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Understanding Organizational Change and Misfits of Enterprise Resource Planning System: A Stage View of Context, Content, and Process Analysis

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Abstract

Adopting an enterprise resource planning (ERP) system has become a symbol that represents both business abilities and IT capabilities, as all ERP systems have inherent best practices of business models for diversified industries. However, misfits between the functionality offered by the package and that required by the firm are common problems when adopting an ERP system. Moreover, implementing packaged software necessitates disruptive organizational change and the degree of change is determined mostly by the resolution of “misfit” problems. This study draws upon data from two cases to understand the change dynamics and the misfits of adopting an ERP system from a stage view. The results reveal that industrial-, business-, and regulatory-specific misfits often occurred in the chartering phase; misfits of data, process, output, and schedule are the major problems in the project phase; misfits of information and new business requirements are the main concerns in the shakedown and onward and upward phases. Resolutions for and impacts of these misfits are addressed in the study.

Keywords: Enterprise Resource Planning Systems, Misfits, Organizational Change, Stage

1. Introduction

ERP research has become the important topic for both practitioners and academics (Hitt et al., 2002; Jacobs and Bendoly, 2003; Robey et al., 2002; Stratman and Roth, 2002). The immediate aspiration of raising IT capability and unsolved problems (e.g. incompatible legacy systems and systems integration) of current IS systems direct firms toward adopting the enterprise resource planning (ERP) system (Scott and Kaindl, 2000). The inherent best practices of business models for diversified industries raise the demand for the ERP system. Adopting an ERP system becomes a symbol that represents both business abilities and IT capabilities. The extent of business processes that ERP systems claim to support comprehensively covers all things to all people in a firm’s value-added chain (Scott and Kaindl, 2000). However, misfits between the functionality offered by the package and that required by the firm are common problems when adopting an ERP system (Soh et al., 2000). As a result, organizations have to decide their resolution strategies. These solutions may not just adopt the system’s functionality or customize the system. There are different considerations in different contexts and phases. Besides, the resolution of misfits also influences the extent of organizational change. Thus, this study draws upon data from two

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cases in Taiwan to understand the change dynamics and the misfits of adopting an ERP system from a stage view.

2. Conceptual Background

2.1 Content, Contextual, and Process Issues of Organizational Change from ERP

After reviewing the organizational change literature in the 1990s, Armenakis and Bedeian (1999) indicate that content, contextual, and process issues are common and relevant to all change efforts in responding to contemporary organizations. The content issues generally focus on the substance of organizational changes (Armenakis and Bedeian, 1999), i.e., the particular areas that firms may be seeking to change (Pettigrew, 1987). Inevitably, the content of any new change must entail managing its contexts and processes (Pettigrew, 1987). Inner and outer contexts form the conditions existing in an organization’s internal and external environments. The process of change addresses actions undertaken from the various interested parties (Pettigrew, 1987; Armenakis and Bedeian, 1999). These three broad analytical categories must be considered together to investigate their inter-connections (Pettigrew, 1987); however, previous research has generally tended to be limited in scope by focusing on one set of considerations or another (Armenakis and Bedeian, 1999). Thus, viewing the adoption of ERP system as the content of organizational change, this study tries to analyze it together with related contextual and process factors.

Implementing packaged software necessitates disruptive organizational change. The degree of change is determined mostly by the resolution of “misfit” problems when adopting a package. Misfits represent gaps between the functionality offered by the package and that required by the adopting organization (Lucas et al., 1988; Soh et al., 2000). They arise from company-specific, public sector-specific, or country-specific requirements that the capabilities of the package do not match and can be clustered into data (either format or relationship), process (functional access, control, or operational), and output (format or content) (Soh et al., 2000). The extreme sides of misfit resolution strategies, adopting the new process of best practices in ERP and customizing ERP to achieve required functionality, determine the content of change stemming from adopting ERP.

The content of change should be embedded in the original organizational system and melt into it; otherwise, the result of change will be failed. The context influences the realization of potential IT values because these conversion contingencies may create barriers to implement the change (Ash and Burn, 2003; Davern and Kauffman, 2000). Under this consideration, organizational change such as new IT adoption cannot be seen narrowly just as a rational and linear problem-solving process but should be dealt with continuity from political and culture views (Pettigrew, 1987). When the implementation of IS/IT is used for both automation and business process change like ERP systems, it involves the interplay of various groups pursuing different interests while exercising power (Cavaye and Christiansen, 1996).

The change process refers to the actions taken to achieve the intended change content and outcomes. It is important to establish good implementation steps to resolve possible resistance or any other problems. Galpin (1996) suggested a step by step process in organizational change: (1) establishing the need to change; (2) developing and disseminating a vision of a planned change; (3) diagnosing and analyzing the current situation; (4) generating recommendations; (5) detailing the recommendations; (6) pilot testing the recommendations; (7) preparing the recommendations for rollout; (8) rolling out the
recommendations; (9) measuring, reinforcing, and refining the change. By treating ERP adoption as organizational change, steps one to three are considered when a firm starts the idea to adopt an ERP system and survey a suitable package but not all the companies take these steps seriously; steps four to eight are the main tasks when performing the ERP project and almost all firms follow these processes with consultants; step nine is critical after the ERP system has gone live but may also be neglected as a final change step in many firms. Change environment and the management of business process change play an important role in producing ERP project outcomes and performance gains (Ash and Burn, 2003). A correct change process may create readiness for change so that resistance is minimized and may also facilitate the adoption and institutionalization of desired changes (Armenakis et al., 1999).

2.2 A Stage View of Organizational Change from ERP

Regarding organizational change as a continuous process in context, considering a time frame of analysis or conducting longitudinal research is the key to understanding the dynamics of change (Pettigrew, 1987; Pettigrew, 1990; Van de Ven and Huber, 1990; Armenakis et al., 1999). Holland and Light (2001) purposed a three-stage model of ERP systems use by evaluating five theoretical constructs: strategic use of IT; organizational sophistication; penetration of the ERP system; vision; and drivers and lessons. According to their research, most firms are in the second stage, which involves the post implementation exploitation of the ERP system and its widespread adoption throughout the organization. Few firms have achieved the third stage to realize the strategic potential of the ERP system and some are still in the stage of implementing the new ERP system.

ERP system adoption involves different phases in the whole life cycle. Markus and Tanis (2000) suggested four phases of the enterprise system experience cycle: the chartering phase; the project phase; the shakedown phase; and the onward and upward phase. The chartering phase is the stage of selecting, evaluating, and budgeting in the initial conditions to consider the use of the ERP system. The project phase is the main stage to conduct a formal ERP project with a well-established project team. The shakedown phase is the painful stage to get the ERP system into normal operations after going live. The onward and upward phase continues from normal operation until the system is replaced with an upgrade or different system, and this phase is the stage in which the organization can ascertain the benefits of the ERP system. This paper will follow this four-phase model to analyze the organizational change induced by the ERP system.

3. Research Methods

Case study analysis was chosen to investigate three research questions that are central to the understanding of what major factors influence the resolution strategies of misfit problems in each phase of ERP adoption and the resulting value, i.e.,

(1) What are the major misfit problems and the corresponding resolution strategies in each phase of ERP adoption?

(2) What factors determine these resolution strategies?

(3) What are the benefits or value generated from ERP?

Four criteria were used to select the sites for the case studies:

- The sites should adopt an ERP package from the same vendor to exclude the impact of functional differences between ERP packages.
- The sites should be in the same industry, so they face the same environmental change.
- The sites should have different contexts, especially the internal environment, in which the ERP software is implemented.
The sites should have finished the implementation and entered into the onward and upward phase so that the benefits of the system could be identified.

Two such sites were identified. Both are contract manufacturers in the electronic industry. They will be referred to as Company A and Company B because of the confidentiality concern. Data collection method used in-depth interview with the manager of information department in each company. They are both in charge of the ERP system and also key project members when implementing the system. Both managers have worked for the company for more than 5 years. The average interview time is about 2 hours for each person.

4. Research Findings: The Change and Misfits of ERP in Each Phase

4.1 Case Background

- **Case 1:** Company A is one of the world’s leading contract manufacturers providing foundry service in the electronic industry, with head-quarters in Taiwan. It has three main goals to achieve with its initial SAP (version 4.6) implementation: (i) to replace the legacy system, which is developed in-house, (ii) to integrate business process across functional units, (iii) to provide managers with easy access to decision-quality information. Key department users in this project are logistics- and finance/accounting-related staffs, e.g. accounting, material management, purchasing, etc.

- **Case 2:** Company B is also one of the world’s leading contract manufacturers providing foundry service in the electronic industry. It is also one of the initial adopters of SAP R/3 in Taiwan. As the legacy ERP package cannot support the changing business needs, this ERP project using SAP R/3 requires a more powerful, scalable, and extendible system to support new business solutions.

4.2 Chartering Phase

Evaluating and selecting an appropriate ERP package and a good consulting firm are the main activities in this phase for both companies before the budget and implementation schedule can be set. Gap analysis from an overall view is their common way to evaluate and select the ERP system. Friendly GUI, flexibility, extendability, and support of global operations are the main concerns to decide which ERP system is to adopt. After deciding the ERP system, choosing the modules to be implemented is the next step. Both companies gave up on modules related to sales, distribution, and production planning because the ERP system does not have the “best practice” for their industry and business model. According to Company B:

“The system is originally designed for assembly manufacturers, and thus cannot be applied to our build-to-order business model. It does not have the flexibility to support the simple request of two quantity units for the same product. Some module like asset management is partially utilized, because the cost calculation function does not fit our requirement. The reason is that the cost function is as complex as our manufacturing processes.”

In addition to the industrial- or business-specific misfits problems, Company A still considers other problems related to regulation, infrastructure, and security. The resolution strategies for these misfit problems are to select a most appropriate ERP system and adopt modules that the extent of misfits is within an acceptable scope. These resolutions are taken for the holistic consideration but do not resolve all of the misfit problems in the detailed level. Thus, many problems may occur in the subsequent phases.
4.3 Project Phase
In the project phase, a formal team consisted of consultants, IS specialists, programmers, and key users is formed as the task force. Both companies require fulltime involvement of the key users from different departments. The misfit problems are matched with Soh’s et al. (2000) data, process, and output categories except for the schedule misfit problem. Company A has to finish the implementation within half year set by the top manager. Comparing with Company B’s one year period, this seems to be a tough work. Under such time pressure, they tend to use the standard processes of the ERP system and to change their business processes. For more independent functions that need to be coded as add-on programs, they decide to implement them in the second phase, i.e., they are excluded in the half-year project scope and continued after the system has gone live.

4.4 Shakedown/Onward and Upward Phases
Because the shakedown phase last only two or three months for the two companies and is not easily separated from the onward and upward phase, these two phases are analyzed in combination. The major misfit problems are lack of decision-supported information for managerial use and insufficient support to the new business requirements and inter-department coordinating mechanisms. Company A described:

“The information for decision-making needs to be accurate and timely, but this should depend on the users in the process flows. The system requires the users to update data once events occurred, so the users in the first stage of any process flows may get heavy loading to key in the data for the use of other departments. It is hard to know whether they have already updated the data or not and this uncertainty makes the information unreliable.”

Company B is simply suffered from insufficient information provided by the system because decision-support information should combine cross-department and overall flow information. The system only focuses on the information at the operational level. This is resolved after the vendor provides OLAP and datawarehouse functions in other extended systems that can be upgraded and integrated with the ERP system.

The problems of misfit and the solutions in different phases are summarized in Table 1 based on the analysis of both Company A and Company B. Obviously, the resolution strategies for the misfit problems have different impact on organization and influence the degree of organizational change. The decisions in one phase may also affect those in the next phase. To analyze the change dynamics and problems in each phase help understanding how and why the change and misfit problems occurred.

5. Discussion and Conclusion
This research investigates the misfit problem of adopting an ERP system from a stage view and also analyzes the resultant organizational change based on the interview data of two cases. The industrial-, business-, and regulatory-specific misfits often occur in the chartering phase. Adopting selected modules of the ERP system may impact the integrity and completeness of the original system and create other problems in the following phases. Misfits of data, process, output, and schedule are the major problems in the project phase. Some of the process misfit problems are resulted from the decision of adopting only selected modules of
the ERP system in the previous phase. Add-on programs increase the maintenance cost in the next phase and changing business process increases user resistance. In the last two phases, misfits of information and new business requirements can be resolved by add-on programs or by the enhancement of the new version of the ERP system. The temporal sequence of events helps understanding the misfits of ERP system and the impact on organizations. Although this study has provided some preliminary evidence that different ERP project phases may experience different types of problems that need to be resolved with different resolution strategies, the generalizability of the implications is limited with only two cases. Future research could conduct more extensive and comprehensive empirical studies regarding the issues analyzed in this study.
<table>
<thead>
<tr>
<th>Phase</th>
<th>Misfits</th>
<th>Solutions</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Chartering</td>
<td>• ERP functions do not fit the industrial specific requirement</td>
<td>• Select the most appropriate ERP software</td>
<td>• Abandon to adopt ERP software if the misfit problems are serious</td>
</tr>
<tr>
<td></td>
<td>• ERP functions do not fit the business specific requirement</td>
<td>• Adopt only partial function modules of the ERP software</td>
<td>• Loss of some degree of the system integrity</td>
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<tr>
<td></td>
<td>• ERP functions do not fit the regulatory specific requirement</td>
<td>• Add-on programs</td>
<td>• Incomplete information in ERP systems</td>
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<tr>
<td></td>
<td>• ERP security do not fit the requirement</td>
<td>• Rewrite report</td>
<td>• Extra coding efforts of add-on programs</td>
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<tr>
<td></td>
<td>• ERP infrastructure do not fit the current architecture</td>
<td>• Change business processes to follow the ERP standards</td>
<td></td>
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<tr>
<td>Project</td>
<td>• The inconvenient input functions</td>
<td>• Create control-purpose reports and check key points manually</td>
<td>• Maintenance effort for add-on programs</td>
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<td></td>
<td>• Screen format</td>
<td>• Create mapping table to link old and new data</td>
<td>• Change user behaviors</td>
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<td></td>
<td>• Report</td>
<td>• Go live by functions by phases</td>
<td>• The risk of errors from manual control</td>
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<td></td>
<td>• Flow control</td>
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<td>• Sacrifice operational convenience of end users</td>
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<td>• Business process</td>
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<td>• Insufficient functions</td>
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<td>• Data length</td>
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<td>• Schedule</td>
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<tr>
<td>Shakedown/Onward &amp; Upward</td>
<td>• Insufficient information for decision-level usage</td>
<td>• Add-on programs to provide integrated information</td>
<td>• Maintenance cost</td>
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<td>• The functions do not fit the new business requirements</td>
<td>• Enhance function when upgrade to new version which supports the requirement</td>
<td>• Over-dependent on the ERP vendor</td>
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<td></td>
<td>• Information processing mechanism does not fit the Inter-department coordinating mechanism</td>
<td>• Many users use only one account</td>
<td>• The problems of responsibility and security result from shared account</td>
</tr>
<tr>
<td></td>
<td>• The gap between license fee and limited budget</td>
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References