

Study of the Impact of Enterprise Resource Planning (ERP) System on the Working Process of Esfahan Steel Company

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ABSTRACT

In today's competitive world, organizations should benefit from such flexibility and dynamism in a minimum possible time in which have managed to meet the new emerged needs of market. This paper seeks to examine using the impact of enterprise resource planning system on the working process of Esfahan steel company; which after being identified these factors, will provide some appropriate suggestions to usability of enterprise resource planning system on the working process of Esfahan Steel Company. This study is consisted of one main hypothesis and other fifteen secondary hypotheses. Methodologically, the present paper is a descriptive – correlational approach in branch field and in essence, it is applicative and in terms of time, is cross-sectional. The statistical population studied in this research has divided into four categories: enterprise resource planning system users, systems and information experts, main users and, contractor. Random sampling method being used in this approach and sample size constituted of 132 individuals. Questionnaire, however, is used in the method of data collection and Cronbach's alpha with a 84% amount is applied to evaluate the validity and reliability of the questionnaire. A total of 110 questionnaires were collected (the percentage of the returned questionnaire was about 84%) which they have been evaluated by SPSS v.19 software. The data analysis is done in two descriptive and inferential phases as well. Based on the tests conducted, it can be concluded that there is a significant relationship between satisfaction, change management, Structure, effectiveness, training, adaptability, easiness, prevention and error detection, language, leadership, Stability and consistency, feed-back, career and work instructions, control and configuration and localization with enterprise resource planning system; hence, using of the impact of enterprise resource planning system has a positive impact on the working process of Esfahan steel company. Finally, the researcher provides some suggestions and guidelines for the proposed study.

KEYWORDS: Enterprise Resource Planning (ERP), Working process, Esfahan steel company, Information systems, Management of process-centric enterprise systems.

1. INTRODUCTION

In today's competitive world, organizations should benefit from such flexibility and dynamism in a minimum possible time which in have managed to meet the new emerged needs of market. Organization should be able to study their customer behavior and establish an appropriate business relationship with suppliers as well. It is also necessary that the different units within an organization are fully integrated and consistent with each other and engage in industrial and services activities that to be deal with the success of the organization as a whole. It is obvious; however, that it is the critical role of comprehensive systems which should establish the integration among interior departments and exterior factors of the organization. Therefore, in the recent years, using of organizational integrated systems have reached to the peak of world's top organizations. Thus, the first and foremost important tool is enterprise resource planning (ERP) systems. The aim of establishment of an enterprise resource planning is implementation of a business information system, includes whatever may be related to: material and energy consumption rate, costs, Inventory, monetary value of Inventories, Sales commitment rate of company, orders, purchase and all the things that a decision-maker manager needs to control the unit under his/her supervision in subject to economically return and accurate information turnover. Therefore, enterprise resource planning systems increase the efficiency and effectiveness of the organization by Intra-organizational and inter-organizational management and operational integration as well as facilitate and expediting the business processes to prepare them to participate in a competitive market.

In the past two decades. There have been created a tendency to focus on solution that enhances business processes. The solution is enterprise resource planning (ERP) systems. ERP can be defined as integrated software which consists of different components and modules in organizations operating areas such as planning, production, sale, marketing, distribution, accounting, Human Resource Management, Project Management, Inventory Management, Service and Maintenance Management, Transportation Management and E-commerce; and they would develop in a manner which all sources of organizational information being integrated with each

other in order to utilize this system alongside with organization's mission. Thus, undoubtedly, draw attention to the tools work and how it affects attitudes and values related to the work are increasingly significant issues that have always been considered by scientists in the workplace; and this is a challenge that increasingly has involved supervisors, managers and practitioners of organizations. To meet this challenge, however, it is essential to have a more comprehensive understanding of the concepts and constructs related to manpower, certain tools and finally, the skills to use these tools. Interaction between human and computer information systems – in particular enterprise resource planning systems – are of those cases that must be considered. Due to the novelty of these kinds of researches in the country, their capabilities for being use are discussed among experts.

Therefore, this paper aims to study answered questions in capabilities and ease of using ERP systems of Esfahan Steel Company in order to help decision-making processes and improve such as these systems. Hence, the paper has attempted to offers modulate and operational tools to analyze and evaluate the capabilities of ERP systems by evaluation the criteria that need to be assessed and, moreover, alongside an appropriate library and field research in order to determine and evaluate satisfaction and dissatisfaction of aforementioned users – staffs in particulate- and may take appropriate decisions to make the usage improved, promoted and facilitated as well. Therefore, to address this issue, we sought to study the question “What is the impact of usability of ERP system on the working process of Esfahan Steel Company”

The importance and necessity of the research

Today, advance and enhancement in technology and information offers digital economic, E-commerce to the world; and this new phenomenon made competitions harder in the economic cycle. In such these situations, organizations can be sustainable if they proper themselves to encounter these challenges and compromise the necessity tools to compliance transformations. The main challenge in large organizations to be entered information and communication technology scene is to putting together the various components of the systems at reasonable cost and time. The planning system of organization is a designed management information system which in order to gather scattered information in different levels of the organization-wide, whether the system is brought, it would process information in very moment and immediately make requirement analysis and reports available to managers. These standard packages will be implemented and utilized easily in any organization while taking a short time that is spent only for the localization system. Obviously, the success of these systems in any organization has a direct relationship with Interest and cooperation of people who are involved in the implementation and operation of the system. On other hand, merely rely on the benefits of ERP systems cannot be considered as a guarantee success and their beneficial use in organizations. Hence, due to the novelty of these kinds of researches in the country, their capabilities for being use are discussed among experts. This paper seeks to study the different aspects of usability of ERP system on Esfahan Steel Company, which is one of the largest and oldest companies in the country.

LITERATURE REVIEW

Enterprise Resource Planning (ERP)

In 1990s, Gartner Group first employed the acronym ERP as an extension of material requirements planning (MRP). In the beginning, this system was considered as manufacturing resource planning with capabilities in quality control, process and operations management and repots. These relatively simple systems, experienced rapid growth and not only covered material requirements planning but all production processes, equipment, funds as well as trade activities.

Simply, ERP systems use a single database and control all related information about the business organization including production, funds, purchase, sale, inventory and manpower. The targeted goals, however, are to offer the users most of the processes associated with organization – from financial process to operations units - in a mechanized information model by Integration of the entire organization and eliminating complex and expensive systems in an organization. ERP systems are used as a tool to accelerate and automate operations in order and sale process alongside integration with financial and production systems. Moreover, these systems considered as highways for Decision Support Systems (DSS). These systems are designed and installed in such a way that it could be used in many manufacturing and service industries. These systems not only taking control of operations within an organization, but also interact with external factors. There are some necessary applications for customer relationship, suppliers and buyers; so connections to the systems through the Internet. In addition to reducing costs have led to increased satisfaction among exterior factors. Vendors of these systems, however, in order to develop the market for their customers and attract new customers, provide products in terms of cost and revenue which in are economically justified for small and medium organizations.

Management Information System (MIS)

These systems exist among organizational middle managers. MIS supports managers by providing real-time access to reports and current and previous activities of organization. Usually, Management Information System (MIS) supports inner-organization activities and does not deal with the exterior factors. Management Information System (MIS) provides input information from Transaction Processing Systems (TPS). Massive and

prolonged data of Transaction Processing Systems (TPS) are compressed by Management Information System (MIS) and are offered to managers in the form of charts and reports.

Information Process System based on Organization

The organization's activities are formed in the context of "logical activities associated with each other In order to accomplish a specific goal" which so-called "process". Some processes are performed in a specific range, such as sales and marketing process, including: customer identification, advertising and ultimately, sales. In contrast, many processes are performed in a multi-phase manner which comprised several parts within an organization; and would exceed the organizational operating borders. For instance, order fulfillment process in many organizations need to cooperate with sale units (receiving orders, entering orders), Accounting (authentication, billing) and as well as manufacturing (assembly and delivery of orders). Nowadays, many organizations have found that by coordinate and integrating their activities can have more flexible productivity and apply an efficient management to their resources and services. Enterprise application have created to coordinate and integrate based –on-organizational process. These applications include: Enterprise Resource Planning (ERS) System, Supply Chain Management (SCM) System, Customer Relationship Management System and Knowledge Management (KM) System.

Supply Chain Management (SCM) System

Flow of materials, information, liquidity and suppliers of raw materials services to factories and wholesale and finally, customers are called "Supply Chain". Moreover, Supply Chain also includes organizations and the process that provide and delivery production, services or information to customers. Supply Chain Management (SCM) Systems are one of inter-organizational systems; because they lead information flows to outside the organizational boundaries.

Customer Relationship Management (CRM) System

This is an approach that introduced customers as the main core of business; and considers company's success, however, depends on the effective management. This approach has a simple basic idea: treat different with different customers, because they have different needs and their values for participation may be vary.

The theoretical background of the research

In 2007, Sarami et al., in a research on mining and estimation of parameters related to the automotive industry in order to implement ERP system aims to assessment the indicators of readiness of Iranian automotive industry in order to implement ERP system have collected the effective factors in preparation of the organization for the implementation of ERP system. "Saipa Automotive Manufacturing Group" selected as statistical population in this study. After literature and background review and getting experts' opinions, ranking of the key factors (18 cases) was examined by using Friedman Test. Then, these factors summarized into five main factors through impact factor, as follows:

Cultural Factors:

- Existence of teamwork culture
- Existence of teamwork culture in the organization
- Potential variability
- Personnel participation in Enterprise Resource Planning (ERP) System project
- Participation of active leaders in the project

Organizational Capabilities:

- Capacity of the organization for allocate adequate and sustained funding to implement ERP system
- Organization's ability to using consultation
- Ability to anticipate and planning for eliminating possible errors
- Organization's ability to conduct adequate and proper training

Supportive factors:

- Top management support
- Granting decision-making authority to the Enterprise Resource Planning (ERP) System project man powers and project leaderships
- Effective change management

Motivational factors:

- The feeling of being in a competitive market
- General understanding of the ERP systems

Technology infrastructures:

- System and information technology engineers in organizations
- Hardware and proper relationship infrastructures
- Review and re-engineering of processes
- Avoid excessive customization of ERP systems

Finally, with another questionnaire of these five factors, they were compared pairwise and the rankings were made by using paired comparisons and eigenvector technique

The obtained results from paired comparisons suggest that the effective factors in preparation of the organization for the implementation of ERP system are respectively:

Supportive factors, organizational capabilities, cultural factors, technology infrastructures and motivational factors.

Hanif Zadeh (2007) in his master's thesis had a look on feasibility to implementation ERP systems into active companies in Iran. After literature and background review and interviews with experts as well, he considered two sets effective factors in implementation ERP systems:

- Interior factors such as management commitment, the growth of IT, computer culture, The size of organization, financial capability and re-engineering experience of process.
- Exterior factors such as culture and regional environment, governmental rules and regulations, economic and economic growth, infrastructures and software features, local vendor of ERP system.

Then, interviews and statistical tests were used as tools to examine the aforementioned factors in Iranian companies and it was found that active companies in Iran are not yet ready to implementation ERP systems; and this is due to the lack of Interior and exterior factors.

Darakhshan Fard and Ferghedan Doost (2008) have discussed the problems of implementation ERP systems from a financial perspective in industrial companies of Iran. The hypothesizes of the study included:

- Applying the system significantly resulted in reducing related costs
- Successful applying of ERP system will increase the level of staff knowledge.
- Successful applying of ERP system will provide an ability to prepare various reports

They have considered all the managers, executives and experts associated with the establishment of the ERP system in their statistical population (Esfahan Steel Company, Saipa and Iran Khodro automotive manufacturing, Beh-Pakhsh and X Companies) and by using questionnaires they have collected driven answers from their statistical population and concluded that:

- The first hypothesis in Esfahan Steel and Saipa companies was confirmed, and in the two other ones did not.
- The second hypothesis in Esfahan Steel, Iran Khodro and Beh-Pakhsh companies was confirmed, and in the other one did not.
- The third hypothesis in Esfahan Steel, Iran Khodro companies was confirmed, and in the two other ones did not.
- The fourth hypothesis confirmed in all the above mentioned companies but X Company.

Alizadeh (2006) have conducted a study on “critical success factors in implementing of ERP systems” and by ranking them, aims to provide native model of effective factors in implementation ERP systems. After reviewing some research on key factors and success; these factors are divided into 8 general and 32 trivial categories. In the next level, he have compared these factors in various researches and then key success factors are classified according to frequency; then, based on data collected in the second level, weaknesses of the model have been investigated and finally, collected these factors to gather and then, by a conducted survey of 60 experts in information technology have provided a native model of effective factors in implementation ERP systems.

Alizadeh concluded that: critical success factors are: financial support of the project, accepting changes (flexibility) and its management, goals and plans and business applications are dealing with high priority. In the next place, critical factors in project management, composition of the working group, integration, configuration, development, testing and debugging, monitoring and evaluation of project performance and Enterprise Resource Planning can be found. The lowest place dedicated to crisis factor and success of business and information technology systems for the organization.

Pan et al., (2011), believe that the majority of researches are related to effective factors in implementation ERP systems and pays less attention to the factors that are in feasibility study and before their effective implementation. They conducted an analogous questionnaire survey to carry out the case study. After reviewing the results, 37 errors identified which 7 of them were identified as critical risks for the company. Finally, they concluded that the majority of identified critical risks (6 of 7) are rooted in the culture of the organization and aspects of the company's business and are not affected by technical fields.

Dezdar and Aitenin (2011) dealt with the impact of organizational factors such as management support, training and organizational relationship of users on the successful implementation of ERP systems In Iran. The study has conducted by questionnaire among the managers of ERP system in Iran. From a total number of 31 companies, 27 companies were answered the questionnaires so 384 questionnaires were collected. They have studied the three following factors: top management support, staff training and organizational relationships. They have found that there is a significant relationship between the three aforementioned factors with the successful implementation of ERP systems. In general, these three factors have affected user satisfaction and subsequently it affected the organization as a whole.

Kumar et al, (2003), have conducted a study on 20 Canadian organizations by using questions about key issues and common activities in the process of implementing ERP systems. They have found: in implementing

ERP systems, factories have countered with more behavioral and managerial challenges such as unavailability of end-user, resistance to changes, lack of training, transfers key people of the project and lack of project planning rather than merely technical problems such as software and hardware problems. When they were asked of what they had learnt from this study, the researcher emphasis on behavioral and managerial issues as well as process elevation.

Mabert et al, (2003), have found a difference between large and small companies to implementation of ERP systems in American manufacturing industry in their study. They were used a diphasic approach to analysis the implement of ERP systems. At the first phase, they have conducted a study on 12 various production companies by interviewing with key managers, IT managers and users. Furthermore, they also interviewed with top advisors as well as consulting firm specializing in implementing ERP systems. At this phase, they created a proposal schema which came into practice in the second phase; and generated randomly among 5000 members of The American Production and Inventory Society (APICS). They obtained 482 applied responses (by %9.6 response rate). Respondents were a combination of staff and managers. The major findings from the study were that the size of the company has a significant role in implementing ERP systems.

Conceptual model of the Study

Variables

In any scientific research, it is very important to deal with recognizing the measurement of variables and examine their relationships with each other as common characteristics of a statistical population. Regard to this fact, variables of this research are:

Independent variable

It is Enterprise Resource Planning System in Esfahan Steel Company.

Dependent variable

Satisfaction, change management, Structure, effectiveness, training, adaptability, easiness, prevention and error detection, language, leadership, Stability and consistency, feed-back, career and work instructions, control and configuration

MATERIALS AND METHODS

The present paper is a descriptive – correlational approach in branch field and in essence, it is applicative and in terms of time, is cross-sectional.

Analysis Method

The data analysis is done in two descriptive and inferential phases which they have been evaluated by SPSS v.19 software. In descriptive phase, statistical characteristics such as abundance, mean and standard deviation were subjected to analysis and inferential phase was used Pearson Correlation Coefficient, Analysis Of Variance and so on due to proportional to the measured data.

Conclusions and suggestions based on research findings

The results of descriptive statistics.

✓ Respondents' Work Experience: %54 of respondents had a working experience of 10 to 20 years, %22.7 of respondents had a working experience of more than 20 years, followed by %13.6 respondents who possessed working experience of between 5 to 10 years and the minority group of respondents in terms of work experience was those with less than 5 years' experience, constituting only %9.5. It was found that the most work experience was related to individuals with a working experience of 10 to 20 years (%54).

✓ Respondents' job position: it was discovered that a majority of the respondents in this study were comprised of users (%68.2), namely 75 individuals. Followed by main users, 26 individuals (%23.6), There were 5 respondents (%4.5) who comprised of IT experts while the remaining 4 individuals or 3.6 percent were working as contractor. It was discovered that a majority of the respondents in this study were comprised of users.

✓ The age distribution of the population distribution fell into four ranges: 18 to 25 years old (%9.1), 26 to 35 years old (%40.9), 36 to 45 years old (%39.1), and 46 to 55 years old (%9.1). Majority of the respondents in this study were comprised of 26 to 35 years old (%40.9) individuals. It shows that the best views of the users to the system In Iran have been consisted of 26 to 35 aging group.

✓ A total number of 100 male and 10 female have formed the total population of respondents in this study. Hence, %90.9 of respondents was men and %9.1 was women.

✓ Time working with the system fall into four ranges: less than 2 years (%14.5), 2 to 4 year (%36.4), 4 to 6 year (%6.4) and 5 year (%4.27) and more than 6 year. The highest percentage was related to 2 to 3 year.

✓ Respondents' Education: it falls into four main ranges: Basic Diploma, Diploma, Bachelor and Master. Based on the findings of the analysis, %77.3 of the respondents had degree in Bachelor who was the most abundance one which followed by Masters (%13.6) and Diploma (%7.3) and then Basic Diploma (%1.8) had the less abundance.

✓ Using the ERP system: A total number of 92 respondents (%83.6) were suing the system daily (the most abundance), 11 individuals (%10) were using the ERP system weekly and 5 individuals (%4.5) were using the system rarely and 2 individuals (%1.8) were using this system monthly. It shows that individuals who used this system daily had a more positive point of view.

The results of inferential statistics

This paper aims to study the Impact of Enterprise Resource Planning (ERP) System on the Working Process of Esfahan Steel Company. As it stated in pervious section, this study is consisted of one main hypothesis and other fifteen secondary hypothesizes. All of aforementioned hypothesizes were approved by the respondents. Thus, we can conclude that:

“Using the Enterprise Resource Planning (ERP) System have been effective on the Working Process of Esfahan Steel Company”

Hypotheses

Main hypothesis

ERP system has an impact on the Working Process of Esfahan Steel Company.

Secondary hypothesizes

- 1- There is a relationship between easiness and ERP system.
- 2- There is a relationship between satisfaction and ERP system.
- 3- There is a relationship between easiness and ERP system.
- 4- There is a relationship between prevention and error detection with ERP system.
- 5- There is a relationship between change management and ERP system.
- 6- There is a relationship between structure and ERP system.
- 7- There is a relationship between career and work instructions with ERP system.
- 8- There is a relationship between effectiveness and ERP system.
- 9- There is a relationship between stability and consistency with ERP system.
- 10- There is a relationship between training and ERP system.
- 11- There is a relationship between configuration and localization and ERP system.
- 12- There is a relationship between compatibility and ERP system.
- 13- There is a relationship between feedback and ERP system.
- 14- There is a relationship between control and ERP system.
- 15- There is a relationship between leadership and ERP system.

Table 1. Final hypothesis results according to the highest coefficient

Hypothesis	The correlation coefficient	Covered Questions	Results
The relationship between ERP system and Satisfaction	.691	26,27,28,51	There is.
The relationship between ERP system and change management	.661	42,43,24,45	There is.
The relationship between ERP system and Structure	.661	41,40	There is.
The relationship between ERP system and Effectiveness	.642	35,36,37	There is.
The relationship between ERP system and training	.634	34,25,33,34	There is.
The relationship between ERP system and Compatibility	.624	21,22,23	There is.
The relationship between ERP system and Easiness	.620	50,52	There is.
The relationship between ERP system with Prevention and error detection	.614	18,46,47,48,49	There is.
The relationship between ERP system and Language	.611	16,17	There is.

The relationship between ERP system and Leadership	.581	6,7,8,9,10,11,13	There is.
The relationship between ERP system and Consistency	.580	14,32	There is.
The relationship between ERP system and Feedback	.565	20,31	There is.
The relationship between ERP system and Career & job Instructions	.564	39,38	There is.
The relationship between ERP system and control	.563	12,15,19	There is.
The relationship between ERP system with configuration & localization	.546	29,30	There is.

Therefore, it should be noted that according to the findings of the pervious researches – including Darakhshan Fard and Fergheadan Doost – they have concluded that applying the ERP system significantly resulted in reducing costs, increasing of staff knowledge, possibility of connection with customers and coordination with suppliers through internet as well as provide an ability to prepare various reports in Esfahan Steel, Saipa and Iran Khodro Companies. Also, Dezdar and Aitenin after dealing with the impact of organizational factors such as management support, training and organizational relationship of users on the successful implementation of ERP systems In Iran, concluded that the mentioned factors have been effective on user satisfaction and subsequently it affected the organization as a whole. Hence - based on the findings of this study- alongside the other findings that mentioned above, we can conclude that “Using the Enterprise Resource Planning (ERP) System have been effective on the Working Process of Esfahan Steel Company” and findings of this study are consistent with previous researches while in Hanif Zadeh’s 2007, results indicate that active companies in Iran are not yet ready to implementation ERP systems.

Suggestion based on research results

Based on the findings of this study, the following suggestions are offered:

- Organizing training courses for ERP users of Esfahan Steel Company in appropriate time period to increase skills for working with the systems. This should be considered by training management in partnership with IT management.
- Synchronization in the organizational structure of the company alongside ERP system processes to avoid organizational parallelism and Implementation of organizational responsibilities with ERP activities. This should be considered by organizing and methods management.
- Continuous control of ERP outputs in order to ensure the accuracy performance of system by Esfahan Steel Company’s experts base on a certain time scale (daily, weekly, monthly, annually).
- The supportive team of ERP should be experienced and have a high ability that after controlling, it should be able to prevent the error as soon as possible. This should be implemented by IT management.
- Configuration and localization ERP system in many cases should be reviewed and revised with Centric- IT management and department management of the factory.
- According to some elapsed years of Implementation ERP system, In line with change management, a team should be created under managing director which consist of deputies to follow change management’s activities.
- Increasing the knowledge level of users will directly affect the effectiveness of the ERP. Hence, it is suggested that selecting user process should be revised in terms of scientific and practical level.
- In regard to ERP which located at the macro level of organization, it is suggested that the leadership committee consisting of top managers, should consider operational process of ERP system on a regular periodic time (monthly) in Esfahan Steel Company and take the responsibilities of the entire ERP leadership.
- In order to increase the effectiveness of the ERP system in Esfahan Steel Company, Industrial Engineering management in partnership with IT and training management should study the effectiveness of mentioned factors by controlling organizational performance indicators as well as comparison them with a time basic (monthly, annually) and inform the organization from this process.
- By implementing ERP system in the organization, organizational careers and job instructions which are comply with ERP process would change too. Hence, it is suggested that revising on the organizational careers and job instructions related to ERP should be performed by organizing and methods management in Esfahan Steel Company to obtain improved performance of ERP.
- Develop and implement a training calendar tailored to users' working areas at all levels of the organization.
- Inactivate unused fields in the users' work areas.

- According to many features and capabilities which were used in ERP system, it is suggested that by forming a group, describe these features and capabilities in various fields and provide the terms of their utilization.
- Due to this fact that ERP's pages are in English, so, many users cannot use or apply all of the features, so it is suggested that Persian equivalent will be replaced by English terms to increase the applicability of ERP system among users.
- User access to ERP system is not controlled, so some users have access to certain resources that could be exploited. Hence, it is suggested that to consider the access level of users and take too much control over them.
- In Steel Company, Top and Middle Managers have the minimal utilization of ERP system, it is suggested that to increase managers' interest for using ERP system by software interfaces.

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