INTEGRATED INFORMATION SYSTEMS IN POLISH SME SECTOR

SISTEMAS DE INFORMAÇÃO INTEGRADOS NO SECTOR DAS PME'S NA POLÓNIA

ABSTRACT As shows statistical data and Author's personal experience, only 10% of Polish SME managers understands the idea of Integrated Information Systems (IIS) and is aware of potential benefits. Giving some business trainings for middle level management (focused mainly on company controlling functions) Author found that participants knew the ERP only as the name and most of them were convinced, that they are using such a solution in their enterprises. The idea of training was to present today top ERP (Enterprise Resource Planning) solutions in the form of professional presentation given by SAP Business One, Microsoft Dynamics AX and Polish most commonly used Comarch CDN Optima. The goal of this article is to present basic knowledge concerning Integrated Information Systems in the domain of its evolution, implementation methods and present situation of ERP usage among SME. The final part is a case study of ERP system selection process for metal construction company in Szczecin (Poland).

RESUMO Como demonstram os dados estatísticos e a experiência pessoal do autor só 10% dos gestores das Pequenas e Médias Empresas (PME's) Polacas compreendem a ideia de Sistemas de Informação Integrados (SII) e têm conhecimento dos benefícios potenciais. Ao fornecer formação para gestores de nível médio (focado principalmente em funções de controlo da companhia) o autor conclui que os participantes na formação conheciam o ERP (Enterprise Resource Planning - Software de Gestão Empresarial) só de nome e a maioria estava convencida, que estavam a utilizar este tipo de solução nas suas empresas. A ideia da formação era apresentar as soluções actuais de ERP (Enterprise Resource Planning) na forma de apresentação profissional dada pela SAP Business One, Microsoft Dynamics AX e a mais utilizada na Polónia: Comarch CDN Optima. O objectivo deste artigo é apresentar conhecimentos básicos em Sistemas de Informação Integrados no domínio desta evolução, métodos de implementação e apresentação da actual situação ERP utilizada entre as PME's. A última parte é um estudo de caso do processo de selecção do Sistema ERP para uma empresa de construção metálica em Szczecin, na Polónia.

KEYWORDS
Polish SME, Integrated Information Systems (IIS), Enterprise Resource Planning

PALAVRAS-CHAVE
PME's na Polónia, Sistemas de Informação Integrados, Software de Gestão Empresarial

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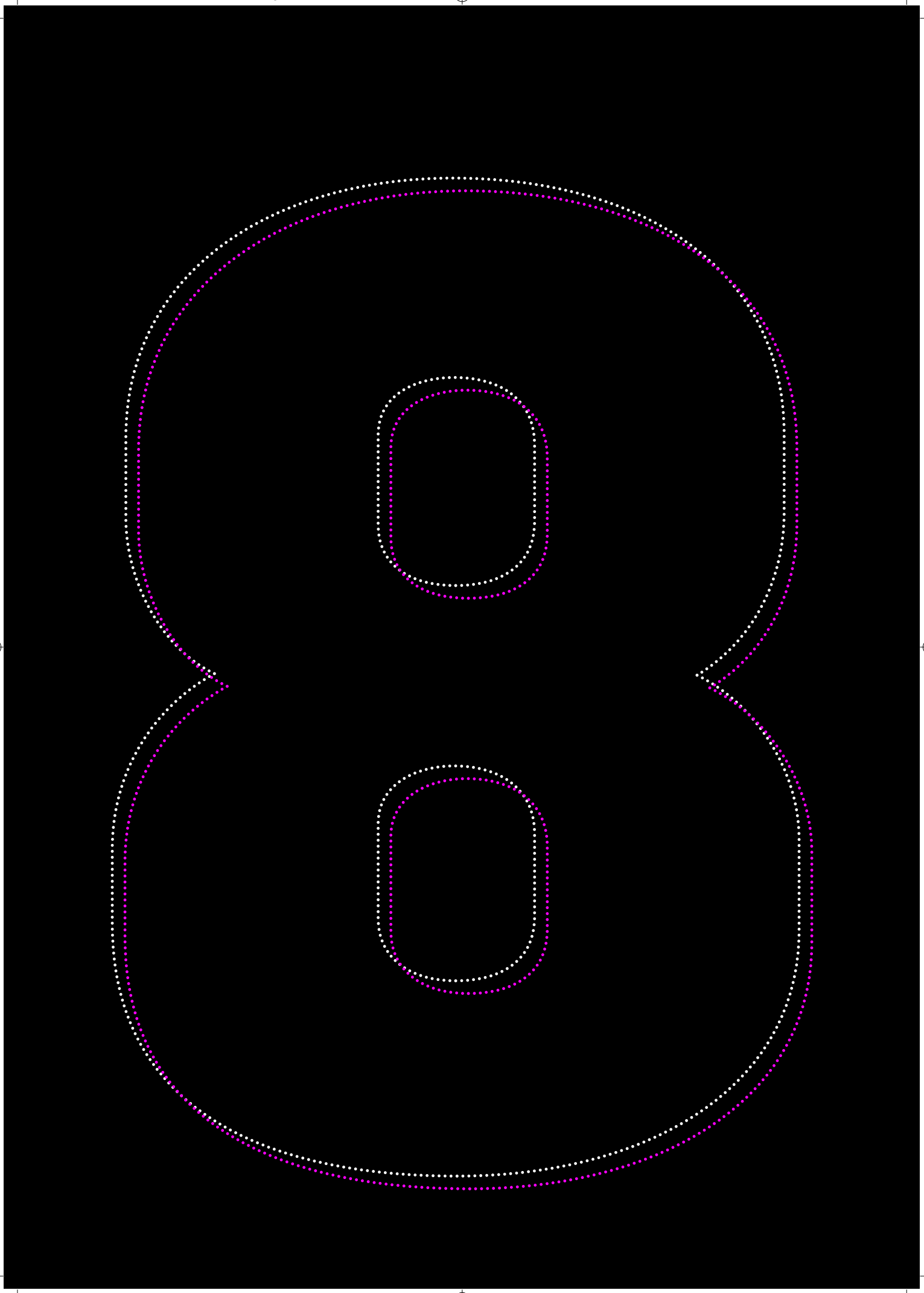


1. INTRODUCTION

As shows Author's personal experience and statistical data only 10% of Polish SME managers understands the idea of Integrated Information Systems (IIS) and is aware of potential benefits. Giving some business trainings for middle level management (focused mainly on company controlling functions) Author found that participants knew the ERP only as the name and most of them were convinced, that they are using such a solution in their enterprises. The idea of training was to present today top ERP (Enterprise Resource Planning) solutions in the form of professional presentation given by SAP Business One, Microsoft Dynamics AX and Polish most commonly used Comarch CDN Optima. The representatives of those companies were invited for the training session and they introduced the general idea and basic functionality of those systems. To Author's astonishment 60% of participants finished the training with the idea that they were cheated by software vendors a few years ago – they were sold systems marked as ERP solution, which had nothing in common with real integrated solution. 80% of participants understood what were main advantages of ERP and were strongly interested in implementation of such a solution in their company. They were also very surprised with new solutions proposed by SAP, Microsoft directly to SME sector – till the training those systems were perceived as extremely expensive and designed exclusively for huge national or international companies.

The goal of this article is to present basic knowledge concerning Integrated Information Systems in the domain of its evolution, implementation methods and present situation of ERP usage among SME. The final part is a case study of ERP system selection process for metal construction company in Szczecin (Poland) which were carried out with Author's participation.

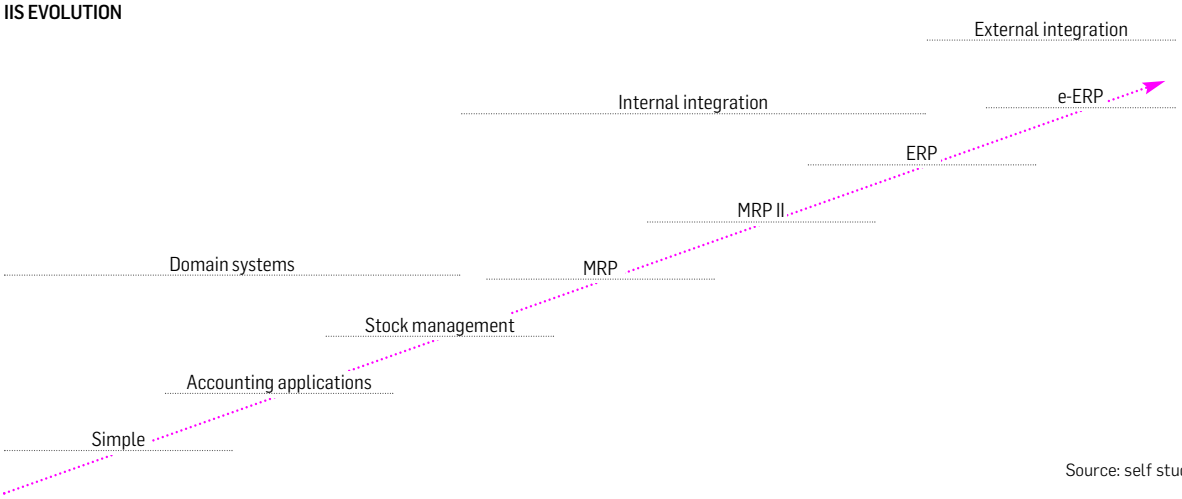
2. THE EVOLUTION OF INTEGRATED INFORMATION SYSTEMS N SHORT BRIEF

The origins of Integrated Information Systems are pointed on the end of 60's and beginning of 70's of the last century. They were natural development of domain support application in the area of accountancy, inventory and administrative management dedicated to huge production companies which became very common in that time. The basis to the first phase (MRP – Material Resource Planning) was the master production schedule (MPS) based on bill of materials (BOM) and predicted production quantity. In the 1970's, manufacturers began to use techniques such as MRP in recognition of importance of distinction between independent- and dependent items (parts or raw materials). The positive results like time scheduled supply plan, production control made this solution appreciated and developed in the domain of planning and controlling all the firm's resources. This caused next generation IIS – MRP II standard (Manufacturing Resource Planning). Those solutions included MRP achievement and additionally integrated

marketing, finance, human resources and engineering functions. There also appeared simulation modules that allowed the firm to ask "what-if" questions. The MRP II was the first and unfortunately the last codified software standard which allowed only a few systems being marked as "MRP II solution". (Chen, 2001)

In the 1990s, MRP II was expended with possibility of planning and scheduling supplier resources (Electronic Data Interchange standards became more common) and dynamic customer demands and schedules modules. In the beginning the name was MRP III but finally the term ERP (Enterprise Resource Planning) coined by Gartner Group was accepted.

IIS EVOLUTION



Source: self study

Due to Internet development and growing popularity of e-business the ERP evolved into ERP II. The main characteristics of the ERP II regarding to the traditional ERP is the difference of the process, that both involves and their nature. In the ERP there are considered the internal processes inside the organization, while in the ERP II the company interacts with its environment (e-business based connections). This is generated as "virtual integration" models of value chains of all the players in the business environment. Recently, companies don't only need to manage internal processes (back Office) but they need covering the necessities of been connected with customers, suppliers, workers, etc. these necessities must be covered even by big and small companies. (Gomez, Serna, Badenez 2009).

The spectrum covered by IIS is constantly expanded. The e-economy, globalization process and ITC development gives the software suppliers new challenges. The best system producers are trying to get ahead the business reality presenting solution for following decades – sometimes looking like science-fiction ideas which will be applied sooner that we expect.

3. BUSINESS PROCESS REENGINEERING AS THE STAGE OF IIS IMPLEMENTATION IN ORGANIZATION

Business process reengineering as the idea of changes in organization was introduced in the early 1990's by Michael Hammer and James Champy. Their definition of BPR was as follows: "Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed." During the research they noticed that in certain moment small, adaptive changes in organization are not enough to lead on the market competition. The solution in that case are revolutionary changes, abandonment the old rules and procedures and building a new order based on specified assumptions:

- Organize around outcomes, not tasks;
- Have those who use the output of the process perform the process;
- Subsume information processing work into the real work that produces the information;
- Treat geographically dispersed resources as though they were centralized;
- Link parallel activities instead of integrating their results;
- Put the decision point where the work is performed, and build control into the process;
- Capture information once and at the source.(Hammer, Champy, 1993)

If one compare the time of those radical ideas with IIS evolution than we see that introduction of ERP systems appeared exactly in the same moment. The BPR idea is very strongly connected with ITC usage and as different methodologies was applied by several software producers. Process analysis create the basis of implementation of ERP application in any organization – as final result we get optimized activities net supported by specially tuned IIS.

There are available several process mapping and optimization case tools where the general idea of BPR is implemented. They are extremely helpful in case of middle-sized or big organization where there is no way to analyze processes using "paper and pencil" method. Those application can be divided into specified types: process mapping/modeling tools, modelers for software development and modeling tools embedded in BPM systems. Due to the goal of this article we focus on the first group.

The mapping/modeling case tools were rather expensive solutions what resulted in the lack of interest among smaller companies. During the last couple of years the situation has changed – the prices decreased and additionally there appeared some open source solutions. Nowadays there is no problem for SME to get and use BPM tool (e.g. Aris Express, Adonis, Igrafx, IBM Modeler or others) except the fact, that usually they don't appreciate potential positive results of those analysis.

The typical BPR process is a complex project and consists of several stages (for the goal of that article concerning SME procedure was simplified):

- Project preparation – on that level all necessary procedures and objectives must be defined; BPR teams consisting of the best employees created; there must be chosen methods and tools for project realization and all tasks must be put on time schedule.
- Definition of present state processes – modeling focused on value-added ones (crucial for organization) with defined measures (like time, cost and quality).
- Analysis and design of target concept – liquidation of unnecessary processes (e.g. outsourcing), improvement of inefficient ones, better organization shape and procedures. Several attitudes can be applied e.g. benchmarking methods or reference models. The simulation modules are very helpful on that stage.
- Implementation of target concept and further changes – the verification stage when all designed processes are implemented into organization work. Constant process measures monitoring is necessary to be sure of reaching target state. Due to TQM (Total Quality Management) the improvement process must be continued with small adjustments (till next BPR is necessary).

The bigger and more complex company is the more experience becomes crucial factor of final success during those stages. Concerning BPR as the preparation of big organization to a new IIS implementation, project should be performed or at least supported by consultants from the software producer side.

4. IIS IN SMALL AND MIDDLE ENTERPRISES IN POLAND

Last research concerning ERP solutions bought by SME in Poland present very optimistic data and trends. Exactly as on global market, all software producers noticed that number of huge national or international enterprises, which can effort spending enormous money on IT solutions (of course all the expenditures are very carefully checked, analyzed and monitored) has shrunk. They can survive on ERP market thanks to money spent as "maintenance" cost (actualizations, additional modules etc.), however it's not enough. Now they attention is focused on SME group offering them almost the same solutions as to "big ones" reducing some unnecessary functionalities or making the systems less complex. There also appeared new ways of licensing the ERP applications – in the beginning it was called "ASP" model (Application Service Provider) and nowadays it changed the name into "SaaS" (Software as a Service). Traditionally the company had to buy the license and has the system installed on company's computers to use it. In SaaS model users don't buy licenses and don't have to install anything. For a specified sum of money (paid e.g. as monthly subscription payment) they are given a login and password and they access the system via Internet web site. The system provider administrates the application kept on provider servers, is responsible for security, safety, development, actualization and solution stability. We can say,

that system or ICT part in enterprise is simply outsourced. This solution makes the ERP/IIS "costly" available for SME companies – the rules are simple, there is no need to have and maintain IT department. Additionally company exactly knows how much ICT will cost out organization in future.

According to statistical data from ERP market the trend of bigger SME share was started in 2004. In that year in Poland we observed 11.5% increase of ERP license value with almost 37% in middle size enterprises comparing to 1.6% in big ones. In 2005 implementation of IIS in big enterprises was only 17.4% of all 6.5 thousand ERP projects. In 2006 there were identified two main tendencies: constant growth of popularity of ERP systems among smaller companies and total decrease of system prices – especially assigned to big enterprises. These trends continued in 2007 giving 14.1% growth of license market values comparing to 2006 with almost 70% of SME participation. The crisis in 2009 has reflected the ERP market with almost 4.8% decrease of it's value but still giving the huge share to middle and small companies.

5. CASE STUDY – – IMPLEMENTATION OF ISS IN METAL CONSTRUCTION COMPANY IN SZCZECIN

The ERP implementation project was performed in one of SME sector companies placed in Szczecin (Poland). Due to the condition of contract the company name stays confidential. Basic characteristic:

- One of the biggest metal construction company in region.
- Almost 50 - 80 employees (35-90 basic production workers and 15 administrative employees).
- Main departments: production, building (constructional), accountancy, marketing and tender, management.
- Market range: Westpomeranian Region of Poland, accidentally project realized in Germany.

The original range of plan was just process mapping and optimization due to idea of being certified with ISO 9001 (increasing the company chances in application for EU funds). This project was assigned to outside consulting company (and personally done by Author as subcontractor). As a BPM tool four applications were considered: Igrafx, Adonis, ARIS and IBM Business

Process Modeler. All of them were commercial products (Authors is certified or trained to use them) which required a relatively expensive license to be used in advanced process mapping. Due to the project requirement the expected result was just documentation of processes performed in company. In that case the ARIS Express tool was chosen, which is simple and free of charge even in commercial projects.

The process identification and documentation took about 2 month – the result was a map of all processes of analyzed company. As always in such a projects, a lot of inefficiencies appeared – in a form of time gaps (like long stops in production process caused by lack of some special tools e.g. professional aluminum saws for production line), unnecessary costs (e.g. doubled activities specially caused by data redundancies or lack of up-to-date information) and quality (e.g. several customer complaints about lack of information about project stage or post-guarantee services). General conclusion was that company requires deep changes – the solution was BPR based on prepared documentation. The BPR project team was established (consisting of managers of all departments, the company owner and outside consultants). This phase of the project tool almost 4 month - mainly because there wasn't possible to eliminate the team members from normal daily activities. The meetings were organized once a week – the kick-off with all members, than several discussions with pointed departments and finally a few global (one informational included all company workers) to optimize and adjust "value-added" processes. The results were very optimistic – most of typically organizational "process mistakes" were eliminated. The changes were applied in day-to-day operations and required some small improvements.

After a 3 month period the control meeting was done. The general opinion, which was shared by all employees, was the feeling of "working in logically designed" organization. The problem which was presented by managers during the meeting was concerning data exchange and information access. Assigned process owners realized after this 3 month period, that they wasted a lot of their working time not to solve problems or manage project but to get proper information for specified decision situation. It was very distinct in two main dimensions: financial and human resources management e.g. documentation, which was prepared for open tenders required specific financial information to properly identify assumptions for feasibility study. There were also a lot of problems with projects/construction management e.g. with assignment of constructive workers to realized project or general project management in case of absence (like sickness) of project manager. Being sure of well organized processes and advised by consultants the owner started to consider improvement of company by IT solution. Applications used at that moment were domain systems supporting only strictly limited areas with no data interchange options.

Once again the project team was created: owner, one representative from each department plus outside consultants. The potential list of system suppliers was presented by consultants and consisted of 4 systems (choice was made on basis of past experiences, the market opinion about software products and reputation of supplier). There was SAP Business One, Comarch CDN OPTIMA, Epicor iScala and TETA Constellation) The owner proposed two additional solutions which were applied by similar (competitive) companies in Poland (IFS Applications, Asseco Safo ERP). The offer inquires, which included optimized map of processes, were sent to those six software producers or representatives. Five of them gave detailed printed answer how their solution can support presented processes and whole company and were asked to give professional presentation of the system (each time the presentation was performed in office of potential supplier – as a form of reputation check). Four suppliers offered a sort of demo version of the system (accessed via Internet). After the presentation, which sometimes looked a little like a cross-examination (consultants and project team members exactly knew what they expect from the solution) it was clear that two sys-

tems were only called "ERP" – they were a set of domain solutions (with separate databases) offering semi-automated data integration via import-export option. Those systems were eliminated from further work. Following steps concerned functionality tests (run by project team members - systems required some tuning to adopt it for company needs) and the contract conditions.

Finally three systems were chosen as potential solution and the final choice was made by the expected value model. Six member of project team established 9 criteria of choice and assigned them wages. The list presents the criteria starting from the most important:

- installation costs,
- annual maintenance costs,
- implementation period,
- level of supporting your department processes,
- presence period on the software market,
- data safety/security matters,
- scalability of the solution (user number, number of available modules),
- user interface impression,
- system architecture and technology, database engine (in this case project team members were advised by consultants to be aware of consequences),

Each of those free systems were evaluated in all criteria (point scale 0-9) by each project member. The results multiplied by wages gave very clear winner. The main winning system advantage was SaaS model, which caused very high score values in three main criteria. For the consultants, who had more technological attitude (due to experience and knowledge) it was important, that the winning system provider had very good reputation on the market and offered huge scalability of his solution. As initial modules were chosen: Accountancy, HR, Inventory and Production. In that moment the role of process consultant (including Author) was finished – the content of contract was controlled by company's lawyer and the implementation of the system was done by supplier's team.

6. SUMMARY

As the market research shows and Author's experience from business courses and consulting the consciousness of meaning and significance of integrated IT solution among SME is rather poor. They don't understand the basic idea of ERP systems and still are convinced that such an application must be very expensive in purchase and maintenance (which was true but has changed lately in SME sector). There are two main problems: lack of interest or time for self studies of new IT solutions or model (mentioning SaaS model during courses caused a lot of interest) among company's owners and sometimes non-ethical practices of software providers. The first factor is dynamically changing –younger, more open-minded and educated managers are given decision power so the global trend on ERP market has it's reflection also in Poland. In case of described company in Szczecin the changes were initiated just after young owner bequeathed a company from his father. The second obstacle is slowly verified by the final users – companies first of all don't trust cheap solutions and secondly are very often looking for objective support in form of outside consulting.

The trends for future on Polish ERP market in SME sector are very optimistic. Growing competition among software providers and developing network infrastructure will make outsourced IT solutions more available. There is also one more important factor – the EU foundation program (till 2013) for SME pointed directly to ERP purchase and implementation. All the facts should "wake-up" companies from IT stagnation and through proper BPR project lead them towards modernization and development.

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