ERP SOLUTIONS FOR SMEs

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Abstract
The integration of activities, the business processes as well as their optimization, bring the perspective of profitable growth and create significant and competitive advantages in any company. The adoption of some ERP integrated software solutions, from SMEs' perspective, must be considered as a very important management decision in medium and long term. ERP solutions, along with the transparent and optimized management of all internal processes, also offer an intra and inter companies collaborative platform, which allows a rapid expansion of activities towards e-business and mobile-business environments. This material introduces ERP solutions for SMEs from commercial offer and open source perspective; the results of comparative analysis of the solutions on the specific market, can be an useful aid to the management of the companies, in making the decision to integrate business processes, using ERP as a support.

Keywords: *software, integrated information systems, ERP, OSS, SME*

JEL classification: *L86, M15*

1. Introduction

In a globalized business environment, highly mobile and competitive, to maintain or to develop a profitable activity becomes a real challenge for any company, regardless of its size or industry to which it subscribes.

The possibility of a global economic recovery may create the perspective of a profitable development for SMEs, based on the identification of some competitive advantages which allow them to resist on the market.

The recent practice has shown that ITC industry has provided complex and effective solutions for the business environment, while the companies' management decision to adopt such solutions, has been proved to be a very good investment in long and medium term.

Likewise, for all the companies, regardless of their field of activity, the necessity to optimize the internal processes, through their integration and the expansion of activities towards the digital business environment has been increased.

The integration of activities, the business processes as well as their optimization in any company, start from creating a hardware, software and communication infrastructure, designed as a support of efficient development of the company.

From this perspective, ERP software solutions, must be considered as very useful support tools for the planning and management of the companies' resources; along with the transparent and optimized management of all business processes, ERP solutions, also offer an intra and inter companies collaborative frame as well as the frame of activities' expansion towards e-business and mobile-business environment.

However, these solutions are adopted in all economic sectors and they are mainly used by the large companies and to lesser degree by the small and medium companies.

Presenting an image of the existing offers of the ERP solutions for SMEs on the software market, may constitute an important step in making the management decision to adopt and implement such integrated software solutions.

What is ERP and what does it represent for SMEs?

Numerous definitions, derived from multiple fields of activity, starting from ITC field, software solutions suppliers, up to specialists in management, specialized consultants, etc. have been formulated for ERP (Enterprise Resource Planning).

Given the nature of the paper, only the definitions originated from business and IT environment, will be presented. Thus, the encyclopaedia, PC Magazine, consider ERP, as a integrated IT system, which serves all the departments of an enterprise [1].

Gartner, the consulting company and the world leader in IT research, defines ERP [2] as a business application integrated system, which sharing processes and common data models and which covers a wide range of operational processes, such as financial, human resources, distribution, manufacturing, services, etc.

The Business Dictionary [3], defines ERP, as an IT system for identifying and planning the necessary resources of an enterprise, a multi-modular system, yet integrated, which provides process management of the enterprise.

The Romanian view on ERP, expressed by Greensoft, the supplier of the first version of ERP web Based in Romania [4], is the integration accomplishment of all departments and functions of a company, through a unique information system, which can fully serve its needs.

It is easily observable the aspect concerning the occurrence of a common element of all these definitions, namely, integration, integrated system.

From the company's internal perspective, its process integration requires the consideration of some aspects related to its internal resources, starting from the ITC infrastructure and continuing with the human and financial resources; at a managerial level, the adoption of the decision of process integration, using ERP systems as support, must take into consideration both the available budgetary resources for the adoption and implementation of ERP solutions and the availability of human resources usable in the efficient utilization of such solutions.

The last period, in terms of ITC structure, has imposed, to SMEs too, the adoption of several solutions, which allows the sharing of ITC resources, aiming the efficiency increase of their utilization and the reduction of the related costs.

Thus, starting with local computer networks, which have become private networks over time, Intranet, SMEs have expanded their networks towards the online business environment, using the Internet and benefiting from the advantages of a collaborative environment both for company's employees and for business environment. Development of mobile technologies has generated a new infrastructure for activities expansion towards the mobile business environment; the integration of mobile technologies, is already a infrastructural necessity, which every company must take into consideration.

From software's perspective, integration deals with the connection of multiple information systems of various types, developed on different platforms and programming environments with the purpose of optimizing information processing in real time.

The adoption of information systems integration represents the optimal solution for the management of the activities of any company; it is well known the habit of companies' managers to use disparate software applications, which solve certain company problems on time; the use of several types of non integrated software applications, has serious repercussions on information redundancy, on its accuracy as well as on the place, way and moment of its generation; in long and medium term, not integrating information systems lead to the impossibility of a further development of some information systems connectable with the business partners and business environment of the company.

Integration of the existing information systems in the company brings a number of advantages, mainly related to long-term cost reductions, the increase of operational efficiency, the fast return of IT investments and the possibility of fast extension towards the online business environment. This integration must be defined at managerial level, must be compact for the entire organization and must not be divided on departments, levels, activities, always considering aspects related to further developments and extensions of activities towards e-business and m-business environments.

The information of the companies are usually centralized on different servers, which serve different units, departments, different functional locations, sometimes even geographically separated; this way of working may possibly serve independent, individual companies, but cannot accomplish whatsoever performance, speed, efficiency and competence of the own activity.

The adoption of an ERP system, as an ample, integrated software solution of client-server type, accomplishes the management and distribution of information in all functional units, regardless of their location. ERP runs on a universal software platform, using a centralized data warehouse that is transacting information, on request, with many software applications.

Initially, ERP systems have been used by large companies; the trends in the utilization of ERP however, have changed radically lately, the systems can be customized for any kind of company, for any size, which operates in any field.

Architecturally, the ERP system can cover a wide range of companies' functions, carrying out the integration of their data in one centralized data warehouse; the integrated system is modularly built, so that all functions and business processes are covered.

Modularity offers the advantage of realization of a customized system for the company's needs;

An information system can be considered ERP, if aggregates a series of features, such as modularity, flexibility, portability and last but not least, the company's business process integration, with the globalized business environment.

An ERP solution can include modules, which cover functions and activities, such as: supply, sales, inventory, production, finance, accounting, asset, logistics/auto park, controlling, managing, catalogues, management of data warehouse (Warehouse Management System), sales force automation SFA, BI (business Intelligence), CRM (Customers Relationship Management), etc; all these modules and functionalities are run on an common interface; the web extensions of e-commerce portals type are widely used in the recent years; also, in order to provide a collaborative

support, which meets the interconnectivity requirements, ERP solutions offer the integration possibility with many software tools and solutions: EDI (Electronic Data Interchange), office packages (Microsoft Office, Open Office, etc..), reports and forms generators, mobile terminals; likewise, the import and export of data to other applications or to their representation forms are ensured.

From the perspective of customization of ERP solutions and from the perspective of the most used modules by the companies, Panorama [5], an IT consulting company, identified the following situation in the report for 2011: the most demanded modules are the financial, sales/distribution, human resources/payroll and on the opposite side are those related to product management.
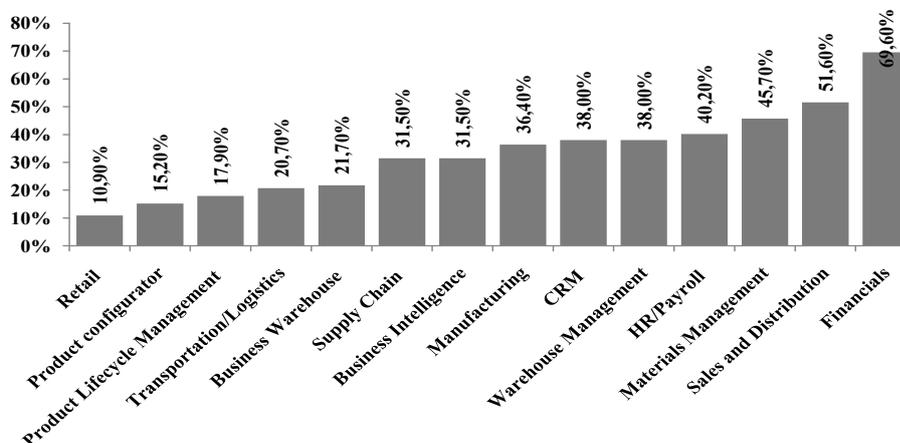

Figure 1. ERP module used
(source: http://panorama-consulting.com/resource-center/2011-erp-report/)

For a company, the adoption of any complex software solution, besides the infrastructural aspects and allocated resources, must consider also the aspects related to the advantages and disadvantages offered by these.

Among the advantages that we can identify in the adoption of ERP solutions, can be listed:

- cover functionally the activity of all departments and ensure an unique collaborative platform;
- the system manages one centralized data warehouse, which allows an easier definition of unique policies of data security;
- the system modularity, ensures the configuration of a customized system according to the company's needs;
- the modularity and integrability of the system reduce the costs of purchasing separate applications, which serve departments;
- provide advanced tools of analysis, synthesis and decision support, through Business Intelligence module;
- provide functionality capabilities on web platform, in order to expand the activities towards e-commerce solutions;
- provide integration facilities with other systems and software interface, through API interfaces (Application Programming Interface);
- allow the distribution of information to the unities that are geographically dispersed, using an unique work platform;
- provide user interfaces and very friendly, suggestive and easy to use dashboards;
- allow integration with other ERP systems of third companies and creation of zonal and regional collaborative web-based platforms at an industry level.

Among the disadvantages, could be identified the following ones:

- high purchasing and implementation costs, alongside must be considered those related to necessary ITC infrastructure;
- long and laborious implementation;
- difficult and long customization of the system for the company's operational processes;
- complexity of ERP systems generates a difficult operation and needs a long training of operational human resources;
- loading in the central database through migration of data from the old systems, also represents a long and laborious process;
- upgrade and update costs are considerably.

We must specify that the disadvantages related to costs and financial resources involved can be avoided by opting for open source ERP solutions.

For SMEs, an alternative of adoption of ERP solutions could be the modular implementation, step by step, which could involve lesser efforts and a shorter duration of implementation.

Likewise, alternative solutions offered by the companies providing ERP solutions, such as those of SaaS (Software as a Service), Hosted ERP and cloud ERP type, would be very profitable for SMEs; these alternatives, reduce companies' costs and efforts regarding the acquisition and implementation of a complete proprietary solutions.

2. Methods and results

Starting from those displayed regarding the ERP systems and processes integration, following are presented the solutions, which SMEs have at their disposal in order to adopt such a system.

Given the large number of ERP solutions and the complexity of their functionalities, the paper has been focused on two classes of offers - commercial and open source.

For this purpose, first of all, commercial and open source solutions have been separately identified and then the features and functionalities on each of the two categories have been analyzed and compared.

The paper has been divided into four levels:

- Offer identification on the market of ERP solutions;
- Selection and analysis of the specific offers for SMEs;
- Identification, analysis and comparison of commercial and open source solutions for SMEs;
- Selection of potential adoptable solutions for SMEs.

The study has been started by using secondary sources of information resulted from web observation, visits of ERP providers websites, papers, statistics and profile reports, has been continued with primary sources resulted from the comparative analysis of demos' software solutions of the providers.

The present paper also has the objective to raise the awareness of SMEs' management on one hand, about the need for adoption of ERP solutions, and on the other hand, about the existing solutions on the market and about the fact that there are many OSS solutions that can be adopted with little effort by companies; the advantages and disadvantages of using an ERP as a planning and management tool of company's resources have been identified and presented for a better edification of potential beneficiaries of such solution.

2.1. Open source ERP Solutions

When referring to the open source software class, OSS (Open Source Software), the same type of software licensing is identified, on basis of which the source code is provided to the public in order to be changed, improved and redistributed free. The last years have familiarized the wide public with the existence of this open licensing system, which led to the formation of a segment of active users which is growing fast, both at individual and especially at corporate level.

We all have been accustomed to see how the Linux operating system, Mozilla Firefox browser, MySQL database management system, Android mobile operating system, are widely and increasingly used; likewise, it is known that many software solutions from all categories are present also in OS licensing system.

The question is, why could not be used also the ERP OS solutions? What would be the benefits of using OSS solution?

The software industry experiences a parallel development, on the two offer levels of software solutions - open source and commercial.

OSS segment development has generated in recent years, an important segment in the management of the companies which is very interested in these software resources and their development; for SMEs, at least in the short and medium term, OSS represents a favourable alternative, which does not involve extra costs.

The attractiveness of OSS solutions, resides in financial reasons, their adoption reduces significantly license costs compared to commercial alternatives; the very important aspect, however, is related to functionalities, which are similar for the offers of both categories of licensing.

For ERP analysis, identification of multiple sources has been necessary in order to allow, visualization of comparative solutions and demos for analysis of the facilities offered by each product separately [6] - [7].

Products have been analyzed, according to a few very important criteria: recipients/ end-users (SMEs), industry/field of activity, work software platform, offered modules and functionalities, provider's market; the analysis has been performed separately, ERP solutions for small enterprises and solutions for the medium ones; a total of 25 ERP OSS products for SMEs [6] have been identified and analyzed; following the analysis, for small enterprises, six supplier companies have been selected, whose products may be taken into consideration for the adoption of such integrated solutions.

To the information related to the companies and their products have been added also those regarding the work platforms necessary for implementing of ERP solutions; it is absolutely necessary to know this technical aspect, so that the management of the company to know whether a solution can be adopted on the existing platforms, without being necessary to change them, which would involve, of course, new financial burdens.

Table 1. Open source ERP products for small enterprises

Product	Vendor	Software paltform
Erpeggio	Alodar systems (www.alodar.com)	Windows, Linux
CuroERP	Aranxa Software (www.curoerp.com)	Windows, Linux, Web based
Compiere	Compiere (www.compiere.com)	Windows, Linux, Web based
Openbravo ERP	Openbravo (www.openbravo.com)	Windows, Linux, Web based, Mac OS
OpenERP	OpenERP S.A. (www.openerp.com)	Windows, Linux, Web based, Mac OS
WebNotes ERP, ERPNext	WebNotes Technologies(www.erpnext.com)	Windows, Linux, Web based, Mac OS

In regard to the offers for medium-sized enterprises seven companies have been identified, which have dedicated products for them.

Table 2. Open source ERP products for medium-sized enterprises

Product	Vendor	Software paltform
Ramco OnDemand ERP	Ramco Systems (www.ramco.com)	Windows, Linux, Web based, Mac OS
Aragon-eRH	Aragon-eRH (www.aragon-erh.com)	Windows, Linux, Web based
CANIAS ERP	Industrial Application Software (IAS)(www.canias.com)	Windows, Linux, Web based, Mac OS
DreamApps	DreamApps (www.sg.dreamapps.com)	Windows, Linux, Web based, Mac OS
IFS Manufacturing	IFS (www.ifsworld.com)	Windows, Linux, Web based
Insight IMS	Insight IMS (www.insightims.com)	Windows, Linux, Web based, Mac OS
Lawson M3 Enterprise Management System	Lawson Software (www.lawson.com)	Windows, Linux, Web based, Mac OS

The advantages of utilization of such open source solutions are found, besides the elimination of commercial costs, also in the fact that the user gets the source code that can be customized and adapted to the needs of the enterprise; on the other hand, using an open source can be seen as a self-administered training and as a testing of company's capabilities to implement a possible commercial complex solution.

2.2. Commercial ERP solutions

In the analysis of commercial ERP solutions have been taken into consideration several aspects: functional and operational abilities, offered modules, final price, licenses and support grant, implementation training, categories of industries/fields of activities which are served, market segment of the supplier company, customer types, software platform.

According to the report of Panorama company, in the database have been taken over 97 suppliers of commercial and open source ERP solutions, divided into 5 main categories [8], depending on their importance in the profile market: 3 main categories, an auxiliary one and ERP cloud solutions; in the first category, there are three main suppliers Microsoft, Oracle and SAP, while the largest category, the third one, comprises 50 suppliers.

According to the same source, the evaluation of the visitors has brought a different type of classification, according to which on the first 5 places appear ERP solutions provider companies: EZ Ware Technologies (www.ezwaretechnologies.com), ProfitKey International (www.profitkey.com), IFS North America Inc. (www.ifsworld.com), Oracle Corporation, xTuple (www.xtuple.com); we must specify that all companies have offers for SMEs as well.

According to the report the Panorama Company, in 2011, the classification of the companies providing ERP solutions, according to their market share, brings on the top 3 places the same largest companies Oracle, SAP, Microsoft, followed by Abas Software.
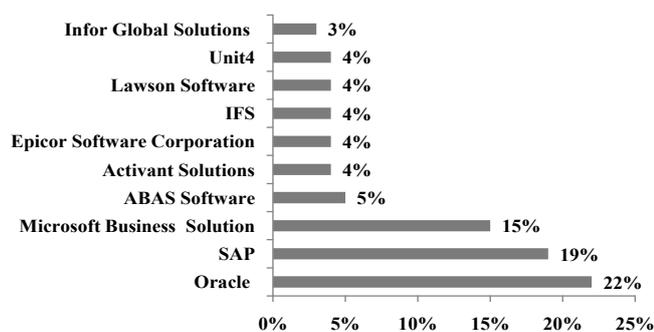
Figure 2. Classification of provider companies for ERP solutions
(source: http://panorama-consulting.com/resource-center/2011-erp-report/)

The analysis of ERP market solutions, shows a huge potential for both suppliers and their customers. It should be highlighted the vision of ERP, Oracle, SAP, Microsoft magnates to focus on SMEs, creating adapted versions to their needs.

For SMEs in Romania, ERP software market is dominated by the same large commercial suppliers, which prevail the global market.

According to PAC [9] (Pierre Audoin Consultants), the Romanian market of ERP software was dominated in 2009 by SAP by 9.5% and by Oracle respectively by 7.1%, followed by TotalSoft with Charisma and SIVECO Applications; for 2010 to 2014, PAC estimated an average annual growth of around 14% at the level of total ERP software and services market.

3.   Conclusions

In adopting ERP integrated solutions, the benefits offered in making effective the activities, integration with business environment and providing a decision support for the management of the company must be considered.

The adoption and implementation of an ERP solutions, necessarily involves consideration of some important technical issues:

- the management of the company must identify clear objectives and short and medium term expectations from the new system; it is necessary the foundation of some phased temporal graphics of implementations;
- the accuracy and the correctness of the data originated from the old information systems must be ensured in order to load up the ERP data central warehouse;
- the integration of the functions and processes must be done uniformly and in synchronization by complete replacements of old information systems which used to serve disparate activities, functions, departments, locations;
- in case of the adoption of OSS solutions, at the level of system customization, it is recommended to remain at a necessary minimum in order to reduce adaptation time.

Although, from statistical perspective and from the expansion trends offered by the providers towards SMEs segment, ERP market seems to be growing, can be highlighted specific aspects of SMEs which have to be considered:

- at the level SMEs' management remains the preconception that the integration of internal processes and the utilization of some ERP solutions, are directly dedicated to the large companies; for many SMEs the level of information on necessity, role and benefits provided by ERP solutions, remains noticeably low;
- a low level of information on ERP OSS alternatives is identified, which offers, without costs, the same facilities as the commercial solutions;
- the adoption and implementation of ERP system, deals also with a change of strategic vision of SMEs' management, reconsidering and reorganizing the internal processes and the functions of the company;
- the decision of adopting the ERP OSS system can be a viable alternative for SMEs, but must be considered all internal resources of the company and especially the human ones, specialized in IT, which can provide crucial support in implementation; without qualified human resource, it exists obviously the outsourcing of these services; in our opinion, in this case, for SMEs it is more profitable to take into consideration an alternative of adoption of Saas and clouding ERP services.

In a deeply competitive business environment, for SMEs, the decision to adopt an ERP integrated system, regardless of the selected solution, can be an essential competitive advantage and an important element of differentiation.

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