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THE METHODS FOR EVALUATING THE EFFECTIVENESS OF INVESTING IN ERP SYSTEMS IN CENTRAL AND EASTERN EUROPE

Резюме. Розглянуто особливості впровадження інформаційних систем управління ресурсами підприємства в країнах Центральної та Східної Європи. Головна увага приділена дослідженню оцінки ефективності інвестування в ERP-системи.

The summary. The article is devoted to the features of enterprise resource planning in Central and Eastern Europe. The main attention was paid to the evaluation of the effectiveness of investment in the ERP-system.

Ключові слова: інформаційні системи і технології, ефективність інформаційних систем, ERP, країни Центральної та Східної Європи.

Key words: information systems and technologies, the effectiveness of information systems, CEE-countries, ERP.

Introduction and the problem statement. Taking up the decision about the implementation of the new corporative information system often find difficulties not by the choice of the system configuration but by the complication of the objective estimation of the accordance of its characteristics to the company aims and tasks. It is necessary (at the initial stage) to elaborate such system of the indices which will provide operative reaction on the arising violation of the realization project work of the implementation of the information system, and also allow to correct the various project indices in correspondence with the enterprise aim dynamic. In other words, it's necessary to estimate the ERP implementation effectiveness. But such estimation is linked with great difficulties for the CEE-countries enterprises. The main problem is in unique enterprise, from other side, enterprises at CEE-countries of one branch and also the same market segment settle different variants of the information system.

This raises the complication and sometimes also impossibility of the comparison of the ERP indices implementation, and also the absence of the guidance lines for the enterprise directors at the effective estimation.

The presence (on the West) of the branch standards of the informative providing essentially facilitates the ERP evaluation task. The evaluation of the adequation effective or non-effective implementation provides the possibility of the comparison of the indices of ERP implementation on different enterprises of the similar profile of the same branch. At present, in business surrounding of CEE-countries these is no unified approach to the effective implementation of the information system, and also there is no branch standards of the information providing [1].

Analysis of recent research and publications. In this part of the paper we should write about the main publications investigating the main problems of Ukrainian IT-market. Bur in real these problems are explored only by the ERP-vendors and consulting companies such as: SAP, Microsoft, GAAP, IDC, Panorama consulting, CONIM etc.

The aim of the paper is the investigation of the main trends and forecasts of implementation by CEE-enterprises of modern information system and technologies.

The main material. The economy of CEE-countries is highly developed, thus headlongly increase the enterprise necessity in effective management technology. The enterprise owners often set out the free means and they realize that investments in IT are the investments in business progress.

On the CEE-market IT background the ERP-market shows the growth high rates, however, meanly at the expense of the large-scale business (2011 facts-more than 60% from the project general number) [1]. Numerous small and medium enterprises prefer the system of book-keeping discount. Today, on the SMB sector market there is such situation that many big consulting and IT-companies give the malter to its positioning, change the work mechanism, elaborate the special decision and form the supplies for the clients. Medium and small companies understand that it's necessary to use integrated and expensive systems.

The development of ERP markets in CEE-countries is not more than repeating of the development tendencies of the analogue markets in the West countries. The dynamics is provided by the stable economy development, stimulating the IT investment, and also by the competition

intensification, forced the company to perfect the resource management methods and make more to the international standards of financial discount. The significant deposit in the growth of the market volume (besides the big enterprises and companies) brings in by the big state projects; the state sector orders; plays an important role and can be one of the market driving factors in the near future [2].

From the point of the potential client view the company level readiness of going over to the modern ERP-systems leaves much to be desired. Evidently, some negative factors are present: the inertness of thinking, insufficient financing of similar projects.

The greatest demand of ERP-systems is at such reorganised branches as: oil-gas sector, electroenergies, machine-building, metallurgy, telecommunication. There is an interest to the IT in the sphere of whole sale-retail trade, among the distribution companies; in such spheres where the important role is the supply planning, the control of output cost price and canals of sale. The ERP-decisions are the most effective at this segment and can bring the return (payment) very fast. The growth interest to the ERP at the segment of retail trade is explained by such fact that many Russian wholesalers decided to open their own retail networks (nets) in order to get rid of intermediary companies and increase their income. And because these companies typically have dealt with ERP-systems, their new retail projects will automatically become potential customers for the purchase of ERP-solutions [3].

Active demand for IT-tools, including the ERP-system, recently demonstrates the company, engaged in continuous production, such as food industry. This industry is experiencing a period of rapid development, and food producers is becoming increasingly difficult to compete in such a dynamic market, without modern IT-systems. In recent years a growing interest in ERP and from the investment and construction holding companies, which use them to consolidate their assets and control the registration of project activities [1].

An important trend of market development is the integration of ERP-systems with other applications which have been used on the company. Moreover, Russian companies try to build a unified information space not only within its own organization, but also outside it, being integrated with the systems of contractors: suppliers, customers, partners, banks and financial institutions.

There is an interest in full-featured ERP-systems and from small and medium-sized enterprises, which "evolved" in its development of simple automation system of accounting. Medium-sized companies are actively growing, and seeing that the state of their information technology increasingly hinders the further growth of business and the lack of information does not allow rapid management decisions. This market segment is strictly required to reduce the time and cost of deployment by providing industry solutions and the use of special rapid implementation methodology. For them, the ratio of cost and experience are crucial when choosing a supplier ERP-solutions [4].

The implementation of ERP-system is always expected and planned that the system will bring business advantages compared with the previous state, whether there are increase profitability, reduce costs, or something else. But in any case, the introduction of ERP-systems spent a lot of money, and regardless of what the effect will be obtained (tangible or intangible), if this effect was not confirmed by the measurable economic indicators to prove the feasibility of implementation and effectiveness of the ERP-system will be difficult.

Evaluating the effectiveness of investing in ERP-system - one of the most difficult tasks. In addition, a question not without significance, which parts of their company to be automated in the first place.

Many experts believe that is possible only a qualitative assessment of the effectiveness of the ERP-system. Qualitative assessment - that the company flexibility and its adaptability to the market, and the imperative of our time, it could not be ", and a variety of unexpected opportunities, principally impossible to evaluate the effectiveness of investment in the figures, there are only indirect indicators by which to judge the effectiveness of investments . Indeed, if as a result of the ERP-system, improve the management of the company, at the time of this assessment, it may not yet seen. In fact, before the implementation process the customer himself should try to define what results he expects. Then he assesses how much he is willing to pay for ensuring that these goals were achieved. The fact that the introduction of ERP-system, besides the tasks are automatically resolved, and many others, should not blur the original objectives. Evaluate the effectiveness of investment in the ERP-system can be by different methods. Although in the first place, of course, have been qualitative assessments of the decision [5].

For qualitative analysis, first of all outline the scope of "source of effective" - those areas in which the one waits for improvements. In general, such improvements can be grouped into categories, each of which has its sources of efficiency. These categories (Table 1) can be used for qualitative analysis [3].

Table 1

Categories improvements and their characteristic sources of efficiency

Category	Source efficiency
Work in progress and the duration of the production cycle	Declining investment in assets, reducing costs on the movement of materials, reduced production time, reduced inventory semi-domestic production
Stocks resources	Stocks decline of investments in assets, reducing costs on the movement of materials, improving customer service
The use of productive resources	Reducing loss of working time, minimizing setup changes, increasing the coefficient of readiness of equipment
Reduced material costs	partnerships with suppliers, the timeliness of incoming deliveries, the use of small quantities
Improved product quality	Reduced production schedules of violations, to prevent decline in sales
Improved customer service	delivery time reduction, maintenance of correspondence between stocks of finished products and customer demand, timely delivery, the intensification of information exchange with customers
Cost Management	Efficiency and accuracy of cost calculation (including on the basis of the functional cost approach), the possibility of rapid analysis of costs, the possibility of analysing the causes of deviations from the plan, identifying the most cost-effective products
Storage and movement of materials	Raising efficiency while reducing complexity, improving service quality, more accurate and operational control
Accounting and Financial Management	Access to accurate and timely financial information, optimization of financial relationships with suppliers and customers

Unfortunately, the exact specific quantitative methods evaluating the effectiveness of ERP-projects do not exist, despite the fact that the methodology for assessing the recoverability of investment (ROI), based on discounted cash flow (DCF), is well known. However, this methodology assumes that the cash flows (both outgoing and incoming) are known - and on the amounts and on time. As to the ERP-project, there is a fairly accurate is known only to the expenditure part of the (cost of licenses, consultancy services, technical support), and incoming cash flows (benefits received as a result of the ERP-system) can hardly be determined with sufficient accuracy.

It is possible a full evaluation of investment attractiveness of the project on implementation of ERP-systems. Financial evaluation of the effectiveness of IT implementation solutions, including ERP is very similar to the evaluation model of enterprise on the basis of NPV (Net Present Value). As in business valuation, the main difficulty arises with the assessment of revenue. In this case there are four most obvious revenues from the ERP-system [2]:

- direct cost reduction;
- direct income growth;
- increased turnover of funds;
- monitoring effectiveness.

It is clear that the list of possible revenue articles mentioned above list is not limited. In our view the main quantitative assessments of the outcome of the ERP for medium-sized enterprises are the following.

The increase in sales. Average - 10% increase in sales per year per manager in the first three years after the introduction of the system. This is due to more efficient sales system that allows managers to give customers more time and work with them more effectively [3].

Increased percentage of deals won. Average - 5% per annum during the first three years after the introduction of the system [3].

The increase in margin. The average rate - 1.3% on the transaction during the first three years after the introduction of the system. The increase in margin due to a better understanding of customer needs, higher levels of customer satisfaction and, consequently, less need for additional discounts [4].

Improving customer satisfaction. Average - 3% per year during the first three years after the introduction of the system. Satisfaction is enhanced by the fact that customers feel more attentive to their needs and focus on solving their specific problems [5].

Reduced costs to support sales and marketing. Average - a decline of 10% per year during the first three years after the introduction of the system. First, reduction of costs associated with the automation of routine processes. Secondly, the system allows more precise definition of target customer segments and understand their needs and customize products and services for these segments.

Reduced inventory. Thanks to the integrated logistics management, comprising the tasks of procurement, sales, production and distribution logistics, warehouse stocks are maintained at an optimum level. This allows you to respond quickly to changing demand and to reduce stocks by 20-50% [2].

There is another aspect of the question of assessing the effectiveness of implementation of the system: how to determine which areas of activity can be automated in the first place, and what can wait. Are there methods and tools to assess in advance the effect of automation of certain sites and from this deduce the necessary functionality ERP-system? In addition, there is a certain logic: not automated logistics (supply, distribution, storage), cannot go to the automation of production planning. And for a typical business priorities and the sequence is clear enough. Although it happens in a different way: for example, CRM-system can be a very high stand-alone effect.

Still, most experts are of the opinion that a more precise and methodical analysis to identify priority areas for automation. Methods of functional-cost analysis of ABC apply to solve these problems. Using this technique can determine the cost of business processes at the enterprise (marketing, production and service delivery, marketing, quality management, maintenance and warranty services, etc.) to conduct functional analysis connected with the establishment and justification of performed structural divisions of enterprises functions. All this allows to determine the basic, additional and unnecessary costs. Then you have to compare the alternatives to reduce costs in production, marketing and management by streamlining the functions of structural units of the enterprise.

In our opinion, the most correct and most frequently used basis for the decision are as follows (in order of priority):

- the prospect of problems in the absence of automation of a plot;
- possible effects of automation of a plot;
- the structural logic and consistency of automation areas, dictated by the structure of the construction of the selected ERP-system.

The effect of ERP-system is fully manifested only when the system will cover the full circuit of the main production process: the customer's order - an order in production - a purchase order - purchase - production - delivery of goods to the client. It lands belonging to the main circuit should

automate first. Each of these plots can be described as functions, and features should be ranked by relevance, which allows to compare different systems in the selection process. At this point there are certain approaches. One of them (developed by Western consultants) is called "Muscovite rule» (Moscow Rule). In this approach, all the functions are divided into four categories: mandatory, highly desirable, are optional and unnecessary".

Another method of setting priorities - for the tasks implementation is called shopping list. The method involves drawing up a table similar to Table. 2. The economic impact of such a table is calculated as the model NPV. If the table to sort out all the functions on a certain principle, we obtain a system of priorities for implementation. Top priority list enter the function with the highest importance (ie, those without which business cannot exist) and the maximum potential return, but with minimal cost of implementation. Next come the less important tasks, but with a high potential return. The most expensive functions often fall to the bottom of the list and may be collecting dust for years in the "priority list". This approach allows to shift the emphasis in the introduction to the technology "bloat", which offers any ERP-system, real mundane tasks facing business.

Table 2

List of functions for setting priorities

Functional need	Importance/ complexity	Complex/cost	Economic kickback
Description of specific business functions (eg, "payroll" or "reporting to the head")	Scale of importance (eg, from 1 to 10) can be installed independently Sometimes, you can create categories for functions such as, is necessary desirable, perspective	It is defined as priorities for, and in particular monetary terms (cost of introducing / developing)	specific performance (in percentage), which returns on the invested dollar offers this feature, taken at the rate of return Investment

According to Western analysts studies, one of the most important criteria for the effectiveness of implementation of ERP systems - is a state of cash flow for the company. Experts identify five main factors influencing the improvement of cash flows: increase revenue, reduce operating costs, increase the turnover of equipment, better use of tangible assets and reducing the term of the sale. The mid-western company, built based on the methodology Standard & Poor's, provides the following indicators.

The company will be able to improve cash flow by 11% if [2]:

- reduce total operating costs by 1%;
- improve the use of tangible assets by 5%.
- The company will be able to improve cash flow by 9%, if:
- increase the turnover of equipment by 20%;
- reduce the time of sale of 5%.

In addition, experts note that the most successful Western companies were able to increase turnover of equipment by 10–50% by improving the quality of its services.

Conclusions. Evaluating the effectiveness of the implementation of information systems at the enterprise can not only assess how effectively the company uses IP, but can serve as a full-fledged tool for project management system implementation in the enterprise. The use of different approaches to evaluate the effectiveness of the use of certain functions and the whole system in the early stages of the project, monitor the deviation of real indicators of the planned. However, to evaluate the effectiveness of implementation of enterprise information system is not easy. All existing approaches should be viewed with some degree of approximation, since none of them do not give a complete picture. Many experts point out that the cost of evaluating the effectiveness of reaching some 1–2% of the cost of the system. However, the need to assess the effectiveness, because cost of error can be many times more. The above classification of approaches to assess the effectiveness of ERP implementation is an attempt to bring a lot of different techniques that exist today in the business

environment in a single system. Naturally, with the development of the market ERP-making classification methods for calculating the efficiency will be extended.

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