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## **OPTIMIZATION OF ENTERPRISE PROCESSES BY MEANS OF IMPLEMENTATION OF AN EFFICIENT ERP SYSTEM**

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■ **Abstract:**

*Optimal functioning of an enterprise in the present era of knowledge economy is related with the demand of efficiency increase in organizing, planning, control and outputs of flows beginning with development and purchase and ending by manufacturing and distribution according to needs of customers so that all conditions of market by minimal costs and capital expenses, while maximizing income of the enterprise. These facts lead to the demand for a qualitative and efficient information system of the enterprise, which is at present becoming the key factor of success on the market. The enterprises that do not put their attention to inclusion of modern information technologies are getting themselves into strategic disadvantage compared to their competition.*

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■ **Keywords:**

*ERP system, optimization of enterprise processes, implementation, efficiency*

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■ **INTRODUCTION**

*The present economics is mainly characterized by globalization and accelerating dynamics of market and production cycles. The terms of deliveries are getting shorter, competition is increasing, the complexity of services is getting broader and control of relations with customers is changing. The enterprises that do not continuously focus on implementation of modern information technologies are getting into competitive disadvantage and they can easily find themselves in crisis. The importance of information systems that are becoming a key factor of success is therefore increasing.*

*The presented article deals with clarification of foundations of information systems, evaluation of demands on an efficient ERP system, the process of design and approach of creation of an efficient information system will also be clarified. The article also contains analysis of incorporation of a chosen information system in a chosen enterprise, together with its situation*

*before implementation of ERP system through the course of implementation of the system to evaluation of its advantages.*

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■ **THE FOUNDATIONS OF ERP SYSTEMS**

*Enterprise Resource Planning (ERP) is designation for a software system that is set to support and automate processes in an organization. It is usually a broad package that covers areas of production, distribution, human resources management, project control, salaries and accounting. Companies usually do not use all the modules, just the part they need. ERPS promises to integrate all sections and operations of a company into a unified software package. In the last years, the definition of ERP is getting broader with new terms and areas. Modules like Customer Relationship Management or Supply Chain Management or business intelligence are becoming parts of ERP systems. (Khouri et al. 2009a)*

■ **DEMANDS ON EFFICIENT ERP SYSTEM OF AN ENTERPRISE**

Information systems have to fulfill certain basic demands reflecting their quality. These ones belong among them:

- ✚ information have to be representative of substance and needs on individual levels of control,
- ✚ frequency and speed of data obtaining have to allow their efficient use by decision making,
- ✚ channels of delivery have to be modified towards the organizational structure taking in account the need of shortest path between sender and receiver,
- ✚ by delivery of data it is necessary to avoid middle elements, which deform and disturb information,
- ✚ forms of data presentation have to be communicative and flexible to possibilities of their understanding by their recipients,
- ✚ information system has to fulfill integrative function and integrate mutually or units of the company and secure feedback,
- ✚ information system has to be able to adapt to changing conditions in inner and outer environment of a company.

The basic demands on IS regarding the needs of control of an enterprise can be summarized in the following way:

- ✚ the information system has to supply the needed information inputs into the enterprise and information outputs into surroundings,
- ✚ it has to prepare all inner information needed for control,
  - ❖ it observes the course of controlled processes, obtains, measures and analyses data about the real state of the controlled processes or deviations from the set values,
  - ❖ it prepares the gathered data for processing on the appropriate media,
  - ❖ it secures input of these data for processing and manages its own processing for the needs of control.
- ✚ It has to supply to all organizational units and to every employee all information needed for their activities and this in appropriate form and needed time. The distribution of the processed data has to

secure information inevitable for decision making for the managers. By executive employees, it is giving orders and other information that precisely specify the appointed work and create assumptions for its execution.,

- ✚ It has to fulfill integration role. It has to secure interconnection of all workplaces in the enterprise and to realize the closing of feedbacks without which, control cannot exist..
- ✚ IS has to be flexible, able to develop and adapt to inner and outer conditions and changes in the control system.
- ✚ IS should be efficient, that can be understood as:
  - ❖ Inner efficiency that is demanded by rational organization of the IS, it should be the cheapest (but not at the expense of quality) and
  - ❖ Outer efficiency shown by the effect of the operation of the controlled system that is obtained on the ground of information supplied to the control. (Khouri et al. 2009b)

For any information system to fulfill its task and obtain selected aims, it has to be secured from the following sides:

- ✚ personal – qualified employees
- ✚ technical – information and other technologies,
- ✚ software organizational – means of practical use of the information system.(Al-Zabidi, 2006)

■ **SELECTION OF AN INFORMATION SYSTEM**

The selection of an information system is bound with demands laid upon it. Regarding complexity and functionality of the system, its level is directly proportional to its price. The base of every system applied in manufacturing is complex observation of supplier-customer relations, based on which operations needed for realization of supplies are executed. By using of information system, it is necessary to obtain other functions – be it the system of control and maintenance planning or the actual system of quality and production control (Khouri 2009)

It is important to realize that even if there are different types of information systems, that does not mean that only one of them can be operational in an enterprise. However in

enterprises, usually more types of IS are operated at the same time. Every enterprise has to have a transactional system. For this system many different products exist today, beginning with simple accounting application to complex solutions of the information system (such systems are usually differentiated according to the type of the enterprise and employees count). By selection of an information system it is necessary to take in account:

- ✚ **adequacy of the system** – how much time it takes for a user to obtain the needed information, if the system is user friendly or maintains the needed level of security.,
- ✚ **expandability of the system** – is the adaptively of the system regarding development of the company secured, does the system have recommendations or needed attests. Is it clear that the more unexpected malfunctions will occur the more serious will be results on total incompetence to face such problems. The information should be considered secure only when the mentioned realities are reflected in its design and operation. With ongoing time, the information system becomes a mixture of old and new elements. The ability to cooperate with specialized modules of competitive suppliers of software is also very important and is realized by data bridges,
- ✚ **lot of hardware and database platforms**, on which the system works,
- ✚ **technologic openness** – the author of the information system cooperates with external software companies on development of specific modules.

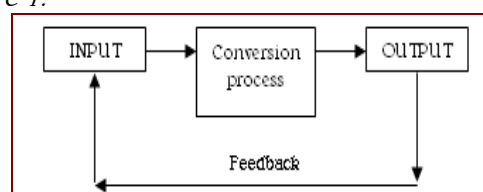
System integrators help the big enterprises that will do the analysis of needs and will set the future – desired state and will completely organize and secure transformation of the information system to the desired state. Advantage of these services lies in decrease of risk of investments into a proprietary software by absence of the needed experience, while transferring the responsibility on the system integrator. The system integrator has to have the knowledge of not very related branches (information technologies, management, logistics, system analysis, quality). (Khoury et al. 2009a)

Before selection of the information system, it is demanded to clear out your business strategy

and aims that the enterprise wants to achieve. The analytics are trying to map official and also informal flows of information. Routine information is found by filling of questionnaires. It is difficult to set the time horizon of a „common” analysis.

## ■ DESIGN OF AN INFORMATION SYSTEM

By design of an efficient information system, it is inevitable to have information about every important element of the system. In this case the system is the given organization – company. Every system has three basic elements: inputs, conversion process and outputs as shown in the figure 1.



Environment – social, economic, political, technical factors involved in operation of the system

Fig 1. The scheme of an open system

In the process of design of information system it is necessary to take in account that some systems are deterministic, what means that their elements operate in foreseeable or definable relations like clock. Problems in such deterministic system can be easily diagnosed. However, most of systems involving human factor are hard to describe and hard to solve problems in. Such more complex systems are known as stochastic and succumb to high deviations in quantity and quality of their output. All organizations, like all companies are based on human factor and are stochastic in their character.

In an ideal case the model organization system should be self regulative, with embedded methodology of output monitoring with feedback signaling results so any needed modifications could be executed – something like a thermostat that automatically turns on a furnace when temperature gets below desired point. But taking in account the reality that every organization has stochastic nature, design of self regulative system of control represents a very complex task.

To be able to progress further in solution, it is necessary to install sensors into every element of the system: into input, into the conversion

process and also into output. These sensors are part of the data – so called “indicators”, which record the course of operations and allow comparing results to standard output.

The input data have to be gathered continuously, so the demand and resources utilized in services could be observed. Operational algorithms have to be monitored continuously because of obtaining of information about exceptions, errors count and errors in operation of the system. Output information about amount and quality of services is needed to be harmonized with according processes. Except this, there is inevitable need of observation of external environment of organization – data like demographic characteristics of population, which the organization offers it services, services offered by other organization – development of competition, newest changes in ladder of values. These data indicators offer the leading employees a key that can help them in further study of situation and give them means to correct current state. (Khouri et al. 2009a)

The development of a real self regulative information system is not achievable aim. It is however possible to design a system with following qualities:

- ✚ Information system of control has to produce information, not data. It is necessary to process data and analyzes them according to set plans and only then the data can become information usable for leading employees.
- ✚ The gathered data have to be relevant to a purpose of their use. Data have to be sensitive and must supply leading employees with differential and sensible comparisons.
- ✚ Information has to be without bias. It should not be gathered and analyzed only for the purpose of acknowledgment of prophecies of ambitious and egoistic leading employees.
- ✚ The system should be understandable and synoptic. The employees doing decision making should get all important element of the system.
- ✚ Information has to be prepared in time and be to disposal before execution of needed decisions and steps.
- ✚ Information should be oriented on activities and should be in the form of such synthesis, which will make decisions easier, it

shouldn't present only passive facts about present operations.

- ✚ It is important to have data unified and precise; it should give indicators that can be compared in time internally with previous output and externally with experiences and results of other institutions.
- ✚ Data folders should be gathered with regard to aims set before.
- ✚ Expected advantages that can be obtained by using information should be higher than costs needed to get a process it. (Cehlár et al. 2005)

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### ■ IMPLEMENTATION OF AN ERP SYSTEM IN THE SELECTED ENTERPRISE

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The function of a complex information system was insufficiently substituted by software from the office package. Except the classics represented by Outlook, Word and Excel software, the enterprise has also created by its own means an application with the form of enterprise portal in FrontPage. The base of the enterprises informational structure were un-interconnected systems of building manufacture control, creation of building budgets, accounting system, salaries and human resources management.

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### ■ Situation in the enterprise before implementation of an ERP system

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### ■ Evaluation of needs of the enterprise

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There was a tender executed on design and implementation of a complex ERP system for optimization of the most important processes in the enterprise, mainly to improve control of projects and supply of complex services to



customers. The customers (the chosen enterprise) demanded interconnection of information by means of portal on the platform Share Point Portal Server. The new information system should support obtaining of strategic aims of the enterprise, thus obtaining competitive advantage. Implementation of active planning was aimed to improve control of economics and more efficient resources usage. The process of selection was very complicated and it lasted three quarters of a year. The enterprise has had a lot of experience with suppliers and it has considered also in this case many information systems. The main criteria of selection was quality, scalability, know how in the area of control of building manufacture and the most user friendly interface. The other criteria were complexity from the point of view of demands on subsidiary processes and functioning of the enterprise. Support of creation, realization and optimization of projects and support of efficient cooperation with a broad spectrum of external professional partners were also important factors.

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■ **The course of implementation of the information system**

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After ending of the tender, before beginning of implementation, the enterprise had demanded a workout of integration-implementation study that mapped processes in the enterprise. This study was a important milestone before achieving agreement between enterprise aims of the customer and possibilities of the projected information system. After negotiations and acceptance, the supplier offered a proposal of solution.

The architecture of the system was proposed with the aim to cover all enterprise processes – from search for customers, through bid and preparation of contract, realization of building, handover of the building, to completion of the project. The pillar of solution was the system for support of purchase, sales and finances. The system had to be integrated with the system of control of building manufacture and tools of Cenkos software (the software of creation of building budgets), system for humans resources management and salaries Human and with the enterprise portal offering subsidiary services, as evidence of contacts, management of

attendance, acceptance processes, etc. This conception would eliminate duplicity of data. All specialized demands were worked into the information system of the enterprise. For example, the module Finances demanded deeper economic analyses, more detailed budget planning, building specialties like mortgages, payment calendars, stoppers, workout of projects, observation of costs of individual projects, evaluation of projects, observation of commitments towards certain date, or data acquisition for statistical needs.

Every implementation of changes is facing mistrust at first. It was very important not to loose support from management of the enterprise during the course of the project. Usually the phases of analyzing and testing of outputs of the project are critical. In this process, it is inevitable to cooperate with the customer. In the chose enterprise, it was difficult for the key employees that had to dedicate main part of their work time to cooperation with the implementer of the solution and they had to do their normal responsibilities.

The course of the implementation was monitored on periodic seminars. The customer wanted to be sure, that capacities and financial means will be efficiently used with demanded results, therefore it observed very precisely and consulted the course and fulfillment of tasks. In this way, the project was lead to its final phase.

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■ **Evaluation of assets**

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After implementation of the information system, the employees obtained a complex entry and quick overview of state of orders and projects. With information share, documents and forms of Share Point Portal Server the duplicities were cancelled and teamwork was simplified.

The solution fulfilled demands of the customer on mobility. The site managers that work on buildings in terrain can connect to the enterprise's portal by use of their notebooks. In this way they solve mainly exchange of information that they need for their operation, like information about course of orders, economics and accounting documents, economics and accounting documents of their projects and similar ones.

By use of online connection they can also report about the actual situation on the particular building that shows a complex overview and

allows a coordinated control of realization of all projects of the enterprise.

The advantage of this ERP system is its ability of horizontal and vertical scaling, so the following system is able to grow with the enterprise. In the future it is possible to implement new functionalities and create new modules.

## CONCLUSIONS

A qualitative information system is inevitable in present economics. Time plays ever more important role. Today, not the bigger ones over stronger win, but faster over slower ones win. Managers have to flexibly react on needs of the market and take fast and correct decisions. They need a simple access to actual, precise and complex information, which only a reliable information system based on modern technologies can supply. The qualitative information system is a mean that allows better orientation in market environment and to simplify the process of decision making.

The implementation of an efficient ERP system in the selected enterprise has replaced several incompatible programs and applications. It allowed integration with specific systems for control of building manufacturing and support of the most important enterprise processes – control of projects and supply of complex services to customers from its search up to commitment of the project into operation. It also contributed to more economic use of all disposable resources of the enterprise by lowering workload and removing duplicate activities. Naturally it also offers a complex and fast access to information and overview of state of orders and economic complexes and analysis for the needs of management.

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