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Feasibility Study of ERP Implementation in Iran Industry

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Abstract

Recent study indicates that the demand for ERP system has been estimated to increase in Iran. Although some companies in Iran proceed to develop ERP system and even several large companies intended to buy it but these projects did not achieve a particular success rate due to lack of preliminary investigation and feasibility study. This article examines the key factors determining the success or failure of ERP solutions within government and private sectors in Iran. This study used a survey method (questionnaires and interviews) with employees, managers and directors of the large companies working in the Iranian Market. Findings show that there are six important factors that cause ERP implementation failure in Iran. However effect of these factors are related and combined and all of them must be considered in the business process model.

Keywords: ERP System, Information Technology, Business, Feasibility Study, Implementation, Iran

1. Introduction

In the present era, with the rapid and continuous development of technology, separation of business from information technology is nearly impossible. To be successful it is essential that we have timely access to complete and accurate information that support the decision making process and market demand responses. In the global economy of 21st century that eighty percent of economy relies heavily on the information and communication technology, study of this important and strategic topic is the critical factor of success in the development of countries and governments. Enterprise Resource Planning (ERP) is the most comprehensive approach that aligns information technology and new concepts of business process management in one integrated solution. ERP solutions today provide the most effective templates and tools for Business Process Reengineering and Information Technology.

ERP implementation has recently received more attention in Iran. Thus It is important to be aware of how ERP can be implemented, especially because recently there have been valuable efforts in our country for the development of comprehensive information systems. Yet organizations still have a long way to achieve standard ERP systems and to fulfill the growing industry and services needs.

Enterprise Resource Planning (ERP) system is a combination of Information Technology and business management practices designed specifically for process-oriented approach that enables organization focuses on the process and the result, as opposed to just the tasks. ERP is a comprehensive and systematic approach that helps an organization to achieve company goals by integration of the business processes and information technology. (Al-Mashari, M.,Zairi, M., 2006; Marnewick, C. and Labuschagne, L., 2005).

A ERP Implementation Goals and Objectives

- Automate business process and manage material, financial, and human resources
- Simplify and improve effectiveness of processes
- Compete in global marketplace

In the last few decades manufacturing and industrial managers control their system and activities using the traditional approach. However, traditional approach is considered inadequate for management and information needs in face of significant increase in the volume of activities and organization developments.

Nowadays, with the rapid development of technology using new approaches in modern management is essential. Computers have revolutionized the management by variety of software systems widely used to guide and control the operations and activities. In 1970s efforts were concentrated on the implementation of Material Requirement Planning (MRP). In the 1980s, the concept of Manufacturing Resource Planning (MRPII) evolved and manufacturers implemented this system as a method for the effective planning of a manufacturer's resources. (Hawking, P., McCarthy, B., 2004; Kelle, P., Akbulut, A., 2005).

Advances in modern technology enable the easy development of management software systems to handle the business and operations and have made it possible to implement a conceptual model. Through evolutionary and historical analysis of ERP systems, we can observe that these systems are the result of systematic and smooth growth and continuity of this trend between 1960 and 1990 with proven great worldwide success experience. These powerful, complex and expensive software packages are pre-designed systems that are implemented by implementation consultants and business process consultants after the customization.

In many cases, organizations force to reform and review their processes due to the fact that they have to comply with the prevailing logic of these applications. In the past years ERP has played a key success role for many organizations that can compete globally.

Currently ERP systems in developed countries such as the U.S., Canada, England and Australia have been widely adopted by companies and also developing countries are moving slowly towards this system. Currently North America holds 66% market share of ERP, 22% share in European countries, less than 9% share in Asian countries, and 3% share in Latin American countries (Hong, K-K. and Kim, Y-G. 2002).

With ERP development and tendency of many large manufacturing companies to implement and execute ERP system, the business market was undergoing some changes and many companies with the correct implementation of ERP have enjoyed the benefits of changed management techniques which lead company to increase profits, reduce process costs and improve customer services and ultimately be in a better position than competitors were. However, many ERP systems face implementation difficulties because of the high cost of implementation that may lead to bankruptcy of the company. In 1996 FOXMAYR DRUG Company declared bankruptcy after a failed ERP implementation due to high operational costs. Reasons that derive decision of companies and organizations to implement ERP can be divided into three groups: technical, operational and strategic.

a) Technical Need for a common platform to replace existing Information Technology infrastructure in organizations or companies. Incompatibility among multiple information systems
b) Functional Improve processes
c) Data transparency

d) Reduce operational and implementation cost
e) Strategic Solve Y2K problem
f) World trade
g) Organizational growth
h) Increase the efficiency of the organization and making appropriate decisions
i) Increase the quality of customer service upon customer sensitivity

Undoubtedly among the existing software systems, ERP is considered as one of the most efficient information integration systems to control organization resources, support business process, save costs, standardization, promotion stages of operation, improve organizational communication, etc. Any ERP implementation, which is generally done correct with desirable consequences will be beneficial to the company. For example, increase sales through shorter promotion periods and reliable delivery times, profit institution increases in suburb areas.

ERP toward the development and improvement of the new horizons for institute planners reduce the cost of purchasing and provision of materials, maintaining inventory, etc. In addition to helping improve worker productivity, product quality, premature delivery, and customer service, ERP systems can help to eliminate the problems and issues such as liquidity management, inventory accuracy and the risk of material shortages. Thus facilitating the beneficial reduction of waste materials, the need for landfill space and working capital, ERP assists in better cash flow and cost saving. In addition to these benefits using sustainable and reliable schedules and programs, will reduce time, additional costs and production waste.

Yet, another advantage of implementing an ERP system is automating business process and reducing promotion times which therefore layout information in a clear and concise structure. Through this cooperation, easy, fast, and reliable data exchange between related departments balance in production will be achieved. (Parr, A., Shanks, G., 2000). ERP with filling the information gap across the organization improves the basic activities, in order to provide the necessary platform for complete integration of departments, companies and factories to form a Single Management Organization. Thus, the capability of adaptation in changing environments will be simplified and institutions are capable to facilitate the rapid response to new needs and modifications. Having the ability to update strategies and technologies, ERP will lead institution toward deployment of new technologies such as electronic transmission costs (EFT), electronic data exchange (EDI), e-commerce, intranet, etc. This ability provides further insights into better decision making for institutions which because of employing traditional practices have faced a serious competitive crisis. One of the most effective methods of design and implementation of ERP system is using successful experience of leading companies in this field.

Familiarity with the experiences of hundreds of leading companies in the world economy and employing thousands of new methods and processes, lead to opening many current node and creating new ways for organizations to join to IT leaders and to implement ERP, CRM (full form) and BPR (Business Process Reengineering). One of the important advantages of ERP systems can be forcing organizations to review business processes perspectives. In fact fundamental change in organizations from the operational view is an important factor in Reengineering Process (BPR). Organizations that implement ERP system will not achieve any results quickly and in short time. Lest when the ERP software vendors are talking about a moderate period between three and six months for implementation, in this short time (six months is indeed short) only a few special cases have been considered: small business, implementation of ERP for a limited level of project, implementation of ERP limited to financial sector (in this case, ERP system would be nothing except an expensive accounting system). ERP implementation success is found in modifying the change management and requires appropriate involvement and empowerment of employees. Thus such changes will not be accepted easily unless the business methods are highly desirable methods.

ERP Implementation Advantages:

1. Organizational integration from information processing perspective, and increase adaptability of information in organizations and companies.
2. Organizational processes standardization based on superior software supplier's experience gained through various organizations.
3. Business processes reengineering and process time reduction.
4. Organizational processes conversion from implicit state to explicit state (due to organizational process reengineering),
5. Simplified and faster installation of ERP related systems in organization, including various ERP software modules or other organization specific softwares which have not been provided by current ERP suppliers.
6. Simplify or facilitate the development of systems and new technologies including JIT, ABC, etc.
7. Facilitate business cooperation, joint investments, mergers, etc. with less cost and higher efficiency and better results for organization.
8. Change in focus from computer programming to improve processes in organizations.
9. Necessary infrastructure development to enter e-Business.
10. Information Integration: Unlike other systems in each of the sectors including financial, sale, and production that may provide contradictory reports on their activities and their shares in the company's revenues increase, ERP will help company to achieve the desired information comprehensively from a complete system.
11. ERP helps company to store customer order information in a fully integrated system. This information includes list of orders that have been received, the time at which the orders have been received, receiving raw materials from goods suppliers for production of the received orders, delivery of produced orders to the customer, and receiving payments. Thus companies are able to easily track their orders and establish the necessary coordination between different departments of the company.
12. Standardization and strive to maximize speed and efficiency of the manufacturing process ERP systems through manufacturing process standardization and use of an integrated computer system will conserve time and increase productivity.
13. Stock reduction: ERP system through production and orders process optimization, reduce inventory and inventory of raw materials during construction which leads to reduce inventory in the warehouse. In other words, ERP also provides supply chain management.
14. Standardization of information on human resources, saving time and preventing duplication.

ERP implementation has recently received more attention in Iran. Thus It is important to be aware of how ERP can be implemented, especially because recently there have been valuable efforts in our country for the development of comprehensive information systems. Yet organizations still have a long way to achieve standard ERP systems and to fulfill the growing industry and services needs.

In this research we examine the key factors determining the success or failure of ERP solutions within government and private sectors in Iran.

2. Research Method

During this study we collected information through a questionnaire survey of 30 high-ranking managers and experts from Esfahan Steel Company. The survey questionnaire includes 25 questions. The data was analyzed using SPSS software and Cronbach's alpha calculated to measure the reliability of the results. The random sampling technique is used to improve the accuracy of survey results. A sample of equal number of experts and managers had been randomly selected as a sample survey from 983 employees of the company. Descriptive statistics such as tables of frequencies and charts were first

obtained and the chi-squared test was calculated to compare the observed data. $P < 0.05$ was considered statistically significant.

Since in this research we used qualitative methods to validate responses on sample survey, the following formula have been used to determine the sample size.

n: sample size
N: population
P: population ratio of success
1 - P: Failed to population ratio
ε: precision estimate

The literature shows that many studies in management field employ the service quality scale. Therefore it is very important to understand the success ratio for each of the source populations (P). Researchers may be unable to estimate P. If the researcher is unable to achieve better estimate for P, then one can use P = 0.5 to calculate n.

In this study, the success ratio in the population (P) is considered equal to 0.5 where we the accuracy of estimation (ε) was taken between 0.01 and 0.1. With considering the accuracy of estimation (ε) equal to 0.1, the sample size will reach its maximum possible value. In this study, therefore, ε was taken to equal 0.1.

As seen in the formula, the sample size is 91 people which randomly selected from the statistical population.

Method Reliability

In this study, data are collected directly from questionnaire survey. The data was analyzed using SPSS software and Cronbach's alpha calculated to measure the reliability of the results. To calculate Cronbach's alpha coefficients, it is necessary to first calculate the variance for the score of each subset of items in the questionnaire and total score variance. Cronbach's alpha coefficient can be calculated using the following:

n = number of questions
Si = (Question)i variance
St = Total score variance

3. Empirical Results

Studying ERP implementation in Iran and comparing our results to other countries shows that ERP implementation does not seem to have significant growth in Iran, and organizations and companies even do not have adequate knowledge about ERP.

In this research, the questionnaire achieved a Cronbach's alpha score of 0.89, indicating that survey questionnaire is a reliable method.

1. Gender of respondents

Based on the results shown in Table 1, most respondents (83.5%) are men, while 16.5% are women.

2. Age of respondents

Based on the results shown in Table 2, most respondents are between the ages of 30 and 50.

3. The level of education of respondents

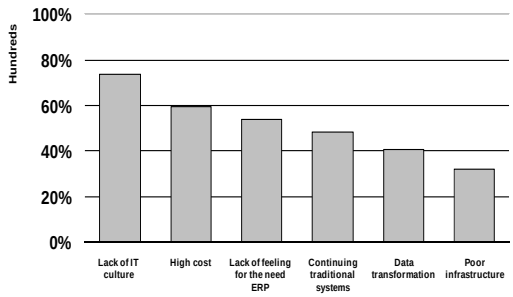
Table 3 shows the relationship between the level of education and the frequency of respondents. The results show that the highest frequency of respondents is among those with high school graduates.

4. The number of years worked for respondents

Table 3 shows that the highest frequency of respondents is among those with average number of years worked where most of middle aged group is included in this group.

The study revealed the following six critical factors, are the main obstacles for ERP implementation in government agencies and private sector companies in Iran.

Figure 1: Percentage of factors for the failure of ERP implementation in Iran



- Lack of IT culture and adequate knowledge and skills to use software applications. This factor was reported by 73.6% of the respondents as the most important factor for the failure of ERP implementation in Iran.
- High cost of ERP implementation and lack of financial support. Many public organizations and companies do not have the ability to accurately forecast and calculate any cost performed either goods or services due to lack of integrated planning, they sell their products for lower prices and they lose some of their revenues because without cost knowledge the fair price can't be set. Most of private sector companies do not have the ability to pay heavy cost of ERP implementation due to lack of financial support to producers and small businesses. ERP implementation also has many inevitable costs such as software license fees, staff training, etc. which need sufficient financial power that is not cost effective for small businesses. 34.59% of the respondents from management level cited high operating cost as most important factor.
- ERP Technology entered the country without feeling the need to it and therefore it was not used properly. Many organizations and companies in the country do not have the feel for the need of this technology and even many senior managers are not able to use computers. How we expect them to understand this system's capabilities? 84/53% of the respondents at the director level know this factor as the cause for lack of progress in ERP implementation.

Table 1: Frequency distribution of the respondents according to their gender

Gender	Frequency	Percentage
Male	76	83.5
Female	15	16.5
Total	**91**	**100**

Although many organizations and companies in Iran have gone beyond the manual and traditional systems, but business changes have not been taking place. Some organizations have been through mechanization individually and have created systems with their own distinct requirements and reports, while in others the mechanization have been stimulated by software development team. Nevertheless providing data from multiple data sources to applications lead to data inconsistency and ultimately to an inconsistent reports. This changing trend in business process was far away from the main goal of mechanization and in fact particular improvement of business processes and information integration has not been met. 35/48% of the respondents at the director level know this factor as a failure factor.

Table 2: Frequency distribution of the respondents according to their age

Age	Frequency	Percentage
25 - 35	17	19
35 - 45	29	32

Table 2: Frequency distribution of the respondents according to their age - continued

45 - 55	30	33
Over 55	15	16
Total	91	100

- One of the great integration and processing challenges to ERP implementation is data transformation. In addition to high costs of implementation, data transmission from previous single-systems or island systems into the ERP system is a critical stage. Old systems interpret and structure data in different way therefore transmitting data from those systems to ERP system cause too many errors and unrealistic results that consequently lead to users' and senior managers' dissatisfaction. If these challenges are not solved using scientific approach, then the project will definitely fail. This is the reason that in Iran senior managers refuse to cooperate with an ERP implementation. 65.40% of the respondents at the director level know this factor as a failure factor.

Table 3: Frequency distribution of the respondents according to the number of years worked

Years worked	Frequency	Percentage
1 - 10	30	33
10 - 15	9	9.9
15 - 20	32	35.16
Over 20	19	21.94
Total	91	100

Table 4: Percentage of factors for the failure of ERP implementation in Iran

Factor	Positive answer Percentage	Number of respondents	Total Percentage	X^2
Lack of IT culture	73.6	67	23.45	
High cost	59.34	54	93.34	$p<0.05$
Lack of feeling for the need ERP	53.84	49	84.19	$p<0.05$
Continuing traditional systems	48.35	44		$p<0.05$
Data Migration issues	40.65	37		$p<0.05$
Poor infrastructure	31.86	29	5.39	$p<0.05$

- Poor infrastructure, government policies and political issues impede ERP growth in Iran. Since many of the major ERP vendors are U.S based, Iranian organizations and companies face challenges in purchasing software and receiving after sales support due to problems in the political and economic relations between the U.S. and Iran. 86/31% of the respondents at the manager level believe that this factor is the cause of ERP implementation failure.

4. Summary and Concluding Remarks

Through evolutionary and historical analysis of ERP systems, we can observe that these systems are the result of systematic and smooth growth and continuity of this trend between 1960 and 1990 with proven great worldwide success experience. This progressive evolutionary (including the existing systems, MRP, MRPII and extended MRPII) have been implemented to produce high quality and reliable products in the industry, with high credibility, a good position in the market and strong advantages over competitive systems.

In the developed countries, ERP systems were implemented beginning with MRP and gradually stretched its limits to ERP systems, and therefore these systems normally became a common activity for organizations and companies. Conversely, in developing countries, the implementation of ERP

system is not within the historical hierarchy and it began with the latest technology which may not be suitable for specific needs of the organization.

According to this research there are six important factors that cause ERP implementation failure in Iran. However effect of these factors are related and combined and all of them must be considered in the business process model.

ERP Providers in Iran

Increased competition and globalization force companies and organizations to join global market in order to provide products and services. Currently only five companies in Iran have implemented an integrated ERP systems, but forecast shows continued growth in the coming years in ERP implementation as more than 500 large and medium-sized companies will attempt to implement ERP system.

BEHPAKHSH DISTRIBUTION CO. affiliated with BEHSHAR INDUSTRIAL DEVELOPMENT GROUP intends to implement human resource management (ERP) in 27 of its Representations all over the country. The aim of this project is to raise efficiency, increase productivity and provide better service to their customers. The first phase of the project is set to start with 100 concurrent users and it will increase to more than 400 concurrent users in phase 2 after an evaluation of Phase 1 is made. Reengineering business processes, reduce costs, increase productivity and extraction of reliable reports for management are the expected accomplishments of this project. ANDISHEH ARA CO. has the responsibility to implement, monitor and support this project and a group composed of ten selected Iranian and foreign experts from COMPUTER AND AUTOMATED METHODS CO. affiliated with BEHSHAHR INDUSTRIAL GROUP will be responsible for implementing and executing the system. In increasing competitive global markets, organizations and companies need to find better business solutions with more flexible and reliable structures.

Further analysis of ERP implementation shows lack of investigation on the readiness of the company, leading to the root of the ERP implementation failures and instead causes very heavy cost to the organization. Indeed, observations and conclusions regarding ERP implementation show that while there is a dramatic increase in ERP adoption in developed countries, in developing countries and Iran ERP implementation is in nascent stages. Although in recent years number of companies are trying to implement ERP, but most of companies are waiting to observe the results in companies that do have this risk. The major reasons for slow growth or failure of ERP implementation in developing countries such as Iran are as follows: infrastructure, cultural problems associated with computer use, the development of IT, government regulations and laws, political and diplomatic issues, lack of professional resources in the field, difficulties in reengineering organizational processes and other variable conditions.

We hope that with optimistic vision we assist senior managers, ERP vendors and ERP implementers to better understand the barriers and critical factors for successful ERP implementation in Iran. However, not all issues have been addressed in this study; we will provide important insights to managers and decision makers to form a team to study the feasibility of ERP implementation before going to start the project.

Generally, ERP implementation faces additional challenges in developing countries related to economic status, country's economic growth, telecommunication network, Internet and intranet, public information systems and infrastructures issues with a weak background and suffering from the problems in every sector . In addition organizations and companies in these countries usually do not have long-term strategies. Senior managers are the first and most important actors in ERP implementation. The lack of strong business incentive has severely slowed down the development of ERP in our country, except for some consumer and small industries. Still there is not enough business incentive to encourage senior managers to implement ERP system. Therefore most managers do not use ERP software to solve problems faced by the business, such as market trends, sale development, cost reduction, cost control, control the money supply, and inventory control issues. For most public

and semi-public organizations in Iran, change is difficult and evolution is not that important issue. Also on one take the primary responsibility for directing and monitoring the progress of the research projects because it is thought that research is highly regarded as the responsibility of the Ministry of Science, Research and Technology, but in fact research is done by industry sector. Organizations and companies that want to set their own research project must work and communicate with universities and thus Ministry of Science, Research and Technology takes an active hand in building the bridge between the industry and university.

Solutions are suggested as following:

a. Adequate investment in training for the involved personnel
b. Careful feasibility studies and necessary cost measurement before ERP implementation
c. Help employees and management to understand ERP implementation benefits and the role of ERP in decision making and business process improvement
d. Recruit subject matter experts for efficient development of legacy data migration
e. Select the appropriate ERP software from local vendors or vendors that are able to trade with Iran and provide support to their customers.
f. Cooperate with other leading countries in terms of ERP, which do not have political issues with Iran

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