Ewa KARBOWNIK
Uniwersytet Ekonomiczny w Katowicach
Wydział Finansów i Ubezpieczeń

ADVANTAGES AND PROBLEMS RELATED TO IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING SYSTEM

Summary. The aim of this article is to identify and critically analyse numerous issues and challenges related to the implementation of Enterprise Resource Planning system. It begins with a brief introduction to the history of IT management support systems, where the evolution of the ERP concept is discussed. The author explains what are the benefits and potential problems for a company introducing ERP with the focus on ERP systems widely used in production businesses, as this solution was developed to meet the changing requirements of the manufacturing industry. Therefore potential enhancements offered by ERP are discussed, mainly connected with production rationalization. The author points out that using one, unified database that can be accessed by all employees simultaneously, affects almost all functional units of an enterprise and discusses what tangible benefits arise from such a solution. The architecture of an ERP system is described on the basis of a solution offered by SAP – SAP ERP. Due to ERP applications, the circulation of information is improved through acceleration. What is more, the redesign of internal business processes required for ERP implementation might be perceived as an incentive for further changes.

Keywords: Enterprise Resource Planning system, ERP implementation, advantages, problems, SAP ERP

ZALETY I PROBLEMY ZWIĄZANE Z WDROŻENIEM SYSTEMU ZARZĄDZANIA ZASOBAMI PRZEDSIĘBIORSTWA

Streszczenie. Celem niniejszego artykułu jest zidentyfikowanie oraz przeanalizowanie w sposób krytyczny licznych wyzwań związanych z wdrożeniem systemu zarządzania zasobami przedsiębiorstwa. Punktem wyjścia do dalszych rozważań jest wprowadzenie do historii informatycznych systemów wspomagania

zarządzania, gdzie omówiono ewolucję standardu ERP. Autorka wyjaśnia, jakie korzyści oraz problemy wynikają z wdrożenia systemu, koncentrując się na systemach ERP wykorzystywanych w firmach produkcyjnych, jako że rozwiązanie to powstało w celu zaspokojenia zmieniających się potrzeb przemysłu wytwórczego. Z tego powodu w artykule omówione zostały usprawnienia związane głównie z optymalizacją produkcji. Autorka wskazuje, iż jedna baza danych, do której dostęp mają równocześnie wszyscy pracownicy, wpływa na wszystkie obszary firmy oraz omawia, jakie wymierne korzyści wynikają z takiego rozwiązania. Architektura systemu ERP została omówiona na przykładzie produktu oferowanego przez SAP – SAP ERP. Zastosowanie systemów klasy ERP wpływa na usprawnienie obiegu informacji poprzez jego znaczne przyspieszenie. Co więcej, przeprojektowanie wewnętrznych procesów gospodarczych organizacji, wymagane przy wdrażaniu omawianych systemów, może być postrzegane jako bodziec do dalszych zmian.

Słowa kluczowe: System Zarządzania Zasobami Przedsiębiorstwa, wdrożenie systemu ERP, zalety, problemy, SAP ERP

1. Introduction

Nowadays companies are operating in a constantly changing business environment where market expansion is driven by rapid paced globalization. Competition is enormous in almost all sectors and additionally, it is being intensified by a wider range of available products and the shortening of product life cycles. According to Klonowski (2004) 30 per cent of products offered nowadays by innovative corporations were not on the market five years ago, and over 50 per cent of the products that will be used in the 21st century have not yet been developed. To some extent, the unpredictability of demand forces enterprises to adopt new approaches in order to remain competitive and responsive. Among the most important challenges that today's companies need to face, the quality of merchandise, punctuality of deliveries and customer service are well worth mentioning. All of these are based on the relevance of information. Bateson formulated the following definition of information: "a difference which makes a difference" (1979). According to Brilman (2000) information is created as a consequence of data integration and sorting. Information technology, on the other hand, offers a wide range of solutions which enables companies to effectively manage information flow and therefore gain a strategic advantage. One of the solutions offered by the IT sector are Enterprise Resource Planning systems.

The history of ERP systems dates back to the late 1950s of 20th century and is tightly connected with the development of information technology and computers in the first place. As early as 1960, computers were used to automate simple business routine tasks (Shields, 2001). These early applications were designed by internal Information Systems Departments

or by external consultants. However each application covered one area – general ledger, accounts payable, accounts receivable or fixed assets (the financial side of an organization was first to be automated). It resulted in huge diversity of applications across various enterprises, often purchased from different vendors and then adjusted to the specific needs of an organization. The beginning of the 1970s brought a significant change in the construction of management support systems. In 1972 five employees left a German subsidiary of IBM in order to set up a company creating standard financial software. Numerous companies began to compile standard payroll and HR applications, all licensed. Despite the fact that created systems joined several functional areas, they still covered only a small part of an enterprise's activity. Since the need for further information integration was clearly visible, vendors started to advance software applications they offered. By the end of the 1980s, the market for fully integrated suites of applications developed and new solutions, MRP (Material Requirements Planning) and subsequently MRP II, were launched. The latter covered almost all of the managerial areas, from production setting, through production planning and control to sales and distribution of produced goods (Klonowski, 2004). Notwithstanding, MRP systems were designed mainly for manufacturing businesses. In the 1990s a new standard was developed – ERP, which enabled more precise modelling of economic processes and was suitable for both manufacturing and service sector organizations. Revolutionary in those days, this model was created to manage almost all aspects of a business.

In 1999 the Gartner Group, an IT!research and advisory company providing technology related!insights, stated that "ERP standard is already dead". Since the beginning of the 21st century improvements of the ERP system have been developed – ERP II, EERP, eERP, iERP, @ERP, EAS, ERRP etc. (Klonowski, 2004).

Nowadays, enterprise resource planning attains far more than simply the projection of resources required for production. In today's world of constantly increasing competition, full resource planning also takes into account the company's future performance. Therefore, currently offered versions of ERP are referred as complex software solutions (or packages), which help to manage the following areas: production planning, purchasing, manufacturing, sales and distribution, accounting, customer service, human resources, controlling, and quality management. ERP offers one database, one application, and a unified interface!across the entire company (Bingi, Sharma and Godla, 1999). Over ten years ago Davenport defined ERP systems as "packages of computer applications that support many, even most, aspects of a company's information needs" (2000). Today ERP systems serve as a foundation to build a competitive advantage since various applications offered by such software packages provide the ability to quickly process information and interpret results of conducted *ex post* analyses.

2. Advantages of ERP implementation

The literature review on the subject of management support software packages proves that ERP implementation tends to save costs (Huang et al., 2009; Kang et al., 2008; Loh et al., 2006; Wieder et al., 2006), facilitate business process (Gattiker & Goodhue, 2005) and in general, a system of resource planning provides better information management as it speeds up the information flow between various business units (Federici, 2009). A simplified flow of information within an organization using an ERP system is presented below, in figure 1.
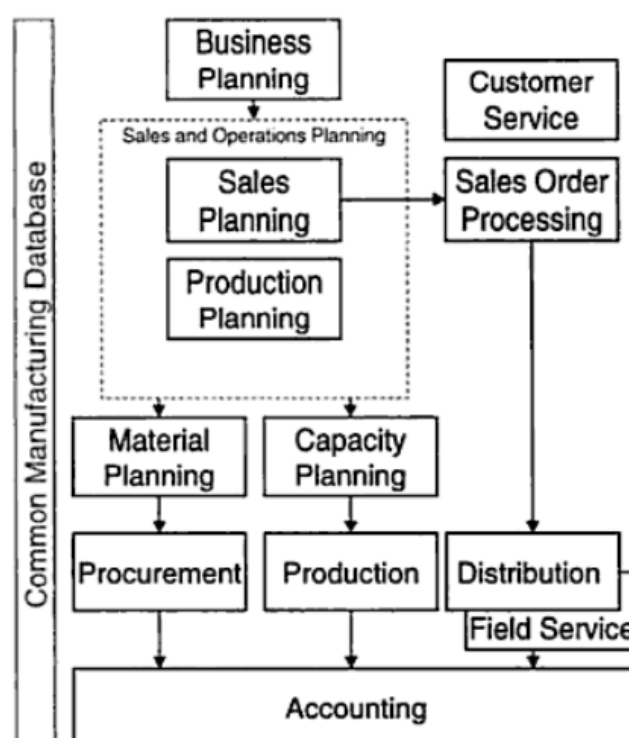

Fig. 1. Simplified Information Flows for ERP
Rys. 1. Uproszczony obieg informacji w systemach ERP
Source: Hamilton S., (2003).

Furthermore, ERP systems provide an excellent solution to the difficulties caused by fragmentation of information in organizations through integrating different functional and business areas (Davenport & Prusak, 1998). They unquestionably improve communication both internal, within an organization, and external, within the macro environment of an organization, including customers and suppliers. Since various functional units are integrated, the flow of information between them is far more efficient. According to Hamilton (2003) typical quantifiable benefits arising from ERP implementation include: cost savings

(inventory reduction, material cost reduction, labour cost reduction), improved customer service and sales, and improved accounting control. More detailed information about the benefits of ERP implementation is provided in table 1.

<div align="right">Table 1</div>

<div align="center">Benefits for business arising from ERP implementation</div>

DIMENSION	SUBDIMENDION	EXPLANATION
1. OPERATIONAL	1.1 Cost reduction 1.2 Cycle time reduction 1.3 Productivity improvement 1.4 Quality improvement 1.5 Customer service improvement	Because ERP systems automate business processes and enable process change, one would expect ERP systems to offer all of these types of benefits.
2. MANAGERIAL	2.1 Better resource management 2.2 Improved decision making and planning 2.3 Performance improvements	With a centralised database and built-in data analysis capabilities, it seems likely that ERP systems will provide informational benefits to management.
3. STRATEGIC	3.1 Support business growth 3.2 Support business alliance 3.3 Build business innovations 3.4 Build cost leadership 3.5 Generate product differentiation (including customization) 3.6 Build external linkages (customers and suppliers) 3.7 Worldwide expansion 3.8 Enabling e-commerce	ERP systems with their large-scale business involvement and internal and external integration capabilities could assist in achieving these strategic benefits.
4. IT INFRASTRUCTURE	4.1 Build business flexibility for current and future changes 4.2 IT cost reduction 4.3 Increased IT infrastructure capability	ERP systems with their integrated and standard application architecture provide an infrastructure that could support this dimension.
5. ORGANIZATIONAL	5.1 Support organizational changes 5.2 Facilitate business learning 5.3 Empowerment 5.4 Build common vision 5.5 Change employee behaviour 5.6 Better employee morale and satisfaction	The integrated information processing capabilities of ERP systems could affect the establishment of organizational capabilities.

Source: Shang S., Seddon S., (2000).

As stated by Hamilton (2003) enhanced planning reduces inventory levels by 20 per cent or more. This reduction is then translated into costs savings, particularly the costs of carrying inventories are decreased. Other instances of cost savings include the cost of interest, warehousing, handling, consumption, insurance, damage and shrinkage. Such improvements are possible due to a more precise use of information – the system indicates what is really needed. For instance, in terms of production and procurement, ERP enables adjusting the deliveries schedule to the actual needs of a company. What is more, orders for materials and products unneeded in a particular moment might be postponed or cancelled.

Furthermore, revamped purchase schedules enable devoting more attention to negotiations with suppliers (the impact on external communication is visible here) and quality improvements instead of solving potential shortage problems. Since fewer interruptions occur, less time is needed for expediting, material!handling and any extra setups. For production managers it means an opportunity to more precisely adjust production capacities to meet timetables. As the whole production is planned in a very strict manner, time management is improved. Production managers might thereby focus on managerial functions and employees' training. Saved time might also be used by the production personnel to develop better methods and enhance throughput. Labour productivity is increased due to software implementation, as is discussed by Rei (2004). Successful ERP implementation can lead up to a 10 per cent decrease in direct and indirect labour costs (Hamilton, 2003). Time necessary for manufacturing and lead time for finished goods might be additionally reduced by implementing Just-in-Time philosophy.

Another business area improved by ERP is customer service and sales. Sales and production are better integrated, which translates into increased sales. Delivery dates are met as delays are eliminated thanks to strict schedules. All of the above identified enhancements contribute to a bigger proportion of time being dedicated by sales managers to actual selling and seeking new sales opportunities instead of sacrificing this time to customers' complaints. All this leads to higher customer satisfaction and repeat!orders (Hamilton, 2003).

Moreover, an ERP system makes it possible to react to changes in demand and therefore to foresee potential delivery problems. Thus it creates the ability to undertake corrective actions, as for instance determining shipment priorities (Hamilton, 2003).

The impact of ERP might also be noticed in the accounting unit of an organization implementing this IT solution. As a consequence of fast invoice creation, the period for collecting receivables shortens, therefore the organization is able to enjoy additional disposable cash.

Although it is generally believed that ERP improves performance, cost reductions and productivity seem to be an accurate measure of the positive ERP impact in manufacturing businesses. Fuβ et al. (2007) points at effectiveness as the most common reason for using this software package in the service sector. However, ERP systems do not always influence a company's performance in a favourable way. There are "some contributing factors that affect this relationship" (Kang et al., 2008).

Enterprise Resource Planning systems should not be perceived merely as packages of computer applications. In fact they are extremely human intensive, as they require huge personnel involvement, particularly at the moment of introduction. However Kumar (2002)

argues that due to ERP implementation, managers became more "task oriented" than "human relations oriented". Furthermore, in their article Carton and Adam (2005) claim that as a result of ERP implementation the process of decisions making is somehow limited. A good example might be in the purchasing department. If parameters for a purchase order are defined in the system and a certain order falls within these limits, a manager's approval is not needed. Therefore it could be concluded that the importance of decision making has been diminished through automation. However this leads to the increase in efficiency of the procurement department and is likely to be translated into tangible benefits, as for instance discounts from suppliers. According to Carton and Adam (2005), who refer to the article by Gorry (1971) "the expansion of information systems into higher management functions has resulted in an exaggerated focus on information quality, at the expense of an emphasis on decision making models".

On the other hand, extremely quick information processing and interpreting results of *ex post* analyses as well as forecasting future effects might be perceived as huge support for decision making, since it speeds up this process.

Many authors draw attention to the importance of upper management commitment in the ERP implementation process, especially when particular processes require reengineering. According to Bingi, Sharma & Godla (1999) upper management's role in managing the change an ERP brings into an organization can be defined as a key role. Management must be involved in every stage of ERP implementation, resolve any conflicts that might occur and strengthen collaboration between various business units (Bingi et al., 1999).

Implementation of an ERP system is usually treated as a project. Therefore it requires the constitution of a project team. Members of such a team are assigned by the project manager and steering committee. As the successful ERP implementation might be of crucial importance or the company and the future utility of the system, the project team should be composed of managers and employees working in supervisory positions (Bancroft, et al., 1998), which indicates that the role of managers is influenced by ERP usage since the beginning of its existence in the organization. ERP implementation projects commonly cover selecting the IT package vendor, establishing business process redesign, implementation and assessment of the undertaken project (Wei, 2008).

3. Problems related to ERP implementation

The Adoption of an ERP system means change which must be competently managed in order to achieve success. Cooke and Peterson (1998) defined change management, from

the view point of ERP adoption, as "activities, processes and methodologies that support employee understanding and organisational shifts during the implementation of ERP systems and reengineering processes". It is important that employees are engaged in the change process, thus it helps them to overcome resistance to the new situation. Personnel becomes an integral part of the change process, more involvement should appear since the change affects employees personally. Bingi, Sharma & Godla seem to agree with the above statement: "ERP implementation is about people, not processes or technology" (1999). Since it is a huge transformation, it is crucial for success that strategic management of this change is planned carefully and implemented in a meticulous manner. It is highly likely that the decision to introduce an ERP system will have a significant impact on the strategy of an organization in the long run, since it commonly requires redesign of internal business processes (Velcu, 2007). As ERP systems constitute, to some extent, a standardized set of applications, it happens frequently that the company must decide whether to adjust the system to the specific needs of a business or to adjust the business process to better correspond with the new system (Davenport, 1998; Holland & Light, 1999).

As stated by Lech (2003) organisational changes preceding implementation of an ERP system might be divided into two groups: changes forced by the system itself and changes supported by the system. Changes forced by the system are necessary for successful adoption of ERP. Crucial here is the modification of existing organisational structures in order to adjust to the system and to fully benefit from its functionality (Parys, 1997).

Redesign of internal business processes undertaken in relation to ERP implementation determines what to change and how to proceed when designing or choosing an ERP system. The company needs to examine current business processes, identify non-value adding activities and redesign them to create value for the customer (through improving quality, timeliness or convenience). As reported by the survey conducted by Brynolfsson and Hitt (1995), greater investment in process redesign and devoting most of IT resources to enhance customer value resulted in increased productivity and improved business performance. Reshaping of the organisational structure should be undertaken prior to the ERP adoption as careful preparation is crucial for implementation success.

Although it is believed that ERP systems improve business performance, there are numerous issues related to the implementation that should be cautiously considered. Currently available ERP packages are quite flexible, but customization is possible up to a point. If for some reasons management decides not to redesign business processes, it is extremely important to choose the IT package that best suits the specific requirement of an organization, so only a slight settings adjustment is needed. However, according

to Bingi et al. (1999) "research shows that even a best application package can meet only 70 per cent of the organizational needs".

A significant number of ERP implementation failures have been reported, as for instance Nike losing shoe orders. Majed (2000) stated that 70 per cent of ERP adoptions did not achieve expected benefits. Adoption of the presented systems is highly time consuming and requires significant capital expenditures. Therefore internal processes within the implementing organisation must be defined in detail, as any oversights or mistakes made during the early stage of an ERP adoption might cause failure. Implementation failure may lead to a drop in market price or losing market share and competitive advantage (Nelson & Ramstad, 1999). What is more, unsuccessful ERP implementations could even lead to bankruptcy, as it happened with FoxMeyer Drug in 1996 (Tiazkun, 1998).

A main reason of ERP system implementation failure is the mismatch between the system and the organisation (Umble et al., 2003).

4. System's architecture – SAP ERP

The first step in an ERP implementation project usually is selecting the IT package vendor. As mentioned above, it is of crucial importance to choose a solution appropriate for a particular enterprise. Currently among major players on the ERP systems market the following three vendors might be mentioned as the most frequently chosen: SAP, Oracle and Microsoft Dynamics (Panorama Consulting Group, 2011). Table 2 presents the structure of the ERP market, divided into 3 tiers.

Table 2

Structure of ERP market (2010)

TIER I	TIER II	TIER III
SAP	Epicor	ABAS
Oracle	Sage	Activant Solutions Inc.
Oracle eBusiness Suite	Infor	Baan
Oracle JD Edwards	IFS	Bowen and Groves
Oracle Peoplesoft	QAD	Compiere
Microsoft Dynamics	Lawson	Exact
	Ross	Netsuite
		Visibility
		Blue Cherry
		HansaWorld
		Intuitive
		Syspro

Source: Panorama Consulting Group (2011).

In 2010 vendors from Tier I and Tier II constituted 64 per cent of the market and comparing these results with previous years, the market share had not changed significantly. According to analysis conducted by Panorama Consulting Group (2011) SAP is unquestionably the market leader, however continuously facing strong competition from Oracle.
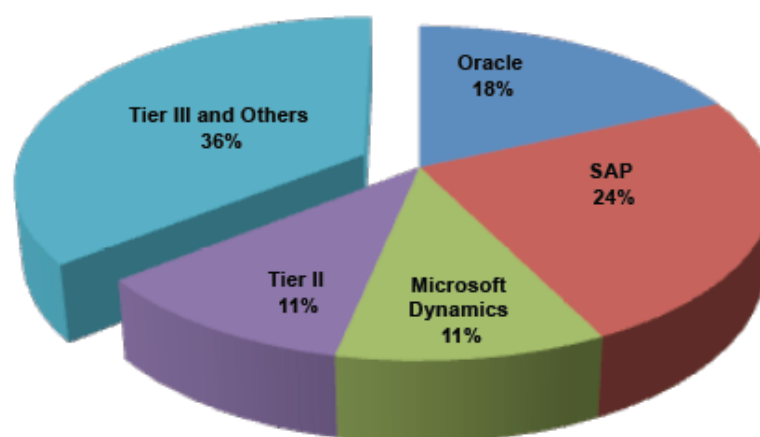

Fig. 2. Vendor market share in 2010
Rys. 2. Udział producentów systemów ERP w rynku w 2010 roku
Source: Panorama Consulting Group (2011).

Due to the leading market position of SAP, a description of ERP system architecture will be based in this article on the product offered by SAP – SAP ERP. SAP-ERP is an application included in SAP Business Suite software. Other applications constituting this package are listed below (SAP, 2012):

−   SAP Customer Relationship Management (SAP CRM),
−   SAP Product Lifecycle Management (SAP PLM),
−   SAP Supply Chain Management (SAP SCM),
−   SAP Supplier Relationship Management (SAP SRM).

Functionality of SAP ERP system is presented in detail by Ausztol et. al (2012). In general, architecture of an IT system might be divided into two areas: technical and functional (Auksztol et al., 2012). Technical area of an ERP system is composed of two subareas:

−   System administration (BASIS), which is usually maintained by investor's IT Department. Activities performed within this area include integration of ERP system with other existing systems, solving problems related to efficiency or networking, granting system authorisation, creating backups in accordance with the strategy of data protection adopted by the organisation.

- ABAP development environment – programming environment fully integrated with SAP-ERP. Important here is that basic functional modules of SAP-ERP are programmed in ABAP, which increases flexibility of the system. Existing access to the source code provides insights into the system's architecture which on the other hand is helpful while adjusting the system to the specific processes of an organisation. During the early stage of ERP adoption programming tasks might be accomplished by external consultants from the implementation company, afterwards by employees with appropriate knowledge on this subject.

Within the functional area of an SAP-ERP system the following two components might be distinguished (Auksztol et al., 2012):

- Functional menu – known also as SAP Easy Access, used by the end-users. This menu allows to perform business operations in the system.
- Functionality configuration – provides ability to define parameters of the system, as for instance, presentation of data and figures, determining default national languages.

For the users of an ERP system, the functional area means simply particular functional modules which support all of the processes within an organization. Integration and administration of these modules is based on the following two principles (Parys, 2007):

- **Straight through processing** – particular data is recorded only once in one place in the system, which allows to eliminate inconsistent data.
- **Zero latency enterprise** – particular data is available to all employees using the system immediately after entering.

SAP ERP delivers three solutions within the functional area of the presented application:

- SAP ERP Financials,
- SAP ERP Human Capital Management,
- SAP ERP Operations.

SAP ERP Operations is the solution of crucial importance for the majority of manufacturing enterprises using ERP systems to support their operational performance. It consists of the following modules:

- SD – Sales & Distribution

    This module enables registration and monitoring of sale transactions. Therefore handling of sales documents, such as sales orders, offers and contacts become easier and more efficient. Demand created by actual sales is integrated with material planning requirements, which provides better control of stock availability and enhances planning and control of deliveries to customers as well as scheduling deliveries from subcontractors. Throughout the consignment control SD module there

is the opportunity to use LIFO or FIFO when valuating material consumption. Another issue related to sales and distribution, namely returns and customer complaints handling as well as warranty and service management, is also included in this module. Furthermore, SD remarkably helps in price and tax calculation, and also in credit line management. Due to creation of document printouts in generally recognizable formats, such as: .xls, .doc, .txt, .pdf, .html and electronic data interchange (EDI) is easier.

–   MM – Material Management

This module is particularly integrated with the following modules: PP – Production Planning, PM – Plant Maintenance, WM – Warehouse Management. MM is responsible for material requirements planning, material procurements, inventory management, stock valuation, checking and recording invoices in the accounts.

–   WM – Warehouse Management

Using predefined strategies, this module suggests the following solutions to its user: the location where material should be placed in the warehouse; location from which the material should be collected; place of order picking.

–   PP – Production Planning

This is the most comprehensive module included in logistic application offered by SAP. It supports all of the activities related to production, beginning with management of information concerning materials – raw materials, semi-finished products and products. This contributes then to advanced planning and balancing of production resources. PP facilitates process line capacity management. Furthermore, this module supports management of workplaces and production capacities assigned to them which is extremely helpful in determining production costs on each stage of production process. Since historical information concerning sales is available in the system, production scheduling might be based on sales projections. Another unquestionable advantage of PP module is that it creates the opportunity to link multilevel production processes. Due to all the above mentioned enhancements, full monitoring of production process performance is possible.

–   QM – Quality Management

This module supports actions undertaken by the organization in order to plan and control determined quality level. Additionally it provides control over the creation of quality certificates and management of quality problems.

- PM – Plant Maintenance

    PM module supports all the operations connected with management, performance and control of plant maintenance. It provides insights into the organisational structure of maintenance services. In addition basic performance of plant maintenance concerning planning and accomplishment of its actual activities is reflected in this module in detail. The PM module supports the creation of a plant maintenance information system.

SAP ERP Human Capital Management helps in the administration of employees' personal data, Additionally, it is composed of various tools supporting the recruitment process and personnel selection (Lech, 2003). The following three modules are included in this solution:

- HR-PA – Human Resources – Personnel Management

    This module is responsible for employees' personal data management and reflects the organisational structure in detail.

- HR-PE – Human Resources – Training and Event Management

    HR-PE supports, among other things, the preparation of training budgets within particular organisational units. The following functions are available within the HR-PE module: registration of trainings dates (current and future), confirmation and cancellation of trainings dates, reservation, substitution and cancelation of participation, evaluation of trainings and their participants, automatic personnel qualifications update, notifying when training is required – as a result of an employee's evaluation.

- HR-PY – Human Resources – Payroll

    This sub module of SAP ERP Human Capital Management facilitates payroll calculations and related to payroll settlements with financial institutions. It provides also full integration with financial modules such as FI and CO.

SAP ERP Financials provides support with facing changes in financial reporting standards, improving cash flow and managing financial risk. Below are presented particular modules of this application (Auksztol et al., 2012):

- FI – Financial Accounting

    This module is responsible for external financial reporting since it simplifies preparation of balance sheet and profit and loss account for purposes of external institutions, such as GUS, banks and also for shareholders. The following components might be distinguished within the functionality of this module: FI-GL (General Ledger), FI-AR and FI-AP (trade Receivables and Payables), FI-AA (Fixed Assets Accounting), FI-BL (Bank Ledger).

- CO – Controlling

  Presented module provides support with analysis of costs and revenues. Since it enables planning and budgeting of costs and revenues, control of availability of funds assigned in the budget is possible. Furthermore, this module provides help in material price calculations, which on the other hand enables enhanced accounting of indirect costs and accounting of production costs. Information processed in the CO module are consistent with internal requirements of an organisation which might be clearly visible in the example of the function related with reporting of costs and revenues in accordance with cost centre accounting, existing profit/cost centres.

- IM – Investment Management

  IM provides support for its users on each stage of an investment process, beginning with the investment proposal, through analysis and approval or rejection of this proposal, to the end of the creation of the investment plan, and through the realisation of particular tasks and purchases related to undertaken projects and control of this process. Since tight connection between investment management and material management may occur, this module is tightly integrated with MM (Material Management module). Going further, IM module enables automatic material reservation and creation of purchase order based on declared requirements.

- PS – Project System

  The PS module supports decision making and enables optimisation of economic processes in the course of planning and completion of tasks related to undertaken projects. Project system might be used as a tool supporting management of the following projects: research and development projects, job order manufacturing, investment projects and maintenance projects. This module provides help on each stage of project completion, including planning and availability control of material requirements, production capacities and any assisting means, budgeting, reporting through information system.

- RE-FX – Real Estate Flexible

  Functionality of this module provides insights into the structure of properties, from technical, architectural and functional point of view. It supports the following actions: property leasing, lease agreements, management of any services related to properties including modernization and maintenance and controlling processes.

- FM – Funds Management

  This module is responsible for planning, realisation and monitoring of expenditure and revenues of an organisation, very often used in the public sector.

Due to the functionality of FM each stage of the funds spending process might be investigated.

In practise it is extremely hard to find organisations who takes advantage of the whole range of ERP system functionality. Despite the fact that all of the modules included in SAP ERP are tightly integrated, due to the system's construction it is not necessary to implement all of them. However it is reasonable to introduce in the early stage of implementation basic financial modules – FI, FI-AA, CO. When the implementation process begins with other modules, investors should consider their integration with the financial area.

5. Conclusions

Nowadays it is hardly impossible to imagine the world without information technology. The amount of information that organisations face everyday is so unreasonably huge that some sort of support is needed. At this point supportive role of IT commences to be appreciated. One of the IT solutions widely used to support business performance of an organisation is Enterprise Resource Planning system. It is important to emphasize here that nowadays the concept of 'resources' goes far beyond the traditionally perceived means required for production. Furthermore, it covers all functional units of an organization and involves planning of enterprise future results. However, the adoption of an ERP system means change which must be competently managed in order to achieve success.

The literature on the subject of ERP provides a wide range of case studies which clearly show what tangible benefits implementation of this IT solution brings to the organization. The Earthgrains Co. for example implemented R/3 package created by SAP and claims to increase its operating margins from 2.4 to 3.9 per cent. What is more, its rate of products delivered on time increased to 99 per cent (Sweat, 1998). Similarly, at Par Industries in Moline, IL, ERP usage made it possible to base manufacturing on current customer orders instead of using projections of future orders as a production volume determinant. The punctuality of deliveries was improved – with ERP in use 95 per cent of orders were dispatched on time compared to 60 per cent before implementation. Going further, as a consequence of ERP implementation, repricing of all its products became for IBM Storage Systems division a matter of five minutes. Before the implementation this process used to take five days. What is more the system helped to reduce the time needed for shipping a replacement part by 19 days, and the time to perform a credit check was shortened from 20 minutes to three seconds (Davenport, 1998).

All the discussed improvements are possible because ERP systems are real-time in nature. Nowadays ERP systems are based on an open client/server architecture which means that clients can process information even from far. Every change in the database influences the whole supply-chain process. The core advantage arising from using ERP is that one database exists across the whole company and as a consequence the same information is immediately available for all employees of each business unit of an organization throughout one uniform user interface. Numerous benefits might be simultaneously obtained from introducing this system. They can result from integration of information as well as from the business process redesign and the entire culture of the business. ERP implementation somehow forces to define and change some of the business operations. It can be beneficial for the company, as it might constitute an incentive for further changes and at the same time facilitate them. As a consequence of an ERP system adoption internal business process is simplified and general performance of a manufacturing enterprise becomes more effective trough elimination of potential production shortages.

An ERP system might be used for up to 15 – 20 years if maintained, extended and updated in an appropriate manner. According to QAD, a successful international vendor of ERP packages, possible ways of lengthening the life cycle of this software include: maintaining the current version of the software, conducting technical upgrade, upgrade of business processes combined with technical modernization or complete system reimplementation.

Although numerous benefits arising from an ERP system adoption have been mentioned in this article, it is reasonable to take into account difficulties encountered by companies introducing this IT solution in the past. Among the most important reasons of implementation failure, mismatch between system and organisation resulting from poor preparation for change caused by this implementation is listed in the first place. Unsuccessful ERP adoption might be a serious threat for the organisation profitability, what is more it might even lead to bankruptcy.

It is worth remembering that none of the IT software packages, including ERP, is a perfect one. Some companies have such unique business processes that it is almost impossible for them to adjust to the rigid system. In such a case it is reasonable to be *best-of-breed*, which means purchasing particular applications from different vendors in order to obtain the best solutions available on the market. Although purchasing individual components of software package from different sources might be risky. When purchasing one complex software package, it should be evaluated and selected extremely carefully in order to minimize potential risk of mismatch between the system and organisation. Furthermore, it should be taken into consideration that ERP system might be the 'backbone'

of a company's applications, but in today's world of e-business it should be integrated with other complementary technologies, as for instance groupware or intranet.

To summarize, implementation of Enterprise Resource Planning system and its further use is a challenging process which requires a high level of management commitment, remarkable capital involvement and quite a big portion of time (Laukkanen et al., 2007). As Mike Greenough (President and EO of SSA Global) explained it in a 2003 presentation to the SSA Global Client Forum "Implementing an ERP system is like brain surgery: you only want to do it once".

Bibliography

1. Auksztol J., Balwierz P., Chomuszko M.: SAP: zrozumieć system ERP. PWN, Warszawa 2012, s. 10-34.
2. Bancroft N., Seip H., Sprengel A.: Implementing SAP R/3: how to introduce a large system into a large organization. Manning Publications Co., USA 1998.
3. Bateson G.: Mind and Nature: A Necessary Unity (Advances in Systems Theory, Complexity, and the Human Sciences), Hampton Press, 1979.
4. Bingi P., Sharma M.K., Godla J.K.: Critical issues affecting an ERP implementation. "Information Systems Management", Summer, Vol. 16, Issue 3, 1999, p. 7-14.
5. Brilman J. : Les meilleures practiques de management, Éditions d'Organisation, Paris 2000, p. 397-401.
6. Brynolfsson E., Hitt L.: Information technology as a factor of production: The role of differences among firms. "Economics of Innovations and New Technology", No. 3(4), 1995, p. 183-200.
7. Carton F., Adam F.: Understanding the impact of enterprise systems on management decision making: an agenda for future research. "The Electronic Journal of Information Systems Evaluation", Vol. 8, Issue 2, 2005, p. 99-106, www.ejise.com, accessed 15.01.2012.
8. Cooke D., Peterson W.: SAP Implementation: Strategies and results. Research report 1217-98-RR, The Conference Board, New York 1998.
9. Davenport T.H.: Putting the Enterprise into the Enterprise System. "Harvard Business Review", July – August, Vol. 76, No. 4, 1998, p. 121-131.
10. Davenport T.H.: Mission Critical: realizing the promise of enterprise systems. "Harvard Business School Press", Boston, MA 2000.
11. Davenport T.H., Prusak L.: Working Knowledge – how organizations manage what they know. Harvard Business School Press, 1998.

12. Federici T.: Factors influencing ERP outcomes in SMEs: a post-introduction assessment. "Journal of Enterprise Information", No. 22(2/2), 2009, p. 81-98.

13. Fuβ C., Gmeiner R., Schiereck D., Strahringer S.: ERP usage in banking: an explanatory survey of the world's largest banks. "Information Systems Management", No. 24, 20078, p. 155-171.

14. Gattiker T., Goodhue D.: What happens after ERP implementation: understanding the impact of interdependence and differentiation on plant-level outcomes. "MIS Quarterly", No. 29(3), 2005, p. 559-585.

15. Gorry G.: The development of managerial models. "Sloan Management Review", Winter, 1971, p. 1-16.

16. Hamilton S.: Maximizing your ERP System – a practical guide for managers. McGraw-Hill Companies, 2003, p. 4-17, 36-50.

17. Holland, C., Light B.: A Critical Success Factors Model for ERP Implementation. IEEE Software, May/June 1999, p. 30-35.

18. Huang S.Y., Huang S.-M., Wu T.-H., Lin W.-K.: Process efficiency of the enterprise resource planning adoption. "Industrial Management & Data Systems", No. 109(8), 2009, p. 1085-1100.

19. Kang S., Park J.-H., Yang H.-D.: ERP Alignment for Positive Business Performance: Evidence from Korea's ERP Market. "Journal of Computer Information Systems", Summer 2008, p. 25-38.

20. Klonowski Z.J.: Systemy informatyczne zarządzania przedsiębiorstwem – modele rozwoju i właściwości funkcjonalne. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2004, s. 92-98.

21. Kumar S.: A study of change in the Manager's job due to process change and ERP implantation with the focus on managerial roles and competencies. Ph. D. The, 2002.

22. Laukkanen S., Sarpola S., Hallikainen P.: Enterprise size matters: objectives and constraints of ERP adoption. "Journal of Enterprise Information Management", No. 20(3), 2007, p. 319-334.

23. Lech P.: Zintegrowane systemy zarządzania ERP/ERP II – wykorzystanie w biznesie, wdrażanie. Difin, Warszawa 2003, s. 11-32, 50-62.

24. Loh T., Koh S., Simpson M.: An investigation of the value of becoming and extended enterprise. "International Journal of Integrated Manufacturing", No. 19(1), 2006, p. 49-58.

25. Majed A., Abdullah A., Mohamed Z.: Enterprise resource planning: A taxonomy of critical factors. "European Journal of Operational Research", No. 146, 2003, p. 352-364.

26. Nelson E., Ramstad E.: Hershey's Biggest Dud Has Turned Out to be New Computer System. "The Wall Street Journal", CIV (85), 1999, p. A1-A6.

27. Panorama Consulting Group, 2011 ERP Vendor Analysis, http://panorama-consulting. com/Documents/2011-Guide-to-ERP-Systems-and-Vendors.pdf, accessed 28.01.2012.

28. Parys T.: Reengineering we wdrażaniu MRP II. Human Computer Interaction'97, edited by B. Kubiak, A. Korowicki. Fundacja Rozwoju UG, Gdansk 1997, s. 211-216.

29. Parys T.: Wdrożenie system ERP w kontekście oporu pracowników wobec zmian, [w:] Porębska-Miąc T., Sroka H.: Systemy wspomagania organizacji. Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice 2007, s. 528-537.

30. Rei C.M.: Causal evidence on the "Productivity Paradox" and implications for managers. "International Journal of Productivity and Performance Management", No. 53(2), 2004, p. 129-142.

31. SAP, ERP Software from SAP: A foundation to execute your business strategy, www.sap.com, accessed 27.01.2012.

32. SAP, SAP Business Suite – run, grow and transform your business, www.sap.com, accessed 27.01.2012.

33. Shang S., Seddon S.: A comprehensive framework for classifying the benefits of ERP systems. Proceedings of Americas Conference on Information Systems, 2000.

34. Sweat J.: ERP – Enterprise Application Suites are Becoming a Focal Point of Business and Technology Planning. "InformationWeek", No. 704, October 26, 1998.

35. Tiazkun S.: SAP Sued for $500 Million. "Computer Reseller News", August 26, 1998, p. 42-44.

36. Umble E., Haft R., Umble M.: Enterprise Resource Planning: Implementation Procedures and Critical Success Factors. "European Journal of Operational Research", No. 146, 2003, p 214-257.

37. Wei C.-C.: Evaluation the performance of an ERP system based on the knowledge of ERP implementation objectives. "The International Journal of Advanced Manufacturing Technology", No. 39, 2008, p. 168-181.

38. Wieder B., Booth P., Matolcsy Z.P., Ossimitz M.-L.: The impact of ERP systems on firm and business process performance. "Journal of Enterprise Information Management", No. 19(1), 2006, p. 13-29.