

Criteria for Efficient Reengineering and Efficient Smart Management in the Business Organizations

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Abstract

The present article interrelates with the definitions of the concepts “reengineering of the business processes” and “smart management” with the imposed by the Fourth Industrial Revolution need of efficiency based on certain criteria. Efficiency, as a main goal in the business organizations, determines a specific two-way relation between the concepts “process reengineering” and “smart management”. This interrelation is reconditioned by the informational and tool set basis, which is similar for both concepts, as well as by the kinship of the factors requiring the introduction of the conceptual fundamentals of reengineering and smart management in the economic entities, and also by the identical goal setting and outcome of the two processes – achieving synergic results. In that sense, the study and analysis of the criteria for efficiency of the process reengineering in the business organizations could also be adopted as criteria leading to efficiency of the smart management itself there in, as well as vice-versa. In the course of studying the factors requiring the application of the reengineering and smart management concept in the business organizations, as well as on the basis of the information about the past and present development of the economic entities, there are some criteria synthesized, which lead to efficiency of the reengineering and smart management process in them.

Keywords: reengineering, smart management, efficiency, criteria.

1. Introduction

The relation between the concepts “reengineering” and “smart management” has not been studied, researched or analyzed in the specialized scientific literature. Moreover - yet there is no clear definition of the concept “smart management” in the scientific theory and, in the conditions of the Fourth Industrial Revolution, the problems with the digitalization of the business organizations and their smart digital management are even more relevant and more prioritized as a field of research. Currently, the economic system is clearly restructuring itself from “economy of ownership” to “economy of sharing”, and the importance of the ownership over assets is giving way to the priority access to assets [1-2].

The connection between the concepts of “reengineering” and “smart management” necessitates a theoretical review of the basic definitions existing in the literature. Based on this theoretical overview, the synthesized similarities and differences are in:

- their informational and toolset basis;
- the factors provoking them;
- goal setting of their final outcome.

The most well-established definition of the concept

“reengineering” in the scientific literature [3] is “a fundamental rethinking and rapid thorough redesigning of the business processes to achieve radical improvement in the main indicators of an enterprise.” A number of other authors [4-6], also assume that radical changes should be quickly implemented. The opposite thesis – that reengineering is not a fast modification in the business processes of an organization, but a more lengthy change, is also a subject of discussion in scientific literature [3]. On the background of the development of science in a global aspect, the Bulgarian researchers [7] assume that reengineering is a contemporary method for industrial engineering and management, whereby using information technologies, multidisciplinary groups of specialists and contemporary managerial approaches, the aim is to achieve: enhancement of the probability of successful market realization of the newly development products by increasing the share of the integrated consumer functions; decreasing the cost of the manufactured production; enhancing the efficiency of using the material, technical and human resources.

Reengineering is a new designing of the processes in the business organizations, in accordance with the fundamental rethinking and redesigning of its overall activity. The purpose of reengineering relates to the registration of tangible positive upgrades in terms of cost indicators, quality of services, speed of delivery and service. The reengineering of the economic activities is implemented by:

- improving the process;

- achieving “the best”;
- profitability margin.

A linguistic analysis should be carried out when defining the concept “smart management”. In this respect, the meaning of the word “smart” is most often related with intelligent, clever. Involving the adjective “smart” with the noun “management” provides grounds to draw the conclusion that, in a wider meaning, this concerns intelligent, clever management, management in a digital environment, which integrates artificial intelligence. In the most general sense, the concept "smart management" may be defined by its five specific characteristics:

- Specific - specificity, which means that this type of management has specific strategic indicators, which should be achieved;
- Measurable – measurability, which manifests itself in the comparison between a planned goal and a reported result;
- Achievable– coordination, expressed in the correspondence between the planned strategic goals and the available resources;
- Relevant– relevance, imposing corresponding reaction of the business organization to any change in its environment;
- Time bounded - time limitation, associated with the need of rapid response by the business organization to the changes in its external and internal environment.

The narrow meaning of the concept “smart management” should be analyzed according to:

- the functions determining it;
- its goals and organization;
- its content defining its range of action;
- the structure, which is built and maintained in the business organization.

In respect to its functional determination, the concept “smart management” is an integrated intelligent system of the management functions planning, organizing, implementing, coordinating, regulating, accountability, analysis and control. These functions unite into a complex unity the relations between production factors and finished products, between hierarchical and functional planes.

The goals of the smart management technological system, applied in the economic entities, are focused on achieving the objectives of the business entities themselves. The organizational structure of the smart management system includes a set of tools, high-tech solutions and business models based on artificial intelligence and cognitive systems, machine learning and intelligent mobile applications, block chain technologies and digital platforms. On this basis, smart management systems in business organizations:

- facilitate the development of the activity and the achievement of strategic guidelines;
- limit bottle necks in production and losses, adding value throughout the product life cycle;
- stimulate the competitiveness of the business organization by creating conditions for the provision of an individualized product with unique quality characteristics, thereby contributing to the achievement of image, financial and production added value.

In terms of content, smart management is an intelligent system of innovative business solutions that can be adapted to the needs and requirements of a particular business structure.

Structurally, smart management in business organizations leads to qualitatively new forms of economic organization and management. Smart management is a systematic synergistic unity of interconnected and interdependent intelligent subsystems. These subsystems are embedded, networked and digitally integrated. By them is facilitated the automated and autonomous management of the whole organizational system [1], [8].

Object of study in the present article are the concepts of reengineering and smart management in the business organizations, while the object of analysis is focused on the criteria leading to efficient reengineering and efficient smart management therein.

The goal of the research is synthesizing certain criteria for efficiency of the two studied processes.

The objectives of the research work comprise:

- defining the concepts “reengineering” and “smart management”, according to the requirements of the Fourth Industrial Revolution;
- proving the interrelation and interdependence between the two specified concepts;
- studying efficiency criteria validating the synergy of the reengineering and smart management process in the business organizations;
- choosing a criterion for efficiency, which should be adequate to the goal setting with both processes.

2. Model for the efficiency of business process reengineering and smart management in the business organizations

Studying and synthesizing criteria for the efficiency of business process reengineering and smart management in the business organizations requires the integration of cognitive process’ main stages in a single and comprehensive system – model.

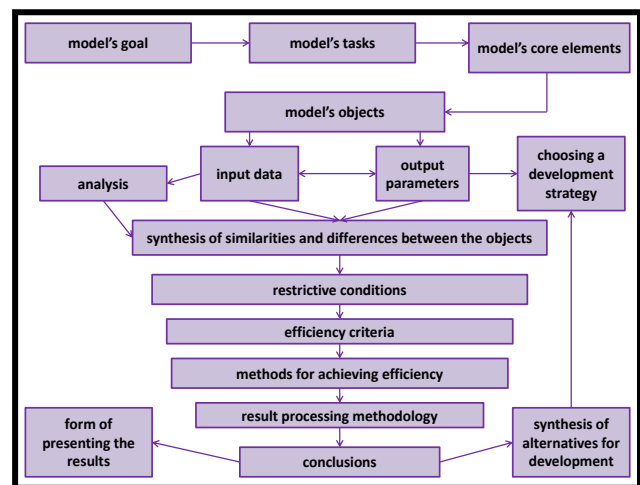


Fig 1. Model for the efficiency of business process reengineering and smart management in the business organizations

The model for the efficiency of business process reengineering and smart management in the business organizations is a specific approximation, reflecting certain aspects of the studied objects – reengineering and smart

management. The description of the system of reengineering and smart management with modeling is represented analytically (Figure 1). This approach is more advantageous since it is based on specific regularities in the studied processes – object of analysis. The experimental approach in developing the model is based on the input-output data about the studied objects.

The model for the efficiency of business process reengineering and smart management in the business organizations, generated in the present research, has the goal of achieving efficiency from a business organization, while the tasks include:

- providing evidence for the interrelation and interdependence between the objects of analysis;
- studying possible criteria for efficiency;
- choosing a criterion for efficiency leading to synergy of the reengineering and smart management process in the business organizations.

The core elements of the model stem from the theory of economic efficiency generated by Vilfredo Pareto, pursuant to which the resources used should contribute to achieving maximum productivity – i.e., the relation “goal – result” is set in the theory of economic efficiency. Therefore, the correlations “costs – revenue” or “gross profit – total revenue” can meet to a highest degree the requirements of Pareto’s theory of economic efficiency. That determines both the core elements and the main usefulness criteria of the model for the efficiency of business process reengineering and smart management in the business organizations. Thus, the two main building elements of the model are:

- cost structure that summarizes the value of the resources invested;
- the revenue structure which gives the fullest possible information on the attainment of the objectives.

The alternative options concerning the efficiency criterion are in respect to the profit, which is the difference between the generated revenue and the generated cost and the overall profitability, which is a correlation between the gross profit and the revenue.

The model’s objects are the reengineering of the business processes and the smart management of the business organization. They have their own main characteristics, goals, functions and structure of running, which, in turn, represent the incoming informational flows, subject to analysis.

The output data of the model are result of the possibility to add additional value, which is a direct consequence from the processes of reengineering and/or smart management in the business entities.

As a result of the analysis of the input information for the studied objects, it is found that smart management in the business organizations provokes radical changes in them. However, this leads to process reengineering. Thus, between the two concepts is defined a specific relation, since smart management, based on artificial intelligence, requires quick restructuring of the business processes in the organization. From a systematic approach perspective, smart management is a driving factor, leading to reengineering.

Pareto’s theory of economic efficiency, adapted to the specific efficiency model, as well as the synthesized main similarities in respect to goals and functions between the two

studied objects, lead to a necessity or control over the flow of invested resources and undertaking measures to increase production. Therefore, resource consumption and the amount of the manufactured production can be set as restrictive conditions in the model for the efficiency of business process reengineering and smart management in the business organizations.

3. Results and discussion

The analysis of the concepts for the business process reengineering and smart management in the business organizations, conducted in the course of generating the model for the reengineering efficiency and smart management, reaches the following main results:

- The two concepts have a common goal – creating prerequisites for achieving efficient results through comprehensive reconsideration and compete redesigning of the processes to achieve overall improvement in the main indicators of any organization;
- In a functional respect, both concepts are focused on systematic reorganization of the material, financial and informational flows;
- The functional scope of both concepts are focused on the same fundamental management functions – planning, organizing, coordinating, motivating, communicating and controlling the process of reengineering and the process of smart management in the business organizations;
- The similarities in respect to the goals and functions of the two concepts provide grounds to synthesize the generalization that reengineering and smart management generate a circular model, according to which they are in a systematic unity and one of the processes can be a prerequisite for the onset of the other one, while it is also possible that they could run simultaneously in the economic entities in a cumulative-and-integrated way.

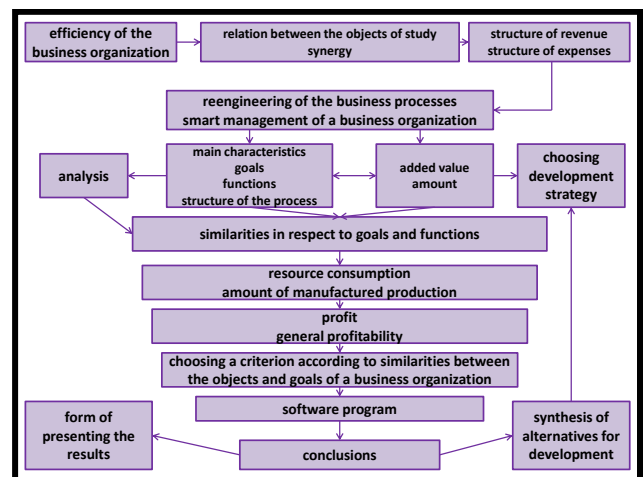


Fig 2. Main parameters in the model for the efficiency of business process reengineering and smart management in the business organizations

The similarity in respect to the goals and functions of the concepts for the business process reengineering and smart management in the business organizations is a prerequisite for the searching of common restrictive conditions, when studying their efficiency. The Increasing of efficiency in the economic entities through reengineering is associated with

improving the quality of management. The quality of the management system is a result of the adequacy of its subsystems, their key elements and interrelations. Based on this, the restrictive conditions in the generated model for the efficiency of business process reengineering and smart management in the business organizations should be the same. Resource efficiency (1) and the amount of the manufactured production in the business organization (2) stand out in the course of analysis as the most suitable restrictive conditions for both processes at the same time:

$$P = \sum_{j=1}^n [(CWT^{\text{machines}} + CLTT + CM + CE + CL) \cdot O_j] \quad (1)$$

where:

P – resource consumption

CWT^{machines} – cash cost for the work of the machines and equipment for the manufacturing of the j type of production in a business organization

CLTT – cash cost for losses of technological time for the manufacturing of the j type of production in a business organization

CM – cash cost for materials for the manufacturing of the j type of production in the business organization

CE – cash cost for electricity for the manufacturing of the j type of production in a business organization

CL – cash cost for labour for the manufacturing of the j type of production in a business organization

O_j – amount of the manufactured j type of production in a business organization

$$O_j = \frac{\sum_{j=1}^n THW}{IPT_{\min_j}} \quad (2)$$

where:

O_j – amount of the manufactured j type of production

THW – total number of hours of work of a business organization for the manufacturing of the j type of production

IPT_{\min_j} – minimum ideal production time for the manufacturing of the j type of production in a business organization,

It has been proven in the course of analysis that the concepts for reengineering of the business processes, and for smart management in the business organizations, have common goals and functions. Nevertheless, the criteria for efficiency in the model for the efficiency of business process reengineering and smart management in the business organizations, elaborated in the present article, should be in structural-and-hierarchical compliance with:

- the goals of the business entities;
- possibility to reflect the dynamics of the environment.

At the same time, the efficiency criteria should be balanced, adequate to the reality and non-contradictory.

The efficiency criteria should not be subjected to the principle of minimizing the costs, but should reflect the maximization of the economic result at a certain level of production and management costs.

Various criteria for evaluating the efficiency of their manufacturing and management processes are applied in the business organizations. Such criteria as the amount of the manufactured production, profit, time consumption, profit ability are specific summarizing indicators, characterizing the final results. At the same time, some specific indicators, such as labour, investments, energy, etc., are also used as criteria for the efficiency of the main types of resources. The

indicators profit and profitability, however, characterize most comprehensively the final results from the activity, and, respectively, the efficiency of the processes in the business organizations. In that sense, profit (3) and total profitability (4) stand out as the most suitable criteria for the efficiency of reengineering and smart management in the business organizations:

$$\text{Profit} = TR - TC \quad (3)$$

Profit – profit

TR – total revenue

TC – total costs

$$\text{Profitability}_{\text{total}} = GP : TR \quad (4)$$

GP- gross profit

TR – total revenue

The research presented in this article has the following restrictive conditions:

- in the formation of the criteria for the efficiency of reengineering and smart management in the business organizations, the research does not differentiate the specificity of the economic entities (small/ middle-sized / large, from the business sector / from the public sector, manufacturing / in the field of non-material production;
- the described criteria for the efficiency of the process reengineering and smart management in the business organizations aren't generated from the perspective of the efficiency concepts, but on the basis of the economic practical applicability;
- the factors influencing the efficiency of the business entities have not been studied with the selection of the criteria for the efficiency of reengineering and smart management in the business organizations;
- the impact of the economic entities' life cycle on the restrictive conditions and criteria for the efficiency of reengineering and smart management in the business organizations has not been studied either.

4. Conclusions

It could be summarized, in conclusion, that the criteria for the efficiency of business processes reengineering and smart management in the business organizations are:

- integrated indicators bearing information about the alternative or cumulative development of two processes in a business organization – reengineering of the business processes therein and/or its smart management;
- relative characteristics of the effectiveness of the studied processes, enabling analysis, evaluation and comparison of data and strategic alternatives for development in various time aspects;
- complex socio-economic categories, which reflect the interrelation between the extent of implementing the planned targets of the business units and a certain material, financial and human resource consumption;
- result of the application of the process and systematic approaches, which interpret business organization as a combination of interrelated and interdependent business processes;
- part of the strategic management system, never the less they are in immediate relational dependence on activities implemented on the operational-and-tactical level in the business organizations.



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