

METHOD OF THE SUB-PROCESSES IMPROVEMENT IN THE ORGANIZATION

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Abstract. Present article presents a set of methods, through which the existing inefficient sub-processes or activities within the business process frames could be reorganized. This way, it can be done improvement as the partial efficiency of each process unit, as well as the business process as a whole. A classification and a scheme which reflecting the influence of the presented processes optimization methods towards the four most often used dimensions of the processes through the aspects of optimization of the business processes are presented. Each method's essence of functioning and application is explained, as well as their graphic image. The advantages and the shortages of the application of each one of them are derived.

Keywords: business process, sub-process, optimization, improvement tools, process dimensions

1. Introduction

All business organizations function through carrying out transformation of raw materials into a product/service designated to satisfy the external customer needs [1]. The very transformation of the inputs is done through the running of various business processes [12], processes [7; 11; 12; 13; 19; 21; 25] and activities [3; 20]. As a result of the running of all these activities, processes and business processes united in production cycles, value is added [13]. The activities on maintaining high level of competitiveness and market position improvement [9] are in fact a function of the striving of the companies to continuously design, redesign and optimize their business processes. The optimization is performed mainly in four aspects: improvement of the process logic; spatial improvement; quantitative and time improvement [6; 17; 18; 24]. Besides, it is necessary to take into account the factors of the external environment [8] and the internal environment, such as changes in the labour legislation; changes in license and tax rates; increase of the ecological requirements, etc. This is exactly what predetermines the existence of the early warning system [2; 3]. In order to deal with the challenges ensuing from the changed external and internal conditions of the environment, the organizations most often resort to modifications of its production and management structure [10]. This brings forth the necessity of taking measures to reorganize and improve the processes running in the business organizations. It is necessary the optimization itself to be carried out under methods in conformity with the company structure, as well as with the chosen strategy.

In order to perform the optimization of the critical business processes in the organization, it is

necessary the necessity and the priority of improvement of the sub-processes, which build them, to be identified. One of the options is to define them by presenting the processes as vectors – real and target ones. Their building can be reviewed as a preparatory stage of the business processes optimization. The real vector represents an aggregate of all activities and sub-processes building the business process [5]. Each activity, sub-process or process is presented as a partial vector with the relevant coordinates. The coordinates describe the real (target) values of the parameters characterizing the various aspects of the process effectiveness [22]. By summing up the vectors, the common (resultant) vector is obtained. The target vector has been built by marking the coordinates of the target on the coordinate system. The values of the dimensions are determined by the parameters monitored by the early warning system. If the juxtaposition of the real process vector and the target process vector is showing deviations in favour of the target vector, then it is necessary to carry out a profound analysis and improvement of the relevant process. In the opposite case the conclusion is that the parameters of the existing company process are better than the target set forth and, therefore, improvement is not needed. The comparison between the two vectors does possibility to determination the necessity of improvement of each business process, as well as to identification the need and the priority of improvement of each sub-process building the business process. Finally, the actual reorganization of the existing sub-processes or activities using the tools of improvement is done. In order to achieve overall and sustainable improvements, it is necessary the business processes optimization to

pass in succession the following steps:

- ✓ identification of the general necessity of improvement;
- ✓ identification of the necessity of sub-processes improvement;
- ✓ identification of the priority of sub-processes improvement;
- ✓ application of the improvement tools;
- ✓ performance of simulation for ascertaining the rate of improvement.

The goal of the present article is to present a toolbox of optimization of the existing sub-processes and to analyze their effect on the dimensions of the sub-processes.

2. Description of the methods of sub-processes optimization

The methods through which the activities of improvement and reorganization of the business processes are performed, are applied after the identification of the necessity of business processes improvement, as well as the necessity and the priority of optimization of the sub-processes and

activities within the business process.

Proceeding from the vector presentation of the processes, the optimization tools which derive are based on the following principles:

- translocation of vectors;
- change of vectors' lengths/sizes;
- addition of a vector;
- elimination of a vector.

On the grounds of those principles, ten methods have been elaborated for the performance of improvements in the business processes. Each tool is based on one or a combination of the aforementioned four principles.

The acceleration method consists of shortening the duration of one or several sub-processes (Figure 1). This is done by reducing the numerical value of one or all dimensions of the process. Through using this tool the efficiency of the process chain is increased, but at the same time the use of resources is also increased. Practically, it should be looking for balance between the efficiency and the necessity of additional resource, through which it could be achieved.

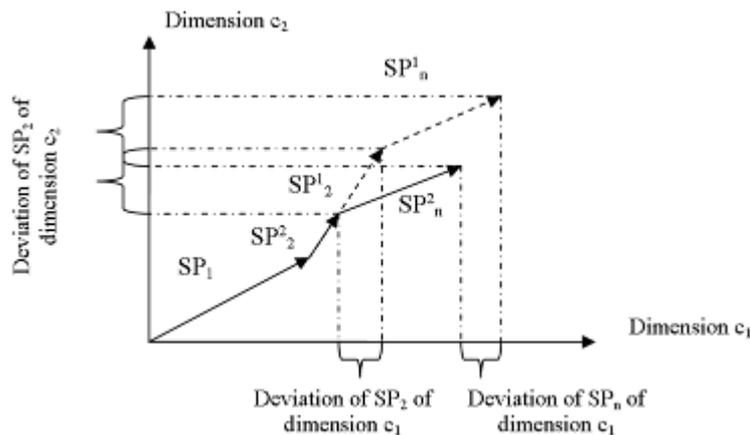


Figure 1. Acceleration of sub-processes

Delay method is contrary to the acceleration (Figure 2). Its essence is expressed to increasing of one or several dimensions of the examined business process. That way, sub-processes running faster than the others are prolonged. The goal is synchronization of the individual element with the overall time rhythm of the process chain to be achieved. The final result is directed towards improvement of the business process logic and efficiency.

The parallelizing method can be presented as an isolated case of the acceleration. The critical sub-process is divided and the newly formed two sub-processes are performed simultaneously. The running time of the newly derived sub-processes is equal to the duration of the bigger of them. In the

idealized case, the critical sub-process is divided in half and the value of the dimensions of the newly formed sub-processes is reduced by half. Thus, the overall efficiency of the process chain is increased.

The automation method can also be described as derivative of the acceleration. It is used with processes, the examined characteristics of which should be reduced as a result of the improvement. Thus, the business process is stabilized and becomes withstanding the external impacts. This leads to increase of its efficiency. On the other hand it reduces the organization's flexibility. This way, upon the occurrence of any change in the environment, the measures that should be applied to handle the changed conditions would be expensive and complicated for application [4].

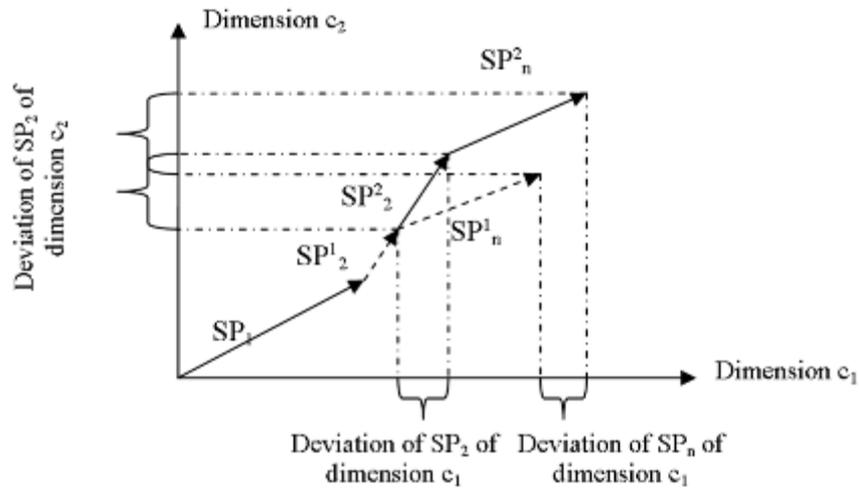


Figure 2. Delay of sub-processes

By the tool of unification, integration of two or more existing sub-processes in a new one is performed (Figure 3). Thus, the links between the individual processes are reduced. Besides, upon the unification of two or more separate sub-processes the benefits of the newly formed sub-process are increased more than the mathematical sum of the dimensions of those sub-processes [16]. Therefore, increase of the synergic potential and efficiency of

the business process is observed. The unification of sub-processes is applicable upon the availability of technological and logic succession between the individual stages of the process. It should be accompanied by additional qualification of the workers. It is necessary to mention that with high technological productions of great complexity during the running of the processes, the application of this tool would not achieve the desired rate of efficiency.

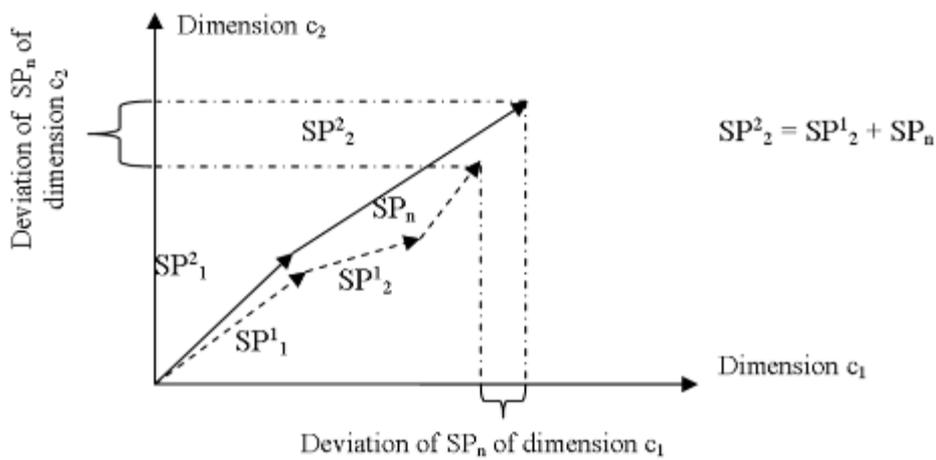


Figure 3. Unification of sub-processes

The method of changing the succession of the processes is applied for the purpose of smoother running of the process chain (Figure 4). The tool is used in the cases, where the existing order of performance of each sub-process hinders or delays the running of the business process. As a result of its application, synergic potential is released. The necessity of change of the sub-processes succession ensues also from the pursuit of continuous improvement of the production technology and structure by the application of re-engineering analyses.

Through the tool of adding a process, a new sub-

process or activity is integrated in the existing process structure (Figure 5). Its application depends on the selected depth of production in the organization. The more activities and sub-processes which build up the business process and the product as a result are performed within the company, the bigger is the depth of production. It can be determined also as a coefficient of the costs of production against the gross value of the products [15]. The adding a new sub-process or activity to the process chain practically increases the depth, the internal productivity and the competitiveness of the organization.

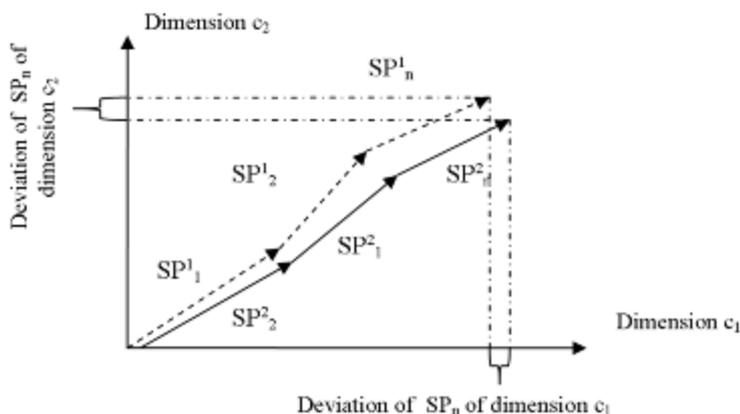


Figure 4. Change the sequences of sub-processes

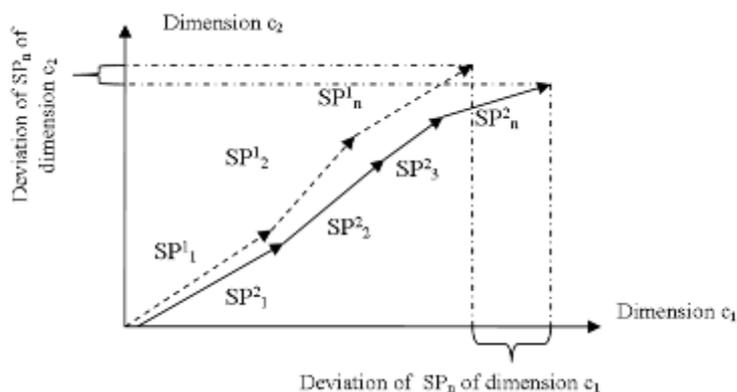


Figure 5. Adding a sub-process

The insourcing method is actually a variety of the adding of a sub-process or activity. The difference is that upon “adding”, a new and not existing by that moment sub-process is added to the product value chain. With insourcing, an activity which was performed outside the company by that moment passes for performance within the company borders. That way, the potential dependency on a

supplier and the expenses of purchasing the result of the relevant unit of the process chain is reduced.

Through the method “Elimination” one or several sub-processes are eliminated from the entire business process (Figure 6). That way, the numeric values of the dimensions of the process chain are actually reduced.

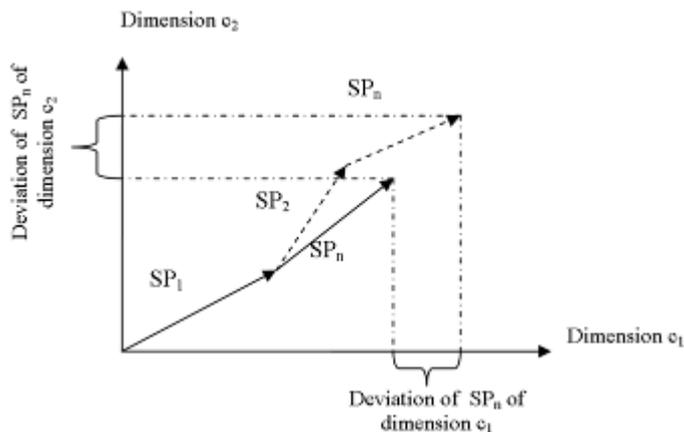


Figure 6. Removing a sub-process

The elimination can be revocable or irrevocable. The revocable elimination of steps of the business process is most often expressed in

outsourcing of sub-processes. With the irrevocable elimination one or several inefficient sub-processes are eliminated as a whole. That way, the

organization can be relieved from extrinsic sub-processes or activities and the assets necessary for their maintenance.

Through the outsourcing method, revocable elimination of sub-processes or “outsourcing of processes” is carried out. The criteria the sub-processes should meet in order to be revocable eliminated are: the external contractor should not be a direct competitor; undertaking measures of preventing dependencies; standardization of the external production; the newly selected contractor should be better than or as good as the company [14]. This tool is easily applicable in the practice, since the achievement of the set forth goal is performed with minimum effort. On the other hand, the revocable elimination may lead to dependency on the relevant external contractors of the eliminated sub-process.

3. Analysis of the influence of the methods for improvement on the sub-processes dimensions

In order to analyze the influence of the improvement methods on the dimensions of the sub-processes, it is necessary a scheme of the influence to be elaborate. To that end it is necessary firstly the dimensions of the processes and the aspects of business processes optimization to be described.

Dimensions of sub-processes

Various characteristics are used as dimensions for the performance of analysis and optimization of the processes (sub-processes) building the business process. They are determined in accordance with the information generated by the early warning system. The characteristics are divided into maximizing and minimizing at the preparatory stage of the optimization. Maximizing are the ones, the values of which should be increased as a result of the improvement, and minimizing are the ones, the values of which should be reduced. In general, the dimensions needed to achieve results from the running of the process can be divided into four categories: “quantity”, “quality” (maximizing dimensions), and “costs”, “time” (minimizing dimensions). The differentiation of the parameters should be in conformity with the strategic goals of the organization. Because of that reason, the characteristics describing each process can be different for the individual business units.

The quantity of manufactured products is one of the most often used characteristics of the processes. The main reason thereof is the fact that the quantity of articles produced in fact reveals the

result of the running of the process and, hence, its efficiency.

Quality is a specific characteristic as of the processes, as well as of the products resulting from their performance. There is no universal measuring unit for quality. Widely accepted is the quality to be measured through features and characteristics, which satisfy the customers’ needs. In the modern practice various concepts of quality management and improvement are applied. The most famous and widely applied are “the systems of total quality management (TQM)”, the “Six-Sigma Approach”, as well as quality standards (ISO 9000).

The costs are one of the basic measuring units in the contemporary business environment. Due to that fact, they are also used as characteristics of the processes. Through them it is determined actually the extent of efficiency of the operation of the process chain in general and, in particular, of the individual sub-processes or activities.

Another important measuring unit for the efficiency of the sub-processes is the time of their running and manufacturing of the product/service ordered by the customer. The shorter the duration of the process, the sooner the customer’s need shall be satisfied. That way one wins the loyalty of the buyers and the result is increase of the company’s revenues.

In order to determine the extent of the influence of the proposed tools on the dimensions of the processes, it is necessary the aspects of business processes improvement to be used. Through them the identification of the exact logical and quantitative interrelations between the methods and the dimensions of the processes is facilitated.

Aspects of business processes improvement

The business processes optimization is most often performed in four main directions – spatial, quantitative, logical and time optimization. They can be presented as summarized categories of criteria, through which one can assess the influence of the methods of optimization over the business processes.

The spatial optimization is directed towards improvement of the spatial dislocation of the separate process elements. The increase of the number of units, in which the factual performance of the separate elements of the processes, sub-processes and activities is carried out, leads to artificial increase of the unwanted relationships. They, on their part, increase the potential of occurrence of problems related to extension of the time, increase of costs, even decrease of the product’s quality.

A basic feature of the quantitative optimization of the business processes is the elimination of their inefficient components. It is expressed as in the physical elimination of sub-processes or activities from the business process structure, as well as spatial configuration of a process outside the company borders – “outsourcing of processes”. This is done for the purpose of elimination of repeating or non-adding value components. “Outsourcing of processes” is applied upon the availability of a more efficient external supplier of the product or service produced in the organization by this moment.

The logical optimization is related to the change of the succession of the sub-processes and the activities within the business process. Modification of the arrangement of its separate elements is done according to the order of their performance [1]. As a consequence of that modification, the time of performance of the process chain is shortened, the productivity is increased and the synergic potential is used.

The essence of the time optimization of the business processes is the shortening or the extension of the running time of one or several sub-processes.

The underlying concept of this improvement aspect is that the speed of each business process depends on the speed of the most slowly running component, which builds it.

It is necessary to mention also that there exist causal relationships between the various aspects. They are presented on Figure 7. For instance, the change of the number of factual locations of sub-processes performance, as well as the elimination of one or more of them, leads to improvement of the logical structure of the business process. On the other hand, the logical optimization can change the spatial dislocation of the sub-processes and to shorten the running time of the business process. In turn, the time optimization affects: the logical succession of running of the sub-processes and activities; the number of the process elements existing within the organization, as well as their spatial dislocation. The application of the quantitative optimization shortens the running time of the business process and at the same time leads to decrease of the unwanted relationships between the processes.

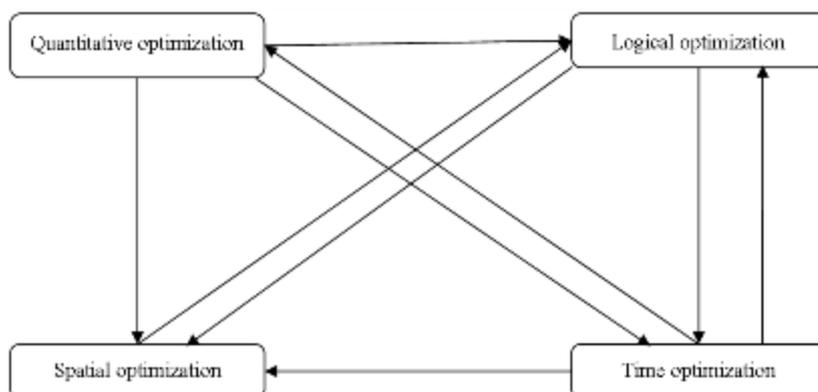


Figure 7. Causal relationship between the aspects of business process improvement

4. Evaluation of the optimization methods influence on the dimensions of the sub-processes

First of all it is necessary to mention that each method may be applied on one or several sub-processes within the business process, as well as that one or several methods of optimization can be applied on one sub-process. This way, the number of possible variants of performing the business process reorganization by the mentioned methods is increased time and again. The number of simulations of process chain running also grows and all that leads to increase of the expenses for the organization. In the conditions of limitedness of resources, in which the companies are functioning, striving exists for

continuous reduction of such kind of expenses.

This could be achieved through assessment of the existing relationships between the optimization methods and the categories of assessment criteria for the business processes and also between the categories of assessment criteria and the dimensions of the separate sub-processes. Besides, in some cases, mentioned most often used in the practice dimensions are dependent from one another. The degree, with which they compensate among them, is specified in a previous stage of the optimization process. The improvement of one may not be achieved by worsening the indexes of the other dimensions. A balance must be sought between all parameters describing the processes. On the other

hand, between the categories of criteria for business processes assessment and the exemplary features describing the processes and the sub-processes certain quantitative dependencies also exist. In addition, the proposed methods of optimization in turn affect the achievement of optimum conditions

in the four main directions of performing the optimization of the business processes (Figure 8). The influence of each of the specified methods of optimization on the mentioned dimensions of processes is ascertained and assessed through an expert's assessment.

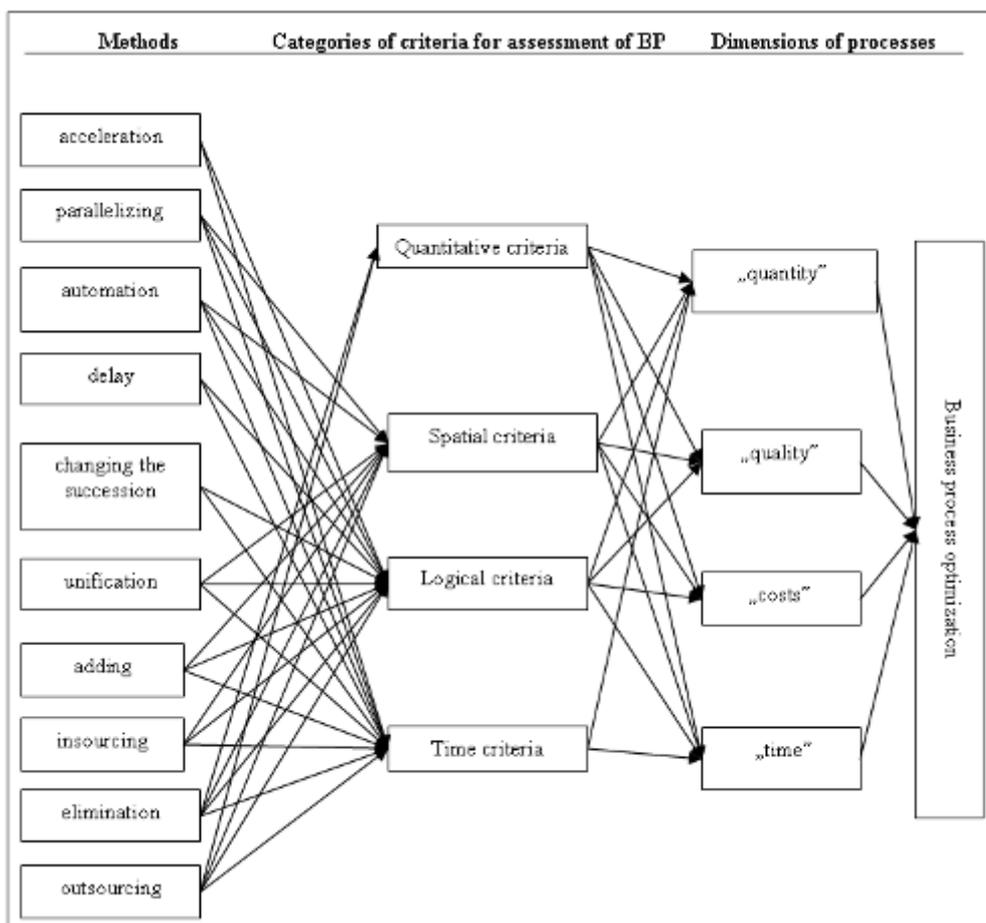


Figure 8. Schematic diagram of influence of methods on the dimensions of processes

5. Conclusions

Ten methods are presented in this article, through which the actual transformation of the existing critical business process in the organization to the desired, target process is performed. Depending on the specifics and the function it performs, each tool uses one or a combination of the principles: rearrangement of vectors; change of vectors' lengths/sizes; addition of a vector; elimination of a vector. The factual reorganization of the business processes can be performed by reduction of the duration of one or several sub-processes (“acceleration”) or the contrary action – “delay” of the process elements. Also, dividing in half and parallel running of the two newly formed sub-processes – “parallelizing”. The improvement can find expression in elimination in full or

assigning for performance to an external contractor of one or several sub-processes of the overall business process (“elimination”) or their unification in a new more efficient sub-process. Another possible approach is the integration of an entirely new sub-process in the existing process structure or addition of a process, which until this moment has been performed by an external contractor. In addition, it can perform change of the sub-processes succession or their automation.

The main advantage of the listed methods is the presence of integrity, flexibility and the strategic scope of the achieved improvements. Through their application, resource is released that could be directed to other critical units in the organization. An opportunity is secured for the use of the synergic potential of the sub-processes interaction.

Another positive aspect upon the application of the improvement methods is that through them as the efficiency of the sub-processes (activities), as well as the entire business process are increased.

The main disadvantage is related to the necessity of financial and human resources for the performance of various analyses ("Make or Buy Analysis") or the possibility of reducing the flexibility in handling the occurring changes in the environment of the organization. On the other hand, the presented scheme of influence of the improvement methods on the dimensions of the processes helps to reduce the number of simulations and the expenses related thereto. Besides, in the presence of data about the exact value, by which each dimension of the business process is deviating from the target, the type and number of methods, as well as the number of sub-processes to be applied thereto are facilitated. Thus, it results in savings and supports the decision making process at strategic and operating level.

The application of the tools of improvement of the business processes represents the fourth, conclusive stage of the optimization process. The achievement of optimal business processes implies the improvement process to pass also through performance of simulations for ascertaining the improvement rate. The realization of the specified stages of the optimization process could lead to achievement of efficient and stable improvements of the processes in the organization.

References

1. Angelov, K. (2008) *Business process reengineering* (in Bulgarian), TU Sofia, ISBN 978-954-438-723-5, Sofia, Bulgaria.
2. Bedenik, N. O., Rausch, Al., Fafaliou, Ir., Labaš, D. (2012) *Early Warning System – Empirical Evidence*. TRŽIŠTE. Vol. 24, No. 2, (December 2012), pp. 201-218, ISSN 0353-4790
3. Bickhoff, N. Blatz, M., Eilenberger, G., Haghani, S., Krause, K.-J. (2004) *Die Unternehmenskrise als Chance. Innovative Ansätze zur Sanierung und Restrukturierung*, Springer, ISBN 978-3540214335, Berlin, Deutschland
4. Biermann, T. (1997) 'Innovation in der Dienstleistung - strategische Optionen', In: *Innovation mit System*, Springer, ISBN 9783642591884, Berlin
5. Brüggemann, J., Heinrich, B., Sobczak, R. (1998) *Mathematik*, Cornelsen, Berlin, Deutschland
6. Buchholz, W. (1994) *Inhaltliche und formale Gestaltungsaspekte der Prozeßorganisation*, Arbeitspapier Nr. 1/94 des Lehrstuhls BWL II, Justus-Liebig-Universität: Gießen, Deutschland, p. 22-26
7. Deckler, G. J. (2003) *Achieving Process Profitability: Building the IT Profit Center*, iUniverse Inc., ISBN 0-595-28970-3, Lincoln, USA, p. 5-15
8. Eversheim, W. (1996) *Organisation in der Produktionstechnik 2*, VDI, ISBN 3642588492, Düsseldorf, Deutschland, p. 2-5
9. Gaitanides, M., Ackermann, Ing. (2004) *Die Geschäftsprozessperspektive als Schlüssel zu betriebswirtschaftlichem Denken und Handeln*, Available from: <http://www.bwpat.de/spezial1/gaitanides-acker.shtml>, Accessed: 23.01.2013
10. Grigori, D. Casati, F., Dayal, Umeshwar., Shan, Ming-Chien. (2011) *Improving Business Process Quality through Exception Understanding, Prediction, and Prevention*, Proceedings of the 27th International Conference on Very Large Data Bases, Apers, P. M. G., p. 159-169, ISBN 1558608044, University of California, December 2011, Morgan Kaufman Publisher Inc., San Francisco, USA
11. Haist, F. (2001) *Qualität im Unternehmen: Prinzipien, Methoden, Techniken*, Carl Hanser, ISBN 3446164103, München, Deutsch, p. 88-92
12. Harmon P. (2007) *Business Process Change*, Morgan Kaufmann Publishers, ISBN 978-0-12-374152-3, Burlington, USA, p. 9-20
13. Harrington, H. (2005) *Business Process Improvement*, McGraw-Hill, ISBN 0070600031, New York, USA
14. Hinterhuber, H., Aichner, H., Lobenwein, W. (2004) *Unternehmenswert und Lean Management: Wie ein Unternehmen den Nutzen für alle Shareholder erhöht*, Manz, ISBN 3214081969, Wien
15. Hirschbach, O., Mielke, T. (1996) 'Optimierung der Fertigungstiefe und Wege zu Wertschöpfungspartnerschaften', In: *Neue Organisationsformen im Unternehmen*, Springer, Berlin, p. 425-429
16. Karst, K. (1998) 'Strategisches Management', *Praktische Betriebswirtschaft*, Cornelsen, Berlin
17. Krüger, W. (2002) *Organisation der Unternehmung*, W. Kohlhammer, ISBN 3170170260, Stuttgart, Deutsch, p. 120-125
18. Lohoff, P. Lohoff, H.-G. (1993) *Verwaltung im Visier: Optimierung der Büro- und Dienstleistungsprozesse*. Zeitschrift für Führung und Organisation, Band 62, Nr.4, (ISBN 811175859, p. 248-254
19. Lowenthal, J. N. (2003) *Defining and Analyzing a Business Process: A Six Sigma Pocket Guide*, ASQ Quality Press, ISBN 0-87389-551-7, USA, p. 1-6
20. McDonald, M. (2010) *Improving Business Process*, Harvard Business School Publishing, ISBN 978-1-4221-2973-9, Boston, USA, p. 3-11
21. Ould, M. O. (2006) *Business Process Management. A Rigorous Approach*, Antony Rowe Ltd., ISBN 1906124329, Chippenham, USA, p. 15-18
22. Papula, L. (2001) *Mathematik für Ingenieure und Naturwissenschaftler*, Friedrich Vieweg und Sohn Verlagsgesellschaft, ISBN 3528349379, Braunschweig, Deutschland
23. Portougal, V., Sundaram, D. (2006) *Business Process. Operational Solutions for SAP Implementation*, IRM Press, ISBN: 1-59140-979-9, USA
24. Schmidt, G. (2009) *Organisation und Business Analysis - Methoden und Techniken*, Auflage 14, Schmidt Verlag: ISBN 978-3-921313-78-7, Gießen, Deutschland
25. Süßenguth, W. (1992) *Methoden zur Planung und Einführungechnerintegrierter Produktionsprozesse*, PhD thesis, Technische Universität Berlin, Deutschland

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