Understanding Individual Level ERP Assimilation: A Multi-Case Study

Luning Liu
Harbin Institute of Technology
liuluning@hit.edu.cn

Yuqiang Feng
Harbin Institute of Technology
fengyq@hit.edu.cn

Qing Hu
Iowa State University
qinghu@iastate.edu

Xiaojian Huang
Shanghai BizEngine Consulting Co.
daniel.huang@bec168.com

Abstract

Assimilation of enterprise resource planning (ERP) systems in organizations has been considered as one of the critical steps towards the realization of the intended benefits. This study extends the assimilation research from the organizational level to the individual level with the argument that ultimately it is the individual users who transform the systems’ capability into organizational performance through daily activities. We conceptualized and defined individual level assimilation in terms of transactional users, power user, and VIP users. Interviews with users at all levels in five organizations revealed that the key drivers for individual level assimilation include influence of supervisors, performance evaluation schemes, intrinsic motivation, job specification, perceived usefulness, and user absorptive capacity.

1. Introduction

The globalization of the economy empowered by information technology (IT) has fostered an unprecedented movement towards integration of information systems and business processes within and across organizational boundaries in order for companies to survive and thrive in the networked world. One of the consequences of this movement is the wide-spread adoption and use of enterprise resource planning (ERP) systems in companies large and small. According to a recent report by the market research firm AMR, the world wide ERP market is expected to grow from $28.8 billion to $47.7 billion from 2006 to 2011, at the annual rate of 11%. With price tags often ranging from $3 million to over $100 million per ERP implementation project [23], ERP systems have also become the most significant IT investment for most companies with serious consequences.

While the focus of ERP research by IS scholars so far has been on the adoption and implementation processes and the critical success factors, some researchers have moved beyond the adoption and implementation phases and into the assimilation phase of the life-cycle (e.g., [19, 24]). This is largely motivated by the recognition that a successful ERP implementation does not automatically translated into the sustained use of the system by the organization, a critical component for realizing the anticipated benefits from the ERP system.

The study on ERP assimilation stems from the literature on technology assimilation in general. Purvis et al. [21] defined assimilation as “the extent to which the use of technology diffuses across the organizational projects or work processes and becomes routinized in the activities of those projects and processes.” This definition is often used in subsequent assimilation studies (e.g. [19, 24]). On the other hand, Gallivan [14] defined assimilation in terms of breadth and depth of use. Breadth reflects how broadly the technology is used in the organization, for example the number of users and percentage of business processes that are using the technology. Depth reflects how extensively the technology is used by the users and in the business processes. By this standard, Purvis et al. [21]’s definition of assimilation is primarily about breadth, and the measurement proposed by Liang et al. [19] actually covers both the breadth and the depth, thought in a more simplistic way.

These definitions about technology assimilation in the literature are all at the organizational level, though the definition of depth does imply the involvement of users. However, it is clear to us that individual users must have played significant roles in technology assimilation in organizational settings for some critical reasons. Individual users are responsible for any implemented technology that becomes “routinized” and “institutionalized.” Without the active involvement of users, technologies implemented in business processes would be superficial and remains functional at best. The anticipated deep impacts by the technology, such as change of organizational culture,
innovative climate, and organizational learning, would be impossible.

In this study, we attempt to address this gap via an exploratory case study as the first step. Since individual users usually do not have influence or control over how wide-spread a technology should be implemented in an organization and its business processes, it is only logical that the individual level assimilation be defined in terms of depth of the technology use. Furthermore, we submit that assimilation is not the same as routine use. According to Merriam-Webster dictionary, assimilation refers to “the process of receiving new facts or of responding to new situations in conformity with what is already available to consciousness.” Thus, assimilation implies understanding current artifacts and being able to respond to non-routine tasks appropriately. Thus, we define the individual level technology assimilation as “the degree of cognitive understanding of a technology and the extent to which the technology is used beyond routine tasks by an individual user.” This definition consists of two related components: understanding and non-routine use. If an individual user has no knowledge of how the technology works and can only do the routine tasks he or she is trained to do, then the degree of assimilation is the lowest. On the other hand, if the user completely understands the how the technology works and is able to use the technology in new and innovative ways beyond routine tasks, then the degree of assimilation is at the highest level.

Our primary objectives for this study are two folds. First, we want to address the question whether there are indeed differences among the ERP users in terms of understanding of the systems and the skills of using the systems for routine functions and beyond routine functions. Second, we want to find out if such individual differences exist, how do they come to be? Given the sparse literature on individual level ERP assimilation, we undertook an exploratory multi-case study. The patterns that emerged from this study suggest that there are different levels of individual ERP users in organizations and the extent of ERP assimilation within an organization can be attributed to the make-up of these user groups in that organization. We also explored the factors that contributed the formation of these user groups in the hope to provide prescriptive insights for managing ERP assimilation in organizations and a deeper understanding of the ERP assimilation processes.

2. Literature review

The terms diffusion and assimilation in IS research were often mentioned together in the past. In fact, assimilation is often viewed as part of the diffusion process. According to Fichman [12], diffusion is “the process by which a technology spreads across a population of organizations”, while assimilation refers to “the process within organizations stretching from initial awareness of the innovation to potentially formal adoption and full-scale deployment” (p. 106). Fichman [12] presented a review of basic concepts, theories, and research findings in IT diffusion and assimilation area and suggested a framework that classified key factors and their effects on diffusion and assimilation. The factors were grouped into three categories: (1) those pertaining to the technologies and their diffusion contexts; (2) those pertaining to organizations and their adoption contexts; and (3) those pertaining to the combination of technology and organization. Under this framework, ERP assimilation can be viewed primarily in terms of the factors pertaining to the combination of technology and organization. On the other hand, Kwon and Zmud [17] divided the process of innovation diffusion into six stages: initiation, adoption, adaptation, acceptance, routinization and infusion [17]. Using this six-stage model, ERP assimilation is about the routinization and infusion stages of the overall diffusion process. Overall, the phase-based approach to diffusion and assimilation focuses on the processes but often neglects the socio-technical dynamics behind the processes.

There are multiple streams of research on IT innovation assimilation at the organizational level. The early research literature primarily focused on the factors internal to organizations. For example, Armstrong and Sambamurthy [3] examined three factors influencing on IT assimilation, including quality of senior leadership, sophistication of IT infrastructure and organizational size. In the later studies, researchers argued that external factors are also significant contributors [7, 19, 24]. Chatterjee et al. [7] found that top management championship, strategic investment rationale, and extent of coordination could significantly affect WEB assimilation. Liang et al. [19] developed a research model about assimilation of ERP by considering the effect of external institutional pressures. In a longitudinal study, Wang [24] found that in addition to institutional forces, the external partners also exert significant influence on the assimilation of ERP technology in the focal firms.

In contrast to this stream of research, other studies have focused on the assimilation patterns and processes emerged in recent years. For example, by using the K-means clustering algorithm, Rai et al. [22] revealed four different clusters or patterns of EPI (Electronic procurement innovations) assimilation: none, focused niche, asymmetric, and broad-based deployment.
another study, Bala and Venkatesh [5] conceptualized four distinct stages of assimilation: awareness, adoption (or rejection), limited deployment, and general deployment. This is consistent with prior research (e.g., [13]). Bajwa et al. [4], based on the concepts of IT acquisition and utilization, presented an assimilation framework which highlights four states (limited, focused, lagging, and pervasive) that capture the assimilation of conferencing and groupware technologies.

However, in the currently assimilation literature there is almost no attention to individual assimilation issues. We submit that organizations are made of individuals and organizational level assimilation is the manifestation of individual level understanding and use of the focal technology. In order to substantiate this conjecture and lay the foundation for future research on individual level assimilation, we commenced an exploratory multi-case study of organizations that have been using ERP systems for some time. In the following sections, we describe the methodology and the research design in detail and present the evidence we collected and the results of the analyses.

3. Research methodology

3.1. Multi-case study design

Using a case study approach to investigate a phenomenon is considered appropriate when “how” or “why” questions are being asked about the focal phenomenon over which the researchers have little or no control [25]. Further, case studies are considered as appropriate for studying concurrent research questions in a natural setting and when investigating an area where little or no previous research has been performed [6, 11, 20]. These features of case study research design fit well with our motivation to understand whether individual level assimilation exists and how it may impact organizational level assimilation, given the fact that there is almost no literature on these subjects.

As one of the most complex information systems application ever developed for organizations, ERP systems vary in terms of modules installed, number of users, industries, vendors, and many other characteristics. Thus it is critical that a multi-case design is adopted for this study. Our design called for visiting companies that have successfully implemented ERP systems with various sizes and in different industries, representing a spectrum of ERP users both in organizational and individual terms. In order for this research to yield rich and reliable insight, individuals with diverse organizational roles and background in each organization were selected for the interviews. Table 1 provides the ideal profiles of these individuals as part of the case study protocol.

### Table 1. Ideal profiles of interviewees in each company

<table>
<thead>
<tr>
<th>Preferred interviewees</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Members of Top Management Team</td>
<td>● Person who has intimate knowledge of the company’s vision and strategy.</td>
</tr>
<tr>
<td></td>
<td>● Person who has intimate knowledge of the company’s ERP systems and how they are used by the top management.</td>
</tr>
<tr>
<td>Divisional or Departmental Level Managers</td>
<td>● Person who is in charge of a business division or department where ERP systems have a significant impact on its operations.</td>
</tr>
<tr>
<td></td>
<td>● Person who has intimate knowledge about how ERP systems are used in their units and who are the most valuable users.</td>
</tr>
<tr>
<td>ERP Users</td>
<td>● Person who is using ERP applications for daily works in the company.</td>
</tr>
<tr>
<td></td>
<td>● Person who has some knowledge about how ERP works and who are knowledgeable about other ERP users.</td>
</tr>
<tr>
<td></td>
<td>● Person who has been involved from the implementation phase of the ERP system.</td>
</tr>
</tbody>
</table>

In design the interviewing questions, we were guided by the three research objectives and the theories related to innovation and technology assimilation described before, as well as the philosophy of cross validation, strongly recommended in the case study literature [6, 11, 25]. Three sets of questions were developed targeting top management, middle level managers, and end users respectively. Each of question sets consists of 16-19 open ended questions, ranging from managerial philosophies on the role of ERP in organizational competitive strategies to how individuals use ERP for their daily work activities. Some questions were specifically designed for cross validation purposes.

3.2. Case companies and interviewees

The data collection process took about two weeks in March 2009 in several major China industrial cities.
Three of the four authors participated in the interview process. The research team visited each site and spent from half-day to one day in each site. At each site, in addition to interviews, relevant documents including brochures and computer files were collected whenever they were deemed essential by the research team and made available to the research team upon request by the companies.

All interviews were recorded using digital recorders, with the explicit permission of the participants, and later transcribed into text using professional transcription service. Each interview started with the prepared open-ended questions, and often followed up with questions that explored the ideas and thoughts as they emerged. A typical interview with one individual lasted about 30-60 minutes, with interviews with managers typically longer than the ones with end-users. In a few occasions, the participating companies sent two or three end users together, so group interviews were conducted. In total, the research team visited 5 companies and interviewed 31 middle or top managers and ERP users from a variety of business departments and divisions, including IT, accounting, finance, operations, and procurement, and sales. For the purposes of confidentiality, the five case companies were referred to as A, B, C, D, and E in this paper. Table 2 shows the profiles of the interviewees, and Table 3 shows the profiles of the case companies.

<table>
<thead>
<tr>
<th>Company</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of interviewees</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>
| Descriptions of interviewees | Top Managers: CEO, COO
Middle Level Managers: Manager of finance department and manager of product management department
ERP Users: 1 user from inventory department

Table 2. Profiles of interviewees

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Type</th>
<th>Industry</th>
<th>Annual revenue (million RMB)</th>
<th>Number of employees</th>
<th>Number of ERP users</th>
<th>ERP vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Shanghai</td>
<td>Joint venture</td>
<td>Plastic</td>
<td>200</td>
<td>2200</td>
<td>300</td>
<td>Developed in house</td>
</tr>
<tr>
<td>B</td>
<td>Shanghai</td>
<td>Joint venture</td>
<td>Gas equipment</td>
<td>300</td>
<td>280</td>
<td>188</td>
<td>External contractors</td>
</tr>
<tr>
<td>C</td>
<td>Shanghai</td>
<td>Private</td>
<td>Paint</td>
<td>150</td>
<td>160</td>
<td>20</td>
<td>UFIDA U8</td>
</tr>
<tr>
<td>D</td>
<td>Suzhou</td>
<td>Joint venture</td>
<td>Electronic</td>
<td>1200</td>
<td>3000</td>
<td>300-400</td>
<td>UFIDA U9</td>
</tr>
<tr>
<td>E</td>
<td>Hangzhou</td>
<td>Oversea Investment</td>
<td>Cosmetic</td>
<td>300</td>
<td>1300</td>
<td>50-60</td>
<td>UFIDA U8</td>
</tr>
</tbody>
</table>

Table 3. Profiles of the case companies
4. Case analysis and findings

4.1. A model of ERP assimilation at individual level

During the interviews and the post-hoc review of the transcripts, a clear pattern of ERP users gradually emerged. In almost every company we visited, the ERP users quite naturally fall into three categories: transactional users, power user, and VIP users. Coincidently, these three categories of users also correspond well to the three levels of ERP knowledge and skill at the user level, forming a natural hierarchy of ERP assimilation. Intrigued by Hardgrave et al. [15], we graphically represent the hierarchical model in Figure 1.

![Figure 1. Individual level ERP assimilation model](image)

In this hierarchical model, the level of assimilation increases as the users move up the hierarchy. Shallow assimilation is characterized by end-users who can only utilize the functionality of an ERP system for routine tasks they are trained to perform and have limited or no knowledge at about how ERP works. In contrast, deep assimilation is characterized by end users who can create new and innovative use of the functionality of the ERP system and have intimate knowledge about the ERP system and its inner workings. The pyramid structure of the hierarchical model also reflects the number of users usually at these levels: transactional users > powers users > VIP users.

The first kind of ERP users, we call them transactional users, are the individuals who use ERP applications for daily works they are trained to perform and who do not know much about ERP systems beyond the functionality they use. They use ERP systems by strictly following the rules and procedures learned during their training. From their perspective, ERP is a just another software application they use every day to do their job, and it is not their duty to be concerned with how ERP systems function companywide and how they might be used in innovative ways.

The existence of this kind of ERP users was described by a user from IT department of Company B: “Most of the ERP users in our company only care their own job assignment. What they do every day is just following their job responsibility to complete their job...... They don’t care the detail of the ERP system and whether or not there are some problems in the ERP system. So they can’t give some suggestions for ERP system improvement.” A user from the finance department of Company C also confirmed that she was a transactional user: “What I care now is just how to input the data into ERP system correctly. My questions towards the ERP system are all about how to use it, not how to improve it. ”

This type of statements appears frequently in the interviews with ERP users who were mostly lower ranked employees with no supervisory or managerial responsibilities. Employees who work at the warehouse, corporate accounting, and production control areas were mostly likely in this category. However, the opposite is not true, that is, not all employees in these functional areas are transactional users and they don’t have to be transaction users.

ERP users at the next assimilation hierarchy are what we call power users, defined as the individuals who use ERP applications for daily work and who have proficient understanding of how the system works and how different parts are linked together. Power users can solve routine technical problems for other ERP end-users. With their in-depth knowledge of the ERP system and functionality, they can create analytical reports meeting the need of their supervisors and management on an ad-hoc basis by extracting data from various parts of the system and application. Further, they can make suggestions about how the ERP functions may be improved by considering the problems they encounter during work.

It seemed that power users are usually grown out transactional users. If a transactional user not only cares about how to complete his/her own job assignment by using the ERP system but also tries to learn how the system works and how they are linked companywide, he/she will eventually become a power user. There are a number of evidences that support this argument. The COO of Company A expressed his view as follows: “After the initial training, all of the users were at the same level at the beginning of ERP usage. The only problem they had was how to use the ERP system correctly. However, after we used ERP for
The transactions of these users could be divided into two kinds. One kind of users were operators, because they only did what their supervisors told them to do. But the other kind of users pushed the usage of ERP further. Although they were ordinary employees, they were thinking about how to make them working more efficiently when they are using ERP system.

Interestingly, the ERP manager of Company E has a slightly different view. She stated that there was no difference between transnational user and power user according to her company’s situation: “Almost all of ERP users in our company can give suggestions for ERP system improvement [more or less]. They can think the ERP system over actively and they believe that they should do that…… There are no ERP users who use ERP system passively and only care about their own job assignment in our company.”

However, this evidence does not contradict the transnational-power user classification scheme. It only extends the scheme by suggesting that it is possible that a company has mostly power users and almost no transnational users. It is also logical to argue that these power users must have started as transnational users and graduated to power user status over time. This idea will be further developed later.

At the highest level of the individual assimilation hierarchy stands what we call VIP users, defined as the individuals who have intimate knowledge of both the ERP systems and the business processes, and about how the ERP systems and the business processes work together. VIP users are capable of recommending and facilitating changes to either the system or the business processes. In fact, VIP users often are the people who have been involved from the early implementation phase. VIP users can initiate the implementation of new ERP applications for the organization when changes happen in the business processes. In addition, ERP vendors often rely on the VIP users for their system and business expertise in new ERP project implementations.

The existence of VIP users evidenced by the manager of product management department whose job responsibility is improving the ERP system in Company A: “For one thing, I know all of the business processes in my company very well. For another, I have been involved into the ERP system architecture from the beginning of the ERP project. So I am very clear about how to get some data from the system and how the modules connect with others.”

However, not every ERP user can become a VIP user. The difficulty in becoming a VIP user was noted by a user from IT department of Company B: “There are a few users who know more about ERP system than other users. But the number of ERP users at this level is limited. First, these users should know almost all of the business processes. They are accomplished manager and have strategic insight. Second, they should also know information technology especially ERP system very well…… With these types of capabilities, they can improve the ERP system at a higher level.”

In summary, we can say that there is strong evidence to support the concept of the assimilation of ERP technology at the individual level; and that ERP users can be classified into three categories: transnational users, power users, and VIP users. This concept of individual user assimilation can be neatly captured in a hierarchical model, as depicted in Figure 1. The value of the hierarchical model of individual user assimilation is at least twofold. For one, it shows the migration path for ERP users in an organization, which can be very useful to individual users and management in terms of career development and human resource management. For the other, the actual shape if drawn proportionally based on the number of users at each level may reflect the maturity of ERP assimilation in the organization. Companies with a heavy base might be at the beginning of their ERP assimilation phase, while the relative size of the middle section might suggest a healthy level of assimilation of ERP in the company.

4.2. Drivers for individual assimilation

If we use the hierarchical model for individual user level assimilation, then some interesting and important questions follow: how did an individual user end up at a certain level? And how might the individual move up in the hierarchy? A further analysis of the interview transcripts showed that there were a number of key factors that drove users to move up the assimilate hierarchy. These drivers included influence of direct supervisors, performance evaluation scheme, self-motivation, job specification, perceived usefulness, and absorptive capacity. A better understanding of how these drivers influence individual level ERP assimilation will have significant theoretical and practical implications. We now provide a detailed account of these drivers based on our interviews.

4.2.1. The influence of direct supervisor. In the extant organizational level studies, scholars have emphasized the important role of top management team (TMT) in organizations. This is also well documented in studies about ERP adoption, implementation, and assimilation (e.g., [19]). However, our interviews revealed that from the perspective of ERP end users, TMT rarely influence them directly. It
is the direct supervisor who has a more significant impact on the users’ assimilation effort.

This point was illustrated by an ERP user from Company D whose job responsibility was developing the statistic reports of daily product data: “I feel that there is a distance between the top managers and me. From the subordinates’ perspective, my direct supervisor’s words and behavior definitely impacts my work attitude. Although I respect the top managers in my company a lot, I don’t feel that I am close to them. I don’t know what they are thinking about.” This is also substantiated in the following statements by a user from the finance department of Company B: “In my opinion, my direct supervisor is a more important person influencing me than the top management team members and my colleagues in my company. My job assignments are usually given to me by my direct supervisor, for example he often asks me to make some statistics reports for him. If I complete my job assignments very well, I will be praised for my neat and careful work by the supervisor. This encourages me a lot.”

However, when being asked the same question, another ERP user from Company B gave a slightly different answer: “I think my colleagues influence my behavior in my workplace more than my direct supervisor.” Nevertheless, according to our data, only 2 users from the 31 interviewees expressed that peers are more important supervisors in terms of influence. Most of the user interviewees confirmed that the superiors were a main driver to their individual level ERP assimilation effort. This discovery seems to contradict to the general understanding of the role of subjective norm on individual behavior [1, 2]. We believe the organizational context in which users are not completely free to choose their behavior may explain a significant portion of the deviation. This issue warrants further research in the future.

4.2.2. Performance evaluation scheme. Studies show that organizational performance can be improved by using performance appraisal [27, 18]. Thus, it was not surprising to find out that the job evaluation scheme for ERP users had a significant impact on their assimilation effort. A user from Company D expressed this view during our interview: “I just do what my manager will check. And I will do my best to complete these job assignments at a high quality level. However, I’m sure that there are people who will never do what their manager won’t check. We believe that the job assignments being checked by the managers are what they really need.”

When being asked how to motivate users to assimilate ERP knowledge, the manager of product management department in Company A confirmed the importance of evaluation scheme: “We have an evaluation scheme to evaluate the performance of users…… If an ERP user can give a helpful suggestion to improve our system, he/she can get some rewards. The evaluation scheme plays an important role in our continuous ERP improvement. By using this method, we encourage every user to be involved in ERP improvement.”

This observation was also made by Kouki et al. [16] who suggested that a continuous evaluation of managers’ and users’ skill and knowledge is important to their organizational ERP assimilation. However, Kouki et al. [16] argued that reward system doesn’t seem to be critical for ERP assimilation. Therefore, how to design an effective evaluation scheme is an interesting issue for future research.

4.2.3. Job specifications. Another interesting issue we found during our interviews and post-hoc analysis is that the assimilation level an ERP user is also depended on his/her position and job specification in company. If the user had a higher position, he/she was likely to get the opportunity to learn more about their ERP system. A user from the IT department of Company B confirmed that all of the power users in his company were departmental level managers or key employees. He said that this was because those people had worked in the company for a long time and tended to be dominant figures in some functional areas. So they not only know their own business processes but also the ones in other departments. The CFO of company D confirmed this: “The users who know a lot about both of business processes and ERP system in my company are all at the middle level, such as the departmental level managers.”

The users of Company E explained their view on why job specification matters in ERP assimilation. They said that they would like to learn more about the ERP system, but they didn’t have the extra authorizations and permissions needed. Their permissions in the ERP system depended on their job specification. So they really could do only what they were being allowed to do. However, technical permissions in the ERP systems should not be the only factor that limited users’ ability to learning and do more with the applications. In many of our interviews, we did not hear complains about this limitation, an indication that there were users who had managed to bypass the technical block and acquired much broader skills and knowledge than they would have otherwise.

4.2.4. Self-motivation. Studies on human behavior show the critical role of self-motivation [10]. There is no exception in the case of individual level ERP assimilation process. We saw clear evidence that at
least in a significant number of users, a strongly self-motivated user could achieve a higher level of assimilation. When being asked how he became a VIP user in his company, a user from Company A whose title is the manager of product management department said: “It is because of my interest and personal goal. I want to get a position in operations management. So I need to learn a lot.”

This was also illustrated by interviewees of Company E. For example, the CIO said: “My salary increases very slowly and the job is not exciting to me. However, when I solve some problems for the ERP users, I feel very happy and satisfied. I enjoy my progress in this process.” A user in the same company expressed a similar view: “If I can use the ERP system better than others, I will feel self-satisfaction. This is attributed to some kind of internal driver, not to the awards my company promised. I want to complete my job better and learn something more because I am still young.”

4.2.5. Perceived usefulness. According to Davis [9], perceived usefulness is “the degree to which a person believes that using a particular system would enhance his or her job performance” (p. 320). The technology acceptance literature suggests that a technology with higher level of perceived usefulness would lead to higher degree of use. This logic can be easily extended to ERP assimilation, and we found plenty of evidence supporting that. When being asked how he had become a VIP user, the manager of product management department from Company C said: “What I need to do is making the product plan more accurate, and I want to get the sales information in a timelier manner. The ERP system we are using can ease my work by filling that need. That’s the reason.”

The manager of product management department from Company A also confirmed this observation when being asked how to make the training for end users more effective: “In my opinion, the training should let users know that ERP system is useful to them…… This is more important than the training focusing on ERP basic knowledge and how to use the ERP system.”

4.2.6. Individual absorptive capacity. The importance of absorptive capacity has been noted across many research fields including strategic management, technology management, international business, and organizational economics [26]. The term of organizational absorptive capacity has been used to explain IT usage in large organizations, especially ERP assimilation [19]. However, an organization’s absorptive capacity will depend on the absorptive capacities of its individual members [8]. A higher level of absorptive capacity makes it easier for an individual to acquire and retain new knowledge [13]. Cohen and Levinthal [8] provided the cognitive basis for an individual’s absorptive capacity including prior related knowledge and diversity of background especially.

The role of individual absorptive capacity in ERP assimilation is well supported by the evidence in our interviews. For example, the manager of finance department from Company A expressed this view: “I think the training is essential……We need some professional people to explain what the whole business process is for us. This will make us work more efficiently.”

However, education background of a user seems not standing out as a significant factor influencing in individual ERP assimilation, as suggested by a user of IT department from Company B: “I think the education background of ERP users is not a determinant towards ERP assimilation.”

This finding suggested that adequate training can certainly make up, if not completely substitute the knowledge shortfall due to lack of education background in related fields. It also implies that users with various education backgrounds, if trained properly, can become skilled ERP users and even migrate upwards in the assimilation hierarchy.

5. Discussion

5.1. Path from transactional to VIP user

According to our findings, if an organization is eager to accomplish a deeper ERP assimilation, there should be a significant number of power users and VIP users in the organization. Then an important question is, how can a transactional user become a power user and a VIP user eventually?

First, we focus on the path from transactional user to power user. We argue that every transactional user has a potential to become a power user. If a transactional user not only cares about his/her daily job assignments, but also thinks over how the systems works and how the problems are resolved, and with adequate effort and self-motivation, he/she will likely become a power user. After an ERP implementation is complete, most of the initial users are virtually at the same level - transactional users. During this early period, the users who have a positive attitude and are thoughtful about their jobs could evolve into advanced ERP users. Second, we discuss the path from power user to VIP user. After analyzing the interview data, we found that not every power user had the chance to migrate to VIP user, regardless how motivated the use was. According to the definition of VIP user we
5.2. Theoretical and managerial implications

The research findings proposed in this paper offers several theoretical contributions. From the perspective of theory development, this study is among the first studies of ERP assimilation at the individual level. On one hand, it identifies three levels of end-users with respect to ERP assimilation. This finding provides a useful theoretical framework for understanding why the differences among ERP users exist. On the other hand, it identifies some key factors that drive users to move up the assimilate hierarchy, including influence of direct supervisors, performance evaluation scheme, self-motivation, job specifications, perceived usefulness, and individual absorptive capacity. This work lays the foundation for the future development of theoretical model of individual technology assimilation.

From a managerial perspective, this study could offer guidance to management practices for post-implementation stages in the technology life-cycle. Top management may choose to follow the findings presented in this paper to influence end-users’ values, perception, and motivation to assimilate ERP systems. Drawing on the findings of the case study, we can also provide some prescriptive guidance for managing individual level assimilation. First, since performance evaluation scheme is an important driver, we recommend that companies set up detailed performance evaluation and reward system that clearly specifies not only job outcome indicators, but also ERP assimilation indicators, such as providing feedback on ERP system performance, and suggesting future improvement for the system, and ideas for redesigning work processes. Second, effective training should be provided to all users. We recommend that the training shouldn’t only include knowledge about ERP system and business processes, but also show why the ERP system is also for users and how the use of the system could directly benefit the individual users. Third, we recommend superiors of the users to play a positive role by encouraging users to understand and use ERP system better and in a border context. Last but not least, creating and fostering an organizational-wide learning culture could have significant consequences to ERP assimilation. A stronger learning culture in organizations will enable stronger self-motivation, and thus lead to higher level individual ERP assimilation.

6. Conclusion

Using a multiple case study design, we conducted interviews with top managers, middle level managers and ERP users at five companies focusing on the issues related to individual level ERP assimilation. We proposed and defined the concept of technology assimilation at individual levels in the context of organizational ERP systems. To capture the essence of ERP assimilation, we proposed a hierarchical model of individual level assimilation in which ERP users are classified as transactional users, power users, and VIP users. We identified six key drivers that influence individual level ERP assimilation, namely, influence of supervisors, performance evaluation schemes, intrinsic motivation, job specification, perceived usefulness, and individual absorptive capacity. The migration paths for ERP users from transitional to VIP are discussed, providing insights for effective management of individual career as well as technology assimilation in organizations.

However, our findings need to be considered in the light of certain limitations. First, this multi-case study is in a single country setting which may have some unique cultural and managerial characteristics which necessitate caution when extending the findings to organizations in other nations. Second, the generalization of the findings may be restricted by the limited number of firms and industries in this study. Finally, we did not explicitly consider the role of time in the assimilation process which may moderate the impact of the drivers identified.

In terms future research, this study suggests a number of future potentials. For instance, future research could focus on developing empirical studies to
test and validate the findings and develop a more rigorous theoretical model of individual level assimilation. Also, it would be an interesting study to conduct a multi-level empirical analysis on the influence of individual level assimilation on the organizational level assimilation. The findings of such studies could have significant theoretical contributions to the theory of technology assimilation and practical implications for managing technology assimilation in organizations.

7. References