# CIO's Perspectives of Critical Issues in ERP Upgrade

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## INTRODUCTION

Enterprise systems have spread rapidly among organizations. According to AMR research (2005), ERP market size was $47.88 Billion in 2004. Although ERP systems offer a great deal, implementation success is far from assured. Statistics show that more than 70% of ERP implementations fail to achieve their corporate goals (Standish Group, 2004) and the number of horror stories about failed or out-of-control projects is growing (Olson, 2004). To deeply understand ERP systems, many researchers are working on this topic and hundreds of ERP research was published in last eight years. However, recent review (Botta-Genoulaz et al., 2005) suggests that most existing ERP research focuses on selection and implementation, not on ERP's post-implementation impacts.

Selection and implementation are critical areas, and numerous valuable insights have been studied by many researchers (Quiescenti, et al., 2006; and Wang, et al., 2006). According to Staehr et al. (2002), the ultimate impacts of ERP on the organization – once the system has been implemented and has been "shaken down" – are not as thoroughly researched. Therefore, understanding post-implementation of ERP will help organizations succeed longer after the ERP implementation. ERP upgrade is one of the major activities in the post-implementation stage of ERP implementation (Nah et al. 2001). Every three years, a major ERP upgrade and several small upgrades are typically needed to keep the system running smoothly. Organizations will spend a significant amount of money on each ERP upgrade project. Without comprehensive understanding of ERP upgrade concepts in the organizational environment may lead to terrible nightmares, and even result in irretrievable disaster. Therefore, the aim of this research focuses on what factors are associated with ERP upgrade success.

There are several reasons why this study is important. First, each ERP upgrade project costs a significant amount of money. For example, a Midwest university spent over $2 million on a recent ERP upgrade project. While the initial ERP implementation happens only once, ERP upgrades will happen many times after the first ERP implementation (probably once every three years).  Therefore, the cost of ERP upgrade is continuous along with the usage of the ERP system in the organization.

Second, according to our literature review through over forty IS top journals in last decade, relatively little research attention has been given to ERP software upgrade. One possible reason could be that upgrade is perceived a smaller project (compared to first time ERP implementation), and another reason could be that little theory has been developed regarding the topic of ERP upgrade. However, ERP upgrade is one of the important activities in the ERP software lifecycle, and an effective and efficient implementation of ERP upgrade has a tremendous impact on an organization's continuous business process improvement.

Third, little progress has been made in identifying relative importance of success factors in each ERP upgrade stage. Understanding the relative importance of success factors in each stage can help IT managers emphasize on dominant issues during the ERP upgrade projects. Especially when there are needs to make decisions about trade-offs among different upgrade activities, IT managers can focus on the most important factors other than less important factors in each upgrade stage.

## ERP UPGRADE

ERP upgrades are mainly intended to take advantage of new technologies and business strategies to ensure that the organization keeps up with the latest business development trends. Therefore, the decision to upgrade ERP is usually not driven by code deterioration or anticipated reduction in maintenance costs alone, but by different purposes. According to an AMR study (Swanton, 2004), 55% of upgrades were voluntary business improvements triggered by the need for new functionality, expansion or consolidation of systems; 24% of upgrades were triggered by technology stack changes; 15% of upgrades were forced by de-support of the running version of software to avoid vendor support termination (Craig, 1999); and 6% of upgrades were triggered by bug fixes or statutory changes.

The cost of ERP upgrades is high (Montgomery, 2004). Swanton (2004) mentioned that the cost of each upgrade includes: 50% of the original software license fee and 20% of the original implementation cost per user, which means over 6 million dollars for a 5,000-user system. Typically, each ERP upgrade requires eight to nine months of effort with a team the equivalent of one full-time employee per 35 business users. The ERP-adopting organization does not have to develop and re-write the ERP system itself but rather it replaces (or upgrades) the old version with a readily available new version from the ERP vendor. However, a lack of experience may cause the costs and length of the upgrade project to approach or even exceed those of the original ERP implementation effort. Collins (1999) listed some general benefits for organizations from ERP upgrades:

- Eligibility for Help Desk Support: Most of ERP software vendors stop providing technical support 12 to 18 months after the next version becomes available. Therefore, keeping upgrade with the pace of ERP vendors will guarantee the support for the system from the vendors.
- Solutions for Outstanding "Bugs" or Design Weaknesses: It is impossible to guarantee spotless and error-free ERP systems after the implementations even though vendors will conduct many different testing processes to eliminate the happenings of errors in the system before the leasing time. "The majority of software bugs are resolved and delivered either fix-by-fix, or all-at-once as part of the next release version of the ERP package." In this case, upgrades will be beneficial to the organizations in problem solving.
- New, Expanded, or Improved Features: ERP software provides organizations with the knowledge and strength (i.e. best practices) from the vendors. ERP upgrades provide organizations future enhancement from the vendors to give the organizations better opportunities to catch up the current business development, improve their processes and build more efficient business models with new functions, new features and new processing styles provided in the upgraded ERP versions.

This study seeks to provide a comprehensive understanding of ERP upgrade by interviewing CIOs in different organizations according to their experiences from their organizations' ERP upgrade projects.

## METHOD AND ANALYSIS

This study uses an in-depth semi-structured interview technique to examine the success factors in ERP upgrade. This method allows a more spontaneous, informal and broader examination into the specific experiences of the interviewees in relation to the topic, which can be useful in identifying factors of influence that previously have not been examined (Taylor and Bogdan, 1984).

To ensure better results, we used only those companies who reported that their organization's ERP upgrade was completed the previous year or this year. By excluding organizations who completed ERP upgrade over two years, 15 CIOs were interviewed. A wide variety of industries were represented in the responses. Characteristics of the organizations are shown in Table 1. The purpose of this study is to gain an initial understanding of key factors in ERP upgrades.

Semi-structured interviews were audio-taped and later transcribed verbatim in preparation for analysis. In analyzing the data, Miles and Huberman's (1994)

*Table 1. Sample demographics*

| Organization | Industry Sector | Annual Gross Revenue | Number of employees | ERP Vendor |
|---|---|---|---|---|
| A | Industrial Manufacturing | 9 Billion | 60,000 | JD Edwards |
| B | Public Sector | 1 Billion | 3,000 | JD Edwards |
| C | Consumer Products | 3 Billion | 6,500 | Oracle |
| D | High Technology | 1.1 Billion | 2,000 | Oracle |
| E | Agriculture | 100 Million | 200 | Oracle |
| F | Education | 500 Million | 6,000 | PeopleSoft |
| G | Healthcare | 850 Million | 6,000 | PeopleSoft |
| H | Education | 800 Million | 11,000 | SAP |
| I | Industrial Manufacturing | 2.6 Billion | 24,400 | SAP |
| J | Industrial Manufacturing | 19 Billion | 84,000 | SAP |
| K | High Technology | 200 Million | 200 | SAP |
| L | Utilities | 200 Million | 1,100 | SAP |
| M | Bank | 1 Billion | 86,000 | SAP |
| N | Distillery | 2.7 Billion | 3,400 | SAP |
| O | Industrial Manufacturing | 100 Million | 100 | Syspro |

method was followed. That is, two researchers coded data independently. In the first phase, each coder read the transcripts to identify the key factors using qualitative classification. In the second phase, subcategories were identified to further the understanding of the layers of factors within each category. In the last phase, each factor was weighed by counting the number of respondents who provided the same or similar answers or emphasized similar themes.

Several strategies were used to ensure the reliability and validity of the analyses. The use of two independent coders ensured convergence in interpretation. Member checks as proposed by Maxwell (1996) were used by sending research findings to all participants. All of the participants concurred with the interpretation of the data gathered from their own interview.

## RESULTS

Eight themes emerged from the coding and analysis of the qualitative interview data: Business vision, communications, consultants, customization, project management, top management support, training and education, and user involvement.

### Business Vision

It is important that the organization has a clear sense of whom and what it is before implementing an ERP project (Cotteleer & Bendoly, 2006). Business vision concerns project goals clarification and their congruence with the organizational mission, business objectives and management expectations of the IT project. All the CIOs believe that "ERP upgrade should have a clearly defined business vision/mission to serve as a blueprint for organizations' success." It is a common knowledge that the first phase of an IT project starts with a conceptualization of goals (Mandal & Gunasekaran, 2003). Further more, the CIO from organization A mentioned that "careful deliberation of success measurement as well as management of expectation by the project manager of IT projects is important factor influencing the success of the project."

ERP projects could suffer a huge disaster without a clear business direction (Cotteleer & Bendoly, 2006). This can be approved by past ERP project failures resulted by inadequately defined business visions (Ehie & Madsen, 2005). A clear business vision remains important through all stages of the implementation life cycle (Loh & Koh, 2004). The vision should provide a direction and general objective, and no details are required (Al-Mudimigh et al. 2001).

### Communication

One major purpose of communication is to inform every level in the organization about the expectations or goals of the change (Huang et al., 2004). Communication involves messages about why change was needed, what the "to be" environment will look like, and what will happen if change does not occur. All the CIOs described positive perspectives about communications. The CIO from organization F emphasized that "Building a complete and convenient communication system for employees was found to be the best way to avoid various communication failures in the organization." Researchers have identified communication as a critical success factor influencing organizational projects (Holsapple & Sena, 2005). Poor communication among reengineering team members and outside organizational members could cause a failure result of project implementations (Belout & Gauvreau, 2004).

Communication should not occur only within a small group of project team members. Frequent interlocking discussions between different functional teams should also be scheduled (Tsai et al., 2005). Given an example, the CIO from organization J mentioned that "We offered employees a good e-mail system, and also created many telephone and face-to-face opportunities for all employees to gain information about ERP changes. So users can share and exchange their education, knowledge, and information quickly and conveniently."

### Consultants

Due to the complexities of ERP projects, most organizations will hire consultants. Consultants may have experience in specific industries, comprehensive knowledge about certain ERP packages or modules, and may be able to help organizations make best decisions in different situation during the implementation of ERP projects (Ehie & Madsen, 2005).

Most of the CIOs mentioned that the cost of hiring consultants can consume more than 30 percent of the overall budget for their ERP upgrade projects. The CIO from organization B displayed a positive perspective on consultants, "I think the success of an ERP upgrade project depends on the capabilities of consultants based on their knowledge of the ERP system. We delayed our upgrade project for 4 months because of the consultants. We replaced our consults three times and that's a nightmare for us during the ERP upgrade." Therefore, organizations should manage and monitor it very carefully by determining the number, how and where to use external consultants appropriate to the ERP projects needs (Botta-Genoulaz et al., 2005).

## Customization

Even with today's state of the art technology, organizations find that not all their requirements are provided by the ERP systems they adopt. One of the major challenge an adopting organization faces while configuring an ERP system is that software does not fit all their demands (Kumar et al., 2003).

In ERP projects, customization includes two types of activities: configuration and modification. Configuration is a customization that organizations make decisions on all the functional choices designed by ERP vendors in the ERP packages. Modification is a customization that organizations try to modify the ERP vendors' code to build new functions in the ERP packages.

Since customizations are usually associated with increased information systems costs, longer implementation time, and the inability to benefit from vendor software maintenance and upgrades (Loh & Koh, 2004), customization should only be requested when essential or when the competitive advantage derived from using non-standard processing can be clearly demonstrated (Light, 2005). The CIO from organization C declared that "Organizations should try to adopt the processes and options built into the ERP, rather than seek to modify the ERP to fit the particular business practices."

## Project Management

Project management is a key to the success of any large project (Kumar et al., 2003). 15 CIOs mentioned project management 37 times during the interviews. Proper management of scope is critical to avoid schedule delays and cost overruns (Tsai et al., 2005).

The vast combination of hardware and software and the myriad of organizational, human and political issues make many ERP projects huge and inherently complex, requiring new project management skills (Ryan, 1999). According to the CIO from organization D, "a better project management can ensure a better upgrade plan and lead you to the right direction in the next couples of months during the upgrade. One of the reasons we delayed our ERP upgrade for two and half months and spent a half more millions dollars is because we underestimated the importance of project management."

## Top Management Support

The commitment of top management to the diffusion of innovations throughout an organization has been well documented (Mabert et al., 2003). In particular, early in a project's life, no single factor is as predictive of its success as the support of top management (Sun et al., 2005). The support of the top management will help focus efforts toward the realization of organizational benefits and lend credibility to functional managers responsible for its implementation and use (Tsai et al., 2005).

All the CIOs emphasized that top management support is critical. The CIO from organization H stated that "it empowered IT team to be flexible in upgrading." Research on project failures also shows that project cancellations occur when senior management delegates progress monitoring and decisions at critical junctures of the project to technical experts (Tchokogue et al., 2005).

## Training & Education

The lack of user training and education has been one of the significant determinants of many ERP systems failure (Gupta, 2000). End users will become frustrated and refuse to use the system if they do not know exactly what happens in the processes (Tsai et al., 2005). To describe the problems his team faced during the ERP upgrade, the CIO from organization M mentioned that "training was a problem. It was a logistic problem in terms of getting enough classroom space and balancing the number of instructors and classroom space versus when we were going to take the system live. Some of the earlier classes had empty seats and some of the late classes had demand that exceeded our capacity. In a perfect world we would have had more training, especially when we went live, or perhaps even try to break up the go live."

ERP implementation requires a critical mass of knowledge to enable people to solve problems within the framework of the system. If the employees do not understand how a system works, they will invent their own processes using those parts of the system they are able to manipulate (Al-Mashari et al., 2003; Mabert et al., 2003; Dowlatshahi, 2005).

## User Involvement

User involvement refers to participation in the system development and implementation processes by representatives of the target user groups. System implementation represents a threat to users' perceptions of control over their work and a period of transition during which users must cope with differences between old and new work systems (Wu & Wang, 2006). According to the CIO from organization I, "user involvement is effective because it restores or enhances perceived control trough participating the whole project plan. The organization should have an implementation process that strives for a high level of user acceptance early on through the use of constant presumptive end user consultations."

## CONCLUSIONS

ERP upgrade projects have grown in importance, as vendors are seeking to generate revenue through improved systems. The reticence of vendors to support old systems was noted by multiple organizations in this study. (The value of improved functionality was also noted.) Upgrade projects seem to be much more controllable than initial ERP installation projects. This should be expected due to the experience organizations gain with their original systems.

This study aims to improve understanding of ERP upgrade. 15 CIOs from a wide variety of industries were interviewed. Qualitative data were analyzed and themes were developed from the data. In essence, the paper recognizes a series of critical issues that must be carefully considered to ensure successful implementation of an ERP upgrade project. These factors, business vision, communication, customization, external support, project management, top management support, training and education, and user involvement, are teamed together to build a complete picture of ERP upgrade. This picture makes a worthwhile contribution since it has clearly identified factors that are influencing ERP upgrade and gives important implications to those CIOs and IT manager who are implementing or will implement ERP upgrade projects. With knowledge of these eight factors, CIOs and IT managers can avoid underestimating or overestimating some factors during their ERP upgrade.

Further more, adhering to the various levels of application of ERP systems will ensure that organizations can derive maximum benefits from ERP systems after upgrading, and that the decision-making process and the flow of information happen in a seamless, corporate-wide perspective.

Since this research is a qualitative study, it is recommended that future studies apply quantitative methods to evaluate the results from this study.

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