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A model (guide) to purchase enterprise resource planning ERP systems

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Abstract— Implementing an enterprise resource planning system for connecting and automating business processes is a strategic investment for any organization. Buy an appropriate system and choose the best seller is crucial to your success. TEC Company was assigned the task about a year to evaluate ERP companies such as Oracle, SAP and to select among them the appropriate ERP that affect the organizations. This article attempts to introduce and ERP applications, as well as the selection criteria, which the company TEC's used in ERP project.

I. INTRODUCTION

By creating new markets and new products and dramatic increase of manufacturers, most of manufacturers and organizations face serious challenges in introduction of their new products in these markets. With the advancement of information technology and software engineering and with the help of ERP, manufacturers were able to meet these threats and confronted them and they even turn it into an opportunity. Enterprise Resource Planning is a standard platform through which business processes were managed and planned. With the help IT and software engineering, ERP can be used as the backbone of an organization. ERP has different implications, from an operational environment to an environment where change is no longer a concept. In general ERP (Enterprise Resource Planning System) is a comprehensive system that tries to integrate all functions and departments within an organization using a single computer system that can meet the specific needs and special sections. This is done using a computer software by a single database, allows users to share information and communicate with each other connects different sectors. The software consists of several software modules that are responsible each part of the tasks in the company. Most ERP software is so flexible and companies are capable of install some or all of your installed modules. For example, the buyer was able to choose only modules of human resources (HR) and install and used them. ERP used integration capability effectively, and each module can help in programming important part of the business and create competitive advantage, and improving the satisfaction of clients. In past, information systems other than ERP, fixed these problems, but the use of these systems could cause more serious problems. In general, ERP systems due to system complexity need to review and more detailed studies.

A. Non-integrated information systems (NON-ERP)

These systems were created with the help of software engineering to fixe some of management problems. One of them was automation systems that are used in many organizations currently. Due to interior design of these systems, they could not maintain inter-organizational relationships and interaction between units within the organization. Due to non-integrated nature of these systems, redundancy occurs in the processes. In this system every unit could have several information systems. And it made the software islands their and it causes a lot of maintenance costs.

B. DBMS in non-ERP systems

In this type of system due to non integration, the Data Base is specific to each application. This leads to data redundancy and this redundancy may be in conflict.

C. Integrated Information System

Almost all of companies active in business need to be in communication with other co-companies. For this reason, the concept of information systems Integration in the distribution of information flows (joint data independent of the applications in an operational environment) into the quiet operating environment (Functional Area) as well as the use of different automatic flow between the various components of the falls and ultimately increase the velocity is executing a process. The Integration of Data Base may be due to the flexibility and security in non-ERP systems.

D. OLAP in Organizational planning systems

In Organizational planning systems due to the presence of united Data base and OLTP that conducted in the data bases, so we can

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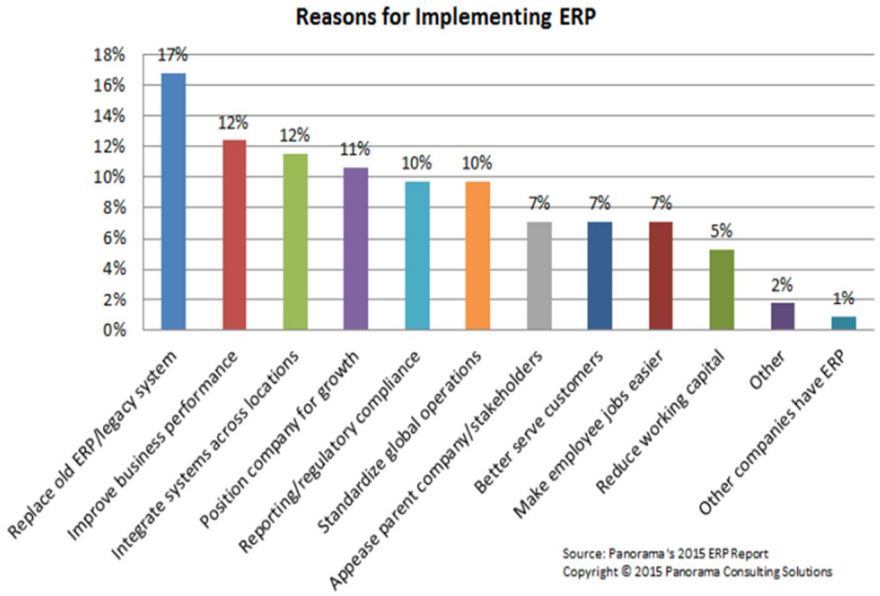
have an analysis system and this creates value-added systems such as CRM (Customer Relationship Management), SCM (Supply Chain Management), DSS (Decision Support System) decision support systems, and using data and techniques Real Time OLAP (Consolidation, Drill Down , Slicing Dicing) can be extracted and finally a proper analysis of the Data warehouse provides managers to make decisions, which will increase the competitive advantage of organizations.

E. ERP and its usage by organizations

Given that organizations are looking to develop their business processes, ERP and its modules make it a strategically important product for their organization, the ERP implementation because of this reasons charts in the United States and Sweden have been studied



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As it can be seen in the figure, it is the most important reason for substitution of old systems, the most used modules can be seen in this figure.

Relative ERP Module Use
(Mabert et al. 2000; Olhager & Selldin, 2003)

Module	Use reported - US	Use reported – Sweden
Financial & Accounting	91.5%	87.3%
Materials Management	89.2%	91.8%
Production Planning	88.5%	90.5%
Order Entry	87.7%	92.4%
Purchasing	86.9%	93.0%
Financial Control	81.5%	82.3%
Distribution/Logistics	75.4%	84.8%
Asset Management	57.7%	63.3%
Quality Management	44.6%	47.5%
Personnel/HR	44.6%	57.6%
Maintenance	40.8%	44.3%
R&D Management	30.8%	34.2%

II. HISTORY

For many years individual applications used in information systems (functional) were presented separately and to do nothing with each other. Such software was of interest to small business and these applications were met their needs easily. After a while, with

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the passage of time and the beginning of the process of re-engineering processes within organizations, the need was felt to different types of information systems. To produce such software, offering new approaches including architecture based on client / server as well as software integration seemed necessary.

In 1992, the structure of an integrated information system was developed by two people named Yakhou and Rahali. In this structure, data sharing between users make it possible to simply and quickly established a required data provided to other units as well as managers in other departments and communicate with each other as an integrated system and to extract required reports from a single system.

A. Evolution

The evolution of ERP on the one hand influenced heavily by the evolution of computer hardware and software and on the other hand is affected by the developments in the field of enterprise management and the competitive environment prevailing in them, ERP can be evolved version of the Information Systems in Organizations that had developed since the early 60s. However, here we refer brief history of Enterprise Resource Planning software.

Enterprise resource planning systems that have been raised in the middle of last century, have a long history. At that time many improvements with a series of problems arose. From start to create business applications sole purpose of this system is to help increase the efficiency of business performance.

The first thing that has been done by all the businesses.

ERP came into existence from MRP (manufacturing resource planning). In the years of its formation in 1960 MRP requirement was interpreted as production planning. MRP and ERP systems as the first organizational and planning tools were designed for manufacturing companies. Performance of next-generation ERP software systems in the field of "ERP applications built using a unique manufacturing company" was developed and began to involve consumers and producers. It was not long ago that the industry began to recognize the benefits of ERP. Government agencies and organizations in the service sector started to learn the benefits of this technology.

1) *Before 1960:* At this time organizations were relying solely on traditional methods of health management workflow to ensure that the organization's activities. In this time software called BOM Processors were developed that aims to detect the amount of raw materials needed to produce the product. The software paid little attention to "the size and volume of production" -Lot Sizing- as well as the delivery time. Also this software, inventory, production lines and warehouses were not considered. Because of the volume in the stream, would increase.
2) *1960's:* Earlier this decade, the software focuses more on control systems. In the meantime, continues to outpace traditional concepts of inventory control software for the development of information systems were used. But at the end of this decade, the concept of (Material Resource Planning) MRP or Material Requirements Planning was introduced and later the IBM Company introduced the IBM MRPI Software. This systems pills or systems for the playoffs, delivery time items required for a particular product the delivery time to the customer until needed for assembly on the assembly line was planned. Members were caused by systemic problems and technological problems. On the other hand the relationship between production systems and the organization did not consider the competitive strategy of the organization. Also, production capacities were not included in this system.
3) *1970's:* Focus on macro-produce MRPI according to the schedule or MPS (Master Production Schedule) and MRP was developed. The system makes it possible failure in the supply chain production planning to hit bottom, but just to be done and there was little support from other sources.
4) *1980's:* MRPI development to the shop floor or the development of MRPII manufacturing resource management agent with the ability to plan took a lot of resources. Early in this decade Distribution Resource Planning systems act separate from MRPII. So, the problem of lack of communication between the two systems together was resolved.
5) *90's and beyond:* MRPII spread to other areas and adding decision support systems to MRPII was developed, in all areas of production, service, trade, and distribution efficiency and emergence of ERP. With the advent of ERP in production, all production systems were covered. Departments, processes and various tasks including quality control, maintenance, accounting and financial and production systems connected to SCM and CRM systems and ERP was introduced as contour. This new system rather than as MRPII, as a higher evolutionary level computer systems designed to support the operation of the organization. In 1995, the category of Web-based ERP and in the years 1998 -2000, EDI and ERP combined together. In 2000,

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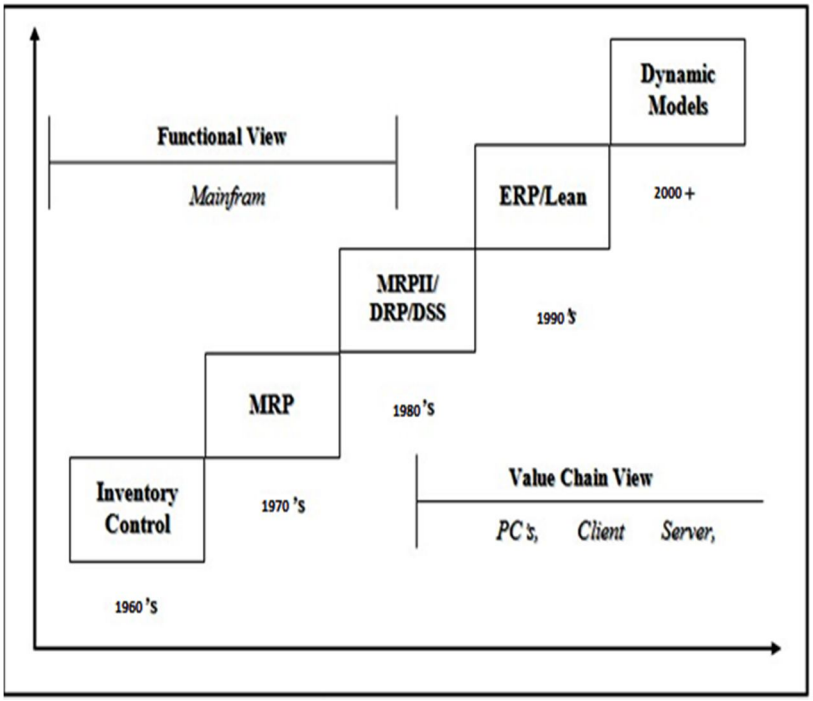
the Internet is considered as an integrated part of the ERP and ERP systems were developed Web technology information system to support multi-tier architecture. The gradual process of evolution of ERP systems are outlined in Figure 1 below.



ERP is actually the result of 40 years of experience, trial and error and because of the continual improvement of existing techniques in organizational management and rapid growth of information technology ERP has also grown up and has followed its evolution. The basic concepts are very strong (that have formed over the years) constitute ERP systems infrastructure.

Gradual evolution of ERP can be regarded in four stages as follows:
The first stage: integration of production
The second stage: Integration of Organization
The third stage: integration based on customer-orientation
The fourth stage: the integrity of interagency

In 1998 more than 20000 organizations all over the world invest about 17 billion dollars in the field of ERP, in later years this amount has grown by 30 to 50 percent in 2003 to around 100 billion dollars.
The cost of maintaining and updating the systems implemented in 2000 to about 21.5 billion dollars, growth rate is 1.13% relative to 1999 [Broatch, 2001].

III. BEFORE PURCHASING ARRANGEMENTS AND ERP BUYING GUIDE

Establishment ERP in an organization should take steps: 1-feasibility and pilot studies, 2-Detailed studies, 3-evaluation of selected suppliers, 4- implementing ERP. These steps should be spent to achieve a successful implementation. In the past, ERP systems were used in large industries like the building. The use of ERP in comprehensive range has been modified and now this word can be any type of organization, without prejudice to enter the industry. There are many companies globally that sell ERP software. Each company will have different ERP efficiency and cost. For a successful implementation, we first have to assess each company's ERP fit with your company and that the company meets the most optimal purchase them. Ministry of Commerce as the first organization in Iran has implement ERP, and create a group for evaluation of the ERP.
The aim ERP systems Guide help business decision makers (business decision makers) to quickly identify need ERP and communicate effectively with vendors to confirm this requirement as well as correct comparison of different designed products.
To identify the need for ERP systems buyers should examine four key areas:

Types of buyers of ERP systems
Product requirements

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Financial considerations
Average seller requirements

This guide is designed around these four areas.

A. Different types of Buyers of ERP systems

By setting one of the following types of buyers, you will have more efficient selection process. More details about how this division makes the buying process becomes more efficient are available in this purchase guide details.

1) I am a novice buyer: I need a simple package of ERP system that is capable of basic functions.
2) I'm a enterprise buyer: My primary job is to deal with issues such as business complexity, integration, scalability and internationalization.
3) I'm a Suite buyer: I am looking for a full suite of ERP to restructure, simplify and optimize business processes across the entire organization.
4) I'm a modular buyer: I'm looking for two or more modules that can be ERP business processes to be automated.
5) I bought a certain part I'm desperate for the industrial sector and strict rules. I have a ERP that are specific to my industry designed just like it.

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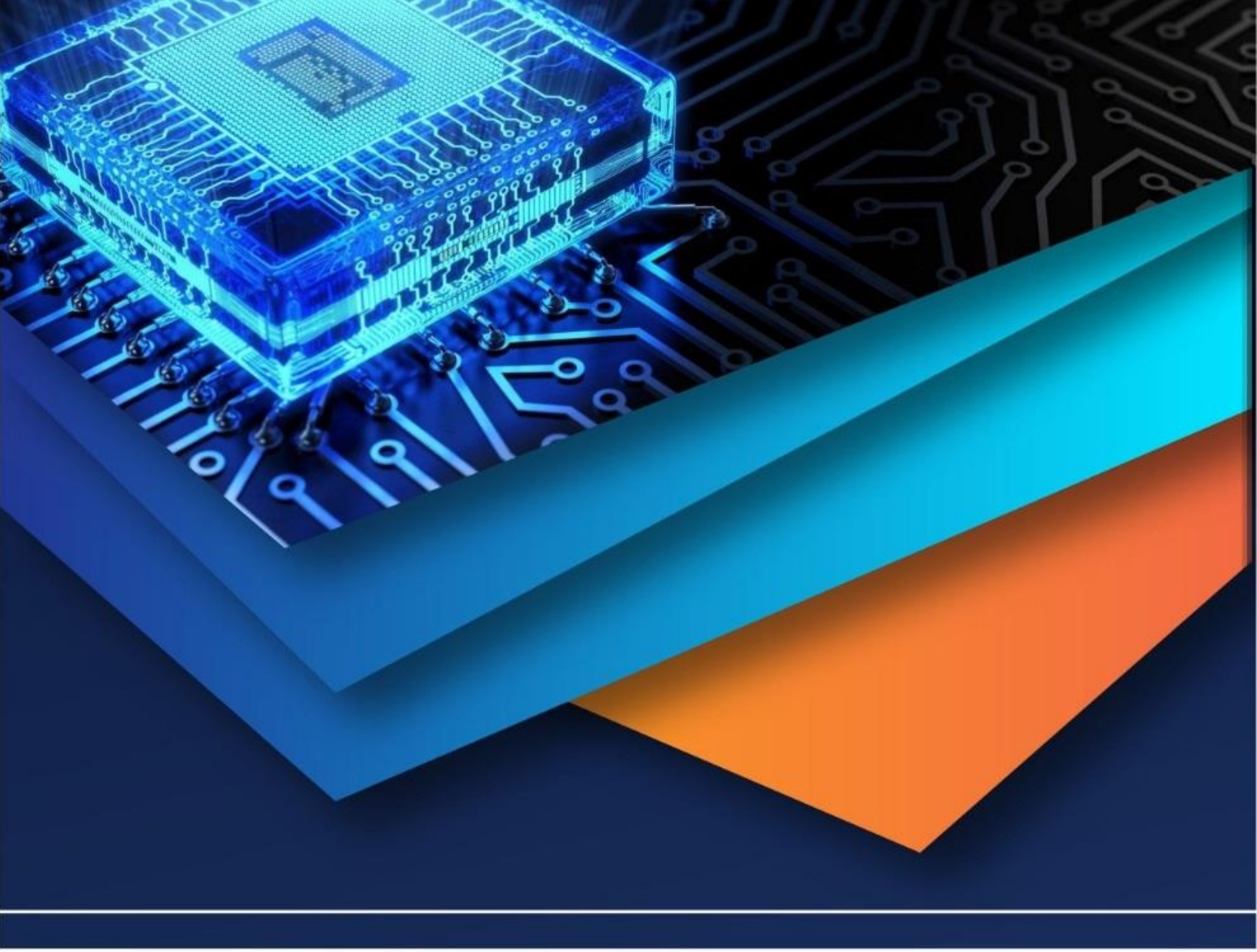

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