

Association for Information Systems AIS Electronic Library (AISeL)

AMCIS 2007 Proceedings

Americas Conference on Information Systems
(AMCIS)

December 2007

Reap from ERP Systems -The Management of Absorptive Capacity in Post-ERP Implementation

Shari Shang

National ChengChi University

Chih-Hsien Hsu

National Chengchi University

Follow this and additional works at: <http://aisel.aisnet.org/amcis2007>

Recommended Citation

Shang, Shari and Hsu, Chih-Hsien, "Reap from ERP Systems -The Management of Absorptive Capacity in Post-ERP Implementation" (2007). *AMCIS 2007 Proceedings*. 87.

<http://aisel.aisnet.org/amcis2007/87>

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2007 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Reap from ERP systems – The Management of Absorptive Capacity in Post-ERP Implementation

Shari, Shang

Department of Management Information Systems,
National Chengchi University, Taiwan
shari_shang@yahoo.com

Chih-hsien, Hsu

Department of Management Information Systems,
National Chengchi University, Taiwan
94356035@nccu.edu.tw

ABSTRACT

This study uses the concept of absorptive capacity to provide a framework for exploring benefit realization in the post-implementation phase of ERP systems. Success factors of ERP adoption such as: training, communication, process change, and integration extension are organized into two types of knowledge absorptive capacity: potential capacity and realization capacity. We propose that absorptive capacity is one of the key determinants of benefits realization from ERP implementation. Although the frequently mentioned factors training and communication are important activities for organizations to assimilate the knowledge of the system processes, these represent potential capacity that requires realization through refinement and execution of what has been absorbed. ERP adopting organizations wishing to continuously generate benefits need to both build potential absorptive capacity by investing in training and education, and leverage realized capacity through extension of integration of the system processes.

Although planned for further testing, this study tries to explain post-adoptive behaviors and provides a source for further understanding of the management of post-ERP adoption.

Key words:

ERP systems, post-implementation, absorptive capacity

Introduction

Enterprise Resource Planning (ERP) systems have been in use among major firms worldwide for more than a decade. The budget for ERP is anticipated to grow 13.7% in 2007 (AMR Research), with nearly half of the companies surveyed expecting to spend more than \$10 million on ERP-related activities. Though many firms have adopted ERP, a large body of work targeting ERP success has yet to emerge. Several studies (Hitt et al. 2002) have reported that many firms failed during the initial implementation of ERP, but gained benefits years later. Other firms have never seen any benefits from ERP implementation (Bingi et al. 1999).

In addition to research into the time lag for benefits realization, researchers (Gattiker and Goodhue 2005; Jasperson et al. 2005; Clark et al. 2006; Karahanna et al. 1999) have proposed factors affecting the value gains from ERP implementation. These research not only suggest that implementing ERP is a continuous process, but also offer ideas for increasing and sustaining value after ERP implementation. These factors range from user training (Davenport et al. 2004; Jasperson et al. 2005; Clark et al. 2006; Muscatello et al. 2006), communication (Ko et al. 2005; Nah and Delgado 2006), documentation (Scott 2005; Rettig 1991), systems/processes integration and extension (Davenport et al., 2004; Clark et al. 2006; Muscatello et al. 2006; Wills and Wills-Brown 2002), process optimization (Davenport 2004; Shang and Seddon 2002; Wills and Wills-Brown 2002), informate (Davenport et al. 2004) and usage enrichment (Jasperson et al., 2005; Clark et al. 2006). Several explanations are given for these recommendations, including the observation that improving data quality can lead to substantial organizational benefits (Redman 1995) and that integration saves money, speeds up communications, and improves decision-making (Weil 1998). However, it is unclear why some firms were able to initiate these activities while others failed to take full advantage of their ERP systems.

Unlike custom made systems, ERP systems are pre-packaged software, with their own internal logic (process architecture and in-built processes), which embeds business knowledge accumulated from large numbers of organizations over many years. This embedded knowledge, which grows with each new software release, can enable, drive, and inspire business process redesign. An ERP System, therefore, requires sophisticated system and process knowledge on the part of its implementers and users.

Due to the complexities of knowledge comprehension and exploitation with ERP systems, this study proposes using absorptive capacity theory to explore organizational factors affecting ERP benefit realization, to help answer the question: *“why are some organizations able to gain benefits from ERP systems after implementation?”*

The objective of this study is to learn from both the developed knowledge and empirical experiences of implementing and exploiting ERP systems.

The following sections first explain the knowledge-intensive nature of ERP systems and ERP system adoption; then, factors affecting ERP adoption are analyzed. This background information was used to create descriptions of absorptive capacity. Critical ERP post-adoption factors were organized by different dimensions of absorptive capacity. Propositions about benefits gained from ERP implementation were then identified and explained. The last section presents propositions describing the interrelationship between the differing dimensions of absorptive capacity.

ERP Systems and ERP Systems Adoption

An ERP system is a set of packaged application software modules, with an integrated architecture, that can be used by organizations as their primary engine for integrating data, processes, and information technology, in real time, across internal and external value chains (Shang and Seddon 2002). It impounds deep knowledge of business practices that vendors have accumulated from implementations in a wide range of client organizations, which can exert considerable influence on the design of processes within new client organizations (Shang and Seddon 2002). Since ERP systems touch many aspects of a company's internal and external operations and provide organizations with an overall view of the business through multidimensional information (Gefen and Ragowsky 2005; Markus and Tanis 2000) successful deployment and use of ERP knowledge is critical to organizational performance and survival (Markus and Tanis 2000).

Research on ERP has focused on firms either prior to, during, or immediately after ERP software implementation (McNurlin 2001). Conventional wisdom saw "going live" as the end of ERP implementation and ignored the second wave, in terms of the post adoptive stage, referring to actions that are taken after going live that help organizations achieve the full capabilities and benefits (Deloitte Consulting 1999).

Many firms failed in the initial implementation, but after two or three years of effort in defining the scope of what they want to accomplish, do see some benefits (Hitt et al., 2002). Significant improvements in ERP adopter firm performance are generally not realized until some time after implementation (Hitt et al. 2002; Nicolaou 2004a). Therefore, after ERP implementation, organizations must continuously carry out change activities, including restructuring of IT systems and organizational structures, in order to obtain maximum value from the ERP systems (Gattiker and Goodhue 2005). To summarize briefly, although ERP systems are designed to create advantages for organizations, firms need to not only learn how to implement them successfully, but also to pay attention to the phases after implementation, to obtain the full benefits of ERP.

Critical Factors for Beneficial ERP Implementation and Use

"Going live" is not the terminus of the ERP implementation journey. After implementing ERP systems, organizations need to continuously monitor and manage those (Clark et al. 2006). Since ERP systems are complex, no matter how good the initial implementation, it is likely that it will still not be a good fit for the organization. Organizations must thus do more than just maintain the systems (Seddon et al. 2003). Therefore, in order to realize the full benefits of ERP systems implementation and use, several researchers have proposed factors affecting the development and maintenance of value from the system. Several studies (Markus et al. 2003; Wills and Wills-Brown 2002) suggest that stabilizing systems is the essential move in obtaining value from ERP systems. Key factors for post-ERP implementation are outlined below:

- ***User Training***

Many studies (Jasperson et al. 2005; Muscatello and Parente 2006; Umble et al. 2003; Wills and Wills-Brown 2002) argue

that user training is critical in the ERP post-implementation context. Pre-implementation user training can make use of organizational experience, and shorten the time required to handle immediate post-go-live issues. However, the goal of user training in post-implementation is “assimilating deeply and updating the knowledge needed”. Post-adoption training enables users to fully understand the implications of the new system for their organizational processes (Davenport et al. 2004), along with how their actions impacted downstream operations (Nicolaou 2004). It also permits additional updating of the ERP system’s knowledge base concerned with the operation of new functions. Another form of user training is periodic meetings of system users which can help identify problems with the system and encourage the exchange of information gained through experience and increasing familiarity with the system (Umble et al. 2003).

- ***Communication***

The ERP literature has identified communication as one of the critical success factors for system adoption (Holland and Light 1999; Ko et al. 2005). During and after implementation, key users, IS personnel, and vendors, who have different knowledge bases, need to transfer knowledge by informal and formal communication. Studies suggest that increased communication competence increases the likelihood of individuals engaging in activities with each other (Berman and Heilweg 1989) and enhances shared understanding (Ko et al. 2005). Through communication, feedback offered by the users of ERP systems can be shared for improving and modifying ERP usage (Nah and Delgado 2006).

- ***Documentation***

Documentation is another source of knowledge acquisition in ERP systems. One of the most important aspects of knowledge sharing is documentation in the form of process descriptions, operating guides, and system design manuals. Users can learn how to operate ERP systems, correct errors, and seek solutions from the documentation (Scott 2005). Well-maintained documentation offers users impressive benefits, such as reductions in learning time, information overload and search effort (Rettig 1991).

- ***Change Management***

After implementation, it is likely that unexpected changes will occur, and organizations need to adjust to the changes to avoid user confusion. People are typically willing to adapt if they understand the need to change and accept responsibility for producing tangible business benefits (IBM 2000b). Change management is not merely an anti-resistance stance, but actively transforms obstacles in its path into new opportunities that will enhance the overall effectiveness of the organization (Orlikowski and Hofman 1997; Sieber and Nah 1999).

Orlikowski and Hofman (1997) proposed that some changes are not anticipated ahead of time but are introduced purposefully and intentionally during the change process in response to an unexpected opportunity, event, or breakdown. ERP implementation commonly involves change, including changes in processes, software/hardware, human resource and

organizational structure. Since ERP implementation is treated as a continual process, not something which has a clearly defined start and finish, the technological and organizational changes made during the ongoing process should not be thought of as having a clear terminal point (Orlikowski and Hofman 1997). Therefore, researchers (Clark et al. 2006; Jaspersen et al. 2005) suggest that change management is a critical factor in beneficial ERP implementation and use.

- ***Process Optimization***

One recent study concluded that the way to obtain greater productivity and business performance from enterprise systems over the long term is process improvement (Brynjolfsson and Hitt 1995; Seddon et al. 2003). Process optimization requires understanding the evolving capability of the software and needs of the organization, and strives to maintain a reasonable on-going level of fit between the software and changing organizational needs (Davenport et al. 2004; Shang 2001). Some organizations change processes radically in the early or pre-implementation stages, and subsequently stopped improving processes. However, the initial fit between organizational processes and ERP systems will not represent the sustained fit years later because organizational processes will change over time. Thus, optimizing processes cannot cease even after the ERP systems go live. Furthermore, reengineering or process improvement should not be restricted to the back-office. Operational processes that have been the primary focus of change processes in the past. Organizations should try to improve processes such as marketing, product development, and strategic planning, to provide the full picture of process optimization and consequently maximize the benefits from ERP systems implementation and use (Davenport et al. 2004).

- ***Integration / Extension***

Integration is universally known to be beneficial to ERP use. However, implementing ERP systems does not guarantee successful, automatic integration of information, processes, and systems of organizations (Davenport et al. 2004; Gattiker and Goodhue 2005). Organizations can improve integration to realize value after ERP implementation by minimizing the number of ESs instances through consolidation, and by integrating ERP systems with legacy systems (Davenport et al. 2004). Consolidating applications into a single global system, for example, where SCM, CRM, and B2B e-commerce are integrated with ERP systems to share applications, hardware, or core processes also reduces the costs of human and technical support for ERP systems (Davenport et al. 2004; McNurlin 2001; Wills and Wills-Brown 2002). For organizations, integration is an ongoing activity that continues long after implementation of core ERP systems functionality (Koch 2001). In order to speed up communications and improving decision-making (Weil 1998), even after ERP implementation, organizations must continually integrate and extend ERP systems.

Extension of the ERP systems is another source of beneficial ERP implementation and use (Clark et al. 2006; Muscatello and Parente 2006; Wills and Wills-Brown 2002). Not all organizations need initially implement each module of their ERP systems, (Clark et al. 2006), but at some point, organizations may require additional functionalities to support new abilities or processes. ERP systems can be used to extend the organization to its suppliers, partners, and customers. Integrating ERP systems with SCM, CRM, and e-commerce, as well as adding new modules, frequently involves integrating current systems with new systems and extending the functionality of the ERP systems.

- ***Informatize***

Informatize means transforming ERP systems data into context-rich information and applying it to support business analysis and decision making (Davenport, et al., 2004). An information processing system which is deeply embedded in a firm's informal and formal management decision-making process may hold the potential for sustained competitive advantage (Barney 1991). Organizations must not only create high quality data from ERP systems but also provide the "right" people with the "right" information to fully exploit data (Barney 1991). Many organizations acquire accurate, consistent and real-time information from ERP systems, thus gaining organizational benefits. But merely possessing the information does not guarantee proper decision-making. Organizations need to spend time in learning the information developed by the ERP systems and experiencing how it can best support their business.

- ***Enrich the Use of Already-installed Systems***

Organizations invest huge resource in ERP systems and seek ways to exploit it to maximize ERP benefits, but they may ignore the most critical factor: usage of the system (Jasperson et al. 2005; Clark et al. 2006). Existing evidence shows that most organizations underutilize the functional potential of installed IT applications (Jasperson et al. 2005). For example, users operate only low level features (Rose and Weill 2002) and rarely initiate technology related extensions of the available features (Davenport 1998; Rose and Weill 2002). In addition to providing ongoing resources to support the development of ERP systems, organizations need to pay serious attention to post-adoptive behaviors to induce and enable users to enrich the use of the ERP systems after implementation (Jasperson et al. 2005; Clark et al. 2006).

Absorptive Capacity

Absorptive capacity (ACAP) is the ability to recognize the value of new information, assimilate it, and apply it to commercial purposes (Cohen and Levinthal 1990). Zahra and George (2002) further specify that absorptive capacity is a set of organizational routines and processes, by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability. They propose two dimensions of ACAP: potential capacity and realized capacity. Potential ACAP refers to the acquisition and assimilation of the knowledge, the capability of recognizing and acquiring external knowledge. Realized capacity refers to the transformation and exploitation of the knowledge, the capability of internalizing and leveraging absorbed knowledge.

Knowledge acquisition is a firm's capability to identify and acquire the knowledge that is critical for organizations. *Knowledge assimilation* is the firm's capability to analyze, interpret and understand the obtained knowledge and information. *Knowledge transformation* means the capability to combine existing knowledge and the newly acquired knowledge. *Knowledge exploitation* is the ability to harvest and incorporate knowledge into operations. It explicitly is the capability to utilize the transformed knowledge to create new systems, goods, and competencies (Zahra and George 2002).

Absorptive Capacity in ERP Implementation and Use

Based on the concept of absorptive capacity, factors affecting the success of ERP implementation can be sorted by either dimension of absorptive capacity (Table 1).

Table 1. Critical Post-ERP Implementation Factors with ACAP

Potential ACAP	Realized ACAP
Acquisition/ Assimilation	Transformation / Exploitation
<p>User training (Davenport et al. 2004; Jasperson et al. 2005; Clark et al. 2006; Muscatello et al. 2006)</p> <p>Communication (ko et al. 2005; Nah and Delgado 2006)</p> <p>Documentation (Scott 2005; Rettig 1991)</p>	<p>Change management (Jasperson et al. 2005; Orlikowski and Hofman 1997)</p> <p>Process optimization (Davenport et al. 2004; Wills and Wills-Brown 2002)</p> <p>Integration/ Extension (Davenport et al., 2004; Clark et al. 2006; Muscatello et al. 2006; Wills and Wills-Brown 2002)</p> <p>Informate (Davenport et al. 2004)</p> <p>Enrich usage (Jasperson et al. 2005; Clark et al. 2006)</p>

• *Potential ACAP with Post-ERP Implementation*

In the stage of knowledge acquisition, organizations have to identify useful knowledge and attempt to obtain it. For example, organizations planning to train users may gather resources such as documentation (manuals), consultants, and classes.

Training is one of the key determinants of the long-term viability of ERP in a given organization (Markus et al. 2000; Bajwa et al. 2004; Clark et al. 2006). User training enables users to understand knowledge relevant to ERP systems in order to know how to operate the ERP and comprehend its potential. First, firms must (re)-train employees to address the gap between employee abilities and knowledge after ERP implementation, to maximize later exploitation. Second, firms need to gain the advanced business and technology knowledge of updated versions.

In the subsequent knowledge assimilation stage, users attend training. Through seminars, meetings, and formal and informal communication, users share and audit knowledge after training to improve their assimilation and raise their potential knowledge and capabilities.

- ***Realized ACAP with Post-ERP Implementation***

After ERP implementation, the business rules of the ERP systems associated with the reference models begin to conflict with the existing business fundamentals of the organizations (Lee and Lee 2000). Thus change management is used to harmonize new and existing systems/knowledge. This balancing of the old and the new, along with the reframing of knowledge to produce stable systems, is the real meaning of knowledge transformation.

In theory, after employees become used to the ERP systems and assimilate knowledge about it, firms learn what actually they need and what is available, and then discover how to improve processes and systems. Davenport (2004) defines the process optimizations that stem from continuous examination and improvement of how the process flow fits with the system and how the system and the processes support the needs of the business. Process optimization involves transformation capacity, to record the process knowledge of both the business and the ERP systems, in order to discover the combination that meets business needs.

Knowledge exploitation involves allowing firms to refine, extend, and leverage existing competencies or to create new ones by incorporating acquired and transformed knowledge into its operations. Many studies (Davenport 2004; Jaspersen et al. 2005; Clark et al. 2006; Muscatello 2006; Wills and Wills-Brown 2002) suggest initiatives to leverage the accumulated experience, such as integration, enriching, extension, add-ons, and upgrades of the functionalities. These activities are designed to extend the existing ERP. Such initiatives involve the knowledge and the capability to operate the affected systems and decisions at different and higher levels within the company.

Extended from the description of critical factors of post-ERP implementation, the framework of absorptive capacity is further used to sorted activities of post ERP systems implementation (Table 2). For example, “the ability to provide documentation/manuals of ERP systems for users”, relates to acquiring the knowledge of ERP systems and is classified in the dimension of knowledge acquisition.

Table 2. Critical Factors of Post ERP Systems Implementation in the Absorptive Capacity Framework

Knowledge Acquisition	Knowledge Assimilation
<ul style="list-style-type: none"> • Ability to identify needed information regarding ERP systems • Ability to understand where to acquire information about ERP systems • Ability to acquire proper information about user training from the ERP systems vendor • Ability to acquire quality information about ERP extended use from the ERP systems vendor • Ability to organize user training for ERP systems • Ability to locate consultants experienced in ERP implementation and use • Ability to provide documentation/manuals of ERP systems for users • Ability to acquire latest information/technology about how ERP systems align with other applications, such as SOA or EAI • Ability to acquire information by attending seminars about ERP systems 	<ul style="list-style-type: none"> • Ability to analyze information obtained from the ERP systems vendor • Ability to process information provided by the ERP systems vendor • Ability to interpret information provided by the ERP systems vendor • Ability to attending user training provided by the ERP systems vendor • Ability to assess users after training in ERP systems • Ability to provide a knowledge sharing platform for information about ERP systems • Ability to provide information on the communication systems of ERP systems for users • Ability to continuously upgrade employee skills through hire training and education, or outsourcing • Ability to understand information provided by consultants or the ERP systems vendor
Knowledge Transformation	Knowledge Exploitation
<ul style="list-style-type: none"> • Ability to develop processes in improving organizational efficiency based on information provided by ERP systems vendor • Ability to develop processes to improve productivity based on information provided by the ERP systems vendor • Ability to improve processes using the processes of the ERP systems to support the needs of the business • Ability to refine the processes in facilitating organizational performance based on information provided by the ERP systems vendor • Ability to continuously examine and improve the flow fit of processes with the system • Ability to restructure the software/hardware in improving ERP use based on information provided by the ERP systems vendor • Ability to relocate human resources to improve ERP use based on information provided by the ERP systems vendor • Ability to restructure the organization to improve ERP use based on information provided by the ERP systems vendor 	<ul style="list-style-type: none"> • Ability to integrate processes involving customers, suppliers and business partners • Ability to extend the ERP systems through integration with other systems, such as SCM, CRM, or B2B • Ability to leverage ERP related knowledge in facilitating performance of the organization • Ability to integrate ERP with existing legacy systems by using EAI tools or Web services • Ability to minimize the number of ERP instances through consolidation.-adopt shared services • Ability to gain high quality information from ERP systems • Ability to transform ERP data into context-rich information and apply it to support business analysis and decision making • Ability to improve the ability to inform by providing better data access. • Ability to enhance the usage of installed functionalities of ERP systems • Ability to upgrade the ERP systems or add additional software/hardware to extend ERP systems

ACAP and Benefits Gained in Post-ERP Implementation

Zahra and George (2002) proposed that there is a relationship between knowledge absorptive capacity and the performance of the firm. This study offers the following propositions about the relationship between knowledge absorptive factors and benefits realized in post-ERP implementation.

Proposition 1: The greater the capacity to absorb ERP system knowledge, the more the benefits realized in the post-ERP implementation period.

The adoption of ERP systems after the implementation phase is a complex challenge in knowledge management. Prior studies (Davenport 1998; Lee and Lee 2000; Pan et al. 2001) suggest that if the ERP knowledge is completely absorbed and utilized properly, organizations can gain competitive advantage. The degree of knowledge assimilation and exploitation of the ERP systems is an important determinant of the benefits of ERP use. Thus, absorptive capacity is a critical factor in obtaining a return on investment in an ERP system.

Zahra and George (2002) observed that high potential ACAP provides firms with the strategic flexibility and freedom to adapt to the changing environment, but does not promise greater performance. By contrast, realized ACAP is a primary source of performance improvement. But it does not mean that the realized capacity can be fully leveraged without well-constructed potential capacity for making proper decisions and actions. Table 3 summarizes the combined situation of these two dimensions of ACAP.

Table 3. Potential and Realized ACAP with Benefits of Post ERP

Proposition	Potential ACAP	Realized ACAP	Benefits of post ERP
1a	High	High	High
1b	High	Low	Low
1c	Low	High	Low
1d	Low	Low	Low

Proposition 1a: Higher potential ACAP with higher realized ACAP leads to higher benefits gained

Given that profits are created primarily through realized ACAP, firms that achieve or maintain a high efficiency factor are positioned to increase their performance (Zahra and George 2002). However, the full benefits of ERP cannot be realized until end users assimilate completely and use the new systems properly (Umble et al. 2003). 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 necessary to adapt and evolve in a high-velocity environment (Zahra and George 2002). Therefore, higher assimilation helps organizations upgrade the knowledge and capabilities of users in pursuit of full exploitation of the capabilities of the ERP systems.

Proposition 1b: Higher potential ACAP with lower realized ACAP leads to lower benefits gained

Some firms possess to the ability to understand complex technical problems but were not as effective in translating such knowledge into product innovation strategies, and thus do not realize the benefits (Baker et al. in press). Although user training plays an important role in renewing a firm's knowledge base and the skills necessary to compete in changing markets (Zahra and George 2002) and develop or produce a technology to meet customer requirements (Schilling 1998), information systems researchers and practitioners often overlook the potential of user training (Jasperson et al. 2005). Thus, the acquisition and assimilation of knowledge in the absence of a capability to transform and exploit the knowledge will not lead to full realization of benefits for organizations (Zahra and George 2002).

Proposition 1c: Lower potential ACAP with higher realized ACAP leads to lower benefits gained

Lower assimilation with higher exploitation may mean that exploitation is based on imperfectly/partially transformed knowledge (Zahra and George 2002). It may thus be carried out by imitating the practices of firms which have successfully obtained value from ERP systems, or perhaps by mere intuition. This implies that the exploitation is inaccurate and success may not be sustaining over the long haul. Different organizations probably have different ways of exploiting their ERP systems (Shang and Seddon 2002). Thus prior to exploiting an ERP system, the enterprise might pause to examine its assimilation of the IT/knowledge instead of blindly integrating and extending it.

Proposition 1d: lower potential ACAP with lower realized ACAP leads to lower benefits gained

Based on the foregoing, we can infer that the condition in which knowledge absorption is low, coupled with lower capability to exploit knowledge, will lead to reduced organizational benefits.

Proposition 2: The higher the potential capacity of the ERP knowledge, the higher the realized capacity of the ERP knowledge

Since potential ACAP and realized ACAP have separate but complementary roles (Zahra and George 2002), they cannot bring their respective potential into full play without each other. Similarly, these factors play unique roles, yet complement each other, in the process of obtaining value from ERP systems.

Assimilating before exploiting the knowledge is important because knowledge assimilation can internalize knowledge and

transform it into organizational knowledge, facilitating discovery of unique organizational approaches to maximizing the capacity to use the ERP.

Conclusion

Based on theory of absorptive capacity, this study formed an understanding of benefits realization after ERP implementation. Success factors of ERP adoption include: training, documentation, communication, change management, process optimization, integration/ extension, informate and enrich usage. These are organized into two types of absorptive capacity: the potential capacity and the realization capacity.

The propositions are based on the recognition that absorptive capacity is one of the key determinants of value creation in the post ERP implementation. Although frequently mentioned factors, training and communication, are important activities for organizations to assimilate the knowledge of the system processes, these represent potential capacity that needs to be realized through proper activities to refine and execute what has been absorbed.

Although the propositions require empirical confirmation, this study has taken an important step in delineating the relationship between post-adoptive behaviors and performance after ERP adoption, and provides a reference for effective planning for ERP management, as well as a framework for further empirical work.

Reference

1. Bajwa, Deepinder S., Mooney, Timothy and Garcia, Joseph E. "An Integrative Framework for the Assimilation of Enterprise Resource Planning System: Phases, Antecedent and Outcomes," *The Journal of Computer Information Systems* (44:3), 2004, pp. 81- 91.
2. Barney, Jay "Firm Resources and Sustained Competitive Advantage," *Journal of Management* (17:1), 1991, pp.99- 121.
3. Berman, S. and Heilweg, S." Perceived Supervisor Communication Competence and Supervisor Satisfaction as a Function of Quality Circle Participation," *The Journal of Business Communication* (16:2), 1989, pp. 103-122.
4. Bingi, P. Sharma, M.K. and Godla, J.K. "Critical Issues Affecting ERP Implementation," *Information Systems Management* (16:3), 1999, pp. 7-14.
5. Brynjolfsson, E. and Hitt, L. "Information technology as a factor of production: the role of differences among firms," *Economics of Innovation and New Technology* (13:4), 1995, pp.183-200.
6. Clark Thomas D., Jr., Jones Mary C. and Zmud Robert W."Post adoptive ERP system analysis: A system dynamic modeling approach", working paper 2-2, 2006.
7. Cohen, Wesley M. and Levinthal, Daniel A. "Absorptive capacity: a new perspective on learning and innovation," *Administrative science quarterly* (35:1), Mar 1990, pp. 128-152.
8. Davenport Thomas H." Putting the enterprise into the enterprise system," *Harvard Business Review* (76:4), 1998, pp. 121-131.
9. Davenport Thomas H., Jeanne G and Cantrell Susan "Enterprise systems and ongoing process change," *Business Process Management Journal* (10:1), 2004, pp. 16-26.
10. Gefen, D. and Ragowsky, A."A Multi-level Approach to Measuring the Benefits of an ERP System in Manufacturing Firms," *Information Systems Journal* (22:1), 2005, pp.18-25.
11. Gattiker Thomas F. and Goodhue Dale L. "What happens after ERP implementation: understanding the impact of interdependence and differentiation on plant-level outcomes," *MIS Quarterly* (29:3), 2005, pp. 559-585.
12. Hitt, L. M., Wu, D. J., and Zhou, X. "Investment in Enterprise Resource Planning: Business Impact and Productivity Measures," *Journal of Management Information Systems* (19:1), 2002, pp. 71-98.
13. Holland, C. P. and Light, B. "A Critical Success Factors Model for ERP Implementation," *IEEE Software* (16:3), 1999, pp.30-36.
14. IBM (2000b) IBM Business Management Services/ERP: ERP Organization Change Services, http://www-1.ibm.com/services/collateral/erp_org.html.
15. Jasperson Jon (Sean), Carter Pamela E. and Zmud Robert W. "A comprehensive conceptualization of post-adoptive behaviors associated with information technology enabled work systems1," *MIS Quarterly* (29:3), 2005, pp.525-557.
16. Karahanna Elena, Straub Detmar W. and Chervany Norman L." Information technology adoption across time: A cross-sectional comparison of pre-adoption and post-adoption beliefs," *MIS Quarterly* (23:2), 1999, pp. 183-214.
17. Ko, Dong-Gil, Kirsch, Laurie J. And King, William R. "Antecedents of Knowledge Transfer from Consultants to Clients in Enterprise System Implementations," *MIS Quarterly* (29:1), 2005, pp. 59-86.
18. Koch, C. "Why your integration efforts end up looking like this... ," *CIO Magazine* (15), 2001
19. Lee Zoonky and Lee Jinyoul "An ERP implementation case study from a knowledge transfer perspective," *Journal of Information Technology* (15:4), 2000, pp. 281-288.
20. Mabert, V.A. Soni, A. and Venkataramanan, M.A. "Enterprise Resources Planning: Common Myths versus Evolving Reality," *Business Horizons* (44:3), 2001, pp. 69-76.

21. Markus, L.M., Axline, S., Petrie, D. and Tanis, C.”Learning from adopters, experiences with ERP: Problems encountered and successes achieved, “*Journal of Information Technology* (15:4), 2000, pp. 245-265
22. Markus, L.M. and Tanis, C. “The Enterprise Systems Experience - From Adoption to Success, “in *Second-Wave Enterprise Resource Planning Systems: Implementing for Effectiveness*, G. Shanks, P.B. Seddon, and L. P. Willcocks (Eds.), Cambridge University Press, Cambridge, UK, 2003, pp.23-55.
23. McNurlin, B. “Will users of ERP stay satisfied,” *Sloan Management Review* (42:2), 2001, pp. 13-14.
24. Muscatello Joseph R. and Parente Diane H. “Enterprise Resource Planning (ERP): A Postimplementation Cross-Case Analysis,” *Information Resources Management Journal* (19:3), 2006, pp. 61-74.
25. Nah, Fiona Fui-Hoon and Delgado, Santiago “Critical Success Factors for Enterprise Resource Planning Implementation and Upgrade,” *The journal of Computer Information Systems* (46:5), 2006, pp.99-114.
26. Nicolaou, Andreas I. “Quality of postimplementation review for enterprise resource planning systems,” *International Journal of Accounting Information Systems* (5:1), 2004, pp.25-49.
27. Orlikowski, Wanda J. and Hofman, J. Debra. “An Improvisational Model for Change Management: The Case of Groupware Technologies,” *Sloan Management Review* (38:2), 1997, pp. 11-22.
28. Pan S.L., Newell S., Huang J.C., and Cheung AWK “Knowledge integration as a key problem in an ERP implementation,” *Twenty-Second International Conference on Information Systems*, 2001
29. Redman, Thomas C.” Improve Data Quality for Competitive Advantage,” *Sloan Management Review* (36:2), 1995, pp. 99-108.
30. Rettig, M.” Nobody reads documentation, “*Communications of the ACM* (34:7), 1991, pp. 19-24.
31. Ross, J. W., and Weill, P. “Six IT Decisions Your IT People Shouldn’t Make,” *Harvard BusinessReview* (80:11), November 2002, pp. 84-91
32. Ross, J. W., Vitale, M. R., and Willcocks, L. P. “The Continuing ERP Revolution: Sustainable lessons, new modes of delivery,” in *Second-Wave Enterprise Resource Planning Systems: Implementing for Effectiveness*, G. Shanks, P.B. Seddon, and L. P. Willcocks (Eds.), Cambridge University Press, Cambridge, UK, 2003, pp. 102-132.
33. Schilling Melissa A. “Technological lockout: An integrative model of the economic and strategic factors driving technology success and failure,” *The Academy of Management Review* (23:2), 1998, pp. 267-285
34. Scott, Judy E. “Post-implementation Usability of ERP Training Manuals: the User’s Perspective,” *Information Systems Management* (22:2), 2005, pp.67-78
35. Shang, S. and Seddon, Peter B. “Assessing and Managing the Benefits of Enterprise System: The Business Manager’s Perspective” *Information Systems Journal* (12:4), 2002, pp. 271- 299.
36. Seddon, Peter, Shanks, Graeme, B.and Willcocks, Leslie P. “Introduction: ERP- The Quiet Revolution?,” in *Second-Wave Enterprise Resource Planning Systems: Implementing for Effectiveness*, G. Shanks, P.B. Seddon, and L. P. Willcocks (Eds.), Cambridge University Press, Cambridge, UK, 2003, pp. 1-19.
37. Sieber, M. and Nah, F.” A Recurring Improvisational Methodology for Change Management in ERP Implementation,” *Americas Conference Information Systems AMCIS*, Milwaukee, USA, 1999.
38. Umble Elisabeth J, Haft Ronald R and Umble M Michael, “Enterprise resource planning: Implementation procedures and critical success factors,” *European Journal of Operational Research*. Amsterdam (146:2), 2003, pp. 241-257.
39. Weil, Marty “Guide to growth,” *Manufacturing Systems*, 1998, pp.2-9.
40. Willis T Hillman, Willis-Brown Ann Hillary” Extending the value of ERP,” *Industrial Management + Data Systems* (102:1/2), 2002, pp. 35-39