A DISCUSSION OF BARRIERS TO SUCCESSFUL EXPLOITATION OF ERP SYSTEMS IN CHINA

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ABSTRACT

The research presented in this paper aims at identifying, assessing and discussing potential social, cultural, organisational and system barriers to successful exploitation of Enterprise Resource Planning (ERP) systems in Chinese State Owned Enterprises (SOE). In spite of the urgent need for research in this area, there is a scarcity of studies focusing on ERP post-implementation, in contrast with an over abundance of studies focusing on implementation and project management aspects. The need for the research thus emerged from the growing awareness in the field that there is a lack of studies addressing the organisational exploitation of ERPs after the implementation stage.

The study adopted a deductive research design based on a cross-sectional questionnaire survey. This survey was preceded by a Political, Economic, Social and Technological (PEST) analysis and a set of Strength, Weakness, Opportunity and Threat (SWOT) analyses that enabled the researchers to narrow the scope of the study and identify an appropriate industry sector and region, namely the Electronic and Telecommunication Manufacturing Sector in the Guangdong province. The questionnaire design was based on a theoretical ontology of barriers drawn from a systematic literature review process. The questionnaire was sent to the operational managers and the information technology (IT) managers of 118 SOEs in China, from which 42 valid and usable responses were received and analysed.

The findings identified that ICT system-related barriers are currently perceived by respondents as more crucial to ERP post-implementation. In contrast, due to China's rapid economic development, continuous reforms and fluid nature of organisational environments, cultural and organisational ERP barriers were assigned a lower priority by the SOEs studied. As a result of this analysis, this paper presents and discusses 25 ERP exploitation barriers, from which 9 barriers were considered critical. The study also explored and identified 15 correlations between the barriers identified.

KEYWORDS

Information Systems, Enterprise Resource Planning, Post-Implementation, Barriers, China, State Owned Enterprises.

1. INTRODUCTION AND BACKGROUND OF STUDY

Since 1978, China has gradually reformed its economic system from the traditional planning economy to a more competitive market-oriented economy. After an effort of three decades, China has now become the world's fourth-largest economy behind the US, Japan and Germany (Reuters, 2006). Nevertheless, the continuous national economic reform and entrance of foreign companies hitherto closed Chinese business market, has significantly changed China's business *status quo*. Probably the most important change introduced is the very serious competition factor introduced in the domestic market, now free from central control.

Faced with this competitive environment and economic pressure, thousands of Chinese companies have implemented Enterprise Resource Planning (ERP) systems in order to improve operational efficiency and enhance core competencies. However, the adoption of ERP is not a straightforward task and often presents a business dilemma to user companies as Liu Chuanzhi, former chairman and president of Lenovo, stated:

> "Not implementing ERP means inevitable failure, while implementation could possibly contribute to one's demise." (SAP, 2005)

This clearly shows that implementation of ERP is often fraught with risks, difficulties and problems (Loh and Koh, 2004). However, even if the system is successfully implemented, the 'go-live' point of the system is not the end of the ERP journey. Very often the system post-implementation stage is where the real challenges begin (Willis and Willis-Brown, 2002). In order to maximize the potential benefits that can be received from the installed system and ensure long-term success, user companies must pay substantial attention to ERP post-implementation and be ready for the long-term fight (Willis and Willis-Brown, 2002; Yu, 2005). Nevertheless, a wide range of barriers embedded in the local business context and the system itself can often prevent user companies from successfully using, maintaining and enhancing their ERP systems in the post-implementation stage. The existence of these barriers can turn initial ERP success into a failure and may lead to system and business collapses. Although many researchers recognize the importance of ERP post-implementation and even state it is the direction of the second wave ERP research (Yu, 2005), current research which focuses on ERP post-implementation is extremely limited. No study in ERP post-implementation barrier in general or in China in particular was identified in the literature reviewed.

This paper presents the results of an empirical study that aims at addressing this significant research gap. An extensive systematic review, which focused on theoretical papers and case studies, was conducted at the early stage of the research. As a result of the systematic review, the researchers developed a theoretical barrier ontology which consists of 25 potential ERP barriers that may prevent Chinese companies from achieving continuous success in ERP exploitation. A questionnaire, which was constructed based on the theoretical barrier ontology, was used to seek Chinese managers' and IT experts perceptions of the 25 pre-defined ERP barriers as well as exploring the correlations between these barriers. This paper is organised into three main sections. An overview of the literature review is presented first, followed by a description of the research methodology and design. Finally, results derived from the questionnaire survey are presented and discussed with conclusions drawn.

2. BRIEF OVERVIEW OF LITERATURE REVIEW

2.1 Introduction of ERP

The concept of ERP has evolved over almost 60 years "driven by the changing business requirements, new technologies and software vendors' development capabilities" (Møller, 2005). The origin of ERP can be tracked back to the 1950s when inventory control systems (ICSs) and bill of material processors (BOMPs) were developed and used in Western companies (Møller, 2005; Shehab et al, 2004; Kapp et al, 2001: 18). The early ICSs and BOMPs gradually turned into Material Requirements Planning (MRP) systems in the 1960s (Møller, 2005). MRP systems used bill of materials (BOM), inventory records and master production schedules (MPS) as inputs to calculate the net requirement plan of materials as output, and therefore create production and purchase orders for lower-level components (Koh et al, 2000). The adoption of MRP systems helps companies improve their production processes by enhancing the efficiency of material scheduling and inventory control. During the 1970s and 1980s, Manufacturing Resource Planning (MRP II) systems emerged to extend MRP's traditional focus on production processes into other business functions related with manufacturing (Chen, 2001). MRP II integrates "primary functions (e.g. production) and other functions such as personnel, engineering and purchasing into the planning process to improve the efficiency of the manufacturing enterprise" (Chen, 2001). However, the main focus of MRP II is still on the manufacturing side of the company.

In the early 1990s, MRP II has further evolved into ERP, which does not just focus on the manufacturing side but also other divisions (e.g. sales, human resource and finance) of the company. ERP systems were traditionally applied in capital-intensive industries such as manufacturing, construction, aerospace and defence (Shehab et al, 2004). During the 1990s, ERP systems have continually evolved and were extended to integrate all the functions of an organisation's 'back office', and were introduced into other commercial (e.g. finance, insurance, retail and telecommunication) and non-commercial (e.g. government, health care, education) sectors (Shehab et al, 2004).

Nowadays, researchers in the field draw slightly different definitions of ERP systems. For example, Kumar and Hillegersberg (2000) define ERP systems as "configurable information system packages that

integrate information and information-based processes within and across functional areas in an organization". Gable (1998) defines ERP systems as comprehensive packages of software solutions that seek to integrate the complete range of business processes and functions in order to present a holistic view of the business from a single information and IT architecture. Shehab et al (2004) consider ERP systems as "business management system[s] that comprise integrated sets of comprehensive software, which can be used, when successfully implemented, to manage and integrate all the business functions within an organization".

Contemporary ERP systems may also contain additional enterprise applications (e.g. SCM and CRM) to address a company's front-office issues (Davenport and Brooks, 2004). Moreover with enhanced e-business capability, ERP systems may link directly with each other over the Internet (Davenport and Brooks, 2004). Specifically user companies can use web tools embedded in their ERPs not only to share information and knowledge and exchange transaction data, but also to engage in business-to-business operation with their business partners and suppliers (Búrca et al, 2005). Such extended ERP systems are sometimes referred to as ERP II (Møller, 2005). With these enhanced ERP functions, companies engaged in the same supply chain may be able to build up stronger business networks with each other, and may even achieve inter-enterprise integration (Davenport and Brooks, 2004).

2.2 ERP in China

The history of ERP in China started in the 1980s, when Material Resource Planning (MRP), the former generation of ERP, was introduced in the country. Accompanied with the emergence of a number of prominent foreign (e.g. SAP) and domestic (e.g. UFIDA) vendors, ERP has become increasingly prevalent in China since the late 1990s. Consequently, the ERP market has achieved rapid development in recent years. Data provided by a prominent Chinese consultancy firm (CCID Consulting), quoted by Xue et al (2005), shows that the ERP market size in Mainland China was around US$70 million in 2000 and grew to US$289.96 million in 2004. CCID Consulting (cited by Zhang et al, 2005) reports that China's ERP sales will grow at an estimated rate of 23.5% and reach US$652.8 million in 2008.

Despite this apparent success in ERP adoption, a set of potential barriers embedded in China's context (e.g. cultural, organisational and even political context, etc) and the system itself may prevent Chinese firms from achieving long-term success in the system post-implementation stage.

3. RESEARCH METHODOLOGY

3.1 Research aims and objectives

The main aim of the study reported in this paper was to identify, assess and explore potential barriers that Chinese SOEs may experience during ERP exploitation. Specifically, the research aims at exploring these barriers from diverse cultural, organisational and system aspects. It also attempts to identify and investigate the causes and consequences of the identified ERP barriers by exploring potential correlations between them.

This study attempts to contribute to a research gap that is becoming increasingly important in the field, namely ERP post-implementation within China's context. It is expected to be of particular interest to ERP researchers, practitioners and user companies, and even ERP vendors and system consultants.

3.2 Research Design

It was considered that undertaking a national study of the whole of China would not be an ideal choice, because the current economic situation and context in China is complicated and fluid. Specifically there are important changes occurring in coastal regions, whereas other parts of the country are still very traditionally led by the central government. There are also significant variances in uptake of technology and IS and specifically of ERP in diverse industry sectors. Moreover, due to geographical and political reasons, it is extremely difficult to identify a valid sample to represent all companies in China (Manion, 1994). Therefore

a nationwide study of this type in China is not only unrealistic and potentially unfeasible, but may result in findings that are neither significant nor meaningful (Peng and Nunes, 2007).

Faced with the necessity of focusing the research and the need of identifying a coherent context to carry out the study, the researchers adopted a PEST and a set of SWOT analyses as a combination to narrow the scope of the study, as well as to identify an appropriate industry sector and a region in China to base the study on. This rigorous approach was illustrated and discussed extensively by Peng and Nunes (2007). As a result of the PEST and SWOT analyses, the researchers identified a reasonable and feasible set of Chinese firms for carrying out the research, namely SOEs in the *Electronic and Telecommunication Manufacturing* Sector in the *Guangdong* province of China.

In order to achieve the research aims, the study attempted to seek generalisable statements on barriers that target SOEs may experience in ERP exploitation. Therefore, a deductive research design based on a cross-sectional questionnaire survey was selected. The questionnaire was developed based on a barrier ontology that was created though a process of critical literature review and is presented in figure 1. From this ontology it became apparent that of the 25 predefined barriers, some were related with core business aspects, while the remainder focused on technical issues. This clearly indicated that two different questionnaires needed to be designed to obtain perspectives of both business managers and ICT experts.

In addition, respondents were asked to which extent they agree or disagree with the 25 listed barrier statements. Each item was scored using a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). All barrier items were thus scaled, so that the greater the score, the greater the extent that a barrier exists in the company.

Furthermore, both questionnaire scripts were originally developed in English and then translated into Chinese. Substantial attention had been paid during the translation process in order to ensure that both the English and Chinese versions of the questionnaire were conceptually equivalent, and thereby ensure high internal validity. In order to further improve its validity, the Chinese version of questionnaire was pilot tested with a group of Chinese postgraduate students and researchers in the authors' department as well as Chinese managers working in one Chinese SOE. A number of corrections to the questionnaires were made according to the feedback received from the pilot test.

3.3 The sample

According to statistical data provided by the local statistical bureau, there are 118 SOEs operating in the Electronic and Telecommunication Manufacturing Sector in Guangdong. A complete list of these companies was obtained from the Guangdong Statistical Bureau. The questionnaires were posted to the operation managers and the IT managers of the target SOEs with a cover letter, which explained the purpose of the study, provided assurances about confidentiality, stressed importance of the research and encouraged recipients to reply. In order to increase response rate, a web-based version of questionnaire was also developed. The URL of the web-based questionnaire was embedded in the cover letter. Respondents could thus either complete the questionnaire and return it by using the pre-paid envelope or fill in the web-based version and submit it online. A total of 2*42 valid and usable responses were received and analysed, which represented a response rate of 35.6%.

4. BARRIERS ASSOCIATED WITH ERP EXPLOITATION IN CHINA

The concept of barrier is defined differently in the literature as shown in the two examples below:

> "In relation to accidents, a barrier is an obstacle, an obstruction, or a hindrance that may…prevent an action from being carried out or an event from taking place …" (Hollnagel, 2000).

> "[From the business perspective,] barrier is an obstacle within the business context that prevents business objectives from being realized" (Polikoff et al., 2005).

These two definitions point out that a barrier is an obstacle that prevents an action or event from being carried out successfully. Additionally, it should be noted that a barrier, unlike a risk, has no uncertainty associated to it. That is, a barrier is a factor that is inherent to a given context and thus has 100% probability

of occurrence. Due to this characteristic, a barrier is fundamentally different from a risk. These two terms should thus not be used interchangeably. For the purpose of this research, a barrier to ERP exploitation is defined as follows:

> "Any obstacle or factor that is inherent to the Chinese SOE context or the ERP system itself; and can prevent these SOEs from efficiently using, maintaining and improving the implemented system."

As described above, the first step in this research was a critical literature review aiming at identifying potential ERP exploitation barriers that may exist in Chinese firms. The findings of this literature review were expressed in terms of a barrier ontology (Figure 1). This general ontology consisted of 25 predefined ERP exploitation barriers, which were further divided into three categories, namely cultural barriers, organizational barriers and system barriers. This barrier ontology was used as the theoretical basis to construct the questionnaire of this study.

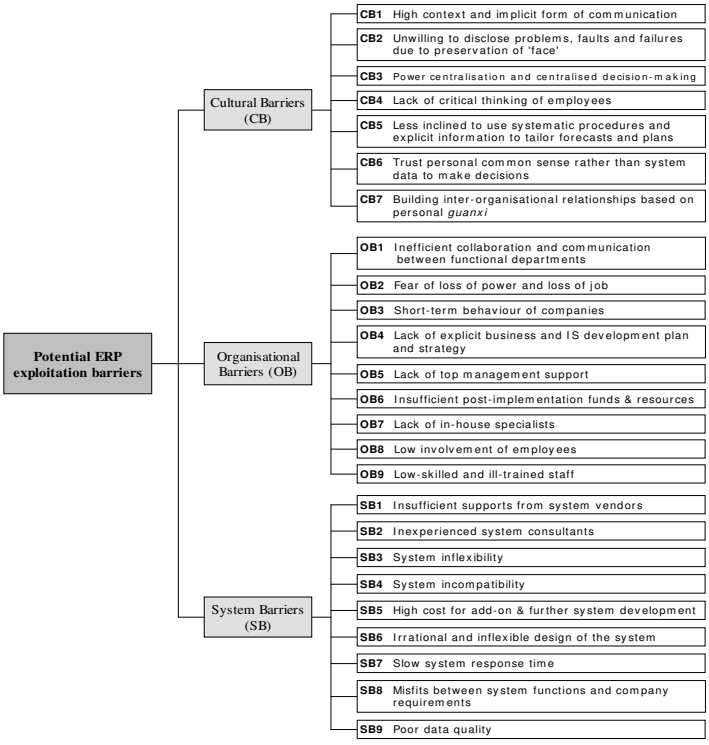

Figure 1 - Theoretical ontology of the 25 predefined ERP barriers

5. DATA ANALYSIS AND FINDINGS

5.1 The nine critical ERP exploitation barriers

The researchers prioritised the 25 barrier variables based on their means, and then identified a set of 9 ERP exploitation barriers that were identified by the participants as particularly important for the target SOE firms (Table 1). A significant amount (24%-38%) of respondents perceived these 9 barriers as critical issues to ERP exploitation in their firms.

It should be noted that the most critical barriers were found around one category, namely the system category. Therefore, it was apparent from the analysis of the questionnaire that the respondents of the survey identified organisational and cultural barriers as less important in their companies. A possible explanation to these findings is that, as a result of China's economic reform and corresponding very recent changes in SOE structures, management and culture, the organisational mechanism of modern SOEs has been gradually but

surely transformed from the traditional Chinese centralised style to a more modern and flexible Western management style (Garnaut, et al, 2005). As a consequence, reformed SOEs, which had to adopt a modern management system, will have a more appropriate environment for ERP adoption than traditional Chinese firms (Reimers, 2002; Zhang et al., 2005). Furthermore, statistical evidence was found in this study's data, which proves that the use of ERP could actually help target SOEs to improve a set of inherent organisational and cultural issues (e.g. power centralisation). As a result of these organisational improvements, many cultural and organisational barriers, that were expected to exist in traditional Chinese firms, might have been substantially resolved in target SOEs.

Rank	Barrier	N = 42	Mean
1	SB1	Insufficient supports and services from system vendors	2.95
2	SB4	System incompatibility	2.86
3	SB7	Slow system response time	2.81
3	SB3	System inflexibility	2.81
5	SB6	Irrational and inflexible design of the system	2.76
6	SB2	Inexperienced and low-qualified system consultants	2.69
7	CB3	Power centralisation and centralised decision-making	2.55
8	OB7	Lack of in-house specialists	2.50
8	SB5	High cost for add-ons and further system development	2.50

Table 1 - The 9 critical ERP exploitation barriers

Nevertheless, Fletcher and Wright (1995) point out that in IS studies, despite other types of barriers (e.g. organisational barriers) are in fact more important than systems barriers, respondents may not often perceive this to be the case. These types of barriers may often be understated by respondents, who may not fully recognise the existence and importance of these barriers (Fletcher and Wright, 1995). It is therefore possible that the cultural and organisational barriers studied in the survey may be, to a certain degree, underestimated by respondents due to a lack of understanding and awareness. In fact, the findings presented below confirm that organisational barriers are in reality as important as system barriers.

5.2 Correlations between the identified ERP barriers

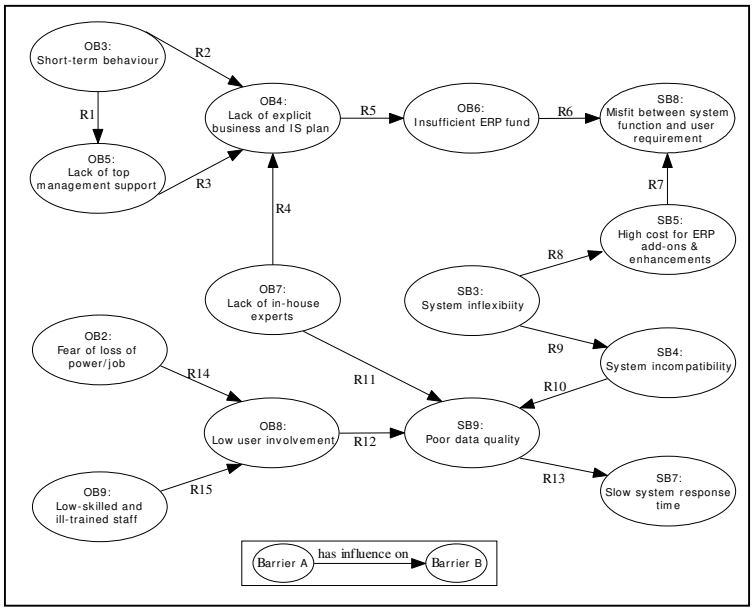

Figure 2 - Concept map of correlations between the identified ERP

The study also aimed at investigating if the existence of a particular ERP barrier in the firm was related to the existence of other barriers. In order to explore potential correlations between the identified ERP barriers, a bivariate analysis was conducted. As illustrated earlier, Likert scales were used in the survey to find out to what extent each barrier existed in a respondent's company, data variables generated were therefore ordinal data sets. According to Field (2005:130-131), Spearman's rho (r_s) is the most common and appropriate approach to use to measure bivariate correlations between ordinal variables. As a consequence, Spearman's rho was adopted for this study. Moreover, one-tailed test was used to test the statistical significance (P value) of each directional correlation identified. By following this

approach, the researcher identified 15 significant relationships between the 25 identified barriers. Figure 2 presents a concept map to summarise and represent these correlations. A full description for each of these correlations is presented in table 2.

	Correlation	r_s
R1	As top managers are more likely to have short-term behaviour, they are more likely to provide insufficient support to ERP.	.584 (**)
R2	As managers in the firm are more likely to have short-term behaviour, an explicit IS plan is more likely to be missing.	.446 (**)
R3	As top management support to ERP is more likely to be insufficient, the firm is more likely to lack an explicit IS plan.	.517 (**)
R4	As the company are more likely to have insufficient in-house experts, an explicit IS plan is more likely to be missing	.507 (**)
R5	As the firm is more likely to lack an explicit IS plan, ERP fund is more likely to be insufficient.	.696 (**)
R6	As ERP fund is more likely to be insufficient, misfit between system function and user requirement is more likely to occur.	.352 (*)
R7	As cost for ERP enhancements is high, system function misfit is more likely to occur.	.312 (*)
R8	As ERP has lower flexibility, cost for ERP add-ons and enhancements will be correspondingly high.	.622 (**)
R9	As system flexibility of the ERP system is low, compatibility of the system will be low.	.474 (**)
R10	As system compatibility of ERP is low, data quality of the system is correspondingly low.	.282 (*)
R11	As the company is more likely to lack in-house expert, data quality of the system can be relatively low.	.396 (**)
R12	As user involvement to ERP is low, data quality of the system is more likely to be low.	.384 (**)
R13	As data quality of the system is poor, system response time of ERP is more likely to be slow.	.400 (**)
R14	As staff fear that ERP can result in power or job losing, user involvement is correspondingly low.	.371 (**)
R15	As staff are more likely to be low-qualified and receive insufficient training, user involvement is lower.	.542 (**)

* Correlation is significant at the 0.05 level (1-tailed); ** Correlation is significant at the 0.01 level (1-tailed).

Table 2. Correlations between the identified ERP barriers

The findings of the bivariate analysis were quite illuminating. Investigating both the list of significant correlations and the concept map, it becomes apparent that the correlations occurred not only between system barriers but also between organisational barriers. Actually, from the concept map it is immediately apparent that the organisational barriers are the main triggers for other barriers, including system barriers. Moreover, the study clearly shows that it is exactly because these organisational and system barriers seem to be interwoven and closely related with each other, that they are so difficult to manage and remove. As a consequence, potential failure of ERP systems cannot be conveniently attributed to system aspects, such as the software package and the ICT infrastructure. Other types of barriers (e.g. organisational barriers) should in reality be as important as the technical ones.

6. CONCLUSION

This paper reported on an exploratory study, which investigated potential ERP exploitation barriers in the context of Chinese SOEs. While some of the findings have confirmed initial expectations, others have been contrary to the initial assumptions deduced from the literature. Specifically, the findings show that most predefined system barriers were identified by respondents as major problems to ERP exploitation. In contrast, due to China's rapid economic development and reform and also because of organisational improvements resulted by the use of ERP, many cultural and organisational ERP barriers, that were expected to exist in traditional Chinese firms, were not identified as critical issues in the target SOEs. It seems that these later barriers were understated by respondents, who may have minimized the existence and impact of these barriers. This understatement was confirmed by a bivariate analysis, which showed that organisational barriers are often the triggers for complex networks of barriers, including the system ones. This suggests that failure of ERP systems may not just be conveniently related to system and technical barriers, but can surely also be attributed to various organisational barriers, such as lack of management involvement in the design and development, lack of management support, internal political issues, or lack of expert support.

This apparent contradiction in the data collected, shows that SOEs may at the moment and due to recent reforms be taking a rather self-congratulatory and somewhat complacent view of their own management practices and organisational structures. Their perception of technical and system risks as being more critical, may blind them to the obvious complexity of organisational barriers, maybe less obvious, but as shown in the

conceptual map in Figure 2, much more complex and difficult to resolve. Therefore, and in order to ensure long-term ERP success, there may be a need to raise awareness on the complexity and networked nature of organisational barriers.

Moreover, it should be stressed that, due to the inherent limitation of a survey research, the quantitative findings derived from this questionnaire may only be generalisable to similar regions, company types and sectors as the ones studied. Further research work in this area is therefore strongly recommended. Further studies may strive to explore potential ERP exploitation barriers in an alternative type of company, region and sector in China.

REFERENCES

Búrca, S., Fynes, B. and Marshall, D., 2005. Strategic technology adoption: extending ERP across the supply chain. *The Journal of Enterprise Information Management*, 18 (4), pp. 427-440

Chen, I.J., 2001. Planning for ERP systems: analysis and future trend. *Bus. Process Management Journal*, 7 (5), 374-386

Davenport, T.H. and Brooks, J. D., 2004. Enterprise systems and the supply chain. *Journal of Enterprise Information Management*, 17 (1), pp. 8-19

Field, A., 2005. *Discovering statistics using SPSS: and sex, drugs and rock'n'roll, 2nd ed*. SAGE, London, UK.

Fletcher, K. and Wright, G., 1995. Organisational, strategic and technical barriers to successful implementation of database marketing. *International Journal of Information Management*, 15 (2), 115-126.

Gable, G., 1998. Large package software: a neglected technology?, *Journal of Global Info. Management*, 6 (3), pp.3-4.

Garnaut, R., Song, L., Tenev, S. and Yao, Y., 2005. *China's ownership transformation: process, outcomes and prospects*. International Finance Corporation (World Bank Group), Washington, D.C., USA.

Hollnagel, E., 2000. *Barrier analysis and accident prevention* [Online]. NASA Human Systems Integration Division, Washington D.C. http://human-factors.arc.nasa.gov/april01-workshop/EH_barrier_analysis.pdf [Accessed 25/01/07]

Koh, S. C., Jones, M. H., Saad, S. M., Arunachalam, S. and Gunasekaram, A., 2000. Measuring uncertainties in MRP environments. *Journal of Logistics Information Management*, 13 (3), pp177-183.

Kumar, K. and Hillegersberg, J., 2000. ERP experiences and evolution. *Communications of the ACM*, 43 (4), pp. 23-26.

Manion, M., 1994. Survey research in the study of contemporary China: learning from local samples. *The China Quarterly*, 139, pp. 741-765.

Møller, C., 2005. ERP II: a conceptual framework for next-generation enterprise systems. *Journal of Enterprise Information Management*, 18 (4), pp. 483-497.

Peng, G.C. and Nunes, J.M.B., 2007. Using PEST Analysis as a Tool for Refining and Focusing Contexts for Information Systems Research. *Proceedings of the 6th European Conference on Research Methodology for Business and Management Studies*, Lisbon, Portugal, pp. 229-237.

Polikoff, I., Coyne, R. and Hodgson, R., 2005. *Capability cases: a solution envisioning approach*. Wesley, California.

Reimers, K., (2002). Implementing ERP systems in China. *Proceedings of the 35th Annual Hawaii International Conference on System Sciences*. Hawaii, USA.

Reuters, 2006. *China is world's 4th largest economy – World Bank* [Online]. Reuters, London, UK. http://today. reuters.com/news/articleinvesting.aspx?type=economicNews&story [Accessed 12/0706]

SAP, 2005. *SAP customer success story high tech* [Online]. SAP, Germany. http://www.sap.com/solutions/busine ss-suite/crm/pdf/CS_Lenovo.pdf [Accessed 12/09/07]

Shehab, E.M., Sharp, M.W., Supramaniam, L. and Spedding, T.A., 2004. Enterprise resource planning: An integrative review. *Business Process Management Journal*, 10 (4), pp. 359-386.

Willis, T. H. and Willis-Brown, A. H., 2002. Extending the value of ERP. *Industrial Management & Data Systems*, 102 (1), pp. 35-38.

Xue, Y., Liang, H., Boulton, W. R. and Snyder, C. A., 2005. ERP implementation failures in China: case studies with implications for ERP vendors. *International Journal of Production Economic,* 97 (3), pp. 279-295.

Yu, C.S., 2005. Causes influencing the effectiveness of the post-implementation ERP system. *Industrial Management & Data systems*, 105 (1), pp. 115-132.

Zhang, Z., Lee, M. K. O., Huang P., Zhang, L. and Huang, X., 2005. A framework of ERP systems implementation success in China: An empirical study. *International Journal of Production Economic,* 98 (1), pp. 56-80.