A New Framework of Effective External and Internal Factors on the Success of Enterprise Resource Planning (ERP)

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ABSTRACT

True understanding of the managers of the organizations that implement the system of the success factors and conditions and their fulfillment is very helpful. Many researches are done regarding the identification of key factors of this system but most of them had one-dimensional view to the subject or they only studied Internal Organizational Factors so, the lack of a Multi-purpose and coherent framework is evident. The researcher by a deep review on review of literature separated the success factors of ERP in 7 factors of country environment, ERP vendors' environment, software package environment, leadership and strategic criterions, organizational environment variables, organization users environment, IT environment in the organization in the form of two external and internal set and finally attempted to present a coherent framework.

KEYWORDS: Information Technology (IT); Enterprise Resource Planning (ERP); Success Critical Factors (SCF).

INTRODUCTION

IT is changed into one of the biggest trading and producing facilitator in the world and even it is used as catalyst of fundamental changes due to its extensive capabilities in strategic models of organizations operation and management (Kamrani, 2007).

Attaining competitive advantage is depending upon having good relationship with customers and suppliers and development of strategic applied programs like Resource Relevance View (RRV), Transaction Cost View (TCV), Relation View (RV) and sharing inter-organizational resources and information is due to developing network collaboration and strategic unity between a pair or network of companies that requires using effective information and communication system like Enterprise Resource planning (ERP) (Lavie, 2006). A mechanism that is able to control all organization units such as , financial, warehouse, human resources, marketing and relations with suppliers and customers in integrated form. This system is composed of a unified database that all parts of the organization share the existing information in this database (Davenport, 2001). Successful attraction of this system is depending upon correct understanding of its effects on processes, staffs, organization and key factors on their fulfillment method and interactive effects on each other. Most of the researches were done with legal approach to the organization and the effects of external environment on the success of the system are neglected. So, this paper objective is to present a coherent framework by combining the sum of internal and external components.

Some of the main previous researches are as follows:

(Gil Ko, 2002) in his Doctorate thesis, determinants of knowledge transfer in implementation of ERP system by Argote model titled "Knowledge transfer in organizational level some factors as the properties of interorganizational relations (Geographical proximity), Organizational properties (including organization size), knowledge transfer properties (including knowledge complexity) and the properties of transfer processes (including language) presented knowledge transfer model at personal level.

This model shows that knowledge transfer between people follows the following 3 characteristics:

1. People characteristics including communications, qualification, attractive capacities, internal and external motivations.
2. Interpersonal characteristics including the quality of communication, the amount of common understand between the speaker and listener (top-down and vice versa).
3. The properties of the transferred knowledge including complexity are mentioned.
   And by modeling structural equations and Lisrel software, the above model is being tested.

(Zhe Zhng et al, 2005) successful implementation of ERP in China mentioned the improvement of organization performance depending upon the performance of four environments:

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a. Organizational environment: Top management support, Reverse engineering of organizational processes, effective project management, organization culture
b. Users environment: Training and academic education, users characteristics, Participation
c. Software package environment: Information quality, system quality, conformity with organizational needs
d. ERP vendor environment: ERP vendor quality and back up services.

(Ifindo, 2006) in his doctorate thesis in Finland and Estonia studied the effects of organizational factors such as top management support, organizational aims, missions and company size, organizational structure and culture and external factors affecting the organization including the effect of industry space and national economy environment on the success of implementation of ERP system. Structural equations modeling and its indices were used for model fit and assumptions test and the relation between indices and latent variables.

(E.W.T. Ngai et al, 2008) by the study of a great number of articles in 10 regions and the countries in the world more than 80 minor factors were found in the form of two main components: a. External factors: The factors related to a country and the factor of vendor.

b. organizational factors. The strong point of this research is considering the effects of external factors on the success of ERP system. (Francoise oliver and et al, 2009) by Delphi method, identified 13 key success factors of implementation of ERP system and by ASCF method the active action in using these factors, a list of probable actions and problems of each factors are presented by a team of professional persons and consultants of ERP system and observing each of them facilitate the fulfillment of key factors of success.

(Hsien Tsai et al, 2011) in a research titled "empirical study of the effects of internal and external factors on the success of ERP project in a form of a model, tested the effects of external factors such as the quality of ERP system vendors and consultants on internal factors namely, project management and the effect of each of the components on the success of ERP project in Taiwan by structural equations modeling.

REVIEW OF LITERATURE

Definitions of Enterprise Resource planning (ERP)

Enterprise Resource planning system is an organizational information system being designed to integrate and improve business processes and transactions in a company. This system is accepted in the industry as a practical solution to attain integrated information systems. (Moon, 2007) knows American Production and Inventory Control Society (APIC S), knows ERP a method for effective planning and control of all the required resources to receive, produce, send and meet the demands of customers in productive, distribution and service companies.

ERP systems are configurable information systems packages that integrate information within and across functional areas in an organization (Kumar and hillegersberg, 2000). ERP are computer-based systems designed to process organization's transactions and facilitate integrated and real-time production, and customer response (Olerry, 2000).
ERP is a commercial software package with the aim of information integration and information flowing through all parts of organization including financial, accounting, human resources, supply chain, management and customer (Davenport, 2000 and cutler, 2001).

Advantages of Enterprise Resource planning

From the business point of view an ERP system attains important goals such as maximizing information efficiency, minimizing responding time to customers and suppliers, reduction of decision making to the minimum level, immediate delivery of information for decision makers and above all, ERP system integrate the information all over supply chain and from business point of view, this means reduction of costs, inventory and improving operation and execution (Chiu Chung). Rapid information responding time, increasing interaction in all over the organization, management improvement, order cycle, reducing the cycle of closing financing accountants, improving relationship with customers, improving on-time delivery, reduction of direct costs of operation, inventory reduction (Jensen, and. Johnson IBM storage products, Bingi, Sharma and Godla–Earth Grains).

Evolution of ERP

In 1960s, software packages capability was limited to inventory control and to predict inventory demand, order point systems were used. When an inventory of a part was less than the pre-determined level, the Re-order

point is occurred. Material Requirement Planning (MRP) was developed in the1970s (Barker, 2001; chung and synder, 2000; Davenport, 1998; Orlicky, 1975; Worthman, 1984)

In the following MRP systems by adding some tools for planning and sale, processing customers order and Rough-cut capacity planning (RCCP) were improved. As the inputs are provided for scheduling production and are called as MRP close loop (Somer and Nelson). In the 1980s, manufacturing resource planning (MRP II) was released as pioneer of integrated commercial systems with the capability of integration of organization duties including production, sale, and finance. The main problem of MRPII systems was that it only supported make-to-stock systems (MTS) (Barker, 2000; Muscatello, 2003; Abdinnour, 2002).

In 1990s, ERP system was proposed to overcome some of the overlapping problems (Muscatello, 2002).Until 1994, there was little difference between MRPII and ERP. In this year, SAP released R/3 and by its introduction a big gap was made between MRPII and ERP, sections, processes and different duties including quality control, maintenance service, accounting and financial were connected to production systems and ERP was introduced as the interval between supply chain management systems and customer relationship management (Delone and Mclean, 1992; Desisto,1997). In 1995 Internet entered ERP and in 1998-2000 electronic data interchange EDI and ERP was connected to each other. In 2000, internet was an inevitable part of ERP and ERP web-bases systems were developed to support multilayer technology in architecture of information systems. Since 2000, new systems were created as ERPII based on web and they focused more on SCM and CRM module support and today it is defined as completely related and inseparable and some companies such as Baan, j. d. Edwards, peoples, st, oracle, SAP to increase their market share attempted more to add some modules and extensive application of ERP in administrative, commercial and Small, Moderate Enterprise (SME) (Al Mashari et al, 2003). Generally, the following chart presents summary of ERP evolution

ERPII	**Extending** Enterprise Resource planning **(ERP)**	**2000s**
ERP	Enterprise Resource planning	**1990s**
MRPII	Manufacturing Resource Planning	1980s
MRP	Material Requirement Planning	1970s
ROP	**Re-Order point**	**1960s**

Chart 1- Evolution of ERP (Pim, 2002; AMR Research, 2005)

Research records

By an extensive review of the previous researches, table (1) as indicating the emphasis of each of the researches on key factors of success and their classification in external and internal components are presented.

Components / Factors, writer and year	Top management support	aims and planning vision	Organizational culture and change	Re-engineering and processes	Effective project management	Qualification of project team	Connections of sections	Organization size	Evaluation of performance	Users characteristics	Staffs training in ERP	Users participation and habit	IT skills and experience	IT previous systems management	IT budget attribution	Vendor quality	Vendor continuous support	Using vendors tools	Software conformity	System quality	Information quality	National economy environment	Competition in industry
	Leadership and strategic criterions		Organization environment							Users environment to accept technology			IT environment in organization			ERP Vendors environment			Software package environment			Country environment	
mayers et al 1997	*	*	*				*	*	*			*	*	*	*	*				*	*	*	*
Holland and light 1999	*	*					*		*	*				*					*				
Donaldson 2001	*	*	*					*					*	*	*							*	*
Somers and nelson 2001	*	*	*	*	*	*	*		*		*	*		*	*	*	*	*		*	*		*
Stratman and roth 2002	*	*	*		*						*	*	*										
Krammergrad and rose 2002	*	*	*	*	*		*			*			*						*	*			
Ang et al 2002	*	*	*	*	*	*	*		*	*		*	*	*	*	*			*				
Umble et al 2003	*	*	*		*	*			*		*	*									*		
Gable 2003									*			*				*		*			*		
Al mashari et al 2003	*	*	*	*	*				*	*	*	*		*					*				
Magnusson et al 2004	*	*	*	*	*	*	*		*	*	*	*	*	*				*	*	*			
Yusuf et al 2004	*	*	*	*	*		*		*	*	*	*	*				*		*				
Zang et al 2005	*	*	*	*	*	*	*		*	*	*	*				*			*	*	*		
finneytt 2005	*	*	*	*	*	*	*		*	*	*	*	*	*	*			*			*		
Albert et al 2005	*			*	*	*				*	*				*	*					*		

Factors, writer and year	Internal environment of the organization — Leadership and strategic criterions: Top management support	aims and planning vision	Organization environment: Organizational culture and change	Re-engineering and processes	Effective project management	Qualification of project team	Connections of sections	Organization size	Evaluation of performance	Users environment to accept technology: Users characteristics	Staffs training in ERP	Users participation and habit	IT environment in organization: IT skills and experience	IT previous systems management	IT budget attribution	External environment — ERP Vendors environment: Vendor quality	Vendor continuous support	Using vendors tools	Software package environment: software conformity	System quality	Information quality	Country environment: National economy environment	Competition in industry
chin wei 2005																		*		*	*	*	
Carson 2005	*	*	*	*	*	*			*		*	*			*	*	*		*	*	*		
Yingiie 2005	*			*	*						*	*							*				
Ifindo 2006	*	*	*	*									*			*		*		*	*	*	*
Hansen 2006	*	*				*	*			*	*	*				*	*			*	*		
Fan zhao 2007	*				*	*					*	*				*					*		
rems 2007	*	*	*	*	*	*			*		*	*		*	*	*	*	*		*	*	*	
Scrota 2007	*	*	*	*	*	*					*	*					*	*		*	*		
Sternad et al 2007	*	*	*	*	*	*			*			*	*	*		*	*	*		*	*	*	
Ngai et al 2008	*	*	*		*	*	*		*		*	*		*		*	*				*		
Percin 2008																*	*	*	*	*	*	*	
francoise 2009	*	*	*	*	*	*			*		*									*	*	*	
Sndoss 2009	*	*	*	*	*					*						*	*			*			
Tsai et al 2010	*	*	*		*	*			*	*	*		*		*	*	*	*				*	*

Model description

The effective factors on the success of Enterprise Resource planning (ERP) system will be explained in two general forms a. external with 3 components of country environment and industry, ERP vendors' environment, software package environment b. intraorganizational environment with 4 components of leadership and strategic criterions, organizational variables, IT environment in organization, user's environment.

External environment (Country)

In the past decades, mostly legal approaches were dominant in the organizations and due to assuming organization environment as constant, mostly intraorganizational factors are considered and more than 98% of the studies regarding critical factors of IT, ERP systems are done on this basis and a little research is done regarding the relationship between environmental and organizational variables. But today, organizations are severely under the pressure of external factors change such as the change of customers expectations, product life reduction, global and environmental and global competition are faced with dynamic market (Powell, 1999;Lee, 2001). In the research titled "Problem solving of implementation of EFQM in Iran, 0.63 are related to external barriers of which 0.31 are due to the lack of competition environment in the industry (Heidarie and Zeinalian, 2010).

External environment factors are always with opportunities and threats influencing projects application strategies and predicted results. In this research by using theories of (Somer 2000; Donaldson, 2001 and namely Ifindo, 2006 and Ngaie, 2008). Two factors of industry environment (fixed or competitive and information intensity) and national economy environment.

Industry environment: competition intensity and information intensity can be separated and competition pressure is one of the effective factors on industry operation environment change (Porter and miller, 1985; Watson et al, 1997; Ifindo, 2006).

Competition concept is discussed in three levels of national, industry and enterprise and while the industry has special and separate nature, it is of nature between national and enterprise (Aqazade Teibi, 2007).

(Buckley et al, 1988) knows industrial competition in the form of an applied framework including competitive function dimension, competitive potential and management processes.

(Michel Porter, 1985) knows industrial structure in which business is active and competitive positioning of business in two strategic factors of competition in industry, Porter know the structure of industry composed of 5 factors, competition amount between the existing competitors in industry, threatening new-comers to the industry and the condition of exiting the industry, the threat of alternative products, bargain of customers, suppliers bargain are separated and trying to attain strategic position, competition on price, increasing after sale services, presenting new products including competition methods in industry.

National economy environment

Most of the theorists know the difference in economical condition of countries the main difference in understanding IT benefits namely ERP (Gargorio et al, 2005; Wu Wang, 2003; Lee and Kim, 2006).

(Davenport, 2001) besides dividing economy environment to advanced and traditional believes that ERP system in advanced economy lead into high efficiency and operation, while the benefits of ERP in less developed economies are always challenging.

ERP Vendors environment

Collaboration with vendors, using vendors tools and supporting vendor in the starting stages, getting, conformity and habit is one of the key factors of ERP system success (Somer and Nelson, 2001).

The relationship between buyer and seller, it is a strategic relationship software as ERP vendor improvement, enhances competitive benefits and effectiveness of buyer organization (Wilkoks and siks, 2000).

Generally, management should be ensuring of continuous support of software vendor in all stages of implementation and upgrading the system (Zhe Zhang, 2005).

(Chun-Chin Wei et al, 2005; Selk Percin, 2008) presented the 3 indices in teh selection of the type of vendo as:

   a. Experience, fame including the scale of vendor, financial condition and market share are evaluative factors of previous performances of the vendor.

   b. Technical capacity: Including capability of research development for upgrading system, technical support capacity, implementation capability

   c. Service: Including warranty, consulting services, education, access level, service speed

So, ERP software vendors factors is controlled as an external factors and considering the key role in fulfilling the results of implementation can be selected with special consideration.

Software package environment

Companies and enterprises cannot implement ERP systems without considering technical aspects and the accepted planning languages of ERP vendors and concentration on modules are different. So, in the selection of a software package, its more conformity with organization requirements should be considered (Zang et al, 2005).

(Chun-chin- Wei et al, 2005) beside describing the stages of ERP system selection and presenting a framework, knows the effective factors on ERP system selection as the followings.

   a. Minimizing costs including software package price, maintenance costs, infrastructure costs and consultants' costs.

   b. Minimizing implementation time

   c. Complete covering of duties including complete modules, duties conformity, and warranty.

   d. Friendly relationship with users including easy operation and easy learning.

   e. High flexibility including upgrading, easy integration and easy development.

   f. High reliability including stability, improvement capability

(Selcuk percin, 2008) divided ERP system factors to 7 systems as: Strategic conformity, flexiblity, friendly relationship with users, implememtation time, total costs, reliabiity capability, covering duties. As any ERP software system impose its own logic on strategy and culture of the compnay, it is necessary to be sensitive and highly precise in the selection of the type of software. As the biggest failure of system implementation is due to consistency weakness of system properties with organization requirments (Yembel et al, 2003; Almasary et al, 2003; Magnusson et al, 2003; Ulrich rems,2007; francoise, 2009).

With reference to previous researches of ERP system environment can be divided into 3 indices as:

ERP software conformity

Foreign vendors including SAP, ORACEL, J.D EDVARD, BANN and internal software are different. In terms of hardware, database and operation system, construction cost and time and construction method. Thus, the organization should at first analyze requirements, financial capability etc, and select the type of good software to maximize conformity (Zang et al, 2005).

Information quality

Information quality is one of the main factors of ERP system success (Yusuf et al, 2004; Zang et al, 2005) (Myers Et Al, 1997) presented information quality with 5 sub-factors: accuracy, content, access level,Timeliness, conciseness (Donald Macland, 1992 and Gobleet Al et al, 2003). Respectively by giving a model for ERP system success regarded one of main success factors, the quality of information.

Information quality as one of the success factors of ERP system being different in different software and it can be influenced by consultant's quality (Ifendo, 2006).

System quality

System quality is one of the important factors of ERP system success.

(Ifindo, 2006) approved the positive effectiveness of this factor of vendor's quality and its positive effectiveness on people. Some of the theorists know data analysis and their conversion method the factor of system quality (Somer and Nelson, 2001, Finney and Corbett, 2005; Ulrich rems, 2007; Scrota, 2007).

Leadership and strategic criterions

The role and commitment of top managers and aims and vision of the organization are important in ERP system implementation.

Top managers' support and leadership

Top management support has important role in the success of projects namely in the countries in which power difference in terms of culture is high because attitude of top managers influences all the factors. Commitment and support of top managers are the most important factor in ERP system implementation and creates the necessary reliability and necessary preparation for variety management (Bingi et al, 1999).

Top management and leadership not only determine direction and goals of enterprise, but also motivates energy and creativity of staffs to implement and use ERP technological capabilities (Al Mashari, 2003) the decision of implementing ERP system at macro level, selecting good software and vendor, resources designation, the selection of project members team, etc are selected by top management team (Welti, 1999; Magnusson et al, 2004). In an article, four subfactors are determined for top managers:

a. Strategy: The organization should have a clear commitment and definition of the strategy of enterprise and IS/IT strategy.
b. Leadership: The organization should have a strong commitment of leadership for creating staffs motivation for change.
c. Support: The organization should have strong management commitment to implement ERP. d. Qualification: The organization should have some people with ERP, BPR qualifications or collaboration in the IT projects in committee and project level.

Some believe that without the support of top managers, ERP will be failed definitely because the selection of using the project of selection of the type of software, vendor, consultant, cost designation, schedule, variables, processes and etc are possible only by top managers support (Sondoss et al, 2009).

Vision, goals and planning

Long-term commercial program of the enterprise, connects ERP project to organizational strategies, define their accessible goals and facilities, ERP condition should be introduced correctly and we should be sure that the decisions are as continuous and long-term.

Determining the vision and planning to implement ERP system should be according to the general vision of the enterprise and a clear definition of goals of enterprise and the connection between enterprise goals and strategy of information systems should be defined (Mandel, P.G Cunasekaran, 2003).

Determining the primary vision and planning can be an instruction to determine IT strategy conformity and as a map of way, it can support key requirements, effective development, and key requirements of enterprise in implementation of ERP (Almasary et al, 2003). If there is not a clear definition of vision and true understanding of enterprise success, ERP implementation and integration will be problematic despite true selection of the software at the primary stages. Without a clear direction and an exact strategic planning, ERP implementation will be failed at the starting stages (Davenport, 1998).

Supporting activities of commercial program and long-term vision are including as:

1. Defining and formulizing the relation between ERP and enterprise strategy
2. Defining the goals of ERP implementation and having access to financial, technical resources and organizational facilities
3. Re-evaluation of goals research by project
4. Management team satisfaction in proceeding implementation goals
5. Making executer responsible to fulfill organization goals (Francoise et al, 2009)

Organization environment

7 factors of organization culture and change management, re-engineering of processes, effective project team and project heroes, project management of organization size, super department coordination, performance supervision are considered.

Organization culture and change management

ERP implementation has meaningful effect on organization culture. Successful implementation of ERP requires the change in staffs behavior, processes, Departments and organization**s**. Change management is including human resources management such as social changes when new processes are introduced, top management should create the necessary background for accepting the change in staffs and reducing resistance against change. Although it is possible that staffs behaviors are not compatible with enterprise processes, learning capabilities and flexibility of staffs will have positive effect on the success of organizational resources planning. The organization should give importance to learning, knowledge, previous experiences and changes in terms of culture and the organization should have basic inclination to change to follow change management strategy.

Using good change management methods is one of the critical factors that lead into maximum changes acceptance by final user by collaboration of users and training (Magnusson et al, 2004. Almasary et al, 2003; Francoise et al, 2009).

Processes re-engineering

The organization should have high level of maturity of enterprise processes to support processes management well. The role and effect of management of enterprise processes has key role in successful implementation of ERP (Sondoss et al, 2009).

To use total benefit of ERP software, re-designing enterprise processes is the first necessary condition and ERP systems develop instruments to improve enterprise processes including building, production, purchase and distribution. Thus, implementation of ERP and BRP activities are closely related to each other.

Francoise et al, 2009 know the necessary actions for processes re-engineering as the followings:

- Formulizing the definition of the limit of re-engineering and customizing demand before starting the activities
- Selection for minimizing customization in execution
- New processes are approved by management
- Special re-engineering activities are registered in project plan

Effective project team and project heroes

The organization should have an implementation team and they include people with different view of development system and enterprise (Magnusson et al, 2004).

ERP system implementation project teams should be composed of top staffs of each department. The selection criterions due to their skills are previous knowledge, fame and flexibility. Key decision-making responsibility should be given to this staff. Management should be always in connection with the system but they should have highly capable for rapid decision-making. One of the exact factors of success or failure of the project is related to knowledge, skills, capabilities and experiences of project manager in selection of project team members that is not only technological qualification but also true understanding of enterprise and its requirement. Skills and knowledge of project team is very important and consultants eliminate the lack of knowledge of team members. As the balance of team is not adequate with their power for project success and it is necessary that it should be selected by team and the team should be supported by a leader or manager (Paul Rice, 2007;Ngaie et al, 2008; Francoise et al, 2009; Wang et al, 2003).

Project management

Project size, project structure and an extensive combination of software and hardware and organization integration make the items related to human resources ERP projects as complex claiming a strong project management more than other projects.

Planning of project schedule, avoiding project range extension, avoiding costs increase are duties of project manager (Somer and Nelson, 2001; Applegate et al, 1999).

- 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. 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 (Umble et al, 2003) the companies should have an effective project management strategy to control implementation processes to avoid budget increase and do in accordance with project schedule. 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 (Zang et al, 2005; Sternad et al, 2007; Francoise et al, 2009).

Communications and coordination of super department

Communications is necessary inside the project team, between team and other parts of the organization. The lack of communication makes the members of re-engineering team encounter problems with other members of the organization in using re-engineering implementation of enterprise processes.

Common values should be created between staffs, stockholders, people and managers for more coordination. The coordination between function parts and departments and all the people participating in the project is necessary (Somer and Nelson, 2001; Wilkoks, 2000).

Supervision and evaluation of performance

Performance evaluation is a key factor to be sure of ERP system success. As by doing periodical evaluations according to pre-determined goals, the goals can be accessed and take corrective measures in case of dispute. Performance management makes the previous condition trend and balanced approach as the basis of work. In addition, technical performance of the system such as reliability and control other aspects such as flexibility, schedule speed and project execution costs etc, and besides considering strategic and operational aspects add visible and invisible benefits of ERP project (Almasary et al, 2003). supervision and analysis of performance is necessary as somthing that is not being measured is not controled (Jarrar et al, 2000).

The actions that should be done to analysis successful performance in implementation of ERP are:

- Supporting supervision and evaluation of performance program and reflecting its results in different periods to top managers
- Exact definition of supervision and evaluation program at the beginning of the project namely supervision and evaluation methodology, reporting method, modifications and their approved.
- An index is defined for each of the goals to provide progress measurement.
- Supervision tools are understood by all participants (Francoise et al, 2009)

Users' environment and technology acceptance level by users

Technology Acceptance Model (TAM) by users is one of the main factors of ERP success as behaviorist approach of users due to the lack of acceptance of ERP system can restrict information technology resources at low level as it is not possible to compensate costs and problems of implementation processes and it will have high organizational resistance (Elise, 2005; Turben Hansen, 2006; zang et al, 2005) considering the review literature three factors

a. users properties, b. Users participatoin in ERP implementation c. Leanring traning and academic education are effective factors on easiness of ERP implementation system and increainsg tecnology aceptance level

Users characteristics

Zviran et al 2005 tested the relations between users' satisfaction level and ERP system efficiency. They divided users characteristics to 6 types: a. The department to which users duty is related b. hierarchy condition of a person in the organization c. academic education level d. age e. IT experiences f. gender and these factors are effective on satisfaction level and udders understanding and they found that efficiency understanding is one of the effective factors on users satisfaction about system.

Hol sapple et al 2006 studied users properties and know some factors such as age, education level, management level and computer experiences, consistency and its relation with working duties as effective factors on ERP success.

Wu and Wang 2006 knows three factors of ERP project team and service, the type of ERP software package, knowledge and experiences and participation of users as effective factors on satisfaction of users of system.

Academic education

The problem of education for staffs led into the failure of full understanding of change processes method in organization and makes being prepared to respond to ERP implementation as problematic (C.Wilder and B. Davis, 1998). At the beginning of ERP projects, the users should take 6 months course to be prepared for ERP implementation system. Although most of the companies use consultants to help them in implementation processes and knowledge transfer from consultant to the staffs of inside the organization is very important, the companies should provide opportunities to increase staffs skills and by providing educational opportunities give positive response continuously to varied demands of enterprise (Th. Davenport Tp, 1998. T. Bingi, 1999; Somers and Nelson, 2001). Top managers of the organization should be completely committed to assign good budget about training and learning of users as a part of ERP system budget and assigning 10% to 15% of total budget of ERP implementation to education, increase 85% of implementation success probability (D. McCaskey, 1999; umbele et ale, 2003).

The lack of consistency of education is one of the meaningful reasons of the failure of many ERP projects and one of the main challenges in implementation of ERP system is selecting a good program for training and justification of final users and the main goal of ERP training should be creating the effective understanding of enterprise processes (Al Mashari et al, 2003).

The organization should have a clear training strategy in ERP implementation to make the activity method easy for staffs (Magnusson et ale, 2004). Users training in ERP implementation increased tecnology acceptance level and expectations manangment improvment (ulrich remus, 2007).

Staffs participation

Referring to user's participation in developing system and implementation of processes along with responsibility of users groups is called goal. Some of the researchers propose the collaboration of users in development including buying software, design, modifications and implementation and regard it as the main factor of system success (Yusuf et al, 2004). System implementation creates a threat for offices and users of their high control and a period of transition in the difference between the new and old system and user's collaboration is very effective because it improves input by control collaboration (Zang et al, 2005).

By collaboration of users in ERP implementation system, users resistance level is decreased and technology acceptance level is increased and decision processes help the project success and real expectations development well and it lead into solving the contradictions an improving the production program (Esteves et al, 2003; Oliver Francoise et al, 2009).

IT factors

IT factors are including the size of IT department, IT systems budget, IT department value and satisfaction of existing IT systems (Donaldson, 2001; Ifindo, 2006)

Maturity of information systems in the organization and management of previous IT system

There is an inverse relationship between satisfaction level of previous IT system and ERP system success (findo, 2006). Previous systems in the organization are applied for a while in the system and created a kind of custom and efficiency for the organization and person and replacing ERP system requires the management of previous IT system (T.h. Davenport, 1998; Markus, M., Tanis, Marbert et al, 2003**).**

Software and hardware facilities of the company and budget assign amount

The lack of commitment to financial and staffs resources are serious problems for processes re-engineering and assigning the required resources is the key to fulfill benefits related to ERP software and they should be determined before starting the project and they should be divided in accordance with a resource program and that is the important part of project management plan (Somer et al, 2000).

Success and benefits of ERP system

Shand Vesden, 2000; Al Mashari et al, 2003 divided the success and benefits of ERP by giving a comprehensive image into 5 groups:

a. Operation including: Reducing costs, reduction of time cycle, operation improvement and quality improvement.
b. Management including: Improving service to customer, reduction of inventories, better resource management, decision making improvement and planning.
c. Strategic including: Supporting continuous growth of enterprise, supporting interorganizational collaboration, creating creative enterprises, attaining costs leadership, development of product variety, creating and facility of external links.

d. Organizational: Including organizational changes, organizational learning facility, creating common vision, organization collaboration facility.
e. IT infrastructure: Including flexibility of enterprise processes, IT costs reduction, increasing IT infrastructure capacity.
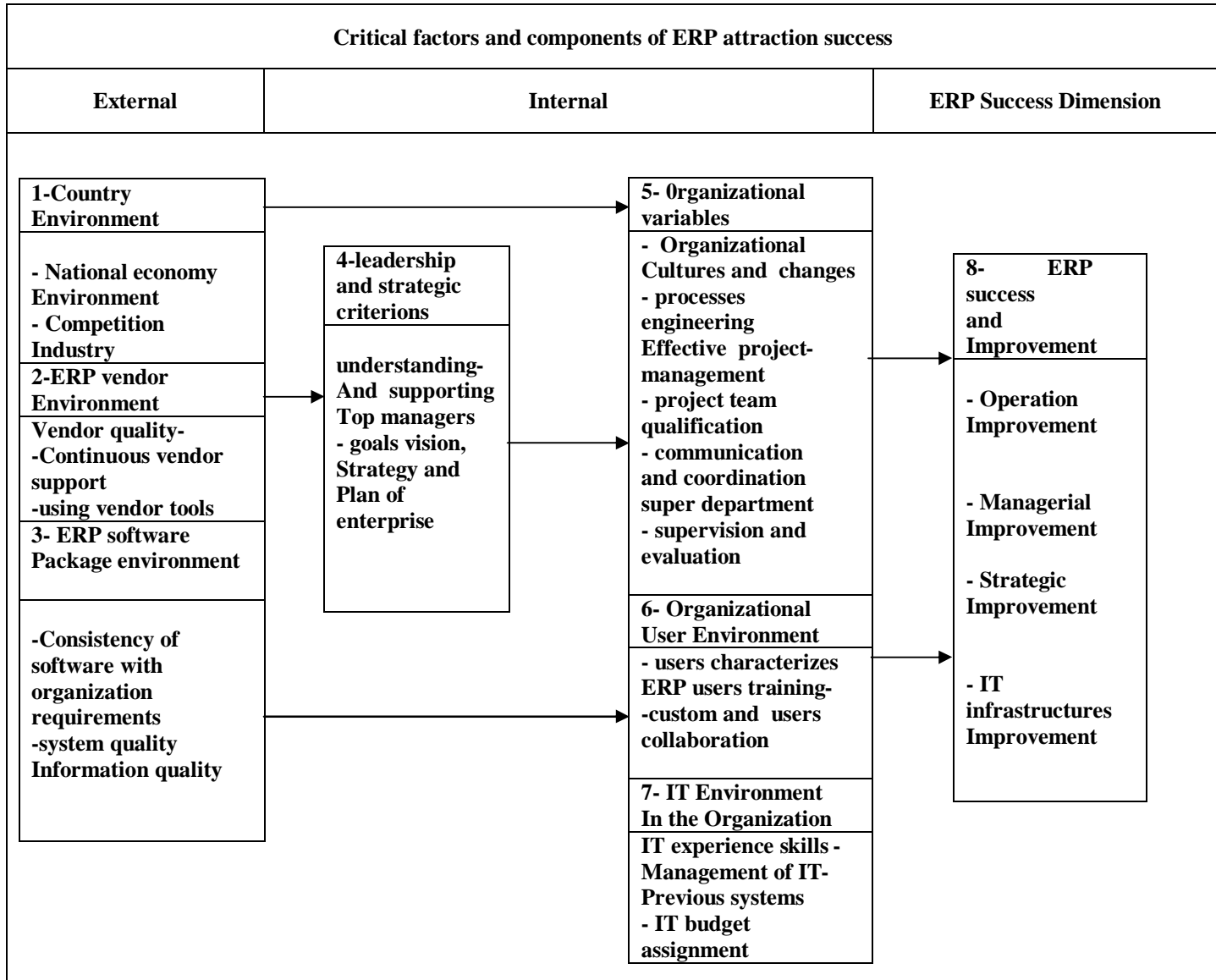
Proposed framework

Critical factors and components of ERP attraction success		
External	**Internal**	**ERP Success Dimension**

1-Country Environment

- National economy Environment
- Competition Industry

2-ERP vendor Environment

Vendor quality-
-Continuous vendor support
-using vendor tools

3- ERP software Package environment

-Consistency of software with organization requirements
-system quality Information quality

4-leadership and strategic criterions

understanding-And supporting Top managers
- goals vision, Strategy and Plan of enterprise

5- 0rganizational variables

- Organizational Cultures and changes
- processes engineering
Effective project-management
- project team qualification
- communication and coordination super department
- supervision and evaluation

6- Organizational User Environment

- users characterizes
ERP users training-
-custom and users collaboration

7- IT Environment In the Organization

IT experience skills -
Management of IT-
Previous systems
- IT budget assignment

8- ERP success and Improvement

- Operation Improvement

- Managerial Improvement

- Strategic Improvement

- IT infrastructures Improvement

Chart 2- Final conceptual model

Conclusion and suggestion

True understanding of success and failure conditions of implementation of ERP system requires good understanding of effective key factors and the effective fulfillment of these factors. In presenting a coherent framework and combining legal and real approaches of organization, the success factors are separated into main groups: a. external. Including some components as country environment, ERPR vendors environment, software package environment b. Internal including some components as strategic and leadership criterions, organization

environment, users environment, IT environment in organization. Some of the most important factors are top management support, goals vision and implementation strategy, effective project management, IT infrastructure in the country, vendor quality and continuous support of the buyer, organizational culture and change, quality of software package, information quality, budget, and technology acceptance level by users. In future researches correlation value of indices with components can be determined by fuzzy method and factor analysis and by interpretation structural modeling (ISM) besides determining the interaction of indices and components with each other, components are leveled.

REFERENCES

1. Abdinnour-Helm, S., Lengnick-Hall, M. L. & Lengnick-Hall, C. A. 2003. Pre-implementation attitudes and organizational readiness for implementing an Enterprise Resource Planning system. European Journal of Operational Research, 146(2), 258-273

2. Albert y.T Sun et al (2005) Achievement assessment for ERP system Implementation based on Critical Success Factors (CSF) International journal of production economics pp: 189-203

3. Al-Mashari,M.,Al-Mudimigh,A.,Zairi,M.,2003.EnterpriseResource planning :Ataxonomy of critical factors .European Journal of Operational Research 146,352–36

4. Ang,J.S.K.,Sum,C.C.,Yeo,L.N.,2002.Amultiple-caseDesign method ology for studying MRP success and CSFs ,Information and Management39,271–281

5. APICS (2001) American production and inventory contol society (APICS)http://www.apics.org

6. Aqazadeh, Hashem, Tayebi, Mohammad Reza(2007) Multi-dimensional view of competition nature, management knowledge. NO.76. P.139-158.

7. AMR Research. 2005. $17 billion expected future growth in enterprise applications arket.http://www.amrresearch.com/Content/View.asp?pmillid=18789. (Accessed on 13/3/2006).

8. Barker, R. 2001. Manufacturing best practice and human intellectual energy. Integrated Manufacturing Systems, 12(1), 7-14

9. Basoglu،.Nuri et al (2007) organizational adoption of enterprise resource planning systems A conceptual framwork ،journal of High technology management rechearch 18 ، 73-97

10. A .Carson .william (2005) successful Implementation of ERP software :A Delphi study , for the degree of doctor of philosophy

11. Chun-Chin Wei , Chen-Fu Chien , Mao- Jiun J. Wang (2005) . An Ahp Based Approach To ERP System Selection International Journal Of Production Economies , 96.Pp 47-62

12. Chung, S. H. & Snyder, C. A. 2000. ERP adoption: a technological evolution approach. International Journal of Agile Management Systems, 2(1), 24-32.

13. Davenport, T. 1998. Putting the enterprise into the enterprise system. Harvard Business Review, 76(4), 121-131.

14. DeLone, W. H. & McLean, E. R. 1992. Information systems success: the quest forthe dependable variable. Information Systems Research, 3(1), 60-95.

15. Dewan, S. & Kraemer, K. L. 2000. Information technology and productivity: evidence from country-level data. Management Science, 46(4), 548-562

16. DeSisto, R. 1997. ERP integration strategies for TES systems, Gartner Research Note: TU-724-344, Stamford, CT: Gartner Research Press

17. DINIS De sousa ,Ruimanuel .(2004) Complex information technology usage: Toward Higher levels Through Exploratory use –the ERPsystem Case .for the degree of doctor of philosophy

18. Donaldson, L. 2001. The contingency theory of organizations. Thousand Oaks, CA: Sage Publication

19. Don Gil ko (2002) Determinants of knowledge transfer in ERP Implementation for the degree of doctor of philosophy

20. E.W.T. Ngai et al (2008) Examining the critical success factors in the adoption of ERP, computers industry 59 ,pp:548-564

21. Finney , sherry and Corbett mrtin (2003) ERP Implementation a analysis of critical success factors www.emerald in sight .com /.1463—14 90

22. Francoise oliver and et al (2009) ERP implementation Throgh critical success factors management , Business process management journal ,vol 15 ,NO 3 ,pp:371-394

23. Gable, G. G., Sedera, D. & Chan T. 2003. Enterprise systems success: a measurement model. In: S. T. March, A. Massey & J. I. DeGross (Eds.), Proceedings International Conference on Information Systems, Seattle, Washington: ICIS Press (AIS e-Library), 576-591

24. Gregorio, D. D., Kassicieh, S. K. & Neto, R. D. 2005. Drivers of e-business   activity in developed and emerging markets. IEEE Transactions on   Engineering Management, 52(2), 155-166.

25. Hakim .amin. Hakim Hamid (2009) A practical model on controlling the ERP implementation risks .information system ***

26. Hansen ,torben (2006) multidimensional effort prediction for ERP system Implementation : for the degree of doctor of philosophy

27. Hsien Tsai et al (2011) An empirical investigation of the impacts of internal/external facilitators on the project success of ERP :A structural equation model ‹Decision support systems, Volume 50 ‹Issue 2 ‹pages 480-499

28. Holland, C.P. and Light, B. (1999), "A critical success factors model for ERP implementation", IEEE Journal, Vol. 16 No. 3, pp. 30-6.

29. Hyung-Kwon Hang, Yong-Gul; Kim (2002) The Critical Success Factors For Erp Implementation An Organizational Fit Perspective . Information Management , 40,Pp,25-40

30. Ifinedo, P. 2006a. A conceptual model for assessing enterprise resources planning (ERP) systems success: an empirical study involving the development of its building blocks. In: A. E. Avery (Ed.) Proceedings of the 36th. Annual Meeting Southeast Decision Sciences Institute Annual Meeting, February 22-24, 2006, Wilmington, NC: DSI Press, 817- 832.

31. Jarrar, Y.F., Al-Mudimigh, A. and Zairi, M. (2000), "ERP implementation critical success factors-the role and impact of business process management", Proceedings of the 2000 IEEE International Conference on Management of Innovation and Technology, pp. 122-7, available at: IEEE Xplore (accessed February 10, 2007

32. Jensen, R., And R. Johnson. 1999. " The Enterprise Resource Planning System As A Strategic Solution. " Information Strategy 15: 28-33.

33. Jiang yingiie (2005) critical success factors in ERP Implementation in Finland : .for the degree of doctor of philosophy

34 .Kamrani, Maryam (2007)   IT strategic management, Computer science publication

35. Kositanurit"Boontaree (2003) An Exploration of factors impacting individual performance in an ERP Envirronment for the degree of doctor of philosophy

36. P.Kraemmergaard and J . Rose (2002)   managerial competences for ERP Journeys , information systems frontiers , vol 4 ,NO 2 ,pp:199-211

37. Kwon Hang , Kyung et al (2002) the critical success factors for ERP Implementation on organizational fit perspective

38. Kumar, K.& Van Hillegersberg, J.2000.Erpexperiences And Evolution. Communications Of The ACM, 43(4),22-26

39. Lavie. D.(2006) "The Competitive Adventage of Interconnected firms: An Extensoin of the Resource-Based View" Academy of Management Review : Vol.31"no 3. PP:638-658

40. Lee, J. 2001. Integration and internalization in ERP adoption and use. The University of Nebraska, Lincoln, Nebraska, USA. Ph.D Thesis

41. Lee, S. & Kim, S. H. 2006. A lag effect of IT investment on firm   performance.Information Resources Management Journal, 19(1), 43-69

42. Magnusson, J., Nilsson, A. and Carlsson, F. (2004), "Forecasting ERP implementation success –towards a grounded framework", available at: http://is2.lse.ac.uk/asp/aspecis/20040100.pdf (ac cessed March 31, 2007 47–55

43. Mandel , P.G Cunasekaran A (2003) Issue in implementating ERP A case   study .european journal of operational research 146 . pp:274-283

44. Marbert , A VINCENT Et Al (2003) the Impact of organization size on enterprise   resourse planning (ERP) Implementations in the us manufacturing sector .omega ,vol 31,issue 3 pp:235-24

45. Markus, M., Tanis, C., Fenema, P., 2000. Multisite ERP implementation. Communications of the ACM 43 (4), 42–46

46. McCaskey, M. Okrent, Catching the ERP second wave,APICS—The Performance Advantage (December)(1999)34–38.

47. Yers, B. L., Kappelman, L. A. & Prybutok, V. R. 1997. A comprehensive model for assessing the quality and productivity of the information systems   function: Toward a theory for information systems assessment. International   Resources Management Journal, 10(1), 6-2545

48. Muscatello ,J .Y 2002 An Exploratory Study Of The Implementation Of Enterprise Resource Planning (ERP). Cleveland State University, Oh USA . Ph.D

49. Nelson, K. G. & Somers, T. M. 2001. Exploring ERP success from an end user   perspective. In: D. Strong, D. Straub & J. I. DeGross (Eds.), Proceedings ofthe 7th. AMCIS, Boston, MA: AMCIS Press (AIS e-Library), 1058-1060

50. E.W.T. Ngai et al (2008) Examining the critical success factors in the adoption of ERP, computers industry 59 ,pp:548-564

51. Nikookar ,Gholamhosein Et Al (2010) competitive advantage of ERP vendors in iran, information systems .vol 35, issue 3.pp:271-277 74/2

52. Orlicky, J. 1975. Material Requirements Planning. New York, NY: McGraw Hil

53. Oliver‹C.(2006).Enterprise resource planning. Business school ‹University of Hull ‹Hull HU6 7RX ‹UK

54. P.Kraemmergaard and J . Rose (2002)   managerial competences for ERP   Journeys , information systems frontiers , vol 4 ,NO 2 ,pp:199-211

55. Percin, Selcuk ,(2008) using the ANP approach in selecting and benchmarking ERPsystems , benchmarking an international journal .vol 15 NO 3, pp:630 6425

56. Powell, T. C. 1996. How much does industry matter? An alternative empirical   test. Strategic Management Journal, 17(4), 323 -334

57. Porter "E.M and Miller(1985) How Information Gives You Competittive Adventage" Harvard Business Review. Vol 12.NO .3. PP:118-123

58. Robert, H . J . , And Barrar , P . N.(1992). " Marpii Implementation : Key Factors For Success ". Computer Integrated Manufacturing System , Vol . 5, No. 1 the ERP benefits , decision support systems , 149-157

59. Scorta Iulina (2007) for the degree of doctor of philosophy

60. Shih-wei chou and yu chieh chang .(2008) the Implementation factors that influence the ERP benefits , decision support systems , 149-157

61. Somers, T.M. and Nelson, K.G. (2004), "A taxonomy of players and activities   across the ERP project life cycle", Information & Management, Vol. 41 No. 3, pp. 257-78

62. Sondoss E1 sowah ,et al (2008) A quantitative model to predict the egyption ERP Implementing success index Business process management journal ,vol 14, NO 30,pp:288-306

63. Startman and A.V. Roth . (2002)   Enterprise Resource planning competence constructs : TWO stage multi , item scale development and validation ,Decistion sciences ,vol 33,NO 9.pp: 601-628

64. Sternad, S., Dezˇelak, Z., S ˇ picˇka, H. and Zabukovsˇek, U. (2007), "Model kriticˇnih dejavnikov uspeha uvajanja resˇitev SAP in Navision", Nasˇe Gospodarstvo, Vol. 53 Nos 1/2, pp. 37-4791/2.

65. Toni M. somers and kbara Nelson (2001) the impact of critical success factors across the stage of enterprise resource planning Implementations preceedings of the 34th Hawaii International conference on system sciences

66. Umble, E.J., Haft, R.R. and Umble, M.M. (2003), "Enterprise resource planning: implementation procedures and critical success factors", European Journal of Operational Research, Vol. 146 No. 2, pp. 241-57.

67. Ulrich ,Remus ,(2007) critical success factors for Implementing enterprise portals A Comparison with ERP Implementation s,Business process management journal ,vol 13 ,NO 4, 538-552

68. Weiling ke and kwok kee wei . 2008 organizational culture and leadership in ERP Implementation , decision support systems , 45 – pp . 208-218

69. Welti, (1999) successful SAP R/3 implementation practical management of ERP projects:Addison Wesley reading ,MA

70. Worthman , J . C . 1984 . " Factory Of Future : Towards An Integrated Theory For On- Of – A – Kind Production , " In On- Of-A-Kind Production : New Approaches , Edited By B . E. Hirsch And K.D. Thoben Amsterdam : North- Holland , 37-74

71. Wu, J-H. & Wang, Y-M. 2003. Enterprise resource planning experience inTaiwan: an empirical study and comparative analysis. In: R. H. Sprague Jr. (Ed.), Proceedings of the 36th. Hawaii International Conference on Systems Sciences, Hawaii: IEEE Computer Society Press, 1-10

72. Yusuf,Y.,Gunasekaran,A.,Abthorpe,M.K.,2004.Enterprise Information systems project implementation :A case study Of ERP in Rolls- Royce .International Journal of Production Economics87,251–266.

73. Zhao., fan (2007) an empirical study of enterprise system upgrades : for the degree of doctor of philosoph

74. Zhe Zhang And Matthew K. O. Lee (2005) A Framework Of Erp Systems Implementation Success In China : An Empirical Study . International Journal Of Production Economies, 98.Pp 56-80duction