ERP IMPLEMENTATION: EXAMINING INTERDEPENDENCIES AMONG PRE-IMPLEMENTATION, IMPLEMENTATION, AND POST IMPLEMENTATION PHASES

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Abstract: This research investigates organizational strategic alignment and managerial decisions during pre-implementation, implementation, and post-implementation of Enterprise Resource Planning (ERP) systems. Knowing that each phase has its inherent complexities, we investigate substantial interdependency between these phases and try connecting the dots of decisions and actions of a phase with the results, decisions, and actions of the next phase. We present two cases of ERP implementation by companies in Saudi Arabia. Case framework takes factors like management style and culture in to consideration.

INTRODUCTION

ERP systems enable a company to increase productivity of the workforce by streamlining business functions, eliminating information silos or incompatible legacy systems, and providing key workers with the information they need to make business-critical decisions (Holsapple & Sena, 2003; Wallace & Kremzar, 2001).

ERP systems are highly complex and difficult to implement (Xue, Liang, Boulton, and Snyder, 2005), and often require long implementation time and significant resources. Over the years, many companies have successfully implemented ERP systems and many faced implementation failure (Shirouyehzad, Dabestani, Badakhshian, 2011; Chen, Yang, 2009; Gargeya, Brady, 2005; Barker, Frolick, 2003; Markus, Axline, Petrie, & Tanis, 2000). Common Information Technology implementation success factors such as, top management support, user involvement, technically sound systems, user friendliness, etc. have been mentioned by Markus (1983) several decades ago.

This research focuses on the dynamic interaction between pre-implementation, implementation, and post-implementation factors. We worked with two Saudi companies to examine dynamic relationships among variables in three implementation stages. In addition, the success or failure of ERP implementation is analyzed in the context of culture and management style of the organization. Case study research approach is a popular approach and examples of information systems case studies are plentiful (Venugopal and Rao, 2011; Okunoye, Frolick, and Crable, 2006; Xue et al., 2005; Parr and Shanks, 2000; Keil, 1995; Yin, 1993; Lee, 1989; Benbasat, Goldstein, and Mead, M., 1987; Markus, 1983). It has been identified by researchers that ERP success is harder to achieve when cultural issues are involved (Xue et al., 2005). Since most ERP systems that are competing for market share in the Middle East are designed by western software developers, it is possible that organizational, cultural, and managerial difference may dictate implementation process a certain way. Therefore, we believe that understanding the intricacies of ERP implementation in the Middle East may lead to some success/failure factors that are different from the success/failure factors applicable for western companies.

The rest of the article is organized as follows. Next section looks at the global and Middle Eastern ERP market followed by the Theoretical model. Cases are presented in the third section. Conclusion of the report is provided in the Final section.

ERP MARKET

According to a published research by Forrester, global ERP market size was $43 billion in 2010 and $40.6 billion in 2009 and expected to grow to 50.3 billion by 2015 (CBR, 2011). Table 1 shows top 10 ERP vendors ranked by application revenue, 2005-2006 (Jacobson, S., Shepherd, J., D'Aquila, M., and Carter, K., 2007). Top 5 ERP vendors ranked by license revenue (2005-2006) were SAP, Oracle, Sage Group, Microsoft, and Infor (Jacobson et al., 2007). The key driving factors behind ERP implementation are operational and technological (Al-Mashari, Al-Mudimigh, & Zairi, 2003).

Table 1. Top 10 ERP vendors ranked by application revenue, 2005-2006 (AMR Research, 2007)

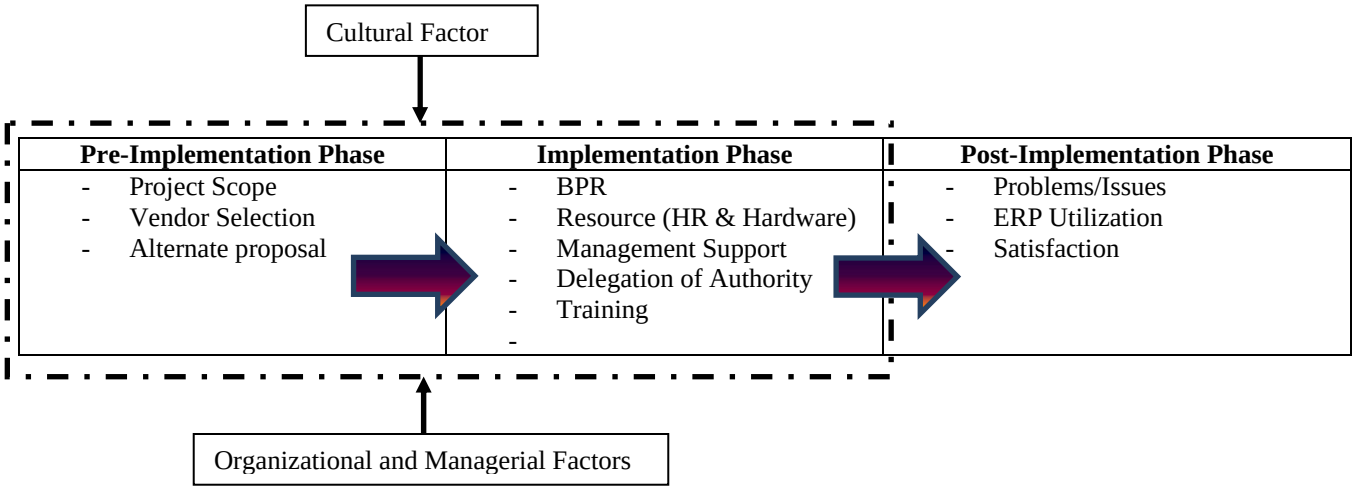
2006 Revenue Rank	Company	Revenue, 2005 ($M)	Revenue, 2006 ($M)	Revenue Share, 2005	Revenue Share, 2006	Growth Rate, 2005- 2006
1	SAP	10542	11753	42%	21%	17%
2	Oracle	5166	6044	20%	21%	17%
3	Infor	480	2114	2%	7%	340%
4	Sage Group	1438	1830	6%	6%	27%
5	Microsoft	844	996	3%	3%	18%
6	Lawson	346	560	1%	2%	62%
7	Epicor	291	384	1%	1%	32%
8	IFS	279	309	1%	1%	11%
9	Exact Software	281	303	1%	1%	8%
10	Activant	260	289	1%	1%	11%

The companies in the Middle East are also recognizing the fundamental appeal of ERP systems. Undeniably, the ERP adoptions by Middle Eastern companies have gone up significantly in recent years. According to Middle East based Madar Research Group, ERP sector in the Gulf Cooperation Council (GCC) countries in 2003 was worth US$134 million (AMEinfo.com, 2004), while online technology news group zdnet.com (http://www.zdnet.com) puts the figure for 2006 at $206 million.

RESEARCH MODEL

As mentioned before, main components of the research model consists of three phases. Important contextual factors for each phase are identified and provided in Figure 1. Cultural, organizational, and managerial factors influence all three phases; however, we believe that the influence of these three factors in pre-implementation and implementation phases mainly dictate the outcome in the post-implementation phase. Western management style is generally 'participative' while Middle Eastern management style is largely paternalistic and supported by greater power distance between managers and workers. Earlier research by Cheng & Bolon (1993) suggests that firms which tend to employ Western management style favor allowing workers to enhance their professional skills. On the other hand, Thompson (1965) found that the centralized management style could impede individual creativity and thereby, inhibit the development of professional skills.

Figure 1. Research Model



CASE STUDIES

Two ERP implementation cases are examined. These cases include a petrochemical company (identified as 'Company A') and an Aluminum manufacturing & installation company (identified as 'Company B'). Data for these cases were collected from senior Information Technology as well as other managers of respective companies. Company documents were examined and few interviews were conducted in the process.

CASE 1: COMPANY A

Company A is a privately owned limited liability company (LLC) headquartered in Eastern Province of Saudi Arabia and operates throughout the Kingdom. The company was established in late 90s and currently has more than 200 gas stations around the country. The main products and services of the company include Distribution of Petrol, Diesel and Car Care products. The company has between 550 to 600 employees.

Implementation Objectives

Objectives behind ERP implementation were to integrate costing, budgeting, purchasing functions and to bring operations of satellite stations under one umbrella. Inventory, payroll, and Human Resource (HR) management automation were also other driving factors behind ERP implementation. The chairman of the company was interested in various summary reports and the directors needed forecasting capabilities. Reporting and forecasting capability was not available in the current system.

At the beginning, the company considered developing a customized software instead of purchasing a commercial off-the-self ERP system. However, after much deliberation, the company settled in on Oracle E-Business Suite. Implementation phase was 6 months long. Implementation cost figure was not available.

Pre-Implementation Phase

After approving the initial proposal, company owners downsized the implementation scope to cut down implementation cost. Vendor selection was also influenced by the owner. Management approved spending on required hardware purchase and network enhancement. Hardware and network components that were added for the project are shown below:

- 31 Desktop (16 in HQ and 5 in each branch office), 9 Printers
- Oracle Application Server
- 100 Mbps Ethernet LAN within HQ
- 8 Mbps WAN Connection with branch offices

Implementation Phase

In some cases top management were not ready to implement business process reengineering (BPR) to adjust or modify business rules required by the ERP system. Even after recommendations from consultants, company owners were not interested in recruiting required number of IT personnel for administration and maintenance of the ERP system. In some occasions, owners and the top management failed to delegate authorities to the middle and lower management. Middle Management did not cooperate as expected. Top management reduced total hours of staff training to cut cost.

Post-Implementation Phase

After implementation, the ERP system, for a certain period of time, was blamed for poor organizational work efficiency. As a result, ERP modules were not fully utilized. The Oracle database backup failed multiple times and the IT Manager was unable to solve the issue at the begining.

Analysis

Reasons that outcomes of the implementation was not satisfactory are both cultural and managerial. As mentioned before Middle Eastern culture is largely paternalistic and the influence of paternalistic culture can also be seen in autocratic management style. Accumulative effects of several management decisions such as, decisions against BPR that was required by the Oracle E-Business Suite, not recruiting adequate number of IT personnel, not providing adequate training, not delegating some authority to lower level management attributed to the unsatisfactory results in the post-implementation phase. The case shows existence of greater power distance between managers and workers.

CASE 2: COMPANY B

The Company is one of the leading Aluminum Manufacturing & Installation Companies in Saudi Arabia. The Company manufactures and fabricates aluminum sheets and bars and other aluminum related products. The company was established in late 90s due to a spin-off action by the original Aluminum Company. The main aluminum plant, fabrication factory, central warehouse and the corporate head quarter of the company all are located in the Eastern Province of Saudi Arabia. The company does not have any branch office; however, it manages three other warehouses located in the Central, Western and Southern Region. The company has between 250 to 300 employees.

Implementation Objectives

ERP implementation objectives were to replace the existing stand-alone production management package, introduce an efficient project management solution, and to replace the isolated Inventory package with an appropriate high-tech integrated Enterprise Resource Solution. Company B was also interested in factory automation, forecasting, payroll, and biometric access control device. The company selected Epicor ERP Solutions. Implementation phase went on for about 8 months. Implementation cost figure was not available.

Pre-Implementation Phase

After signing agreement with Epicor, top management proposed to replace Epicor ERP by Oracle E-business suite. However, the proposal was not successful. Management approved spending on required hardware purchase and network enhancement. Hardware and network components that were added for the project are shown below:

- 37 Desktop, 4 Plotters, 18 Printers
- MS Office, Auto CAD, 3D MAX
- 1000 Mbps Ethernet LAN within HQ with IEEE 802.11g Wireless
- Servers required for the Epicor ERP systems

Implementation Phase

Major BPR initiatives were approved by the management while a few minor business processes adjustments had not been approved. Management allowed hiring of recommended number of IT personnel. Middle management was not comfortable with the idea of allowing lower level management make financial decisions, therefore, minimum financial authorities to lower management were not delegated. The project was affected due to delay in payment to ERP vendor. Adequate and timely employee training was arranged and completed by the organization.

Post-Implementation Phase

In this case, Company B experienced a highly satisfactory post-implementation phase. No major technical or operational problems were detected after the implementation of Epicor ERP systems. As an evidence of successful implementation, the major components of the system were fully utilized. Top management agreed that the system increased overall business efficiency.

Analysis

Despite largely autocratic managerial style, Company B's ERP implementation was successful. Several critical decisions were responsible behind the success; first, BPR was allowed to match Epicor business functions; second, management allowed hiring of recommended number of IT personnel; third, adequate and timely employee training was provided. Even though financial authority was not delegated to lower level managers, at the end, the project was deemed successful.

CONCLUSIONS

The results of this study have implications for both academics and practitioners. For academics, this research provides real-world examples of interdependencies among ERP implementation factors in different stages of implementation. The whole process is affected by management style, organizational and regional culture. This research attempts to highlight ERP implementation concerns in the industries in another part of the world.

Findings of this research can help practitioners compare implementation issues in Middle Eastern companies with that of Western Companies, and thereby, lead to better planning and preparation. The findings in two cases suggest that BPR initiatives, appropriate employee training, and hiring of right people are key for the successful ERP implementation.

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