Enterprise Resources Planning Systems Implementation Success In China

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Abstract

ERP (Enterprise Resources Planning) plays an important role in today's enterprise management and is beginning to be the backbone of organizations. However, the successful implementation rate is low and many firms did not achieve intended goals in China. This article is focused on important critical success factors (CSFs) of ERP implementation and discusses the Chinese ERP market. This paper also has been to examine the reasons for the Multinational Corporation to apply ERP systems and its main function. An experience survey using a questionnaire within five companies with 115 respondents in Shanghai city in China.

Keywords: Enterprise Resources Planning; China; Implementation; Critical Success Factors.

1. INTRODUCTION

ERP is a high technical cross-functional information system which is designed to improve organizational performance and competitiveness by streamlining business processes and eliminating duplication of work and data (Kwahk and Ahn, 2010). Many businesses have adopted ERP as a tool to achieve strategic competitive advantages (Ngai et al., 2008). Somers and Nelson (2004) have investigated the temporal importance of CSF over the ERP project life cycle and Akkermans and Helden (2002) examined whether these factors are interrelated with each other. Nowadays, ERP systems have become very important in modern business operations and ERP market is expected to recover from the sharp downturn in 2000 and 2001 (Clouther, 2002). The ARC Advisory Group estimates that the total ERP market in 2006 was $18.4 billion with an annual growth of the market to the level of 6.7%. It means that by 2011 the value of the market will have reached $24 billion.

A research has been done on factors that affect the implementation process to identify the critical success factors that are necessary for successful ERP implementation in Chinese companies.

2. LITERATURE REVIEW

ERP is a high technical cross-functional information system which is designed to improve organizational performance and competitiveness by streamlining business processes and eliminating duplication of work and data (Kwahk and Ahn, 2010). ERP provides 3 major advantages including: automation and integration of business processes; availability of common data and business practices throughout the organization, and the generation of information in real time (Heizer and Render, 2008). Many businesses have adopted ERP as a tool to achieve strategic competitive advantages (Ngai et al., 2008). Despite of extensive advantages of ERP systems, its implementation is not straightforward and involves significant risks (Malhotra and Temponi, 2010). ERP implementation projects need to be controlled. ERP implementation system is significantly different from a traditional system implementation (Grabski and Leech, 2007). Adopting firms expect ERP systems to improve operating performance and ultimately financial performance (Kallunki et al. 2010). However, history shows that the successful implementation and integration rate remains fairly low and many enterprises that have gained some benefits from ERP implementation have not exploited the software’s full potential (Ge and Voß 2009; Zabjek et al. 2009).

In response to a changing global marketplace, most Fortune 500 companies have implemented ERP systems over the last 10 years and reaped strategic benefits (Monk and Wagner, 2009). ERP implementation first occurred in China in the 1980’s and companies like SAP AG have been in the market for over 10 years (Hartung,
Today, ERP implementation is China still faces major challenges due to China-unique cultural factors (Avison and Malaurent, 2007). New brain research has found that culture can affect not just customs and language, but how people look at the world on a basic level (Goldberg, 2008). The study of Hong and Kim (2002) has defined the success in terms of achievement of predetermined goals regarding cost overrun, schedule overrun, system performance deficit and failure to achieve expected benefits.

3. THE MAIN FUNCTION OF ’ERP’

In the past decade the business environment has changed dramatically. The world has become a small and very dynamic marketplace. Organizations today confront new markets, new competition and increasing customer expectations. This has put a tremendous demand on manufacturers to: 1) Lower total costs in the complete supply chain 2) Shorten throughput times 3) Reduce stock to a minimum 4) Enlarge product assortment 5) Improve Product quality 6) Provide more reliable delivery dates and higher service to the customer 7) Efficiently coordinate global demand, supply and production. Thus today’s organization has to constantly re-engineer their business practices and procedures to be more and more responsive to customers and competition. In the 1990’s Information technology and Business Process re-engineering, used in conjunction with each other, have emerged as important tools which give organizations the leading edge.

The functions of ERP software should be divided into two parts: basic and extended functions. The basic function is essential for all ERP software as the "entry" function, which emphasizes integrating all activities within the value chain. Extended function can make integration form upstream (suppliers) to downstream (clients) of supply chain. The integration of information system of back-end vendors belongs to the function of Supply Chain Management (SCM). The integration of information of front- end clients belongs to the function of Customer Relationship Management, CRM, Sales Force Automation (SFA) and Electronic Commerce (EC). The functions mentioned above are required functions of ERP software. In addition, in view of the characteristics of different industries, the software companies can adjust and supply some functions according to their own understanding of ERP.

4. REASONS FOR THE MULTINATIONAL CORPORATION TO GO ’ERP’

Initially, in the mid- and late- 1990s, Y2K compliance has been a major concern for many companies as well as the wish to replace the existing and poor quality systems. However, the major reasons driving companies to choose ERP are related to improve firm’s performance and decision making, to reduce labor costs, bureaucracy and errors.

Other reasons are: pressure from the side of the competitors, business partner requirements wishing to receive faster service, integration between units, organizational standardization across different locations and globalization of businesses. Acquisitions and mergers between the units are forcing companies to change and function as a one system. However, for each companies the motivations for implementing ERP are different as well as their priority order depends from the nature of the projects.

O’Leary (2000) has grouped the reasons into four types of categories: technology, business practices, strategic and competitive. Holland et al (1999) have recognized three main dimensions: technical, operational and strategic. Some studies narrow the reasons down even to broader groups: technological and business performance. Based on the literature, the foremost reasons that have caused a fast growth in the use of ERP systems can be summarized as follows:

- Technical
  - a need for a common platform and replacement of an existing IT infrastructure
  - an incompatibility of several information systems

- Operational
  - process improvement
  - data visibility
  - operating cost reduction

- Strategic
China is becoming one of the major destinations for the multinational companies, who are looking for expansion of their business operations. The increase of global operations in China is leading to the up-gradation of the IT systems, which include ERP. Thus, the Chinese ERP market is emerging as the fastest growing market. The Chinese ERP market is witnessing an increased competition, with the international companies entering the local market. These international players provide ERP solutions at lower costs compared to the existing local Chinese players, ensuring competition in the market. Also, these companies provide more valuable options at low cost to gain preference in the Chinese ERP market.

5. THE CHINESE ERP MARKET

The Chinese ERP market, which started in the late 1980s, has been booming in recent years because informatization has played a vital role in the development of enterprises. The demand of enterprise management system increases rapidly, in that case, the requirement of ERP is higher and higher. At present, Chinese ERP market is full of potential. Chinese enterprises have already realized that they cannot rely on low cost production, while ERP is a good medicine for Chinese enterprises to enhance managerial performance. According to the China Center for Information Industry Development (CCID), a well-known Chinese marketing research firm, the Chinese ERP market has grown from approximately USD $251 million in 2003 to USD $571 million in 2007. From 2002 to 2005, the average annual growth of the Chinese ERP market was 23.75% (Source: CCID Research 2008). According to the survey of CCW Research, the total sales of TOP10 General ERP software vendors were USD $ 296 million in the first half of 2009. According to sales statistics, the top six manufacturers were UFSoft, SAP, Kingdee, Oracle, GenerSoft and Digital China (Figure 1).

In the 2009 report of Chinese ERP Market form CCW Research, domestic ERP vendors took a major share of the market. As figure 1 show, the top six players hold 87.7% of the ERP market, with four Chinese domestic companies holding 58.7% and the two foreign ERP leaders holding 29% of the market. Evidently, the Chinese ERP software vendors have emerged as dominant players in this important market.

By 2014, the market should reach $1.06 billion (Gartner, 2009). UFIDA commands the most market share at 32%, while local rivals Inspur and Kingdee control 16%, and 15% respectively.

Figure 1: The brand structure of Top 10 General ERP software vendors in the first half of 2009.
Source: CCW Research 2009
The number of small and medium enterprises (SMEs) in China has exceeded 42 million, accounting for 99% of the total amount of Chinese enterprises. Large volume and rapid development trend bring tremendous demand. The requirements of SMEs are relatively simple but the differences are large. Return on Investment (ROI) of ERP vendors in this area may be less than ideal. However, in The Long Tail theory, the market energy of combination of these products will be great enough to compete with the mainstream of popular products. That tells us that mining the fundamental needs of SMEs, catering to their characteristics, providing corresponding products, can create miracles in the competitive ERP market.

The ERP spending plans definitely reflect this more upbeat and aggressive company strategic posture (Figure 2). Even in established economies like the United States and Germany, a significant percentage of companies expect to ramp up ERP investment. The rate is even higher for companies with less than 1,000 employees.

![Figure 2. ERP budget growth in 2010 (AMR Research, 2009)](image)

6. **THE WORLD ‘ERP’ MARKET REVENUE**

Total ERP market revenue grew to over $28Billion in 2006 (Figure 3), driven by a combination of strong customer demand and leading vendors expanding their product portfolios through acquisition. The ERP market had a spectacular year, with total revenue growing by 14% and license revenue up an amazing 18% from 2005. While sales of traditional ERP applications were very healthy in 2006, many vendors also saw substantial revenue growth from the acquisition of other software companies. Globalization, centralization, and regulatory compliance were the key drivers for continued ERP investment among large corporations. In the small and midsize business segment, which continues to outgrow the overall market, companies are buying new ERP systems in response to new customer requirements and the desire to participate in the global market.

![Figure 3. ERP application revenue estimate, 2006-2011](image)

Source: AMR Research, 2007
7. RESEARCH OBJECTIVE AND METHODOLOGY
The objective of the paper is to use the data of Chinese companies to evaluate the degree of importance of each Human Resources (HR) requirement factor in their ERP implementations, to identify the degree of importance of each change management strategy, to indicate the importance of each communication factor and reward system. A field study was conducted with 115 respondents within five companies in Shanghai City. Data were collected through an experience survey using a questionnaire. A questionnaire was designed with items for each one of these selected factors. For each factor, a question assesses the level of importance that it has in the implementation process. This level, or grade, was provided based on the experience of the enterprise. A five-point Likert scale was used in order to determine the importance level of each critical factor. The scale goes from “Extremely critical and important for the success of the implementation” to “Neither critical nor important for the success of the implementation.”

8. 'CSFS' IN 'ERP' IMPLEMENTATION IN CHINA
A critical success factor is something that the organization must do well to succeed. In terms of information system projects, a critical success factor is what a system must do to accomplish what it was designed to do.

8.1. Project team Competence
According to Welti the availability, expertise, quality and composition of project teams were the most important HR requirements for success. Additionally, he suggested that the composition of project teams with skillful and competent project team members will directly influence the output of the project.

Wateridge (1997) and Hawa (2002) investigated the human competences required for the project and skills the project managers need to possess to manage IT project successfully. I elaborated this to a larger context and investigated in more detail the composition of the project teams in ERP implementation projects and the skills these people need to employ in ERP projects.

8.2. Educating training and Developing
Not surprisingly, when respondents were asked to indicate the degree of importance of each training factor the responding companies gave the highest importance. Yet, one of the major challenges that the study of (Kumar et al., 2003) has brought out was running out of the budget. Documenting the training process and measuring training performance were also given a low importance.

8.3. Managing Change
However, the literature has suggested these guidelines as a good starting point to assist top management to analyze the sources of resistance and develop a strategy to overcome them (Welti, 1999). Surprisingly, building user acceptance was given the lowest importance. Many researchers such as May and Kettelhut (1996) and Welti (1999) have stressed the importance of gaining employees acceptance as an important strategy to manage the ERP change process.

Scholars agree that it is easier to specify the reasons for going ERP than to gain user acceptance and implement the desired changes.

8.4. Communication
As the goal of ERP systems is to integrate various business functions across different locations, interdepartmental cooperation and communication is the core of the ERP implementation process (Akkermans and Helden, 2002), he suggested that intensive communication between the key parties is directly linked to the success of the project.

8.5. Reward System
Managing user expectations successfully is closely related to the success of the implementation project and stays important throughout all the stages of the ERP life cycle (Somers and Nelson, 2004) and (Akkermans and
Helden, 2002). The reward system is based on managing user expectations and providing tangible and non-tangible compensations.

9. RESULTS

The 115 respondents in the five companies were analyzed and the following results show the mean for each important success factor to the ERP implementation (Tables 1, 2, 3, 4 and 5). A value of 1 represents “Neither critical nor important for the success of the implementation process” and a value of 5 represents “Extremely critical and important for the success of the implementation process”. A score of 3 points is labeled as “Moderately critical and moderately important for the success of the implementation process”.

TABLE 1. THE IMPORTANCE OF THE HR REQUIREMENTS FACTORS IN ERP IMPLEMENTATION, RATING FROM 1 (EXTREMELY LOW) TO 5 (EXTREMELY HIGH)

<table>
<thead>
<tr>
<th>HR requirements</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skillful and competent project team members</td>
<td>3.92</td>
</tr>
<tr>
<td>Availability of sufficient HR for the project</td>
<td>3.59</td>
</tr>
<tr>
<td>Availability of expertise</td>
<td>3.47</td>
</tr>
<tr>
<td>Composition of project teams</td>
<td>3.29</td>
</tr>
</tbody>
</table>

TABLE 2. THE IMPORTANCE OF TRAINING IN ERP IMPLEMENTATION, RATING FROM 1 (EXTREMELY LOW) TO 5 (EXTREMELY HIGH)

<table>
<thead>
<tr>
<th>Training Factors</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning the new system and job functions</td>
<td>4.51</td>
</tr>
<tr>
<td>Accepting the new processes and procedures</td>
<td>4.32</td>
</tr>
<tr>
<td>Preparing employees for change</td>
<td>4.27</td>
</tr>
<tr>
<td>Having qualified trainers</td>
<td>4.11</td>
</tr>
<tr>
<td>Identifying the type of training needed</td>
<td>3.89</td>
</tr>
<tr>
<td>Providing the support for training</td>
<td>3.82</td>
</tr>
<tr>
<td>Documenting the training process</td>
<td>3.49</td>
</tr>
<tr>
<td>Having sufficient budget</td>
<td>3.35</td>
</tr>
<tr>
<td>Measuring training performance</td>
<td>3.27</td>
</tr>
</tbody>
</table>

TABLE 3. THE IMPORTANCE OF EACH COMMUNICATION FACTOR IN ERP IMPLEMENTATION,
TABLE 4. THE IMPORTANCE OF EACH COMMUNICATION FACTOR IN ERP IMPLEMENTATION,

<table>
<thead>
<tr>
<th>Communication factors</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open communication between the key parties</td>
<td>4.54</td>
</tr>
<tr>
<td>Cooperation and involvement of the key parties</td>
<td>4.23</td>
</tr>
<tr>
<td>Communicating ERP benefits</td>
<td>4.15</td>
</tr>
<tr>
<td>Regular communication practices</td>
<td>3.94</td>
</tr>
<tr>
<td>Communicating ERP change vision</td>
<td>3.89</td>
</tr>
<tr>
<td>Establishing communication guidelines</td>
<td>3.35</td>
</tr>
</tbody>
</table>

TABLE 5. THE IMPORTANCE OF EACH REWARD SYSTEM FACTOR

<table>
<thead>
<tr>
<th>Reward system factor</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building employee commitment</td>
<td>4.11</td>
</tr>
<tr>
<td>Creating a pleasant working environment</td>
<td>3.93</td>
</tr>
<tr>
<td>Rewarding on the basis of performance</td>
<td>3.82</td>
</tr>
<tr>
<td>Celebrating success</td>
<td>3.67</td>
</tr>
<tr>
<td>Awarding the team</td>
<td>3.45</td>
</tr>
<tr>
<td>Recognition through intangible rewards</td>
<td>3.32</td>
</tr>
<tr>
<td>Awarding the individual</td>
<td>3.24</td>
</tr>
<tr>
<td>Providing bonuses and other financial benefits</td>
<td>3.23</td>
</tr>
<tr>
<td>Clarifying the future career opportunities</td>
<td>3.20</td>
</tr>
</tbody>
</table>

10. DISCUSSION

The results showed (Table 1), that the respondents viewed skillful and competent project team members to be the most important requirement, which is in line with the large part of the academic literature that suggests that success cannot be achieved without qualified and motivated personnel. Next important were availability of sufficient human resources for the project and availability of expertise.

The responding companies gave the highest of each training factor importance (Table 2) for learning the new system and job functions, accepting the new processes and procedures, and preparing employees for change. Having qualified trainers, identifying the type of training needed and providing support for training were also ranked high. People with right ERP skills are in shortage because there are not enough professionals who would have a good understanding of both business and ERP systems. In addition, each user group has different needs, preferences and learning potential. Having sufficient budget was given a moderate importance.

The results showed (Table 3) that the leadership commitment received the highest importance. In addition, top management support is mentioned in many CSF lists. Other strategies that received high ranking were empowering employees and understanding the strategic vision of ERP. A common strategy to increase user acceptance is to empower employees and communicate the ERP change vision and benefits to them. Next important is developing new business performance and control measures. This reason is logical as the system change brings in the new way of going about things. Identifying sources of resistance and who are resisting changes were ranked low by the respondents.

The highest importance received open communication between the key parties, and cooperation and involvement of the key parties (Table 4). Communicating ERP benefits and change vision are an integral part of
ERP change management process. Establishing communication guidelines was given the lowest ranking and clearly it is not the first priority of the communication practices. The highest importance was given here to building employee commitment and creating a pleasant working environment (Table 5). As it is difficult to find people with the right set of ERP and business skills and training being expensive, companies put all the efforts in retaining the employees. Celebrating success on the basis of the performance was ranked higher than awarding the team. This can be explained by the fact that we are not in a collectivistic culture and individual achievements have higher value.

Celebrating success was given a much higher importance than recognition through intangible rewards and providing bonuses and other financial benefits. Thus, money comes the last, fame second and having fun and building up a team spirit first. Clarifying the future career opportunities was not considered as important. The reason being that today, with flatter organization structures promotions are less likely to happen but the trend is having cross-functional career and moving across different projects and tasks.

11. CONCLUSION
To adapt to today’s challenging and competitive business environment, organizations are implementing ERP systems to achieve a capability to plan and integrate enterprise-wide resources in order to shorten lead times, and to be more responsive to customer demands.

Despite the fact that ERP integrates and optimizes the flow of information across the entire organization’s supply chain, the implementation of such software packages can be costly, and may even require reengineering the entire business operations. Combinations of factors have to be considered when undertaking an ERP implementation including: project team competence, educating training and development, managing change, communication and reward system.

The Internet represents the next major technology enabler which allows rapid supply chain management between multiple operations and trading partners. Most ERP systems are enhancing their products to become “Internet Enabled” so that customers worldwide can have direct to the supplier's ERP system. ERP systems are building in the Workflow Management functionally which provides a mechanism to manage and control the flow of work by monitoring logistic aspects like workload, capacity, throughout times, work queue lengths and processing times.

REFERENCES


