The ERP Systems in Modern Business and Corporate Management

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Abstract: The purpose of this paper is to make an analysis and assessment of the increasing need of using sophisticated software systems for managing business processes. In our days the most important thing is the information and the success of every business depends on how fast and effective managers deal with information. Business processes usually include manufacturing, sales order management, inventory and warehouse control, logistics, advanced forecasting and planning, financial management, customer relationship management and many others, all of them connected and depending on each other. It is practically impossible to manage all those processes effective without using software that gives a convenient, easy understandable and user friendly interface to the end user. End user of such system can be anybody from top to the bottom level of the company hierarchy. It is commonly recognized that ERP (Enterprise Resource Planning) systems are the software systems that provide the functionality to manage all that information. A major issue for these systems is that these processes are very different and specific for each business and company. Because of this there is impossible to create one universal ERP system that is good enough for everyone. Instead of this, software companies produce core software which can be expanded and tuned according to each specific company. This automatically includes a process of integration that is a key part of the ERP system.

1 INTRODUCTION

Nowadays when we speak about business modelling and software information systems, it naturally comes to ERP systems as the most significant, large, complex and sophisticated implementation of information technologies into the contemporary enterprises, business companies and corporations. But what exactly is or isn't an ERP software system? First of all we can say that it isn't software in the traditional meaning that we all know – programme that you can buy, install, run and start to use right away. ERP is a large sophisticated software solution that combines many parts (modules) that are used to manage different business processes in certain company or enterprise. The development of such a system is long and difficult process that involves many people – software engineers; programmers; business consultants; even field workers from all levels of the hierarchy of the client company that will be using the ERP system. In fact there are no two absolutely identical ERP systems. That is because each ERP solution is designed and developed for one exact client company, according to their business models, processes, needs and desires. That's why they are very expensive (the investment for ERP system can cost to the client company as high as hundreds of thousands of US dollars) and complex because they integrate many functional and cross-functional business processes. Typical ERP systems support Operations (Production), Human Resources, Finance & Accounting, Sales & Distribution, and Procurement (Magal, 2012). As mentioned before – the development of an ERP system is a long demanding task, involving many specialists and unfortunately there is no guarantee for success at the end.

Many ERP implementations have been classified as failures because they did not achieve predetermined corporate goals (Umble, 2003). The process of implementation of one ERP system has few major steps and can take between 6 months and 1 year of time! Those steps are:

- Analyzing the company business processes and creating abstract models of each one of them and the corresponding relationships between them.

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- Designing database models that contain all the necessary information for those models and relationships.
- Designing the actual software. This includes user interfaces, security management system, backup and archiving systems and mechanisms etc.
- Integration of the system and training the end users how to work with the software.

Each one of these steps involves constant dialogs and communication between the ERP vendor, Client Company, different consultants in certain areas, software engineers and end users. Should any of these steps fails, there is a very high probability that the whole project will fail and lead to huge financial losses for the vendors and the clients.

But when implemented and integrated correctly and precisely, one ERP system gives to the company very powerful tools for running their business in the most effective way. That means sharp resource planning and decision making using analytical instruments; better fast and effective communication and coordination between company departments and external counteragents; efficient accounting and warehouse management; minimizing loses and abuses of any kinds.

2 EVOLUTION OF THE ERP SYSTEMS

To understand how the contemporary complex ERP systems started to exist, we will follow briefly the natural software evolution during the past 50 years, using an article on implementation procedures in ERP systems, written in 2002 by Elisabeth Umble, Ronald Haft, and Michael Umble.

During the 1960's the use of software technologies was mainly for inventory control. Companies could afford to keep lots of ''just-in-case''inventory on hand to satisfy customer demand and still stay competitive. Consequently, techniques of the day focused on the most efficient way to manage large volumes of inventory (Umble, 2003). Most of the software packages then were designed and served the purpose for more efficient inventory control and warehouse management (Ptak, 2000, Shankarnarayanan, 2000).

In the 1970's, it became increasingly clear that companies could no longer afford the luxury of maintaining large quantities of inventory. This led to the introduction of material requirements planning (MRP)systems. MRP represented a huge step forward in the materials planning process. For the first time, using a master production schedule, supported by bill of material files that identified the specific materials needed to produce each finished item, a computer could be used to calculate gross material requirements. Using accurate inventory record files, the available quantity of on-hand or scheduled-to-arrive materials could then be used to determine net material requirements. This then prompted an activity such as placing an order, cancelling an existing order, or modifying the timing of existing orders. For the first time in manufacturing, there was a formal mechanism for keeping priorities valid in a changing manufacturing environment (Umble, 2003). Later the MRP systems expanded to "closed loop MRP" (Oden, 1993), that besides inventory planning included also tools for planning the production levels, sales planning and scheduling, making business promises to customers, forecasting and different analysis tools.

In the 1980's, companies began to take advantage of the increased power and affordability of available technology and were able to couple the movement of inventory with the coincident financial activity. Manufacturing resources planning (MRP II) systems evolved to incorporate the financial accounting system and the financial management system along with the manufacturing and materials management systems. This allowed companies to have a more integrated business system that derived the material and capacity requirements associated with a desired operations plan, allowed input of detailed activities, translated all this to a financial statement, and suggested a course of action to address those items that were not in balance with the desired plan (Ptak, 2000).

By the early 1990s, continuing improvements in technology allowed MRP II to be expanded to incorporate all resource planning for the entire enterprise. Areas such as product design, information warehousing, materials planning, capacity planning, communication systems, humanresources, finance, and project management could now be included in the plan. Hence, the term, ERP was coined (Ghosh, 2012).

Since then the ERP systems are becoming larger, more sophisticated and they are being integrated in enterprises and companies of all sizes – large business corporations, medium and small business enterprises.

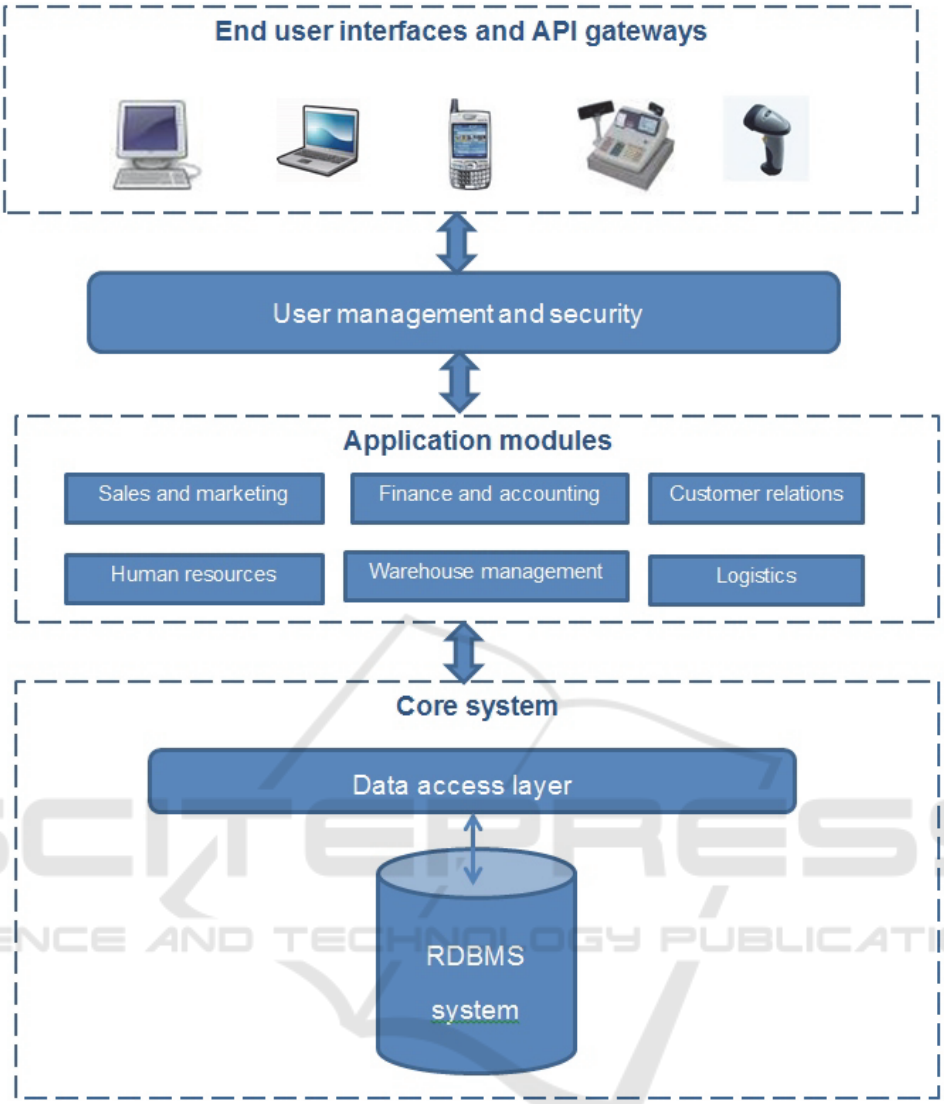

Figure 1: Common ERP system structure.

3 STRUCTURE OF THE ERP SYSTEMS

All contemporary ERP systems are client-server based applications and they allow interaction with and operation from many types of computer devices – desktop or mobile computers, industrial mobile devices, POS (point of sale) devices and even cell phones. Of course this is impossible without using the Internet, VPN and LAN networks. Also because of the big variety of devices and operating systems that interact with the ERP systems, the most convenient and maybe the only way of implementing ergonomic, user friendly and convenient user interface is to use web based technologies.

The web interface is universal,platform independent and the only thing that one device is required to have in order to interact with the ERP modules is the web browser.

Key feature of successful ERP systems are to be flexible – in order to respond to the constantly changing needs of an enterprise; to be modular – that means that different functionalities must be logically separated in the system, which allows them to be detached, modified and attached back to the system without affecting unintentionally any other functionality or part of the whole system; comprehensive – must support wide range of

business processes within one or more organisations. Beyond the company – it should support online connectivity and information exchange with other business-related companies (usually using web service API interfaces).

As mentioned before – the ERP system is not single software that can be produced once and distributed as is to various companies, but is a complex modular system that is being engineered and developed according the company needs. Therefore the ERP vendors are using their own ERP development frameworks – software environment that allows them fast and efficient implementation of the software system. Most significant vendors of this type of software are SAP, Oracle, Microsoft, SAGE and Info Global (IBM) (Low, 2013).

The common structure of ERP systems is shown on Figure 1. It consists of database management system (RDMS) – where all the information is stored and managed; data access layer; application layer which consists of various modules that represent different business processes and activities, analytical tools and other instruments and tools; user management and security layer; end user interfaces.

4 THE IMPORTANT ROLE OF THE ERP SYSTEM FOR THE BUSINESS

As regarded in this article, integrating well designed and developed ERP system into enterprises and companies has a crucial role to their successful business. With today's information variety and amount, constantly increasing market needs and demands, complex services, intra and inter-companies processes and relationships, it's impossible to be successful without actively and even aggressively using the power of the contemporary information technologies. Each stage of one's enterprise activity must be precisely planned, implemented, monitored and analyzed. ERP systems combine everything in a way so that managers can have wide view of the whole picture in front of them, so they can make effective and in time decisions. Efficient warehouse management is important for materials ordering and production planning. This is directly connected to customer management, logistics, effective distribution and service support. Efficient accounting and financial planning depends on how fast and precise the information about all those business processes is maintained, presented and analyzed.

The most important benefits of using ERP systems, based on Kay Roman detailed research article (Roman, 2009) are as follows:

1. Enhanced Technology – the old legacy software systems can't meet the current technology needs. ERP systems allow speeding up all operations;
2. Efficiency in Processes – The new system will eliminate labour-intensive manual processes and current duplication of efforts; will streamline critical business processes for many departments; will make data collection better and more efficient;
3. Integrated and consistent information - A major benefit of a new system will be replacing multiple, disconnected databases with a single, integrated system;
4. Easier Reporting - An advantage of a new system will be improved and more customizable reporting;
5. User Friendliness of the System - A new system will provide easier access to information and overall improvements in its use for the functional staff;
6. Access to Data - Increased self-service for data needs, real time data, Better access to information and decision making;
7. Ability to Provide Better Customer Service - Speedier and more applicant friendly service;
8. Increased Functionality - Better functionality for users;
9. Better Communications- Promotes more collaboration with business partners;
10. Increased Security of Data - Data restrictions can be enhanced.

5 CONCLUSIONS

ERP systems have a key role for successful business in modern enterprises and business companies. They are natural evolution of the general software systems and the use of constantly expanding nowadays information technologies. ERP are the most complex and sophisticated software systems, developed for certain company according to its needs and specific business processes. Therefore their integration is a long difficult process, involving many specialists and consultants. If not planned and designed precisely and carefully, such a project can be easily turned into a failure and huge financial loses. When done correctly, once integrated this system brings big benefits to the companies, allowing them better planning, managing forecasting and expanding their successful business.

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