

## REENGINEERING OF ECONOMICAL SYSTEMS – INSTRUMENT FOR RE-TECHNOLOGIZING AND REHABILITATION APPLICABLE IN EXTRACTIVE INDUSTRY

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**ABSTRACT.** The efficiency analysis of lignite exploitations must be based on the advanced techniques and methods, widely applied in the successful firms. The involving of personnel and the teamwork, correlated with the top information techniques, need high efforts in the human resources field but also in the technological and financial field of activity. The rigorous approach and strictly focused on obtaining the results, is offering optimal solutions for the increasing of performances and for the recovery of human, material and financial efforts. The teams for reengineering must be sustained logistically and have to be systematically coordinated for obtaining the optimal solutions. These solutions must help the firm to obtain a better orientation on the market towards top positions and also for the recovery of the funds invested in projects.

### РЕИНЖЕНЕРИНГ НА ИКОНОМИЧЕСКАТА СИСТЕМА – ПОДХОДЯЩ ИНСТРУМЕНТ ЗА ВЪЗСТАНОВЯВАНЕ И ТЕХНОЛОГИЧНА РЕХАБИЛИТАЦИЯ В ОБОГАТЯВАНЕТО

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**РЕЗЮМЕ:** Кратко изложение на технологията при разработването на лигнитни въглища, което се основава на предварителни подбрана техника и технология, широко приложими в успешно развиващите се фирми. Заинтересованите служители и работни групи, съотнесени към най-съвременните информационни технологии, нуждаещи се от големи усилия, свързани както с човешките ресурси, така и в технологичното и финансова област от дейности. Точни достижения и строго погледнато от получените резултати е предложено оптимални решения за повишаване на производителността и за възстановяване на човешкия, суровинния и финансови усилия. Реинженеринговата работна група трябва да бъде постоянно материално-технически обезпечена и трябва да бъде постоянно координирана за получаване на оптимални решения. Тези решения трябва да помогнат на фирмата за получаване на по-добра ориентация към постигане на високи пазарни позиции както и възстановяване на основни проектни инвестиции.

The analysis of efficiency made inside the lignite mining exploitations have to be based upon the advanced managerial methods and techniques, largely applied inside the successful firms. The involving of personnel and the teamwork, correlated with the top informational techniques, need sustained efforts in the human resources field but also in financial and economical fields. The rigorous and strictly oriented on results is offering optimum solutions for increasing the performances and for the recovery of human, material and financial efforts. The teams for reengineering have to be logistically sustained and systematically coordinated for obtaining optimum solutions that will allow the orienting of the firm on the market to top positions and also the recovery of the funds involved in projects.

One of these methods, that approaches a process as a whole and that can be applied in the analysis of restructuring way, of its impact and in the evaluation of the technological rehabilitation is the Reengineering of Processes, syntagma that was adopted by Hammer and Champy in already classical volume published in 1993, *Reengineering the Corporation*.

*By BPR (Business process reengineering) we understand: The fundamental revision and radical designing of processes for reaching to the spectacular improvements regarding costs, service quality and its rapidity.*

If we are taking into consideration the accumulated experience regarding the applying of reengineering in different fields, we will observe that the possibilities that this orientation have in the rehabilitation, modernizing and re-technologizing are promising.

Hence, the improvements in productivity had as main objective industry and, inside this, those activities strictly connected to production. This approach chooses complex processes that have a great number of resources and activities that have to be adequately coordinated.

The implementing of reengineering has as object: Business, management, organizational structures, processes and mentalities. This presumes a continuous process of reorienting, reorganizing, reinventing and rethinking, characterized at the organization level.

The covered stages are:

- diagnostic analysis and the establishment of the forces field (evidencing the pro and against pressures);
- becoming aware of the need of changing and setting the objectives (evidencing of internal and external restrictions)
- execution of effects evaluation process and the retaking of process.

As managerial supporting methods we are evidencing:

- benchmarking (comparing of processes, products or services, internal or developed by leader firms);
- SWOT analyses (evaluation of opportunities and of threats);
- costs reducing;
- Pareto analysis.

Effects of the reengineering action are:

**in the field of technological processes:**

- Reducing of consumption and of power loss;
- Increasing of output and of efficiency;
- Simplifying of processes, increasing the safety degree in functioning;
- assistance from expert informatics;
- increasing the functioning cycle between two repairing, shortening the interventions and in some cases the elimination of maintenance;
- Optimization of functioning regimes;
- reducing of pollution and of associated expenses;
- Increasing of performances, of efficiency and of central quality;

**in the field of human resources:**

- preparing, involving and evaluation of personnel;
- Increasing the culture degree, responsibility degree and effective motivation of personnel;
- improving the work conditions by ergonomic measures, by intensification of the actions for the increasing the dialogue human-computer-process.

**in the economical and decisional field:**

- promotion of rapid methods for economical analyses, which will allow the taking of measures in useful time. It is preferred to know the expenses in real time and the central level, by methods and techniques that are offering consistence in the detriment of precision, for the decisional factor;

- substantiation of decisions by applying the adequate techniques and by informatics assistance;

As example of key decision in the reengineering of mining processes, we can underline the extending of outsourcing (term that is equivalent with spinning-off) for the basic activities, not only for the connected activities.

This is referring to the delegation of some tasks or objectives to some organizational segments belonging to external entities that are offering a better price/quality ratio or are having experience in specialized fields. The spinning-off comprises a wide specter of activities, from operational processes (for example delivery of products) and going to functions of the firm.

**Theory of modernizing the techno-economical systems**

The techno-economical system can be defined as an **assembly of elements, of diverse nature, well outlined and delimited towards external environment, coordinated with the purpose of achieving an objective of technical, economical or social nature on the basis of resource consumption, limited by requirements of a durable development.**

The structure of component elements and the nature of their connections with external environment are specific to each system. Establishment of objectives for the conceiving and functioning of a technico-economic system can be done in its exterior, and the adjustment of adapting of functioning way towards these objectives can be done by internal elements, respective self adjustment system. Together with the positive effects of the systems functioning, have to be evaluated also the negative effects from *double perspective*: **The negative effects for the system**, (self destruction) and **negative effects for external environment** (destruction of external environment). Schematically, the structure of a technico-economical system, from this perspective, is presented Fig. 1.

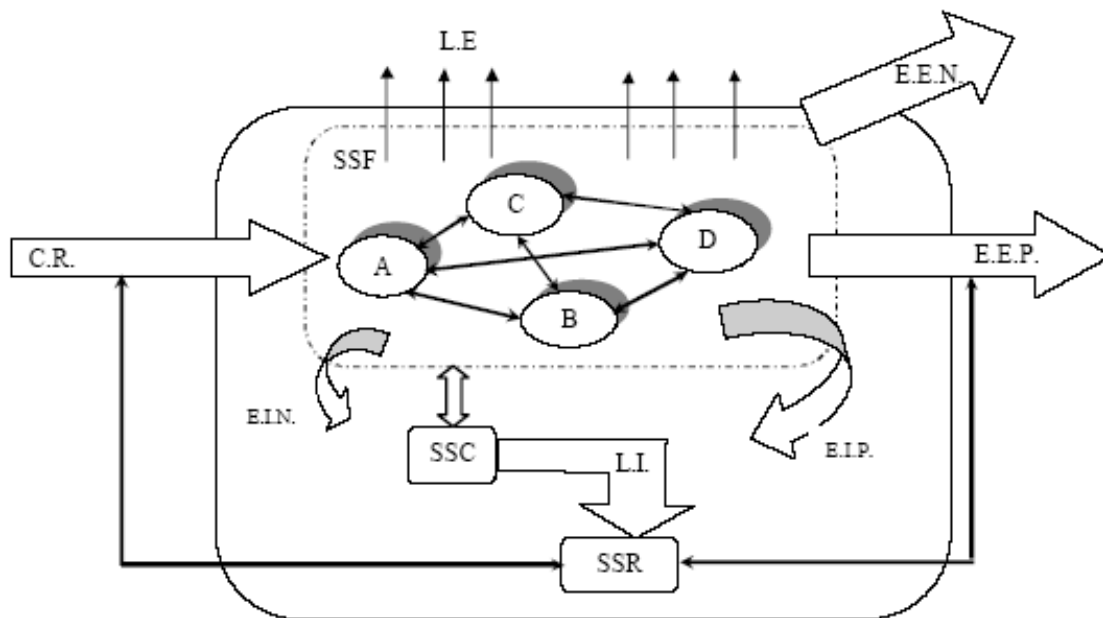


Fig. 1. Structure of a technico-economical system

Significance of the elements from Figure 1 is the following:  
 A, B, C, D – components of the technico-economical system;  
 E.I.P. – internal positive effects ; E.I.N. – internal negative effects;  
 E.E.P. – positive internal effects ; E.I.N. – negative external effects;  
 C.R. – resources consumption; SSF – fabrication subsystem;  
 SSC – subsystem for the system leading;  
 SSR – subsystem for the system adjustment;  
 L.E. – external connections of the subsystem with environment;  
 L.I. – internal connections between the component subsystems of the system

The presented structure can be adapted to a diverse category of systems from social and economical activity; further it can be done the association between the technico-economical systems and the specific organizations of market economy, with particularization on the ones from extractive industry.

### **Definition and content of technico-economical systems modernization**

One of the solutions for straightening and for going out from the actual situation can be the identifying of modernizing variants of the existing production capacity.

According to the explanatory dictionary of Romanian language, *modernization of a technico-economical system* means that adapting capacity of the system to the requirements and exigencies of the present for corresponding as optimum as possible to this requirements.

The modernizing and re-technologizing can be solutions for a rapid straightening of technico-economical systems in conditions of technological mutations and of turbulent situations, crisis that characterizes the actual economical environment. These activities have a benefic influence in economical efficiency, due to the efforts made and due to the economical effects obtained after these actions.

The concept of modernization appeared relatively recent, at the end of 1950, when the economical situation on international markets aggravated, the competition became more powerful, the economical differences between the states were greater and the politics regarding environmental protection became more and more powerful.

*Modernization* represents a form of integration of the new technologies inside the activities of economical agents, fact that is leading to the diversification of technical progress sources and to the approaching of activities from diverse productive sectors in a systemic vision.

The modernizing activity of productive systems presents some **specific characteristics** that are giving it some advantages towards other method of increasing the economical efficiency.

In the modernizing activity the starting point is **an existing technical and economical base**, that offers already some equipments, devices, technologies, buildings, utilities; these

*need no more supplementary efforts for achievement*, just eventually for some changing for setting them in consonance with other works that will be done. These adaptations *will cost much less in comparison with the situation when they would be totally new*.

Reaching the target in a shorter time period has the advantage that *ensures in advance the proposed effects*, when they are more intense solicited, it is materialized a supplementary profit as following of the production obtained the gained economy of time.

By *technology* it is understood the assembly of processes, methods, proceedings, operations used for the fabrication of making of a product or achievement of a service. The re-technologizing presumes the bringing back of equipments to the superior technical parameters for ensuing the products a superior quality or lower costs.

### **Particularities of the projects for modernizing**

Inside the technico-economical systems, "the expenses for modernizing are more judicious distributed, in the sense that they are with priority printed for the building, adaptation or structural improvement of active fixed assets, meaning the one that is directly participating to the obtaining of results as: Equipments, special buildings, technological chains, etc.

In the case of modernizations, the passive assets (buildings) need a lower volume of resources, because need only small changing, sometimes ambient, or no changes, that creates the conditions that the constituted and allocated finds for modernization to be oriented specially to the activities that are leading to the increasing of economical results of the firm, meaning the increasing of active assets.

By modernizing, no different upon the achievement level, it is applied **new solutions and ideas**, because modernizing, by its essence, has an **innovator character**, and it is the bearer and a generator of technical progress. This is ensuring the reducing of material specifically consumption, but also of work, fact that is leading to the decreasing of efforts for modernizing and of the ones with production activity.

In the same time, the modernization is ensuring the reducing of nonconformities, refuses and also the decreasing of loss by increasing of manufacturing degree of raw materials, due to the use of better equipments and better technological solutions.

Modernization has a favorable effect also over the equipment feasibility and over the entire productive system.

The main influence of modernization is connected to the impact over the *quality aspects of the participant factors to economical and social life*. Also, modernization makes pressure also on the quality of technologies, by modernizing the existing chains, by finding the new technological solutions or by adapting the exiting ones. Closely connected with the equipments and technologies quality improvement takes place also the increasing of quality level of work force, from the point of view of content but also from the point of view of its structure.

As a corollary of presented production factors improvement, we can reach to the improvement of products quality, as final purpose of the modernizing activity.

*The qualitative and quantitative improvement of economical effects occurs as a consequence of advantages presented by the modernizing activity.* A direct effect is the increasing of obtained production, as a following of making of supplementary production, due to the superior parameters of equipments, but also due to the improvement of finished products and of their structure.

The increasing of production value and in general of all economic effects is obtained also by the improvement of structure or consummated resources, in the sense of using of some raw materials well dimensioned and of corresponding quality, according to the technological process requirements but also due to the corresponding level of human resources and of the technical levels of equipments used and the high quality level of products.

Any non-concordance between the three quality levels (equipment's output, quality class of products and the employee qualification) can have negative effects in the production process.

The modernizing activity of all economical activities is a main way for the improvement of economical efficiency at all levels, because by this way it can be ensured the changing of ration between the efforts and effects. The efforts have a relative decreasing, and in the same time the economical effects are increasing, by volume and also by structure.

The modernizing of national economy represents a **dynamic process** that presumes a good knowledge of economical realities for the ensuring of a viable inter-conditioning of national economy branches but the correlation with the other countries economy.

Also, the modernization is a vital requirement for ensuring the increasing of economical efficiency ant micro and macro-economical level, an objective independent factor, a condition "sine qua non" for ensuring the economical growth, in the development conditions known by the contemporary world.

## Conclusions

Starting from the essential idea of finding analytical instruments for studying at a general level of management

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problems of equipments, in the conditions of reducing the mining activities, specially referring to the conditions from Oltenia coal field, in this work I tried to synthesize some theoretical and conceptual elements regarding modernization of technical and economical systems.

Considering that the study of recovery and re-use problem of tangible assets of closed mines is sufficiently clarified by the Mine Closure Manual, I focused in the analysis over the problems of **re-engineering of productive system**, with a special regard to modernization, the only way of solving the economical dilemma of producing more with more limited resources.

In this context, I approached the main elements of modernization, in a systemically conception, as it is today outlined in the theory of modernization of technical and economical systems.

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