Abstract

Enterprise Resource Planning System (ERP) in the modern era is a comprehensive and suitable approach for the integration of resources and quick and easy access of managers to data released by an organization’s agents and staffs. In fact, the ERP is comprehensive software to integrate financial, administrative, and manufacturing systems that have already worked as isolated island systems. However, the high cost, time and failure rate of this project has doubled the necessity to determine the critical success factors in its implementation. Managers and staff resist against the risks of ERP implementation such as a robust dam with their knowledge of the factors and applying them and also ensure its success. This article reviews the previous research to provide a comprehensive model of critical success factors in the implementation of Enterprise Resource Planning based on the latest research in this field. After identifying 37 factors, 10 critical success factors in these articles were selected based on the highest frequency and finally the final model was designed and explained based on these 10 factors.

Keywords: Enterprise Resource Planning, Critical Success Factors, Integrated system, Implementation

Introduction

Today, the correct and appropriate use of information technology in a business environment is the key to gain competitive advantage. Most public and private organizations are trying to find dominance over the competitors using this technology in order to reach the maximum profitability. In the world today, enterprise resource planning system (ERP) is a driving key factor in business area. (Garg , 2010) Enterprise Resource Planning is a software system in business area that enables the organization to use its sources effectively and efficiently (materials, human resources, capital, information, etc.) through providing integrated and comprehensive solutions.(Umble,2003)

Deployment of enterprise resource planning systems in terms of quality differs from the establishment of information systems differs for three reasons: firstly, the ERP affects the entire organization, secondly the staff may also learn new software and new business processes, and thirdly the ERP is not only an information system but also a trading system. (Milford,2000)

Enterprise Resource Planning requires using complex information systems in terms of model and technology which is implemented in the organization by allocating a considerable time and resource. ERP provides two major advantages in non-integrated systems as: 1. It involves an organizational shared vision that covers all functions and sectors. 2. An institutional database that reports records and processes all commercial transactions. (Umble,2003)

Enterprise Resource Planning systems projects are considered to be complex, time consuming and costly projects of an organization. Studies show that most enterprise resource planning systems fail in an organization.(Mohebat et al.,2010) Therefore it is necessary to identify the factors that ensure the success of this
project before implementing the ERP project. Identifying critical success factors in implementing ERP has become a challenging process of most global organizations.(Al-fawaz et.al ,2008)

This study aims to identify the critical success factors in the implementation of Enterprise Resource Planning (ERP) in order to reduce the failure rate and implement this project effectively. Thus, by reviewing the previous literature and extracting the vital factors contained therein, 10 critical success factors will be addressed according to the latest findings of researchers in ERP.

Review of Literature

Extensive studies have been done on enterprise resource planning (ERP) and critical success factors in its implementation in and out of the country (Iran) and all of them have agreed on the most critical success factors depending on the activity type. By studying each of these studies, a research according to the latest findings of researchers can help the managers and staffs of public organizations and private companies. Iranian investigations are as follows.

Taherpoor, Kalantari and et al. (2011) on the evaluation of factors affecting the successful implementation of enterprise resource planning in public organizations, identified 23 key success factors in ERP implementation by reviewing 15 public organizations and providing questionnaires to their managers and IT experts. They divided four factors affecting the ERP success using the factor analysis technique and varimax rotation as: 1. Strategic. 2. Organizing. 3. Appropriate selection. 4. Control and monitoring.

Saremi and colleagues (2007) in an applied-survey research collected the factors associated with the readiness of the automotive industry for ERP implementation. After reviewing the literature, identifying key factors and then interviewing the internal experts in the field of ERP and information systems, they identified 18 factors affecting the automotive industry's readiness to implement the enterprise resource planning system. After the preparation of the questionnaire using factor analysis, the factors obtained were classified in 5 groups of cultural factors, organizational capabilities, supporting factors, motivational factors, and factors related to the information technology.

Alizadeh and Hanafizade (2006) in a survey among industry experts in the field of ERP, reviewed the previous studies and compared the models in these studies to express the strengths and weaknesses of each model. After extracting the critical success factors in ERP and giving questionnaires to the experts of this field, classified the obtained factors in eight main categories with 38 factors. Then, they determined the importance of each factor by statistical tests and ranked them according to the degree of importance.

In the studies have been done in the other countries , Ahmad and Pindo (2013) identified the success factors of ERP in large organizations by examining 50 articles related to ERP and determined 33 factors relevant to small and medium enterprises. Then, ten important factor were expressed in two general categories including sufficient resources and organizational data analysis such as the evaluation process, communications, cultural change, top management support, using counselor, experienced project manager, project team skill, and collaboration between sectors as an operational and organizational factor.

Gupta and Naqvi (2013) in a descriptive study, with a review of previous research extracted the identified critical factors in the ERP success and after dividing the factors into two groups of inter-organization and intra-organization, classified them into five categories based on the views of stakeholders: 1. the senior management / organizational views. 2. The project manager’s views. 3. The advisor’s views 4.The client views 5.The consultant view

Garg (2010) conducted an exploratory study on the identification of key success factors in ERP implementation to be used in the retail industry of India. He aimed to provide a valuable perspective to researchers and those involved in the implementation of enterprise resource planning systems and then introduced five key factors including: 1. top management. 2. Choosing the right product, 3. Project management. 4. Management team composition. 5. Education and training.

Significance of the study
Since the success of an organization depends on its dynamics and development should always be embraced and transformed for dynamism, thus the successful people and organizations have planned developments more than sudden developments. In other words, they should always gain the innovation and should not be forced to move to the desires and demands of others. In the twenty-first century, sudden changes are felt more than ever on the field of information technology and the necessary tendency of Iranian companies to information systems and especially enterprise resource planning system. Since the implementation of this system (ERP) is faced with many risks and is a new technology in the Islamic Republic of Iran (as yet few organizations and companies have attempted to implement it), it is necessary to ensure its success with update and wide studies of the latest findings from researchers in the field of ERP and by identifying the key success factors in the implementation of this system in order to prevent failures and losses caused to the organizations that implement this software. Obviously, by identifying these factors, managers and employees will take steadier steps toward changes and added values with more attention and using appropriate methods in change management. This research is an innovation in terms of identifying the critical success factors, according to the latest articles published in scientific journals in the period 2006 to 2013 and explaining each of the critical success factors that had the highest frequency in those papers.

Identification of critical CSF in ERP and the introduction of research model

The present study is applied in terms of purpose and is library in terms of data collection method. Firstly, based on research methodology, about 50 articles related to ERP and factors affecting its successful implementation were obtained through searching the authentic scientific databases in the world such as Science Direct and Emerald.

Secondly, ten articles were selected based on the priority date and the frequent citations in other scientific articles. Thirdly, ten key factors were extracted from the ten final papers that showed over two hundred different factors. After the removal of repeated factors in the fourth stage, 37 factors affecting successful ERP implementation were determined. In the fifth stage, each of the factors was listed in one of the rows of the final table and 37 factors were identified in a number of articles. The sixth stage was the final stage of the study in which the ten final factors were identified based on the priority of the citations in articles to a factor as shown in Table 1, and finally the ultimate model was determined and the main factors were explained.

Table 1: List of CSFs as mostly cited in literature

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The ultimate model was determined as follows: Based on Table 1:
Explaining each of the critical success factors in ERP based on the research model

With regard to the ten final factors obtained based on the research model, it is necessary to briefly explain each factor, so that the managers who are planning to implement ERP, ensure the success of this project by applying these factors in three phases before, during and after the implementation. The following is a brief introduction to each of these factors.

1. Top management commitment and support

The commitment of top management has been recognized as one of the most important elements in the successful implementation of ERP systems. The lack of financial support and adequate resources will inevitably lead to failure. Apart from this primary support, there should be steering committee, which can sponsor the money, ensure visibility and motivate the team. (Garg, 2010) It consists of searching key managers support that should be enough interested and convinced by the importance of such a project for the company’s performance (Zouaghi And Laghouag, 2012) Indeed, several authors stipulate that this strategic factor contributes largely to successfully implement an ERP system, explicitly by the fact that it can be advantageous in setting disputes and put an end to any existing doubts (and Somers Nelson, 2004) This factor ensures two advantages, the first is about power and leadership provision and the second is for getting access to the available resources (Zhang et al. 2005) We can add the fact that top management support permit to align ERP implementation project to strategic business goals (Kansal, 2007)

2. Education and Training

Three aspects concerning the contents of training are:

a) logic and concepts of ERP
b) features of the ERP system software; and
c) hands-on training. (Zhang et al. 2005)
The training plan should take into consideration both technical staff and end-users, and its scope will depend on the type of implementation approach selected. Some organizations use an in-house training approach while others prefer using training consultants. ERP implementation requires a critical mass of knowledge to enable people to solve problems within the framework of the system. (suganthalackshmi, 2012) Top management must be fully committed to spend adequate money on education and end-user training and incorporate it as part of the ERP budget. It has been suggested that reserving 10–15% of the total ERP implementation budget for training will give an organization an 80% chance of implementation success (Volwer, 1999 and McCaskey, 1999). To make end user training successful, the training should start early, preferably well before the implementation begins. (suganthalackshmi, 2012)

3. Project Management

Successful implementation of ERP is depending upon using excellent project management and is possible with clear order of goals, work schedule development and resources planning and determining an exact path line of project improvements. (Aldawani, 2001) Project scope should be defined at the beginning clearly and the selected modules should be defined to use enterprise processes. If decision of management about ERP software package presented standard without corrections, this decision minimized the order according to ERP code and complexity of the project will be reduced and ERP implementation is done according to schedule. (suganthalackshmi, 2012) 5 main activities of project managers are as the followings: Arranging a formal planning b. a scheduled framework for project execution c. holding periodical meetings to review the condition of the project. e. Having an effective project leader doing as the hero of the project f. forming the members of project team. (Zhang et al. 2005)

4. Organizational changes management

Implementation of enterprise resource planning systems causes a large number of the changes which may result in opposition, confusion and errors. Calculations show that almost a half of ERP implementations do not bring the expected results solely due to the fact that management of changes has been provided with sufficient attention. The success of ERP implementation is directly proportionate to an organisation’s determination to undergo changes. Two principal sources of opposition to implementation of ERP systems are identified: the risk perceived and habits. The perceived risk is associated with the fear of employees to lose their work, a high-ranking position, etc. Habits are of particular importance for people, and their endangerment most frequently results in opposition. (zhang, 2002, Somers And Nelson, 2001, aldawani, 2001) Organizational change refers to the body of knowledge that is used to ensure that a complex change, like that associated with a new big information system, gets the right results, in the right timeframe, at the right costs. The change management approach will try to ensure the acceptance and readiness of the new system, allowing the organization to get the benefits of its use. A successful organizational change approach relies in a proper integration of people, process and technology. (suganthalackshmi, 2012)

5. Communication between sectors

Communication should be of two kinds “inwards” the project team and outwards' to the whole organization. This means not only sharing information between the project team but also communicating to the whole organization the results and the goals in each implementation stage. The communication effort should be done in a regular basis during the implementation phase. (suganthalackshmi, 2012)

6. Composition and skills of project team

ERP projects typically require some combination of business, information technology, vendor, and consulting support. The structure of the project team has a strong impact in the implementation process. Two important factors are the integration of third-party consultants within the team and the retention within the organization of the relevant ERP knowledge. (Zhang, 2005)
7. Clear goals and objectives

Each new project must have as its starting point the understanding of the goals of that project and provision for the possible ways of attaining those goals.
• assist the project team in focusing on key issues and thus ensuring the timely performance of the project’s tasks;
• define a clear complex of the project’s success and failure criteria and provide an opportunity for objective evaluation of the work of the project’s team. (Pabedinskaite, 2010)

8. Business Processes Reengineering (BPR)

This is related with the alignment between business processes and ERP business model and related best practices. In the course of ERP implementation, an organisation almost always needs to decide whether to reorganise organisational business processes according to the logic proposed by a system or to modify the system by adapting it for existing business processes of the organisation. An enterprise resource planning system itself cannot improve an organisation’s work until it restructures its business processes. In order to obtain a tangible benefit provided by enterprise resource planning systems, it is necessary to reorganise an organisation’s business processes according to the logic proposed by a system. An enterprise must be prepared for the acceptance of the best practice contained in enterprise resource planning systems and modelling of its business processes according to their description in the system. (Zhang, 2002 And Somers and Nelson, 2001)

9. User involvement in project

This factor deals with psychological state of the individual, and denotes the approximation of the personal significance of a system to a user. This involvement can be performed by identifying future users of the application in order to implicate them in the project as soon as possible, developing channels of communication in order to ensure a permanent exchange between the project team and users to better understand their needs for ERP system adaptation. Thus, organizational communication is a very important tactical factor. (Kansal, 2007)

User involvement refers to participation of the user in the process of ERP implementation. The functions of the ERP system rely on the user to use the system after going live, but the user is also a significant factor in the implementation. There are two areas for user involvement (Zhang, 2002):
1. User involvement in defining the company’s ERP system needs and;
2. User participation in the implementation of ERP systems.

10. Choosing a suitable ERP package

Implementation planning began with product selection. For successful ERP implementation, the enterprise must conduct a careful preliminary analysis and develop a plan for selecting the right ERP product for their organization. (Garg, 2010) The selection of a suitable ERP system is a challenging and time-consuming process. There are various ERP packages in the market with similar functionality but different designs including, SAP, Oracle, JD Edwards and Baan. Therefore, an organization must select an appropriate vendor that able to provide a flexible ERP system. Various authors identified important criteria that need to be taken into account when selecting a new ERP system. (Al-Fawaz et al, 2008)

Conclusion and Recommendations

The main purpose of this paper is to investigate the critical success factors in enterprise resource planning system taking into account the results of the latest research in this field. All factors were obtained in the period 2006 to 2013 and the obtained results include 37 critical factors and after the implementation and comparison of factors mentioned in the articles and deletion of duplicates, ten final factors were achieved. The ten factors include: 1. top management commitment and support, 2. Education and training, 3. Project Management, 4. Organizational changes management, 5. Communication between sectors, 6. Composition and skills of project.
team. 7. Clear goals and objectives. 8. Reengineering of business processes 9. User involvement in project. 10. Choosing a suitable ERP package. Since the risk of ERP projects is so high and fails and in many cases, the evidences based on the experience of many countries show the high effect of the above factors on ERP project success that prevents the failure of this project. This study demonstrated that focus on only one technical or human aspect cannot guarantee the success of ERP and the organizations’ managers should consider all essential factors accurately and simultaneously.

According to the results of this study, the following items are recommended to managers, practitioners and experts of ERP to improve the development process and ensure its success.

- With regard to all citations of all selected papers to commitment and support factor, the organizations are recommended to make sure of the desire and the importance of senior managers before starting if they want to implement the ERP. If they do not have the tendency, they are recommended to hold expert meetings and remind them the benefits of ERP.
- Since seven out of the ten selected factors are related to human factors, considering these factors and holding meetings and training courses on ERP is inevitable that can guarantee the ERP implementation success to a high level through increasing the efficiency of the project team, user notification and change management.
- For future studies, the researchers in the field of ERP are recommended to do their best to find practical ways to prepare and empower human resources, identify and explain the expertise necessary to ERP project team, the management methods of before and after the implementation of ERP other applied research on the critical success factors in implementing this project.

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