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THE METHOD OF EFFECTIVE REENGINEERING OF BUSINESS PROCESSES IN PROJECT-DRIVEN ENTERPRISE

Abstract

The aim of this paper is to present the method of reengineering of business processes that perform engineer-to-order production in a manufacturing company. The base of the method is a strategy of the company that applies Balanced Scorecard technique. The reengineering of critical business processes in the enterprise is assigned to the implementation of Enterprise Resource Planning system. The method facilitates the quantitative evaluation of business process improvements in the enterprise and the support for assigning the Total Cost of Ownership of the ERP system.

1. INTRODUCTION

1.1. Business Process

In recent years the customer-oriented market and new technologies have forced dramatic changes in enterprises especially in respect to the introduction of new products on the market, along with the area of; design, technological and logistics processes. IT tools and systems are considered by top management of enterprises as a proper way to improve the efficiency of the business processes.

However, the implementation of the new technologies as ERP (Enterprise Resource Planning), B2B and B2C (business-to-business and business-to-customer), CRM (Customer Relationship Management), SCM (Supply Chain Management), BI (Business Intelligence), etc., guarantees; the increase in productivity ,and the improvement of efficiency of activities in the company, provided the implementation of the organizational suitability of the enterprise and business process reengineering dedicated for the implementation has been performed.

Champions of BPR, Hammer and Champy [2] claim that, 'A business process is a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer. A business process has a goal and is affected by events occurring in the external world or in other processes'. Another founder of the BPR movement, Davenport describes business process as; 'simply a structured set of activities designed produce a specified output for a particular customer market' [6].

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Initiated in 90's by Hammer and Champy the research in the area of Business Process Reengineering (BRP) is actually very important to improve the competitiveness of enterprises, especially globalization of customer market and rapid development of new technologies are the most important factors that decide about the reengineering of business processes in enterprises. Business Process Reengineering (BPR) 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'' [2]. Implementation of BRP in an enterprise is a project which through the reduction of utilization of resources and outsourcing leads quickly to an increase or efficiency of business processes in the enterprise. However, the BRP is for each enterprise a kind of revolution that brings a lot of disturbances and problems in routine proceedings of the enterprise. The BPR concept is actually replaced by the Business Process Management (BPM) technique – permanent improvement, monitoring, control and management of business processes in a company. Of course the BPM requires the informatics tools for modeling, improvement and management of business processes and especially for automation of business processes - Workflow Management. The critical business processes (most important processes, key processes) should be permanently analyzed and the results of this analysis should be a base of the reconstruction of processes in the company by implementing new information technologies that improve business management.

The management of business processes should be realized globally for internal and external processes to achieve all strategic goals of a company. One of a very interesting method that enables measurement of efficiency in the company is Balanced Scorecard. The method is based on redeveloping of business processes and verification of efficiency of the processes by selected indexes rates in the area of; accounting, customer, inertial processes, infrastructure and developing. The reengineering of business processes based on the Balanced Scorecard method enables to evaluate not only a change of financial rates of the enterprise but also factors such as; competitions, external environment or internal infrastructure. The example of strategic goals supported by the Balanced Scorecard method are reduction of time of preparing of sales offer, reduction of time of completion of production order, reduction of time of introduction of a new product on the market, improvement of logistics processes, improvement of quality control system, increasing of flexibility and adaptation abilities of the enterprise, increasing of value of the enterprise.

1.2. Balanced Scorecard

Balanced Scorecard is a set of factors that enables monitoring of the current activities of the enterprise to achieve business strategy assumptions. The method enables the evaluation of the enterprise condition in a short time. It does not only make an efficient reporting system but also a tool for business management, which means that the Balanced Scorecard should be used as decision support system in the enterprise. A lot of enterprises measure hundreds of parameters daily to evaluate efficiency of the operation management. The number of the parameters is often so large that the top management can not take reasonable decisions without specialized reporting and analyzing tools. The large quantities of the parameters determine high costs of the data acquisition and the results can be distorted due to poor quality of the data. Balanced Scorecard integrates some critical success factors of the enterprise with some indicators, wherethrough the top management own the most important information to determine quickly the position of the enterprise from different perspectives. The standards analysis of balance-sheet enables evaluation of only a part of the assets and liabilities of the enterprise in former

periods. The Balanced Scorecard indicators make the evaluation of the enterprise to generate an added value in future periods possible.

The indicators are usually divided into two groups:

- lag indicators that deal with former periods,
- prediction indicators (qualitative indicators), that enable the forecast and determine how the past activities would affect the form of the enterprise in the future (for example level of the customer satisfaction).

On the one hand the Balanced Scorecard method can not skip any critical indicator from the enterprise standpoint but on the other hand the method can not involve too many indicators because too great amount of information will be generated. Each enterprise individually has to determine which indicators will be taken into consideration in relation to; financial perspective, internal processes, customer and development. The main advantages of implementation of BSC strategy are as follows:

- one-to-one coordination of visions and strategic goals,
- running monitoring of the implementation in practice,
- simplification of introduction to any strategic changes,
- increase in satisfaction of employers on the each levels of management,
- internal communication improvement

In the next part of the paper an example of enterprise that realizes project-driven manufacturing will be presented. For the enterprise an evaluation measure of market position from strategic point of view will be performed. A BSC-based method of business process reengineering will be presented.

1.3. Project-driven enterprise

The project-driven enterprise deals with design and manufacturing of unique products and services (projects) for individual clients. The project-driven enterprise realizes engineer-to-order projects, for example, there are some mechanical engineering firms that belong to the category of small and medium enterprises. Let us consider a firm *Delta* that produces a machine tools and technological lines for industry. For the enterprise, efficient knowledge and business experience management is a key success factor that decides about product competitiveness. The rapid development of the firm poses permanent problems of access to important information (dealing with material management or calculations of manufacturing expenses of a product). The management of the enterprise makes a decision about necessity of implementation of enterprise resource planning system. A range of the analysis can be difficult to define because the management of the small and medium enterprise often has not enough knowledge about the ERP systems. To make a final evaluation of efficiency of implementation of ERP system, a set of evaluation measurements has to be defined. The decision about the implementation of ERP system has to be preceded by detailed analysis of business processes running in the firm [7]. Therefore, the methodology of the implementation of the system has to take into account know-how management and a strategy of the enterprise development defined on the basis of BSC method. It means that the identification of critical business workflow in the enterprise from financial, internal business processes, innovation and learning, and customer point of view has to be performed. The goals and measurements for the respective points of view is presented in the Table 1.1.

Firms the customers play the key role in the business strategy and the measurement of enterprise activities from this perspective is most important. The management of the firm *Delta* has to define a destination market and the set of end-users. The most important question from the customer point of view can be formulated as follows: 'What our customers think about us'.

Tab.1.1. Customer points of view

Objectives	Measurement	Actual value	Destination value
Offer preparation time reduction	Average time of an offer preparation	4 weeks	2 weeks
Product delivery time reduction	Average time of a product delivery	5 months	3 months
Product reliability improvement	Average number of guarantees and after-guarantee repairs in 5 years	10	5
Product operating expenses reduction	Operating expense in year	5 000 $	3 000 $
Guarantee repair time reduction	Average time of a guarantee repair	2 weeks	5 days

The perspective of internal business processes shows how good the enterprise is prepared to fulfill the customer requirements. The most important question from this point of view is 'Which business processes decide about the market leadership'.

Tab.1.2. Internal business processes point of view

Goals	Measurement	Actual value	Destination value
Storage volume reduction	Average storage value / annually	300 000 $	100 000 $
Project errors reduction	Average time of change cards preparation / project	170 h	100 h
Documentation proceeding time reduction	Average time of documentation preparation / project	600 h	400 h
Project costs monitoring at every stage of the process	Average assumed and real project cost	80 %	95%

Presently, the success of the company is determined by the adaptation abilities, paying particular attention to a proper enhancement of innovations and training .Bearing in mind the internal processes, a management board should be able to answer the question such as; what kind of infrastructure is inevitable for the company to carry out the key processes, which would ensure the company competitiveness in the market .

Tab.1.3. Development prospect

Objectives	Measurement	Real value	Destination value
Increase in CAD system investment	CAD system investment / annually	30 000 $	50 000 $
Increase in staff training investment / annually	Average staff training investment / annually	500 $	1 000 $
Increase in employees productivity	Average cover commission/ employee	50 000 $	60 000 $

Financial prospect assessment reflects the financial results of the company operational activities. Typical indicator for this prospect assessment is the return profitability evaluation derived from investments along with the increase rate in the shares' value.

Tab.1.4. Financial prospect

Objectives	Measurement	Real value	Destination value
Increase in the own capital profitability indicator	After tax profit / own capital	4 %	6%
Increase in the on return indicator from ROI investment	(profit, investment costs) / Investment costs	10 %	15 %
Increase in the financial flow indicator	Funds / Current payment obligations	8 %	12 %
Increase in the expected investor's profitability rate	Proportion of the expected volume sum and the expected share price decrease	13 %	18 %

1.4 *Delta* company strategic map

A strategic map can be built for four prospects determined by BSC for Delta company which is managed with the project (Fig. 1.1). BSC brings the greatest advantage in those companies which treat it as a fundamental strategic and operational management system. According to numerous researches [Benten] carried out in different companies (which defined the strategy properly) only 10-15% are able to proceed it. Thus, the realisation of the strategy as such seems to be more important than its quality It is conditioned by the fact that most of the companies are not concerned about the lack of the idea and the strategy but about the way it should be realised.. BSC allows for the efficient implementation of the strategy. As a result, a sustainable market competition advantage is being built.

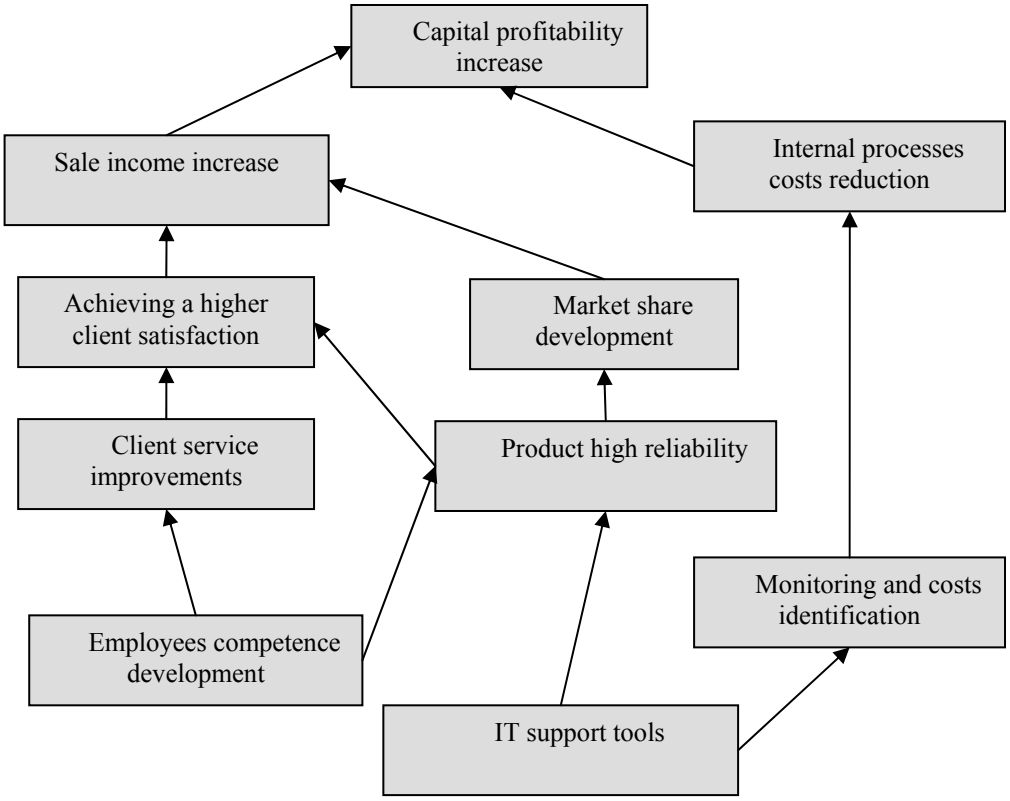

Fig.1.1. Delta company strategic map

The outcome of the strategic map directly refers to the objectives which are outlined in a balanced demands card and should be re transformed to be suited for the company operational objectives in particular fields of functionality.

Sale

S1. Accuracy improvement in orders proceedings evaluation costs.
S2. Preparation of new offers time reduction.
S3. Monitoring of interactive proceedings in an integrated IT system.
S3. Production item costs monitoring in every stage of its production process.

Construction

K1. New construction design time reduction.
K2. Time reduction in relation to the construction errors correction (time associated with the change in the project cards).

Technology

T1. Waste product level reduction.
T2. Project's technology design time reduction.

Production planning

M1. Orders deadline accuracy - evaluation correction.
M2. Production orders proceeding - time reduction.

Supply and storage management

Z1. Storage volume reduction.
Z2. Low demand materials storage reduction.
Z3. Materials on time delivery guaranty.

Because some of the objectives are contradictory or supplement one another in the first stage of the efficiency analysis it is necessary to evaluate the interrelations of the business process related to the goals achievement process.

2. BUSINESS PROCESS ANALISIS

2.1. Business process modelling

Business process modelling should include the following aspects concerning the operation of these processes:

Event aspect - The business process stands for the activity which is initiated by the economical event that is essential from the point of view of those who are interested. In the activity of the organisation.
Relation aspect - The business process is completed only if all the actions that supply products/business result (essential for all the interested parties in response to the events that launch the process) have been proceeded.
Transformation aspect - The business process transforms the input data of all type into the output products, in accordance with the indicators (policies, standards, procedures , regulations and so on.), using different kind of resources.
Functional aspect – organizational -.The business process involves some logical steps which require a functional ability unit that can usually be found in many organizations.
Result aspect –: The business process is equipped with the efficiency indicators, for which measurable objectives can be set and assessed.

For the purpose of a formal assumption the business process can be defined as follows:

Definition 2.1
Business process as a set of functions determined by the following parameters:
$T_i(n) = (t_e^i(n)-t_s^i(n))$ – process duration time $p_i(n)$ where n – number of the order proceeded by the process sp_i so $t_s^i(n)$, $t_e^i(n)$ – proper start up and the closure of the process p_i.

$\mathbf{R_i(n)=[}r_1, r_2, \ldots, r_M\mathbf{]}$ - necessary resources vector for the proceeding of the process p_i where M class number (sorts) resources, and

$$r_k = \begin{cases} \text{a - resource volume of class k necessary for the } p_i \text{ process realization,} \\ \text{0 - if the resources of class k are not necessary for the } p_i \text{ process realization,} \end{cases}$$

Ti(n)=[t_1, t_2,… t_M,] –time vector of the resources application necessary for the p_i process realisation where

$$t_k = \begin{cases} \text{b} - \text{resource accessability class necesery for the process realization } p_i \\ 0 - \text{if k resources are not necessery for the realization of the process} \\ 1 - \text{if k is the class of unrenewable resources} \end{cases}$$

For the purpose of the cost calculation related to the process operation a discrete function has been defined that can make use of the resources[4] which makes one of the indicators of the process efficiency.

Definition 2.2
A discreet cost function of the resources usability stands for the function $F(r_i, t)$, where t defines a discreet period of time, and r_i is an element of the vector R_i. A discreet cost function of the resources usability can take the value A

$$F(r_i, t) = \begin{cases} \text{k - resource usability } r_i \text{ costs in time t} \\ 0 \text{ - resources inaccessible in time t} \end{cases}$$

C_i – Process proceeding costs $p_i(n)$ while

$$C_i = \sum_{t=t_s^i(n)}^{t_e^i(n)} F(r_i, t) \cdot r_i \cdot t_i \qquad (1)$$

Let us take into consideration the business process designed for the customer offer (Fig. 2.1) The customer makes a query concerning the possibility of the digital machinery purchase that would include some technical specifications. This query with the technical specifications should be placed in the queries file register, next in accordance with the current point of sale work load and their competence a project manager should be appointed to be responsible for the commercial dealings with the customer. The main responsibility of the project manager is to prepare the offer and the contract which often requires the inclusion of the technical specifications required by the customer Having obtained the technical specifications the project manager in conjunction with the constructors should be able to work out the initial construction plan enclosing the most important mechanisms, elements and materials and their accessibility, on the basis of which, an initial calculation can be made. Next the project manager along with the construction team prepares a basic technology for the product manufacturing and defines a budget in relation to the time and costs necessary for the manufacturing of specific elements, both inside the company and with cooperative contractors.

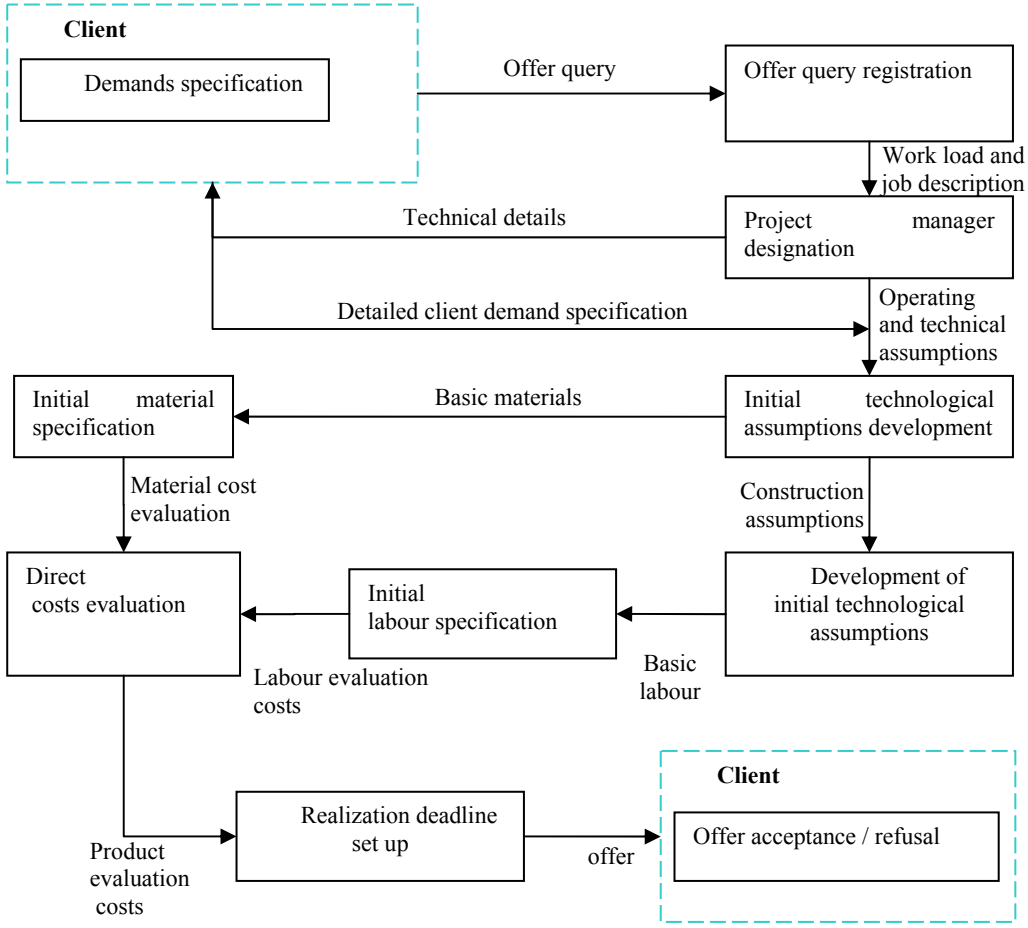

Fig.2.1. Business processes related to the preparation of the offer in the Delta company

Having completed an overall construction and technology it is necessary to evaluate both direct costs and the commission rate to put forward an initial contract to the customer Table 2.1 shows all the actions related to the realisation of the initial sale offer preparation p_4 for selected offer 1000. The vectors outlined in the Table 2.1 should be interpreted as follows; For the process $\mathbf{R_1(1000)}$ = [0;1;2;0;0;0;0;0;0]; $\mathbf{T_1(1000)}$ = [0;112;56;0;0;0;0;0;0] – one person in the sale department((project manager) and two constructors will be involved in the initial product construction plan (project manager 112 h and each constructor 50 h) Total time of the task realisation will amount to 21 – 28 days - because some works can be performed simultaneously. Total time for the offer preparation will last approximately 5 weeks. The total time for the offer preparation amounts to 236 hours , while the offer workload comes to 348 hours. The total cost related to all the project proceedings can be calculated with the assumption that all the values of the discreet functions (for the resources usability) are known.

Tab. 2.1

Activities p_i	$R_i(1000)$	$T_i(1000)$ **[h]**	**Time** $T_i(1000)$ **[h]**
p_1 – offer query registration	[1;0;0;0;0;0;0;0;0;0]	[1;0; 0;0;0;0;0;0;0]	1
p_2 – project manager appointment	[0;0;0;0;0;0;0;0;0;1]	[0;0;0;0;0;0;0;0;0;3]	3
p_3 – technical details acquisition	[0;0;0;0;0;0;0;0;0;0]	[0;0;0;0;0;0;0;0;0;0]	56
p_4 – initial construction planning	[0;1;2;0;0;0;0;0;0]	[0;112;56;0;0;0;0;0;0]	112
p_5 – initial technological planning	[0;1;0;1;0;0;0;0;0]	[0;56;56;0;0;0;0;0;0]	56
p_6 –project realization schedule, preparation and offer mailing	[0;1;0;0;0;0;0;0;0]	[0;8;0;0;0;0;0;0;0]	8

If we assume that in this period of time the costs of the resources usability are stable and refer to the following;

$F(r_1,t) = 10$ EUR /h
$F(r_2,t) = 50$ EUR /h
$F(r_3,t) = 40$ EUR /h
$F(r_4,t) = 40$ EUR /h
$F(r_9,t) = 100$ EUR /h

then the proceeding costs for the specific processes will amount to as follows;

$C_1 = 10$ EUR;
$C_2 = 300$ EUR;
$C_3 = 0$ EUR;
$C_4 = 5600 + 4480$ EUR $= 10\,080$ EUR;
$C_5 = 4480$ EUR;
$C_6 = 400$ EUR;

while the total cost of the offer preparation will be equal to $\sum C_i = 15\,270$ EUR.

The time balance sheet shows that over 50 % of the time is used for the offer preparation related to the design of the initial construction and over 20 % for the design of the initial technology. Therefore these processes should be examined in detail so that the realisation time could be reduced. The p3 process (awaiting for the customer technical specification) does not affect the resource usability costs. It only affects the term of the offer realization because this time is conditioned by the customer's action and it does not have to be taken into consideration, Table 2.2 shows the main causes that determine a high process efficiency related to the offer preparation process in the area of construction and technology.

Tab. 2.2

Process	Cause
p_4	Lack of the construction specification updated database
p_4	Lack of updated material prices (lack of updated suppliers' offers).
p_4	Lack of the framework for searching similar products
p_4	Lack of the product configuration
p_5	Lack of the products and elements technological specification
p_6	Lack of the work hour rates calculation for specific production jobs
p_6	Lack of a master production schedule including a currant resources load

The results of the analysis concerning the causes of the p4 processes high efficiency make a foundation for the assumptions related to the functionality of the ERP system in the area of the offer support process. Fig 2.2 shows a reengineering process structure including ERP offer support system

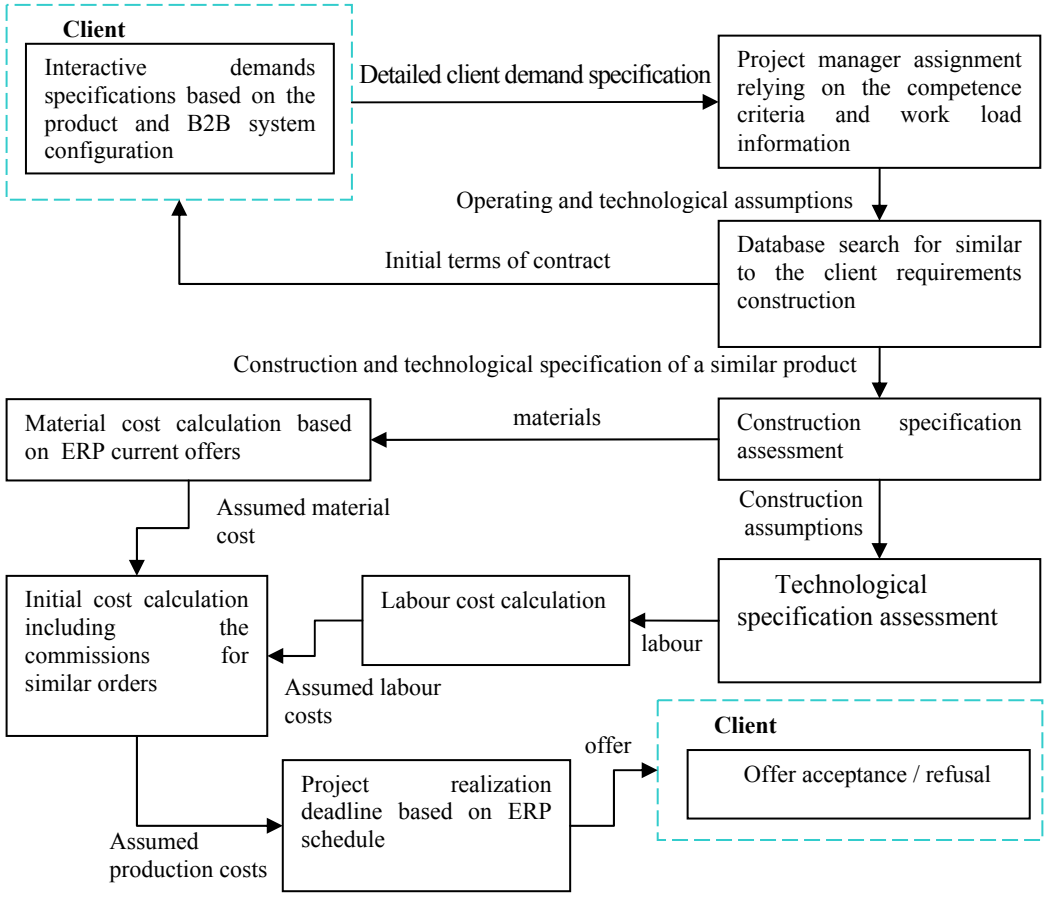

Fig.2.2. Rebuilding business processes related to the offer preparation in the Delta company

A client prepares his or her demands specification using B2B system which is accessed via internet. A product configuration system leads the client through a questionnaire that provides the company with detailed information as far as the product in question technical characteristics are concerned In this way further questions to the client concerning technical details can be eliminated. The offer specific questions are saved in the ERP system along with the most essential personal data of the client (company name, address , contact details) On the basis of the specification and information about the actual work load the system is able to support the decision making process in relation to the selection of the manager. Next the project manager searches the system for the product which has previously been designed in *Delta* company and it is close technologically to the one that is in question. Then the project manager defines the technological assumptions on the basis of which the constructors develop an initial construction by the verification of the technical specifications. In practice it is proceeded by copying either an entire or a part of the product construction specification which is modified to meet the client demands. On the completion of the constructor verification a technology specialist verifies time budget for the production of the particular elements including a current production time table. The offer is then sent to the client. This kind of a redesigning process facilitates 50 % time reduction in the process of preparation. Obviously, the offer process time reduction requires the implication of ERP system in the database so that it would include many complete products which could be used for 'quick offers' Analogically, the reengineering of the other processes can be done for the processes related to the offer preparation of a new product. The implications for the reengineering processes determine the objectives defined by ERP. Calculation cost for the resources usability, which stands for ERP, requires the Total Cost of Ownership system. Table 2.3 shows an index of redeveloped business processes related to the development of a new offer as well as to the altered resources load, thus enabling the realization time reduction. The total preparation time amounts to 90 hours while the offer work load to 171 hours.

Tab. 2.3

Action p_i	$R_i(1000)$	$T_i(1000)$ **[h]**	**Time** $T_i(1000)$ **[h]**
p'_2 – project manager assignation	[0;0;0;0;0;0;0;0;1]	[0;0;0;0;0;0;0;0;1]	1
p'_3 – search for similar construction	[0;1;1;0;0;0;0;0;0]	[0;1;1;0;0;0;0;0;0]	1
p'_4 – initial construction design	[0;1;1;0;0;0;0;0;0]	[0;56;56;0;0;0;0;0;0]	56
p'_5 – initial technology development	[0;1;0;1;0;0;0;0;0]	[0;24;24;0;0;0;0;0;0]	24
p'_6 – project realization schedule, offer preparation and mailing	[0;1;0;0;0;0;0;0;0]	[0;8;0;0;0;0;0;0;0]	8

3. REENGINEERING PROCESS COST ANALYSIS AND BUSINESS PROCESS PROCEEDINGS

3.1 Reengineering and process operating costs including TCO

The business process operating costs are assigned to the figure and the cost of the resources usability. Reengineering of the business processes brings certain costs resulting from the ERP system implementation as well as the preparation and implementing of the data which impose the cost on the company only once. In addition the process operating analysis supported by ERP should include the costs resulting from the maintenance of the system (the system software update costs), the IT specialists employment, and equipment modernization. The ERP implementation costs are calculated on the basis of Total Cost of Ownership method developed by Gartner Group. When this method is used not only the equipment, software and implementation costs should be taken into consideration but also the costs resulting from the delays, management, development, support, and end user related costs. Having proceeded the profit assessment and the costs evaluation the analysis of the return on the investment can be performed. Table 3.1 shows the example of the total costs of the ERP implementation in *Delta* company, using different types of costs as a classification framework which specifies the operating costs as well as the costs that are covered only once.

Tab. 3.1

Overall company's costs	**Single costs EUR**	**Operating costs EUR/annually**
Licence purchase costs	500 000	
Staff training costs	200 000	
Consultations costs	300 000	
System modification costs	100 000	
Pre-implementation costs (business process reengineering)	100 000	
Basic data implementation costs	100 000	
Operation system and equipment purchase costs	200 000	
IT infrastructure implementation/development single cost	100 000	
Total single costs	**1 600 000**	
IT specialists employment cost		80 000
Technical support		20 000
Software update costs		50 000
Database update costs		50 000
Equipment exchange and infrastructure modernisation		20 000
Annual operating cost - total		**220 000**

In order to determine the reengineering and operating costs for the business processes related to the offer preparation it is necessary to reduce the costs associated with ERP system application in the sale department. Table 3.2 shows the costs resulting from the purchase and the implementation of the ERP system in the sale department of *Delta* company.

Tab. 3.2

Costs specification for the sale department	**Single costs EUR**	**Operating costs EUR/annually**
Sale licence purchase	100 000	
Sale representatives training costs	20 000	
Consultations costs	50 000	
System modification costs	10 000	
Pre-implementation analysis costs	20 000	
Basic data implementation costs	16 667	
Equipment and operation systems purchase costs	33 333	
A single cost of IT infrastructure development	16 667	
Single costs share in the sale department	**266 667**	
IT employment related costs		13 600
Technical support		3 400
Software update		8 500
Date update costs		8 500
Equipment exchange and infrastructure modernisation costs		3 400
Annual operating cost share in the sale department		**37 400**

Table 3.2 shows both direct and indirect costs of the ERP implementation in the sale department, The costs which have been met due to the licence purchase, sale representatives training, consulting, system modification, and initial analysis costs can be defined directly. The costs of the basic data implementation, equipment purchase , IT system development were defined in a form of commission as a share of the direct costs in the total costs that have been covered once Similarly, the share of ERP operation costs has been defined in a form of the commission .Consequently, as it can be concluded ,examining Table 3.2, the total business process reengineering in *Delta* company amounts to 37 400 EUR, while the annual cost of the ERP process implementation amounts to 37 400 EUR In order to determine the contribution of these costs within the offer related operations business processes it is necessary to establish basic sale departments operations and their work load during a year time span. Chart 3.1 shows the work load of the specific operations in the area of sale within a period of one year, which was taken from the *Delta* operation registry system.

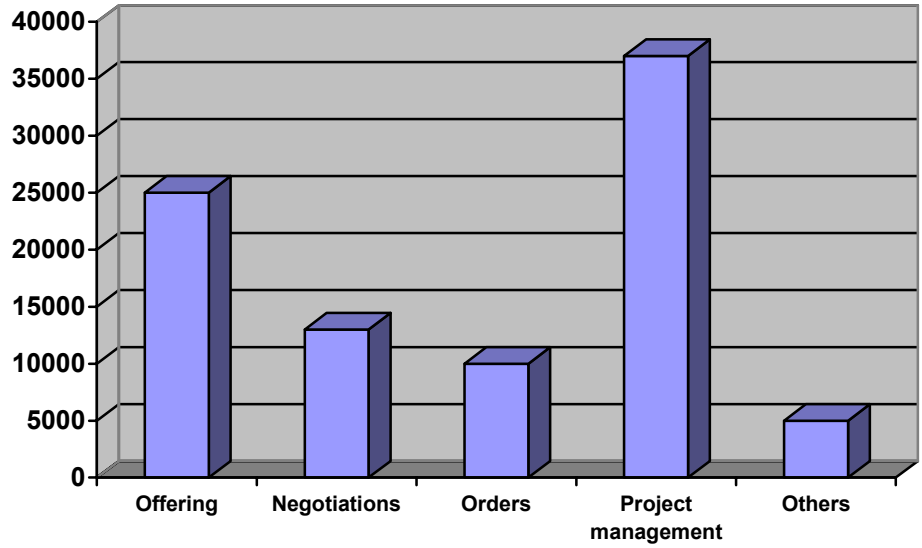

Fig.3.1. Workload in selected activities of the sale department (hour/year)

Fig. 3.1 shows that the annual offering process work load in the sale department makes about 20% of a total work fund (negotiations 14%, orders 11% sale project management 41% and other works 6%) Assuming that all the processes in the sale department would undergo a reengineering process due to ERP implementation the enhancement of the work load processes can be directly calculated for the operating costs therefore a single cost covered due to the reengineering of the business processes in the area of offering can be calculated as follows:

Reengineering costs of business processes related to offering	=	single share work load share offering	*	average percentage department cost sale

Thus, a single cost, of the business process reengineering of the sale department in relation to the customers offering, amounts to:

266 667 * 0,28 = 74 667 EUR

While the share of the ERP operating costs in the offering process can be referred to the number of business processes carried out annually. Fig. 3.1 shows that the annual work load of all the business processes related to offering amounts to 25 000 hours The work load of a single offering related process after it has been redeveloped amounts to ,on average, 171 hours. Therefore the average offer number proceeded annually amounts to about 146 offers. Thus, after the reengineering of the business processes related to the product offering and the system implementation, the ERP average share of the operating costs for offering process amounts to 256 EUR. Depending on the duration of the offering related processes the exact operating cost share assignment requires the application of the weighted mean in relation to the

product offering related process duration. A total cost of the product's offering related process reengineering amounts to (resources usability costs remain unchanged).

C_2= 1 · 100 EUR = 100 EUR;
C_3= 1 · 50 EUR + 1 · 40 EUR= 90 EUR
C_4=56 · 50 EUR + 56 · 40 EUR = 5 040 EUR;
C_5 = 24 · 50 EUR + 24 · 40 EUR = 2160 EUR;
C_6 = 400 EUR;

The offer total preparation cost after the reengineering process amounts to $\sum C_i$ = 7 790 EUR.

3.2. Business processes efficient reengineering method

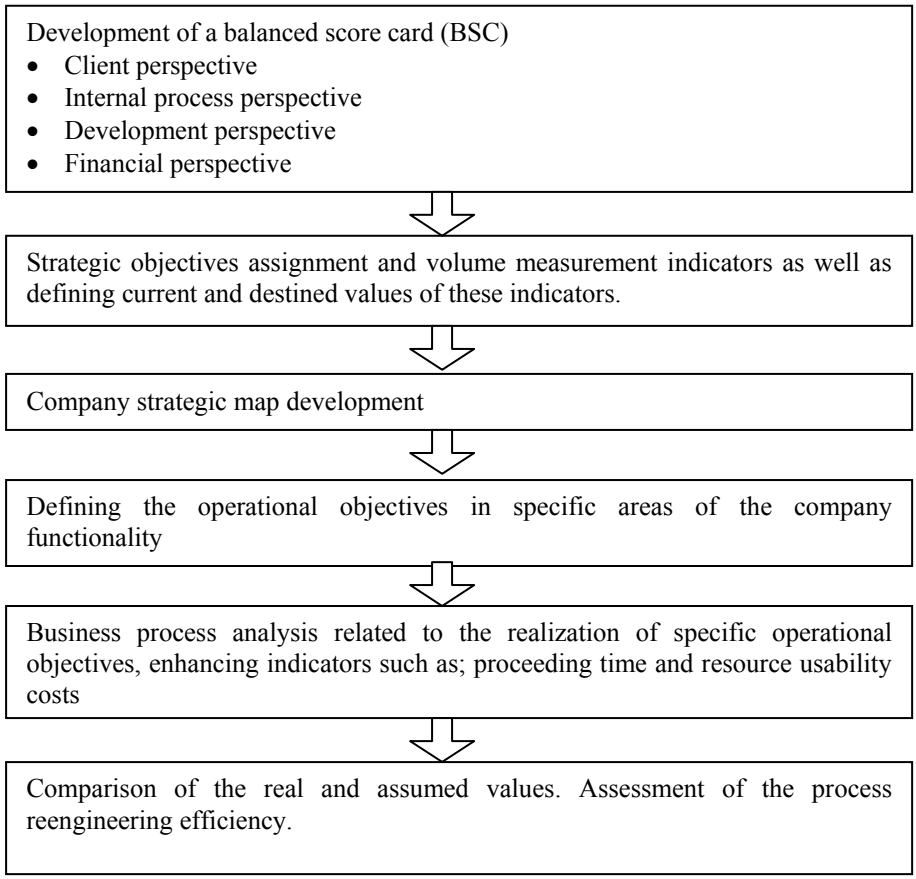

Fig.3.2. Business processes efficient reengineering method in the project driven type of company

On the Fig. 3.2 the business processes efficient reengineering method is presented. The BSC is an integral part of the method. Table 3.3 shows the efficiency of the pre/post reengineering of offering related business process.

Tab. 3.3

Category	Work load	Duration	Costs
Pre reengineering value	90 h	236 h	15 270 EUR
Post reengineering value	171 h	348 h	7 790 EUR

The difference in the offer costs preparation before and after reengineering amounts to 7480 EUR. Thus, the single system implementation costs will pay off after 10 offers have been preceded.

4. SUMMARY

The method of an efficient reengineering of business processes in a company run by the project presents a systematic approach to the company restructuring so that the strategic objectives can be achieved, which is done by improving the company operating function For the sake of visualization the Integration Definition Language and the Unified Modeling Language [5] can be used. The method is compatible with IT tools such as ARIS Easy Design. In the work to follow this paper the method will be implemented in a form of application software.

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