Research Article
Factors Manipulate ERP Implementation: An Experiential Study from Pakistan

Muhammad Jamil Anjum and Saif-ur-rehman Khan
Faculty of Management and Human Resource Development, Universiti Teknologi Malaysia, Malaysia

Abstract: ERP (Enterprise Resource Planning) is a foremost improvement in the arena of organizational management and information system. ERP has the ability to integrate and assimilate the information in an efficient way. ERP is an utmost extensive business management system that presents real-time competences and flawless presentation of information for organizations and businesses. Nevertheless, not all the ERP implementation projects are successful. Implementation of ERP affects the overall processes of organizations. The organizations implementing ERP systems may face various challenges. The objective of this study is to identify the critical success factors of ERP implementation in Pakistani organizations using ERP systems. The study was conducted by developing a survey questionnaire. The questionnaires distributed among the ERP users of Pakistani organizations. For further analysis total 422 responded were. The study founds a significant association of technological, strategic, project management, people, top management support and communication factor with ERP implementation. The results of the study are beneficial to the ERP vendors and professionals to formulate particular strategies to overwhelm the misfit between ERP systems and organizations implementing ERP systems in developing countries like Pakistan. Additionally, the managers and organizations might increase their understanding regarding the complications essential in the ERP installation to evade hurdles and escalate the chances of ERP success.

Keywords: ERPS (Enterprise Resource Planning System), Pakistan, successful implementation factors of ERPS

INTRODUCTION

Several theoretical perceptions have focused the factors of ERP implementation with characteristics like plan of projects and achievement (Laframboise, 2002), forecasting the likelihood of achievement (Magnusson *et al*., 2004), features, acceptance and execution process (Butler and Pyke, 2003; Nandhakumar *et al*., 2004), directorial pressure (Westrup and Knight, 2000), improvement towards e-commerce (Kemppainen, 2004; Schubert and Leimstoll, 2004; Schubert, 2003). ERP implementation is on its initial stage in various developing countries like Pakistan. Furthermore, research concluded that various factors such as limited capital, poor management, lack of resources and deficiency of information technology capability are critically distressing the execution and variation of ERP systems in Pakistan and various Asian countries compared to industrial countries.

Several practitioners and academic researchers have endeavored to incarcerate the key factors of success or failure of ERP implementations (Anexinet, 2006; Ewusi-Mensah, 1997; Ibrahim *et al*., 2008; Kimberling, 2006; Lindley *et al*., 2008; Stapleton and Rezak, 2004; Weightman, 2004). Numerous studies focused on both the failure and success factors contributed to success and failures. If all the issues are proscribed and supervised therefore these factors express as constructive and encouraging factors that contribute to achievement and the frequently investigated factors are change management, clearly defined goals and objectives, user training and education, top level management, project management and project competence (Upadhyay and Dan, 2008, 2009).

The role of choosing the appropriate package is very significant in the successful ERP implementation and most users' friendly package is normally selected from firms, which has sufficient capacity applicability and integrates a series of business procedures where firms face difficulties. Careful and cautious concentration should be given to the selection of appropriate and specific package (Al-Mashari *et al*., 2003; Kraemmergaard and Rose, 2002; Somers and Nelson, 2001, 2004; Yusuf *et al*., 2006).

Two researchers conducted a research study on the success issues of ERP which identified ten successive issues through investigate ten selective articles which are: effective decision making, Business Plan and vision, project management, effective communication, testing and troubleshooting, appropriate business and legacy system, ERP teamwork and composition, top management support and software development (Nah and Lau, 2001).

Corresponding Author: Muhammad Jamil Anjum, Faculty of Management and Human Resource Development, Universiti Teknologi Malaysia, Malaysia

The study of Umble *et al*. (2003) concluded nine vital factors towards successful execution of ERP which includes: Support from top management, data accuracy, change management, multi-site issues, proper education and training, project management, focused performance measures and clear understanding of goals.

Woo (2007) conducted a study through interviewing professionals concerned with the execution of ERP foremost Chinese ventures, the researchers acknowledged six vital success issues that contain: project team, process management, training and effective communication, commitment form top management, proper project management and proper education and training (Woo, 2007).

LITERATURE REVIEW

Technological: There are two different strategies of ERP implementation originated in the literature. These strategies can be named as the phased implementation and the Big Bang implementation (O'Leary, 2004). Depending on the organizational structure, economic issues, the intricacy of the firm, time constrictions and environmental locations and strategic partners (Markus and Tanis, 2000), the suitable execution strategy should be preferred. The Big Bang implementation strategy needs synchronized implementation of manifold modules of ERP systems, whereas, phased implementation includes developing, testing, designing and installing dissimilar modules of the similar ERP package.

There should be sufficient IT infrastructure, both hardware and networking is vital for ERP system's success. It is obvious that ERP implementation entails a multifaceted evolution from inheritance information systems and business procedures to an incorporated IT infrastructure ordinary business process all over the organization. Hardware collection is based on the organization's choice of an ERP software package. The merchant of ERP software normally endorse which hardware and hardware configuration must be utilized to run the ERP system (Al-Mashari, 2002; Yasser, 2000).

This issue has been recognized vital by the researchers and practitioners (Bhatti, 2005). The 'Vanilla' approach of implementation is an additional execution approach that spotlights on smallest customization of the ERP package (Holland *et al*., 1999) and it has been concluded a most general implementation approach (McCredie and Updegrove, 1999; McConachie, 2001). The study of Mabert *et al*. (2003) concluded that the most imperative inspiration for implementing ERP systems is to reinstate legacy systems and to regulate systems. Al-Mashari *et al*. (2006) investigates a firm who advances the ERP implementation as a re-engineering proposal to modify the IT infrastructure for professionals recommended that the firm required standardizing information system to obtain the benefit of the re-engineering attempt. The project ERP system modules are normally associated with one another, erroneous data input into one component, module will negatively influence the functioning of another module (Sum *et al*., 1997; Markus and Tanis, 2000).

Strategic: Top management support, business plan and vision have been frequently recognized as the most significant and critical success factors in ERP system execution projects (Somers and Nelson, 2001). An obvious business plan and vision are required to express the scheme throughout the life cycle of ERP (Loh and Koh, 2004). Project management recognizes three challenging and interconnected restraints which are time, scope and cost goals (Schwalbe, 2000). The principal phase of any project should commence with a conceptualization of the goals and probable ways to accomplish these goals. Furthermore, goals and objectives must be investigated so that they are definite and prepared and designate the common directions of the project (Somers and Nelson, 2004). Nah *et al*. (2003) argued that one of the major problems of ERP project leaders face come not only form the implementation itself, but from prospects of board members, key stakeholders and senior staff members. It is significant to set up goals of the project before even looking for top management support. Most ERP implementations failed as a result of deficient obvious plans (Somers and Nelson, 2004). Top management support is the level of obligation by senior staff in the organization of the project in terms of their own association and the motivation to distribute important managerial resources (Slevin and Pinto, 1987). They must be eager to allow for an outlook change by accommodating that a lot of understanding has to be completed at all levels, including themselves (Rao, 2000). Business Process Reengineering (BPR) has materialized is one of the most for best practices. BPR can be defined as the primary rethinking and essential redesign of business procedures to attain remarkable enhancement in significant, existing procedures of performances, like quality, speed approaches, cost and service (Hammer and Champy, 1993; Koch, 2001; Huang *et al*., 2004).

To enhance the possibility of accomplishment, management must select suitable software that most strongly outfits its necessities and due to this ERP system received a lot of concentration in the last years; there are several ERP systems research examples and fairly a lot of assessments, e.g., (Esteves and Pastor, 2001; Shehab *et al*., 2004). Appropriate package selection participates a vital role in the triumphant implementation of ERP usually the organization chooses a package which is most user responsive, has sufficient capacity for scalability and covers a series of

business procedures where organizations faces problems.

The selection of the detailed ERP package is one that necessitates cautious concentration (Kraemmergaard and Rose, 2002; Yusuf *et al*., 2006; Al-Mashari *et al*., 2003; Somers and Nelson, 2001, 2004). A fundamental measurement of the ERP selection process is the selection of the merchant who will provide the ERP system. Several significant factors linked to merchants consist of their skills and knowledge of their system, understandings of the necessities, limitations and apprehensions of the firm and its industry, merchants prolong existence and capability to assemble future needs and to sustain and support in the execution process (Verville and Halingten, 2003). Vendors and merchants must be assessed on the basis of providing support of ranging from technical assistance to train.

The relationship between ERP implementer and vendor is an important success factor which influences ERP implementation success (Nah and Lau, 2001; Zhang *et al*., 2005; Somers and Nelson, 2001). Efficient enterprise communication is significantly to ERP implementation (Falkowski *et al*., 1998). Middle management needs to converse its significance (Wee, 2000). The scope, activities, objectives and updates should be told in advance to employees and admit change will happen (Sumner, 1999). Muscatello and Chen (2008) stated that appropriate communication strategies should be set up to keep senior management knowledgeable on the matter of ERP project impact, risks, progress and challenges.

Project management: The study of Suganthalakshmi and Mothuvelayuthan (2012), concluded that the formation of the project team has robust influence on the ERP execution process and two significant issues are the combination of third-party professionals within the team and the preservation within the firm with the pertinent ERP knowledge. Boon *et al*. (2003) stated that of the project implementation team is comprised of those who have past successful experience, flexibility, reputation and it is the accountability of those significant assessments.

Implementation of ERP involves the collaboration of technical and business professionals with end users. Hence, team composition and teamwork together with ERP specialists and merchant have been emphasized in the literature (Nah *et al*., 2007). The finest people in the firm are believed to be employed in the teas of ERP implementation. The team of the ERP should be balanced, should be consist of an amalgamation of internal employees, cross-functional and external consultants. The internal employees can extend the indispensable technical efficiency of ERP implementation. It is also critical that firms select a balance ERP team and approve them to make coherent

decisions (Dezdar and Ainin, 2011). Furthermore, addition of business users on the ERP team to harmonize the procedural parts is critical to the implementation of ERP success (Somers and Nelson, 2004).

People: Education and training provides the logic and general conceptions of ERP systems to the management and employees (Ehie and Madsen, 2005; Sum *et al*., 1997). The users of the ERP implementation should be educated about all the phases of implementation and extra training should be presented for fresh employees and those who obtain job rotations. The probable influence of providing training is less aggravated users having an obvious understanding of system usage which will save firms time and money (Jha *et al*., 2008). ERP project should be considered as a change management program not an IT program and firms must focus on change management plans for efficient execution (Wood and Caldas, 2001; Ngai *et al*., 2008; Robert and Willcocks, 2007). Change management must be effectual balancing of forces in favor of a change in excess of the forces of confrontation (Siriginidi, 2000). Consecutively to evade the resistance of change, training is necessary. ERP involves altering management plans and traditions. If the employees can easily share the common principles and objectives and accept the change, it will be likely successful (Bingi *et al*., 1999; Somers and Nelson, 2001; Sumner, 1999; Zhang *et al*., 2003). The innovative behavior of employees may play an important role in the measurement of ERP success (Lee and Lee, 2000).

It has been obvious that the advantages from an ERP implementation is essentially derived from the change in the organization and that the ERP system is immediately an enabler of these changes (Martin, 1998). Some ERP literature has tried to securitize how change in organizations can be best administered through an ERP implementation (Boudreau and Robey, 1999; Baskerville *et al*., 2000; Edwards and Panagiotidis, 2000; Aladwani, 2001). Participation of users is necessary because it advances apparent control through contributing to the entire project plan. Involvement of user is one of the most imperative success factors in ERP implementation projects (Zhang *et al*., 2005). The involvement of users augments user satisfaction and approval by increasing pragmatic expectations about system competences (Esteves and Casanovas, 2003).

Top management support: Top management support has been highlighted in a sense of critical features in the successful ERPS implementation. Most of the researches (Al-Mashari *et al*., 2003; Umble *et al*., 2003; Zhang *et al*., 2005) considered top management support is one of the most critical organizational factors that lead a foundation for ERPS implementation. Ngai *et al*.

(2008) stated that top management support takes part in an important job in the ERPS execution success since ERPS are usually major and entail wide-range capital and for this management trust is required. Al-Mashari *et al.* (2003) recommended that top management support must not discontinue just in the beginning and facilitation phase, however, it ought to persist in the course of the whole ERPS execution process.

Daoud and Triki (2013) conducted an empirical study of 102 Tunisian firms adopting ERP systems. They found that top management involvement and external expertise, have an impact on the MAS which facilitate the implementation of ERPS successfully.

According to Zhang *et al.* (2005), top management support includes two primary and basic characteristics in ERPS execution projects: one is to make available the required funds and the second is to offer managerial skills. In ERPS implementation the duties of senior administration comprise correspond the company policies headed for every member of the organization, increasing the perception of the limitations and capabilities, which represents dedication and balanced goals for the ERPS execution (Umble *et al.*, 2003). Willcocks and Sykes (2000) distinguished that top management support and involvement in whole process even post ERPS integration is one of the essential features to pursue meaningful ERPS implementation. Executing ERPS does not simply engage amendments in software systems practice relatively; it engrosses the relocation of an organization's performance. For this purpose, top management must illustrate their support; openly, clearly and genuinely to accentuate the preference of the ERPS execution (Somers and Nelson, 2004).

The extant literature presents empirical evidence that exhibit how top management support is important throughout the complete ERPS execution process and in what sense it stays decisive in order to obtain the desired results (Bradford and Florin, 2003). Cristóbal and Gary (2012) revealed that, management can get extra benefits from ERPS such as computational powers, state-of-the-art processing of transactions and extended use of management accounting.

Communication: ERP implementation projects require an appropriate communication plan to assure that in the entire organization open communication happens with customers and suppliers which are operating at different levels and functions of ERP systems (Kumar *at al.*, 2003). Another requisite factor for successful ERPS is organization-wide communication among employees. Such organization-wide communication transverse meant to support the various stages of ERPS implementation. Communication is one of difficult and most challenging steps in the ERPS execution project. Informing employees and other stakeholders about the objective, scope, expectations, user inputs and other updates on ERPS implementation are important aspects since it makes the ERPS implementation project more
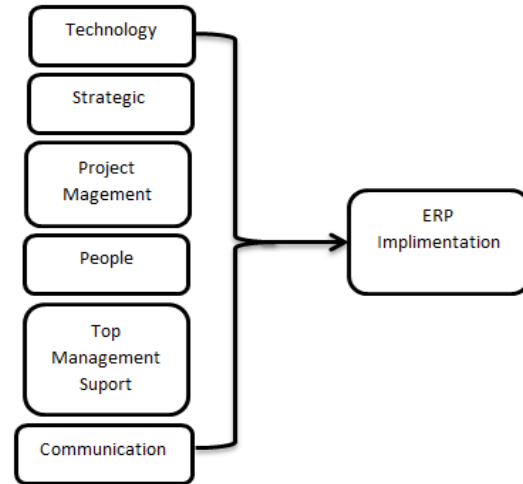

Fig. 1: Conceptual framework

efficient (Nah *et al.*, 2007; Sedera and Dey, 2006). The research study of Nah and Delgado (2006) suggests that early, continues and consistent communication, including an overview of the ERPS and visualization on how the business will modify have significant implications for the successful ERPS implementation project. Somers and Nelson (2004) stated that one of such benefits of communication among the stakeholders of various functions is that, it assists ERPS adopting firm to reduce users' resistance which is very important in initiating such project (Esteves-Sousa and Pastor-Collado, 2000). Communication should include both internal and external. Internal communication includes communication among ERPS project member, whereas external communication includes the entire organization. For better communication, communication plan among the member is critical since communication plan warrants that open communication is happening in the entire organization and also with the suppliers and customers (Kumar *et al.*, 2003).

In view of the fact that the communication supports the ERPS in order to take on the company; reducing consumer conflict, which is vital since the commencement of the system recognition stages (Somers and Nelson, 2004). The study of Esteves-Sousa and Pastor-Collado (2000) acknowledged that not only internal communication between ERPS project team individuals, but also external communication among the whole corporation are tremendously essential. The communication between dissimilar points and purposes of ERPS execution projects have to a communication map that assures that miscommunication may occur during the implementation phase of ERPS which could in turn affect the clients and brokers (Kumar *et al.*, 2003). A research study of Muscatello and Chen (2008) have the difference of opinion regarding the communication that appropriate communication strategies ought to be

locating to maintain higher-ranking supervision on the matter of ERPS project impact, confront, possibility and growth. The communication must be carried out through ERPS navigation board meetings plus standard position exposure. Holland and Light (1999) recommended that utilizing communication apparatus, for example information sheet, monthly press release otherwise weekly meetings in order to maintain users' well-versed regarding ERPS execution project advancement. The motives for applying should be related to the idea lying on how the business will transform and how the system will sustain throughout the implementation phase and even after the implementation (Fig. 1).

RESEARCH METHODOLOGY

The present study was attempted to examine the success of ERP implementation in the firms using ERP in Pakistan and purpose was to classify and corroborate the association between factors influencing ERP implementation and the success of ERP system.

The research was a survey based study. A research instrument was developed to analyze the psychometric responses regarding the factors influencing ERP implementation. The measurement scale for technological, strategic, project management and people was adopted from the study of Garg and Garg (2014). Furthermore, measurement scale for top management support and communication was adopted from the studies of Nah and Delgado (2006). All the responses were measured at five points Likert scale indicating one for strongly agrees and five for strongly disagree. Technological construct is measured through five items while the variable strategic is measured through six items. The variables project management and people are measured through seven and three items respectively. Top management support and communication were measured through six and three items respectively.

Total 500 questionnaires were randomly distributed among the users of ERP implementation systems. Out of the total 500 distributed questionnaires 450 questionnaires were collected back from the respondents. Therefore, 422 questionnaires were used for further analysis. SPSS 20 was used to test and analyzed the data.

DATA ANALYSIS AND DISCUSSION

Table 1 describes the reliability analysis of the constructs. The purpose of reliability analysis is to check the validity and consistency of the data. The results report that all the items included in the study are reliable.

Table 2 demonstrates the mean and standard deviation of the variables investigated in the study. The

Table 1: Reliability and inter-item correlation

Measurement items	Items	Cronbach alpha	Inter-item correlation range
Technological	5	0.880	0.632-0.743
Strategic	6	0.815	0.642-0.708
Project management	7	0.901	0.584-0.754
People	3	0.768	0.694-0.747
Top management support	6	0.844	0.585-0.703
Communication	3	0.799	0.679-0.696
ERP implementation	5	0.739	0.658-0.751

Table 2: Descriptive statistics

Constructs	Mean	S.D.	Sample
Technological	4.141	0.944	422
Strategic	3.787	0.975	422
Project management	3.795	0.950	422
People	3.540	0.877	422
Top management support	3.749	0.972	422
Communication	3.423	0.990	422
ERP implementation	3.577	0.984	422

S.D.: Standard deviation

results further present that the average response rate of all the variables is between 3.4 and 4.1. The mean values (4.141, S.D. = 0.944) of technological indicate that technological factors have significant impact on ERP implementation. The purpose of executing this analysis is to examine the association between independent variables and ERP implementation. The mean values of Project management (3.795, S.D. = 0.950) report its imperative role in the success of ERP implementation. The people involved in the ERP implementation project also report its vital role in the success of ERP implementation with the mean values of (3.540, S.D. = 0.877). The higher mean values of Top Management Support also indicate its greater impact on the success of ERP implementation.

Table 3 demonstrates the correlation results. The purpose of correlation results is to examine the association between the independent variables and a dependent variable. Technological construct is positively associated with the success of ERP implementation with (r = 0.494) and it is considered as one of the vital success factors of ERP success. Similarly, items related to strategic and project management with the values of (r = 0.493) and (0.538), respectively, are also positively linked with implementation of ERP systems at significance level of 0.01. Furthermore, top management commitment and communication, both have positive and constructive connection with the implementation of ERP systems.

Table 4 divulges the multiple regression analysis of the constructs investigated in the study. The purpose of this analysis is to investigate the association between independent variables and a dependent variable. The results regarding Technological construct (β = 0.849, t-value = 20.82, p-value = 0.935) further clarify that items associated with the Technological construct have a significant positive impact on the ERP implementation success. The items related to the

Table 3: Correlation results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Technological (1)	1						
Strategic (2)	0.767**	1					
Project management (3)	0.868**	0.814**	1				
People (4)	0.620**	0.613**	0.640**	1			
Top management support (5)	0.767**	0.622**	0.690**	0.602**	1		
Communication (6)	-0.588**	-0.520**	-0.598**	-0.399**	-0.443**	1	
ERP implementation (7)	-0.494**	-0.493**	-0.538**	-0.277**	-0.353**	0.642**	1

**: Correlation is significant at the 0.01 level (2-tailed)

Table 4: Multiple regression analysis

Variables	Standardized beta	t-value	p-value
Constant		10.731	0.000
Technological	0.849	20.082	0.935
Strategic	0.761	18.875	0.062
Project management	0.834	19.084	0.038
People	0.743	18.156	0.032
Top management Support	0.835	16.458	0.647
Communication	0.796	10.165	0.000
F-value	83.917 (0.000)		
R square	0.787		
Adjusted R square	0.754		

Dependent variable: ERP implementation

construct strategic with the results (β = 0.761, t-value = 18.87, p-value = 0.062) report positive influence of Strategic items on the success of ERP implementation. The results associated with the items of project management (β = 0.834, t-value = 19.08, p-value = 0.038) also report higher positive association of project management with ERP implementation Success. The other independent variables Top Management Support and Communication also have a significant positive association with the Success of ERP implementation with the associated results of (β = 0.835, t-value = 16.45, p-value = 0.647) and (β = 0.796, t-value = 10.165, p-value = 0.000), respectively.

The results of the Table 4 further report R square. The result of R square is (0.787), demonstrating that 78% of the variation is explained six independent variables and the F-value (83.917) was significant at 0.01 significance level.

CONCLUSION

This study attempted to examine the implementation of ERP impact factors. This study provides some interesting results. First, this study has made a contribution to scientific research, producing empirical evidence for theories and factors affecting the success of implementing ERP. Studies have empirical evidence that technological, strategic, project management, people, top management support and communication positively affect the success of implementing ERP. Second, the results are mainly carried out in accordance with previous studies in other countries.

The study provides an overview and assessment of existing research work going on. While ERP is no longer considered a new tool of IT, many organizations in Pakistan do not know about ERP, or are not agreeable to invest to implement ERP. Our model suggests that factors such as quality systems, quality of information and quality of vendor/consultant will have a positive association with ERP tangible benefits. Anticipated benefits of ERP have a positive impact on ERP system success in the Pakistan healthcare industry.

From another point of view from standard field ERP, this research focuses on the impact of the implementation of ERP success. This study analyzes the conceptual framework to assist managers in recognizing potential problems before they actually occur at the implementation stage and create a strategy for the implementation of ERP.

Thus, the company should offer the degree of difference between ERP software and the organization as an important reference parameter before selecting a software package for ERP adoption stage. Trying ERP software, according to the organizational nature should be chosen so as to reduce resistance to the introduction of a revolutionary program risk. Though, the difference between ERP software and the organization cannot be completely avoided; in addition, due to environmental pressure the firms may employ the ERP system that is much uncharacteristic. For that reason, the successful introduction will be more or less influenced by the negative impact on the organization. Consequently, the manager should be responsible, to be equipped to project full knowledge of business processes and ERP software, carefully analyze the difference between the degree of ERP software and the organization will be officially presented to the ERP system and making the appropriate adjustment plan for revolution and the risk of future adjustment system to reduce errors.

The main contribution of this study is to define new designs with the implementation of ERP and the development of new measurement scale for the measurement of multi-element structures involved. Unlike many ERP implementations prior research, our study takes a grounded theory approach perception ERP-specialists. Further implementation of ERP empirical evidence indicate that these structures are in causal models in ERP greatly from the existence of adequate construct definition and measurement model good advantage. The secondary contribution of this study is to demonstrate a rigorous process and products of an empirical scale.

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