Successful Adoption of ERP Technology as Influenced by Country of Origin

Eric Wang
National Central University
ewang@mgt.ncu.edu.tw

James J. Jiang
University of Central Florida
jjiang@bus.ucf.edu

Gary Klein
The University of Colorado at Colorado Springs
gklein@uccs.edu

Ben Martz
The University of Colorado at Colorado Springs
wmartz@uccs.edu

Abstract

The complexity of ERP implementation can create high profile failures. Technology transfer scholars identify a difference in culture, either organizational or national, as a potential barrier to successful implementation of any complex technology. We explore this barrier to ERP system quality and consider user support, top management support and consultant quality as possible factors for success.

1. Introduction

While an ERP system holds much promise for revitalizing IT infrastructures and enabling business process integration, difficulties in ERP implementation lead to approximately 90% of these projects being late or over budget [Martin 1998]. In addition, evidence is accumulating to show that as many as 70% of projects failed to achieve the benefits promised by implementing firms [Al-Mashari 2000]. Firms abandon high cost implementations and some even claim the ERP project's poor implementation to be contributors to financial disaster [Bingi 1999; Hitt 2002]. Consequently, adopting an ERP system has been considered a make-or-break decision, requiring a careful exercise of concerted efforts, from internal staff as well as external experts. Given the difficulty of ERP

implementation, understanding the factors that influence the extent to which an ERP package can be implemented to satisfy the adopter's requirements is important.

ERP systems integrate business practices across functional boundaries, impose systematic restrictions on business practices, and are most often an untried technology for the adopting organization. More often than not, the business logic embedded within the ERP will not match the operations of the ERP customer, requiring the ERP customer to either change their operations or to customize the ERP software. Each of these options presents a potential misfit to the organization, either in business practice, cultural expectations, or both [Kumar 2000]. The issues of misfit could be particularly pronounced in Asia when firms adopt a Western ERP system [Liang 2004]. None of this is unexpected, however, as the deployment of any complex technology has always faced barriers [Rogers 1983]. Barriers to the deployment can arise from behavioral and procedural concerns and be addressed by looking at the adaptability of the technology. Each step in the deployment process requires an analysis to determine what factors will promote effective deployment [Klein 2003]. To overcome any barriers, the process of implementation must be cracked open to better understand the nature of the "black box" of technology transfer.

In this fashion, we raise questions about the deployment of ERP technology. The potential impact of the ERP implementation misfit results in several questions of note to an organization. Do problems result in ERP systems based on their country of origin? How do potential implementation moderators, such as user support, top management support, and consultant quality, affect perceived ERP system quality?

2. Background

The Social Shaping of Technology (SST) perspective [Williams 1996] explains the potential of culture as a barrier to technology deployment. From this perspective, the design of technology is seen as the outcome of social processes of negotiation between complicated, heterogeneous networks of diverse stakeholders who have different commitments, perspectives, or positions in the structure [Clausen 1999]. This perspective insists that the "black-box" of technology must be opened to allow examination of the socio-economic patterns embedded in both the content of technology (design and reference models in ERP systems) and the processes of innovation (ERP implementation in this case) [Williams 1996]. A characteristic of ERP packages is that the processes of development and use are accomplished in different organizations. Thus, actions and business processes in an ERP system are separated with design in the vendor organization and implementation in the user organization [Orlikowski 1992].

After the design stage, the architecture and functionality of the ERP systems become stabilized and embedded, achieving certain level of closure for changes.

Thus, although the SST perspective does not indicate exactly what social factors are relevant for the analysis of ERP development and implementation, it nevertheless points out the critical concepts of "choices" and "closure" for such effort. Choices are inherent in the design of ERP systems whereas closure is the way in which innovation may become stabilized with little possibility of reversing the choices at earlier stages of system development [Williams 1996]. Consequently, selecting a particular ERP package is the acceptance of the set of stabilized social elements which reflects the vendor's beliefs about "how things ought to be done." In contrast, customizing the package is an attempt to reverse the vendor's choices, leading to a new closure that embodies a different set of beliefs in the user environment.

The ERP implementation process takes on the implementation technique of "cultural infusion" [El Sawy 1985], but instead of having a core group of human adopters "spread the word" and infuse the organization with system acceptance, the system attempts to gain acceptance by its embedded processes. ERPs are developed by their vendors with a specific set of beliefs about how certain business processes need to be accomplished. Vendors in different countries will bring different beliefs. The decisions and expertise to infuse the ERPs reside in management, users and consultants. Users are the main source of the organization's operational business knowledge while consultants are a major external information source and technical skills [Hitt 2002]. Top management has a primary role in providing a conducive environment for effective implementation [Zmud 1984].

One of the key issues identified by Rogers [Rogers 1983] in the diffusion of a technology cluster is the compatibility of that technology with its adopters. He broke his construct down into three main areas: compatibility with socio-cultural values and beliefs; previously introduced ideas; and the adopter's needs. Rogers [Rogers 1983] found that "The compatibility of an innovation, as perceived by the members of the social system, is positively related to its rate of adoption" (p.226). The more compatible the technology is the faster the rate of adoption.

Combining the notion of El Sawy's [El Sawy 1985] "cultural infusion" with Rogers' [Rogers 1983] "compatibility," create a notion that when a generic ERP is applied to a new business organization, the match between embedded business processes and techniques and those in the organization produces a technology-based "cultural compatibility." This type of compatibility can influence the general satisfaction and acceptance of the technology as a whole.

Since, the development of customizable-off-the-shelf (COTS) ERP software may occur in a totally different culture than the one in which it is being implemented. This produces our first construct of interest: country of origin (CO). The concern is that ERPs implemented from different countries than the organization itself may create such a low level of technology infusion compatibility that implementation success and satisfaction may be jeopardized, since SST indicates that the software product will inherit the social constructs of the point of origin. While ERP implementations involve people more than technology [Bingi 1999], the cultural incompatibilities embedded in the software

may produce an incompatibility that impacts the success of the ERP implementation. This is the main question explored by this study.

3. Research Methodology

A sample of firms was drawn from the Common Wealth directory of the 500 largest manufacturing firms in Taiwan. ERP project leaders were chosen as the key informants because they are knowledgeable about every aspect of the ERP project in their company.

The questionnaire was constructed based on existing measures. The Chinese version of the questionnaire was verified and refined for its translation accuracy by one MIS professor and two senior doctoral students who were familiar with and had done extensive research on ERP systems. The draft questionnaire was pre-tested for face and content validity with two IS executives who have led their company's ERP project and two consultants who have extensive experiences in ERP implementation consultation of both local and foreign ERP packages.

The identification of the ERP project leaders was through the firms' chief operating officer (COO). Each COO was sent a letter of solicitation, which included a brief description of the study and its purpose and a copy of the questionnaire to be completed by the ERP project leader. A follow-up was conducted two weeks after the first mailing. In total, 85 questionnaires were received and usable for analysis, yielding a 17% response rate, which is typical for similar surveys conducted in Taiwan. Table 1 shows the characteristics of interest.

Table 1. Demographic characteristics of the Responding Firms (n = 85).

	Firms	Percentage
Sector		
Electronics	22	25.9
Information & Communication	13	15.3
Metals	10	11.8
Automobile & Parts	7	8.2
Others	33	38.8
Country of Origin of ERP Package		
Foreign - Oracle: 18, SAP: 5, Others: 8	31	36.5
Local - Data Systems: 29, Proyoung: 11, Others: 14	54	63.5
Time after Implementation		
Less than 6 months	10	11.8
6 months – 1 year	28	32.9
1 year – 2 years	27	31.8
Over 2 years	20	23.5

Number of Adopted Modules	
Maximum	8.0
Minimum	2.0
Average	5.5
Standard Deviation	1.3

We checked the data for non-response bias in terms of company assets, number of employees, and annual sales. No significant differences between the two groups were found based on independent sample t tests. The respondents were then divided into two halves based on the dates of return [Armstrong 1977]. The comparisons on the three size measures between the two groups again showed no significant differences. Accordingly, there were no apparent problems that might skew responses.

Perceived ERP System Quality. How to best represent and measure IS success still remains questionable [Rai 2002]. DeLone and McLean [DeLone 1992] reviewed over 100 articles and developed a success model to classify all success measures. Among these measures, system quality was recognized to impact other success measures. This study thus focused on assessing the ERP system quality perceived by clients after implementation consistent with Baroudi and Orlikowski's Quality of Information Products dimension [Baroudi 1988]. Based on this conceptualization, perceived ERP system quality was measured with an established five-item scale [Shin 1996].

Consultant Quality. Measures for assessing professional and information services quality have been developed largely based on the SERVQUAL scale [Parasuraman 1985]. Since ERP implementation consultation is professional service, the measure of ERP consultant quality was adapted from the scale for assessing professional service quality from a client's perspective [Freeman 1993]. Two dimensions were dropped: Tangibles is often dropped in studies related to information services function [Kettinger 1994] and management interviewees believe that fee-related issues would not affect ERP system quality [Lapierre 1999]. A performance-only approach was adopted for measuring consultant quality [Brady 2002].

Country of Origin of ERP Package. The construct was operationalized by a binary variable, which was coded 1 if the firm adopted an ERP package developed by a local vendor in Taiwan and 0 otherwise.

Top Management Support. Top management support was operationally defined as the extent to which top management provides necessary involvement, resources and authority in guiding and assisting ERP implementation and contains seven items [Lee 1992].

User Support. Concepts such as user participation, user involvement, user attitude, and user support have been proposed theoretically and examined empirically with various research designs [Barki 1994; Jiang 2000]. ERP systems are enterprise business applications; users must accept and use the systems. Consequently, this study adopted the concept of user support by

focusing on user attitudes. The five-item measure of user support in [Jiang 2000] was adapted to assess user support toward ERP implementation.

4. Analysis

Because the size of our sample was small, PCA, instead of confirmatory factor analysis, should be a more appropriate technique for assessing measurement properties. Also, it has been suggested as a rule of thumb that there should be between four [Hair 1992] and ten [Kerlinger 1986] observations for each empirical indicators included in the factor analysis. Given that there are only 85 observations in the study while the measure of consultant quality contains 20 items, it should be more appropriate to perform factor analysis for each measure individually in order to obtain more stable factor structures. Consequently, PCA was performed for each construct individually with Direct Oblimin procedure for allowing inter-factor correlations. The outcomes of the PCA are shown in Appendix A. The threshold employed for judging the significance of factor loadings was 0.50 [Hair 1992].

Except for consultant quality, the other multi-item scales converged into a single factor, as shown in Appendix A. So, measures for top management support, user support (reverse-scored), and perceived ERP system quality were considered sufficiently unidimensional. Although the percentages of variance extracted by the scales measuring user support and perceived ERP system quality were relatively low, they were nonetheless greater than 60%, indicating sufficient data variances were captured by the scales [Heck 1998]. Consultant quality was originally hypothesized as a five-dimensional construct, but only two factors emerged from the 20-item measure. A comparison of SERVQUAL replication studies by Kettinger and Lee [Kettinger 1994] showed that the factor structure of the scale is not quite stable for information service function, and a cross-national study by Kettinger et al. [Kettinger 1995] also demonstrated that national culture may affect how people perceive service quality, leading to significantly different factor patterns of measurement across nations. Given such possible cultural effects and to simplify the subsequently analysis, this study treated all the measurement items as a single scale. Cronbach's alpha was also satisfactory for this and other scales [Nunnally 1998].

Table 2. Descriptive Statistics and Inter-correlations of Variables.

	Mean	S.D.	1.	2.	3.	4.	5.
1. Country of Origin	.635	.484					
2.Consultant Quality	3.377	.707	.161**	(.977).			
3. Top Mgmt Support	3.587	1.017	.274*	.415*	(.962)		

4. User Support	3.313	.732	.104	.613*	.444*	(.831)	
5. ERP Quality	3.583	.650	.296*	.669*	.398*	.480*	(.854)

*significant at the level of 0.05, **significant at the level of 0.10, number in parentheses are Cronbach's alpha.

For the subsequent analysis, composite scores for the five scales were obtained by averaging their respective items. The inter-correlations, means and standard deviations of the composite scores, the binary variable, country of origin of ERP package, and the controls variables are shown in Table 2. Further, according to [Gaski 1986], the level of discriminant validity can be demonstrated by showing that the correlation between any pair of scales is lower than the reliability of both the scales. Since this condition clearly holds in Table 2, the discriminant validity among the measures is sufficiently demonstrated.

5. Results

The correlation values in Table 2 show some of the expected relationships. The perceived quality of the delivered ERP is significantly correlated with each of the remaining variables, and in the direction expected. Selecting a domestic ERP, heightened management and user support, good consultants all relate to an improvement in the level of quality. Regression analyses allowed further exploration of the data. Table 3 presents the results from five regression models that give further indication of the relationships between the variables.

Table 3. Regression Coefficients: Dependent Variable: ERP System Quality.

Independent Variables	*Model #1*	# 2	# 3	# 4	# 5
Constant	3.33*	1.27*	.83	1.11**	2.09*
Country of Origin of ERP	.34*	.21**	1.28*	.94*	-.52
Consultant Quality (CQ)		.66*	.82*	.61*	.61*
Top Management Support (TMS)		.05	.02	.13**	.01
User Support (US)		-.07	-.06	-.06	-.26**
PIM*CQ			-.32**		

PIM*TMS				-.20**	
PIM*US					.28**
F value	7.95*	21.67*	20.10*	18.50*	19.90*

*significant at p < .05, ** significant at p < .10

Model 1 is a simple regression between country of origin and perceived ERP system quality. Results indicate the independent variable is significant in explaining the final perceived system quality. Model two includes the possible mitigating variables of consultant quality, top management support, and user support to determine any direct influence these variables might have. Consultant quality emerges as a dominant predictor of final quality, even lowering the significance of the country of origin (but not eliminating it). To determine if any of the potential mitigating factors may serve as moderators under either domestic or foreign ERP products, models three through five were conducted. Each model considers system quality as the dependent variable with location and all three potential mitigating variables included as independent variables. Models 3, 4, and 5 check for possible moderating effects of consultant quality, top management support, and user support respectively. In this fashion, all three emerge as weakly significant moderators of the relationship between country of origin and final perceived ERP quality.

6. Discussion

Our results indicate that ERPs may produce a cultural incompatibility simply based upon the country of origin in which it was produce being different than the country of the organization in which it is being implemented. This result demonstrates the closure effect of stabilized systems and suggests that deeply entrenched social and business process elements may make ERP systems difficult to be configured or customized to fit local contingencies of different nations. While, it is true that all ERP packages can be reconfigured through adjusting certain parameters, the findings suggest that the ranges of such configurations must be able to adequately cover the range so that the necessary value may be obtained for each implementation. Our findings suggest that for ERP and other information systems developers, it is important to offer as much customization as possible on the cultural and business process variables found in the system. In turn, our findings therefore suggest that it is important for ERP adopters to recognize the cultural differences embedded in foreign business applications and to carefully evaluate the functionality and business practices offered by alternative packages, since the ERP choice may preclude the ability to fully resolve all the problem areas during implementation through customization.

While the importance of ERP implementation consultants has been frequently raised in the literature, a systematic investigation into their role in delivering quality ERP systems has been lacking. These preliminary results show that consultant quality has a positive effect on perceived ERP system quality. Consultants may be able to bridge the cultural compatibility gap. When consultants are knowledgeable, reliable, and willing to help the client, they will be able to configure the system to fit the client's needs more effectively and efficiently, as well as suggest sensible, reasonable recommendations when necessary organizational adjustments are required. Our findings suggest that higher consultant quality can benefit ERP implementation, leading to higher ERP system quality delivered, and that the value of higher consultant quality also increases as the incompatibility becomes more severe. Thus, while selecting a suitable ERP package is important, hiring competent consultants might be equally, if not more, critical. Given the significant role of consultants in ERP implementation, future research may take a process approach to analyze the interactions between consultants and the stakeholders of the client in the consultation process and their implications on system implementation.

The results, however, are not in congruence with existing literature. Top management support and user support weighed in to these results only as possible moderators, unlike a large body of previous evidence that suggests they should be more influential. This could be solely an artifact of the data, but more likely is the result of an incomplete model of analysis. An obvious omission to this study is that there are many other potential influences on system misfit. These might include industry sector and ERP industry targets, legacy systems and infrastructures, and knowledge practice incongruences. To include these possible factors, we propose a research model derived from the results presented here and previous studies reported in the literature on user support and top management support. To incorporate the misfit studied in this paper as well as other potential causes of misfit, we propose including an indicator of initial misfit into the model that serves as a collector of potential misfits and may be mediated or moderated variable constructs from known success strategies. Figure 1 incorporates this concept and highlights the expectations below that require further investigation:

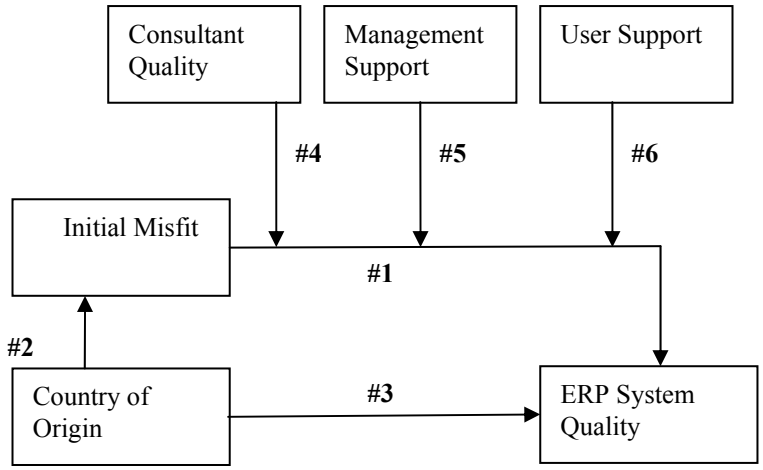

Figure 1. Proposed Future Research Model.

1. For packaged software such as ERPs, the social choices made at the design stage inevitably have achieved a certain level of closure and thus have heavy influences on the shaping of the system at the implementation stage [Clausen 1999]. All ERP systems emphasize the embedded best practices, which provide generic industry solutions containing a set of event-driven processes and are not easy to change due to the high interconnectivity of the processes. Because all firms have their own specific business cultures, such generic solutions typically can only partially meet the business processes and software functionality specific to the needs of the firms. Given the various constraints imposed on those implementation alternatives, ERP implementation usually is characterized by "an apparent absence of choice" [Williams 1996: 871]. We propose, therefore, that the extent of initial misfit of an ERP system has a lasting, adverse effect on the quality of the system delivered even after implementation.
2. From the SST perspective, the very structure and architecture of contemporary IT is itself a product of historical processes of social and economic shaping [Clausen 1999; Williams 1996]. As complex business applications, ERP systems are gradually shaped through a cyclic process of revision within a particular social context. This phenomenon has been characterized as the liability of foreignness in the literature of multinational enterprise, arising from foreign firms' higher coordination costs, unfamiliarity with the local culture and market, a lack of information networks, and inability to appeal to nationalistic buyers [Tallman 1991]. On the other hand, the local systems have been gradually tailored to the local context, enabling them to match better with local contingencies than their foreign counterparts. We thus expect domestic systems to have less initial misfit.

3. In addition to initial cultural incompatibility, adopting a foreign ERP system may also result in lower system quality even after implementation. With years of experience in dealing with local issues, the local vendors should be able to provide packages that can be more easily configured to satisfy local needs, through a range of alternatives that has a more suitable coverage of local cultural, business and regulatory requirements. For example, accounting practices, financial reporting requirements, and tax regulations typically are different across countries. Besides, firms in a given country can still demand, for example, different ways of handling their accounting data within the bounds of acceptable business practices and principles. For an ERP system to be successful at least in its local market, it is important for the vendor to pursue the requisite variety for accommodating various local as well as company-specific requirements. Moreover, the practices embedded in ERP packages are culture-laden, making foreign systems more difficult to be understood by local professionals, as people in different nations can have quite distinct beliefs and norms about "how things ought to be done" and "how things ought to be" [Calori 1997]. Thus, firms adopted a foreign package might find the models and processes of the system difficult to comprehend. Consequently, we would expect that adopting a foreign package impacts success negatively.
4. Because of the complexity of ERP systems, few firms by themselves have sufficient in-house skill and knowledge base to implement an ERP system. The technology and business knowledge relevant to ERP implementation is also so dispersed and differentiated that needs to be effectively articulated, gathered, and shared during implementation [Pan 2001]. Given that the know-how of the technology itself and its implementation is tacit and "sticky" and not easily articulated or transferred [Roberts 2001], the service quality provided by consultants is critical in lowering the client's knowledge barriers for ERP implementation and should be a moderator variable [Attewell 1992].
5. Top management support has been considered one of the most important institutional factors that influence technology adoption in organizations [Agarwal 2000]. The importance of top management support for the acquisition and successful implementation of innovation is well accepted in the literature [Rai 1996]. In fact, under various conceptualizations of success and contexts, the influence of top management support on technology adoption and implementation has been repeatedly demonstrated [Zmud 1984]. Specifically, the critical role of top management support in successful ERP implementation has also been widely suggested [Willis 2001].
6. Unlike in-house IS development projects, user participation occurs well after the system design phase for packaged ERP systems. As a result, users' ability to influence the design, functionality, and look and feel of an ERP system and the range of process models to be implemented is limited. However, even though ERP systems are rigid, they are still to certain extent open to redefinition and renegotiation in the implementation process of technical exploration and interest articulation [Williams 1996]. Without the willingness

to cooperate, change and learn, users are unlikely to share their functional expertise with each other and with consultants, and are unable to absorb sufficient system knowledge and skills from the consultants [McLachin 1999]. Implementing an ERP system is a social shaping process and thus requires sufficient user support. Although user support is not a universal panacea, especially for implementing packaged software, it nonetheless is important in eliciting user commitment and enabling new business procedures to be permeated into the organization with less resistance, and certainly will be useful for system fine-tuning and customization.

7. Conclusion

Asian countries provide a fertile test bed for examining and contrasting the implications of adopting culture-laden, business applications developed in different countries, such as the ERP system. This study from the SST perspective contributes to the literature by demonstrating the importance of a non-human, ERP implementation characteristic - the country of origin of ERP system adopted - and showing that ERP packages developed by local vendors generally have a perception of higher system quality after implementation. This finding also contributes more examples of the closure effect of stabilized systems. Finally, this study contributes to a further understanding of the critical role that implementation consultants play in delivering high quality ERP system, recognizing and closing compatibility gaps, and alleviating misfit problems.

8. References

[Agarwal 2000] Agarwal, R. Individual acceptance of information technologies. In R.W. Zmud (Ed.), Framing the Domains of IT Management: Projecting the Future … Through the Past. Pinnaflex Education Resources, Inc. Cincinnati, Ohio, 2000.

[AlMashari 2000] Al-Mashari, M. Constructs of process change management in ERP context: A focus on SAP R/3. The 6th Americas Conference on Information Systems. Long Beach, CA (2000).

[Armstrong 1977] Armstrong, J.S., and Overton, T.S. Estimating non-response bias in mail surveys. Journal of Marketing Research, 14 (1977), 396-402.

[Attewell 1992] Attewell, P. Technology diffusion and organizational learning: The case of business computing. Organization Science, 3, 1 (1992), 1-19.

[Barki 1994] Barki, H., and Hartwick, J. Measuring user participation, user involvement, and user attitude. MIS Quarterly, 18, 1 (1994), 59-82.

[Baroudi 1988] Baroudi, J.J., and Orlikowski, W.J. A short-form measure of user information satisfaction: A psychometric evaluation of notes on use. Journal of Management Information Systems 4, 4, (1988), 44-59.

[Bingi 1999] Bingi, P, Sharma, M.K., and Godla, J.K. Critical issues affecting an ERP implementation. Information Systems Management, 16, 3 (1999), 7-14.

[Brady 2002] Brady, M.K., Cronin, J.J., and Brand, R.R. Performance-only measurement of service quality: A replication and extension. Journal of Business

Research, 55 (2002), 17-31.

[Calori 1997] Calori R., Lubatkin, Very, P., and Veiga, J.F. Modelling the origins of nationally-bound administrative heritages: A historical institutional analysis of French and British firms. Organization Science, 8, 6 (1997), 681-696.

[Clausen 1999] Clausen, C., and Koch, C. The role of spaces and occasions in the transformation of information technologies – Lessens from the social shaping of IT systems for manufacturing in a Danish context. Technology Analysis & Strategic Management, 11, 3 (1999), 463-482.

[DeLone 1992] Delone, W.H., and McLean, E.R. Information systems success: the quest for the dependent variable. Information Systems Research 3, 1 (1992), 60-95.

[El Sawy 1985] El Sawy, O.A. "Implementation by Cultural Infusion: An Approach for Managing the Introduction of Information Systems," MIS Quarterly, 9, no. 2 (June 1985), pp.131-140.

[Freeman 1993] Freeman, K.D., and Dart, J. Measuring the perceived quality of professional services. Journal of Professional Services Marketing, 9, 1 (1993), 27-47.

[Gaski 1986] Gaski, J.F. Interrelations among a channel entity's power sources: Impact of the exercise of reward and coercion on expert, referent, and legitimate power sources. Journal of Marketing Research, 23, 1 (1986), 62-77

[Hair 1992] Hair, Jr., Anderson, R.E., Tatham, R.L., and Black, W.C. Multivariate Data Analysis with Readings, (3rd ed.). New York: McMillian, 1992.

[Heck 1998] Heck, R.H. Factor analysis: Exploratory and confirmatory approaches. In G. Marcoulides, (ed.), Modern Methods for Business Research. Mahwah, NJ: Lawrence Erlbaum, 1998, 177-215.

[Hitt 2002] Hitt, L.M., Wu, D.J., and Zhou, X. Investment in enterprise resource planning: Business impact and productivity, Journal of Management Information Systems, 19, 1 (2002), 71-98.

[Jiang 2000] Jiang, J.J., Gary, L., and Means, L.T. Project risk impact on software development team performance. Project Management Journal, 31, 4 (2000), 19-26.

[Kerlinger 1986] Kerlinger, F.N. Foundations of Behavioral Research, (3rd ed.). New York: Holt, Rinehart and Winston, 1986.

[Kettinger 1994] Kettinger, W.J., and Lee, C.C. Perceived service quality and user satisfaction with the information services function. Decision Sciences 25, 5/6 (1994), 737-766.

[Kettinger 1995] Kettinger, W.J., Lee, C.C., and Lee S. Global measures of Information service quality: A cross-national study. Decision Sciences 26, 5 (1995), 569-588.

[Klein 2003] Klein, G. and Martz, W.B. The Metronome of technology transfer. Comparative Technology Transfer and Society, 1, 3 (2003), 243-254.

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

[Lapierre 1999] Lapierre, J., Filiatrault, P., and Chebat, J. Value strategy rather than quality strategy: A case of business-to-business professional services. Journal of Business Research, 45, (1999), 235-246.

[Lee 1992] Lee, J., and Kim, S. The relationship between procedural formalization in MIS development and MIS success. Information & Management, 22 (1992), 89-111.

[Liang 2004] Liang, H. Xue, Y. Boulton, W.R., and Byrd, T.A. Why western vendors don't dominate China's ERP market. Communications of the ACM, 7(2004), 69-72.

[Martin 1998] Martin, M. H. An ERP strategy. Fortune, 2 February (1998), 95-97.

[McLachin 1999] McLachlin, R.D. Factors for consulting engagement success. Management Decision 37, 5, (1999), 394-402.

[Nunnally 1998] Nunnally, J.C. Psychometric Theory, (2nd ed.). New York: McGraw-Hill, 1998.

[Orlikowski 1992] Orlikowski, W.J. The duality of technology: Rethinking the concept of technology in organizations. Organization Science, 3, 3 (1992), 398-427.

[Pan 2001] Pan, S.L., Newell, S., Huang, J.C., and Cheung, A.W.K. Knowledge integration as a key problem in an ERP implementation. Proceedings of the Twenty-Second International Conference on Information Systems, New Orleans, (2001), 321-327.

[Parasuraman 1985] Parasuraman, A., Zeithaml, V., and Berry, L.A. A conceptual model of service quality and its implications for future research. Journal of Marketing, 49, 4 (1985), 41-50.

[Rai 2002] Rai, A., Lang, S.S., and Welker, R.B. Assessing the validity of IS success models: an empirical test and theoretical analysis. Information Systems Research 13, 1 (2002), 50-69.

[Rai 1996] Rai, A., and Patanayakuni, R. A structural model for CASE adoption behavior. Journal of Management Information Systems, 13, 2 (1996), 205-234.

[Roberts 2001] Roberts, T.L., Leigh, W., Purvis, R.L., and Parzinger, M.J. Utilizing knowledge links in the implementation of system development methodologies. Information and Software Technology, 43 (2001), 635-640.

[Rogers 1983] Rogers, E. M. Diffusion of Innovations, New York : Free Press, 3rd edition, c1983.

[Shin 1996] Shin, H., and Lee, J. A process model of application software package acquisition and implementation, Journal of System Software 32, 1 (1996), 57-64.

[Tallman 1991] Tallman, S. Strategic management models and resource-based strategies among MNEs in a host market. Strategic Management Journal, 12, (1991), 69-82.

[Williams 1996] Williams, R., and Edge, D. The social shaping of technology. Research Policy, 25 (1996), 865-899.

[Willis 2001] Willis, T.H., Willis-Brown, A.H., and McMillan, A. Cost containment strategies for ERP system implementations. Production and Inventory Management Journal, Second Quarter (2001), 36-42.

[Zmud 1984] Zmud, R.W. An example of "push-pull" theory applied to process innovation and knowledge work. Management Science, 30, 6 (1984), 727-738.