ERPSD: A New Model for Developing Distributed, Secure, and Dependable Organizational Softwares

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ABSTRACT
In this paper, regarding ERP technology, we have proposed a process to achieve management satisfaction, efficiency and performance. To present the new model, ERPSD, we have defined metrics which using them, security level, distributivity, and dependability can be optimized. The new model has been analyzed regarding the data and information of some organizations in IRAN and improvements has been seen in time, cost and better access of users in comparison with old models. By increasing the number of objects to be processed, response time and cost factors have been decreased by applying this new model.

Keywords: ERPSD, Security Level, Dependability, Organizational Knowledge

1. INTRODUCTION
Organizational automation generally is the work to be done in software department of organizations with aim to create automated systems and also generate information commodities to speed up the process of doing daily activities. Software developments on organizational automation should be done continuously and cooperatively in different departments. ERP systems are state-of-the-art management tools, which are being used widely in many countries in the world. ERP systems are the result in information technology advancements and are being evolved and changed rapidly [1,2].

ERP is not a strategy but software systems that integrate all the information inside an organization and present them to the users in proper time. So ERP includes all aspects of an organization like sale and distribution, manufacturing process, provisioning raw materials, human and organizational resources management and control of structured commercial competitive processes.

Although it is about two decades that ERP has been appeared, but historically it's the development of MRP II systems.

ERP systems have been developed because of companies' competitive needs and also their capabilities improvements. ERP is the result of 40 years of human try and error process and also development of management tools and information technology. The goal of ERP is trying to integrate organizations departments and also its operations in a complete computer system. ERP shares all the information in an organization between the right users.

Information is the most expensive commodity, and it is used from the 1990's when the Internet allowed easy and virtual accesses to this information. This cycle is presented everyday in the form of new software packages. The tendency is to establish a mechanism to allow accesses to the information as rapidly as possible. This will become possible when everybody has proper education, and accesses to ERP software [3].

As we know, uncategorized information will change to data and proper data will become information. This categorized information eventually will become knowledge, which will bring us closer to the edge of technology. But the main point is that the data should have the highest security so that we would be able to use it in applications like electronic government safely and dependably. The proposed ERPSD framework details every block and using it can result more performance and efficiency in a general and complete information system [6].

The rest of this paper is organized as follows: In section 2, we will describe our proposed model. In section 3, we will present the results and suggestions.

2. ERPSD PROPOSED MODEL
ERP is a set of softwares including multiple company applications, which is used to monitor and control functional and key components of an organization. In other words, ERP is a connection between different software packages like financial softwares, distribution and sale softwares and so on with different operational aspects like engineering, manufacturing, research and development and human resources, which support the processes.

ERP is a strategic tool, which helps companies to get the needed competitive level by integrating all commercial processes and also optimization of available resources. Using ERP, the processes execute in more simple and effective manner.

ERP is a systematic method, which includes dynamic tradeoff and also resource optimization. The goal of ERP is trying to integrate all of the organizations departments and also their operations in a complete computer system for satisfying user's special needs and requirements. As an example, when ERP is not used, the customer's order starts to travel in different departments of an organization without any

certain information about where it is now and nobody could certainly say in which situation it is now. Also different departments cannot answer the customer's needs and requirements correctly. But using ERP general computer system, this could be done easily.

Using ERP systems, the errors should become less and the time should be saved considerably. Unfortunately the above point (Less errors) has not been much realized because there is some negative resistance from the implemented system [4,5].

Using ERP computer systems seems to be somehow difficult because human being does not like to change and he/she resists against it, but by using and installing ERP system and its implementation, many solutions are being optimized and there will be changes in staff duties for matching purposes [7].

In this model, regarding ERP software system, we have proposed a new method, which could create a solution regarding Case Study technique, which increases the performance and also decreases the cost, which is an important factor. The two important factors, security and dependability, have been added to the system. Using these functional blocks with ERP increases expenses and small organizations could not use it effectively. The implementation process in ERP also needs so much time so we proposed ERPSD for solving these problems. Regarding Figure 1, we will define the function of each block in our proposed mode.

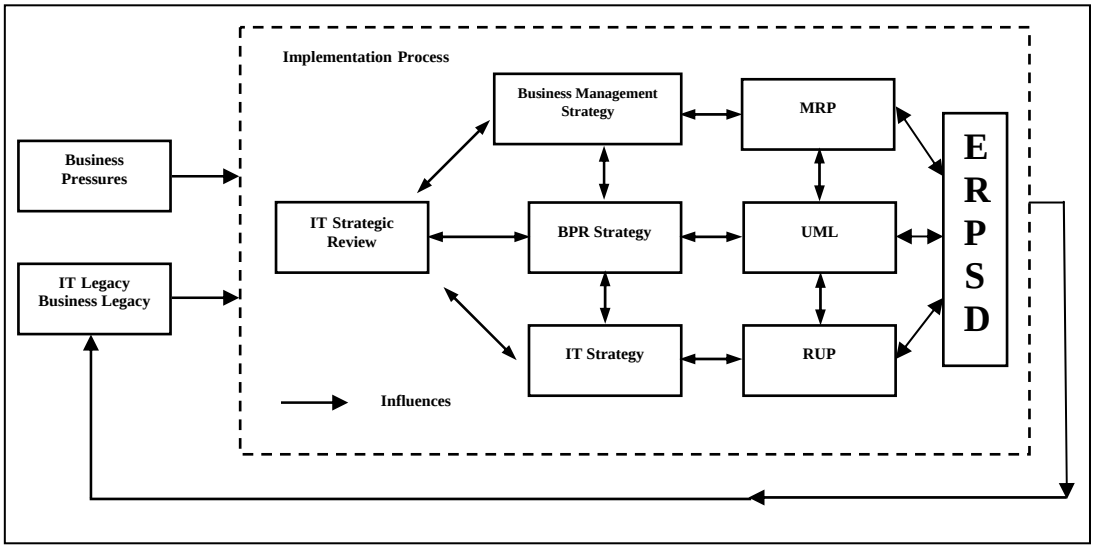

Figure1: ERPSD Resource Management Framework

2-1: Business Legacy

This system considers the attributes and specifications of an organization like structure, culture, and sales strategies and so on in a legacy manner.

2-2: IT Legacy

This is the available IT infrastructure, which can affect the functions and operations of an organization and it can have an important role in effectiveness of an organization. For example, software applications affect the operations of a company. It is important because of factors like cost, size and complexity.

2-3: Business Pressures

This part of the systems involves with pressures like globalization, information technology and competition. For example, the rapid changes in market, changes in customers' requirements and so on are examples for commercial problems. Older systems and the problems mentioned above affects the implementation process. The implementation process includes four parts which are:

2-3-1: IT Strategic Reviews

The basis of this part of system is strategic selection, which includes creation, evaluation and strategic selection options and needs a model with improved and optimized infrastructure. For example when its needed to improve the IT infrastructure of a company. By improving that part of the system, service levels and also performance of the system will improve much.

2-3-2: Project Management Strategy

Strategies are considered in much detail in this part of the system. Processes like using internal or external professional people, decisions about using advisors from large corporations or determining what expert knowledge is needed for doing a new project are all embedded in this part of the system. In project management strategy, economical feasibility study could be an important parameter for project control.

2-3-3: BPR Strategy

It includes the changes in business, which is involved in the project. When a software package is implemented in an organization, that organization reengineers the processes in the direction of that software. Also formal study of system regarding system resistance is being considered.

2-3-4: IT Strategy

It is used for implementation. For example, a company manager uses "70/30" rule to implement a software. In this case, installing and using this software will satisfy 70% of the tasks and the remainder 30% will be satisfied by improvement of external MIS.

2-4: MRP II Strategy

MRP II logic is very simple but it is being done handy and it makes it very time consumable. Also it is being executed by cooperation of large computer softwares. MRP II is an effective technique for managing available resources but it ignores other distributed resources because it is a central approach for managing the resources. MRP II has been developed by support of large corporations like IBM. As MRP II is costly and also time consumable because of separate integration of different available sub-systems, new MRP II system has been developed by considering new facilities and also sub-systems integration.

2-5: Proposed ERPSD Method

One of the parameters of this method in ERP software packages could be performance, which is being defined as index code of large information databases. In this situation with collection of each object's information and use of local and global networks, we can obtain the complete information of each object. This can have some effects on the old systems, since the old systems worked in accordance with the defined sub-index and not index code. Also accesses to the information have been central and we could not access the local information from global information, which reduces the capability of the system. But with the use of ERPSD software packages we have increased the capability of the system so we have accesses to both local and global information. It means that with the access to the global index code of any object, user person can obtain all the information about that person from the time of birth until present. In this situation the performance comparing to the old systems will be increased and also access to the information will speed up. This could be achieved by a sub-system in ERPSD that is distributed.

In the distribution systems, each layer provides service for the upper layer, and of course the upper layer has to request this service. ERPSD uses a distributed database system, which is based on the Internet; therefore it can have more reliability options comparing with the old versions. Since its database is distributed, from any local or global location of the system it can communicate with the database and distribute the information faster. It should be noted that in the distribution system cost is higher than central systems. To reduce the cost, ERPSD uses resource sharing in the local network. ERPSD is fully compatible with organization behavior and the connections between them could be found easily by using DFD, ER and RUP diagrams.

The reader can follow this recommendation for distribution of the software packages but it should be asked that what should be done to increase the security of the system?

In traditional systems for increasing the security a firewall is been used. One of the drawbacks of firewall is that whenever the software is changed, the firewall had to be changed too. In ERPSD a distributed firewall is used, which means with changes in the software, major changes does not occur in the main structure of the ERPSD.

3. CONCLUSION AND RESULTS

ERPSD presents an advanced and complete model in comparison with older ERP. In this model, regarding parameters like performance, reliability, dependability, distributivity, and cost, some feedbacks are given to the system so that the system could manage the available system resources and also the knowledge base in an effective manner. ERPSD could be easily used in E-Commerce and E-Government applications to exploit time and physical resources more and also making efficiency in such systems. The results in Table 1, have been obtained from implementation of ERPSD in a large car manufacturing company.

	Number of Objects to be processed	ERPSD Response Time in comparison with ERP	ERPSD Cost Factor in comparison with ERP
1	0 - 1000	1.5%	2.5%
2	1000 - 5000	1.5%	3%
3	5000 - 10000	2%	4%
4	10000 - 20000	2.5%	4.5%
5	20000 - 50000	3%	5.5%
6	50000 - 100000	3.5%	7%
7	100000 - 250000	3.5%	8%
8	250000 - 500000	4.5%	9%

Table 1: Comparison of Response Time and Cost Factor in ERP and ERPSD

By using industrial companies' data and information and implementing ERPSD, the time and cost factor has been improved. In table 1, by considering the analyzing results, in the best case, ERPSD shows 4.5% improvement in comparison with ERP. By increasing the number of objects to be processed, response time and cost factors have been decreased by applying this new model.

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