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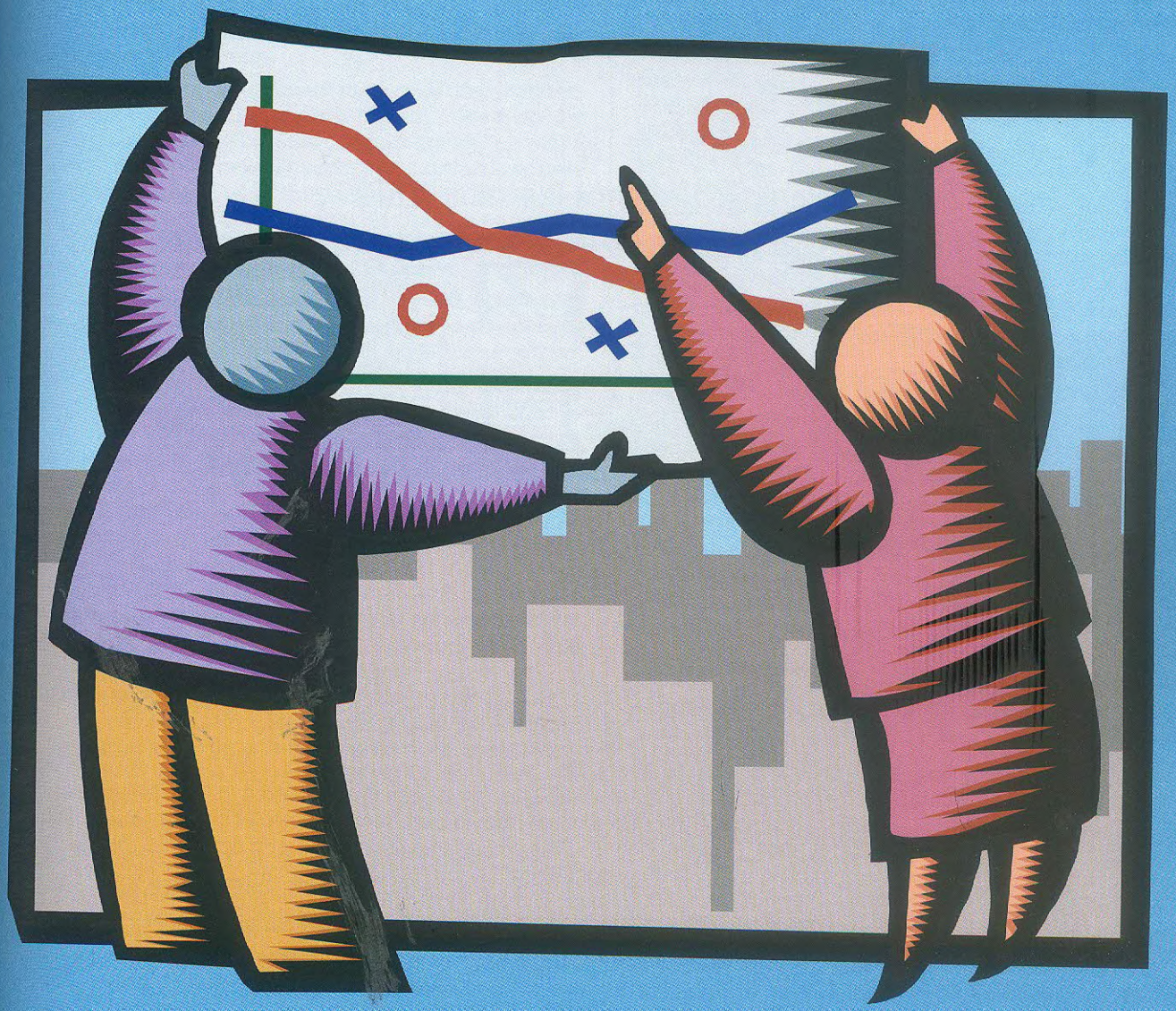

Influencing ERP System Implementation Success

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ABSTRACT
Enterprise Resource Planning (ERP) systems have become an essential part of the Information Technology (IT) infrastructure of large-sized organizations. Despite the many benefits of implementing ERP systems, the initial failure rate is high, and failure to properly implement the system has led many organizations into financial ruin. Prior research has primarily examined the role of organizational-level factors in influencing ERP system implementation success; this study examines the role of individual user-level factors. Data was collected at two points in time from users who were transitioning from a "legacy" system to a newly implemented ERP system. Results indicate that factors such as business process ownership, business process experience, user training, computer self-efficacy, and subjective norms influence user perceptions of implementation success. Implications for businesses include a rethink of existing implementation strategies by including leadership roles for business process owners, developing personalized user feedback channels, and having experience-based selective training.

Keywords: *Enterprise Resource planning (ERP), Information Technology, Business Process, Implementation.*

Enterprise Resource Planning (ERP)

INTRODUCTION

Enterprise Resource Planning (ERP) systems facilitate the seamless integration of business processes and information across functional activities within an organization. They have been implemented in over 80% of Fortune 500 companies and are considered an essential component of the Information Technology (IT) infrastructure of large organizations (Cotteleer and Bendoly 2006, Liang et al. 2007). The advantages associated with deploying ERP systems include improved business performance, increased competitiveness, and enhanced decision support capabilities (Cotteleer and Bendoly 2006, Holsapple and Sena 2005). However, with a high initial failure rate, ERP systems have led many organizations into financial ruin (Barker and Frolic 2003, Wallace 1998). Thus, research that seeks to enhance the acceptance and assimilation of ERP systems is of increasing relevance in the business world.

ERP implementation is viewed as complex and challenging as they are multi-user, cross-functional, organization-wide systems (Cotteller and Bendoly 2006, Jacobs and Bendoly 2003). Prior research on ERP implementation has focused primarily on organizational-level factors that could influence implementation success with limited research conducted on individual user-level factors (see Esteves and Bohorquez 2007 for a review). These organizational-level factors include top management support, presence of technology champions, having a solid business plan and a skilled project team, and effective project management (Finney and Corbett 2007, Remus 2007).

While organization-level factors are important, to better manage ERP implementations, it is important to address individual user-level factors, as ultimately it is the users that interact with the system and translate system capabilities into organizational performance (Holsapple and Sena 2005, Krumbholz and Maiden 2001). The relevance of individual user-level factors in influencing technology implementation has been well established in the context of single-user systems (see Kai and Larsen 2003 for a review). Thus, it is pertinent to examine whether these can be extended to the context of ERP systems, and perhaps more importantly, whether individual user-level factors unique to ERP systems can be identified.

The "Vanilla" ERP System Implementation

The business processes and transactions built into ERP systems are in line with industry benchmarks; hence, organizations are encouraged to adopt the basic or "vanilla" version of the ERP system with minimal customization and software modifications (Mabert et al. 2003, Siriginidi 2000, Somers and Nelson 2004). This ensures that upon implementation, the organization implicitly follows industry benchmarks and work practices, leading to increased operational efficiency. In addition, it enables a better "fit" or alignment with the software vendor, facilitating system upgrades with minimum errors and reconfigurations when updates or newer versions are released (Rosario 2000). As these newer versions incorporate evolving industry benchmarks, the organization in turn will find itself adopting state-of-the-art work practices.

To facilitate a "vanilla" implementation, existing business processes within the organization may need to be reconfigured to meet ERP system requirements, entailing users to acquire complex new knowledge and at the same time unlearn large portions of what they already know (Jones and Price 2004, Robey et al. 2002). Along with changing and new business processes, the stress of interacting with new technology can be traumatic, particularly if users are ignorant about the potential changes it could bring to their work practices (Barker and Frolic 2003). The disruption brought about by an alteration of organizational business processes could foster user hostility and resistance (Jiang et al. 2000).

To address user hostility and resistance, organizations attempt to "buy-in" the allegiance of potential users by ensuring that they are active participants in the design and subsequent implementation of the ERP system. It is recommended that user suggestions be actively solicited by the implementation team, and if found appropriate, incorporated into its design (Duplaga and Astani 2003, Grossman and Walsh 2004). This is important in the case "power" users such as business process owners and business unit supervisors. In addition, it is recommended that potential users be co-opted into the implementation team, as greater involvement in system implementation is expected to translate into positive attitudes, increased user satisfaction, and greater support for the system (Turnipseed et al. 1992). Training is also viewed as important in educating users and reducing user hostility towards the system (Mabert et al. 2003, Palaniswamy 2002).

In the case of single-user systems, individual characteristics such as age, education, experience, computer self-efficacy, and subjective norms have been found to influence user perceptions of technology implementation success. Older and less educated users have been hesitant to adopt and utilize new technology into their work practices. However, users who are already familiar with similar systems tend to have more positive attitudes towards a new system (Agarwal and Prasad 1999, Harrison and Rainer 1992). Computer-self efficacy, an individual's judgment of his or her ability to use computers effectively, has also been found to be a key predictor in shaping user perceptions towards a system (Venkatesh 2000). An equally important predictor is subjective norms, the tendency of people to use technology once they perceive others who are important to them believing that they should be using it (Venkatesh and Davis 2000).

Traditionally, ERP implementations have incorporated recommended practices such as user involvement in system design and user training, and acknowledged the importance of individual user characteristics in influencing implementation success. However, there has been limited research conducted to measure the actual impact of these factors on implementation success. The approach hitherto has been prescriptive with little or no examination as to whether these factors actually do influence implementation. Further complicating matters is the fact that ERP implementation takes place over an extended period and factors critical to implementation might change over time, with some gaining prominence and others ceasing to be relevant (Palaniswamy 2002). This research addresses these issues by conducting an empirical study examining predictors of implementation success at two different points in time.

RESEARCH FRAMEWORK

ERP Implementation Success

What constitutes ERP implementation success? ERP systems introduce new business processes and reengineer existing ones so as to align them with industry-standard practices, which in turn enable users to execute their tasks more efficiently, increase productivity, facilitate innovation, and improve client satisfaction. Thus, one dimension of ERP implementation success is individual impact, the influence the system has on user task performance (DeLone and McLean 1992, 2003).

While individual impact focuses on changes in user behavior towards their job tasks, another approach would be to addresses user perceptions of the quality of the system such as its usefulness, ease of use, and reliability. Thus, a second dimension of ERP implementation success is system quality (DeLone and McLean 1992, 2003). Together, the individual impact and system quality dimensions represent a balanced view of ERP implementation success.

Business Process Ownership

As ERP systems bring about a re-configuration of business processes, the owners of existing business processes within the organization play an important role during implementation (Rodriguez 2003, Strait 2006). The external consultants in the ERP implementation team may not be familiar with the outdated business processes associated with the existing "legacy" system. Moreover, these business processes might have been customized to suit long-established organizational and departmental work practices. By virtue of their authority over and responsibility for business processes, process owners are best positioned to provide a detailed analysis of existing processes, identify problems, and propose solutions. Hence, business process owners are often drafted full-time into the implementation team and are vital participants in the implementation process (Jeston and Nelis 2008, Rodriguez 2003).

The Investment model (Rusbult 1980) argues that the more time and effort a person utilizes in an activity, the more satisfied that person is with the activity, due to the heavy "sunk" investment in the activity. Given their heavy investment in the implementation process, it is expected that business process owners will perceive the ERP system as

having a positive impact on their job performance and will foster positive perceptions regarding the ERP system. Hence,

H1: Business process ownership will be positively related to implementation success.

Involvement in System Design

To create a sense of ownership and commitment towards the ERP system, the involvement of potential users is encouraged in its design and implementation. Often, user input is solicited by the implementation team and users are co-opted into the team on a part-time basis so as to "buy-in" their allegiance towards the ERP system, which in turn is expected to manifest as positive perceptions towards the system (Duplaga and Astani 2003, Grossman and Walsh 2004). Again, based on the Investment Model, users of the ERP system that have contributed towards its design and implementation can be expected to work harder to understand the changed business processes brought about by the system and effectively utilize the system in their work practices. Thus,

H2: User involvement in system design will be positively related to implementation success.

Experience in Business Processes

In the context of single-user systems, prior experience has been found to engender positive perceptions regarding a new system being implemented, particularly if such experience is with similar systems having like operational features (Agarwal and Prasad 1999). However, when a new ERP system is implemented, it replaces long-standing "legacy" systems and brings about radical changes in existing business processes and work practices. Hence, experienced users, attuned to existing "legacy" system business processes and at ease with associated work practices, will have to discard their long-standing knowledge and learn new industry standard business processes, leading to cognitive dissonance in excess of what would be felt by less experienced users. Perhaps more demoralizing will be their having to come to terms with the irrelevance of their hard-earned, experience-based knowledge in the context of the new system, and the resulting loss of power. This frustration could lead to experienced users fostering negative perceptions of the system. Hence,

H3: Experience in existing business processes will be negatively related to implementation success.

Training

The integrated and interdependent nature of ERP systems require users to understand the manner in which their tasks relate to and interact with other processes at the unit, divisional, and organizational levels. Training is the primary means through which users are educated about the ERP system (Mandal and Gunasekaran 2003, Robey et al. 2002). In addition to transferring technical knowledge regarding the system, users have to be trained in new and re-configured business processes and educated about the potential changes it could bring into their work practices. Training enables users to come to terms with the changes introduced by the system and could help build positive attitudes toward the system, thereby influencing implementation success. Thus,

H4: User training will be positively related to implemen success.

Computer Self-Efficacy

Computer self-efficacy refers to a users' belief regarding ability to perform a task with a computer, and has been fo to lead to positive perceptions regarding technology an use (Venkatesh 2000). Though extensively researched i context of single-user systems, computer self-efficac rarely been studied in the context of ERP systems (Esteves Bohorquez 2007). Users who have confidence in their abili handle computers in general can be expected to be ade using ERP systems, hence,

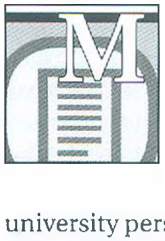
H5: Computer self-efficacy will be positively relat implementation success.

Subjective Norms

As with computer self-efficacy, in the context of singl systems, subjective norms have been found to posi influence user perceptions of technology (Venkatesh Davis 2000). Subjective norms refer to the tendency of pe to use technology once they perceive others who important to them believing that they should be usin Similar to single-user systems, subjective norms are exp to positively influence user perceptions of implemen success. Hence,

H6: Subjective norms will be positively relat implementation success.

These hypotheses were tested in the context of a implemented ERP system, the details of which are pres in the following sections.



METHOD

ERP System Implementation

The study was conducted using an SAP ERP system that was being implemented large southeastern university in the Un States. The implementation team compri university personnel and external consultants, both tech and managerial, from the software vendor implementation partners. The existing 20-year old system major operational inefficiencies and top managem decided to implement the "vanilla" version of the software. As the system was expected to bring about l term, radical changes in the work environment and re extensive user learning, it generated considerable hos and resistance within the user community.

To overcome this resistance, the implementation te highlighted business process inefficiencies associated w the existing system and explained how these would addressed by the new system. To inculcate a sense ownership regarding the system, business process owners selected potential users were drafted into the implemen team. User opinion regarding changed business processes solicited and where found feasible, incorporated into design of the system. Also, regular training sessions w conducted to educate users regarding the new busin processes and the manner in which it would affect their tasks.

Data Collection

Data was collected using a survey questionnaire, the cover page of which gave a brief description of the research study, and invited users to participate in it. The completed questionnaire was returned through the internal mail delivery system of the university. Two rounds of data collection were conducted to examine whether the hypothesized relationships were sustainable over time. The first round of data collection (Round 1) commenced immediately after implementation ("go-live") of the system, and the second round (Round 2) commenced six months after implementation.

Measures

The independent variables for this study are business process ownership, experience in existing business processes, involvement in system design, training, computer self-efficacy, and subjective norms. Data regarding business process ownership was obtained from the human resource department and the implementation team. It was coded as a dichotomous variable with "1" indicating ownership and "0" indicating otherwise. Involvement in system design was measured using a single item measure that asked users about the extent to which they were involved in the design of the ERP system. Training was measured as the number of training sessions attended by the user. The number of years a user had been involved in their current job function using the existing "legacy" system was used to measure experience in existing business processes. Computer self-efficacy and subjective norms were measured using well-validated measures (Venkatesh and Davis 2000) adapted to suit the implementation context. Data regarding the age and educational level of the user was also collected and the latter coded as a five level variable (0 = High school diploma, 1 = Associate's, 2 = Bachelor's, 3 = Master's, 4 = Ph.D.).

Drawing upon DeLone and McLean (1992, 2003), implementation success was measured using the individual impact and system quality dimensions. Individual impact was measured using an existing 8-item measure (Doll and Torkzadeh 1998) adapted to suit the study's context. System quality was measured using user perceptions of perceived usefulness of the system, and here again a well-validated measure (Venkatesh and Davis 2000) was adapted to suit the study's context (see Appendix 1).

DATA ANALYSIS AND DISCUSSION

Based on the user list provided by the implementation team, 440 questionnaires were distributed among users of the system. After excluding questionnaires that were incomplete or returned blank, there were 207 usable responses in Round 1 (i.e. data collected in the first round immediately after implementation) and 156 usable responses in Round 2 (i.e. data collected in the second round, six months after implementation), representing response rates of 47.06 and 32.27 % . A confirmatory factor analysis on the questionnaire items using Principal Component Analysis (PCA) with varimax rotation for factor extraction resulted in seven factors corresponding to the measures of individual impact, system quality, computer self-efficacy, subjective norms, and involvement in system design. The items for each of these measures have corresponding factor loadings greater than .5, which is more than its loadings with any other factor, and the Cronbach's alpha for each of these measures was greater than the widely used critical threshold of 0.70.

The descriptive statistics for the variables used in this study are presented in Table 1. The Pearson's correlations between the variables are presented in Tables 2a and 2b.

Table 1: Descriptive Statistics

Measure	Round 1 (n=207) Mean (SD)	Round 2 (n=156) Mean (SD)
Age (Years)	44.33 (10.36)	44.45 (10.64)
Experience (Years)	6.70 (7.01)	6.96 (7.40)
Education	1.47 (1.11)	1.45 (1.14)
Ownership	0.14 (0.35)	0.14 (0.35)
Involvement	1.49 (0.90)	1.48 (0.88)
Training	3.74 (1.39)	3.81 (1.33)
Self Efficacy	4.13 (1.27)	4.22 (1.23)
Subjective Norms	4.10 (1.19)	4.12 (1.02)
Individual Impact	4.28 (0.96)	4.32 (1.22)
System Quality	3.96 (1.33)	4.05 (1.30)

Table 2a: Pearson's Correlations and Inter-Correlations (Round 1)

S.No.		1	2	3	4	5	6	7	8	9	10
1	Age	1									
2	Experience	.55**	1								
3	Education	-.08	-.12	1							
4	Ownership	.02	.01	-.05	1						
5	Involvement	.03	-.01	.05	.01	1					
6	Training	-.01	-.10	.03	-.05	.10	1				
7	Self Efficacy	-.06	.06	-.03	.09	.03	.04	1			
8	Subjective Norms	-.08	-.11	-.06	.18**	-.02	-.03	-.08	1		
9	Individual Impact	.04	.03	.06	.35 **	.05	.12	.26**	.19**	1	
10	System Quality	-.10	-.20 **	.04	.19 **	.16 *	.18 *	.18 **	.19**	.20 **	1

*Note : Correlation significant at the .01 level; * - Correlation significant at the .05 level*

Table 2b: Pearson's Correlations and Inter-correlations (Round 2)

S. No.		1	2	3	4	5	6	7	8	9	10
1	Age	1									
2	Experience	.54**	1								
3	Education	-.07	-.13	1							
4	Ownership	.01	.01	.00	1						
5	Involvement	.04	.00	.05	-.12	1					
6	Training	-.02	-.18b	.06	-.06	.09		1			
7	Self Efficacy	-.06	.01	.06	.24**	.01	.14	1			
8	Subjective Norms	-.05	-.01	.05	.04	.05	.10	.06	1		
9	Individual Impact	.11	.04	.00	.47**	-.03	.12	.27 **	.07	1	
10	System Quality	-.14	-26**	.09	.22**	.09	.23**	.25**	.20**	.04	1

*Note: ** - Correlation significant at the .01 level; * - Correlation significant at the .05 level*

A multivariate multiple regression analysis was conducted with individual impact and system quality as the dependent variable the results of which are presented in Table 3.

Table 3: Results of Multivariate Multiple Regression Analysis

No.	Covariates	p-value Wilk's Lambda		Dependent Variable	b Co-efficient		p-value	
		Round			Round		Round	
		1	2		1	2	1	2
1	Age	.74	.51	Individual Impact	.01	01	.437	.261
				System Quality	.01	.00	.901	.849
2	Experience	.09	.02	Individual Impact	.00	.00	.802	.709
				System Quality	-.03	-.05	.029*	.005**
3	Education	.26	.87	Individual Impact	.11	-.01	.121	.876
				System Quality	.05	.05	.530	.611
4	Ownership	.00	.00	Individual Impact	1.02	1.53	.000**	.000**
				System Quality	.64	.88	.015*	.004**
5	Involvement	.07	.32	Individual Impact	-.04	.03	.668	.787
				System Quality	.22	.16	.025*	.149
6	Training	.01	.02	Individual Impact	.12	.14	.028*	.039*
				System Quality	.15	.13	.018*	.099
7	Self Efficacy	.01	.01	Individual Impact	.17	.15	.007**	.057
				System Quality	.15	.19	.046*	.037*
8	Subjective Norms.	01	.04	Individual Impact	.16	.12	.014*	.127
				System Quality	.17	.20	.027*	.026*

*Note: ** - p-value significant at the .01 level; * - p-value significant at the .05 level*

usiness process ownership has a significant positive lationship with implementation success in Round 1 ($p < .01$ individual impact and $p < .05$ for system quality) and Round $p < .01$ for individual impact and system quality). Thus, there strong support for H1 [Business process ownership will be positively related to implementation success]. Experience in isting business processes has a significant negative lationship with one of the two measures of implementation ccess, viz. system quality in both Round 1 ($p < 0.05$) and ound 2 ($p < 0.01$), thus there is support for H3 [Experience in isting business processes will be negatively related to plementation success]. In the case of user training, there is a gnificant positive relationship in Round 1 ($p < .05$ for both dividual impact and system quality), and Round 2 ($p < .05$ for dividual impact). Thus, overall, there is strong support for H4 User training will be positively related to implementation ccess].

elf-efficacy has a significant positive relationship with plementation success for Round 1 ($p < .01$ for individual pact and $p < .05$ for system quality), and Round 2 ($p < .05$ for stem quality). Likewise, subjective norms has a significant positive relationship with implementation success for Round $p < .05$ for both individual impact and system quality), and ound 2 ($p < .05$ for system quality). Thus, there is strong pport for H5 [Computer self-efficacy will be positively lated to implementation success] and H6 [Subjective norms ill be positively related to implementation success].

nvolvement in system design has a significant positive elationship with system quality in Round 1 alone; hence, H2 User involvement in ERP system design will be positively elated to implementation success] is not strongly supported. ynthesizing the above, the data broadly supports the contention that individual user-level factors such as business rocess ownership and experience, user training, computer elf-efficacy, and subjective norms influence user perceptions f ERP implementation success.

Discussion

n the research setting, business process owners were usually nit supervisors or mid-level managers, and were the first oint of contact and primary source of information regarding isting business processes for the external consultants rovided by the vendor and implementation partners. usiness process owners were co-opted into the plementation team either full-time or part-time on an "as d when" required basis. Their deep involvement and rsonal investment in the design and implementation of the stem translated into strong positive beliefs regarding the efulness of the ERP system and its impact on their job tasks.

perienced users had to come to terms with the sudden elevance of their knowledge and the accompanying loss of wer, and the fear that they were on the same footing as their unger, less experienced colleagues. This is best nonstrated by the following comment of a user with 20 rs experience: "The ERP system scares me - have sleepless hts thinking about how I will manage my work with the new tem. I am thinking of quitting my job". In fact, subsequent to plementation, many experienced users quit their jobs, as were unable to come to terms with the demands of the system. Embracing this paradigm shift in business cesses and work practices seem to have proved easier for less experienced users. This is an interesting result as it runs counter to prior research that has indicated that prior experience leads to positive perceptions regarding a new system (Agarwal and Prasad 1999). Apparently, the changes brought about by the ERP system were so radical that prior experience was rendered irrelevant and did not translate into positive beliefs.

When users contribute towards the development of a system, it is expected that the resulting sense of ownership would translate into positive perceptions towards the system, however, the results indicate otherwise. In the study setting, user input was frequently solicited through the project website and through e-mails, and users were co-opted into the implementation team on a part-time basis. Though user suggestions were actively solicited, for a variety of reasons, technical and otherwise, these were rarely incorporated into the actual design of the system. Also, there were limitations on the extent to which alterations could be made to the industry-standard practices that were inbuilt into the system. Users who had contributed suggestions in good faith may have been disappointed at not seeing their suggestions incorporated into the system, and this could have diluted their sense of ownership towards the system.

Prior studies have found training to be critical to the success of single-user systems; this study reinforces those findings and extends it to the context of ERP systems. Training is an extended activity, commencing prior to implementation and extending over many months until the ERP system has been assimilated into the daily operations of the organization. Classroom-style training sessions involving hands on interaction with the system commenced one month prior to implementation and regular sessions were scheduled for over a year following implementation. These sustained training activities seem to have contributed towards fostering positive user perceptions regarding the system. The user attributes of computer self-efficacy and subjective norms, long established as strongly influencing user perceptions towards single-user systems, have the same strong impact in the case of ERP systems.

MPLICATIONS

The results of this study have interesting implications for ERP system implementation practices. Given their commitment towards the ERP system, business process owners could be entrusted with championing it within their unit. They could be drafted to lead training sessions, particularly during the early stages of implementation. As subjective norms are important in influencing implementation success, statements made by co-workers in positions of authority regarding the capabilities and advantages associated the system may have a strong positive impact (Karahanna and Straub 1999). Hence, business process owners could be encouraged to conduct periodic unit-level briefings regarding the capabilities of the ERP system and its operational advantages.

To create a sense of ownership regarding the system, ERP implementation teams actively encourage user involvement in the design and implementation of the system. However, this does not seem to have produced the desired impact, as with the "vanilla" approach, the system was implemented with minimal modifications, and hence there was limited scope for

incorporating user suggestions. Potential users provide suggestions in good faith and might feel disappointed when they realize that their input has not been incorporated into the system. To counter this, implementation teams would have to provide personalized feedback to users, informing them of those suggestions that have been implemented, and more importantly, provide detailed explanations as to why certain suggestions could not be implemented. This would mitigate the disappointment that users would feel when they see that their well-meaning suggestions have been discarded by the implementation team.

Our findings re-emphasize the importance of sustained training for system implementation in general and ERP systems in particular. However, to make training more effective, it should not take a "one-size fits all" approach, but should consider an experience-based approach, with experienced users being provided specialized training and greater support than less experienced ones. Until users have assimilated the ERP system into their work practices, training sessions and similar educational activities should be sustained.

IMITATIONS

As with any research study, this too has its limitations. The setting is an educational institution and caution needs to be exercised in extending these results to a commercial business setting. The sample consists primarily of women in administrative jobs with high school educations and an average age of forty-four. A more gender-balanced business environment having highly educated, younger users might result in different findings.

The dependent measures of individual impact and system quality are both perceptual measures. Though such measures are widely used in technology acceptance and implementation research (DeLone and McLean 1992, 2003), a better approach might be to use objective measures such as the actual time spent using the system. Admittedly, the actual time that a user was logged on the system may reflect task requirements and problems using the system as well as non-problematic use, and may not be a particularly valid proxy for implementation success. Hence, it might be more appropriate to validate the perceptual measures by triangulating it with objective use data.

UTURE RESEARCH

As this study was conducted in the context of an educational institution, future research could attempt to replicate it in a commercial business setting. The research model could be refined and expanded to include additional factors such as task structure, task difficulty, and task interdependence (Guimaraes et al. 1992). Differences in task structure could influence user perceptions of implementation success and need to be examined in future research.

User education is critical to ERP implementation success; and is usually done through formal classroom-style training sessions. Research could examine whether online training would be a cost-effective substitute, particularly in the later stages of implementation. Future research could also examine the role of other individual attributes in influencing implementation success. Learning and knowledge transfer may also be realized through social collaboration among users in the course of system use. Future research could examine whether the social network structure of business units could influence systems-related learning (Cross and Cummings 2004).

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Annexure

All measures use 7-point Likert scales	
Individual Impact	The SAP system: ..... helps me create new ideas. ..... helps me meet client needs. ..... allows me to accomplish more work than would otherwise be possible. ..... saves my time. ..... increases my productivity. ..... helps me come up with new ideas. ..... helps me try out innovative ideas. ..... improves client satisfaction.
Perceived Usefulness	I find the SAP system to be useful in my job. Using the SAP system: .....improves my performance in my job. .....makes it easier to do my job. .....enhances my effectiveness in my job.
Computer Self-Efficacy	I could complete my job using the SAP system: .....if there was no one around to tell me what to do. .....if I had only the training manuals for reference. .....if I had seen someone else using it before trying it myself. .....if I could call someone for help if I got stuck. .....if someone else had helped me get started. .....if I had a lot of time to complete the job.
Subjective Norms	My friends would think that I should use the SAP system. My colleagues would think that I should use the SAP system. People who influence my behavior would think that I should use the SAP system. People who are important to me would think that I should use the SAP system.