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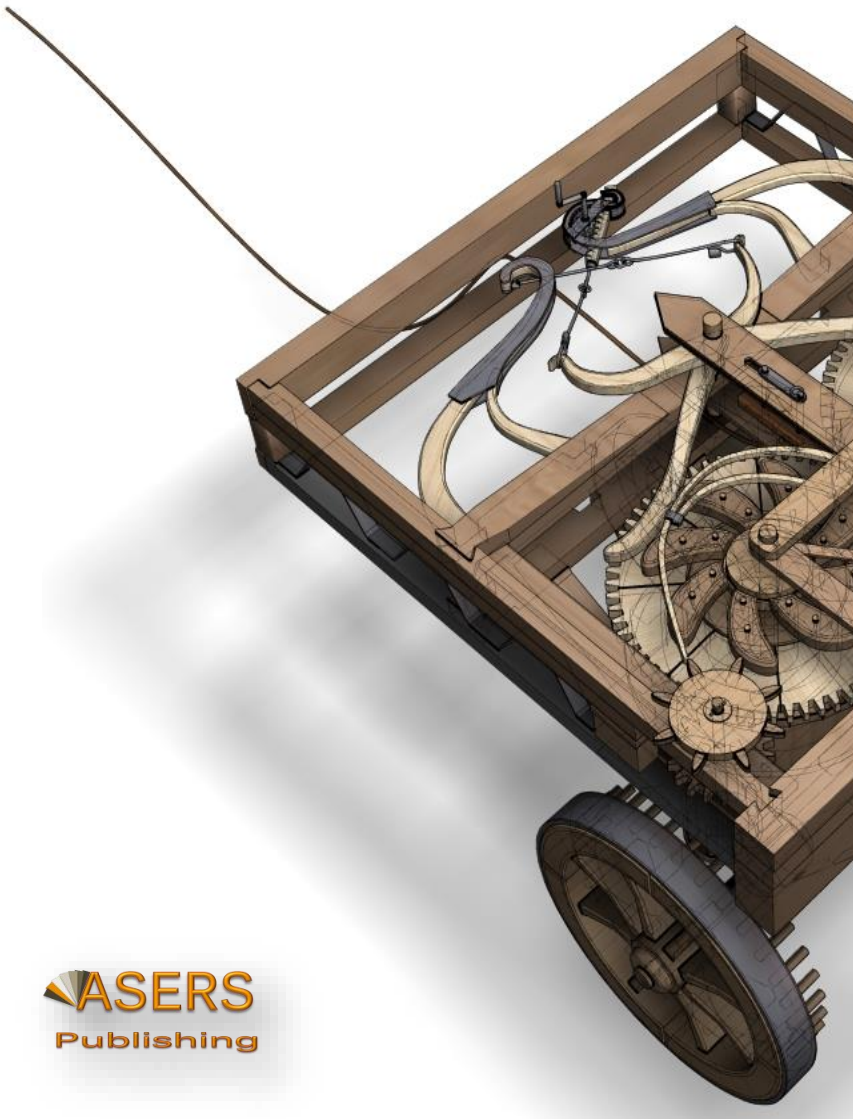

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STUDY ON PRE-ASSESSMENT AND EVALUATION SYSTEM. INDICATORS FOR ENERGO - MINING COMPLEX IN BASIN OF OLTENIA

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Abstract

General behavior of the company's mining and energy is superstate, pursuit function entity, independent of multiple relationships with the external environment.For a superstate behavior, mining company, energy internal control circuit acts that manages to attract, to resolve the problems that arise in the functioning of the internal capabilities of resourcefulness and initiative.

Statement by offsetting adjustment takes place by opening the internal control circuit to apply the means of establishing equilibrium. In our assessment, the company mining / energy has double adjustment possibilities, but is really effective only when they occur in the system superstate.Intervention-compensation adjustment is necessary in some periods, precisely because of the place it has mining company / energy in general economic system.The Company has analyzed the precise functions and features specific means, but was only able to take over certain disturbances.

Key words: evaluation system, indicators, energy and mining sector.

JEL Clasiffication:D3

1. Introduction

The system concept enables highlighting the many factors that contribute to the assessment decision area. Decision making energy-mining without reference to a specific mining energy-econometric system will be hazardous. Restructuring of the mining sector management in connection with the energy can not prove reliable conceptual if not taken into account in making the decision econometric perspective.

Reporting the results of any action economic structures econometric energy-mining system that competed in the result of the subsequent results would increase the chances of adopting some decisions based on variables that contribute to their success.The systemic perspective to explain the production processes and maximum complexity and dynamic econometric, mining and thermal power system, the essence of which can hardly be highlighted by other means of investigation.

Basin Oltenia Using econometric system concept through this process is trying real economic analysis of the phenomenon productive as he is, as a set of interacting elements.The system concept is the expression of a way of thinking econometric management.

It provides a framework that allows to highlight the internal and external factors of technological lines of pits and burning of lignite power plants as an integral whole.The concept of econometric energy-mining system is used to explain the mechanism of expression of hurt economic phenomena-productive area of Oltenia, or operational means to optimize economic activity by building models based on system behavior in the field.Econometric system in this case is a conceptual tool which delimit the field within which investigates the energy-mining target, ie objective basis, structural, temporal and spatial two areas.

The system provides a new light means used to improve the career civil process lines and systems of power plants burning lignite, management and prognosis, and other aspects, such as self-organization and self-specific processes, aspects of creative expression the individual in the group, explaining the behavior of subjects responsibility as a social phenomenon in the area.

2. State the decision econometric energy-mining complexes

Econometric modellers situation in the area, according to our research, is characterized by the meeting of 3 elements, namely:

- The set of independent parameters or stimuli (denoted S) defining the objectives and uncontrollable variables form;
- The set of rational alternatives or possible reactions (denoted R), which is able to respond to each objective conditions that make up the controllable variables;
- The set of outcome indicators that can be reasonably considered in the choice of decision criterion.

Stimuli. This includes elements of the environment that can not be changed in the decision (eg geo-mining conditions natural energy-mining basin Oltenia).There uncontrollable parameters, common form of political and economic restrictions of the country, the behavior of machines, innovation, phenomena related to employment. Uncontrollable parameters may be continuous or discrete categories of state.

Reactions. This set consists of all the possibilities that are available to decision makers and lignite power plants careers for solving decision problems.Reactions are generally understood in the sense of ,, value "(quantity, size, type, number, etc).The crowd crowd reactions generated by stimuli from a state of nature.

Indicators. In the state of nature, for each rational variant applicable results are obtained, which can be characterized by indicators.Deciding means choosing an econometric versions of several possible action, and is subordinate to the requirement of optimality in the energy-mining research.It is estimated that the optimization is carried out with respect to all criteria.An alternative is better than another only to the extent that it satisfies more than one criterion than another.

The decision criteria for the study are:

- *simple decision criterion:* we consider a single output indicator (tons of lignite, KWh electricity), the other being neglected or kept at a constant level (optimum yield relatively).
- *complex decision criterion*. This is a subset of the set {I} outcome indicators, to be taken into account when solving a decision problem Basin Oltenia.If complex decision criteria differ more options:
    - youcan choose limiting values for all indicators derived from the subset of {I}, less than one, depending on which optimizes max. or min. (Via mathematical programming);
    - determinethe functional relationship between two or more indicators and combine into one.
    - itshall result in the transformation of indicators deviations from the optimal.

It establishes a matrix containing rows indicator value of each option, and the columns, the value of all indicators for a variant.

Table 1 – The value of all indicators for a variant.

I/V	V_1	V_2	V_3	…	V_N
I_1	a_{11}	a_{12}	a_{13}	…	a_{1n}
I_2	a_{21}	a_{22}	a_{23}	…	a_{2n}
I_3	a_{31}	a_{32}	A_{31}	…	a_{3n}
…	…	…	…	a_{ij}	…
I_M	a_{m1}	a_{m2}	a_{m3}	…	a_{mn}

The result indicators matrix elements of a matrix C is calculated transformed.

Table 2 - Deviations from the optimal value of the result indicator.

I/V	V_1	V_2	V_3	…	V_N
I_1	c_{11}	c_{12}	c_{13}	…	c_{1n}
I_2	c_{21}	c_{22}	c_{23}	…	c_{2n}
I_3	c_{31}	c_{32}	c_{31}	…	c_{3n}
…	…	…	…	c_{ij}	…
I_m	c_{m1}	c_{m2}	c_{m3}	…	c_{mn}
Σc_{ij}					

Elements c_{ij} are obtained using the relation:

$$c_{ij} = \xi \frac{a_{ix} - a_{ij}}{a_{ix}} \quad (1)$$

unde: $\xi = \begin{cases} +1 \text{ for max. (when it comes to the max.)} \\ +1 \text{ for min. (when it comes to min.)} \end{cases}$

a_{ik} = the optimal value of an indicator

The optimal variant is that which has the minimal deviations c_{ij}:

$$\text{The optimal variant} = \text{variant min}[\Sigma c_{ij}] \quad (2)$$

with a_{ij} =elements of the matrix A.

3. Decision-making in energy-mining complexes

Deciding the researched area is based on: the selection criteria decision; alternative choice of action (decision itself).Decision criterion is a measure that compares each action options to choose the best alternative.Simple decision criteria apply when the objective can be characterized by a single indicator of outcome (all other results are ignored, considered insignificant for the ultimate goal). The

objective of energy-mining complexes composed of the maximum amount of energy production variant would ensure maximum yield criterion would be the best option, quantity of products. Typically, the maximum similarity in criterion coincides with the minimum cost, minimum investment, etc. We conclude from our analysis that rarely Basin Oltenia decision shall be taken by a simple criterion. Most often resorting to a complex criterion, since it reflects more results indicators:

$$D = S \cup R \cup I \quad (3)$$

*in which:*D = decision*;*
I = set of outcome indicators (variables that reflect the results that would be obtained by taking a lot of reactions R, defined objectives in terms of stimuli S).

Simultaneously,

$$I = \{I_K\} \quad (4)$$
$$I = F^k(X,Y,Z)$$

These outcome variables (response) according to R and S are taken. It concludes that the results reasonably possible to consider the energy-mining production system in Oltenia are: the amount of energy, works, services; production costs, investment; consumption of materials; benefit;delivery or the putting into use; security; the degree of compliance of technical safety at work; the social effects etc.

Ways to use a criterion energy-mining complex entities, are mainly the following:

a) Identify a mathematical relationship between several indicators result.
Example: cost price / unit is a complex criterion c;

$$c = f(Q,C_e,C,) \quad (5)$$

*in which:*Q =production of lignite / energy;C_e =operating expenses (in careers lignite power plants);C_i =investment expenditure.

Similarly, the benefit b is:

$$b = f(Q, C, p_v) \quad (6)$$

in which: Q = output; C =cost price; Pv =cash price.
For K =considered equivalent expenditure, the relationship is:

$$K = C_{ie} + C_e \quad (7)$$

in which:C_{ie} =investment costs for achieving; e = coefficient (rate) of efficiency of investments (as a percentage of investment returns / returns as accumulation);C_e =operating expenses.

b) Limit values they can take some of the indicators for results and maximize (minimize) after another indicator considered of prime importance (constrained optimization).This we believe that is the most widely used in energy-mining complexes decisions Basin Oltenia (which appeals to operational research).The decision is constrained optimization:

$$\begin{cases} Q \geq Q_p \\ C_i \leq C_{iN} \\ \min \{C_e\} \end{cases} \quad (8)$$

in which:Q_p =planned production quantity (tonnes lignite kWh); C_{iN} =rated investment.

The best solution (conventionally favorable) is required which ensures production volume Qp, which refers to the assignment of an investment fund available CIN, and leads to minimal operating costs what.

Table 3 - The weighting results in degrees of importance or utility

I/V	V_1	V_2	V_3	…	V_N
I_1	c_{11}	c_{12}	c_{13}	…	c_{1n}
I_2	c_{21}	c_{22}	c_{23}	…	c_{2n}
I_3	c_{31}	c_{32}	c_{31}	…	c_{3n}
…	…	…	…	c_{ij}	…
I_m	c_{m1}	c_{m2}	c_{m3}	…	c_{mn}

From the set {I} indicators extract a subset containing only indicators of utility grade> 0 and 0.Looking for a procedure to transform the results into a common unit of measurement in order to proceed with their summation.At its heart is the concept of „nullity".

4. Model the pre-evaluation indicators energy-mining complexes in Oltenia

Energy is considered essential to catalyze actions vector for inducing general welfare in society in human communities.Functional perspectives and maintain/increase the role of energy in the context of overall development are set taking into account some basic relations and relations of physical force, transformative, effective energy production systems in the same area with the consumer (Figure 2).

In classical economics evaluation using indicators known to the current economic productive applications.Due to the complexity of production in the new economy it is found that exclusive estimate using strong indicators outline is insufficient.The consequence of such observations lead to the need for pre-assessment, using complementary indicators or to express the same indicators in an early evaluation segment, projected under probabilistic incidence.

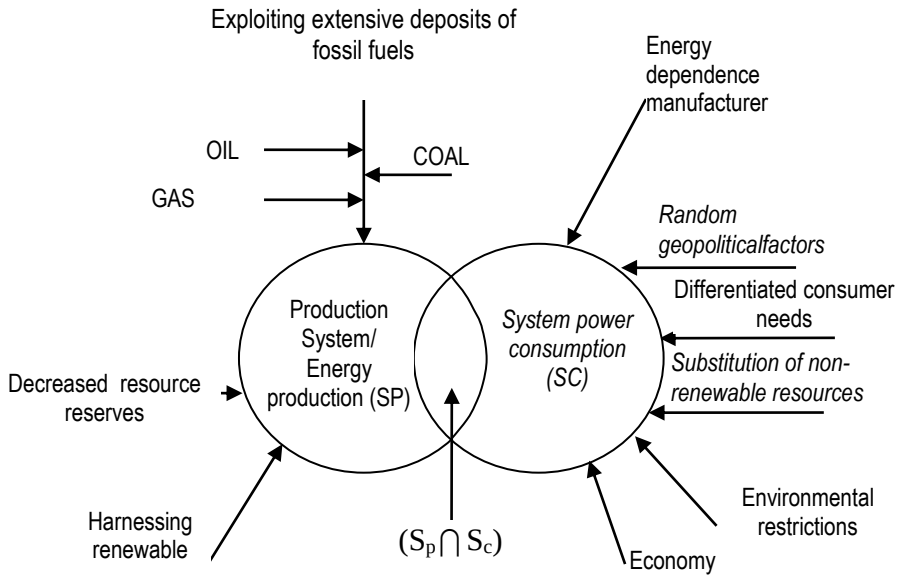

Figure 2. The resulting system functional perspectives (Sp Sc) production a Energy consumption

It is observed that always between energy production systems {SP} i and consumer {SC} i found an intersection (Sp Sc), which generates a surface relational / satisfactory dynamic economic advance in society.In this context, if:

$$\{S_P\}_i * \{S_C\}_i \rightarrow \max (S_p \cap S_c) \quad (9)$$

then get extensive image-economic productive environment considered a complex unit (country, region, region). This case study is for the energy-mining basin Oltenia.

In such a condition occurs an accelerated dynamics of production / economic reproduction. As such, it appears relatively normal conventional functional state of quasi-linear energy-mining economy in the area.

$$\{S_P\}_i * \{S_C\}_i \rightarrow \min (S_p \cap S_c) \quad (10)$$

There is restriction of production, energy-mining economic reproduction caused mainly by the following restrictive alternative:

- country, region, area, etc. does not have sufficient resources for setting up a powerful system of energy production;
- economic system locale (country, region, area, etc.) is not appropriate for functional valences of "absorb" amounts of energy consumption (reduced demand occurs), which demonstrates the inconstancy of development / progress.

The types and quantities of energy (produced and/or consumed) causes a lot quasi-finite influences the economic environment studied entity (country, region, area etc.) The appreciation of the relationships between the surfaces visible result from the intersection of production systems/energy and influences the type and amount of energy in the economic environment leads to the conclusion that between economic growth and energy consumption is manifested direct link, direct.

The investigations carried out for this doctoral dissertation that is necessary to explain motivations underlying the alignment of managerial decision on the establishment / setting type energy-mining entities.Data influences the type and quantity of energy produced from mining and energy production determines, in fact, developments in the national economy and changes in the public state budget to the extent that the latter was involved in the last 20 years in Romania to participation subsidies in the energy-mining.

The problem of determining and / or measurement proves nedeterminativă influences prevailed in connection with the operation of tangible assets.In such a situation, contributory recourse for the first time in the field, the allocation of pre-evaluation indicators index (IPI) mentioned influences.It starts from the intersection configuration of the system matrix of indicators of influence, and appreciated feature of synthesis of two indicators: GDP (i1) and investment.

As such, the general symbolic model of the pre-assessment indicators is:

$$\{P\} * \{VF\} * \{M\} \rightarrow \{I\} \subset PIB \quad (11)$$

restrictions:

$$\begin{cases} \{i_1; i_4; i_7; i_8; i_{11}\} \rightarrow \max \\ \{i_3; i_5; i_9; i_{10}; i_{13}\} \rightarrow \{\min/\max\} / \{\max/\min\} \\ \{i_2; i_{12}\} \rightarrow \min \end{cases} \quad (12)$$

The {(3); (4)}, set the first time in the literature, is subject to specific data parameterization of energy-mining complexes Rovinari, Turceni and Craiova-Işalniţa give information for economic decision-dominated productive efficiency/more reliable/conceptual feasibility systemic .

Formalizing, contextual, a set of sizes/conventional units of measurement/assessment influences} {SMI is possible to conduct comparisons on data influences of changes in technical, economic and organizational returned essentially the establishment and operation of energy-mining complexes.

The set {S} conventional units of measurement include:

$$\begin{cases} \Phi_0 = \text{influence economic technical and managerial null;} \\ \Phi_{1;2;3} = \text{economic technical and managerial influence reduced;} \\ A_0 = \text{harmonization null; A1; 2; 3 = reduced harmonization or medium,large;} \\ D_0 = \text{zero fault; D1, 2, 3 = low fault or medium, large.} \end{cases} \quad (13)$$

On a statistical basis, using multiple systematization of a set of assessments, scores symbolic form of influence concerned.For each energy-mining complex in the present study is the first developed an array/matrix table, the intersections between political, financial vectors respectively and investment environment in connection with the GDP, providesimages of influence (Tables 1, 2 and 3).

Table 1. Table matrix of technical-economic and managerial influences in energy-mining complex Rovinari

Specifications		Policies $\{P\}_R$				Financial values $\{VF\}_R$				Medium $\{M\}_R$		
		i_3	i_5	i_{11}	i_{13}	i_2	i_9	i_{10}	i_{12}	i_4	i_6	i_8
Investment$\{I\}_R$	i_7	Φ_1	Φ_2	Φ_3	Φ_2	Φ_3	Φ_0	Φ_0	Φ_3	Φ_3	Φ_3	Φ_2
		A_2	A_1	A_1	A_1	A_2	A_3	A_3	A_0	A_1	A_0	A_1
		D_1	D_0	D_0	D_0	D_1	D_0	D_0	D_2	D_2	D_1	D_2
$(PIB)_R$	i_1	Φ_1	Φ_3	Φ_2	Φ_3	Φ_0	Φ_0	Φ_0	Φ_1	Φ_1	Φ_0	Φ_1
		A_2	A_3	A_2	A_3	A_0	A_0	A_0	A_1	A_1	A_1	A_1
		D_1	D_3	D_2	D_3	D_1	D_0	D_0	D_0	D_2	D_0	D_1

Table 2. Table matrix of technical-economic and managerial influences in energy-mining complex Turceni

Specifications		Policies $\{P\}_T$				Financial values $\{VF\}_T$				Medium $\{M\}_T$		
		i_3	i_5	i_{11}	i_{13}	i_2	i_9	i_{10}	i_{12}	i_4	i_6	i_8
Investment$\{I\}_T$	i_7	Φ_1	Φ_2	Φ_3	Φ_2	Φ_3	Φ_0	Φ_0	Φ_3	Φ_3	Φ_3	Φ_2
		A_2	A_1	A_1	A_1	A_2	A_3	A_3	A_0	A_0	A_0	A_1
		D_1	D_0	D_0	D_0	D_1	D_0	D_0	D_2	D_2	D_1	D_2
$(PIB)_T$	i_1	Φ_1	Φ_3	Φ_2	Φ_3	Φ_0	Φ_0	Φ_0	Φ_1	Φ_1	Φ_0	Φ_1
		A_2	A_3	A_2	A_3	A_0	A_0	A_0	A_1	A_1	A_1	A_1
		D_1	D_3	D_2	D_3	D_1	D_0	D_0	D_0	D_2	D_0	D_1

Table 3. Table matrix of technical-economic and managerial influences in the complex energy-mining Craiova-Işalniţa

Specifications		Policies {P}C				Financial values {VF}C				Medium {M}C		
		i_3	i_5	i_{11}	i_{13}	i_2	i_9	i_{10}	i_{12}	i_4	i_6	i_8
Investment{ I}C	i_7	Φ_1	Φ_3	Φ_3	Φ_2	Φ_3	Φ_0	Φ_0	Φ_3	Φ_3	Φ_3	Φ_2
		A_2	A_2	A_2	A_1	A_2	A_3	A_3	A_0	A_1	A_0	A_0
		D_1	D_1	D_0	D_0	D_1	D_0	D_0	D_2	D_2	D_2	D_3
(PIB)C	i_1	Φ_1	Φ_3	Φ_2	Φ_3	Φ_0	Φ_0	Φ_0	Φ_1	Φ_1	Φ_0	Φ_1
		A_2	A_3	A_2	A_3	A_0	A_0	A_0	A_1	A_1	A_1	A_1
		D_1	D_3	D_2	D_3	D_1	D_0	D_0	D_0	D_2	D_0	D_1

Pre-evaluation indicators of the 3 energy-mining complexes is statistically formalized step which systematizes and worked correlative findings indicators based on observations and their analysis.

Observations taken in the coal basin of Oltenia and thermal power production network in the area were concentrated by statistical cores appreciative destination for characterization data influences the types of energy (electricity and heat) and quantities output from the Integrated system for power plants using fuel burning lignite coal caustobiolitici category.Finally, it retained a number of useful feedback alignments decisions in the transformation of technical, economic and managerial energy-mining infrastructure, as follows:

- characterization matrix of the set of conventional size influences unit turns out to be normally distributed (see Table 4).

Table 4 - Normal distribution of the number of units, conventional to measure the influences transformative technical, economic and managerial energy-mining complexe in Oltenia

Specifications	{ Φ }	{A}	{D}	TOTAL conventional
0	12	11	18	41
1	10	17	12	39
2	8	8	10	26
3	14	8	4	26
TOTAL conventional	44	44	44	

- It follows that approximate levels {0, ..., 3} for each unit have one relative maximum;
- Technical-economic and managerial influences are found significantly null (in context meta-physical) index content "fault";
- In other words, between "influence" and "harmonization" fault manifestation is observed that the maximum tends to zero, ie practically the lowest fault, or the fault essentially non-happening;
- The actual content of pre-evaluation indicators indicators shows that technical-economic and managerial influences {Φ} have maximum on the maximum step (3) specifications (max / max) (94%);
- Harmonization {A} record (max/max) (89%) in step (1) a set of units and faults {D} is the zero step (max/min) (- 59%);
- The graph manifestation trends show that the set of units is marked by arranging histogram values decreasing time influences {(0,1,2,3)} min (see Figure 4).

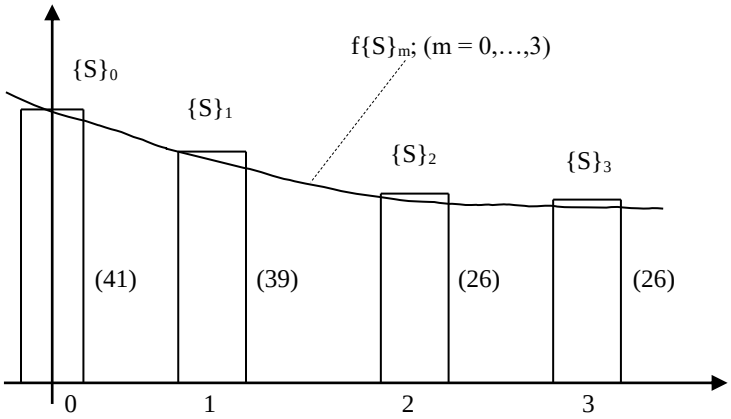

Figure 4. Growth curve determined values histogram of assessments for pre-evaluation indicators energy-mining complexes

In this context, we obtain:

- Preliminary conclusion no. 1:

$$\begin{cases} \{\Phi\} \text{ is the maximum (3);} \\ \{A\} \text{ is the maximum (1);} \\ \{D\} \text{ is the maximum (0).} \end{cases} \quad (15)$$

- Preliminary conclusionnr no. 2:

$$\begin{cases} \text{„0”} \} \text{ is the maximum } \{D\}; \\ \text{„2”} \} \text{ is the maximum } \{D\}; \\ \text{„1”} \} \text{ is the maximum } \{A\}; \\ \text{„3”} \} \text{ is the maximum } \{\Phi\}. \end{cases} \quad (16)$$

- Preliminary conclusionnr no. 3:

$$\begin{cases} \text{„0” is the most significant indicator "not edit";} \\ \text{„1is 2}^{nd}\text{”;} \\ \text{„2”is 3}^{rd}\text{;} \\ \text{„3” is 3}^{rd}\text{.} \end{cases} \quad (17)$$

Among the three types of comparisons can be made preliminary conclusions, cases in which a conclusion is given priority / chosen and used in the restructuring decision.

Conclusions

In the chapter is considered the first pre-assessment and evaluation indicators system energy-mining complex in Oltenia using the concept of econometrics / econometric energy-minier.Procedând behavior analysis result from the intersection of the relationships between areas of production systems / energy and influences the type and amount of energy in the economic environment, it is concluded that between economic growth and energy consumption is manifested direct link, direct.

Does the research that is necessary to explain motivations underlying the alignment of managerial decision on the establishment/setting type energy-mining entities. The problem of determining and/or measurement proves nedeterminativă influences prevailed in connection with the operation of tangible assets. In such a situation, contributory recourse for the first time in the field, the allocation of pre-evaluation indices indicators mentioned influences. It starts from the intersection

configuration of the system matrix of indicators of influence and, in context, the chapter has formalized a general symbolic model of the pre-evaluation indicators.

Model, set the first time in the literature, was set up with concrete data mining complexes energy-Rovinari, Turceni and Craiova-Işalniţa give information for decision-dominant economic productive efficiency/more reliable/systemic conceptual feasibility. Formalizing, contextual, a set of sizes/conventional units of measurement/assessment of influences is possible to obtain data comparisons influences on changes in technical, economic and organizational returning the establishment and operation of complete energy-miniere.Apelând the systematization of a set of multiple assessments on a statistical basis is formed for symbolic influences in question.

For each energy-mining complex is developed for the first time an array/matrix table, the intersections between political, financial vectors respectively and investment environment in connection with the GDP of providing images of influence. Pre-evaluation indicators of the 3 energy-mining complexes is statistically formalized step which systematizes and worked correlative findings indicators based on observations and their analysis.

Observations between 2010-2014 in the coal basin of Oltenia and thermal power production network in the area were concentrated by statistical cores appreciative destination for characterization data influences the types of energy (electricity and heat) and energy quantities obtained from the output of integrated system for power plants using fuel burning lignite coal caustobiolitici category.

To qualify a number of alignments of assessment, decision-useful in the transformation of technical, economic and managerial energy-mining infrastructure, as follows:

- the characterization of the set matrix size of conventional units influences turns out to be normally distributed;
- It follows that approximate levels were appreciative for each unit one relative maximum.

Technical-economic and managerial influences are found in significant void in the content index "dranjament". Between "influences" and "harmonization" fault manifestation is observed that the maximum tends to zero, ie practically the lowest fault, or essentially non-deranjamentul.În happens actual content of pre-evaluation indicators indicators it is found that technical and economic influences and managerial maximum specifications on maximum gear (max/max) (94%).

Harmonization records (max/max) (89%) on the first stage of a set of units and faults are on stage zero (max/min) (- 59%). The graph manifestation trends show that the set of units is marked by the histogram values arranging decreasing time influences.

The article is plotted normal distribution of the number of conventional units of measurement transformative influences of technical, economic and managerial energy-mining complexes in Oltenia area. It is also shown by the growth curve determined values histogram of assessments for pre-assessment indicators energy-mining complexes.

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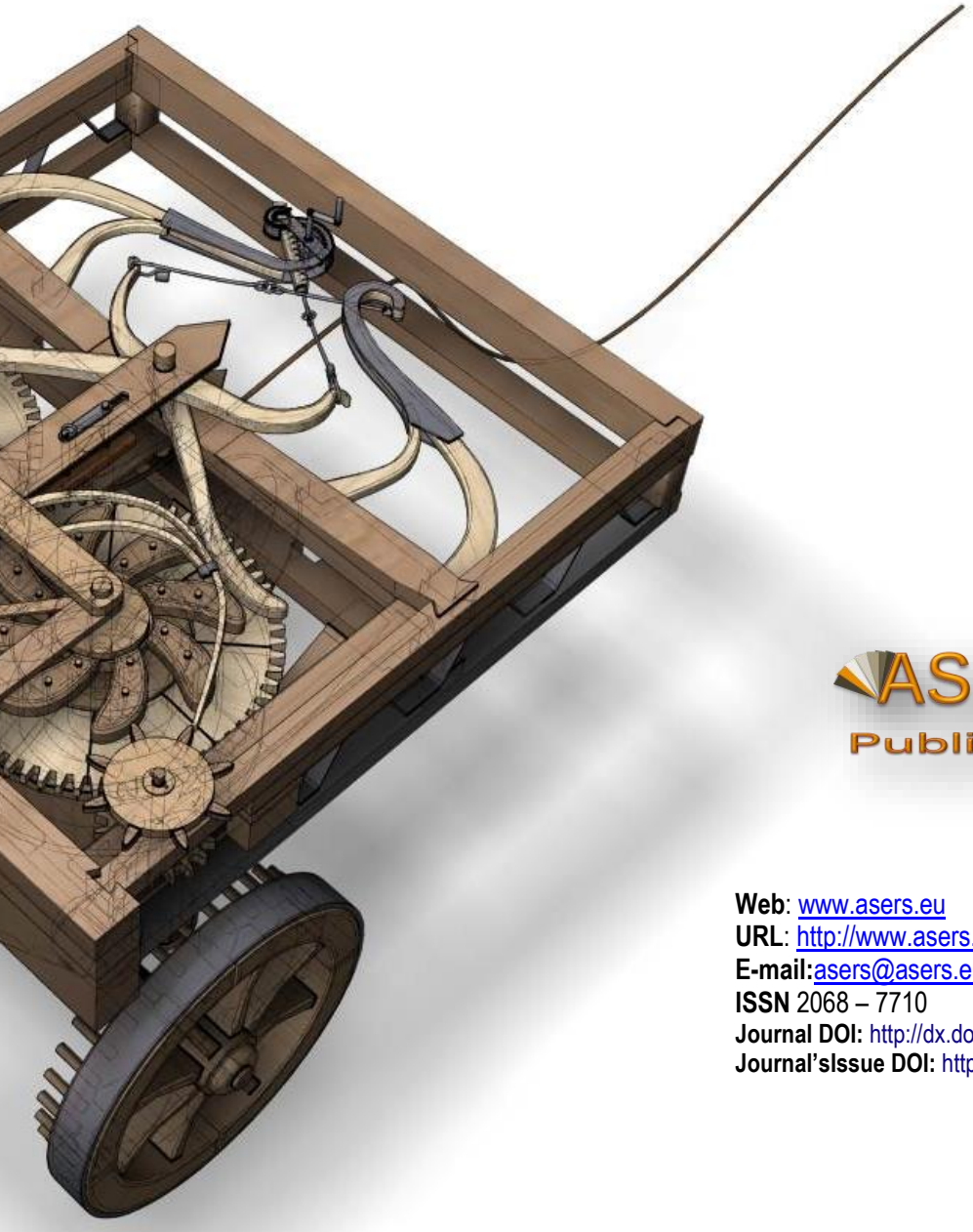

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