RESOURCE BASED VIEW OF INTANGIBLES ON ERP SYSTEMS IMPLEMENATION AND ORGANISATIONAL PERFORMANCE IN CHINA

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ABSTRACT

The aim of this study is to determine the relative impact of intangible resources on effectiveness of ERP (Enterprise Resource Planning) system implementation and organisational performance. This study uses survey data from 261 senior executives employed either in the People's Republic of China (PRC) firms, or in China-based foreign joint-venture firms. The structural equation model (SEM) analysis revealed that of the tested intangible resources employed for ERP system implementation; strategic alignment/leadership engagement, and corporate culture had the greatest positive impact on the effectiveness of IT system implementation respectively; resulting in a higher non-financial performance. Contrary to expectations the local Chinese employee values/culture construct exhibited minimal influence on the effectiveness of IT implementation and organizational performance.

Key words: resource based view, cross cultural management, business performance management

INTRODUCTION

Studies based on the Resource Based View (RBV) (Powell and Dent-Micallef, 1997, Hatch and Dyer, 2004, Barney and Clark, 2008) suggest that intangible assets related to IT use (such as culture, trust, HR practices and IT management skills) could have a significant impact on organisational performance. As intangible assets are more difficult for rivals to replicate they could contribute significantly to the competitiveness of a firm. However, there are few empirical studies that explore the influence of intangible resources on IT effectiveness and organisational performance; this study will contribute to this identified gap.

This study investigates the relative impact of key intangible factors on the effectiveness of IT implementation in China, particularly in regard to enterprise resource planning (ERP) systems. Although many critical success factors have been suggested (mainly tangible factors such as hardware and software integration) this study focuses on intangible factors (Somers and Nelson, 2001; Nah et al., 2001; Zhang et al., 2003; Umble et al., 2003). A review of previous studies underscored the grouping of these intangibles into three constructs: (1) HR practices; (2) leadership decision and strategic alignment; (3) and a sharing and trusting organisational culture. As it is well established that different cultural groups have unique values and beliefs which could affect work behaviours an additional intangible construct of employee

values/culture was added; for example collective behaviour is more common in some cultures (House et al., 2001, Hofstede 2001, and Smith et al., 2002). Furthermore, since the majority of participants (98%) in this study were Chinese, Chinese values were included to determine whether personal values/culture influences the effectiveness of ERP IT implementation (Pudelko, 2005).

The contributions of this research are three fold. First, we propose to extend the existing resource based theory to include key IT intangible assets as an integral component to achieve competitive advantage. Second, the framework in this study determines the relative impact of these particular intangible assets on the effectiveness of IT implementation in securing increased organisational performance based on the RBV of the firm; the research results could extend management insights as to the relative value of these intangibles in strategy formulation. Third, with the rapid convergence of best practices, the effect of employee personal values (Chinese employees' values) as an intangible influence on IT implementation to secure high performance is explored. With the increase in convergence of best practice in international business, the working behaviours, values and national culture of local Chinese employees could be an important element in successful IT implementation and organisational performance.

IT SYSTEMS AND ORGANISATIONAL PERFORMANCE

ERP systems are considered to be value creation strategic tools whereby value is derived through: operational performance improvements (Cotteleer and Bendoly, 2006; McAfee, 2002; Hendricks et al., 2007); cost reductions; and customer service improvements (Shang and Seddon, 2002). Translating this conceptual value into concrete value has proved illusive for many firms as ERP systems are complex; implementation requires an organisation wide transition to align business and organizational processes, human skills, resources, structure and culture.

These implementation complexities often result in high failure rates with around 80% of ERP system implementations reported as late, over budget, and/or under-delivering on the anticipated benefits (Başoglu, Daim and Kerimoglu 2007). Despite these poor statistics, firms continue to adopt these systems as part of their overall strategy to develop competitive advantage. The uptake of ERP systems, first introduced into China at the beginning of the 1980s, was initially

slow. Since then, ERP system sales have substantially increased. In 2006, the total ERP system sales (including Western and Chinese made systems) reached 4 billion Yuan (around US\$ 570 million). The number of enterprises adopting these IT systems was around 3000, which is only 3.8% of total enterprises in China (E-work,2006). Overall, 12% of firms reported that they were totally dissatisfied with their ERP performance and only 8% of the firms reported total satisfaction. More than half of the firms in China (both local and foreign firms) that implemented ERP systems were dissatisfied with the expected performance outcomes (Xue et al. 2006)

A review on the effectiveness of ERP systems in China uncovered a number of common success factors including: alignment of strategy, management support, corporate culture, user involvement, training, integration of software and hardware, vendor support, project evaluation processes, communication (Ho, Wu & Tai, 2004), human resource practices (Loh and Koh, 2004, Reimer 2003), organisational culture (Zhang et al., 2003) and implementation (Wang et al. 2005, Xin 2004,). These findings are consistent with results from the West (Reimers, 2003; Loh and Koh, 2004).

THE FOUR INTANGIBLES IN THIS STUDY

Many ERP IT implementation critical success factors ranging from hardware (tangibles) compatibility to organisational and human factors (intangibles) have been discussed in the literature (Hong and Kim 2002; Nah et. al., 2001; Umble et. al., 2003; Somers, 2001; Davison, 2002; Reimer, 2003). A review of these critical factors indicates that intangible factors can be grouped into three broad categories: human resource practices; strategic alignment and leadership engagement; and a trusting and sharing corporate culture. In addition, this study includes employees' values as one of the RBV (resource based view) intangibles since the majority of employees are Chinese and the influence of these employees' value on work practices and IT implementation in China is relatively unknown.

Local human resource practices

Since human capital is an important capability required to sustain corporate performance, HR practices (an intangible factor) in the firm are expected to have an important influence on the successful adoption and implementation of ERP IT systems for high organizational performance. For example, Chan, Shaffer and Snape (2004) and Huselid, Jackson and Schuler (1997) have argued that rigorous hiring and

retention procedures, performance based rewards, extensive training and development programs, planned succession policies and employee involvement are important HR practices that contribute to high organizational performance. Evidence demonstrates that HR practices such as recruitment, reward and performance management may be different in China as compared to the West (Cunningham and Rowley 2007; Warner, 2003; Jaw et al., 2007). This suggests that the alignment of local HR practices (e.g. performance management, autonomy, reward systems, career development and training) could significantly influence the success of ERP IT implementation and positive organisational performance in China. Consequently it is expected that:

H1: Local HR practices have a positive effect on ERP IT system implementation in China

Strategic alignment and leadership engagement

Strategic alignment and leadership engagement can influence the effectiveness of ERP IT system implementation. Leadership engagement with HRM, alignment of competencies and capabilities, leadership vision and change readiness, and involvement of employees in planning and innovation could greatly enhance the competitive advantage of the firm (Hitt et al. 2001). Barney and Clark (2008), argue that the strategic alignment of corporate goals with organisational capabilities and resources is critical to achieve competitive advantage. As studies on the critical success factors of ERP IT system implementation in China (Loh and Koh, 2004; Zhang et al., 2003; Wang, 2003) highlighted the importance of strategic alignment and leadership engagement in realizing organizational benefits from ERP IT systems it is expected that:

H2: Strategic alignment and leadership engagement have a positive effect on ERP IT system implementation in China

Corporate culture (knowledge sharing, teams and trust)

Corporate culture dimensions such as: pride in high quality outputs; open and transparent communication; trust; innovation; belief and commitment to accountability; knowledge sharing; collegial support, team cohesion; and shared vision and values are well documented as being crucial to attaining a high performance culture (Kalliath et al., 1999; Goffee, 2003). Previous studies concluded that knowledge sharing (at the firm level) could increase the level of

IT use, increase operational and service performance of the firm and increase IT assimilation in value-chain activities and business strategies (Armstrong and Sambamurthy 1999).

Based on the RBV, intangibles such as knowledgesharing, trust, and other organisational culture variables (e.g. leadership empowerment, openness and innovation) must be exploited effectively to optimise the value of both tangible and intangible IT assets. The influence of corporate culture on ERP IT system implementation in China was highlighted by Loh and Koh, (2004) and Zhang et al., (2003). They concluded that the main corporate culture barriers to effective ERP IT system implementation were: hierarchical control and bureaucratic policies; top down decision making and the lack of empowerment; and poor performance management controls. Since a number of studies (Davison 2002, Soh et al., 2002) argue that corporate culture is a significant success factor in ERP IT system implementation, this suggests that corporate culture may have a higher impact on the effectiveness of ERP IT system implementation as compared to the other three independent variables. Therefore it is expected that:

H3: Corporate culture (knowledge sharing, trust and teams) has the highest positive effect on ERP IT system implementation as compared to the other three independent variables, namely HR practices, strategic alignment/leadership and Chinese values.

Chinese employee culture/value

Whilst the convergence of global best practices and technology increases competition among firms, national cultures can impact on how global best practices are adopted (von Glinow et al., 2002). Past studies acknowledge that divergence in national cultures, such as Confucian values and high power distance in Asian countries, have to be managed effectively to achieve the desired organisational performance outcomes (Huo, Hang and Napier, 2002). Thus, foreign firms need to "think global, and act local" to integrate into the local market. As the effect of local Chinese employees' culture and values on organizational performance is highlighted in a number of studies (Jaw et al., 2007; Cummingham and Rowley 2007), and since the majority of employees in this study are local Chinese, it is expected that: H 4: Chinese culture/values have a significant effect on ERP IT system implementation in China

ORGANIZATIONAL PERFORMANCE MEASUREMENT

Traditional organisational performance measurements are based on financial results. However, financial results are historical and whilst they may serve as an estimate for future growth, this is a weak proxy for future performance. A more robust measure of organizational performance is the balanced scorecard system whereby a fuller range of potential growth factors, and the firm's strengths, can be included. Kaplan & Norton (2001) proposed that organizational performance can be assessed holistically through employee innovation/learning, process improvement, customer satisfaction and financial results. It is often assumed that an effective ERP IT system will result

in greater organisational performance. Based on the balanced scorecard approach, organisational performance can be expressed in both financial and non-financial (operational) outcomes. Since performance studies in the past have focused on financial metrics, the holistic balanced scorecard approach of performance measurement is limited and inconclusive. Hence, it is expected that:

H5: There is a direct positive relationship between successful ERP IT system implementation and higher organizational financial performance (based on financial figures and customer market share).

H6: There is no direct positive relationship between successful ERP IT system implementation and higher organizational human and operational performance (employee innovation/learning and process improvement).

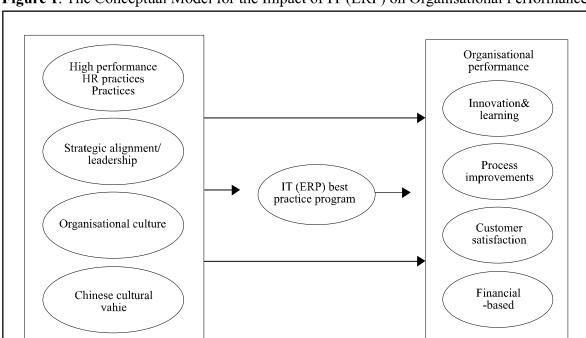


Figure 1. The Conceptual Model for the Impact of IT (ERP) on Organisational Performance

Dependent variable = organisational performance base on the Balanced scorecard framework

^{*}Independent variables = high performance HR practice, strategic alignment/leadership, organisational culture and Chinese culture/values; Mediating variable = IT (ERP) best practice program

DESIGN/METHODOLOGY

Data was collected using a survey instrument; the data was analysed using Structural Equation modelling to obtain the best fit model and path for this study.

Sampling approach

Access to these companies was gained through the relationship sampling approach (Easterby-Smith and Malina, 1999). Snowballing techniques then obtained contacts of contacts. The sample companies were from multiple locations in China, with the majority from Shanghai, Guangzhou, Xiamen, Beijing, Tianjin, Kunming and Chengdu. Out of the initial 380 contacts of contacts, 261 returns were obtained; 199 returns were from Chinese firms and 62 returns from foreign joint venture firms. 4 returns were from solely foreign firms. Since the solely foreign firm category had too few responses for meaningful statistical analysis it was discarded (after a detailed review of the responses in these 4 surveys to ensure that there were no major differences between them and the foreign joint venture responses).

The anonymous questionnaire (in Chinese), covering letter, and self-addressed return envelope were forwarded to the chief executive officer (CEO). The covering letter (in Chinese) explained the purpose of the research, and requested the questionnaire to be completed only by either the chief operation officer, or any senior executive in the company (that is CFOs and COOs). The survey was translated into Chinese from the original English research questionnaire using a thorough back-translation method.

Measures

The questionnaire was structured into six parts. The items for local HR practices were selected from the Huselid et al., (1997) survey. The items for corporate culture were adopted from Kalliath's (1999) organisational cultural survey. Items for strategic alignment were adopted from Bjorkman and Fan's (2002) survey. Items for Chinese values were adopted from Ralston et al., 's (1992) survey; Confucian values such as harmony with others, loyalty to superiors, respect for tradition, and protection of 'face', were included. The items for effectiveness of the ERP IT system implementation were adopted from Xin (2004). The items for organizational performance were adopted from Delaney and Huselid (1996). Since actual financial and performance data is sensitive and therefore difficult to obtain from firms, Delaney and Huselid (1996) obtained data from senior executives through their perceived performance of the firm. The results of these perceived data is considered as

comparable with real financial and performance data. The total items (Huselid's items plus additional ones) used for organisational performance in this study also reflect the balanced scorecard performance measurement approach (Kaplan and Norton, 2001) based on four components: financial, customer satisfaction, process improvement, and employee innovation/learning. All items were structured based on the Likert scale ranging from: strongly disagree of 1 to strongly agree of 7; or not important at all as 1 to extremely important as 7. Demographic data such as number of employees, ownership, industry type and location were also collected.

RESULTS

Multi-group analysis for Chinese and foreign joint ventures

A multi-group analysis was conducted to determine the possible differences in the effectiveness of ERP IT system implementation and organisational performance between the Chinese and foreign joint venture groups. Data from these two groups (199 and 62 respectively) were entered into the baseline (nonconstraint) model and the constraint model simultaneously. The series of Chi-Square tests indicated that there was no statistical difference between these two groups in terms of measurement weights, structural weights, structural covariance, structural residuals and measurement residuals.

Results of confirmatory and structural models

The results demonstrate that all variables had high reliability indexes ranging from 0.826 to 0.953. The results of the confirmatory factor analysis illustrated that the measurement model fitted the data reasonably well. The second step in the two-step structural equation modelling procedure (Anderson and Gerbing 1988) examines the structural weights in Figure 1. The results of this show that the model fit as well as all the path coefficients as summarised in Table 1. Model 1 in Table 1 displayed all the path coefficients while Model 2 indicated the trimmed model, in which only the significant paths were retained. The final model is presented in Figure 2.

Table 1 Standardised Structural Equation Estimation

Standardised Path Coefficients	Model 1	Model 2
Strategic alignment to Performance (F1)	0.374***	0.363***
Strategic alignment to Performance (F2)	0.417***	0.420***
Organisational culture to Performance (F1)	0.045	
Organisational culture to Performance (F2)	0.180*	0.253***
Human resource practice to Performance (F1)	0.184*	0.214***
Human resource practice to Performance (F2)	0.061	
Chinese cultural value to Performance (F1)	-0.069	
Chinese cultural value to Performance (F2)	0.071	
Strategic alignment to IT (ERP)	0.385***	0.392***
Organisational culture to IT (ERP)	0.188*	0.240***
Human resource practice to IT (ERP)	0.097	
Chinese cultural value to IT (ERP)	-0.021	
IT (ERP) to Performance (F1)	0.180**	0.210***
IT (ERP) to performance (F2)	0.032	
Model goodness of fit statistics		
Chi-square	437.00	371.33
Degree of freedom	167	141
P-value	0.000	0.000
Goodness of Fit Index (GFI)	0.874	0.880
Tucker-Lewis Index (TLI)	0.913	0.918
Comparative fit Index(CFI)	0.930	0.932
Root Mean Square Error Approximation (RMSEA)	0.078	0.079

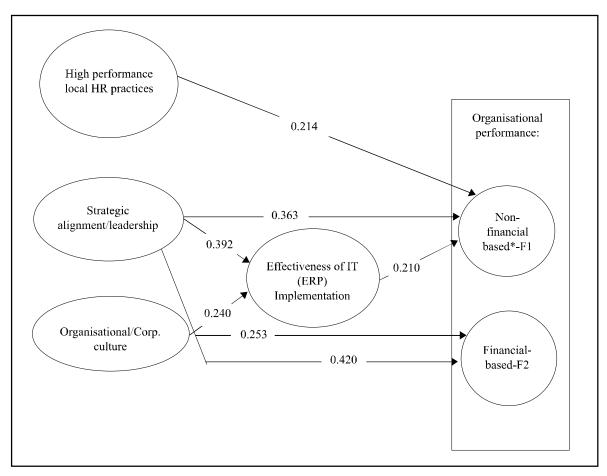
Notes: * denotes that the path coefficient is significant at the 0.05 level, ** denotes that the path coefficient is significant at the 0.01 level, and *** denotes that the path coefficient is significant at the 0.001 level. Performance (F1): performance measured by non-finance elements (organisational learning, innovation, human resource management, and customer satisfaction); Performance (F2): performance measured by finance outcomes and market share.

As Figure 2 shows, the ERP IT system implementation best practice program has a direct positive effect on non-financial organisational performance measured by organisational learning, innovation, human resource management, and customer satisfaction (β =.21, p<.001). There is no statistically significant link between ERP IT system implementation and organisational performance calibrated by financial outcomes. It means that ERP IT system implementation has not made a significant contribution to performance financially to the surveyed participants in China. The strategic alignment and leadership variable is the only construct which made a direct significant contribution to both financial and non-financial performance (β =.420, p<.001 and β =.363, p<.001 respectively). Organisational culture provided a direct impact (β =.240, p<.001) in ERP IT implementation and financial performance (β =.253, p<.001). The local human resource practice has a direct positive effect on nonfinance performance (β =.214, p<.001). Surprisingly, Chinese cultural values had no impact on any elements in the model.

Figure 2: Significant Direct and Indirect Impact of Independent and Mediating Variables on Organisational Performance (Based on the Conceptual Framework)

DISCUSSION AND CONCLUSION

The final model revealed that only "strategic alignment and leadership engagement", and "knowledge sharing, trusting organisational culture" had a direct positive impact (β =0.39 and 0.24 respectively) on the effectiveness of ERP IT system implementation. There is no direct impact of local HR practice on the effectiveness of ERP IT system implementation. Hence, H1: "Local HR practices should have a positive effect on ERP IT system implementation in China" was



(Non-financial Performance- F1- is measured by organisational learning, innovation, process improvement and customer satisfaction; Financial Performance -F2- is measured by profit and market share)

rejected. This was somewhat unexpected because of the strong evidence that local HR practices exert significant influence on the effectiveness of IT system implementation (Jaw et al., 2007, Fang, 2000). This finding may indicate that local firms that have implemented ERP IT systems have adopted HR best practices to optimise the potential benefits of ERP systems and hence this showed no significant impact when compared to the other key independent variables in this study. Alternatively, since local HR practices are standardised by the government, all firms would need to adhere to similar policies. Hence, the impact of local HR practices would be similar among firms and exhibit a weak influence on the effectiveness of ERP system implementation when compared to other independent variables. H2: "Strategic alignment and leadership engagement should have a positive effect on ERP IT system implementation in China", was accepted. This finding was expected since it has been stated that strategic alignment with corporate goals is a key factor in securing competitive advantage and high organisational performance (Barney & Clark 2008); the findings in this study showed that the

alignment of strategic goals had a significant positive result on the effectiveness of ERP IT system implementation. Furthermore, the results also supported the premise that leadership engagement with employees is required in order to operationalise strategic alignment (Soh et al., 2000, Zhang et al. 2003, Wang, 2003).

Since the direct impact of organisational culture on the effectiveness of ERP IT system implementation is less than strategic alignment, H3: "Corporate culture has the highest positive effect on ERP IT system implementation as compared to the other three independent variables, namely local HR practices, strategic alignment and Chinese values", was rejected. This was also a counter intuitive finding because previous studies strongly suggested corporate culture was an important factor in effective ERP IT system implementation (Davison, 2002; Reimer, 2003; Nah et al., 2002). The results also showed that Chinese employee values had no influence on ERP IT system implementation, hence H 4: Chinese culture/values have a significant effect on ERP IT system implementation in China, was rejected. This is a counter intuitive finding and could be explained through considering that globalisation and the concurrent trend of management best practice convergence may be increasingly diminishing the influence of cultural values. As discussed earlier the convergence of global best practices (mainly technical best practices - as a key corporate resource/capability) is gaining momentum and the impact of best practices on organisational performance may have overshadowed the effect of cultural values on performance (Von Glinow et al 2002). Furthermore, the results of this study indicate that the values of Chinese employees in these firms may not have significant impact on the effectiveness of ERP IT implementation as compared with other independent variables used in this study. Also, since the majority of employees in these firms were local Chinese, there may not be significant differences in the impact of national culture/values between firms. However, the divergence of national culture and its impact on organisational performance is still inconclusive given that the employees in this study were mainly Chinese (Huo et al., 2002).

Based on the result that there is only a direct impact $(\beta=0.21)$ of the effectiveness of ERP IT system implementation on non-financial based organisational performance, and no impact on the financial based, H5: "There is a direct significant relationship between successful ERP IT system implementation and higher organizational financial performance (based on financial figures and customer market share)" was rejected and H6: "There is no direct significant relationship between successful ERP IT system implementation and higher organizational human and operational performance (employee innovation/learning and process improvement)" was also rejected. This result is contrary to past expectations. Although Bharadwaj (2000) argued that information technology, as an organisational capability, would result in superior financial performance for the firm, the reality different. Xue et al., (2006) and E-work (2006) reported that more than half of the firms in China (both local and foreign firms) that implemented ERP systems were dissatisfied with their expected financial performance. However, the positive and significant relationship between ERP IT system and non-financial performance was unexpected. This may reflect that the IT system implementation could have a positive influence on how people learn and work in the firm, hence, changing the relationships among employees, team cohesiveness, learning and sharing opportunities and the corporate culture in general. That is the ERP IT system may not yet have had an impact on the financial performance of the firm, but the positive corporate culture supported by the ERP IT system may eventually provide the

expected financial outcome. However, this is an area which requires further longitudinal research.

Finally, the results of this study provide insights into the direct effect of strategic alignment and leadership on both financial and non-financial organisational performance (β = 0.42 and 0.36 respectively). Furthermore, the total effect (via ERP IT system implementation) of strategic alignment and leadership on non-financial performance is higher than organisational culture (β value, 0.39 x 0.21 =0.08 and 0.24 x 0.21 =0.04 respectively). This further supports the relative importance of strategic alignment and leadership as an important intangible factor for ERP IT system implementation and organisational performance.

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