
Implementing Enterprise Resource Planning, the Case of Small and Medium-Sized Enterprises in Romania

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Abstract

In our days, corporations often must operate in a constantly changing environment, while they must perform the necessary tasks of their key processes. ERP gives more visibility on data across the entire corporation, speeds up communications facilitating the exchange of data across corporate divisions.

When a small or medium-sized enterprise can exploit the benefits from using an ERP system, it significantly enhances the performance of the organisation's business operations.

In this paper we examine the situation of ERP systems in Romania, as well as the challenges of implementing ERP systems for small and medium-sized enterprises.

Keywords: ERP Systems, SMEs, system implementation, integrated solution

JEL Classification: M15

1. Introduction

In our days, more and more people can hear about the potential and importance of ERP systems. However, implementing a new ERP system does not always guarantee successful results. ERP implementation can be a considerable drain upon an organization in terms of both cost and development time, and the result does not live up to expectations.

The predecessors of the ERP systems are considered the MRP (Material Resource Planning) systems. They tried to answer the question of how much material is needed for a production process. Material Requirements Planning simulates the universal manufacturing equation. It uses the master schedule (What are we going to make?), the bill of material (What does it take to make it?), and inventory records (What do we have?) to determine future requirements (What do we have to get?) (Wallace & Kremzar 2006).

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In the 1970s, the so-called Closed Loop MRP systems were created, which contain tools to address both priority and capacity, and to support both planning and execution. By 1980, it became necessary to integrate the manufacturing process with additional resources, so the next step in the evolution is Manufacturing Resource Planning or MRP II. Ideally, it addresses operational planning in units, financial planning in dollars, and has a simulation capability to answer "what-if" questions. Manufacturing resource planning is a direct outgrowth and extension of closed-loop MRP.

Additionally, systems such as CAD (Computer Aided Design), CAM (Computer Aided Manufacturing), CAL (Computer Aided Learning) tried to make up for the shortcomings of MRP II.

In the 1990s, appeared the fully integrated solution, the ERP. The following section will explain this system.

For a graphical view of the evolution of ERP systems, see Figure 1.

2. Definition of ERP

The use of concept ERP as an integrated enterprise resource planning information system (a software) or enterprise resource planning as an enterprise-wide set of management tools is still not completely clarified.

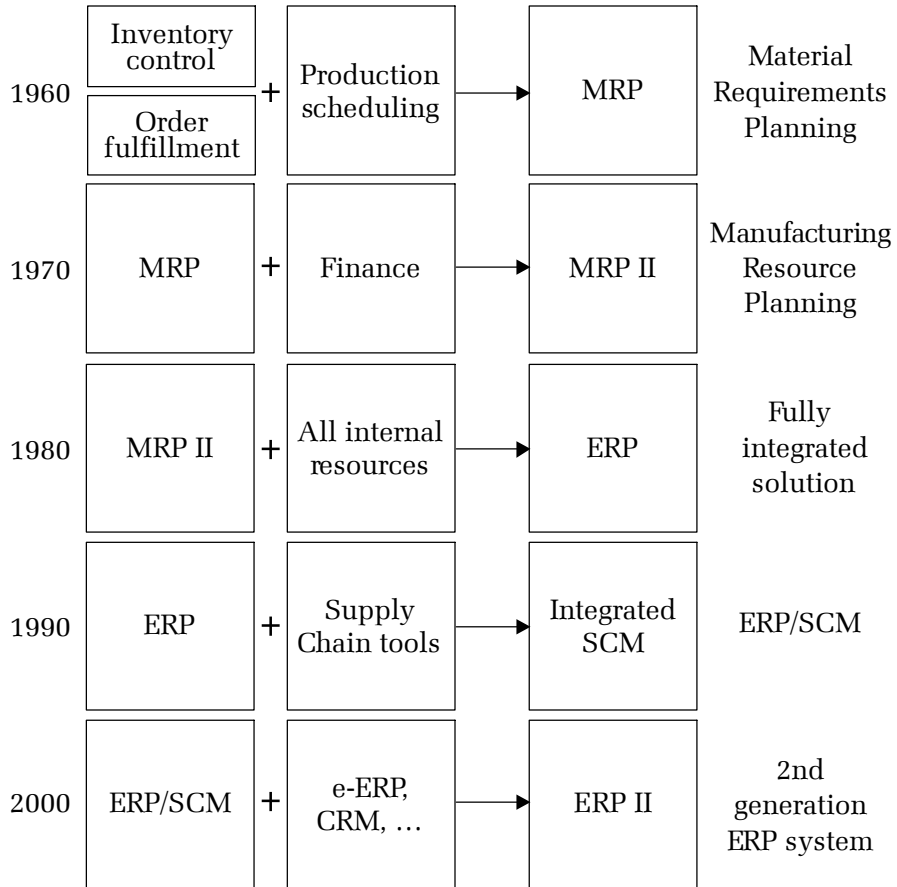
Wallace and Kremzar defined ERP as follows: "ENTERPRISE RESOURCE PLANNING (ERP) predicts and balances demand and supply. It is an enterprise-wide set of forecasting, planning, and scheduling tools, which:

- links customers and suppliers into a complete supply chain,
- employs proven processes for decision-making, and
- coordinates sales, marketing, operations, logistics, purchasing, finance, product development, and human resources." (Wallace & Kremzar 2006)

ERP systems are also being referred to as "enterprise systems" (ES). However, other authors use this acronym to refer to software. In his book *Mission Critical*, author Thomas H. Davenport describes enterprise systems as "packages of computer applications that support many, even most, aspects of a company's information needs."

The functionality of an ERP system covers the following:

- Production planning
 - Sales management
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Source: Turban, McLean, Wetherbe 2002

Figure 1. The evolution of ERP

- Inventory control
- Effective supply chain management
- Customer service
- Order Tracking
- Financial records
- Human Resource Management
- E-commerce

In the past 10 years, ERP vendors have increased their product offerings to target and work with midsized companies to capture this huge market opportunity.

3. Advantages and disadvantages of ERP systems

It is important to mention the benefits and costs of ERP systems, as they affect the introduction of these systems.

The benefits of ERP systems can be summarized as follows:

- direct access to a wealth of information: the system can quickly respond to user requests;
- increased quality of information provided to enterprises: since the system possesses a unique database, should always be able to deliver quality information;
- applicability: the system is easily reconfigurable in case of economic changes;
- optimal data storage and operations: the system's database storing and rationalizing redundant data;
- the system is well maintained: the system can be modified by a specific company, if necessary;
- collaborative dimension: CRM and SCM modules can be added to the system;
- opening in the direction of e-business: the ERP system architecture allows the integration of e-business applications;
- cost reducing: a well-designed system leads to decreases in lead times, purchase costs;
- effective planning of all the company's resources: a good ERP system can cover the complete resource planning;
- overall improvement in productivity: an ERP system improves productivity;
- profit maximization: in case when the system adapts to the market expectations.

As disadvantages of the ERP systems, we can mention the following:

- complexity: it's not easy to design and implement an ERP system;
 - high costs: the implementation of an ERP system is expensive;
 - the time requirements are very large: as the system is generally complex, it takes a lot of time to implement;
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- dependence on the supplier: it may be that there is only one supplier and the company depends on it;
- not appropriate use of the modules: it can happen that the enterprise may not choose the right system for his needs.

In summary, although implementing an ERP system may be costly and time consuming, the benefits are worthwhile.

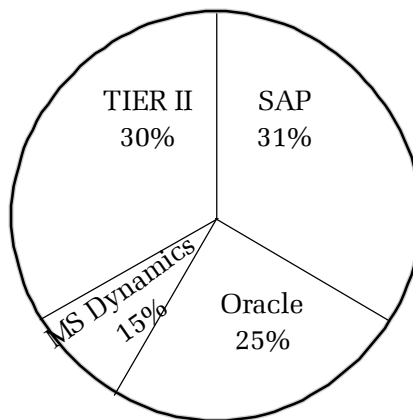
4. ERP systems in the world market

Despite the economic crisis, business applications, including ERP systems began a slow recovery in the world market.

ERP software market increased to 24.5 billion \$ at the beginning of 2010, compared to 23.8 billion in 2009.

Historically, the dominant vendors on the ERP systems market were only three, namely SAP, Oracle and Microsoft.

Figure 2 indicates market share by major vendors in 2009. Of course, this distribution varies depending on what sized businesses the respective ERP system is addressed to.



Source: Panorama Consulting Group, 2010

Figure 2. Major Vendors' Market Share in 2009

One point of note is that Tier II vendors have increased their market share from 23% in 2008 to 30% in 2009.

Epicor, Baan, Sage, Infor, IFS, QAD are considered Tier II solutions.

Also, there has been a lot of growth in the last ten years on web based enterprise applications such as SaaS applications, or software as a service, that have change the ERP market share profile.

The ERP industry has dramatically innovated with new web based products such as software on demand applications or SaaS, software as a service solutions that have been skyrocketing in demand from companies of every size and capturing significant market share from on-premise ERP vendors with robust solutions that are easy to use, easy to deploy, and significantly more affordable.

For smaller businesses, it gives the user the opportunity to finally enjoy the benefits that an ERP solution can deliver to an organization by eliminating the major capital requirement hurdle.

5. ERP systems, the situation in Romania

At the end of the year 2008, the strengthening economic crisis had a major influence at companies looking for an ERP solution, because they are targeted toward lower-cost products.

A current report by global market research and strategic consulting firm Pierre Audoin Consultants (PAC) assesses that the ERP market in Romania dropped by 17% in 2009, compared to year 2008. For 2010, a decrease of 4% will be expected.

Growth in the ERP market in Romania only in 2011 is expected. The return to an above 20% annual growth rate is not expected before 2012, in the context of multiplying public projects and of a more optimistic attitude in the trade area, especially that of medium-sized and large companies.

According to PAC study results, S&T Romania continues to be the leading ERP system integrator in Romania, with a market share around 23% in 2009, followed by IBM and NESS, despite the fact that their income is reduced in the recent period.

If we consider the total ERP market in Romania, TotalSoft is located in the top, based on revenues, followed by Oracle and SAP.

According to PAC data, the value of the ERP market was 120, 6 million euro at the end of year 2008. By the end of the 2009 this figure has gone under 100 million euro. In 2008 the CRM (Client Relationship Management) segment was 7.8 million Eur, compared with 6.6 million Eur in 2009. The BI (Business Intelligence) applications market value was 10.7 million Eur in 2008, while in 2009 increased to 11.7 million Eur.

The BI and CRM has small and fragmented market in Romania. At the top, there are only a few companies, the rest is very spread.

The economic crisis has a great impact on the CRM market and a visible reduction will be observed. The BI segment is less affected by the crisis, but it will not be experiencing too much growth.

In the last few years ERP vendors and enterprise software developers are trying to cover a larger range of businesses with their systems. One such developer is Epicor, which provides solutions to SME sector. In 2010 the company releases Epicor 9 in Romania, introducing a new approach to the way enterprise resource planning (ERP) systems and business software solutions are designed, built, and used.

Another competitor in the SME market is Microsoft. They are not leaders of this segment in Romania, but offer good solutions for SMEs. The compatibility with the Microsoft Office products, which has a wide user base, is also a key component of their popularity.

Another company, BIT Software from Brasov implemented solutions that can be used successfully by enterprises with 50-250 employees. They implemented ERP & CRM-type system, the first "open source" system in Romania. Their system, called SocrateOpen, was implemented on Compiere platform.

In the current circumstances, the success of ERP packages implemented for SME also depends on how they can integrate systems such as CRM, SCM, BI and Internet-specific applications.

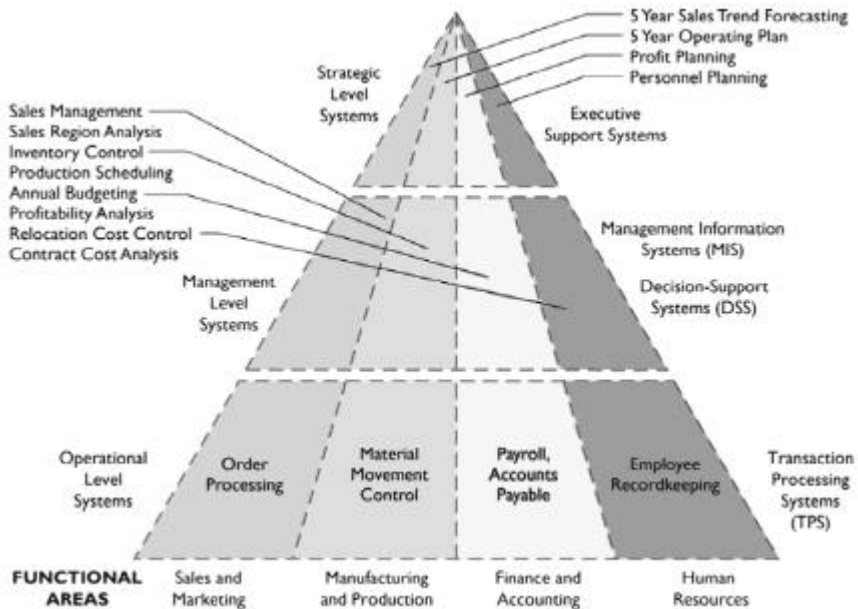
The development of integrated systems is also affected by new e-commerce and e-business opportunities, which have to be integrated in the ERP systems in the near future. Given the economic uncertainty of the past years, PAC predicts that in 2011 only slow growth on the ERP systems market can be expected.

For the 2010–2014 period, the average annual growth of the ERP systems market in Romania is expected to be around 14%. This growth will be perceptible also in the SME market.

6. The challenges of implementing ERP systems

ERP implementation is a social-technical challenge. The primary purpose of implementing ERP is to improve the corporate governance process. This does not mean process automation, but making them more efficient.

Each business function has its own specialized information system at each level. This can be seen in Figure 3.



Source: Laudon & Laudon, 2006

Figure 3. Information pyramid

An ERP system development permeates the whole enterprise, changing the expectations, processes, and is important to manage them properly. When considering the decision to invest in an ERP system, a business case must be developed to provide an understanding of ERP and to formally assess the benefits that the company can expect to achieve. The analysis must consider not only the cost/benefits analysis, but also the non-financial factors. ERP implementation can be disastrous for companies that fail to manage the implementation process.

The ERP system development can only be effective if it takes into account the specificities of the enterprise and adapts to them, but also influences the processes, the organization and structure.

In a company's lifetime, implementing an ERP system is usually a

one-time task. Therefore, efforts should be made that the process to happen more effectively. It is possible that the involvement of external experts may be needed, since not all businesses have the necessary personnel to achieve this task.

Many companies today need to re-implement. Some of these are companies who thought they were implementing ERP, but actually were only installing enterprise software (Wallace & Kremzar 2006).

There are many strategies for implementing ERP. The most widely discussed ERP implementation strategies are (Avdejenkov et. al. 2009, Laudon & Laudon, 2006):

- *Big Bang*: Implementation happens in a single, major event. All modules are installed across the entire organization, users move to the new system on a given date.

- *Phased rollout*: Changeover occurs in phases over an extended period of time.

- *Parallel adoption*: Both the legacy and new ERP system run at the same time. Users learn the new system while working on the old.

- *Slam-dunk*: In this method the focus is on just a few key processes, such as those contained in an ERP system's financials module. The goal here is to get ERP up and running quickly. The slam-dunk is generally for smaller companies expecting to grow into ERP.

Of course there is no one-fits-all solution when it comes to implementing an ERP.

Risk factors most likely to occur during implementation, based on the literature reviewed (Willcocks et. al. 2003, Summer 2003, Holland & Light 2003):

- lack of motivation: not precisely defined what is expected from whom and how to reward;

- disorganization: the project team is not suitable;

- lack of feature-function fit between available packages and company needs: they want the system to adapt the existing processes;

- users do not understand the basic concept of the system: employees need training in order to use it to continue day-to-day operations and to understand how the system will change business processes;

- not adequately assessed IT needs: you may need to modify the system;

- the financial plan is impractical: most implementations go over budget (over 51%);
- bad corporate communication of the project: the employees do not have enough information on the project;
- There are no clear metrics: we do not know exactly what to expect from the system in short- and long-term;
- Lack of top management commitment: the management imagine only an IT project;
- the functions of the system are not clearly defined: the functions will not be suitable for management;
- data conversion problems: transferring data from the old system may not be successful;
- the developer and the client can not understand each other: the professional language-speaking individuals cannot reach a consensus;
- the system facing technical challenges: there may be compatibility problems.

Consequently, the implementation of ERP systems for small and medium businesses is prominently a managerial activity. Managers must know and understand the implications of the system. They must be aware of changes that will take place and must agree that the change is necessary and possible.

Another important issue in the case of small and medium-sized enterprises is to purchase or to develop an ERP software system. Selecting a system is not easy, because they are difficult to acquaint.

Due to complexities of implementing an ERP system, most companies choose to hire a consultant to help select, configure and implement the system. This approach has the drawback that the consultant firm does not have adequate insight into the processes of the company. Also, the cost of hiring consultants can be very high.

Since every company has its own specific processes, each individual case requires a unique decision to develop a system or to select and implement an existing system.

In the reviewed literature, many studies try to give advice on how to select a system, however the financial approach is usually disproportionately pronounced (Avdejenkov et. al. 2009, Forslund 2009, Ifinedo & Nahar 2007).

There are more cost estimation models available, such as COCOMO (Constructive Cost Model), and COCOMO II.

TCO (Total Cost of Ownership) analysis was popularized by the Gartner Group in 1987. Today, TCO analysis is used to support acquisition and planning decisions for a wide range of assets that bring significant maintenance or operating costs across a long usable life. This will help to complete the IT project evaluation.

The major problem of IT developments of Romanian small and medium-sized enterprises is lack of resources. These enterprises are not engaged in investment calculations.

The SME sector has simpler hardware and software systems, and also the IT skills are scarcer. This sector predominantly using existing products, the individual development is rare.

The implementations and the resulting experience are growing rapidly.

7. Conclusions

ERP is widely acknowledged as having the potential to radically change existing businesses. ERP provides real-time integration of sales, operating and financial data.

The company must be prepared to use a comprehensive ERP system. This assumes that in the enterprise the responsibilities and tasks are well-defined. The implementation of ERP can be classified in the long-term decisions, therefore, above all, through-out strategy should be developed.

As it was shown, the implementation of ERP is not only a technical task, installing enterprise software, but also hard management work in order to improve business processes. ERP packages force an organization to implement a proven set of business processes. Therefore top managerial support is very important.

In the past few years, ERP vendors and enterprise software developers are trying to cover a larger range of businesses with their systems. For smaller companies in particular, SaaS based system should be considered as a real viable enterprise application option.

When used properly, ERP systems can help SMEs to optimize their business processes, to bring improvements in efficiency and effectiveness and ultimately to obtain competitive advantage.

References

Avdejenkov, V. – Vasilecas, O. – Smaizys, A. 2009. Business rule management in enterprise resource planning systems. In: *Frontiers in Artificial-*

al Intelligence and Applications, Databases and Information Systems V, Vol. 16. IOS Press, pp. 255–266.

Badawy, M. – Richta, K. 2002. Deriving triggers from UML/OCL specification. In: Kirikova, M. *et al.* (Eds.), *Proc. of ISD 2002 conference on Information Systems Development: Advances in Methodologies, Components and Management*. Kluwer Academic/Plenum Publishers, pp. 305–316.

Bajec, M. – Krisper, M. 2005. A methodology and tool support for managing business rules in organisations. *Information Systems*, 30(6), 423–443.

Blaske, L. 2008. *Mi az ERP?*, *SAP Tudásmorzsák*, <http://www.tudasmorzsak.hu/uzletvitel-cikkek/52-uzletvitel/135-mi-az-erp>

Forslund, H. 2009. ERP systems' capabilities for supply chain performance management. *Paper presented at the 21 NOFOMA conference* in Jönköping, Sweden.

Graeme, S. – Seddon, P.B. – Willcocks, L. 2003. *Second-Wave Enterprise Resource Planning Systems*. Cambridge University Press.

Holland, C. P. – Light, B. 2003. *A Framework for Understanding Success and Failure in Enterprise Resource Planning System Implementation*, In: *Second-Wave Enterprise Resource Planning Systems – Implementing for Effectiveness*, Cambridge University Press

Ifinedo, P. – Nahar, N. 2007. ERP systems success: an empirical analysis of how two organizational stakeholder groups prioritize and evaluate relevant measures. *Enterprise Information Systems* 1(1), pp. 25-48.

Laudon, K. C. – Laudon, J. P. 2006. *Management Information Systems: Managing the Digital Firm*, Prentice Hall

Panorama Consulting Group, 2010 ERP REPORT–ERP Vendor Analysis <http://panorama-consulting.com/resource-center/2010-erp-vendor-analysis/>

Softstar Systems 2009., <http://www.softstarsystems.com/>

Sumner, M. 2003. *Risk Factors in Enterprise-wide/ERP Projects*, In: *Second-Wave Enterprise Resource Planning Systems – Implementing for Effectiveness*, Cambridge University Press

Wallace, T. F. – Kremzar, M. H. 2006. *ERP: Making It Happen: The Implementer's Guide to Success with Enterprise Resource Planning*, HVG Kiadó Rt., Budapest

Willcocks, L. P. (et. al.) 2003. *The Continuing ERP Revolution: Sustainable Lessons, New Modes of Delivery*, In: *Second-Wave Enterprise Resource Planning Systems – Implementing for Effectiveness*, Cambridge University Press

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