Summary

Knowledge is considered as an enterprise's invisible assets. Surviving in today's highly competitive and ever expanding global economy requires efficiently managing corporate knowledge. Increasing requirements for extended enterprises have stimulated the integration of knowledge management (KM) function into ERP systems for knowledge asset management. So far enterprise information systems such as ERP systems are developed and implemented for mainly managing physical assets of an enterprise since 1990s. Due to the fact that both types of assets need to be properly managed, the integration of KM and ERP becomes a strategic initiative for providing competitive advantages to enterprises. This paper discusses how to deploy KM and ERP concurrently in the framework of enterprise information systems, with a discussion of the interaction of KM and ERP systems in systems perspectives.

Keywords: BI, BPR, BSC, CRM, e-company, ERP, IT, KM, SCM

1. Introduction

The rise of global corporations has predicated the need for organizations to implement enterprise-wide systems for linking core operations and business units. Organizations have learned that their business units often need access to the same information but at different times during the product/service life-cycle. ERP (Enterprise Resource Planning) systems are large, integrated software packages that offer solutions for administrative (back-end) and core business processes [11], [12]. ERP systems allow for integration on the data and functional levels in a way that aims to avoid data redundancy. In today’s global economy, companies can also benefit by allowing partners, vendors and customers access to some internal information - ERP systems lend themselves well to this capability.

An ERP system is [defined as] an integrated, configurable, and tailororable information system which plans and manages all the resources and their use in the enterprise, and streamlines and incorporates the business processes within and across the functional or technical boundaries in the organization. With ERP, an enterprise can automate its fundamental business applications, reduce the complexity and the cost of the collaboration, force the enterprise itself to take part in the Business Process Reengineering (BPR) to optimize its operations, and finally result in a successful business.
2. ERP systems as ecosystem of BI-modules

Despite lack of formal specification of ERP systems, most literature sources indicate such features as [1], [10]:

- they are based on client/server architecture,
- they apply dispersed relative databases,
- they are based on fourth generation programming languages,
- they have graphical user interface,
- they include an entire enterprise in their activity, supporting organisations of department (global) structure. Additionally, integration of functioning contributes to development of other essential activities in an enterprise (e.g. product information management, production executive system etc.), as well as distribution activities.

The scope of popularisation of ERP systems in terms of IT support of modern organisations allows for a thesis that they are perceived as an element of IT architecture which in practice is a condition of their effective operation. ERP systems are subject to evolution, among others, under influence of new business requirements, changes in technology of IT solutions and technical infrastructure. They are characterised by strong orientation towards building relationships with clients and business partners and so called system intelligence.

IT support of management processes in companies became a synonym of a modern organisation. It must be remembered that IT technologies fulfil two main functions: service and innovation. The former allows for effective execution of company strategy, e.g. by process automation or decreasing costs. Innovative function creates new possibilities of development, which would not be possible without IT. The example may be actions associated with reaching new segment of clients or building new model of competition. Both these functions in an essential way influence level of return rate from invested capital and potential of its growth. At the same times opinions emerge that IT ceased to have strategic significance in a company, since it became a generally available resource and relatively increasingly cheaper. This may mean that it does not provide competitive advantage anymore. In terms of so-called referential models, exemplary business processes and best practice are incorporated in functionality of IT systems of ERP class. Due to their ability to multiplicity those systems become available to all companies which are willing to implement them. Thus, postulates appear to only invest in verified solutions and focus, in terms of SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) – mostly on weaknesses of companies and there to look for opportunities for organisation authorisation.

Experience of recent years indicates that traditionally construed ERP systems are not sufficient anymore. Their basic functionality was enriched with CRM (Customer Relationship Management), SRM (Supplier Relationship Management), SCM (Supply Chain Management) and PLM (Product Lifecycle Management) [4], [12], [15]. At the same time, development of ERP systems aroused demand for IT solutions referred to as Business Intelligence. They mean effective support of decision-making processes based on so-called Business Analytics. It involves tools and applications for analysing, monitoring, modelling, presenting and reporting data supporting decision making. To this purpose, data warehouses, operational analyses of supply chains, CRM and SRM analytical systems, financial analyses and enterprise capacity indexes are used. Users of such solutions include strategic levels of companies, basing on certain data aggregates.
Model approach to knowledge management system in an enterprise implies a key position for ERP systems, which in terms of IT support management of all enterprise resources. Such a system optimises processes, both internal and those occurring in the nearest surroundings of an enterprise by offering ready tools, allowing for automation of data exchange with co-operators in an entire logistic chain. Application on a mass scale of Internet technologies in IT systems strengthened mechanisms of globalisation of economic operations and integration of connection chains between business partners. It is accompanied by advancing information revolution, whose task is providing information necessary for effective support of corporate decisions. Only ERP II systems, with significantly extended functionality in comparison to ERP, may face this challenge. Business processes executed in their framework significantly exceed area of operation of a single enterprise. They combine information flows within integrated economic areas, including business partners, financial and insurance institutions, science and research institutes and other links of organisation’s surroundings, using internet technologies and electronic market mechanisms (among others Internet auctions and exchanges).

ERP II systems allow for extension and deepening of scopes and functionality of integrated solution, as well as focusing on strategically important tasks for company operation. They use new IT business technologies and categories of solutions, including [5]:

- Data warehouses (DW) and Business Intelligence (BI),
- APS (Advanced Planning and Scheduling techniques),
- CPM (Corporate Performance Management),
- BSC (Balanced ScoreCard).

Whilst analyzing the BI definitions four basic approaches to the concept can be noticed where it is interpreted as [8]:

- a management concept which goal is to assure that the managers obtain information of appropriate quality and in due time,
- an information technology solution which means dedicated applications allowing an advanced analysis of data (queries, reports, analysis),
- a system architecture comprising, first of all, data warehouses, query and report tools, online analytical processing, statistical analysis and data mining,
- a system solution resulting from the strong co-operation of information technology and business where BI is not only a tool for data analysis, but also the preparation and conduction of this analysis.

Range of popularization of ERP systems in terms of information technology support of modern organizations allows for a thesis that they are perceived as an element of information technology architecture, which practically constitutes a condition of their effective functioning. ERP systems are subject to evolution, among others, under influence of new business demands, changes in information solution technologies and technical infrastructure. They are characterized by strong orientation towards building relations with clients and business partners and so-called system intelligence [1], [4], [14].
3. Evolution of ERP systems in knowledge management

As business needs evolve and core processes are connected through automation, the following are likely to be components of the next-generation ERP systems [6]. Systems will likely be:

- heterogeneous (components from different vendors will coexist in the system; components and integration are necessary),
- collaborative (the systems will include enterprise-centric processes and collaborative (partner/vendor) processes and interfaces will be web accessible),
- intelligent (ERP systems will hold more confidential information that will be used for analysis, strategy planning and investigation),
- knowledge-based (analytics from the system will support daily business decision making including knowledge-based operations, management and communication),
- wireless (web-based ERPs will be accessible from mobile locations).

Relationship BP (Business Processes), KM and ERP is shown in fig. 1.

![Diagram of BP - KM - ERP relationship](image)

**Fig. 1. Relationship: BP – KM – ERP**

Next generation ERP systems are being designed with an emphasis on flexibility and scalability. Fast changing business needs, industry consolidation and rapidly evolving technology will all play a role in the design of future enterprise-wide systems. Companies are committed to developing tools that will increase productivity, decrease product time to market and encourage collaborative processes within their supply chains. Companies are anxious to implement systems
that will meet their business needs for a decade or more. The database structure of a future ERP system will likely include the following design parameters [2], [15], [16]:

- componentized - different business functionalities are designed as different components,
- integrated - components are integrated and seamless data flows between components allowing them to collaborate as a one function,
- flexible - the system is expandable and compatible with the old systems; changes to the business processes and strategies are easy to fulfill,
- tailorable - the system should be easily configured according to the enterprise’s needs,
- real-time - the components work in real time, online, and batch processing modes should be available,
- profitable - the system must have the potential to reduce the cost or increase profit, since these are a company’s basic requirements and motivations,
- secure - the security schema has to be enforced to protect various enterprise resources regardless whether it is appropriate or sufficient.

4. Conclusions

Pragmatics of implementation and exploitation of ERP systems and performed deliberations allow for drawing the following general conclusions [6], [7], [9]:

- ERP systems constitute a key element in enterprise architecture of e-companies as a specific information technology ecosystem,
- in the last 2-3 years or so, ERP vendors have recognized and begun to meet the needs of companies that seek to mine BI information from their ERP systems; many companies have taken advantage of the BI capabilities ERP vendors provide, and most of these companies also have other BI packages that they "layer" over their ERP packages,
- dynamic evolution of ERP systems expands their functionality with SRM, PLM, CRM, SCM and BI modules,
- ERP create a basis of integrated information technology systems with advanced Business Intelligence, which constitute a basis of ultimate knowledge management system in e-company,
- often, however, many companies carry out the process of integrating BI capabilities with their ERP systems in an ad hoc manner. The result is a quagmire of multiple BI packages, legacy information systems - and perhaps even multiple ERP packages,
- one way to avoid a BI/ERP quagmire is to ask the right questions before begin the process of tying BI capabilities to ERP systems.

Bibliography


Piotr Adamczewski
Poznan School of Banking
Al. Niepodległości 2, 61-874 Poznań, Poland
e-mail: adamczewski@wsb.poznan.pl