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Differences in Critical Success Factors in ERP Systems Implementation in Australia and China: A Cultural Analysis

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Abstract-Enterprise Resource Planning (ERP) systems are integrated, enterprise-wide systems that provide automated support for standard business processes within organisations. They have been adopted by organisations throughout the world with varying degrees of success. Implementing ERP systems is a complex, lengthy and expensive process. In this paper we synthesise an ERP systems implementation process model and a set of critical success factors for ERP systems implementation. Two case studies of ERP systems implementation, one in Australia and one in China are reported. The case studies identify which critical success factors are important in which process model phases. Case study analysis then explains the differences between the Australian and Chinese cases using national cultural characteristics. Outcomes of the research are important for multinational organisations implementing ERP systems and for consulting companies assisting with ERP systems implementation in different countries.

I. INTRODUCTION

Organisations have been increasingly moving towards purchasing software packages throughout the 1990s. Enterprise Resource Planning (ERP) systems are comprehensive, fully integrated software packages that provide automated support for most of the standard business processes within organisations. A company's investment in ERP systems is typically measured in millions of dollars [1] and the total market for ERP systems is forecast to be over $70 billion dollars by 2002 [2]. The benefits claimed for ERP systems are reduced operating and maintenance costs for information systems, reduced administrative expenses and more efficient business processes, better quality information for decision making, and increased capacity to handle growth [1,3].

There is strong evidence that many ERP systems implementation projects are not completed on time and within budget [1] and there are reports of complete ERP implementation failure [4]. Although some of these problems may be due to poor cost and time estimation and changes in project scope [2], ERP systems implementation projects are complex and careful planning is critical. ERP systems have been adopted throughout the world in many different cultural settings. To date, there is little published research on ERP systems implementation in general and no published work on cultural differences in ERP systems implementation.

In order to better understand and plan for ERP systems implementation, we first synthesise an ERP systems implementation process model and develop a set of critical success factors for ERP systems implementation from previous empirical studies reported in the literature. We then report two case studies of ERP systems implementation, one in Australia and one in China, to determine which critical success factors are most important in which phases of the process model. Differences between the Australian and Chinese cases are then explained using national cultural characteristics.

The contributions of the paper are important for both practitioners and researchers. The process model and critical success factors will provide a useful guide for organisations planning to implement ERP sytems. Multinational organisations planning to implement ERP systems in western and Chinese cultures should gain insight into important differences in the implementation processes that should be used and the critical success factors that are most relevant. International consulting organisations also will benefit from these insights.

II. THE ERP IMPLEMENTATION PROCESS

The ERP implementation process concerns all aspects of implementation including developing the initial business case and planning the project, configuring and implementing the packaged software, and subsequent improvements to business processes. ERP implementation should therefore be considered a "business project rather than a technological initiative" [3].

Ross [5] developed a five phase ERP implementation process model based on fifteen case studies of ERP implementation. The phases are design, implementation, stabilisation, continuous improvement and transformation. The design phase is mostly concerned with selecting the ERP system, scoping the project and formulating the system architecture. The implementation phase involves configuring and implementing the software and is highly disruptive for organisations and performance drops accordingly. After initial implementation, a stabilisation period occurs when implementation problems are fixed and organisational performance improves. Ross notes that most organisations remain in the stabilisation phase for many months and sometimes years. The continuous improvement of processes follows and finally major process transformation is enabled. Few organisations ever reach the transformation phase although most plan to. Ross notes that large ERP system implementations may involve different cycles through the process model for each separate module within the ERP system.

Markus and Tanis [3] developed a four phase ERP implementation process model. The phases are chartering, project, shakedown, and onward and upward. The chartering phase includes development of the business case, selection of the ERP package, identification of a project manager, and approval of budget and schedule. The project and shakedown phases are very similar to the implementation and stabilisation phases in the Ross model. The onward and upward phase involves continuous business improvement and transformation corresponding to the last two phases of Ross's model.

A synthesis of these two process models leads to the four-phase process model shown below in Fig. 1. The planning phase includes both the broader business focus of the Markus and Tanis chartering phase and the more technical project

focus of the Ross design phase. The next two phases are implementation and stabilisation; these are taken directly from the Ross model. The final phase is improvement and includes both incremental and radical improvements to business process enabled by the implemented ERP system corresponding to the onward and upward phase of Markus and Tanner.
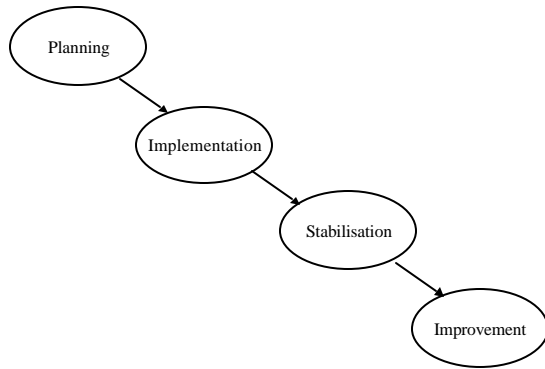

Fig. 1. Synthesised process model for ERP implementation.

III. CRITICAL SUCCESS FACTORS FOR ERP IMPLEMENTATION

The notion of "success" changes as the implementation project unfolds. For the first two stages, success is mainly concerned with completion of the project, to acceptable standards, on time and within budget. For the last two stages, success is more concerned with the perceived contribution of the system to organisational performance. Throughout, the success would be assessed from the point of view of senior management [24].

Critical success factors have been defined as "those few critical areas where things must go right for the business to flourish" [6]. They have been applied to many aspects of information systems including project management, manufacturing systems implementation, reengineering, and, more recently, ERP systems implementation [1, 2, 7]. Critical success factors are particularly useful to practitioners as they provide clear guidance on where to focus attention and resources in planning an ERP implementation project.

Most of the previous research on critical success factors in ERP systems implementation has developed prioritised lists of factors (see for example [1, 7]). Holland, Light and Gibson [2] grouped their set of critical success factors into strategic and tactical factors, thereby providing additional assistance to managers planning ERP implementation projects. In this paper we first synthesise a set of the eleven most important critical success factors for ERP systems implementation from the literature (in particular from [1]), and then we ask case study participants to indicate which of these factors are most important in each of the four phases of the ERP implementation process model described above.

The eleven critical success factors synthesised from the literature include:
- Top management support: the positive commitment, enthusiasm and support of senior management for the project [1,2,7].

- External expertise: the use of the knowledge and experience of external consultants [1,2,7].
- Balanced project team: a mix of IT and business people with broad understanding of business processes [1,7].
- Data accuracy: data loaded from existing legacy systems must be of high quality [1].
- Clear goals: the project must have clearly defined and well understood goals [1,2].
- Project management: a detailed project plan related to the project goals should be defined [2,7].
- Change management: careful attention must be given to change management, as the ERP implementation will involve changes to business processes [1,2,7].
- Education and training: both technical knowledge about the ERP system and its reference models and knowledge about its operation and use for IT and business people [1,7].
- Presence of a champion: an individual, not always a senior manager, who consistently advocates the benefits of the ERP system [1,7].
- Minimal customisation: minimising the scope of the ERP system implementation and the amount of customisation and option selection [1].
- Best people full-time: project team members from within the organisation need to be fully released from other duties during the ERP implementation project [1].

IV. CULTURAL ISSUES IN INFORMATION SYSTEMS IMPLEMENTATION

Culture has a substantial and definite influence on organizations, organizational behavior, and the management of organizations [7,8,10,11,12,13,14,15,25]. Many difficulties have been faced when implementing and using western technologies, management processes, information systems methods, and information systems techniques in developing countries [16,17]. In this context it can be argued that cultural differences will mean that factors important in one culture may be less important in another, and vice versa.

Culture is a set of shared beliefs within a country or community where a person lives. Culture is learned; it cannot be inherited [9]. It reflects the ability of humans to feel, communicate and learn. If we agree that culture is learned, then it will affect behavior at the organizational and at the individual level. Therefore, culture imposes rules, values, and practices for societies. At the cultural level, Hofstede [9] argues that there are four elements that can be used to identify differences between one country and another. These are listed below with specific comments regarding differences between Australia and China:
- power distance - used to indicate the dependence relationships in a particular country. Australia has low power distance with flatter organizational structures and less centralised authority and power. China is more hierarchical with high power distance and more centralised authority;
- individualism and collectivism - collectivism is concerned with group interest rather than individual interest. Australians tend to be individualist while China is a collectivist society;
- uncertainty avoidance - the extent to which the members of a culture feel threatened by uncertain or unknown situations. Australia exhibits low uncertainty avoidance

and generally accepts risk taking as an integral part of business life. China is moderately high in uncertainty avoidance and thus there will be anxiety about ambiguous situations and unfamiliar risks. Precision becomes very important; and

- masculinity and femininity – the extent to which dominance is used and perceived in a society. In a more feminine society such as China, managers generally use intuition as much as logical thinking to solve problems. In the moderately masculine society of Australia, managers are more aggressive. "Big" is seen as beautiful. Money and rationality dominate.

Whilst Hofstede's model has been criticised for its reliance on a single organization (IBM) and for suggesting that the four dimensions alone are sufficient enough to frame all aspects of culture differences [18,20], it is widely used to explain cultural differences in organizations and effective use of information systems. These categories in their own right are useful only in that they highlight some differentiation of culture. Others [8] [9] [10] [26] have shown that value sets and ideologies are more representative of cultural difference and inform cultural behavior in more understandable ways. Culture in the Hofsted context is oversimplified and too generalized. However, it remains a key starting point in any analysis of culture and its impact on Information Systems. Burn, Davison and Jordan [8] suggest that Hofstede's research is dated and has not been substantiated within the context of the 1990s and after twenty years of innovation and information technology diffusion through societies.

In their recent review of the existing culture literature, Burn, Davison and Jordan [8] have argued for a culturally informed information acceptance model. They claim that the way in which information is accepted is central to the way information systems are used within an organization or in a society. Understanding the impact of societal culture and the cultural assumptions that frame that society impacts on the way that society and those individuals and organizations within it accept and use information. In the Chinese context this is informed by the concepts of Confucianism [10, 27]. They suggest that "a change may have to be effected in the information culture before the innovation can produce the expected results" [8]. In such circumstances individuals and organizations recontextualise information [19] and adapt it to their cultural mores and values [20].

Realistically though, the cultural impact referred to above is perhaps oversimplifies the situation. Like any society and like any set of organizations there is a spectrum of acceptance and practice from those organizations and those individuals who act within the frameworks outlined above to those that totally reject and avoid that form of behaviour. In the case of Elevatorco in this case, it is a joint venture between a Chinese partner and a Japanese manufacturer. Thus the activity of management will be fused with a mixture of Chinese ideology, Confucian behaviour, and Japanese management practices. Such fusion complicates and blurs any interpretation other than suggestive remarks about what may or may not be apparent. It is only in a larger report where the hermeneutic analysis of the narrative collected in the research process can be reported that any differentiation of this kind can be fruitfully reported.

In this paper we use two case studies, one from China and one from Australia, to compare critical success factors in ERP systems implementation. To enable us to make sense of the differences noted, the analysis is couched within the framework proposed by Hofstede [9, 25] and modified by Burn, Davison and Jordan [8].

V. RESEARCH METHOD

The case study research approach is used in this study. Case studies are used to study phenomena within their real world context [21], and may be used to build theory [22]. In this study, a process model and a set of critical success factors were synthesised from the literature and provided a framework from which interview protocols were developed and the case study data presented. The unit of analysis in the study is the project team responsible planning and implementing ERP systems implementation, and the users of the ERP system. Case study data was collected by two of the authors using interviews of approximately one and a half hours duration and based on the same interview protocol. Various stakeholders were interviewed including those involved in managing, planning, implementing and using the ERP system. Documentation about the systems was also used in data collection.

Two case studies are reported in this paper, one from an Australian company and one from a Chinese company, to enable cross case comparison. Interviews were conducted with several different stakeholders within each of the companies. Other data was collected from project documentation and other company literature [23]. Data were collected in 1999, based on recollections of key players. Data collected included general background information about each company, details about each of the phases in the ERP implementation process model, and the success factors considered most important in each phase. Both cases were perceived within each company to have been successful ERP system implementations and to have brought considerable benefits to the companies.

VI. THE CASE STUDIES

In this section, data from two case studies, one in China and one in Australia, is presented. A general introduction to the organisations involved in each case study is provided first followed by a tabular summary of the details for each phase in the process model, including the most important critical success factors.

The Chinese case study involves Elevatorco, a large elevator company in China, with annual sales of US$450 million in 1998. It has 20% of the market share for elevators in China and an annual growth rate of 15% in terms of both revenue and production. Information systems within Elevatorco in the early 1990s included a number of different hardware platforms and a variety of software packages. Data redundancy was widespread, maintenance was expensive and senior management believed that these problems would limit future growth of the company. Relative to the Australian case, the general level of technological sophistication of both user and IT staff was lower in Chinese company than in the Australian one.

The Australian case study involves Oilco, a refiner and marketer of a broad range of petroleum products in Australia and eleven countries in the Pacific. As one of Australia's major industrial companies, Oilco directly employs over two thousand people and owns assets valued at aproximately A$2 billion. Oilco is the Australian subsidiary of one of the

world's largest multinational oil companies. It has a nationwide network of eighteen hundred locations, is one of the four major oil companies in Australia, and enjoys a substantial marketshare. In the late eighties the global oil industry underwent significant restructuring and increasing competition. As a consequence, Oilco wished to implement a new information system to achieve fully integrated process automation, improved levels of customer service, and to facilitate planned business restructuring. To meet these business requirements the company selected, in 1989, a mainframe based ERP solution. With sixteen hundred users in Australia, New Zealand and the Pacific Islands, this ERP system is now one of the largest and most complex mainframe implementations in the world. It processes 25-35,000 transactions per hour, and handles over one thousand orders per day across the country. The implementation of the system involved major change to the company's business processes so that they matched the ERP's processing methods. While recognising that some existing business process changes were necessary, Oilco aimed to maximise the integration benefits of the ERP and simultaneously to streamline the company's existing processes. The implementation also involved development of an oil-industry specific module. The ERP has now been implemented for over four years, and the business benefits are substantial. They include better sales forecasting, fully automated ordering and delivery processes, real-time financial data, improved data quality and streamlined business processes. Overall, since implementation, Oilco has been experiencing continuous improvement in its IS function.

Table 1 below summarises the case study results for the two companies. At each stage of the implementation, critical success factors that differed in the two cases are highlighted in bold.

TABLE I: Case Study Data

	Elevatorco	Oilco
Planning	An information technology strategic plan, initiated by senior management and released in 1995, recommended the implementation of an ERP system throughout all areas of the organisation. The ERP system was intended to support rapid business growth, address data sharing issues, obtain a competitive advantage and introduce "best practice" process management techniques. *"In 2001 our production is expected to rise to 10,000 elevators per year. We believe an ERP system will help our business to be more efficient and profitable in the long run".* Selection of the ERP system involved evaluation of four western ERP products and vendors over a two year period. A contract was signed in 1996 to implement SAP. *"We wanted a system that was the best quality at that time. SAP was the largest ERP vendor in China and the world. We thought that SAP was the ultimate system for our needs."* A staged implementation was planned with the materials management, financials and accounting, sales and distribution, planning and production, and field service modules implemented sequentially. A detailed project plan was developed based on the clear project goals of staged implementation a complete SAP system with minimum customisation. Critical success factors identified by case study participants in the planning phase were (in order of importance): 1. *Top management support*: believed to be critically important in the early stages of the project to provide leadership, direction and necessary resources. 2. *Balanced project team*: a mix of IT and business people with broad understanding of the company's operation. 3. **External expertise: in both SAP processes and technical aspects, and also knowledge of implementation process.** 4. **Project management: a detailed project plan should be established early in the project** 5. **Clear goals: need to be defined for the project.**	In 1988 the international parent of Oilco had been searching internationally for package solutions which could become global standards. A pilot ERP project began in Europe. In Australia, that ERP was evaluated primarily to ensure it would meet business requirements for pricing and sales processing. The evaluation team recommended the strategic use of the ERP not just for pricing and sales but to support system integration, and to reduce costs by minimising the number of application technical platforms that were being supported. The directors of Australia Oilco and New Zealand Oilco agreed, and the decision was made to adopt a core application strategy. In 1990 a project team was assembled to implement the ERP in multiple stages. Stage 1 covered financials and purchasing for Australia and NZ, and sales and pricing for Australia. Stage 2 covered logistics and plant maintenance for Australia Stage 3 extended this functionality to the Pacific Islands. Stage 4 was intended as a rollout of the Australian design to NZ, but some local changes were required.. Critical success factors identified by case study participants in the planning phase were (in order of importance): 1. *Top management support:* critically important to engender commitment, provide resources, provide project structures and reporting mechanisms. 2. ***Presence of a champion:* the drive for the system came from a USA MD, who promoted the ERP as a global strategy. Subsequently, the project was driven by the Australian MD and the Finance Director during this phase.** 3. *Balanced project team:* a mix of business and IT resources from Australia and NZ were assigned to the project team. Additionally many Local User Experts (LUEs) were assigned to provide ongoing support.

	Elevatorco	Oilco
Implement-ation	The project was managed by an account manager from the ERP vendor. The project team consisted of IT staff and end users from many different parts of Elevatorco, each with carefully planned roles. After the objectives of the project were clearly communicated, the team members were trained by the vendor. Team members were pleased with the level of management support provided and with the clear plan for staged implementation of the ERP system. *"We believe that senior management assigning us to a team early on in the project and providing us with necessary training helped us greatly in adapting to the new system".* For each module, requirements were established, a prototype system implemented and then assessed, the final version implemented and users trained. During implementation, the performance of the company was perceived to have dropped, but only marginally. Critical success factors identified by case study participants in the implementation phase were (in order of importance): 1. *Balanced project team*: again, a mix of IT and business people is important 2. *Project management*: a detailed and stable project plan. 3. ***External expertise*: external consultants with necessary SAP expertise.** 4. ***Data accuracy*: data must be cleansed and transferred to the ERP system to ensure no disruption to performance.** 5. *Top management support*: although not considered as important as in the planning phase, leadership and support for the project direction from top management remains important	The ERP implementation project was set up, under the leadership of a venture manager who came from the UK, as a different organisation to IT. The venture manager reported directly to the CEO Australia. The team consisted of business and IT personnel from both Australia and NZ, and consisted of 90 full-time people plus another 20 who developed documentation, plus the LUEs. Project managers for each application area were responsible for a number of application teams. These managers reported to the venture manager. A steering committee had overall responsibility for the whole project. Oilco did not have an Implementation Partner in project management. Selective use was made of part-time ERP consultants. After the 1st stage, Oilco took on the training, and relied heavily on its own personnel to give credibility to the project. An overall aim of the project team was to, where possible, adapt to the ERP. This was referred to as the 80/20 rule, and meant that the company was prepared, most of the time, to re-engineer business processes to map onto the ERP. This however was not achieved as much as was hoped. Also, they needed specific oil industry functionality, which had to be developed as a separate module. Critical success factors identified by case study participants in the implementation phase were (in order of importance): 1. *Top management support*: required to provide more resourcing than originally expected, to 'sell' the system via presentations around the country, newsletters etc; to overcome resistance in some sites; to resolve conflicts over process design 2. ***Best people full-time:* given its scope and length, this project had to have people who had a deep understanding of business processes, and who were not distracted by other roles.** 3. *Balanced project team:* required the right mix of technical and business skills. LUEs were involved in testing, data purification and setup, documentation review, training, and other implementation tasks. They also provided credibility and engendered ownership of the system. 4. *Minimal customisation:* substantial adherence to the 80/20 rule facilitated the meeting of time and budgetary constraints, particularly during later stages. 5. ***Presence of a champion:* the project took 7 years. Senior management, who initially championed the project, moved on, and the role of champion was taken by the venture manager and the finance manager. This was necessary to maintain focus, commitment and enthusiasm over the life of the project, particularly when a major company re-organisation took place.**
Stabilis-ation	Problems in stabilisation were minimised by extensive training of system users and by the enthusiatic adoption of the ERP system by end users. However, there was some adjustment to business processes required and ongoing problems with data accuracy. *"When the system went live, there were still many problems of transferring the data over from the old system and getting the users used to the new system".* By mid 1999, the materials management, financials and accounting, sales and distribution, and planning and production modules had been implemented and stabilised. With each module, improvements in company performance became apparent after several months. The ERP system has enabled the company to increase its production and market share without increasing the number of employees. Critical success factors identified by case study participants in the stabilisation phase were (in order of importance): 1. *Balanced project team*: a mix of IT and business people is important 2. ***Data accuracy*: high quality data is very important in the integrated environment of an ERP system.** 3. ***Education and training*: provision of training for users of the ERP system was critical as many had very little IT experience at all.** 4. *Top management support*: continued support from top management remains important throughout the project.	Problems with culture change was a significant finding of a 1995 post-implementation review. Response to the system was mixed. Some users adapted to it easily, but the review showed that for many users there were significant problems. The ERP incorporated concepts that were not created by the company. Some of the business changes introduced new ideas. As a result many users found the transition from the customised to the package system very difficult, and they perceived the system as "unfriendly". The screens contained terms that were foreign to their experience; and they had to adopt a more regimented approach to data quality and timeliness. The changes to familiar business processes involved radically different concepts and for many people it required an unexpectedly long acclimatisation before they could use the ERP competently and effectively. One consequence of deficient skills was infrequent system use, which in turn resulted in lower motivation to use the system. Also the changes to business processes sometimes required people to process transactions that would previously have been handled by someone else. However, with each stage of the implementation these problems lessened, because greater attention was paid to user motivation and thus realisation of the system benefits. Critical success factors identified by case study participants in the stabilisation phase were (in order of importance): 1. ***Best people full-time*: again the role of the LUEs was critical in resolving user issues, training, and encouragement to become proficient users of the system.** 2. *Top management support*: required to overcome the problems with frequency of usage and to ensure adequate skilling and training for users. 3. ***Change management*: Careful management of changes to business processes was required to overcome resistance.**

	Elevatorco	Oilco
Improve-ment	Elevatorco considers itself to be still in the stabilisation phase of ERP implementation and expects to be there for some time to come. They are more concerned with tuning the system and refining the interfaces between implemented modules. They believe it will be a long time before major process transformation will be considered.	The ERP has been fully operational for four years. The teething problems experienced in the stabilisation phase have been surmounted, however no major further reengineering of business processes has occurred. Post implementation assessments have not included a quantitative audit. A series of re-organisations in response to market conditions reduced the number of employees significantly and increased productivity. It is unclear what contribution the ERP made in achieving these quantitative benefits, although it has clearly been an enabler of substantial cost reduction. The company has experienced many benefits from the real-time integrated system. These include: • Consistency and quality of data is much improved • An accelerated integration of operational activities between Australia and NZ • "Data analysis capabilities are phenomenal" • Reduced inventory and receivables • Improved sales margins • Real-time accounting (used to be month-end) • Headcount savings in business and in IS

VII. DISCUSSION

The synthesised process model for ERP systems implementation provided a useful means of collecting and describing case study data. In Elevatorco the improvement phase was not yet reached, although some process improvement had occurred during implementation and stabilisation. In Oilco the system has been largely stabilised and minor continuous improvement is taking place. There is no evidence of any transformation as in the Ross model. Both organisations remained in the stabilisation phase for a considerable amount of time.

A number of similarities were evident between the two projects. Both projects were large-scale implementations of ERP systems that were implemented in a staged method. Both projects were critical to the ongoing success of the companies. Two critical success factors were clearly similar in the first three stages of the synthesised process model model. First, top management support was important in both companies throughout all three stages, though its importance varied from stage to stage. In the early stages of the ERP implementation projects, top management support was clearly critical. Top management support is necessary for initiation and ongoing resourcing of such large, expensive and critical projects. Second, the need for a balanced project team was identified as a critical success factor for all three stages in Elevatorco, and for the first two stages in Oilco. Balanced project teams contribute to project success by providing of a mix of IT people with ERP knowledge and end-users with a good understanding of organisational processes.

A number of differences were also evident. First, the presence of a champion was considered important in Oilco but not mentioned at all in Elevatorco. We suggest that in the Chinese context, the concept of a champion, as distinct from top management, is not important because the top manager is perceived to be champion. By contrast, in the Australian context, the champion is often a subordinate. In the Chinese context such a champion would be seen as a challenge to the authority and position of top management.

Second, change management was considered important in the stabilisation phase at Oilco but not mentioned in Elevatorco. Change management in an Australian context refers inevitably to enabling change through manipulation of or challenges to existing organisational culture. By contrast, in the Chinese context, organisational culture is imposed; it is determined by top management. What top management insists on will happen. Change management in the Chinese context is then not important. Change is accepted if it is demanded.

Third, external expertise was considered very important at Elevatorco but not mentioned at Oilco. One explanation for this emphasis on technical expertise is that staff in Elevatorco were less technologically sophisticated than those in Oilco, so they perceived access to expertise as a critical success factor. However, another explanation is that in the Chinese context the implementation of SAP resulted in the development of trust - trust in the experts from SAP. As a result the Chinese implicitly accept that the SAP consultants are the experts and it is they who will make the system work. The collective nature of Chinese society accepts that experts become an integral part of the organisation. They belong. In the Australian context, once trained, experts can be individuals within the existing organisation. There is an acceptance of knowledge being transferred. In the Chinese context, that transference usually happens at the conclusion of the project.

Fourth, project management and clear goals are clearly important in large ERP implementation projects. They were very important at Elevatorco but not mentioned at Oilco. Uncertainty avoidance is a key element of Chinese society. Therefore planning and attention to detail are significant issues. project management is one key method by which such processes can be implemented. There is a great deal of formal attention given to processes in Chinese organizations to ensure that there is significant levels of certainty.

Fifth, data accuracy is clearly an important issue in any ERP systems implementation but was mentioned at Elevatorco but not at Oilco. One explanation for this difference is that the quality of data in the prior Chinese system was poor, whereas the legacy data were of higher quality in Oilco. An additional explanation is that in the Chinese context improving data accuracy would be considered to be part of the process of uncertainty avoidance. Management in Chinese organisations want to know what the outcomes will be. Attention to detail by ensuring data quality goes some way to enabling certainty.

The above analysis has examined the critical success factors (CSFs) identified in the cases, one by one. When one focuses on the implicit social level of interpretation, rather than the explicit, surface level, a richer picture emerges. A key to understanding differences between CSFs for Elevatorco and Oilco appears to derive from individual cultural characteristics embedded in both companies. This embedded behaviour is integral to those national characteristics implicit in the national cultures of the contextual settings of the cases. On the one hand, greater power-distance and the collectivist nature of Chinese culture suggests that fewer resources need to be devoted to enthusing people and convincing them of the need to change their behaviour. Thus there was more focus in China on technical issues and training than in Australia. The Chinese tend to be more cautious because of their desire to reduce uncertainty and unpredictable outcomes. Training and technology are seen as mechanisms to minimize uncertainty. In Australia, however, technical issues were less important than project champion enthusiasm and change management. Less concern about uncertainty and narrower power distance relationships means less dependency on leadership within an organisation. In such contexts leadership delegates responsibility and empowers subordinates to champion or drive projects as part of accountability.

A. Limitations of the Study

The findings of this study are not strongly generalisable as only one case study is reported in each of the two countries and the two case studies were from different industry sectors. Care was taken in collecting case study data to improve internal validity by using multiple sources of data and triangulation of important data where possible. Further case studies are currently being undertaken in each country and these tend to confirm the patterns reported in Table 1.

B. Implications for Practitioners and Researchers

The findings here present indicative evidence that national cultural characteristics do help understand differences in the process of ERP systems implementation. Case studies in other countries will also help deepen our understanding of cultural differences in ERP systems implementation.

Organisations should carefully consider cultural issues when planning for ERP systems implementation. A standard generic implementation process may be adopted but the focus of attention will differ in different cultures. Consulting organisations should be careful when applying ERP systems implementation approaches that have been successful in one culture in another culture. An awareness of cultural differences will help practitioners properly plan ERP implementation projects.

Further research about ERP implementation in different cultural contexts needs to be conducted to strengthen the findings in this paper and to develop knowledge of ERP implementation processes further.

VIII. CONCLUSIONS

Using an implementation-stages framework based on the work of Ross [5] and Markus and Tanis [3], and a set of critical success factors drawn primarily from Parr et al. [1] in Western organisations, this study has explored the critical success factors that consultants and company staff identified as key at various stages in the implementation of ERP systems in two organizations. Using a case study methodology, two companies were studied, one in China, and one in Australia.

The picture that emerges from the study is that some factors may be important independent of national culture, and some other factors may be culturally dependent. The two critical success factors (CSF) that were common to both firms through most stages of the implementation projects were top management support and formation of a balanced project team. The differences in CSFs, that may be culturally driven, seem to be that because of the greater power-distance and collectivist nature of the Chinese culture.

The findings in this study should be of assistance to multinational organisations implementing ERP systems, international consultancy companies working with clients in different countries, and organisations with Chinese cultural characteristics using western methodologies and consultants to help with their ERP systems implementation.

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