

# ENTERPRISE RESOURCE PLANNING - ERP FOR BUSINESS AND KNOWLEDGE MANAGEMENT

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## **Abstract:**

*This article presents the advantages of using the most modern information technologies to support business objectives and to provide a real support in transforming the company's internal processes through the implementation of an ERP suitable solution. ERP systems are the right IT solution for the management of company's resources, regardless their size, they are integrated systems that optimize and simplify the internal business processes. ERP systems supports operations from important areas such as distribution, retail, manufacturing, medical, pharmaceutical, agriculture, energy or services. The main advantages on the implementation of an integrated ERP in a company are: reducing operating costs; improving sales processes; increasing the level of orders fulfillment; improving cash flow; store optimization and more important facilitating the decision making process and knowledge management processes.*

**Key words:** ERP, KM, business management, tacit knowledge, explicit knowledge

**JEL classification:** D83, J24, M15

## **INTRODUCTION**

### ***Software ERP – Enterprise Resource Planning***

Collection of applications designed to automate the business operations of a company (especially the accounting and human resources departments) and to help the enterprises to manage more effectively activities related to the production process, orders from customers, production planning etc. ERP systems create an interactive environment that helps the company to manage and analyze business processes within the company, associated with the production of goods: inventory control, order handling, accounting, etc. In terms of functionalities, an ERP software *covers* the following areas of business interests: production planning, purchase management, inventory management, the interaction with suppliers, customer relationship management, orders monitoring, financial management, human resource management *and facilitating the knowledge management processes.*

## **1. THE ADVANTAGES OF THE INTEGRATED ERP SYSTEM PROPOSED**

### **1.1. Reducing operating costs**

The ERP system is composed of a series of modules that are intended for various departments such as manufacturing, financial - accounting, purchasing, sales, etc. Even if it has a highly varied nature, the information is operated once and it's accessible to any module is required. Thus it saves resources, diminishes the probability of operating mistakes, it provides access to last-minute information – always updated. In addition, the **proposed ERP system** allows the automation of repetitive tasks, issuing invoices and annexed documents, generating replenishment or transfer orders from other deposits based on orders for sale and much more.

### **1.2. Improving the sales processes**

The **Sales Module** of the ERP system allows a company to (re)organize and track the sales process in an effective manner due to configuration multiple option and tracking of sales covered

channels. Sales agents, sales divisions, distributors, key accounts, retail, the contact with the online portal are just some of the facilities offered.

### **1.3. Increasing the level of orders fulfillment**

By automating the chain of taking orders, purchasing, inventory management, warehouse, logistics it eliminates the vast majority of potential malfunctions that lead to not honored requests or delivery of unsolicited goods. The **Logistic Module** from the ERP system enables planning and streamlining processes of supply, storage and redistribution of goods within a company or delivery of goods to customers. The primary information for planning these resources is taken from related modules - Purchasing, Inventory, Fleet - or specific add-ons: SeniorInventory for advanced optimizing of the procurement process or SeniorWMS for the reception, storage and goods deliveries.

### **1.4. Cash flow improvement**

By implementing coherent trade policy and the easiness with which you can obtain the specific indicators, the company controls more strictly the monetary flows and the payback periods, imposing financial discipline to all the involved factors. The **Controlling ERP Module** allows the planning of financial parameters and provides both, proactive capabilities for early warning in case of negative exceeding and complex analysis tools to determine the influence factors.

### **1.5. Store optimization**

In many cases they have been reported major reductions in the assets values in stocks, given that customer satisfaction had increased. This is due to operational and decision management tools which allow the control of supply, production, picking and delivery processes. As well, they are kept under control stocks that have short expiration dates, slow rotation, etc. In the case of companies working with stocks for thousands products and which have complex supply processes and time and resources consuming, add-on SeniorInventory is extremely useful for advanced optimization of these processes, resulting in reduction of up to 85% of the time for supply planning.

### **1.6. Efficient management of production activities**

Officers in the production department have access to a range of instruments through which to manage their work: recipes production, bills of entry, consumer bills, wizards for documents automatic generation, stock reports depending on the related product recipe and so on This produced a number of benefits such as:

- Automation of specific flows of production activity;
- The possibility to track traceability from raw material to finished product;
- Transparency of production costs;
- Balance between the projected and the actual production

### **1.7. Facilitating the decision making process**

Daily decisions are made based on information available at the moment and that an ERP system keeps them continuously updated. For data analysis, ERP system provides a series of reports on business indicators, grouped by category: sales, purchasing, stocks etc. SeniorERP is complemented by an advanced add-on of Business Intelligence: SeniorVisualBI, developed on the Tableau Software platform, the global leader in data visualization. The BI system offers simplicity of use - just drag & drop - and advanced analysis and reporting capabilities.

## **2. ERP – BASIC CHARACTERISTICS**

### **2.1. Strong investment in IT equipment**

- Based on distributed open systems (client/server architecture), unlike the old MRP systems that were mainframe or minicomputer systems based on proprietary architectures or stand-alone PC systems;

- Based on database technology relational distributed (offering transparent support for multiple copies of a database, to user worldwide). Access via SQL (Structured Query Language)
- SGBD have a design integrated with the software application
- IBM DB2, Oracle, Informix, Microsoft SQL Server,
- Based on the 4th generation software; imperative: OOP/modularity, presents graphical interface (GUI)
- Global at the company level, operations across multiple locations etc.

Managers who frequently avoid technologies and suffer from a lack of technical knowledge, have nevertheless to make decisions about buying expensive I.T. equipment and have to manage investment, education and support budgets. Moreover, it seems that managers who are familiar with technologies also suffer some “techno-stress” because of the fast changing pace of I.T (Gunson & Blasis, 2002).

## 2.2. Hardware ERP

Constant improvements to the level of computing techniques, lower prices have made possible the ERP system purchasing by smaller companies.

Requirements:

- RAM (min. 1GB -> tens of GB for large installations)
- HD (tens of GB -> hundred, thousand of GB)
- High-speed hard drives, RAID systems (Redundant Array of Inexpensive Disks)

## 2.3. ERP operating systems

Operation systems multitasking, multi-user, multi-threading, support on 32/64 bits, SMP (Symmetric Multiprocessing).

Versions of operating systems used:

- Sun Solaris
- HP-UX, Tru64 UNIX (Compaq)
- IBM – AIX
- Windows XP/2003/2007/8
- IBM AS/400, MVS

On the top market (high-end) are preferred high-end UNIX variants, while on the middle market Windows XP/2003/2007/8 is the master.

## 2.4. ERP architecture

From an architectural point of view, the first ERP applications were written in mainframe computing environment. At that time, the computer mainframe was the brains, while terminals were used only for access and data entry. Now the dominant architecture is the client / server ("n-tier").

## 2.5. Producers of ERP systems

- SAP
- Oracle – Oracle Apps.
- Sage Group (Sage Pro ERP 7.4)
- PeopleSoft
- Microsoft Dynamics NAV
- Global Technologies (infor.com)(BaanERP)

In Romania:

- SIVAPPS (Siveco Applications)
- Charisma (TotalSoft)
- Clarvision ERP

<300 thousands

- SIVAPPS (Siveco Apps.)
- PeopleSoft
- JD Edwards (OneWorld) – took over by PeopleSoft in July 2003 and renamed EnterpriseOne (later, in 2004, Oracle took over PeopleSoft, continuing the support for EnterpriseOne suite reached to the version 9.1 – 2013)

<50 thousands

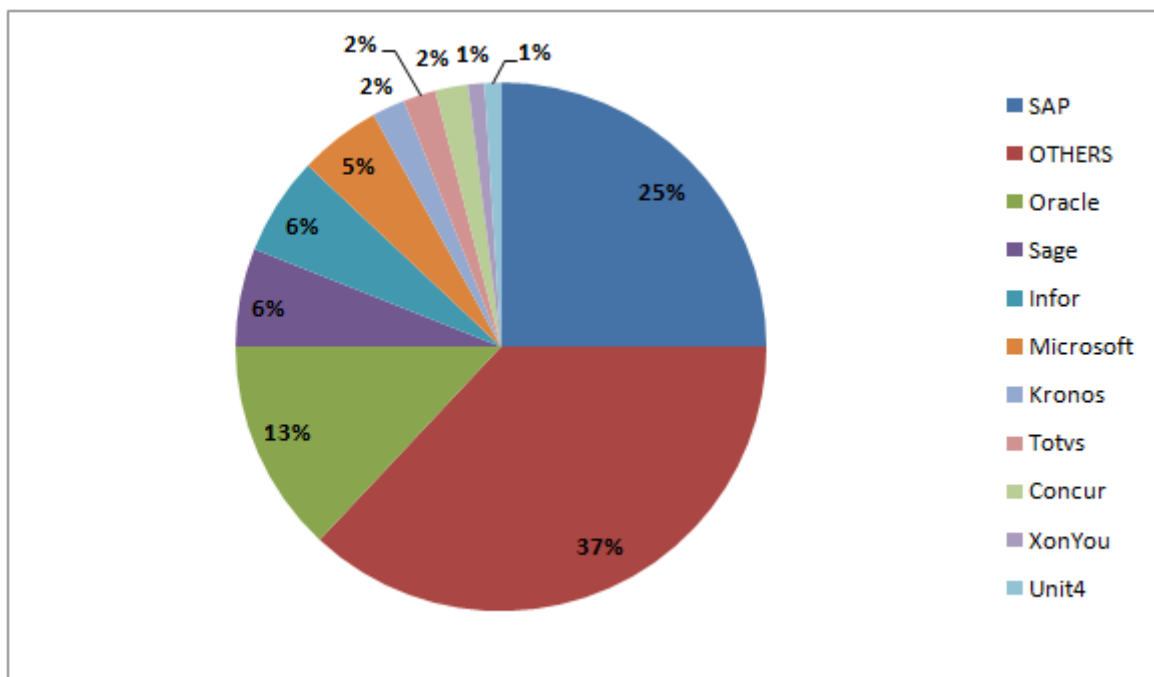
- Scala
- WizRom Count

### 3. THE MOST IMPORTANT ERP SYSTEMS PRODUCER IN THE WORLD

**Table 1. The most important ERP systems producer in the world**

ERP PRODUCERS	FISCAL VALUE	MARKET SHARE
SAP	4726	28.7
ORACLE APPLICATIONS	1674	10.2
THE SAGE GROUP	1221	7.4
MICROSOFT DYNAMICS	616	3.7
SSA GLOBAL TEHNOLOGIES	464	2.8

The Worldwide ERP Software Market Share, 2012 is shown in **Figure 1**. Market Size: 24.58 \$; 2.2% Growth Over 2011.



**Figure 1. Worldwide ERP Software Market Share**

Source: <http://www.forbes.com/sites/louiscolumbus/2013/05/12/2013-erp-market-share-update-sap-solidifies-market-leadership/>

### 4. ERP DESCRIPTION

A set of management tools at the level of the entire company which ensures a balance between supply and demand;

- Creates links with both suppliers and customers in a completely supplier-customer chain;
- Develops a process of business decision making;
- Provides a high degree of functional integration between multiple departments: sales, marketing, manufacturing, operations, logistics, purchasing, financial accounting, human resources, etc.
- Provides, in this way, the possibility to work at high levels of consumer services, productivity while reducing costs - provides the basis for an effective e-commerce.

## 5. THE EVOLUTION OF ERP SYSTEMS

### Phase I - Material Requirements Planning (MRP)

In 60s – they were looking for a better method for materials and components orders (ordination activities).

- Which is the objective achieved? (Planning)
- What we need to achieve the objective? (Material requirements)
- What resources we have? (Inventory records)
- What should we buy? (Necessary future materials)

### Phase II - "Closed loop MRP" (Capacity Requirements Planning - MRP)

Planning the priorities

- adds a number of new functions to the traditional MRP
- contains tools for analyzing priorities and production capabilities, provides support for both planning and execution
- planning functions - planning may be changed when its necessary

### Phase III - Manufacturing Resource Planning (MRP II)

Three additional elements:

- S&OP (Sales & Operations Planning) - the process particularly useful in balancing supply and demand - providing more control over the operational aspects of the business;
- Financial Interface - provides the ability to convert the operations plan (number of items, liters, kilograms etc.) in monetary terms (**money!**)
- Simulation - the possibility to simulate certain scenarios and to get relevant results (today: **APS** - Advanced Planning Systems)

### Manufacturing Resource Planning (MRP II)

"MRP II - a method for the effective planning of all resources of a manufacturing company. Ideally addresses operational planning in units, financial planning in dollars and has simulation capabilities to respond to "what-if" type of questions. It comprises many interrelated functions: business planning, sales and operations planning, production planning, execution support systems for capacities and materials. The result of these systems is integrated with financial reports and business plan, the purchases ratio, transportation budget and inventoty in dollars. MRP II is the direct result of the growth and expansion of closed-loop MRP." (APICS - The Association for Operations Management).

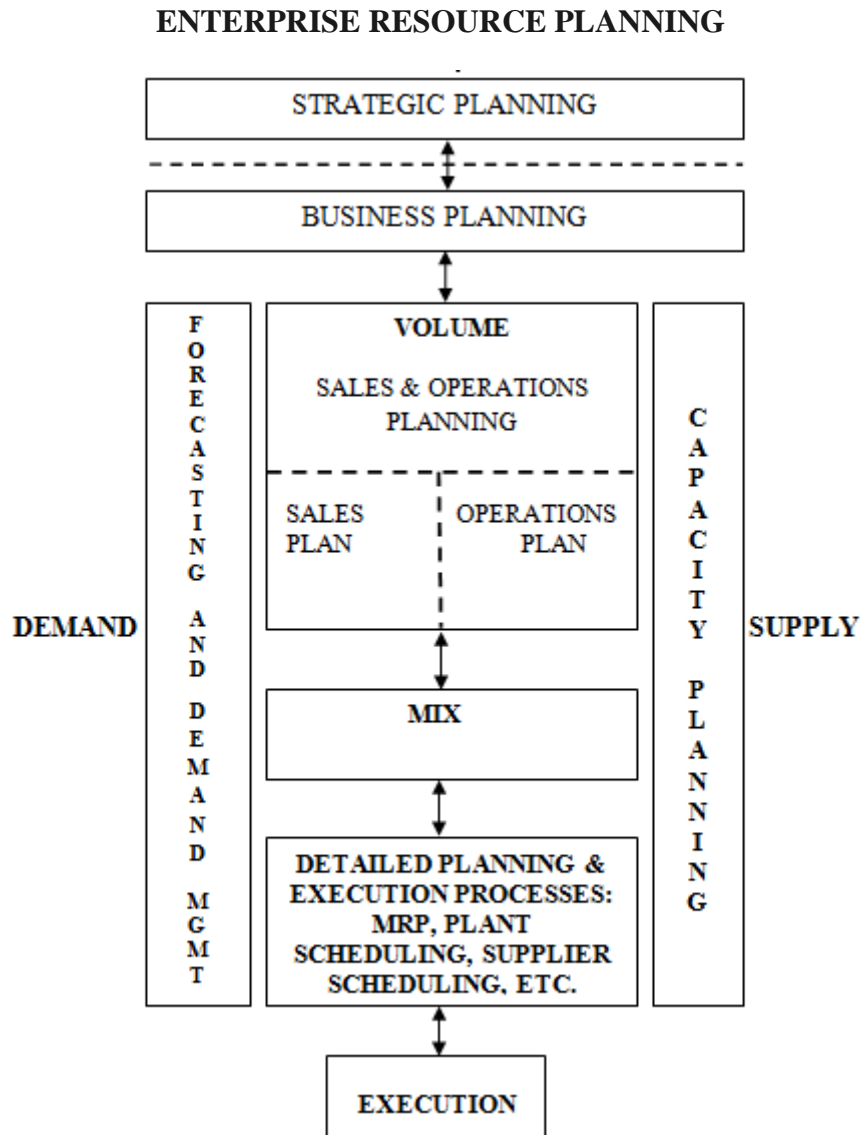
### Phase IV - Enterprise Resource Planning (ERP)

Represents a lot of business processes in a wider and more effective spectrum with stronger financial integration. Goals:

- increase customer service quality, productivity, cost reduction - offers the premises of a supplier-customer management and electronic commerce.

- provides business plans and resources planification - all available in the quantity needed when is necessary.

The scheme of an ERP system is described in **Figure 2**.



**Figure 2. The scheme of an ERP system**

Source: Thomas F. Wallace; Michael H. Kremzar, *ERP: Make it happen*, John Wiley & Sons, 2001

## 6. ERP FOR KNOWLEDGE MANAGEMEMNT (KM) AND VICE VERSA

ERP packages are attracting increasing attention from both academic and industrial communities (Shebab and Spedding, 2004). ERP systems can be regarded as one of the most innovative developments in the information technology of the 1990s. With the growing interests of many organizations in moving from functional to process-based IT infrastructure, ERP systems have become one of today’s most widespread IT solutions (Al-Mashari, 2002). An ERP implementation is a do-it-yourself project; it requires **intimate knowledge** of your business. The essence of implementing ERP is to acquire better business processes, and these must be implemented by the people operating the business (Wallance and Kramzar, 2002).

### 6.1. ERP and KM – both needed

Beside the fact that **ERP** reflects an innovative strategy for the business administration the additional potential benefits of applying an **ERP systems** can include the improvement in a few

areas, such as product reliability, customer service and **knowledge management**, as we mention above. As a result ERP systems are expected to enhance market value and firm performance, through efficiency and effectiveness gains (Hunton, Lippincott and Reck, 2003).

**Knowledge management (KM)** may simply be defined as doing what is needed to get the most out of **knowledge resources**. Although KM can be applied to individuals, it has recently attracted the attention of organizations. KM is viewed as an increasingly important discipline that promotes the creation, sharing, and leveraging of the **corporation's knowledge** (Becerra-Fernandez and Sabherwal, 2010). Knowledge resources can be both explicit and tacit (Nonaka, 1995). The first category can be stored in archives, user's manuals, e-documents, standards, information about products, etc. The second is more personal and hard to formalize, share or imitate. An ERP system it is helpful, firstly for sharing and using the first category while for the second there is an elementary need for individuals, human experts, interactions, abilities, training and experience, all governed by the quality of formal education of each individual within the organization. KM is the process that makes possible and manages the interaction in both, *harmony and chaos*, between those resources in the idea to create new knowledge and lately innovation or innovative ideas.

## 6.2. Some distinct resources

**Time and knowledge** are the untarnished currencies of the past, present, and future. Finding ways to The Strategic Future (Phase III) 321 move faster with more **knowledge**, will always be in style and will provide the ability to generate more money, more assets, or any other important corporate measure (Wallance and Kremzar, 2001).

In the current period, **knowledge**, along with the ability to capture, create, produce, share or multiply it dynamically – in a few words to exploit them, are considered to be the most important, distinct and the most attractive resource for competitive advantage for modern business organizations. Why? Because compared to the tangible resources it's harder to get them with money and sometimes impossible, it's harder to imitate them and most of the time impossible. Some of them are incorporated in the company's behavior and corporate culture and the company **raison d'être**, but most of those resources are brought to the company by its individuals (their skills, experience, talents) and their relations with the others in the company, that's why some of those knowledge live temporarily the company while the employees are living the working place (Scurtu, 2015).

## 6.3. The first stage of KM and Information Technology

Certainly many managers today readily admit that **knowledge management** matter for their companies, especially if their businesses are built to deliver innovation (Von Krogh et al., 2000) or if they depend on it, in both cases the recourse to **knowledge management** and **developed technology** can be considered the most likely tools for competitive advantage. In this regard by developed technology we mean, simply, the assembly of modern tools, applications, instruments and mechanism that can help the knowledge mapping and sharing in organizations and its use and reuse by the people need it – knowledge workers and not only, for accomplishing business and individual objectives within their activity. Many experts believe that 80% of **KM** involves people and culture-related components and 20% has to do with KM Technologies (Liebowitz, 2001). However applying KM strategies and processes in organizations is a complementary process to ERP adoption (Vandaie, 2008) and ERP implementation is knowledge-intensive, being in the hands of a group of knowledgeable employee from across the organization and the success of the project relies heavily upon effective management of knowledge into, within, and out of this team during enterprise system life cycle. Implementation team members are, by definition, knowledge workers. (Retrieved from Vandaie, 2008).

The initial stage of **KM** was driven primarily by information technology. Organizations—particularly the large international consulting ones—realized that their stock in trade was information and knowledge, that often the left hand had no idea what the right hand knew, and that if they could share that knowledge, they could avoid reinventing the wheel, underbid their

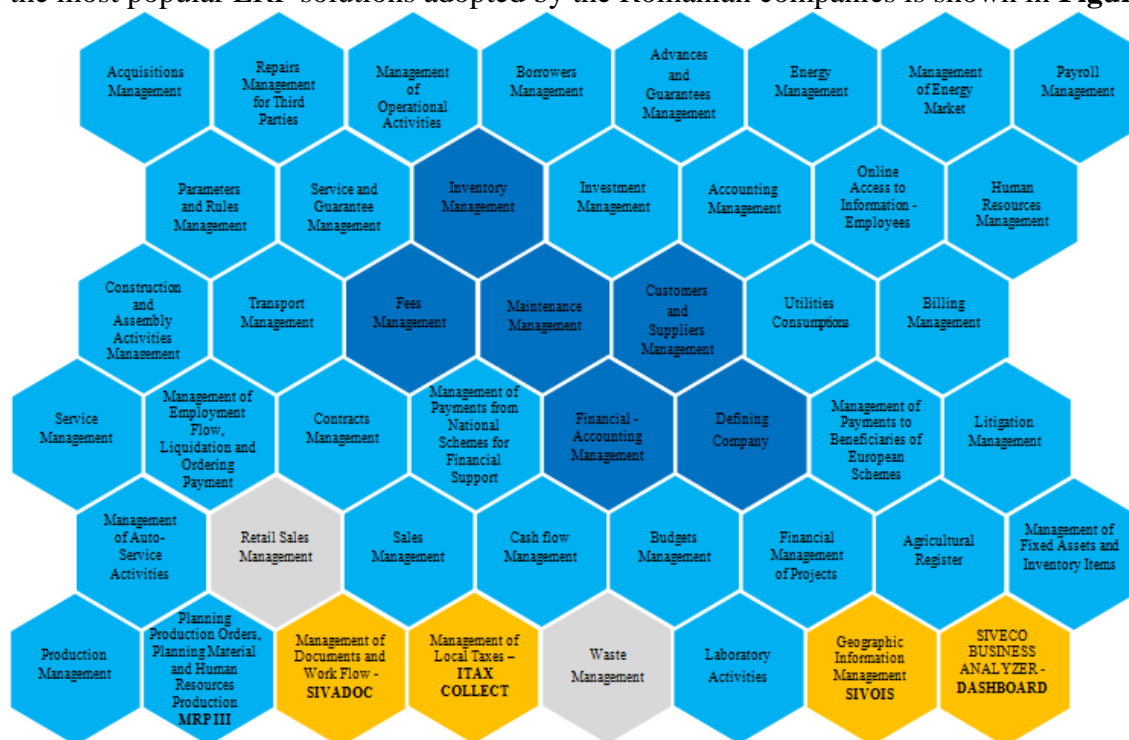
competitors and make more profit. When the Internet emerged, they realized that the intranet flavor of the Internet was a tool to accomplish that knowledge coordination and sharing. The first stage of KM was about how to deploy the new technology to accomplish those goals (Koenig, 2002). However, without the knowledge and time offered via ERP, the high speed of the Internet can simply raise expectations with limited ability to satisfy those expectations (Wallance and Kremzar, 2001). The relation between knowledge assets and the knowledge conversion processes are shown in Figure 3.

External Parties of ERP	External Knowledge Assets	SECI Process	IT Support
Consultant Vendors Supervisors Experts Other Working Partners	<b>Explicit Knowledge</b>	Combination (explicit to explicit)	Database, information repository, best practices
	<ul style="list-style-type: none"> <li>• Business/IT blueprint</li> <li>• Work plan documents</li> <li>• Product information</li> <li>• Track record</li> <li>• Users manuals</li> </ul>	Socialization (tacit to tacit)	Video conferences, electronic groups, e-mail
	<b>Tacit Knowledge</b>	Externalization (tacit to explicit)	Chat groups, lessons learned database, portal
	<ul style="list-style-type: none"> <li>• Training</li> <li>• Experience</li> <li>• Talent</li> <li>• Instincts</li> <li>• Emotions</li> <li>• Distinct abilities</li> <li>• Problem solving</li> <li>• System configuration</li> </ul>	Internalization (explicit to tacit)	Computer-based simulation & communication

**Figure 3. Knowledge assets and SECI Process in the context of ERP implementation**  
 Source: Based on Mahendrawathi ER, *Knowledge Management Support For Enterprise Resource Planning Implementation*, Elsevier, 2015

**7. ERP SOLUTIONS IN ROMANIA**

One of the most popular ERP solutions adopted by the Romanian companies is shown in Figure 4.



**Figure 4. SIVECO ERP Romania**

Source: Based on <http://itchannel3.itchannel.ro/mobilitatea-ofera-un-mare-avantaj-competitiv-companiilor-romanesti/>



## 8. CONCLUSIONS

Regarding the relationship created between knowledge management as business process and modern business technologies as business tools, we can talk about interdependence between those two for achieving organizational objectives and its long-term mission. Modern technologies, such as ERP systems, are tools without which exploitation of knowledge, primarily the explicit ones, would not be efficient and would cost more time and risk-taking = money. When we are discussing about capturing and sharing tacit knowledge and convert them, infer the need for human experts to manage the interactions between explicit and tacit and for managing the effects. An ERP system streamlines decision making, daily decisions. If we consider strategic decision-making, the role of human decision maker and teams is imperative. In this sense an ERP system is useful to the point that, to automate can become harmful for a lifetime business. Modern corporations afford, today more than ever, to invest in ERP systems, because this integrated modular systems become, within the implementation, a knowledge and information bearer tool, continually updated and accessible horizontally and vertically in the main departments and function of the organization.

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