Implementing ERP in China – Lessons from Leading Chinese Enterprises
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Abstract
Enterprise resource planning (ERP) systems is one of the most popular organisation wide software packages to emerge in recent years because of the potential benefits of successful implementation. This paper adopts a multiple case study approach to examine the ERP implementation experiences of four Chinese enterprises. Relatively new to Chinese enterprises, ERP uptake is on the increase as Chinese enterprises look towards ERP in the hope that these will change their management model and modernise their business. The major findings of this paper are that the critical success factors for ERP implementation is fundamentally the same in China as it is in Western countries, with the addition of an underpinning theme - cultural characteristics. The value of this paper is that it presents enterprises wishing to implement ERP as well as vendors and consultants with a set of critical success factors that is applicable in China.

Keywords
ERP implementation, China, critical success factors

Introduction

When China began an “open door” policy in 1978, few people could imagine how the country would turn out over a quarter of a century later. Once described as a “destitute, hermetically sealed museum of Marxist utopianism” (Clifford, Roberts, Barnathan and Engardio, 1997), the world has witnessed, in China, one of the most breathtaking economic transformations of the twentieth century (Woo and Prud’homme, 1999). China is currently enjoying a period of phenomenal growth and is the world’s fastest growing economy.

Once described as ‘cheap and shoddy’, products by Chinese enterprises now provide good value with good quality and at very competitive prices. Chinese products have found their way into many households in the world, with items such as clothing, food products, toys and electronic goods. Despite the revaluation of the Chinese currency, the renminbi or yuan, on 21 July 2005, Chinese exports will continue to remain competitive, mainly due to cheap labour and land costs in China.

Chinese enterprises trade in a competitive environment and with accession to the World Trade Organisation (WTO), these enterprises no longer only compete within China amongst Chinese businesses and abroad with foreign enterprises, they have to compete with foreign business in China, as well as abroad. Under its 2001 WTO accession agreement, the Chinese government pledged to open up the country’s economy to more foreign competition (EIU, 2005). For example, foreign enterprises no longer have to enter into joint ventures with Chinese enterprises but can set up a wholly owned foreign enterprise, thus increasing opportunities to foreign companies to make use of China’s low labour cost, low land rental, and raw material procurement amongst other advantages to start-up and trade in China.

Chinese enterprises’ reaction to this is to modernise, often involving their processes and management models through introducing technology. Huang and Palvia (2001) observe that China is investing heavily in IT projects in both private and public
sectors, but in 2001, there were only a handful of Enterprise Resource Planning systems. However, enterprises in China are increasingly looking to Enterprise Resource Planning or ERP systems as the latest in a line of IT investment and modernisation projects. The result is an upsurge in purchasing ERP systems as businesses rush to invest in a system that they hope will change their management model and modernise their businesses. This trend is not restricted to China.

Willis and Willis-Brown (2002) observe that the ERP market is one of the fastest growing markets in the software industry and Adam and O’doherty (2000) and Yen et al (2002) observe that ERP will continue to be one of the fastest growing and influential players in the application software industry through to the next decade. Estimates of the ERP market varies from US$16 billion in 2002 (Huang et al, 2004b) to US$66 billion in 2003 (Themistocleous et al, 2001).

However, not all implementation projects have been successful and businesses are more likely to comment on the failures of their ERP implementation than on successes. Scott and Vessey (2002) observe that 90 percent of SAP R/3 projects run late. In extreme cases, companies have even had to close because of vast ERP investments that did not go live, an example being the FoxMeyer Drug Company that went into bankruptcy (Scott and Vessey, 2002). The cost associated with ERP implementations can be staggering (Hayes et al, 2001). Cooke and Peterson (1998) observe that up until 1998, 6000 companies had implemented ERP packages at an average cost of US$20 million, while Mabert et al (2001) put the total implementation cost at ‘tens of millions’ dollars for a medium sized company and US$300-500 million for large international corporations. All of this leads to a heavy financial burden that companies must bear and as Brakely (1999), Davenport (2000) and Kumar and van Hillegersberg (2000) observe, this financial burden can be high. This financial burden is not restricted to the direct cost of the ERP system, but can lead to lost sales as experienced by Hershey Foods’ ERP implementation problems that led the company to lose US$150 million in lost sales (Reuters, 1999 and Burritt, 2000).

As Huang et al (2004) point out, successful implementation of ERP systems has been difficult to achieve in practice owing to the complicated integration of organisational and technical levels. If there are many cases of ERP implementation failure in western countries that have high IT maturity and good IT infrastructure, good ERP experience (Huang and Palvia, 2001), then ERP implementation in China will also encounter similar numbers, if not more cases of failures. As Huang and Palvia (2001) suggest countries with inadequate IT infrastructure and governmental policies, lack of IT / ERP experience and low IT maturity will experience ERP implementation problems. In addition, as Martinson and Hempel (1998) suggests, the process of innovation, including ERP implementation, is limited in China because of the Chinese management style, informal planning, highly dependent social and organisational relationships and attitudes towards organisational change.

This research examines the ERP implementation efforts of four large Chinese enterprises. The paper focuses on the key obstacles and problems experienced by the companies in implementing ERP. In an earlier research into the ERP implementation experiences of a Chinese electronics manufacturer, Woo (forthcoming) suggests a set of critical success factors (CSF) for the manufacturer. This paper expands on the study by examining the CSF of the four enterprises.
Critical Success Factors for ERP Implementation in China

In a case study of a major electronics manufacturer in China, Woo (forthcoming) suggests a set of six CSFs for implementing ERP. The study suggests that the CSFs for implementing ERP in China is similar to its Western counterparts, with the addition of an underpinning theme, cultural characteristics.

Top Management
Top management support and involvement is essential to the successful implementation of ERP. Walsham and Waema (1994), Davenport (1998), Bingi et al (1999), Buckhout et al (1999), Laughlin (1999), Nah et al (2001) and Umble et al (2003) are amongst those who suggest that top management need to make sustained involvement and commitment in order to make the ERP implementation a success. Davenport (1998) suggests that top management should not push the responsibility of ERP implementation to their technological departments, because, as Walsham and Waema (1994) also suggest, implementation of ERP is more than a technological challenge. In China, top management generally take the opposite view, frequently remaining in the background. They tend to regard projects such as ERP as technological projects and thus, appoint the staffs who best understand technology to manage the project, the IT staff (Woo, forthcoming).

Project Team
Having the right composition of the ERP implementation project team is very important (Jiang et al, 1996; Bingi et al, 1999; Buckhout et al, 1999; Laughlin, 1999; Ross, 1999; Nah et al, 2001; and Umble et al, 2003) but may be difficult to have. Team members should be technologically competent, understand the company and its business and come from the departments affected by the new system. emphasises the importance of having a good composition of the ERP team. This team should contain the best people in the organisation (Bingi et al, 1999, Buckhout et al, 1999), and be cross-functional (Nah et al, 2003) to reflect the cross-functional nature of ERP systems. This does not often happen in China, where top management of many enterprises frequently view ERP as a technological project, and not cross-functional, and thus the project team is frequently composed of IT specialists (Woo, forthcoming). Further, ERP consultants used are not always those that understand the differences in culture. Frequently, ERP consultants are engaged based on their international experience, and these consultants may never have worked in China.

Project Management
Project management is a key requirement in implementing ERP. Laughlin (1999), Nah et al (2001, 2003) and Umble et al (2003) suggest that successful ERP implementation requires excellent project management which includes a clear definition of objectives, development of both a work plan and a resource plan and careful tracking of project progress. The project team should be capable of, and entrusted with, making critical decisions (Laughlin, 1999 and Minahan, 1998) and Jiang et al (1996) suggest that a competent project manager is one of the most important factors in implementation of information systems, such as ERP. Project management is still a relatively new concept in China, and is usually associated with major construction projects. The construction of the 2008 Beijing Olympic Games only serves to reinforce this. It is common for the project team and project leader appointed to lead ERP implementation projects to be inexperienced in project
management, a result is the project team setting unrealistic schedules and budgets (Woo, forthcoming).

**Process Change**

Most companies that implement ERP are unlikely to have processes and structures compatible with the structure, tools, and types of information provided by ERP systems (Umble et al, 2003). For this reason, it is likely that companies implementing ERP will need to reengineer, at a minimum, their key processes to support the requirements of the ERP system. Bingi et al (1999), Holland and Light (1999), Mandal and Gunasekaran (2002) and Yusuf et al (2004) suggest that to take full advantage of the ERP software, business process reengineering is a prerequisite. However, as Martinsons and Hempel (2001) suggest, because Chinese culture view radical change associated with BPR differently to Western culture as Chinese culture is more past oriented, reactive and reluctant to change established social relationships, the Chinese are reluctant to engage in major change efforts. Furthermore, top management of companies frequently view ERP as simply technological challenge rather than one that affects the entire company (Woo, forthcoming).

**Education and Training**

Training end-users to use ERP is important because ERP is not easy to use even for highly educated managers with good IT skills. Gupta (2000), Nah et al (2001, 2003) and Umble et al (2003) suggest that adequate training can help increase success for ERP systems. Vosburg and Kumar (2001) meanwhile observe that lack of proper training can frustrate ERP users and suggest on-going training as a way to ensure success in implementing ERP. This is especially important with the company, both internally and for those externally affected by ERP, because it is important to gain user acceptance and training can help employees and other users adjust to the change, and helps build positive attitudes toward the new system. Furthermore, as Russo and Kremer, (1999) observe, hands-on training is an important driver of new system implementation success. In China, training senior managers of enterprises is an important government initiative. However, training within enterprises does not always hold the same degree of importance. Many company’s human resource departments entrusted to provide training often find that there is an insufficient budget, and as a result, only a small percentage of users receive training (Woo, forthcoming).

**Communication**

Kraemmerand et al (2003) suggest that communication is essential for creating approval and widespread understanding and acceptance of ERP. Spike and Lesser (1995) suggest that in implementation of change, communication is a tool for announcing, explaining or preparing people for change while Lippitt (1997) suggests that communication can increase commitment to change as well as reducing confusion and resistance to change. According to Bancroft et al, (1998), communication should start early, be consistent and continuous, and include an overview of the system, the reasons for implementing it, and a vision on how the business will change and how the system will support these. In contrast, in China, change projects such as ERP are frequently kept from company employees. Chinese companies’ top management rarely inform all other employees of their plans, and have an ineffective communication structure. Employees, suppliers and customers frequently complain that they did not know, formally, what was going on with the company’s activities (Woo, forthcoming).
Methodology

This research is a multiple case study of four growing enterprises in China and through the findings seeks to explore the enterprises’ ERP implementation experiences. Although there is a growing body of knowledge on ERP, there is little on the experiences of ERP implementation in Chinese enterprises where ERP is relatively new. Flynn et al (1990), McCutcheon and Meredith, (1993) and Yin (1994) suggest that case studies are particularly suitable to explore new areas and issues where little theory is available or where the areas and issues are complex, and as Benbasat et al (1987) suggest, in areas where research and theory are at their earliest stages.

Case study observations are often single case reports, but as Eisenhardt (1989) suggests, multiple cases allow for comparison across cases and can thus offer greater analytical leverage, although this is at the expense of losing some of the richness that single case reports presents.

Data collection involved semi-structured interviews with key staff in a position to discuss the ERP experience backed up by follow-up phone calls when necessary and documents related to the ERP implementation efforts. The semi-structured interviews, using open-ended questions, centred on the problems experienced by the companies and the actions the companies took to overcome these problems. Concerning any bias responses, this paper does not seek to prove or disprove any prior theory on ERP implementation in China but to examine the actual experiences of those involved in managing, implementing and using ERP in the company.

The Case Companies

The four Chinese enterprises in this study represent a range of firm sizes, core business, ERP expenditure, and ERP modules implemented (table 1).

Table 1 Company Profile and ERP project

<table>
<thead>
<tr>
<th>Company</th>
<th>Revenue (actual)</th>
<th>ERP budget (actual)</th>
<th>Status of project</th>
<th>ERP modules implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company A</td>
<td>US$100M</td>
<td>US$3M (US$3.25M)</td>
<td>Completed (18 months delay)</td>
<td>Finance, sales, human resources, manufacturing, supply chain</td>
</tr>
<tr>
<td>(Electronic Parts Manufacturer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company B</td>
<td>US$80M</td>
<td>US$0.75M (US$1.55M)</td>
<td>Abandoned after 14 months delay, only implemented</td>
<td>Finance, sales, manufacturing, supply chain</td>
</tr>
<tr>
<td>(Machining Equipment Manufacturer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company C</td>
<td>US$50M</td>
<td>US$1M (US$0.90M)</td>
<td>Completed (3 months delay)</td>
<td>Finance, sales, manufacturing, supply chain</td>
</tr>
<tr>
<td>(Garment Producer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company D</td>
<td>US$35M</td>
<td>US$0.5M (US$0.80M)</td>
<td>Abandoned after 8 months delay, only implemented</td>
<td>Finance, human resources, sales, supply chain</td>
</tr>
<tr>
<td>(Furniture Producer)</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
One of the factors driving all four companies to look to ERP is to replace an obsolete legacy system. This is a common reason, as Vosburg and Kumar (2001) suggest, ERP can replace a number independent legacy systems in an organisation and as Laughlin (1999) suggests, ERP systems manage an enterprise’s value chain in an integrated manner, handling its inventory, logistics, orders, billing, shipping, sales, and customer service.

Companies A and C completed their ERP implementation projects while companies B and D abandoned their after considerable delays. It is interesting to note that company A completed their implementation after 18 months delay. Company A is owned by a Hong Kong based company, which, after noting that the initial deadline had not been met, introduced changes such as brining in a new ERP consultant, and investing in structured training for the company’s employee.

Findings

Top management
The experiences of Companies B and D are common in China, as many Chinese senior managers prefer to take a back seat during implementation once they have approved investment of a project. On the other hand, top management of company C was involved with the project from initiation and throughout implementation. Company A’s top management only involved themselves in the implementation project after the project had failed to meet its initial completion deadline. Table 2 compares the top management conduct of the two companies that completed ERP implementation and the two that abandoned the projects.

Table 2 Comparison of top management conduct

<table>
<thead>
<tr>
<th>Completed</th>
<th>Abandoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong and visible top management, fully understand requirements of ERP; Supportive; ERP project benefited from focused strategy and direction; Project champion is highly respected senior manager</td>
<td>Absence of visible top management; Lacked control; Lacked understanding of ERP requirements and benefits; No project champion or inexperienced coordinator</td>
</tr>
</tbody>
</table>

Top management in companies A and C were taking on what Pfeffer (1981) describes as symbolic management, providing explanations and rationales for the company’s change activities, and what Spender and Grinyer (1995) suggest as creating an energising context for change.

Project team and project management
The experiences of companies B and D are common in China as enterprises frequently regard ERP implementation as an IT project, and therefore, qualified IT staffs are best suited to complete the project. Table 3 compares the completed and abandoned projects’ experiences. This usually happens when top management fails to understand the importance of having an appropriately composed project team with members who are familiar with the various aspects of the company’s business operations.
Table 3 Comparison of project team and project management activities

<table>
<thead>
<tr>
<th>Completed</th>
<th>Abandoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project team composed of staff from across company and includes ERP consultants; Team led by experienced project manager;</td>
<td>Project team mainly consist of IT staff; Consultants not familiar with Chinese business and management practices</td>
</tr>
</tbody>
</table>

Concerning the consultants used, companies B and D had engaged foreign consulting firms with good international reputation in ERP implementation, but they had little experience working with Chinese companies and had little understanding of Chinese business and management practices. The consultants did not understand that Chinese management style, informal planning and process modelling, interdependent social and organisational relationships, and attitudes towards organisational change all limit process innovation efforts Martinsons and Hempel (1998). Company A engaged a local consulting firm. Although company C engaged a foreign consulting firm, this firm had completed several projects in China.

Process change
Companies B and D’s top management did not understand the need to redesign their company’s key processes. Instead, they considered ERP as merely a technological tool, an add-on to their existing processes that they hoped would ‘speed things’ up. Table 4 shows the process change activities of the two groups of companies.

Table 4 Comparison of process change activities

<table>
<thead>
<tr>
<th>Completed</th>
<th>Abandoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redesign of company key process began soon after project initiation; Support from top management evident; Key staff received training before undergoing process change activities</td>
<td>ERP viewed as simply a software system and technological change; No redesigning of key process</td>
</tr>
</tbody>
</table>

Education and training
Both company B and D did not allocate sufficient funding for training and only a handful of departmental managers and key employees received training. Some of the training took place abroad and these were usually attended by senior managers who did not cascade learning back to the company. Most of the end users did not receive any formal training. This is common in China as many Chinese enterprises commonly consider training as low priority, an expense that they can reduce or eliminate in difficult times. Further, the training material, developed and delivered by Western based training consultancies, were not customised for the companies employees who often commented that the materials were too difficult to understand. Table 5 compares the education and training provision.

In contrast, company C’s Western training consultancy had customised their training material to the company’s needs and understood the company’s employees’ abilities. Company A entered into partnership with a local university to reduce cost, to develop distance-learning material. Both companies A and C have cascading programmes to enable any senior managers who have received training to train or mentor those working for them.
Table 5  Comparison of education and training provision

<table>
<thead>
<tr>
<th>Completed</th>
<th>Abandoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training partnership developed with local university to reduce costs;</td>
<td>Ineffective and insufficient;</td>
</tr>
<tr>
<td>Training material customised to meet company needs</td>
<td>Managers did not allow employees to attend courses;</td>
</tr>
<tr>
<td>Distance learning material available;</td>
<td>Insufficient budget allocation</td>
</tr>
<tr>
<td>Programme to cascade training from higher to lower level employees</td>
<td></td>
</tr>
</tbody>
</table>

Communication
Companies B and D’s top management operated almost in secrecy about the ERP implementation project. Many employees hear of their company’s ERP project only when they attend training or through hearsay. In contrast, top management in companies A and C kept their employees informed right from the start, and conducted regular meetings and briefing sessions. Table 6 compares the communication activities and strategies.

Table 6  Comparison of communication activities

<table>
<thead>
<tr>
<th>Completed</th>
<th>Abandoned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top management regularly communicate with employees;</td>
<td>Lack communication from top management or project team;</td>
</tr>
<tr>
<td>Good variety of communication mechanisms including newsletters, weekly</td>
<td>Employees did not understand purpose or benefits of ERP</td>
</tr>
<tr>
<td>and daily briefings</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion
This paper provides valuable insights towards understanding ERP implementation in China. In particular, it examined the ERP implementation experiences of four major Chinese enterprises, two of which had successfully implemented ERP while two had abandoned their projects.

Using a set of critical success factors to examine these companies, this study shows the following:

- Top management - strong, committed, and visible top management to promote ERP and to support the implementation process;
- Project team and project management - a cross-functional and qualified team that also consist of suitably qualified and experienced consultants working within realistic plans and deadlines;
- Process change – needed to redesign the company’s key processes to work with the requirements of the ERP system;
- Education and training – needed to suit the employees’ needs, as well as meeting the needs of the company; and
- Communication – structured and regular.

These CSFs are similar to those experienced by many Western businesses when implementing ERP, with the addition of understanding cultural differences. ERP is essentially a Western designed system for Western companies, but implementing this in Western companies is not always easy and successful. Implementing ERP in
China, where there are differences in cultural characteristics, business and management style and practices increases the difficulties. This makes understanding the CSFs more important, and the CSFs put forward by this study will be beneficial to future enterprises wishing to implement ERP in China.

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