Organizational Change in ERP Implementation: A dialectical perspective

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ABSTRACT

Dialectical perspectives have been used as logics of change driving organizational change in ERP implementation context. The dialectical logic of opposition explains organizational change by identifying forces both promoting and impeding change through lenses of organizational politics, organizational culture, institutional theory, and organizational learning. Although the literature survey of this study is not exhaustive, it can serve to some degree as a representative database for the understanding of mechanisms driving organizational change in ERP implementation. Many opposing forces and conflict may happen in user organizations from different phases in ERP implementation. ERP packages are culture-laden business applications, cross-cultural misfit issues may be worse in Asian cultural, economic, and regulatory contexts. In addition, ERP systems can engender a duality: in the pre-implementation and implementation stages, they act as objects of institutional forces; in the post-implementation stage, they show as carriers of institutional logics. An effective experiential learning strategy in ERP implementation is learning from failure which encourages double-loop exploration, consequently leads an organization resilient to change and seeks long-term success through short-term failure. Adopting vicarious learning strategy to partner with experienced implementation consultants and successful knowledge transfer plays a critical role in both overcoming knowledge barriers and mitigating misfit problems.

Keywords: dialectical perspective, organizational politics, organizational culture, institutional theory, organizational learning.

INTRODUCTION

Enterprise Resource Planning (ERP) systems are 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 (Seddon, et al., 2003). ERP is a recent information technology (IT) innovation (Rajagopal, 2002). Nowadays many corporations adopt ERP systems to promote business performance and create a competitive advantage in fluctuating global economic circumstances and totally digital times. This blooming phenomenon intrigues many practitioners’ and researchers’ interest as a potential means to enhance organizational agility (Davenport, 1998; Sambamurthy et al., 2003; Ke et al., 2006).

ERP implementation usually goes with a certain degree of organizational change (Robey et al., 2002; Markus et al., 2000). Organizational changes associated with implementing an ERP will most likely cause resistance until people become familiar with the technology and with new ways of working (Bancroft et al., 1998). Commitment to change by all stakeholders is one of critical success factors (CSFs) for ERP implementation (Par and Shanks, 2003). Consequently, organizational change management plays a very influential role on ERP projects.
Studies about organizational change typically focus on the antecedents and complex social processes through which IT produces organizational consequences (Van de Ven et al., 1990). Van de Ven et al. (1995) identified four alternative logics embedded within process theories about organizational change. These logics of change “motors” denote their theoretical role as mechanisms driving change (Robey et al., 2002). The four motors are life cycle, teleology, evolution, and dialectics. A life cycle motor adopts the metaphor of organic growth to explain the development of an entity from its initiation to its termination. A teleological motor relies on the philosophical doctrine that a goal guides the change of an entity. An evolutionary motor of change refers to cumulative changes in structural forms of populations of entities through a continuous cycle of variation, selection, and retention. The dialectic motor of change emphasizes a pluralistic world of colliding events, forces, or contradictory values that compete with each other for domination or control (Van de Ven et al., 1995, p.517). Each of these four motors represents fundamentally different ways to explain how organizational change unfolds.

Based on the dialectical perspective, our research questions are: What are those opposing forces and how do they affect the change process leading to the diverse organizational consequences in ERP implementation?

RESEARCH METHOD

Academics and practitioners alike use journals most often for acquiring information and disseminating new findings, and represent the highest level of research (Nord et al., 1995). ERP publications in the main IS journals have emerged since 2000 (Esteves et al., 2001 and Klaus et al., 2000). The literature survey of this study was mainly based on seven core MIS journals encompassing Communications of the ACM, Information & Management, Information Systems Research, the Journal of Management Information System, MIS Quarterly, Journal of the Association for Information Systems, and European Journal of Information System. In addition, the following eight journals which have published special issues relevant to ERP systems were also included: Communications of the ACM, Information Systems Frontiers, the Journal of Information Technology, Database for Advances in Information Systems, the Business Process Management Journal, the Journal of Management Information System, the European Journal of Operational Research, and the International Journal of Human-Computer Interaction. Although this literature survey is not exhaustive, it can serve to some degree as a representative database for the understanding of mechanisms driving organizational change in ERP implementation.

A Dialectical Perspective In ERP Implementation

Lucas et al. (1988) argued that the implementation of a dedicated package such as ERP systems differed from the implementation of a custom system in several ways: the users may have to change procedures to work with the package, change some of the programs in the package to fit their unique requirements, become dependent on the package vendor for assistance and update on the package. The real challenge of implementing an ERP was that these firms were instilling discipline into relatively undisciplined organizations – a major cultural change (Ross et al., 2000). The logic of opposition explains organizational change by identifying forces both promoting change and impeding change (Robey et al., 1999). The dialectic interplay is used as the basis of dialectical “logic of opposition” to explain the diversity of organizational consequences of information technology (IT). Four specific theories: organizational politics, organizational culture, institutional theory, and organizational learning are commonly used to explain IT’s role in organizational change. The following sections illustrate organizational change researches in ERP implementation with these four theoretical lenses.
Organizational Politics

Researches related to organizational change in ERP implementation through the lens of organizational politics are tabulated below.

<table>
<thead>
<tr>
<th>Topic</th>
<th>A Dialectical Logic of Opposition</th>
<th>Opposing Forces</th>
</tr>
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<tbody>
<tr>
<td>Misalignments in ERP Implementation: A Dialectic Perspective (Soh et al., 2003)</td>
<td>Organizational politics/opposing forces and misalignments</td>
<td>Four pairs of dialectic forces: (1) integration vs. differentiation, (2) process orientation vs. functional orientation, (3) flexibility vs. restrictiveness, (4) package domain specifics vs. organization domain specifics</td>
</tr>
<tr>
<td>ERP as a Technology of Power: Empowerment or Panoptic control (Sia et al., 2002)</td>
<td>Organizational politics/power redistribution</td>
<td>(1) Perpetuation of management power (2) Resistance of empowerment.</td>
</tr>
<tr>
<td>ERP Project Dynamics and Enacted Dialogue: Perceived Understanding, Perceived Leeway, and the Nature of Task-Related Conflicts (Besson et al., 2001)</td>
<td>Organizational politics/enactment and conflict</td>
<td>(1) During the project phase, the designers make the integration or differentiation choice. (2) During the shakedown and subsequent phase, job and governance conflict with end users. (Due to the lack of perceived leeway by the actors, organizational outcomes often are not realized)</td>
</tr>
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</table>

ERP systems also demand organizational discipline and strict adherence to their standardized processes (Davenport, 1998). Thus, many opposing forces and conflict happening in user organizations can be derived from different phases in ERP implementation. Soh et al. (2003) proposed four pairs of dialectic forces: (1) integration vs. differentiation, (2) process orientation vs. functional orientation, (3) flexibility vs. restrictiveness, (4) package domain specifics vs. organization domain specifics. Besson et al. (2001) found designers’ choice of integration or differentiation during the project phase, and job and governance conflicts with end users during the shakedown and subsequent phase. Due to the lack of perceived leeway by the actors, organizational outcomes often are not realized. Davenport (1998) observed that ERP systems can empower users by equipping them with real-time data. ERP as a technology can facilitate both empowerment and panoptic control by perpetuating management power and resisting empowerment. The “interpretive flexibility” (Pinch and Bijker, 1984) can be left for users to deal with them in practice.

Organizational Culture

Table 2 tabulates studies concerning organizational change in ERP implementation by a lens of organizational culture.
**Table 2: A Dialectical Logic of Opposition in Organizational Culture**

<table>
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<tr>
<th>Topic</th>
<th>A Dialectical Logic of Opposition</th>
<th>Opposing Forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP Misfit: country of origin and organizational factors (Wang et al., 2006)</td>
<td>Organizational culture/ The social shaping of technology perspective</td>
<td>Different ERP systems can embody distinct social arrangements when developed in different cultural contexts and lead to various misfit problems both during and after ERP implementation.</td>
</tr>
<tr>
<td>Why western vendors don’t dominate China’s ERP market (Liang, 2004)</td>
<td>Organizational culture/ The cultural and business practice fit and misfit</td>
<td>Due to the differences of culture and business practice between China and the West, international ERP vendors need to localize their strategies.</td>
</tr>
<tr>
<td>ERP in China: one package, two profiles (Martinsons, 2004)</td>
<td>Organizational culture/ A cultural and managerial fit and misfit</td>
<td>The eight cultural differences indicate a poor fit between ERP and the Chinese state-owned enterprises (SOE) context.</td>
</tr>
<tr>
<td>Cultural complications of ERP (Davison, 2002)</td>
<td>Organizational culture/ Adaptation of ERP products and services for different cultural markets.</td>
<td>Through awareness of cultural differences and preferences, developers and consultants need to adapt their products and services to different cultural markets.</td>
</tr>
<tr>
<td>Cultural Fits and Misfits: Is ERP a Universal Solution (Soh et al., 2000)</td>
<td>Organizational culture/ A cultural fit and misfit</td>
<td>Three broad categories of misfits: (1) data (2) process (3) output These misfits may be worse in Asia due to the different cultural, economic, and regulatory context.</td>
</tr>
<tr>
<td>Implementing ERP Packages in Different Corporate and National Cultures (Krumhholz et al., 2000)</td>
<td>Organizational culture/ A corporate and national cultural fit and misfit</td>
<td>(1) A mismatch between a small set of core values is indicative of customers’ corporate culture. (2) An association between corporate culture and ERP implementation problems but no association between national culture and implementation problems.</td>
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</table>

ERP implementation can result in cultural impacts (Davison, 2002). Cultural differences are critical to ERP success (Martinsons, 2004). Corporate culture rather than national culture shows more association with ERP implementation problems (Krumhholz et al., 2000). Awareness of cultural differences and preferences will certainly improve the assessment of ERP suitability and any subsequent implementation (Davison, 2002). The "misfit" issue may be worse in Asia because the business models underlying most ERP packages reflect European or American industry practices. Procedures in Asian organizations are likely to be different, having evolved in a different cultural, economic, and regulatory context (Soh et al., 2000). A mismatch between a small set of core values is indicative of customers’ corporate culture (Krumhholz et al., 2000). Due to the difference in cultural and business practice between China and the West, international ERP vendors need to localize their strategies (Liang, 2004).

From the social shaping of technology (SST) perspective, the very structure and architecture of contemporary IT is itself a product of historical processes of social and economic shaping (Clausen et al., 1999, Williams et al., 1996). Based on the SST perspective, the historical, cultural, as well as political elements play significant roles in shaping the design and implementation of technology (Clausen et al., 1999, Williams et al., 1996). In addition, socioeconomic patterns are embedded in both the content of technology (models in ERP systems) and the processes of implementation (Williams et al., 1996). Any ERP system is the outcome of social processes in one particular cultural context and is gradually shaped through a cyclic process of revision within a particular social context (Wang et al., 2006). An ERP system imposes its own logic on a company’s strategy, culture, and organization (Davenport, 2000).
Thus, the business practices embedded in ERP packages are culture-laden and ERP vendors’ assumption of universal best practices for information management is questionable (Wang et al., 2006, Soh et al., 2000).

Based on the above, these cross-cultural issues lead to various misfit or misalignment problems in ERP implementation and are one of the most difficult challenges. ERP products and services for different cultural markets need to adapt to fit local markets. In addition, international ERP vendors need to make their local strategies to span the cultural gaps between the East and the West.

**Institutional Theory**

Institutional theory used as the theoretical lens to understand organizational change in ERP implementation is illustrated below.

<table>
<thead>
<tr>
<th>Topic</th>
<th>A Dialectical Logic of Opposition</th>
<th>Opposing Forces</th>
</tr>
</thead>
<tbody>
<tr>
<td>ERP as Objects and Carriers of Institutional Forces: The New Iron Cage? (Gosain, 2004)</td>
<td>Institutional theory/ the institutional forces and misalignments</td>
<td>Enterprise information systems engender a duality. (1) In the chartering and project phases, they act as objects of institutional forces. (2) In the shakeout and onward &amp; upward phases, they show as carriers of institutional logics.</td>
</tr>
</tbody>
</table>

Researchers have used the institutional theory lens to study the success or failure of information systems implementation (Christiaanse and Huigen, 1997). Gosain (2004) argues that enterprise information systems can engender a duality: in the chartering and project phases, ERP acts as objects of institutional forces due to the introduction of new systems causing the institutional misalignments to be solved. In the shakeout, onward and upward phases, ERP exhibits as carriers of institutional logics to constrain organizational activities and shape the cognitive frames of organizational members.

Gosain’s (2004) conceptual research corresponds with the SST perspective, i.e. in the pre-implementation and implementation stage, ERP systems embedded with practices and social elements of the origin of systems encounter the institutional misalignments to be solved and are shaped by institutional forces of their implemented contexts. But in the post-implementation stage, ERP systems adapt to implemented organizations and demonstrate as carriers of institutional logics to shape the cognitive processes of organizational members and influence organizational activities.

**Organizational Learning**

Organizational learning is another appropriate lens for studying organizational change in ERP implementation. The relevant researches are tabulated in Table 4 below.
Table 4: A Dialectical Logic of Opposition in Organizational Learning

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<tr>
<th>Topic</th>
<th>A Dialectical Logic of Opposition</th>
<th>Opposing Forces</th>
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<tbody>
<tr>
<td>Antecedents of Knowledge Transfer from Consultants to Clients in Enterprise System Implementation (Ko et al., 2005)</td>
<td>Organizational learning/ Knowledge transfer</td>
<td>Antecedents of knowledge transfer consist of three types of factors</td>
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<tr>
<td></td>
<td></td>
<td>(1) communication factors</td>
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<td></td>
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<td>(2) knowledge factors</td>
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<td></td>
<td></td>
<td>(3) motivational factors</td>
</tr>
<tr>
<td>Implementation Partner Involvement and Knowledge Transfer in the Context of ERP Implementations (Haines et al., 2003)</td>
<td>Organizational learning/ Knowledge transfer</td>
<td>two types of knowledge transfer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1) methodology and technical knowledge as well as skills</td>
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<tr>
<td></td>
<td></td>
<td>(2) Knowledge is deeply embedded in complex social interactive relationships and have a property of stickiness within the organizations</td>
</tr>
<tr>
<td>Learning to Implement Enterprise Systems: An Exploratory Study of the Dialectics of Change (Robey et al., 2002)</td>
<td>Organizational learning/ knowledge barriers</td>
<td>two types of knowledge barriers:</td>
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<tr>
<td></td>
<td></td>
<td>(1) configuration knowledge barriers</td>
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<td></td>
<td></td>
<td>(2) assimilation knowledge barriers</td>
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<tr>
<td>An ERP Implementation Case Study from a Knowledge Transfer Perspective (Lee et al., 2000)</td>
<td>Organizational learning/ Knowledge transfer</td>
<td>three types of processes and two types of knowledge transfer:</td>
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<tr>
<td></td>
<td></td>
<td>(1) canonical processes (explicit knowledge transfer)</td>
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<td></td>
<td></td>
<td>(2) non-Canonical processes (tacit knowledge transfer)</td>
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<td></td>
<td></td>
<td>(3) integration process (a process of internalization)</td>
</tr>
<tr>
<td>Implementing Enterprise Resource Planning Systems: The Role of Learning from Failure (Scott et al., 2000)</td>
<td>Organizational learning/ Learning from failure</td>
<td>Learning from success encourages exploitation. Seeking to maintain the status quo (single-loop learning) and leading to reliable organizational responses. This situation is efficient in stable environment. Learning from failure encourages exploration Seeking to push the envelope (double-loop learning) and leading to an organization resilient to change. This situation is effective in changing environment.</td>
</tr>
</tbody>
</table>

Organizational learning is a process (Dodgson, 1993; Pentland, 1995), during which information and knowledge are acquired, created, interpreted, distributed, stored, and retrieved (Huber, 1991; Nonaka, 1994; Stein and Zwall, 1995), enables the acquisition of, access to and revision of organizational memory, and thereby provides direction to organizational action (Robey et al., 2002). Organizations may learn from their own experiences (experiential learning) or from the experiences of other organizations (vicarious learning) (Huber, 1991). The organizational learning process results in one of two potential types of outputs: exploitation and exploration (March, 1991). Exploitation derives from single-loop learning (March, 1991) and involves adaptive organizational learning (Fiol et al., 1985). Exploration derives from double-loop learning, requires unlearning (Hedberg, 1981) and involves creative organizational learning (Levitt et al., 1988; March, 1991; Robey et al., 1995). Attewell (1992) describes the IT adoption as a learning process. There is a close relationship between organizational learning and IT implementation (Pentland, 1995).

Organizational learning involving IT may take two quite different forms. Organizational learning occurs during implementation called learning-by-doing and learning takes place subsequent to the implementation called learning-by-using (Levitt et al., 1988). Learning-by-doing includes two types of organizational learning: a system that automates an existing business system will simply embed existing routines, procedures, rules, and assumptions in a single-loop learning environment and a system that makes explicit current assumptions, re-evaluates, and reformulates them will involve double-loop learning (Scott et al., 2000). In learning-by-using, the extent of the changes users experience will
depend on whether the new system involves single- or double-loop learning e.g. adopting ERP best practice to change organizational routines is the double-loop learning (Scott et al., 2000). The organizational learning process plays a critical role in shaping IT adoption results (Tippins et al., 2003).

In IT implementation, learning generally takes place in both the business and technological aspects. In ERP implementation, the integration of the software across functional areas renders the two aspects much more closely related and interdependent. In addition, ERP systems are much more complex and far-reaching in both implementing them due to the lack of requisite skills as well as knowledge and using them due to users’ adapting to the new system as well as changing to new ways of working (Scott et al., 2000). Organizations must undergo an intensive learning process enacted in ERP implementation, which organizational factors are explicitly linked with, to bridge the gap between what they have known and what the new technology requires them to know (Ke et al., 2006).

Scott et al. (2000) applies the “learning from failure” model to two ERP implementations, one of which fails while the other succeeds. The analysis reveals that the company following many of the tenets of the “learning from failure” model succeeds and its organizational learning is both single-loop exploitation and double-loop exploration while the other does not. The lessons learned from these two cases are as follows. Learning from failure encourages double-loop exploration and consequently leads to an organization resilient to change. This situation is effective in changing environment. To consider using a phased or roll-out strategy facilitates organizational learning and provides the opportunity for learning from small failures to leverage knowledge gained. In addition, both fostering an open organizational culture and encouraging open communications can facilitate organizational learning.

Because ERP systems different from the functionally-oriented systems are such complicated systems, organizations usually need partner with consultants who have expertise and experiences in the software and implementation to gain the necessary knowledge and skills. Thus, successful knowledge transfer from consultants to organization is critical to implement ERP systems effectively.

Ko et al. (2005) proposes knowledge transfer as the crucial aspects of IS implementation and integrates theory developed in other transfer contexts with those developed in the IS literature. They present three types of antecedents of knowledge transfer in ERP implementation: knowledge-related antecedents, motivational antecedents, and communication-related antecedents.

Haines et al. (2003) argues that during ERP system implementation hardly any organization has all the necessary knowledge in-house. Methodology and technical knowledge as well as skills needed during the implementation may well be provided and transferred by consultants. However, the knowledge and skills of playing the strategic roles in an implementation project should be in-house. To select “appropriate” consultants is important in successful ERP implementation. Expertise, experience, and costs are criteria commonly included in the evaluation of consultants, in addition to the consideration of the willingness and ability of consultants to transfer critical knowledge to the implementer.

All firms based on their dialectic learning process must overcome two types of knowledge barriers: configuration knowledge barriers and assimilation knowledge barriers during ERP implementation (Robey et al., 2002). Configuration knowledge barriers mainly compose of explicit knowledge. Assimilation knowledge barriers consist of tacit knowledge. Consultants and experts are hired to fill the knowledge gap in emerging technology. Companies often lack the technical know-how, while technical experts often are short of understanding of the business context.

Lee et al. (2000) conceptually identifies different types of knowledge transfer and knowledge transfer processes during an ERP implementation. Canonical processes (implementation stage) are visible, explicitly coded in the ERP software and explicit knowledge transfer is included.
Non-Canonical processes (conflict stage) are a difficult-to-migrate portion of organizational knowledge which is deeply embedded in complex interactive social relationships within the organizations, have a sticky property, and encompass tacit knowledge transfer. Integration process or a process of internalization represents the organizational capability to adjust the conflict and adapt to the new rules, which then provides a process-based competitive advantage.

Initially, the consultant primarily possesses technical knowledge, whereas the client primarily possesses business knowledge (Rus et al. 2002). Such knowledge asymmetry can create knowledge barriers that inhibit the adoption of complex technologies (Attewell 1992). In fact, hardly any organization can own all the necessary knowledge and skills in-house without external help during a successful ERP implementation. Choosing the right consultants and using their skills and knowledge appropriately, as well as transferring and retaining essential knowledge within the organization, is essential to the overall success of an ERP system implementation (Haines et al., 2003). Based on a knowledge transfer perspective, an organizational adaptive capability, and the introduction of a different knowledge structure, these standardized processes must be internalized into business routines that provide a competitive advantage.

Conclusions And Managerial Implications

The dialectical logic of opposition explains organizational change by identifying both the forces of promoting and impeding change to explain the diversity of the organizational consequences of IT. In the ERP implementation context, as IT’s role in organizational change, four organizational theories can be used: organizational politics, organizational culture, institutional theory, and organizational learning.

ERP packages are culture-laden business applications and the ERP vendors’ assumption of universal best practices for information management is questionable. Due to cultural differences, resources and policy constraints, global ERP vendors of world wide brand-name reputation are limited to simultaneously satisfy the local contingencies of different countries. These cross-cultural misfit issues may be worse in Asia as such business practices have evolved in a different cultural, economic, and regulatory context than the West. Corporate culture rather than national culture shows more association with ERP implementation problems. Both the country of origin of the ERP package and consultant quality play important roles in configuring a high-quality ERP system and alleviating the negative effects of misfit problems. In addition, international ERP vendors need to adapt their products and services to local strategies to fit foreign markets.

Gosain (2004) proposed the conceptual model that ERP systems can engender a duality: in the pre-implementation and implementation stages, corresponding with the SST perspective, ERP systems embedded with practices and social elements of the origin of systems encounter the institutional misalignments to be solved and are shaped by institutional forces of their implemented contexts. But in the post-implementation stage, ERP systems adapt to implemented organizations and demonstrate as carriers of institutional logics to shape the cognitive frames of organizational members and constrain organizational activities.

The organizational learning process plays a critical role in shaping IT adoption results. ERP implementation is much more difficult and far-reaching due to the lack of requisite skills and knowledge in both the closely related and interdependent business and technological aspects. Thus, organizational learning generally takes place in experiential learning or vicarious learning. An effective experiential learning strategy in ERP implementation is learning from failure which encourages double-loop exploration, in turn leads an organization resilient to change and seeks long-term success through
short-term failure. In addition, organizations usually adopt vicarious learning strategy to partner with consultants who have expertise and experiences in the software and implementation to gain the requisite knowledge and skills. Thus, successful knowledge transfer from consultants to organization is critical to implement ERP systems effectively.

In the ERP implementation context, initially the consultants primarily own methodology and technical knowledge, whereas the clients primarily possess business knowledge. Such knowledge asymmetry produces knowledge barriers inhibiting the adoption of complex business applications. Indeed, hardly can any organization have all the necessary knowledge and skills in-house without external help during a successful ERP implementation. Choosing the right consultants, using their skills as well as knowledge appropriately, and transferring as well as internalizing necessary knowledge within the organization, is essential to the overall success of an ERP system implementation. In addition, fostering an open culture and encouraging open communications can facilitate organizational learning.

In sum, four theoretical lenses of organizational politics, organizational culture, institutional theory, and organizational learning are utilized to analyze the complicated social interaction of organizational change derived from ERP implementation. Adopting vicarious learning strategy to partner with experienced implementation consultants and successful knowledge transfer plays a critical role in both overcoming knowledge barriers and mitigating misfit problems. It is very important that the research community have a complete understanding of what has been studied thus far and the extent to which it has been studied in order to design future studies that optimally contribute to our knowledge of organizational change in ERP implementation. In addition, this study can be beneficial to practitioners in sufficiently understanding the dialectical driving logics and mechanisms of organizational change imposed by ERP implementation and in relieving their burden in the black boxes of ERP implementation.

REFERENCES


