Understanding the Cross-Cultural ERP Implementation Impact: A FVM Perspective

Imran Muhammad  
School of Business IT & Logistics RMIT University, Melbourne, imran.muhammad@rmit.edu.au

Juergen Seitz  
DHBW Heidenheim, seitz@dhbw-heidenheim.de

Nilmini Wickramasinghe  
Epworth HealthCare and RMIT University, Melbourne, nilmini.wickramasinghe@rmit.edu.au

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Imran Muhammad
School of Business IT & Logistics RMIT University, Melbourne
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Juergen Seitz
DHBW Heidenheim
seitz@dhbw-heidenheim.de

Nilmini Wickramasinghe
Epworth HealthCare and RMIT University, Melbourne
nilmini.wickramasinghe@rmit.edu.au

Abstract
Successful adoption and implementation of ERP Systems has been the subject of extensive research as can be evidenced by the large body of research literature on this topic. However, the effect of cross-cultural issues has been less widely studied, perhaps because of the difficulty and complexity of such cross-cultural studies. In today’s global business environment this remains a key issue and critical success factor. Hence, this paper explains how challenging the cross-cultural ERP implementation success is for organizations and how important it is to assess a fit and viability of cross-cultural ERP implementations in diverse cultures (which is especially important in economies heavily reliant on off-shoring services). By drawing upon multiple streams of theory building, a framework, from the Fit-Viability Model (FVM) perspective, is developed. The framework provides important and valuable guiding principles for organizations for their decisions on adoption and deployment of Enterprise Systems (ES). Grounded on the fit-viability framework, the paper advocates the use of a multi-case study approach to examine the success or failure of ERP adoption and implementation. Managers and researchers can use the developed framework to identify the fit and viability of cross-cultural ERP implementations so as to increase the possibility of success.

Keywords: ERP systems implementation, Fit-Viability Model, cross-cultural ERP implementation
1 Introduction

Information technology is a compulsory part of almost every business. Businesses are expanding their boundaries by becoming global businesses. Due to globalization companies are expanding and having their head offices in one country and operations in another, they are trying to find integrated solutions for their business needs to automate their business processes to gain a strategic advantage (Ives and Jarvenpaa 1991). In addition, globalization is compelling and forcing organizations to adopt globally used technologies but the problem organizations are facing is the need to adopt these technologies according to their requirements and best fit having considered their environment, infrastructure, government regulations, and scope of their business, availability of funds and local culture and norms (Ignatiadis and Nandhakumar 2007). The global corporations are becoming more inclusive corporations involving different stakeholders, partners, customers and suppliers from different cultures and different regions; they need more sophisticated means of communication and interaction (Harris, Moran, & Moran, 2004). Since the last decade of the last century we have witnessed a huge growth in the adoption rate of information technology and a big shift towards the deployment of Enterprise Systems (ES) (van Everdigen and Waarts 2003). Most fortune 500 companies have responded positively to the changing global market place and are reaping the strategic benefits by implementing Enterprise Systems (Mukesh and Betsy 2009).

This shift though is becoming problematic. Research (AMR 2008) indicates that 88% of the ERP market is in Europe and North America and systems developed in Europe and North America are embedded with western cultural norms and they tend to clash with Asian and sub-Saharan African cultures. The implementation in diverse cultures is now anticipated to be more challenging because decision makers have to make decisions according to their local criteria (Daneva and Wieringa 2010). The social, economic and technologic factors play a very crucial role in any decision making processes (Huang and Palvia 2001). In a global context where organizations have to work as a networked framework an ERP implementation is more complex and challenging because of the different business processes, available infrastructure, compatibility issues, decision centres, authorization mechanisms and hierarchies, enterprise systems, and data semantics (Avgerou 2008). Businesses would not be willing to change and reveal their trustworthy business rules and processes; therefore, it is important for organizations to find ways to overcome the problems that arises due to the mismatch between the flexibility requirements of business and rigidity imposed by ERP systems (Daneva and Wieringa 2010).

ERP implementation is a difficult and complex decision, system implementation doesn’t mean installing software it is much more than a technology adoption. Rather it involves people issues more than technological issues. Research indicates that people issues are more to blame for the unsuccessful efforts of ERP implementations (Mukesh and Betsy 2009). A recent report (www.CIO.com) indicates a citation from an analyst “no major software implementation is really about the software, It’s about change management”. She particularly emphasises that “when you move to SAP, you are changing the way people work. You are challenging their principles, their beliefs and the way they have done things for many, many years".
ERP implementation problems are more or less strategic, organizational and technical (Holland et al. 2000). ERP implementation is integrally connected to organizations strategic decisions which in turn are designed to gain a competitive advantage.

Despite the significance of the topic of cross-cultural ERP system implementations, very little empirical research has been conducted in this domain. Studies have indicated that culture play a very important role in the process but fail to pinpoint how it affects important and inimitable IT innovations. (van Everdigen and Waarts 2003; Png, Tan and Wee 2001). One reason for this could be due to the lack of a robust and rich models.

By extending the Fit-Viability Model of Liang and Wei (2007) we have developed a framework to bridge the research gap by looking into the impact of national factors on organizational factors in cross-cultural ERP system implementations by conceptualizing the main constraints of system fit for the organization. Then we will evaluate the model and the national factors as well as organizational factors on both strategic and tactical levels for successful adoption and implementation of ERP systems. Soh, Kien and Tay-Yap (2000) had identified that system functionality needs to fit with the adopting organization’s business processes. Fit here is measured by identifying the requirements of adopting organizations with the technology. This fit would be characterized by identifying the tasks an organization wants to perform with technology and how better it fits with the organization’s business processes. Fit would be in the form of a cross-module integration including data standardizations, reporting requirements as well as human resource practices. System success is measured by system performance and system performance will be measured by system use and user satisfaction. Viability here depends on organizational as well as national factors such as political and social, economical, environmental infrastructure/technology and organization factors at a strategic level (leadership, management style, and polices), tactical level (information sharing, training and learning, technical staff, user behaviour).

2 Literature Review
The key relevant areas in the literature are briefly summarised below.

2.1 Enterprise Systems
ERP systems development has gone through several different phases (Khan, Bali, & Wickramasinghe, 2007). The use of information technology in a business has its roots in the early 1950s with the invention of the punch card system by IBM. In the 1960’s, mainframe computers were wide spread and organizations started shifting their financial accounting and inventory management onto computers without any integration. In the, 1970’s the most powerful future leaders of ERP systems like SAP, Oracle, BAAN and JD Edwards were founded and the first child of the ERP family under the name of MRP was born. In the 1980’s the second breed of MRP II emerged with enhanced capabilities of consolidation of materials planning with finance, plants, and people. Client server technologies started to develop and mainframe growth slowed and then stopped. In addition, many early manufacturing software vendors started to vanish. In the 1990s, the term ERP system was first used by the research firm Gartner; ERP systems basically replaced MRP and MRP II.

ERP systems can be thought to consist of different integrated modules of human resource management (HRM), customer relationship management, accounting and finance, production and planning, project management and supply chain management (SCM) which taken
together comprehensively manage, integrate and automate core business processes by providing enterprise wide solutions to an organization’s business problems. ERP systems improve organization performance through enterprise-wide control of operations and management which then help in planning resources and decision making while reducing the operational costs by eliminating the redundant work processes (Ash and Burn 2003; van Everdigem and Waarts 2003; Skok and Doring 2001; Soh, Kien and Tay-Yap 2000; Parr and Shanks 2000; Thavapragasam 2003).

The basis for ERP adoption varies from company to company depending on their need and perceived benefits. There could be many motivational forces for implementation including; one standardized IT platform, data integrity and visibility, better customer care, efficient business processes, better decision making, lack of support for old legacy systems, better return on investment, less operational costs, integration of different systems and platforms (Parr and Shanks 2004). ERP implementation is not only a technological initiative but also considered to be a business project because it involves developing a business case, project planning, software configuration and customization, and business process engineering (Markus and Tanis 1999).

Although ERP systems are very promising; there are reports of difficulties and high failure rates. Most of the failures are due to management, social, cultural and organizational issues but not so much on technical aspects. Avison and Mataurent (2007) have established that national cultural issues have played a significant role in the failure of ERP system implementation projects in China. Other researchers like Applegate, McFarlan and McKenney (1999); Harris and Davison (1999); Tan, Watson and Wei (1995); Bancroft (1996); Burn, Davison and Jordan (1997); Hall (1990); Hofstede (1991); Bendoly et al. (2000) have argued that successful implementations require better understanding of cultural differences because of its significance and impact.

Studies done by Davidson (2002); Soh et al. (2000); Robey et al. (2002); Zhang et al. (2003); somehow successfully recognized many problems linked with ERP implementations. The situation in Asian countries is even more complex and critical (Xue et al., 2004). According to Zhang et al. (2003) the success rate in China is less than 10 % as compared to USA where the success rate is 51% which itself is not very promising. Asian people have different beliefs in sharing information. Employees working in the authoritative environment, like to be told about their day-to-day activities. Organizational processes are more complex and hard to reengineer, processing procedures are complex and incompatible. Information content and data, presentation compatibility is another critical issue (Guo and Miguel 2010).

On the other hand, studies done by Ives and Jarvenpaa (1991); Krumbholz and Maiden (2001); Perez et al. (2000) indicate that the “localization” and “environmental fit” are common hurdles that can hinder ERP system deployment. They proposed that organizational and national culture characteristics play an important role in the success of ERP system implementation. Most of the system development happened in America and Europe, vendors are less informed about the requirements of future customers from emerging economies like China and India and the lack of research about these countries has lot to do with this pitfall (Davison, 2002). Recently Srivastava and Gips (2009); Rabaa'i and John (2008); Peng and Nunes (2010); Zanga et al. (2005); Martinsons (2004); Davison (2002); Soh et al. (2000); Kaye and Little (1996) claimed that the cultural factor is the most critical factor for the success in any IT based project implementation especially for those systems built in western
countries but then implemented in eastern and developing countries. Sheu et al. (2003, 2004) studied the role of cultural and national differences in ERP system implementations in the USA, Europe, Taiwan and China. They found government regulations politics, management style, language, and labour skills are important and critical success factors for ERP system implementations across different nations.

For the measurement of success many authors have used the Critical Success Factors (CSFs) approach and have identified culture as a very important success factor (Esteves and Pastor (2000); Parr and Shanks (2000); Al-Mudimign et al. (2001); Umble et al. (2003); Holland and Light (1999); Tatsiopoulos et al (2003); Motwani et al. (2005)). This approach has its roots in the work of Pinto and Slevin (1987). For instance Esteves and Pastor (2000) developed a unified Critical Success Factors Model; Holland and Light (1999) suggested a model by dividing CSFs into two groups of strategic and tactical factors; and Al Mashari et al. (2003) and Kumar et al. (2003) argued that firms can realize quick performance benefits and smoother implementations if they accentuate and stress on CSFs throughout their ERP deployment.

The success or failure of any ERP implementation depends on how the ERP systems are perceived, treated and integrated. When ERP systems developed in western countries are implemented in eastern countries with quite a different culture, implementation may need to be localized for a better chance of success. On the other hand, companies can potentially lose all or some of the strategic benefits of ERP systems by localizing them. The problems to transfer ERP systems to developing countries range from mismatch with the local culture, economic and regulatory requirements to under or over estimation of perceived benefits of ERP system implementation (Molla and Loukis, 2005). Due to these factors companies thus end up having undesirable designs and reality gaps, which could lead to underperforming systems (Heeks 2001, Walsham 2001).

2.2 Fit-Viability Model

Tjan (2001) proposed fit viability dimensions for evaluating Internet initiative projects. Liang and Wei (2004) by taking these two dimensions and adding Task Technology Fit (TTF) theory proposed a fit-viability model to study m-commerce applications. In their framework, viability measures the readiness of the organization for the technology adoption and implementation, and fit measures capabilities of the systems to optimally perform the required tasks. These two dimensions make a simple matrix with fit on horizontal and viability on vertical axis, as shown in figure 1.

![Figure 1: FIT-Viability Framework (Liang and Wei 2004)](image)

By using the four corners of the matrix, organizations can make an informed decision for technology adoption and implementation. For example developing countries could have better
political stability, growing economy, better environment, and more stable telecommunication and information technology infrastructure, which mean the system could rate high on viability but the task does not fit the nature of an ERP system would lead to unsuccessful projects. For example, for a multinational corporation (MNC) having operations in two different geographical locations such as USA and China, a system could have high viability and high fit in the USA, but high viability and low fit in China because of different data structure, reporting procedures and business processes which means the system has to be customized according to the local organizational and cultural requirements or the business has to go through organizational restructuring or Business Process Re-engineering (BPR), which could lead to complications, delays and budget overruns. Only those systems with high task-technology fit and high viability are good targets.

2.3 Task-Technology Fit
The theoretical basis of the fit construct is derived from the Task-Technology Fit model which according to Goodhue (1995; 1998) argues that a fit between task characteristics and system features need to be high for the better performance and success and this will have effect on the decision making process of an organization. Research (Madapusi 2008; Soh et al. 2000; Goodhue 1998) has indicated that if a system is more aligned with the requirements of the users there are greater chances of system success which leads to better performance. It means that if the features offered by the system fit with the task requirements the users will be more incline to use it.

2.4 Viability
Viability refers to the degree of impact of national and organizational factors on a system adoption and implementation decision. These factors at the national level include political and social, economic, environmental as well as infrastructure/technology factors. At the organizational level literature has proposed many factors at the strategic and tactical levels (Umble et al., 2003; Ang et al., 2002; Poon and Wagner, 2001). These factors include leadership, management style, polices, information sharing, training and learning, technical staff, and user behaviour. Taking the example of China, Huang and Palvia (2001) suggest that economic and technological factors are crucial factors in cross-cultural ERP system implementations; and ignoring these factors could lead to unsuccessful projects. Molla and Arjun (2006) argued that stable economic growth and strong IT infrastructure could create better business environments and innovation adoption, positively affecting viability of the system.

3 Research Framework
The research framework shown in figure 2 illustrates the key constructs and factors affecting ERP system implementations. Fit will be measured by matching the requirements of the organization with the functionalities offered by the system e.g. data format, operating procedures, and output format. Viability will be measured by assessing the impact of national and organizational factors on the adoption decision of the organization.
4 Methodology

Based on the criteria given by Yin (2010); the appropriate choice of methodology to test the use and usability of the proposed framework (figure 2) is a qualitative Multi-case study research because this is an exploratory study of a new phenomenon of cross-cultural ERP systems implementation. Further, we wish to explore how an ERP solution in different countries and in different industry sectors can be implemented successfully and what are the factors that impact on the implementation and adoption of these IS based interventions. Qualitative research is holistic, humanistic, and interactive, it can provide more support to focus on the study of a complex phenomenon of human and system interaction and relationship; as in our case cross-cultural ERP implementations (Motwani et al. 2008; Yin 2010; Yin 2009). Qualitative research can provide deeper understanding of the phenomenon as compared to quantitative study because of the exploratory nature of the study and focus which would not be on quantitative measures (Trochim & Donnelly 2008). The chosen case studies are from Australia Germany and USA. To make the study more robust we have chosen three different sectors as depicted in the figure 3.

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<tr>
<th>Industry / Country</th>
<th>Australia</th>
<th>Germany</th>
<th>USA</th>
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<td>Automotive</td>
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Data will be collected by employing variety of data collection techniques. This will include in-depth, open-ended unstructured interviews with key informants from the respective group of different key stake holders in ERP implementation projects in the chosen countries and
industries. These stakeholders will include project and IT managers as well as ERP systems service providers. Standard techniques of qualitative analysis such as coding and thematic analysis will be employed (Boyatziz, 1998; Kvale, 1996).

5 Discussion and Conclusion

The purpose of this research in progress paper is to conceptualize a framework to investigate cross-cultural ERP implementation implications, since we recognize that with e-innovations not only the technology solution is necessary but it is also critical to look at organizational and societal aspects concurrently especially in today’s global business environment. ERP system implementations comprise of technology as well as human involvement. In view of this it is important to investigate the impact of political and social, economic, environmental and infrastructure/technology factors on the organizational decision making. We propose the importance of studying the system viability and fit before making any decision about system adoption and deployment. Technology needs to have a good fit to perform the required tasks, then we anticipate that system viability and fit should have positive effect on the organization’s performance and that can be measured by system use and user satisfaction.

Based on this conceptual paper, we plan to pursue a tri-country study, in particular focusing on Australia, Germany and the USA, in order to test the use and usability of our proposed framework. Given the large uptake of ERP systems in all these three countries in addition to the fact that businesses in these countries have offices in developing countries and emerging economies we are confident that such a study will serve to provide us with insightful data and key results that will in turn serve to provide the necessary empirical evidence to support the proposed framework. Clearly, until such empirical data can be provided any proposed framework remains theoretical and its practical relevance can be questioned. This limitation with our current conceptualization, while out of scope for this present paper, will be addressed in our follow up future work. We have outlined the research methodology and research design we will follow and plan to commence on the receipt of ethics clearance. The current paper serves to identify the key challenge of cross-culture with regard to ERP implementation and present the proposed integrative framework as a contender to address the key problems of failure of ERP systems today due to poor or no cross-cultural conceptualisation.
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