2011 3rd International Conference on Advanced Management Science
IPEDR vol.19 (2011) © (2011) IACSIT Press, Singapore

Influence of Tactical Factors on ERP Projects Success

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Abstract. This study aims to identify tactical factors that are crucial for the successful implementation of ERP systems. This study focuses on tactical factors, namely, Enterprise-wide Communication, User Training and Education, and ERP Vendor Support. The study was conducted using a survey questionnaire. The questionnaires were distributed to ERP users in Iranian organizations. A total of 384 responses were collected and analyzed. A significant relationship was found between enterprise-wide communication, user training and education, and ERP vendor support with ERP implementation success. The outcomes of this study are useful to ERP vendors and consultants to prepare some strategies to overcome the misfit between their ERP products and ERP adopting organizations in developing countries. Moreover, ERP adopting organizations and managers could gain an understanding of the complexities inherent in ERP installations to avoid barriers and increase the likelihood of achieving desired results.

Keywords: Enterprise Resource Planning, Tactical Factors, Project Success, Developing country, Iran.

1. Introduction

ERP systems allow the integration of functions, divisions of businesses in terms of information exchange and flow, and the integration of business functions as diverse as accounting, finance, human resources, operations, sales, marketing, customer information and even the supply chain (Dezdar and Ainin, 2011). In spite of the many benefits, the adoption of ERP has not been without problem. A recent research reveals that more than 90% of ERP implementations have been delayed and required additional budget amounts (Wang et al., 2008). Consequently, it is vital to identify factors leading to success of ERP systems implementation (Dezdar and Ainin, 2010). Global ERP vendors are now trying to extend their market to companies in developing countries and many developing countries are now implementing ERP systems, but there has not been much research on the success factors of ERP projects in these regions/countries (Sawah et al., 2008). Finney and Corbett (2007) identified a gap in the literature which there is a need to identify the explicit tactical factors to be used to successfully manage an ERP implementation project. Consequently, this research seeks to ascertain the tactical CSFs for successful implementation of ERP systems. In the following sections, the related literature is reviewed. Then, research framework and hypotheses are presented followed by the research methodology chosen to conduct the study. Next, data collection and analysis are described and findings are discussed. Finally, conclusions and implications for future research are highlighted.

2. Literature Review

Critical success factors (CSFs) are crucial to achieving the predetermined goals of an organization, and vital to the overall success of an ERP system implementation. The CSF approach facilitates the identification and prioritization of factors that could influence ERP implementation success (Dezdar and Sulaiman, 2009). In terms of an ERP implementation, the CSFs are those conditions that must be met in order for the implementation process to happen successfully. Since 1999, many IS researchers have increased using CSFs to study ERP system implementations. Critical success factors for ERP projects have been studied from a

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number of different perspectives. Numerous authors have identified a variety of factors that can be considered to be critical to the success of an ERP implementation. According to Pearce (2004), tactical factors are those that involve skilful methods and details. Holland and Light (1999) focused on tactical factors that can be applied to particular parts of the project. Esteves-Sousa and Pastor-Collado (2000) also concluded that the CSFs model should have tactical perspectives. A recent comprehensive examination of the CSFs for ERP implementation which was carried out by Finney and Corbett (2007) identified CSFs based on the investigation of all CSFs in the literature and grouped them into strategic and tactical categories.

3. Research Framework and Hypotheses Development

According to the purpose of this study and based on the classification of ERP CSFs by Finney and Corbett (2007), the research framework was developed as shown in Figure (1).

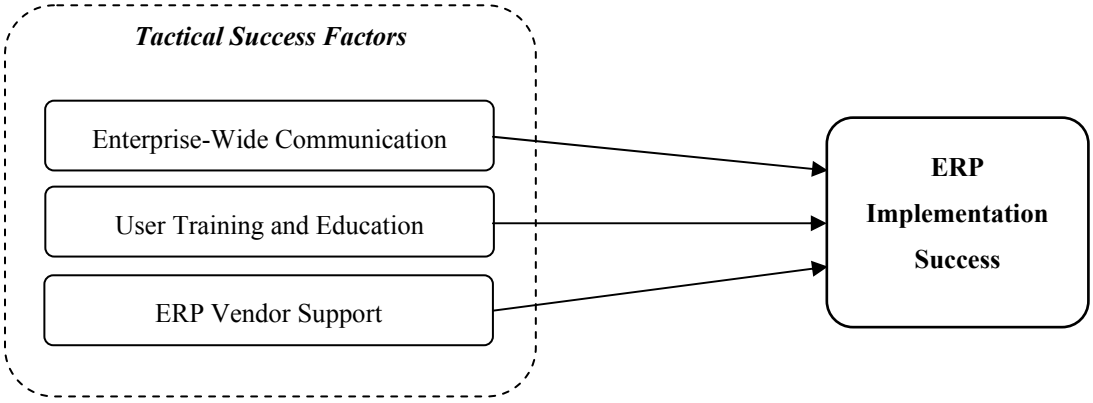

Fig. 1: ERP Implementation Success Model.

Nah et al. (2007) believed that effective communication of requirements, direction, mission, plan, user input, feedback and changes is critical to all stages to ERP implementation. They stated that communication is essential for creating approval and widespread understanding and acceptance of ERP. Additionally, effective communication has a large impact on the success of change management efforts during a project. Somers and Nelson (2004) advised that strong communication throughout the various stages of the implementation is essential in allowing employees to understand what is going on, why change is necessary, and how it will benefit the organization. Accordingly, following hypothesis was defined:

H1: Enterprise-wide communication is positively related with ERP implementation success.

ERP systems are extremely complex systems and demand rigorous training. All users must be trained to take full advantage of the system's capabilities. Nah et al. (2007) suggested that adequate training can increase success of ERP systems and lack of proper training can frustrate ERP users. Moreover, training decreases levels of resistance and increases ease of use, which in turn enhance success possibilities of ERP systems' use. On the other hand, inadequate or lack of training has been one of the most significant reasons for failure of many ERP systems (Somers and Nelson, 2004). Thus, next hypothesis was defined:

H2: User training and education is positively related with ERP implementation success.

The need for vendor's support in ERP implementation is stronger than in another IS project because ERP implementation project requires a wide range of skills and technical implementation knowledge. ERP systems require continual investment in new modules and upgrades to add functionality, achieve better fits between business and system, and realize their strategic value. The organizations implementing ERP should supplement the skill sets of their internal teams with implementation resources from a software vendor or consulting firms that offer the requisite skills and knowledge. Accordingly, following hypothesis was defined:

H3: ERP vendor support is positively related with ERP implementation success.

4. Research Methodology

The population for the research is Iranian ERP user companies. A questionnaire was utilized to collect data for this study. Items used in the operationalization of the constructs were adapted from relevant prior research (Nah et al., 2007; Zhang et al., 2005). Moreover, this research defined ERP implementation success

based on two dimensions, i.e. organizational impact and user satisfaction (Gable et al., 2008). To ensure the reliability of the questionnaire, a pilot study was conducted. The questionnaire was distributed to 54 operational managers and 37 completed questionnaires were collected. The data were tested using the SPSS software 16.0. It was found that all the variables' cronbach alpha values were above 0.7 hence the questionnaire was considered to be reliable (Hair et al., 2006). In data collection phase, after constant reminder, 411 completed questionnaires were collected. The questionnaires were reviewed and 384 questionnaires were used for analysis.

5. Data Analysis and Findings

The characteristics of respondents have been illustrated in Table (1). These statistics express that the respondents were well experienced and highly educated. They also knew the business and company's processes. Consequently, the respondents were the best informant people to answer the survey.

Table (1): Characteristics of the Respondents

Measure	Categories	Frequency	Percent	Cumulative (%)
Gender	Male	328	85.4	85.4
	Female	56	14.6	100
Age	Below 30 years old	43	11.2	11.2
	31-40 years old	111	28.9	40.1
	41-50 years old	150	39.1	79.2
	Over 50 years old	80	20.8	100
Education	Undergraduate	88	22.9	22.9
	Graduate	184	47.9	70.8
	Postgraduate (MS)	97	25.3	96.1
	Postgraduate (PhD)	15	3.9	100
Employment with this company	Less than 3 years	36	9.4	9.4
	3-5 years	61	15.9	25.3
	6-10 years	112	29.2	54.4
	More than 10 years	175	45.6	100

The findings of convergent validity test are offered in Table (2). First, the entire factor loadings of the items in the measurement model were greater than 0.70 and each item loaded significantly on its underlying construct. Second, the composite construct reliabilities were within the commonly accepted range greater than 0.70. Finally, the average variances extracted were all above the recommended level of 0.50. Therefore, all constructs had adequate convergent validity (Hair et al., 2006).

Table (2): Convergent Validity Test

Construct	Items	Factor Loading	Composite Reliability	Average Variance Extracted
Enterprise-Wide Communication	EWC1	.880	.927	.717
	EWC2	.817		
	EWC3	.874		
	EWC4	.812		
	EWC5	.847		
User Training and Education	VES1	.814	.941	.763
	VES2	.884		
	VES3	.880		
	VES4	.891		
	VES5	.894		
ERP vendor support	VES1	.870	.936	.746
	VES2	.842		
	VES3	.866		
	VES4	.867		
	VES5	.873		
ERP Implementation Success	SUC1	.853	.953	0.715
	SUC2	.870		
	SUC3	.835		
	SUC4	.854		
	SUC5	.833		
	SUC6	.853		
	SUC7	.823		
	SUC8	.844		

The outcomes of convergent validity test (Table 3) indicate that constructs share more variances with their indicators than with other constructs.

Table (3): Discriminant Validity Test

Construct	EWC	UTE	VES	SUC
Enterprise-Wide Communication (EWC)	.847			
User Training and Education (UTE)	.560	.873		
ERP Vendor Support (VES)	.553	.657	.864	
ERP Implementation Success (SUC)	.703	.711	.708	.846

Note: Leading diagonals represent the square root of the average variance extracted between the constructs and their measures, while off diagonal entries are correlations among constructs.

The proposed structural model was examined using AMOS 16.0 software. The normed $\chi 2$ was 2.301, which is within the recommended level of 3.0. The RMSEA was 0.065 which is below the recommended cut off of 0.08. The CFI was 0.942 that is greater than threshold of 0.90. Overall, the hypothesized structural model provided an acceptable fit for the data. In addition, the SEM path results, standardized path coefficients and t-values of all relationships hypothesized in the model are shown in Figures (2). The coefficient for Hypothesis (1) path is positive and significant (β=0.260, p=0.010) which supports hypothesis H1. Furthermore, the coefficient for Hypothesis (2) path is also significant (β=0.246, p<0.001) which supports hypothesis H2. Finally, the coefficient for Hypothesis (3) path is positive and significant (β=0.293, p=0.021) which supports hypothesis H3.

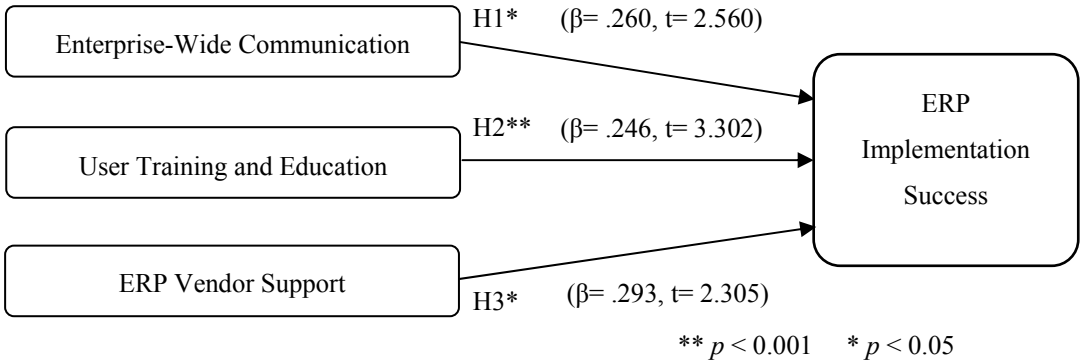

Fig. (2): Path Analysis Results for ERP Implementation Success Model

6. Discussions

The findings of this research supported that there is positive relationship between enterprise-wide communication and ERP implementation success. This finding is consistent with outcomes of studies carried out in developing countries (Nah et al., 2007; Al-Mashari et al., 2006). A coordinated communication plan is an efficient way to explain the goals, timelines, benefits, and popular ideas, and that regular reports to executive levels are absolutely essential. This study supported that there is a positive relationship between ERP user training and education and ERP implementation success. This result confirms the findings of researches conducted in developing countries (Al-Mashari et al., 2006; Zhang et al., 2005). All users must be trained to take full advantage of the system's capabilities. Training should start with the education of the project team in system, line, and project management, and ends with the system's users. This study also supported that there is a positive relationship between ERP vendor support and ERP implementation success. This result is consistent with findings of previous researches in developing countries (Al-Mashari et al., 2006). Vendor support activities should include user training, technical assistance, emergency maintenance, updates, service responsiveness and reliability. In addition, ERP vendors should provide suitable user guide, operation guide, manual, and any formal document required for using ERP system.

7. Conclusion

This study resulted in important theoretical contributions. This research confirmed that enterprise-wide communication, user training and education, and ERP vendor support positively related with successful ERP

implementation. This research will add to the growing body of knowledge on ERP implementations in developing countries. Third, this study developed a research model which could be applied into other Asian, Muslim and developing countries to test its applicability or for those interested in cross cultural issues of ERP implementation success. This study is also one of the few that examine success of ERP implementation from the perspectives of key stakeholders (operational/unit/functional managers). This research found significant managerial implications. This study cautions us that before ERP adoption, thorough misfit analysis and resolution plan based on ERP knowledge will help organizations to achieve the expected benefits of the ERP systems. The outcomes of this study are also useful to ERP vendors and consultants to prepare some strategies to overcome the misfit between their ERP products and ERP adopting companies in developing countries. Furthermore, experiences revealed can be useful to other developing countries with similar environments, in the Middle-East, North Africa, Muslim and developing countries.

Since few empirical studies have examined the ERP implementation success in developing countries, there are numerous paths for future research and extensions of this study. More studies can be conducted in developing countries in Middle-East, North Africa and other Moslem countries. At present, only a few studies can be found on the subject; thus, researchers have an opportunity to further explore the CSFs for these countries. Moreover, this study focused on the tactical related CSFs for successful ERP implementation. Potential researchers could examine organizational and technical CSFs. Lastly, the target group of this survey was operational/functional/unit managers in ERP user companies. Future researchers could send out questionnaires to different groups of people involved in ERP implementation such as ERP project team members, consultants, chief information officers, and users.

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