. However, not all training is useful for every company. Companies should check whether the training offered suits the needs of its users.

Companies need to invest in acquiring and assimilating different knowledge, including knowledge that cannot be applied immediately, because the knowledge companies gain may become a basis for competitive advantage at some point. But this does not mean that companies should obtain a vast array of knowledge based on the possibility that someday it may be useful. Companies need to check whether the knowledge can support the objectives of the company, or employee resistance and waste of resources may result. Company D, for example, checks current and future business needs and then plans short, medium, and long term development of information technology for the organization. Thus, it has designed its own training and education programs based on these development plans. Company D treats "balanced scorecard project" applying in information technology as long term objective. Therefore, its current training programs of balanced scorecard are in the preliminary and experimental stage. It does not want to place too much pressure on its employees; hence, this stage involves exploring new knowledge for the future use of company D.

Organizations should not only consider whether training is sufficient, but also take into account the timing of training. Thus, the ERP systems should be able to provide on-going support for the needs of organizations (Nicolaou 2004). In our study, company B initiated operating classes for employees after implementing ERP systems, to strengthen the process operations.

The case of Company C shows that training should be harmonized with the condition of the organization. Companies cannot hold training sessions that are too advanced for the current level of company development. For instance, company C is in the transformation stage and talent is leaving. Its IT employee structure and IT infrastructure, have not yet reached a stable configuration with the new parent company's systems, so their emphasis should probably be on the stabilization of IT infrastructure and other relevant basic development aspects, instead of advanced training in such fields as business intelligence (BI).

After training in the "classroom", companies should provide opportunities for practical exercise of the new knowledge to reinforce its assimilation. Company D encourages its employees to set up projects to put new knowledge into practice, and to further explore how the company can apply and realize the benefits of the new knowledge and its application. Such exercises may be viewed as an accelerator of training, and also, as another kind of training for employees. They enable employee peer interaction and stimulate creative use of the new knowledge.

In the process and termination of training, this study suggests that companies establish a mechanism to evaluate and review employee assimilation of training. If most employees understand and assimilate the content of the training, companies can hold advanced training for further application of ERP systems. In this way, organizations can not only comprehend employee absorption of knowledge, but also design customized educational classes for themselves based on the assimilation progress.

Based on our case studies, company training programs should consider the following aspects of training, including timing, relevant, path, practice and review, as shown in Table5.1

Table 5.1 Training program plans

	To do	Not to do
Timing	■ Before and after implementation, organizations need to train employees to upgrade employee skills and knowledge	■ Lacks focus on knowledge that is or may be useful to the company
Relevant	■ Check business needs and plan short, medium, and long term training	■ Too advanced for current development
Path	■ Discover which training is the "right" training for the "right" people (transfer to right persons) at the right time	■ Implement advanced training without basic training (difficult and unrealistic for employees)
Practice	■ Include practical exercises to reinforce the training	■ Unchallenging programs (do not stimulate employee creativity)
Review	■ Set up review mechanisms to ensure assimilation	■ Conduct training programs without follow-up evaluation and modification

5.4 Environment that encourages assimilation of knowledge and full use of the ERP system

There is concern about whether it is possible to manage the forms of knowledge that really

matter for performance and competitive advantage (Isabel and Mark, 2006). Since most knowledge tends to be tacit, and based on individual experiences and intuitions, it becomes difficult to codify and exchange. Furthermore, the transfer of 'useful' knowledge between individuals and groups depends increasingly upon the quality of relationships, and whether there is sufficient trust/reciprocity between those involved (Jones and George, 1998). Thus, *while information technology can facilitate knowledge sharing and exploitation, the environment the company provides is important in encouraging and facilitating employee knowledge sharing and exploitation.*

In this section, this study defines "environment" as both abstract atmosphere and concrete institution. Thus, this study preliminarily divides environment into three elements including institution, culture and leader involvement.

■ Mechanism

Companies establish institutions to encourage employee sharing and assimilation of knowledge. Company C provides a knowledge platform for employees to stimulate peer communication and knowledge sharing. IT professionals can also find knowledge related to ERP systems use and exploitation. In order to retain creative people and encourage them to share their knowledge with peers, incentive and reward systems are needed (Randall, 1996). Thus, company C uses the click-rate as a performance measurement to evaluate use of the knowledge platform.

In addition to the knowledge platform, company C encourages employees to convene study groups to acquire and share new knowledge. Study groups can gather persons who have the same interests and objectives to brainstorm and pursue the knowledge that they want to learn and share with each other. Company C provides the environment to acquire and assimilate knowledge, but does not determine whether acquired and assimilated knowledge is used in practice.

Companies should not only establish institutions to encourage employee sharing of knowledge, but should also provide mechanisms to stimulate use of the knowledge. For instance, company D sets up projects for employees to exploit new information technology applications. Company D has a high potential capacity, which is not taken for granted. Instead, the company actively pursues ways to convert potential capacity into actual performance.. Company D has also erected recognition systems to reward employees who successfully complete projects.

■ Culture

Many academics and practitioners argue that the performance of an organization is dependent on the degree to which the values of the culture are widely shared, that is, are "strong" (Kotter and Heskett, 1992). A "knowledge-friendly" culture is clearly one of the most important factors contributing to the success of knowledge projects (Davenport

et al, 1996). Culture plays a crucial role for organizations and is perhaps the most difficult constraint that managers must deal with.

In company A, more than 60% of employees are operators. These employees do not believe that they need to transfer knowledge and share information in the knowledge platform. The company's IT professionals merely respond to user' daily requests and modify systems based on user needs. It is a common consensus that IT professionals do not have time to exploit new IT applications and that they also do not need to do that. The culture of company A does not stress knowledge sharing and use. They rarely acquire the latest information about information technology including ERP systems. Therefore, it seems obvious that they will reap a lower level of benefits from their ERP systems.

By contrast, company D encourages employee discussion and sharing of findings in the projects and after attending classes. Company D thinks all systems (including ERP systems) are organic and can become larger and more powerful over time. For company D, this means that systems will adapt to changes in the enterprises if users can irrigate systems with proper use and constant modification. They think knowledge is the most critical factor in achieving "organic systems" since exploitation of knowledge can enable extensions, integration, and usage of systems. Thus, company D provides resources for employees to attend classes and exploit what employees have learned.

■ Leader involvement
Like almost every other type of program, knowledge management projects benefit from senior management support. Managers signal the organization that knowledge management and organizational learning are critical to the organization's success. Furthermore, timely stimulation from leaders can inspire employees to learn more and provide more feedback.

Company C is a good example. In its training programs and study groups, managers, including sometimes even the CEO, attend these programs and ask questions to evaluate employee assimilation. These managers make employees feel that the classes are important and their assimilation of new knowledge is emphasized by the company. In this way, employees may experience pride that they can be involved in these classes and be willing to share what they have learned.

5.5 Business training for IT professionals

IT professionals ought to learn professional knowledge about information technology application and development. However, if IT professionals can learn more business knowledge, they can understand business needs and find the most suitable solutions for their business. Despite this potential, this study discovered in all four cases that the companies

either ignore this aspect of training for their IT professionals, or do not put emphasis on it. Company A and company B do not have business trainings for their IT professionals at all.

Company D does sometimes provide business training, such as electronic commerce development, for its IT professionals to enable them to further understand business operations and trends in the company's field of business. But theses classes are informal and are not considered central to the training of their IT professionals. Though this type of training is not made the target of projects for further study and exploitation, employees who attended such classes still share the lessons learned with their peers.

Company C provides "rotation" mechanisms for IT professionals to understand processes and operational objectives in other departments. On rotation day, IT professionals perform other jobs such as sales or operations. In this way, IT professionals can further comprehend what users need and why they need it. This study views this training as business training since IT professionals can gain business knowledge through rotation. It is regrettable that this kind of training is so rarely held.

Timely and proper business training for IT professionals can enable them to comprehend business needs. Combined with their professional knowledge, it could lead to exciting new solutions.