Methods of processes improvement

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Abstract. **Present article presents a set of methods, through which the inefficient processes 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. 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**

I. INTRODUCTION

All business organizations function through carrying out transformation of row materials into a product/service designated to satisfy the external customer needs (Angelov, 2008). The very transformation of the inputs is done through the running of various business processes (Harmon, 2007), processes (Deckler, 2003; Harmon, 2007; Haist, 2001; Harrington, 1991; Ould, 2006; Lowenthal, 2003; Süssenguth, 1992) and activities (McDonald, 2010; Portougal, 2006). As a result of the running of all these activities, processes and business processes united in production cycles, value is added (Harrington, 1991). The activities on maintaining high level of competitiveness and market position improvement (Gaitanides, 2004) 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 (Buchholz, 1994; Krüger, 1993; Lohoff, 1993; Schmidt, 2001). Besides, it is necessary to take into account the factors of the external environment (Eversheim, 1990) 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 (Bedenik, 2012; Bickhoff, 2004). 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 (Grigori, 2011).

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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 (Brüggemann, 1998). 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 (Papula, 2001). 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 processes optimization.

II. DESCRIPTION OF THE METHODS OF PROCESSES OPTIMIZATION

The methods trough which the activities of improvement and reorganization of the business processes are performed, are apply 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 deriving 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.
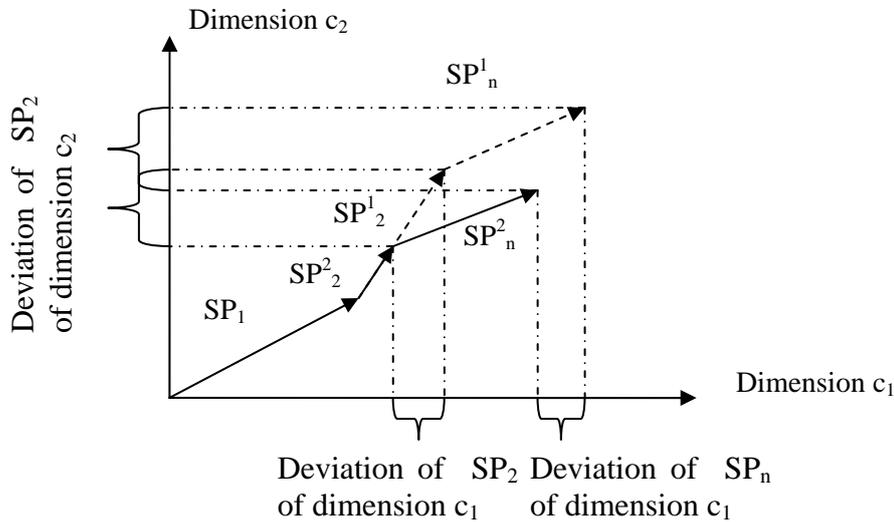

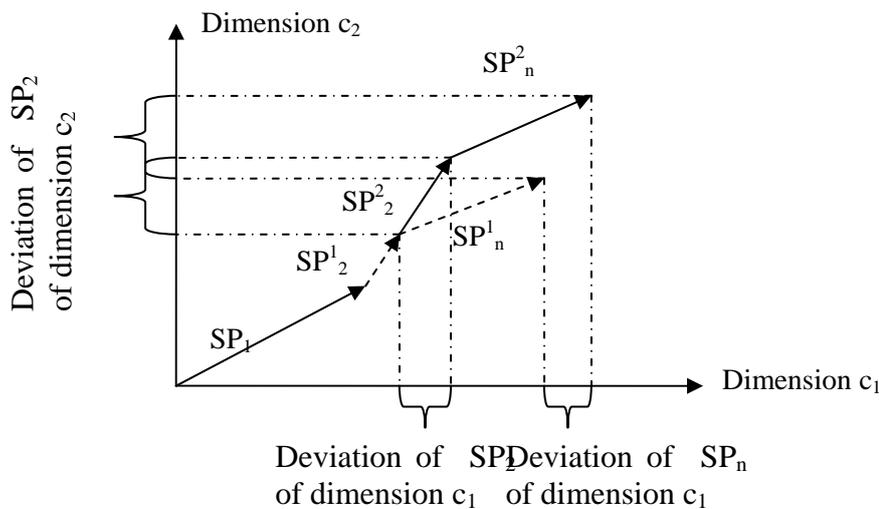Figure 1. Acceleration of sub-processes

Figure 2. Delay of sub-processes

Delay method is contrary to the acceleration (Figure2.). 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 (Biermann, 1997).

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. 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 (Caldorf, 1994).

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.
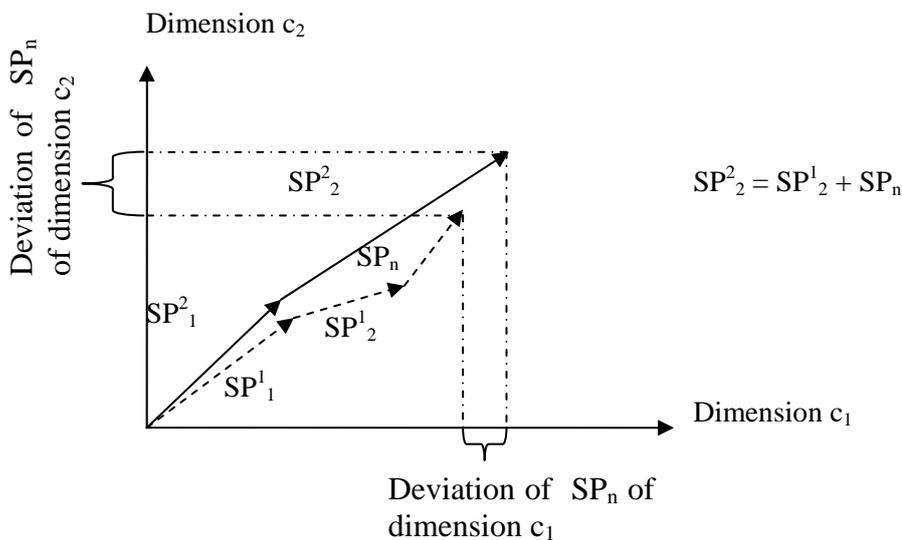

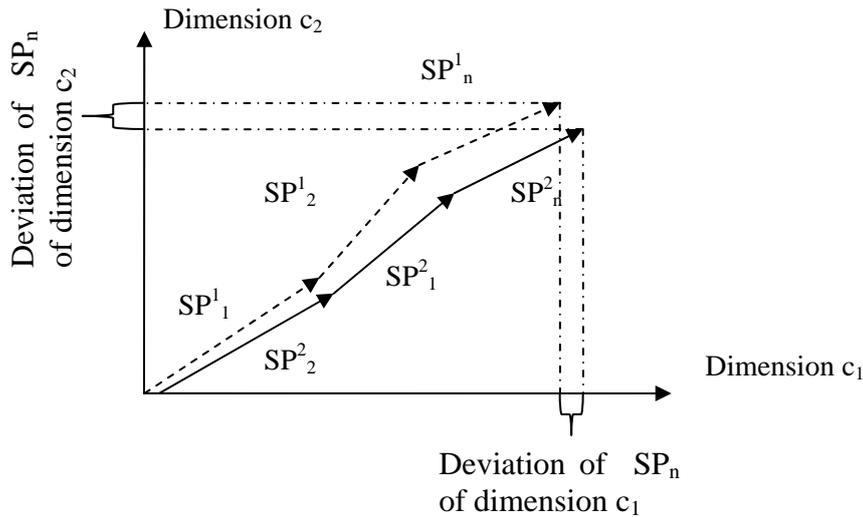$$SP^2_2 = SP^1_2 + SP_n$$

Figure 3. Unification of sub-processes

Figure 4. Change the sequences of sub-processes

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. 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.

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 out-side 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. 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.
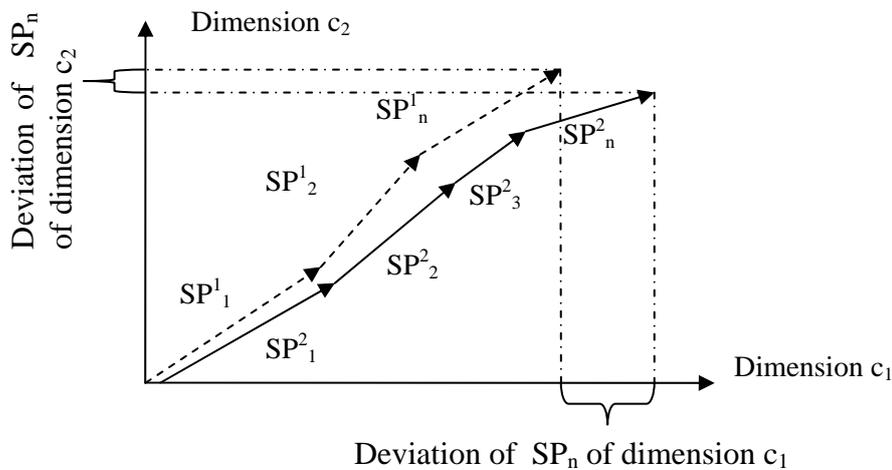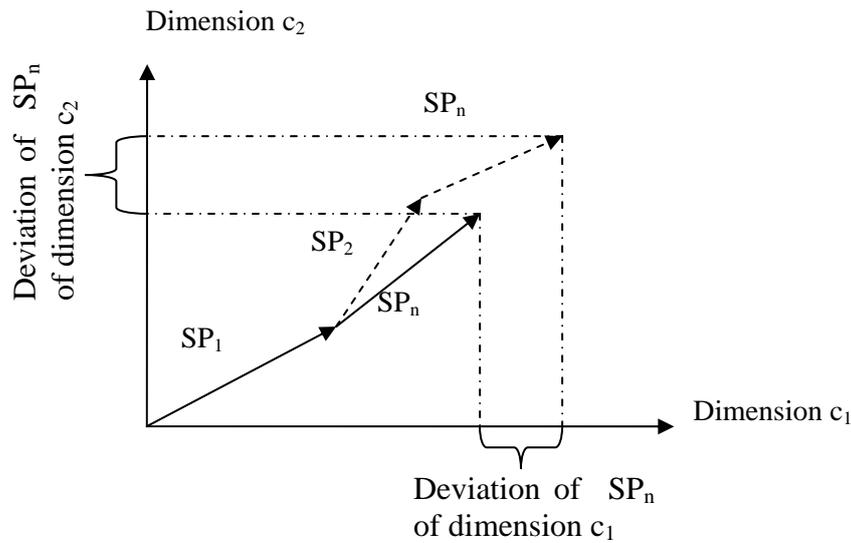

Figure 5. Adding a sub-process

Figure 6. Removing a sub-process

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 (Hinterhuber, 2004). 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.

III. CONCLUSION

Ten methods are presented in this article, through which the transformation of the critical business process in the organization to the desired 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 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 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. For this purpose it should be developed a scheme of influence of the improvement methods on the dimensions of the processes and evaluated their influence.

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.

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