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Risk Management in the Implementation of Enterprise Resource Planning (ERP)

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ABSTRACT

ERP or Enterprise resource planning is among the latest management tools which use information technology to collect the available information and resources from all sectors of an organization through one integrated, fast and high quality system. Also ERP software modules can help an organization's administrators to monitor and manage different sections such as projects, human resources, services and other organizational components which make ERP an important acceptable system for the organizations. In the recent years this system has been welcomed largely by the organizations. However, one should consider that establishing this systems affects the strategic levels of an organization, it is expensive, and its implementation might be associated with some problems and challenges which are time consuming and costly or may fail in the implementation stage. Hence, studying the factors which lead to failure or success of implementing this system, as well as identifying the risk factors of implementation can reduce the general risk of the project. As a result, organizations must learn about their situation before the implementation, identify the risks and effects imposed by the implementation of this system on the organization's activity and examine whether the organization is prepared to accept such risks or not, and to manage the risks to have a successful ERP system, then tries to implement it. In this regard, the present paper based on library method, and studying the related texts and researches in ERP domain, its risks and management, provides definitions of the intended concepts, then discusses the risks and system of enterprise resource planning and the methods of risk management of this system. The results of this research can be useful in increasing the awareness of risk management and ERP systems.

KEYWORDS: risk, risk management, Enterprise resource planning system.

1. INTRODUCTION

The new millennium is called the millennium of economy, services and technology. Today IT is helping the companies in the exchange, integration, faster and better transition of information [1]. The necessity of the use of software systems for companies led to the use of island systems and then integrated systems during the previous decades. But with the growth of companies and large organizations with high-volume products and personnel, previous systems could not meet the needs of managers in these organizations. As a result, a new generation of these systems [2] came to existence in the 1990s to cover the problem of the lack of integrity of the systems and to take advantage of integration [3].

In recent years the use of integrated systems has been at the head of the company's plans [1]. Enterprise resource planning systems (ERP) is an integrated software which has components or modules for planning, production, sales, marketing, distribution, accounting, human resources management, project management, inventory management, maintenance and repairs service management, transportation management and electronic commerce which perform the organization operations by a new thought and by implementing the processes introduced in the system [2] and on the one hand, it manages all the organization information in the defined frameworks as crystallization of information via an operational frame work, and on the other hand, it brings all the activities of the organization under its control in the same framework [4] and through creation of a centralized database, they caused that experts introduce these systems as a prerequisite for success in the twenty-first century [5]. Enterprise resource planning system is seen as the most important organizational development in information technology and while giving noteworthy contribution to the promotion of competitive situation, providing effective response for customers and increase of the efficiency of the organization, it causes flexibility in doing the organizational activities in macro-economic aspects [6].

It should be considered that the establishment of these systems because of the complexity, high cost and risk is one of the most difficult investment projects [7, 8] which allocate a high failure rate to itself [6]. Therefore, addressing the success factors for ERP in various organizations was of the important challenges for researchers since ERP appeared [5] because identifying the risk of implementation of a project has significant effect on the decision to do or not to do it [6].

Bernroider and Koch [9] offered important and key criteria for the success of ERP in large and medium organizations. The study examined 12 key factors and the impact of each of these factors in the organizations of different sizes (small, medium and large) has been mentioned [5]. Jiang (2005) examined six factors of ERP success of Finnish companies and organizations and referred to them as the key success factors. Nah and Delgado [10] have identified seven categories of the ERP key success factors. Vilkokus (2007) with a survey of experts' opinions from different countries has shown that the ERP key success factors in various countries can differ from each other [5].

A series of developments emerged in business conditions such as increased competition and rising expectations of stakeholders, has made the continuity of activity and sustainability difficult and has made the risks with which economical firms are facing, increase [11]. The diversity and various aspects of work and occupation and complexity of

them can affect performance [12]. Risk management provides required ground for risk budgeting, performance evaluation of portfolio managers and determining investment strategies [13].

This management has evolved rapidly over the past 10 to 20 years (Rashidi, undated). America project management standard (PMBOK) introduces risks in projects as unknown events or conditions that may happen which in case of occurrence they have effect on the project objectives as negative or positive consequences. Each of these events or conditions has specific causes and distinguishable results or consequences; the consequences directly affect the time, cost and quality of the project. ISO "10006: 2003" says that risk management in projects deals with uncertainties throughout the project. This requires a structured approach that should be written in the form of risk management. The processes related to risk aims at minimizing occurrence of potential negative events and make maximum use of the opportunities for improvement [14].

Chapman & ward divide the process of project risk management into the steps of: definition of all aspects of the project, focusing on strategy, approach to risk management, the information structures about the assumptions and risk ratios, recognition of risk possession and responsibility, estimation and measurement of unknowns, assessment of the relative importance of various risks, planning of response and managing the control and implementation. Artur Williams & Richard Heins state risk management as the process to identify, assess and control potential accidental risks, the consequences of which in particular could cause damage or change in the current situation [14].

The experiences show that projects contain strategic, technical, economical and national components and in the achievement of predetermined targets, they face with threats and opportunities in relation with key elements of the project, namely time, cost and quality [15]. For better scoring of the projects, project management emerged, the general concept of which is application of knowledge, skills, tools and techniques necessary to manage the implementation of activities to meet the needs and expectations of the custodians and beneficiaries of project implementation. Its main goals are reduction of the cost and time of doing the project and improvement of its quality. Risk management emerged in order to maximize the positive events and to minimize the consequences of adverse events [14]. Corporate managements understand the costs due to the risk better because they are reducing the risk of their company in different ways [16].

Shirube Zad & et al in their research were to find ways to reduce errors and failures in the implementation of ERP and as a result reduction of risks in projects, using fuzzy FMEA method [6]. Of what is clear today, one can predict a day in which no organization can survive without ERP because the perseverance of the values and basic organizational concepts and access to concepts such as: customer-orientation, results-orientation, process-based management, stability of leadership and objectives, development and involvement of employees, continuous learning and innovation, the development of trade cooperation and practices of social responsibilities of organization, cannot be achieved except by the approach to ERP systems [4]. But the question that arises in this regard is how to avoid the risk of implementation or in other word, how to manage the risk of implementation of enterprise resource planning system.

According to the necessity and the need to respond to the considered question, this study intends, using library method and review of previous researches, study risk management in implementation of enterprise resource planning system (ERP). The results of this research could lead to identification of risk, management of risk and also enterprise resource planning systems (ERP) in order to improve the performance of organizations in the establishment of the ERP.

MATERIALS AND METHODS

2. Theoretical Foundations of Research

2.1. Risk and its Management

The term risk originated from the Italian word "RISCARE" the equivalent of the English word "TO VENTURE"; implies on accepting the risk in making deliberate decision [14]. Risk is generally considered as a negative aspect [14]. The origin of risk can be external accidents and factors such as the arrival of a new competitor into the market and lack of true forecast about market changes, or internal factors such as the behavior of the organization forces and industrial accidents in the workplace [11].

In the international standard, ISO "10006: 2003" risk is used as the same meaning of uncertainty; means it considers both positive and negative aspects. Nigel states that risk is the possibility of the occurrence of an uncertain event, in a situation in which that event can cause problems. Arthur Williams and Richard Heins defined risk as the deviation in the events that can occur during a specified period at a certain situation. If only one event be possible to happen, its deviation and therefore its risk is zero and if many events be possible to occur, the risk is not zero anymore. The more the magnitude of the deviation, the greater the risk will be. Kerzner knows risk as measurement of possibility and the degree of not reaching the already determined goals of the project and generally risk is the lack of knowledge of an event in the future [14].

There are many techniques for identifying risk such as brainstorming sessions, checklists, questionnaires and interviews, the Delphi group technique, dynamic systems, influence chart, techniques of system analysis, analysis of threats, opportunities, weaknesses and powers. To analyze risk, one should identify the factors in risk which naturally occur in the process (Hatefi, undated). If there is an accurate assessment of risk in a system, one can design control methods proper and compatible with existing risks and implement them [17].

Uncertain event or condition that, if happens, will have a positive or negative effect on project are called risk [15]. Risk management is a systematic planning process for risk recognition [17] evaluation, reflection and control risk of the operations, duties, (Fakharian, undated) identification, analysis, response and monitoring of project risk which includes processes, tools and techniques which help the project manager to maximize the likelihood of the results of positive

events and to minimize the likelihood of the results of adverse events (Hatefi, undated). It is useful for protecting against adverse consequences of risk and ensuring access to the benefits of accepting risk. In risk management, we seek to hunt opportunities. Modern portfolio theory knows diversification and forming a diverse portfolio of assets, the key to risk management [13]. Set of two phases: risk identification and risk analysis is known as risk assessment [15].

The process of risk management includes risk identification, internal resources, external resources and the risk assessment [17]. Using the complete process of project risk management, it can be claimed that this is the project manager who dominates the uncertain conditions in the project, and the conditions and events do not capture the manager [15]. The main objective of risk management is to measure types of risks so to control them. One risk management system includes procedures and criteria in order to calculate the quantity of different types of risk [18]. According to the researches done in complex projects, risk management has a wide range of organization and project benefits with it, among which we can refer to the followings: Increase of the control over the effective allocation of resources, increase of confidence in the achievement of project objectives, detailed estimates (by reducing uncertainty), increase of the usability of opportunities, reduction of unexpected events, increase of the chances of success, readiness to deal with unpleasant events, reduction of task duplication, creation of focus and balance in activities and increase of win-win situations [19].

2.2. Enterprise resource planning system (ERP)

Enterprise resource planning system is a comprehensive software system which provides a wide range of operations and company processes to provide a general overview of each data and overall structure of information technology [20]. This system contains a wide range of software products which supports daily business operations and decision making [21] The purpose of this system is integration of information and their process [22] in the form of a database and managing common information and standard [8], between all parts of the organization, including human resources, finance, supply chain, and management of communication with customer [22]. In other words, the design and structure of enterprise resource planning is in a way that provides integration and collection of data [23] with an emphasis on process-oriented approach throughout the organization [24] and provides a smooth flow of information between different parts of the organization [23]; this system utilizes the IT and provides the possibility of data and information sharing within the organization [24], and in a desired manner and at the right time, share them with users that need them [25]. Enterprise resource planning system enables the organization to manage the efficiency and effectiveness of use of resources; these systems have two important features; first, the ERP system creates a link between business. These systems are capable of providing service to companies of any size and volume of activity and in any geographical expansion [26].

Among the advantages of use of ERP, we can refer to process automation and reduction of the promotion time, creation of a specific information structure, easy, fast and secure exchange of information between relevant sectors, balance in production [27], optimization of value chain in business processes, improvement of the quality of work in the value chain, increase of profitability [28] and improvement of the speed and accuracy of system answering [29]. Five main reasons for the use of enterprise resource planning in the companies can be integration of financial information, standardization and speed of the manufacturing processes, reduction of inventory, standardization of human resources [23].

2.3. Implementation of enterprise resource planning system

Implementation of enterprise resource planning system usually is a huge commitment for the organization (Enterprise Risk Management Initiative Staff, 2013) [30]. ERP systems, in order to be implemented, require deep investigation and complete doing of all feasibility stages due to their complex nature and major changes they cause in the work culture of an organization. Because implementing these large systems in addition to the software system changes, has also process changes with it. This means that available processes must change according to the best suggested patterns of system Provider Company, which has been experienced for years [31]. Implementation of the said planning system, makes all people in the organization to work together harmoniously-even if there is geographical boundaries between themactivities be automatically done to a great extent and creates integration of duties between the departments of sales, marketing, manufacturing, support operations, purchasing, finance, research and development and with organization resources [25]. Recent studies show that the degree of success in projects of implementing this system has been decreased and the risk of implementing has increased to the same extent [28]; therefore, the organizations which seek to take advantage of the many benefits of enterprise resource planning, have many difficulties ahead the main of which is related to the implementation stage of enterprise resource planning [29]. ERP implementation problems occur often due to cultural problems that exist in the depths of the organizational structure [32]. Enterprise resource planning requires the use of complex information systems in terms of model and technology, therefore the implementation of these projects in the organization has devoted considerable time and resources to itself [33]; and due to broadness of facilities and its capabilities; it is complex and will have profound and vast impact on all technical and non-technical aspects of organization. The system implementation process must be evaluated accurately and regularly so to prevent undesired result and problematic deviation [28].

3. REVIEW OF LITERATURE

Due to the amount of money spent and the statistics that show more than 70 percent of enterprise resource planning projects are unsuccessful, careful study of the causes of success and failure in these projects and identifying the degree of

risk of the implementation for companies are so vital [6]. Therefore, many studies have been done so far on risk and its management in the implementation of enterprise resource planning; so we can refer to the article of Abolhosseini & Molla Hosseini [6] who analyzed the risk in the implementation of ERP project in one of the active companies in the automotive industry, the results showed that the studied company is at the range of mild failure. Gooran et al. [34] in their study on the reduction of costs and risk in enterprise resource planning systems have expressed that to build trust, ERP projects presenters should not transfer all project risks to the organization and do not undertake the responsibility for the results of the projects. Meanwhile, using optimal methods in implementation of such projects has essential role in the success of the project [34]. Findings of Dibaei & Hakim [35] research, on risk control in decision making of enterprise resource planning (ERP) suggests that companies, to survive in the industry and repulse the internal and external threats of organization, has no choice but to move toward recruiting and ERP implementation in the long run. In their offered model, processes of decision-making, absorption and implementation of ERP systems were identified at the organizational levels (strategic, tactical, operational) and were analyzed in the organization [35].

The results of Shirazi et al. [23] research on risk management in enterprise resource planning systems, indicate that after rating of risks, changes in market demand has the highest risk and risks related to control and supervision have the lowest risk. The results of Rafighi et al. [36] showed that in the ranking of threats based on risk outbreak, lack of a certain definition and criteria for measuring the success of the project have the highest priority and doubt in the organization readiness has the lowest priority [36]. Khavalev [37] in a paper on key risks in ERP implementation has stated that successful implementation of the ERP system depends on successful risk management. He divided the ERP implementation risks into two operational risks and technological risks and stated that identifying key risks allows managers to better understand the problems regarding the implementation of their projects. From Grabski et al. [38] point of view, to minimize the five types of risks that organizations must consider in the implementation of the ERP system, control is required. Zeng [39] after study of risk management in the implementation of enterprise resource planning systems, categorized the ERP implementation risks into the following 6 factors: organizational risk, managerial risks, operational risks, technological risk, human risk and other risks.

4. Risk management in the implementation of enterprise resource planning

Unfortunately, despite the enormous benefits that successful implementation of enterprise resource planning systems has with it, due to the high complexity of the system and lack of models and comprehensive solutions for establishing the system, implementing them in organizations has high risks and numerous threats, insofar as according to studies in this area, this system has faced failure in 50% of implementation projects and in 90% the implementation has been done with the time and cost more than the initially approved time and budget [7, 8]. It is clear that the more money, time, and operational area and resources required to do a project, the more important the decision making will become, and the more critical feasibility report will be needed; because the risky factors of the project has become highly perilous and in case of failure of the project, the organization should bear a heavy financial burden, which may lead to the liquidation of the organization [26]. The risks that lead to the failure in implementing the enterprise resource planning projects are: compliance risks in the selection stage, neglect and ignore in the showing and critical processes, the need for interpreting the suppliers feedback, focusing on products that are not much customizable [19].

ERP implementation is a risky and expensive work because its implementation is usually associated with the following events: change of organizational culture, so much expertise work needed, expensive software, disturbance in current affairs, disturbing the balance of forces, increased organization and facilities, design flaw, change in conditions and needs [34]. Therefore ERP implementation risks include organizational risks, risks of technical skill, project management risks, the risks of the system, the user risks, technology risks [35], operational risks [37], risk of management, human risks [39]. We can outline the main impact of risks in the establishment of enterprise resource planning as increase of the cost, increase of the time of implementation, the project stops, poor returns in the business, lack of reliability and stability of the system, low communication between organizational processes, not being user friendly, lack of required integration and flexibility, little proximity to strategic objectives and low monetary / economic efficiency [23]. Installing enterprise resource planning system requires compliance with many points such as reasonable support of senior managers, participation of middle managers, proper organization, proper phasing, shortening the project, the gradual development, training, and secure ground [34]. Therefore, we can draw a risk management framework for ERP projects which is made of seven core activities and four stages [19]:



Fig. 1. Risk management in EPR projects (Ahmadi, Allah Vakil, & Shokripoor, 2013).

On the other hand, the use of quantitative tools for the analysis of ERP risk can help a lot to risk management of these projects, including:

4.1 Method of FANP Network Analysis

The simplest method. This method is made of a number of clusters and the elements inside them. In cases the elements of a cluster affect all others or some of elements in another cluster or be affected by them, a relationship will be created between the two clusters which is called external dependency and in cases the elements of a cluster affect some or all elements in their own cluster, this relationship is called internal dependency [23].

4.2.Method of SWOT Analysis

The strengths and weaknesses within the organization are identified based on ERP systems so to take action to improve strengths and repair weaknesses and finally provide a program of accurate risk management control for a better and more successful establishment and implementation of ERP systems in the organization [35].

4.3. Method of Fuzzy Analytical Hierarchy Process (AHP), or FMEA

Fuzzy AHP method or fuzzy hierarchical analytical method is one of the strongest methods of decision-making for prioritizing the criteria [40]. Since for analysis of weight of the decision-making indicators, it needs pair study and more questions and answers, it has greater ability to resolve issues such as the selection of a model with independent criteria [41]. This technique involves different options in decision making and has the possibility of analysis of sensitivity on criteria and sub criteria [42]. Fuzzy FMEA approach, based on the theory of fuzzy collections, is a flexible and suitable method for risk assessment. In this approach, the parameters of severity, occurrence and detection (RPN) become fuzzy using suitable membership functions, to be able to determine the degree of membership of each of the inputs. Inputs, in the fuzzy inference engine and based on Agr rules- then are evaluated and the appropriate fuzzy output is produced. The fuzzy output, then for determining the risk priority number, is defuzzied. The higher the value of RPN, the greater the risk will be [43].

4.4. Method of Network Analysis of FTOPSIS

The systematic logic of this model defines the ideal solution (positive) and the negative ideal solution. The ideal solution (positive) is a solution that increases the profit criterion and reduces the cost criterion. The optimum option is an option that has the minimum distance from the ideal solution and the maximum distance from the negative solution. In other words, they get higher rank in the ranking of the options that are most similar to the ideal solution [23].

Generally, to manage risk in ERP projects, carrying out the following steps can be helpful:

Risk management plan (stating goals of management process, defining roles and responsibilities, defining the resources of project and defining the activities that are known as risk), risk identification (identifying and documenting

all contingent risks), qualitative risk analysis (defining words related to the probability of risk occurrence and consequences of risk), quantitative risk analysis (using mentioned methods of analysis) and plan to respond to risk (defining strategy for dealing with any risk) [42].

5. Conclusion

Since the implementation of IT projects causes many organizational changes, they are often very risky and costly, but in today's competitive and IT-oriented environment, facing the risk of the implementation of these projects is inevitable. Thus the main challenge is how to manage risk and reduce its harmful effects. The results of this study showed that risk management of enterprise resource planning (ERP) as one of the large IT projects is of great importance and for this purpose during the implementation, using different methods of risk analysis such as classification of risks, qualitative and quantitative risk analysis are very essential. In this context, and based on the findings of this study, in order to reduce the risk of ERP project implementation and risk management, the following suggestions are offered:

- Evaluation of the organization preparedness before project implementation.
- Evaluation of IT infrastructure of organization before the project implementation.
- Holding briefing sessions for employees and culture building to accept new changes.
- Examining the implementation risks before ERP implementation.
- Realistic identification of risk and considering all organization internal and external risks.
- Prioritizing the identified risks.
- Using several quantitative methods of analysis as much as possible to reduce the possible risks.

- Considering all aspects and putting the organization in hypothetical and possible situations at the time of determining risk response strategies.

REFERENCES

- 1. Forghandoost Haghighi, K., & Derakhshanfar, S. 2008. The Problems of Implementation of Enterprise Resource Planning System (ERP) in Selected Industrial Companies from a Financial Perspective. Auditor, No. 41, 53-61.
- 2. Kamali, B., Talebpour, A., & Amid, A. (Undated). Analyzing challenges and Obstacles in the implementation of ERP in Shahid Beheshti University. 1-22.
- Saremi, M., Mosakhani, M., & Abedini, M. 2007. Extraction and Evaluation of Indicators Related to the Automotive Industry Preparedness for the Implementation of ERP. *Journal of Knowledge of Management*, Vol. 20, Issue 77, 47-60.
- 4. Bayat, A., Abdipour, Gh., & Bayat, A. 2008. Measuring the Performance of ERP Systems with Fuzzy Approach. *Journal of Modern Economy and Business*, numbers 15, 16, 195-211.
- 5. Mahmoudi, J., & Ahmadi. F. 2008. Determining Key factors of ERP Success in Iran Governmental Organizations. *Journal of Modern Economics and Business*, No. 13, 67-8.
- Abolhosseini, A., & Molla Hosseini A. 2011. Risk Analysis of ERP Project Implementation, using fuzzy logic (Case Study: active company in automotive industry). *Journal of Industrial Management*, College of Humanities of Islamic Azad University, Sanandaj Branch, the sixth year, No. 15, 83-94.
- Sohrabi, B., Shami Zanjani, M., Farzaneh, M., & Raeisi Vanani, A. 2012. Offering a System for Evaluating the Degree of Success of the Implementation of Enterprise Resource Planning Systems based on Fuzzy Inference Approach. Management Researches in Iran, 16 (3).
- Sohrabi, R., Shaverdi, M., & Bashiri, V. 2012. Model of Application of Fuzzy AHP and Balanced Scorecard to Select the Appropriate System of ERP (Case Study: Beh Pakhsh Company). *Journal of Industrial Managemet*, College of Humanities, Islamic Azad University, Sanandaj Branch, the seventh year, No. 190, 109-129.
- Bernroider, E., Koch, S. 2001. ERP selection process in midsize and large organizations. Business Process Management Journal, Vol. 7, issue 3, p. 251–257.
- 10. Nah, F. F., Delgado, S. 2006. Critical success factors for enterprise resource planning implementation and upgrade. Journal of Computer Information Systems, Vol. 46, p. 99–113.
- 11. Fakharian, A. (Undated). Risk Management and Management Accountants. Hesabdar, Seventeenth Year, Number One hundred and fifty-one, 41-45.

- 12. Mazloomi, A., Kermani, A., Nasl Seraji, J., & Ghasemzadeh, F. 2013. Identification and Evaluation of Human Errors Using the SHERPA Method in Emergency Physicians Working at Hazrat Amiralmomenin Hospital in Semnan. Specialized Scientific Journal of Medicine, the Fifth round, No. 3, 67-78.
- Fadaei Nejad, M., & Eghbalnia, A. 2006. Test of Model of Value at Risk Model for Predicting and Managing Investment Risk. The Message of Management, No. 21, 22, 33-53.
- 14. Shams Majd, R., & Mortaheb, M. 2007. Offering a Model for Examination and Management of Risk in EPC Contracts. *Journal of Project Management*, 1-12.
- 15. Hatefi, M. (Undated). A Review of the Principles and Challenges of Process of Risk Managemen. 1-16.
- Poorhossein, M. (Undated). Integrated View of Risk Management. Accountant, Thirteen year number one hundred and thirty, 74-78.
- 17. Sehat, S., & Alavi, S., (Undated). The Necessity of the Application of Risk Management knowledge in the field of Third Party Insurance and the Impact of New Legislation of Third Party Insurance on the Risk Associated with this Insurance. New in World of Insurance, numbers 144-145, 17-31.
- 18. Rostamian, F., & Haji Babaei, F. 2009. Measuring Cash Risk of Bank Using Model of value at risk (Case Study: Saman Bank). *Journal of Financial Accounting and Auditing*, 175-198.
- Ahmadi, A., Allah Vakil, M., Shokripoor, M. (2013). Enterprise Resource Planning Systems. Tehran: Atinegar Publication.
- Hanafizadeh, P., Dadbin, SH., & Barati, M. (2012). A Survey of the Aspects of the Implementation of Enterprise Resource Planning Systems and Customer Relationship Management in the Iranian Companies. IT Management, 21-46.
- 21. Singla, A. (2008). IMPACT OF ERP SYSTEMS ON SMALL AND MID SIZED PUBLIC SECTOR ENTERPRISES. Journal of Theoretical and Applied Information Technology, 119-131.
- 22. Tavakoli, A., & Taqikhah, F. 2012. Explaining the Importance of Designing Comprehensive Indicators, Suitable for Measuring the Impact of Enterprise Resource Planning Systems on Organizations Performance. *The first national conference of modern management science*. Gorgan.
- 23. Shirazi, B., Mahdavi, A., Eghbali, S., & Ahadi, S., 2012. Risk management in Projects of Enterprise Resource Planning (ERP) Using the Method of TOPSIS. *First National Conference on Industrial Engineering and Systems*.
- Azar, A., & Jahanian, S. 2013. Framework Extraction based on Multi-Dimensional Understanding in order to Assess the Success of Enterprise Resource Planning System. Management Research in Iran, 2 (17).
- 25. Ebrahimi Kordlor, A., Hesarzadeh, R., & Mohammadabadi, D. 2011. Critical success factors of managers in establishment of enterprise resource planning systems. Process of Management and Development, 75, 51-65.
- 26. Aqajani, H., Samadi Miarkalaei, H., Khanzadeh, M., & Samadi Miarkalaei, H. 2014. The Feasibility of Implementation and Execution of Enterprise Resource Planning Systems (ERP). IT Management, 161-186.
- 27. Lotfi, M., Rohani, S., & Noori Koopaei, M 2011. Offering a Model for the Identification of Effects of Enterprise Resource Planning Systems (ERP) in the Management Quality System of Organization. *Journal of Industrial Management*, College of Humanities, Islamic Azad University, 73-88.
- Shafiaa, M., Manian, A., & Raeisi Vanani, A. 2013. Designing Fuzzy Inference System to Predict the Degree of Success of Strategy of Enterprise Resource Planning. Information Technology Management, 5 (1), 89-106.
- 29. Mollanazari, M., & Zeraatifard, L. 2012. Examining the Role of Innovation Factors in the Successful Implementation of Enterprise Resource Planning. Experimental Researches of Accounting, 2 (2), 95-109.
- 30. Enterprise Risk Management Initiative Staff. 2013. *Enterprise Risk Management Initiative*. Retrieved from NC STATE UNIVERSITY: http://erm.ncsu.edu
- Hatami Lankarani, F., Tarokh, M., & Akbari Jowkar, M. 2011. Roadmap of Implementation of Enterprise Resource Planning (ERP) in Health Care Centers. *International Journal of Industrial Engineering and Production Management*, 2, 206-213.
- 32. Sommer, R. 2011. Public Sector ERP Implementation: Successfully Engaging Middle-Management! CIBIMA.

- 33. Alizadeh, A., & Hanafizadeh, P. 2006. Study of Critical Success Factors in the Implementation of Enterprise Resource Planning Projects and Their Ranking. *Science-Research Journal of Sharif*, p. 87-99.
- 34. Gooran, P., Karimpour, J., & Kafil, P. 2011. The Step By Step Establishment of A Way to Reduce Costs and Risks in the Enterprise Resource Planning Systems (ERP). *First National Conference on Computer and IT students*. Tabriz.
- 35. Dibaei Aghaei, P., & Hakim, A. 2007. Offering a Practical Model for Controlling Decision-Making Risk in Implementing a Comprehensive Enterprise Resource Planning System (ERP). *Fourth International Conference on Information and Communications Technology Management.*
- 36. Rafighi, M., Farjami, Y., Modiri, N., & Khozooei, N. 2012. Examination and Identification of Existing Risks in the Repair and Maintenance of ERP, Haj & Pilgrimage Organization. *National Conference on Computer Science & Engineering*, Islamic Azad University, Najaf Abad Branch. Najaf Abad.
- Khvalev, E. 2010. Key Risks in ERP ImplementationIdentification and Analysis by Project Phases. Proceedings of 2nd international Conference on IT & Business Intelligence. Nagpur, India.
- 38. Grabski, S., Leech, S., & Lu, B. 2001. Risks and Controls in the Implementation of ERP Systems. *The International Journal of Digital Accounting Research*, *1*(1), 47-68.
- 39. Zeng, Y. (2010). Risk Management for Enterprise Resource Planning System Implementations in Project-Based Firms. United States: University of Maryland, College Park.
- 40. Javanmardi, M., Alizadeh, P., Rad Darvish, A., & Keshaei, S. 2013. Ranking Different Areas of Environmental and Human Health Risks in Nanotechnology Using Methods of Topsis and AHP in Fuzzy Environment. Urban Management, 31, 335-355.
- 41. Haji Aghabozorgy Amiri, A., & Daraei, M. 2008. Offering a Model for Selecting an Appropriate ERP System Using Fuzzy AHP Approach. *Sixth International Conference on Industrial Engineering*.
- 42. Chinichian, F. (2008). Fuzzy Ranking in Risk Management. Fourth International Conference on Project Management.
- 43. Khazaki, H., Mahdyar, M., & Shokrizadeh, R. 2007. Evaluation of Failures Risk Using FMEA Method and based on fuzzy logic. *The first International Congress of risk management*.
- 44. Rashidi, R. (Undated). From Risk Management to Enterprise Risk Management. New in World of Insurance, numbers 146 and 147, 27-36.