Prioritization of Enterprise Resource Planning (ERP) Systems Success Measures: Viewpoints of Two Organizational Stakeholder Groups

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ABSTRACT

Business organizations worldwide are adopting Enterprise Resource Planning (ERP) systems. A number of studies deliberate the adoption and implementation of ERP, but few investigate the success of the system. To our knowledge, this is the first study of its kind to investigate the perspectives of key organizational stakeholders with respect to the success of their ERP software. Using postal surveys in Finland and Estonia, two small Northern European countries, we obtained empirical data from 44 private organizations in diverse industries. Our objective was to determine whether differences exist between two organizational stakeholder groups (top- and mid-level managers) concerning their prioritization and evaluation of measures relating to the success of their ERP software. Despite their distinct roles and influence, we did not notice any significant statistical differences between the two groups in this regard. However, each group evaluated measures such as "accuracy" and "reliability" differently. This paper discusses the implications of the study for both practice and research.

Categories and Subject Descriptors

K.6 [Computing Milieux]: Management of Computing and Information systems

C.4 [Computer Systems Organization]: Performance of Systems

General Terms

Management and Measurement

Keywords

ERP, ERP Systems Success, Measures, Prioritization, Evaluation, Top Management, Functional or Middle Managers, Stakeholders.

1. INTRODUCTION

Enterprise Resource Planning (ERP) systems are complex, comprehensive software designed to integrate business processes and functions [9, 29, 30, 36, 47, 53]. They present a holistic view of the business by permitting the sharing of common data and practices in a real-time environment [9]. Several businesses worldwide are adopting ERP for a variety of reasons, including legacy systems replacement, cost reductions and faster information transactions [9, 12, 13, 20, 53]. A recent press release by AMR Research reported the global ERP market increased 14% in 2004 to US $25 billion for the vendors of such software [45]. The top ERP vendors include SAP and Oracle. ERP adoption continues to grow globally, despite the difficulties and risk encountered by organizations when they adopt and implement these systems [30, 31, 36, 44]. Not surprisingly, most studies in the trade press and information systems (IS) domain focus on the implementation and adoption of ERP systems [e.g., 12], and only a few discuss the success of such systems in the adopting firms. The studies that discuss ERP systems success include Nelson and Somers [37], Tan and Pan [57], Markus and Tanis [29] and Gable and colleagues [16, 48]. These studies compare with our research endeavor of focusing on the issue of organizational "ERP systems success." Our definition of "ERP success" refers to the utilization of such systems to enhance organizational efficiency and effectiveness [16, 17, 35]. We stress that the "success" we refer to differs in scope from the technical installations for ERP implementation success [e.g., 30, 31].

The paucity of research on ERP success after the initial adoption phase is the motivation for our study, which is unique in several ways. First, we empirically investigated the views of two organizational stakeholder groups regarding ERP success dimensions and measures. Second, we discuss these views in the order of priority given them by the respective groups. Huge investments are required to adopt ERP systems [9, 12, 29, 44], and corporate managers could benefit from an understanding of how key organizational players view its success. Similarly, insights from our study could facilitate theory development in the IS and Management Science domains vis-à-vis ERP systems success measurement.

Organizations are social structures consisting of various actors or stakeholders whose interests might converge or diverge depending on roles, values, or situations [6, 15, 40, 41, 46]. Concerning ERP implementation, Abdinnour-Helm et al. [1] found that "employees in management" have a more positive attitude towards the expected capabilities and value of ERP systems than do "others", and reported significant differences between the "value" variable across the two groups. We will investigate the perceptions of two key organizational stakeholder groups; i.e., top-level and mid-level (functional) management. We excluded from our study lower-level workers who perform clerical duties, which was a

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third management level identified by Anthony [2]. The purpose of our study is to investigate whether differences exist between the two groups regarding how they prioritize measures of ERP systems success. Our primary objective is to answer this question: Are there differences in how top- and mid-level managers prioritize the dimensions and measures of ERP systems success? Our secondary objective is to determine if there are differences in how these respective groups evaluate ERP systems success measures. Our study will benefit both research and practice by contributing to the discourse of differing views between top- and mid-level management and clarifying each group's ERP systems success assessment.

We conducted our research in Finland and Estonia; both are small Northern European countries with a combined population of approximately seven million people. Finland is a technologically advanced country [61], and Estonia leads Eastern European countries on the use of IT products for socio-economic development [61]. Finnish companies began adopting ERP systems in the late 1990s [13, 20], but the system is just beginning to spread to Estonia and other parts of Eastern Europe [7].

Finland and Estonia are neighboring countries with similar cultural values [21, 32]. Hofstede's [21] cross-national typology includes the following: Power Distance (PD), Individualism-Collectivism (IC), Uncertainty Avoidance (UA), and Masculinity-Femininity (MF). We will not focus on these issues, but will center our study on organizational stakeholders. However, because PD is a cultural dimension relevant to our discussion, we will explore it further. PD refers to the degree of equality or inequality in a society and measures how subordinates respond to power and authority. A low PD ranking indicates that a society de-emphasizes the differences between citizen's powers. Hofstede [21] and Mockaitis [32] gave Finland and Estonia low PD rankings that indicate superiors and their subordinates in those countries have similar views and do not treat each other differently. Mockaitis' [32] study of the Baltic countries replicated Hofstede's work.

The remainder sections of this paper are structured in the following order: background, research methodology, data analysis and discussions, and concluding remarks.

2. BACKGROUND

We will first review IS and ERP success assessment literature [10, 16, 48] and then discuss The Stakeholder Theory [15].

Over the past three decades, evaluating the value and success of organizational IS has been a recurring issue [3, 35], and various assessment methods were used. One stream of research focuses on the use of attitudinal and subjective measures [e.g., 11], while another utilizes financial and objective parameters [e.g., 5]. In both cases, understanding the success or effectiveness of the IT systems could be limited when the dimensions and measures of success are restrictive [3, 10, 16]. There is no consensus among IS researchers regarding the conceptualization and operationalization of IS success evaluations [10, 35, 50], and researchers [e.g., 17, 35] have argued for the use of comprehensive measures. Because objective measures are difficult to quantify, our study uses both attitudinal and perceptual measures.

Perhaps it was the plethora of IS success assessment approaches that led Keen [25] to seek clarification of the "dependent variable." In response, DeLone and McLean [10] developed an integrated, multi-dimensional, and inter-related IS success model that is now the dominant model for IS evaluation research [3, 16, 35]. However, this model is not without criticism [3, 50]. Seddon [50] believes that the original model promotes diverse interpretations not intended by the authors.

With regard to ERP system success assessment, Gabel and colleagues [16, 48] developed an ***additive*** model that redefines the dimensions in the original Delone and McLean [10] IS model by eliminating the **Use** and **User satisfaction** dimensions through statistical analysis. Arguments against those dimensions are also available in the literature [e.g., 3, 50]. Additionally, **Use** can only be a measure of success where IS use is not mandatory. The retained dimensions of success in Gable et al. [16] are System quality (SQ), Information quality (IQ), Individual Impact (II) and Organizational Impact (OI). Myers et al. [35] argued that any IS success model should incorporate Workgroup Impact (WI) because of the contributions made by work teams and groups toward organizational productivity. Essentially, the underlying philosophy of ERP systems – the harmonization and integration of organizational functions and business processes – underscores the arguments of Myers et al. [35]. Finally, the role and quality of vendors/consultants throughout the life span of any ERP adoption is imperative for any ERP success measurement model [9, 29, 55]. Markus and Tanis [29] highlighted "dependence on vendors" as a key issue in ERP implementations that differentiates these systems from other IT implementations. Recently, Ko et al. [26] highlighted the role of vendors/consultants in transferring knowledge to organizations during ERP implementation [see also, 49].

Our ERP systems success model is composed of six main dimensions (see Figure 1) and consists of attitudinal, perceptual, and other relevant measures related to the IS in this discourse. Our model, using six dimensions, has a better predictive (explanatory) power than one using four dimensions (Gable et al. [16]). Ifinedo [23] concludes that ERP systems success is a second-order factor best represented by the six dimensions as indicated by Figure 1.

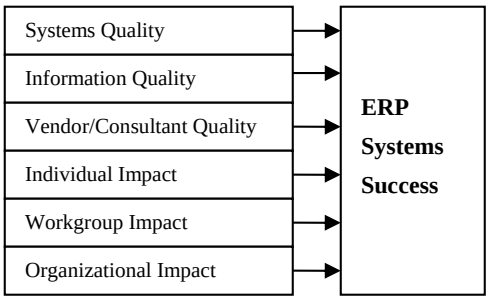

Figure 1. ERP Systems Success Framework.

Our discussion of the Stakeholder Theory draws from the work of Freeman [15], who provides the following classical definition: "A stakeholder in any organization is (by definition) any group or individual who can affect or is affected by the achievement of the organization's objectives" [15, p.25]. Essentially, the Stakeholder Theory is primarily a management instrument that contains methods for identifying and managing stakeholders' objectives. Fraser and Zarkada-Fraser [14] state, "The stakeholder theory

posits that sustainable success rests, to a great extent, with a systematic consideration of the needs and goals of all key stakeholders." The Stakeholder Theory has techniques for identifying stakeholders, describing the relationships among them, and providing guidelines for handling conflicting interests [18, 43].

In extant IS studies, stakeholders have been identified based on a particular research purpose. Singletary et al. [54] identified stakeholders as managers, IT professionals, and end-users. Somers and Nelson [55] listed "top management" among key organizational players in ERP systems. Sedera et al. [49] identified stakeholders as "Process owners", "Strategic owners", "Operational users", etc. In our study, the two groups of stakeholders are the top- and mid-level managers, and we identified them according to the three levels of management described by Anthony [2]. In general, top-level managers set objectives and design policies for the organization, while mid-level managers handle the day-to-day operations of the organization [2].

Literature shows that the organizational rank and position of an individual is crucial in influencing the decisions of other organizational stakeholders [46]. Due to the political nature of organizations [6, 40, 41, 46], differing stakeholders have dissimilar values or opinions on certain organizational issues [4, 28, 33, 52, 58, 59, 60]. Because value is a relative concept that is in the eye of the beholder, the evaluation of IS issues in an organization often depends upon the individuals position or rank [28, 33, 52, 59, 60]. Wilkes and Dickson [60] studied the perceptions of three organization stakeholders (top-level management, IS managers, and internal auditors) regarding the assessment of an IS organization. They found that the perceptions of the three groups differed markedly. Top-level management stressed the importance of managerial data for the IS organization more than IS managers did. With regard to ERP systems adoption, Abdinnour-Helm et al. [1] found that "employees in management" have a more positive attitude towards the expected capabilities and value of ERP systems than do "others". It is worth noting that some researchers (e.g., [24]) also found that no significant differences exist between top- and lower-level management regarding IS effectiveness or success.

The differences between top- and mid-level managers are not surprising. Pijpers et al. [42, p. 960] states, "Their [top-level management] position and role in the organization and the nature of their duties and social/organizational relationship differs from the other members of the company." On the other hand, mid-level managers oversee the operational aspects of the business that might involve more extensive use of IS than is required for top-level management [51].

3. METHODOLOGY

3.1 Research Method

We decided to sample firms generated from local contacts, ERP Usergroups and lists of Top Enterprises for 2004 in both countries. We chose only the private sector, because we thought the adoption of ERP systems might be higher there than in public firms. We identified 350 firms in Finland and 120 firms in Estonia. Four knowledgeable individuals completed the questionnaire prior to our mailing it, and their comments helped us improve its quality. Respondents indicated agreement with statements using a 7-point, Likert-type scale, where 1 = strongly disagree and 7 = strongly agree. The questionnaire also had sections for other information such as company turnover, workforce, ERP type and demographic profiles.

Key organizational informants (including chief executive officers, unit managers) received a packet consisting of a cover letter, questionnaire, and a self-addressed, stamped envelope. Forty percent (40%) of the mailings were matched pairs (two questionnaires in the packet), and the recipient was encouraged to give one questionnaire to an appropriate person within their organization. Low response rates from studies in the region [38] prompted us to use this method. We also thought that multiple respondents from one organization would enhance the validity of the study. The other 60% of the mailings included only one questionnaire. We instructed the respondents to present views representative of their organization. The unit of analysis of this study is at the functional and organizational levels.

3.2 Results

We used SPSS 13.0 to analyze the data. Our respective response rate was 29 firms (8.5 %) and 15 firms (12.5%) for Finland and Estonia and 9.5% combined for the two countries. We received 62 individual responses, to include 26 (42%) from top-level management and 36 (58%) from mid-level management. Their job titles included chief executive officer, chief information officer, chief accountant, IT manager, finance manager, and analyst. There were 35 (56.5%) men and 27 (43.5%) women in our sample. On average, they had 9 years of work experience in their respective organizations. Of the respondents, 40% had college degrees, 20% had technical and other vocational education, and 43 (69.3%) were between 31 and 50 years old.

Of the 62 respondents, 33.9% had SAP in their organizations, 14.5% had Movex, 9.6% had Scala, 8.1% had Hansa, and the remaining 33.9% had other mid-market ERP including Concorde, Scala, etc. The majority of firms implemented their ERP between 1998 and 2002. The annual turnover of the firms in the sample ranged from €1 million to a little over €2 billion, with €19 million as the median. The workforce ranged from 10 to 13,000 employees, with the median being 120 employees. We received responses from a wide range of industries, including manufacturing, financial services, IT firms, pharmaceuticals, food processing, retail, and warehouse businesses. The two largest groups in our sample are manufacturing with 9 respondents (20%) and the retail/warehouse business with 12 respondents (27%). We classified our firms using Laukkanen et al.'s [27] guidelines: large firms have over 250 employees, medium-sized firms have 50 or more but less than 250 employees and small firms have less than 50 employees. Based on this classification, our study includes 15 (34%) large firms, 18 (41%) medium-sized firms, and 11 (25%) small companies.

3.3 Instrument Validation

We developed the research instrument from measures and constructs validated in the literature. The Appendix shows the measures and the reliability of the research variables. The Cronbach Alpha for each dimension is above the 0.80 limit recommended by Nunnally [39], indicating a reasonably high reliability of the research measures and dimensions. Similarly, the

item-to-total correlation coefficients of the constructs are high, and are as follows: Systems Quality (0.55 to 0.79), Information Quality (0.50 to 0.76), Vendor/Consultant Quality (0.70 to 0.89), Individual Impact (0.53 to 0.71), Workgroup Impact (0.62 to 0.76), Organizational Impact (0.59 to 0.81), and ERP success (0.94 to 0.95). The inter-correlations among the dimensions range from 0.44 to 0.81. Further, we examined the construct validity of our instrument through principal component analysis. The results of factor analyzing the 45 measures using Varimax with Kaiser Normalization for the six constructs accounted for 64.29% of the variance in the model.

3.4 Data Analysis

We tested the normality of our data variables using the Kolmogorov-Smirnov statistic, significant at the 0.05 level. The results indicate they do not conform to a normal distribution, and because of the small sample size, we decided to use non-parametric tests to answer our research questions. We performed a strict test on our data by randomly selecting an equal number from each group. In all our tests, we found that the results were comparable to those in the original data set.

Our first objective was to determine whether there are differences in how top- and mid-level managers prioritize the dimensions and measures of ERP systems success. We computed the mean of each variable or measure for the two groups and ranked the variables in order of priority according to their mean. We then used the Kendall Tau-b Coefficient (T^b), significant at 0.05, to compare the ranking orders of the 45 measures for both groups, and the results were $T^b = 9.55$, Value = 0.648, Sig. =0.000. This indicates there is a strong relationship between the two variables, which suggests there are no differences between the two groups in prioritizing the measures of ERP systems success.

We noticed several salient points upon inspection of the ranking orders for both groups. The five most important variables in order of importance for top-level managers are as follows: importance, relevance, accuracy, reliability, and timeliness of ERP. This is almost the same for the mid-level managers, with the exception of "usability of ERP," which was included in their top-five measures but was 8th in importance for top-level managers. Of the top-ten issues or measures, 90% are common to both groups, which is similar to the 80% seen for the measures on which both groups attach less priority or importance. For example, "Our ERP provides us with competitive advantage," "Our ERP is easy to use," and "Our ERP is flexible" are among the measures that received lower ratings from both groups and resulted in these measures being placed at the bottom of the ranking order. With regard to the priority accorded the dimensions of ERP success, we assessed the six dimensions through their composite mean scores. We computed a composite measure representing each dimension of ERP success from the averages of the relevant measures [see, 19]. For top-level managers, the order of importance for the dimension is as follows: IQ (5.36), VI (4.88), SQ (4.85), WI (4.68), OI (4.65), and II (4.56). For mid-level managers, the order of importance is IQ (5.18), SQ (4.78), VI (4.68), WI (4.55), II (4.51), and OI (4.42). The results of the Kendall Tau-b Coefficient test for comparing the two groups on the six dimensions are $T^b = 7.33$, Value = 0.476, Sig. =0.000, which indicates no difference between them. The two groups seem to agree on prioritization of the dimensions, which is evident by their respective ordering. The top-three and the bottom-three dimensions include the same items, and both groups ranked the Information quality (IQ) dimension highest. Our secondary objective was to determine if top- and mid-level managers evaluate the dimensions and measures of ERP systems success differently. Using the Mann-Whitney U test, we compared the measures across the two groups individually. The results of the three measures on which the two groups differ are as follows. "Accuracy of ERP data" (U=337.5), p = 0.049; "Reliability of ERP data" (U = 324.5), p = 0.028; and "ERP improves overall productivity" (U = 313.5), p = 0.023.

4. DISCUSSION

The primary objective of this study was to determine whether two groups of organizational stakeholders, namely, top- and mid-level (functional) managers, hold differing views regarding their assessment and prioritization of ERP systems success measures and dimensions. The extant IS literature suggests dissimilar views do exist because of the differing roles and positions of the two groups. Given this reasoning, we thought our study would coincide with previous studies on this issue. However, our statistical results did not indicate any differences between the two groups. We did find some variations on how each group evaluates certain measures. Overall, both groups hold comparable views on the measures of ERP success. The Appendix shows that the top-level managers in our study have higher or more positive views on the issues than do their mid-level counterparts. This is consistent with findings in other studies [e.g., 1], and a possible explanation is top-level managers tend to have a broader view of organizational issues [4, 52, 58, 59, 60] and would attach higher values to them [1].

Our study identifies three measures on which the two groups hold differing views, namely, "accuracy", "reliability", and "the improvement of overall productivity". As with the other measures, top-level management has a more positive view of these issues than do their mid-level counterparts. These differences are perhaps attributable to the organizational influence and position held by top-level managers. For example, some organizational departments might have to wait for their ERP systems to be updated and made "accurate" before proceeding with certain aspects of their tasks [56], whereas top-level managers can obtain data and information from different sources, including non-IT based systems [8]. This could account for the diverging views for both groups on these measures. Another plausible explanation could be that these three measures may highlight the paradoxical effect of ERP systems on organizational control. Strong et al. [56] described this phenomenon as the "unequal outcome" resulting from the use of data held by the ERP system and suggested that in the process of increasing the visibility of data, lower-level workers may gain "greater access to information with which to make decisions and meet customer demands." (p. 503). They identified three dimensions of data (definition, accuracy, and timeliness) as being critical for the monitoring of the paradoxes of control arising from ERP systems. Apparently, the three issues on which the two groups in our study had differences relate to the three issues discussed in Strong et al. [56]. More importantly, other studies have raised concerns about the accuracy and reliability attributes of ERP systems [e.g., 47], which suggests a wider problem exists with ERP systems.

4.1 Implications and Contributions

Our study has produced significant insights that will benefit both practitioners and IS academics. Since discussions often focus on how to better manage, measure, and evaluate organizational resources, our findings (that top- and mid-level managers have comparable views) are vital for practitioners. The common views of these players suggest that they accept their ERP as belonging to everyone, and conflicts that might have arisen from having an IT system that one party believes benefits the other are avoided. Under these scenarios, the organization is better poised to reap the benefits of its investment in complex and expensive IT systems [9, 29, 30, 36, 44]. Specifically, corporate managers in Finland and Estonia could examine the views of the other organizational stakeholder groups (such as lower-level workers), which could result in a company-wide perception of adopted ERP systems. Additional investigation is needed on the three measures of ERP systems success where diverging views were noticeable. Efforts toward minimizing the negative impacts that emerge from these differences are necessary, especially if further investigations could link these measures to any paradoxes in organizational control; i.e., some sections of the organization gaining more power than necessary. Management of organizations elsewhere could use our findings to assess the ERP software perspectives of their various stakeholders. Using our model, management might periodically benchmark various stakeholders or departments for an assessment of the success of their ERP software. This is vital because ERP systems often touch almost every aspect of the organization. The three identified measures on which the two groups differed will be useful for vendors as they develop or promote these systems.

The IS discipline is also enriched by our study. Using the ERP systems success measurement of Gable et al. [16], we demonstrated that ERP systems success could incorporate other relevant measures. Our study is among the first to operationalize the Workgroup Impact in IS success evaluations as suggested by Myers et al. [34, 35). Although our results that suggest converging views for the assessment of ERP systems success between top- and mid-level managers depart from several other studies, they support the work of Igbaria [24] and Sedera et al. [49]. This produces the opportunity for further inquiry and theory development regarding the effectiveness of enterprise systems in adopting firms in relation to organizational stakeholders. In particular, our study adds credence to Strong et al. [56] where three measures including "accuracy" of ERP data are vital when monitoring the effects of ERP systems vis-à-vis organizational control.

The challenge for other researchers is to produce a better understanding of our theme by replicating the study in other settings and regions. Such replications are useful for the development of cumulative knowledge in the IS field [25]. Similarly, there is a need to validate our findings in relation to ERP systems success assessment. Future studies could investigate the views of other stakeholder groups such as IS professionals and business managers.

Overall, there are limitations to our study. It is exploratory, and although a convenient sample of 62 respondents may be adequate, it is insufficient for a conclusive understanding of the issue. In addition, our sample comprises mixed ERP software, to include top-brand names such as SAP and Oracle and mid-market products like Scala and Nova. It is possible that the heterogeneous nature of the ERP systems used for our study are limiting. We also noticed that patterns of ERP adoption within our sample firms suggest that larger firms adopt top-of-the-line systems and smaller enterprises procure mid-market products. Further, we used variables that have been tested and validated for instrument use, but in one dimension - Workgroup Impact – we used a relatively new scale that might require validation. The administered questionnaire was in English; there is a possibility that completing the questionnaire in a foreign language might have posed a problem and that some issues were misunderstood. Finally, our sample consists of small, medium, and large companies. The diversity in the sample is good, but it may affect our findings. A homogenous sample of only large or global firms might yield results different from ours. Future research addressing some of the limitations of our study is expected.

5. CONCLUSION

We investigated the prioritization and evaluation of ERP systems success assessment using two organizational stakeholder groups (top- and mid-level managers) from 44 private companies in two Northern European countries. The major finding is that there is no difference in how both groups prioritize measures of ERP success. Despite their differing organizational roles, it was not our objective to investigate *why* there are no differences in this area. However, one plausible explanation could be the regional contextual influence. Northern European countries have a low PD ranking, which might result in superiors and their subordinates having comparable views on issues. Our findings are crucial for management as we offer more insight regarding the perceptions of these two key organizational players. Common views will help avoid any conflict of interest should one group view an IT system as benefiting only the other group. In our research context, the adoption of ERP systems will result in easier management of organizational stakeholder interests. The IS research community is enriched by the perspective of ERP systems success evaluation presented in our work. The identification of three measures or issues where diverging views might exist can help management focus their resources and time. In the same vein, ERP vendors can view these three issues as areas deserving of their attention.

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7. REFERENCES

[1] Abdinnour-Helm, S., Lengnick-Hall, M. L., and Lengnick-Hall, C. A. Pre-implementation attitudes and organizational readiness for implementing an Enterprise Resource Planning system, *EJOR, 146,* (2003), 258 -273

[2] Anthony, R. N. *Planning and Control Systems: A Framework of Analysis*. Ph.D. Thesis, Graduate School of Business Administration, Harvard University, 1965.

[3] Ballantine, J., Bonner, M., Levy, M., Martin, A., Munro, I., and Powell, P. L. Developing a 3-D model of information systems success. In *Information Systems Success*, Edward Garrity and G. Lawrence Sanders (Eds.), Idea Group Publishing, Hershey, PA, 1997.

[4] Brancheau, J., and Wetherbe, J. Key issues in information systems management. *MISQ, 11, 1* (1987), 23-45.

[5] Brynjolfsson, E., and Hitt, L. "Paradox lost" firm level evidence on the return of information systems spending, *Mgt. Sci., 42, 4 (1996)*, 541-558.

[6] Cameron, K.S. Effectiveness as paradox: consensus and conflict in conceptions of organizational effectiveness. *Mgt. Sci*., 32, 5 (1986), 539-553.

[7] Clouther, S. *Industrial ERP Market Turns Positive after Years of Declining Revenues*, ARC Advisory Group], http://www.arcwire.com. Accessed (6/7/2005).

[8] Davenport, T. H. Saving IT's soul: human-centered information management. *HBR*, (April, 1994), 119-131.

[9] Davenport, T. Putting the enterprise into the enterprise system. *HBR, 76, 4 (*1998), 121-131.

[10] DeLone, W. H., and McLean, E. R. Information systems success: the quest for the dependable variable. *ISR, 3, 1* (1992), 60-95.

[11] Doll, W. J., and Torkzadeh, G. The measure of end-user computing satisfaction. *MISQ, 12, 2* (1988), 259-274.

[12] Esteves, J., and Pastor. J. Enterprise resource planning systems research: An annotated bibliography. *CAIS, 7, 8* (2001), 1-52.

[13] Everdingen, Y., Hillegersberg, J., and Waarts, E. ERP adoption by European midsize companies. *CACM, 43, 4* (2000), 27-31.

[14] Fraser, C., and Zarkada-Fraser, A. Investigating the effectiveness of managers through an analysis of stakeholder perceptions. *Journal of Mgt. Dev., 22, 9* (2003), 762-783.

[15] Freeman, R. E. *Strategic Management: A Stakeholder Approach*. Pitman, Boston, MA, 1984.

[16] Gable, G. G., Sedera, D., and Chan T. Measuring enterprise systems success: A preliminary model. In *Proceedings of the 9th. AMCIS*, Tampa, Florida, 2003, 576-591.

[17] Grover, V., Jeong, S. R., and Segars, A. H. Information systems effectiveness: The construct space and patterns of application, *I & M, 31*, (1996), 177-191.

[18] Gupta, A. A stakeholder analysis approach for interorganizational systems. *IMDS, 95, 6* (1995) 3-7.

[19] Hair, J. F. Jr., Anderson, R. E., Thatham, R. L., and Black, W. C. *Multivariate Data Analysis*. Prentice-Hall International, Inc., Upper Saddle River, NJ, USA, 1998.

[20] Hallikainen, P., Laukkanen, S., and Sarpola, S. Reasons for ERP acquisition. In *Proceedings of the 6th.* (ICEIS), Porto, Portugal, 2004.

[21] Hofstede, G. *Culture's Consequences: Comparing Values, Behaviours, Institutions, and Organizations across Nations*. Sage Publications, NY, 2001.

[22] Ifinedo, P. Do organisational-technological contingency factors influence the perception of ERP systems success? An exploratory study in the Baltic-Nordic region of Europe, In *Proceedings of the IBIMA Conference*, Lisbon, Portugal, 2005, 427-437.

[23] Ifinedo, P. Enterprise resource planning (ERP) systems success measurement: An extended model, In *Proceedings of the 8th.* (ICEIS), Paphos, Cyprus, 2006, Forthcoming.

[24] Igbaria, M. End-user computing effectiveness: A structural equation model. *Omega, 18, 6* (1990), 637-652.

[25] Keen, P. MIS Research: Reference disciplines and a cumulative tradition. In *Proceedings of the ICIS*, 1980, Philadelphia, PA.

[26] Ko, D., Kirsch, J. L., and King, W. R. Antecedents of knowledge transfer from consultants to clients in enterprise system implementations. *MISQ, 29, 1* (2005), 59-85.

[27] Laukkanen, S., Sarpola, S, and Hallikainen, P. ERP system adoption Does size matter? In *Proceeding of the 38HICSS*, Hawaii, 1-9, 2005.

[28] Lederer, A. L., and Mendelow, A. L. Convincing top management of the strategic potential of information systems, *MISQ, 12, 4* (1988), 525-534.

[29] Markus, L., and Tanis, C. The Enterprise systems experience–from adoption to Success. In R.W. Zmud (Ed.) *Framing the domains of IT research: Glimpsing the fFuture Through the Past.* Pinnaflex Educational Resources, Inc, Cincinnati, OH, 2000, 173-207.

[30] Markus, M. L., Tanis, C., and Fenema, P. C. Multisite ERP Implementation. *CACM, 43, 4* (2000), 42-46.

[31] Martin, M. An ERP Strategy, *Fortune, 2* (February 1998), 95-97.

[32] Mockaitis, A. *The influence of national cultural values on management attitudes: A comparative study across three countries.* Ph.D Thesis, Management and Administration, Vilnius University, Vilnius, Lithuania, 2002.

[33] Moynihan, T. What chief executives and senior managers want from their IT departments, *MISQ, 14, 1* (1995), 15-26.

[34] Myers, B.L., Kappelman, L.A., and Prybutok, V.R. A case for including work group productivity measures in a comprehensive IS assessment model. In *Proceedings of the 27th. Decision Sciences Institute*, 1996, 756-758.

[35] Myers, B. L., Kappelman, L. A., and Prybutok, V. R. A comprehensive model for assessing the quality and productivity of the information systems function: Toward a theory for information systems assessment. *IRM Journal, 10, 1*, (1997), 6-25.

[36] Nahar, N., and Savolainen, V. IT-enabled international promotion of technology transfer in the enterprise resource planning space. *Studies in Informatics and Control, 9, 3* (2000), 233-251

[37] Nelson, K. G., and Somers, T. M. Exploring ERP success from an end-user perspective. In *Proceedings of the 7th. AMCIS*, Florida, USA, 2001.

[38] Nissinen, M. *The Baltics as a Business Location for Information Technology and Electronics Industries.* VTT Research Notes 2166, Helsinki: Edita Prima Oy, 2002.

[39] Nunnally, J. C. *Psychometric Theory*, (2nd. Edn.). McGraw-Hill, New York, NY, 1978.

[40] Parker, C. P., Dipboye, R. L., and Jackson, S. L. Perceptions of organizational politics: An investigation of antecedents and consequences. *Journal of Mgt., 21, 5* (1995), 891-912.

[41] Pfeffer, J. *Managing with Power: Politics and Influence in Organizations*. Harvard Business School Press, Boston, MA, 1992.

[42] Pijpers, G., G., M., Bemelmans, T. M. A., Heemstra, F. J., and van Montfort, K, A. G. M. Senior executives' use of information technology, *IST, 43*, (2001), 959-971.

[43] Pouloudi, A. and Whitley, E. A. Stakeholder identification in the inter-organizational systems: gaining insights for the drug use management systems. *EJIS, 6*, (1997), 1-14.

[44] Rao, S. S. Enterprise resource planning: Business needs and technologies, *IMDS, 100, 2* (2000), 81-88.

[45] Reilly, K. *ERP Market Report Showing Overall Growth of 14% in 2004*. www.amrresearch.com/content/Display. Accessed (15/10/2005).

[46] Rousseau, D. M. Characteristics of departments, positions, and individuals: contexts for attitudes and behavior. *ASQ, 21, 4* (1978), 598-616.

[47] Sammon, D., Adam, F., and Carton, F. Benefit realisation through ERP: The re-emergence of data warehousing. *EJISE, 6, 2* (2003), 155-164.

[48] Sedera, D., Gable G., and Chan T., Measuring enterprise systems success: A preliminary model. In *Proceedings of the 9th. AMCIS*, Tampa, Florida, 2003.

[49] Sedera, D., Gable G., and Chan T. Knowledge management for ERP success, In *Proceeding of the 7th. PACIS*, Adelaide, Australia, 2003.

[50] Seddon, P. B. A re-specification and extension of the DeLone and McLean model of IS success. *ISR, l 8, 3* (1997), 240- 253.

[51] Seeley, M., and Targett, D. Patterns of senior executives' personal use of computers, *I & M, 35*, (1999), 315-330.

[52] Schein, E. H. *The role of the CEO in the management of change: The case of information technology*. Sloan School of Management, MIT, Cambridge, MA. 1992.

[53] Shang, S., and Seddon, P. B. Assessing and managing the benefits of enterprise systems: the business manager's perspective, *ISJ, 12*, (2002), 271-299.

[54] Singletary, L, Pawlowski, S., and Watson, E. What is applications integration? Understanding the perspectives of managers, IT professionals, and End Users. In *Proceedings of the 9th. AMCIS*, Tampa, Florida, 2003.

[55] Somers, T. M., and Nelson, K. G. A taxonomy of players and activities across the ERP project life cycle. *I & M, 41*, (2004), 257-278.

[56] Strong, D. M., Volkoff, O., and Elmes, M. B. ERP systems and the paradox of control. In *Proc. of 9th. AMCIS*, Tampa, Florida, 2003.

[57] Tan, C. W., and Pan, S. L. ERP Success: The search for a comprehensive framework", In *Proceedings of the 8th.* AMCIS, Dallas, Texas, 2002.

[58] Teo, T.S. H., and Ang, J. S. K. Critical success factors in the alignment of IS plans with business plans, *IJIM, 19*, (1999), 173-185

[59] Weiss, J. A., Gruber, J. E., and Carver, R. H. Reflections on value: policy makers evaluate Federal Information Systems, *PAR, 46*, (November 1986), 497-505.

[60] Wilkes, R., and Dickson, G. Assessment of the information systems organizations: An empirical investigation of assessor perspectives. In *Proceedings of the 8th. ICIS, Pittsburgh*, PA, 1987, 428-439.

[61] World Economic Forum [WEF]. The Networked Readiness Index Rankings 2003. http://www.weforum.org/. Accessed (5/10/2004).

APPENDIX

	Source	Measures	Cronbach Alpha (α)	Both (N=62) *Mean*	Both (N=62) *Std. Dev.*	Top Mgt (N=26) *Mean*	Functional Mgt (N=36) *Mean*
1	[10] [16] [48]	Our ERP has accurate data	0.852	5.39	1.441	5.81	5.08
2		Our ERP is flexible		4.05	1.336	4.12	4.00
3		Our ERP is easy to use		4.15	1.226	4.04	4.22
4		Our ERP is easy to learn		4.05	1.372	4.15	3.97
5		Our ERP is reliable		5.40	1.260	5.69	5.19
6		Our ERP allows for data integration		4.92	1.418	4.85	4.97
7		Our ERP is efficient		5.05	1.260	5.12	5.00
8		Our ERP allows for customization		4.79	1.381	4.77	4.81
9		Our ERP has good features		4.90	1.224	4.96	4.86
10		Our ERP allows for integration with other IT systems		5.00	1.268	5.00	5.00
11	[10] [16] [48]	Our ERP meets users' requirements	0.822	4.65	1.010	4.50	4.75
12		Our ERP database contents is up-to-date		5.47	1.352	5.50	5.44
13		Our ERP has timely information		5.16	1.416	5.42	4.97
14		The information on our ERP is understandable		5.08	1.334	5.15	5.03
15		The information on our ERP is important		5.84	.944	6.08	5.67
16		The information on our ERP is brief		4.65	1.229	5.00	4.39
17		The information on our ERP is relevant		5.73	1.089	5.88	5.61
18		The information on our ERP is usable		5.47	1.067	5.31	5.58
19		The information on our ERP is available		5.23	1.220	5.42	5.08
20	[26]	Our ERP vendor/consultant provides adequate technical support	0.876	4.79	1.295	4.96	4.67
21		Our ERP vendor/consultant is credible and trustworthy		4.81	1.212	5.00	4.67
22		Our ERP vendor/consultant has good relationships with my organization		4.63	1.309	4.88	4.44
23		Our ERP vendor/consultant is experienced and provides quality training and services		4.55	1.210	4.69	4.44
24		Our ERP vendor/consultant communicates well with my organization		4.61	1.121	4.88	4.42
25	[10] [16] [35] [48]	Our ERP enhances individual creativity	0.769	3.98	1.431	3.73	4.17
26		Our ERP enhances organizational learning and recall for individual worker		4.08	1.232	4.23	3.97
27		Our ERP improves individual productivity		4.82	1.000	5.04	4.67
28		Our ERP is beneficial for individual's tasks		4.89	.889	4.77	4.97
29		Our ERP enhances higher-quality of decision making		4.60	1.123	4.69	4.53
30		Our ERP saves time for individual tasks and duties		4.68	1.400	4.92	4.50
31	[22] [34] [35]	Our ERP helps to improve workers' participation in the organization	0.810	4.23	1.078	4.19	4.25
32		Our ERP improves organizational-wide communication		4.50	1.501	4.54	4.47
33		Our ERP improves inter-departmental coordination		4.60	1.260	4.88	4.39
34		Our ERP creates a sense of responsibility		4.74	1.100	4.85	4.67
35		Our ERP improves the efficiency of sub-units in the organization		4.60	1.093	4.85	4.42
36		Our ERP improves work-groups productivity		4.55	1.197	4.65	4.47
37		Our ERP enhances solution effectiveness		4.61	1.061	4.77	4.50
38	[10] [16] [48] [53]	Our ERP reduces organizational costs	0.867	4.50	1.411	4.85	4.25
39		Our ERP improves overall productivity		4.68	1.315	5.04	4.42
40		Our ERP enables e-business / e-commerce		4.31	1.685	4.46	4.19
41		Our ERP provides us with competitive advantage		3.89	1.472	3.96	3.83
42		Our ERP increases customer service/ satisfaction		4.29	1.372	4.46	4.17
43		Our ERP facilitates business process change		4.19	1.265	4.54	3.94
44		Our ERP supports decision making		4.76	1.126	4.96	4.61
45		Our ERP allows for better use of organizational data resource		4.74	1.070	4.96	4.58
46	[16] [48]	Overall, the impact of our ERP on **me** has been positive	0.942	5.06	1.158	5.31	4.89
47		Overall, the impact of our ERP on **my workgroup (department)** has been positive		4.92	1.219	5.23	4.69
48		Overall, the impact of our ERP on **my organization** has been positive		4.98	1.221	5.23	4.81