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POSITIONING OF PRE-UNIVERSITY EDUCATION INTO THE NATIONAL SYSTEM OF EDUCATION OF ROMANIA

Dima I.C., Man M., Ciurea V.[*]

Abstract: Defining the pre-university educational institution as fundamental unit of the national pre-university educational system takes into account the social function of the pre-university educational institution in relation to the structures this can define in time and space.

The social function of the pre-university educational institution is determined by the *teaching-learning-evaluating structure*, based on: general pedagogic norms and principles, which, from a value point of view, orient the projects for organising the pre-university educational institution into the future; pedagogic programs socially accredited, stating a certain division of the work at the level of the pre-university educational institution; open pedagogic communication channels, providing the efficiency of the pre-university educational institution at a methodological level and in the durable relations with educative territorial and local communication.(JEL: I23, C51)

Key words: pre-university education, cybernetic patterns, management processes.

Introduction

The systematic approach of the management processes, models accomplished based on thoroughly knowing the studied system allows the foundation of decisions for obtaining a good evolution of the system under conditions of perturbations. The model represents thusly a useful tool in evaluating the studied system.

When elaborating the economical-mathematical patterns, the economical theory has an especially important role as it formulates categories, the objective concepts and laws of the economical reality. The mathematical patterns can faithfully represent the economical phenomena only based on the economical theory.

The following types of models are known: verbal-descriptive patterns (used in all non-mathemized disciplines), mathematical patterns, physical patterns, analogical patterns (of the static or dynamic model type), graphic patterns etc.

Within the scientific management, during the last decades, the patterns are used in all variety of types that exist, thusly outlining more and more the tendency of particularly using the mathematical-cybernetic patterns, as consequence of their capacity of rigorously concentrating the base, as well as their opportunity of being solved by means of the electronic calculators.

The use of the cybernetic patterns for analysing the National System of Education needs the elaboration of a complex methodology based on general

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principles of the analysis of the cybernetic-economical systems that may be thusly formulated:

- The integrating tendency of the complex analysis of systems, based on the synthesis of the methods of the scientific management, the analysis and diagnosis of the systems;
- Orientating the analysis activity towards the key/relevant problems of the systems;
- The need of a continuous activity of complex analysis of the systems;
- Initiating and coordinating the analysis of the subsystems within the system;
- Flexible application of the solutions suggested in the project of the new system;
- Adopting an open, participative organisation;
- Underlining and valuing the inter-human relations;
- Joining the approaches formalised with the intuition and experiences of those empowered to take decisions;
- Underlining the multidimensional aspects of the problems dealt with;

The informational-decisional analysis and design of the systems since the stage of investments must be extended from those in operation to specific forms of informational-decisional analysis and design for the future systems.

From the multitude of cybernetic patterns, the *Hierarchic Model* may be used that can be defined by the following variables:

- *Input vector (perturbation)*

$$\omega(t) = (\omega_1(t), \ldots, \omega_2(t)) \subset \Omega \subset R^q \tag{1}$$

where:

Ω represents the amount of inputs,

- *Command vector*

$$u(t) = (u,(t), \ldots, u_p(t)) \in U \subset R^p \tag{2}$$

where:

U represents the amount of admissible commands;

- *State vector:*

$$x(t) = (x_1(t), \ldots, x_m(t)) \in X \subset R^m \tag{3}$$

where:

X represents the space of states;

- *Output vector:*

$$y(t) = (y_1(t), y_2(t), \ldots, y_n(t)) \in Y \subset R^n \tag{4}$$

where:

Y represents the space of outputs within the hierarchic model, where the *amount of coordination variables* is entered

$$S = \{S_1, S_{2i}, \ldots, S_{ri}, \ldots, \ldots\} \tag{5}$$

This is provided with the order relation ">", for $S_1 > S_2$ and is estimated that S_1 coordinates S_2, having the following properties: reflexivity: $S_1 > S_1$; skewness: $S_1 > S_2$, $S_2 > S_1 \Rightarrow S_1 - S_2$; transitivity: $S_1 > S_2$, $S_2 > S_3 \Rightarrow S_1 > S_3$.

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The amount of interaction variables (coupling) is also entered.

$$V=\{v_1,v_2,...,v_i\} \tag{6}$$

This states the dependence between the subsystems on the same hierarchic level.

The following functions are entered onto the amounts thusly obtained: input function: ω: $T \cdot \Omega \rightarrow$ S; command function: h :T-A-»U; dynamics function: o: T-T-U-V-X->X; output function: ç: $T \cdot X \rightarrow Y$

Within this pattern, the coordination and interaction functions are entered. Thusly, the coordination function may be described in the following drawing at two levels (figure 1).
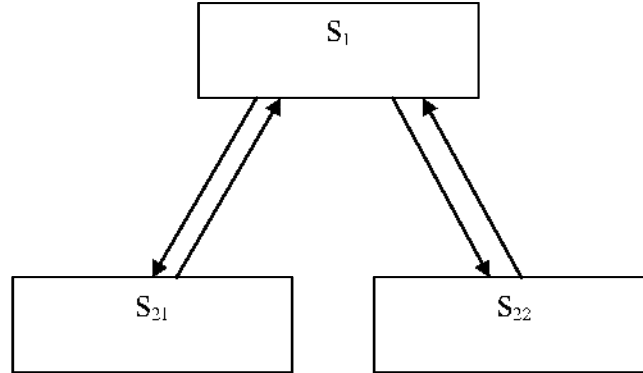

Figure 1. Levels of the coordination function

It thusly results that f: $T \cdot \Omega \cdot S \rightarrow$ S. The interaction (coupling) function may be entered by starting from the example of two subsystems found on the same hierarchical level (figure 2).
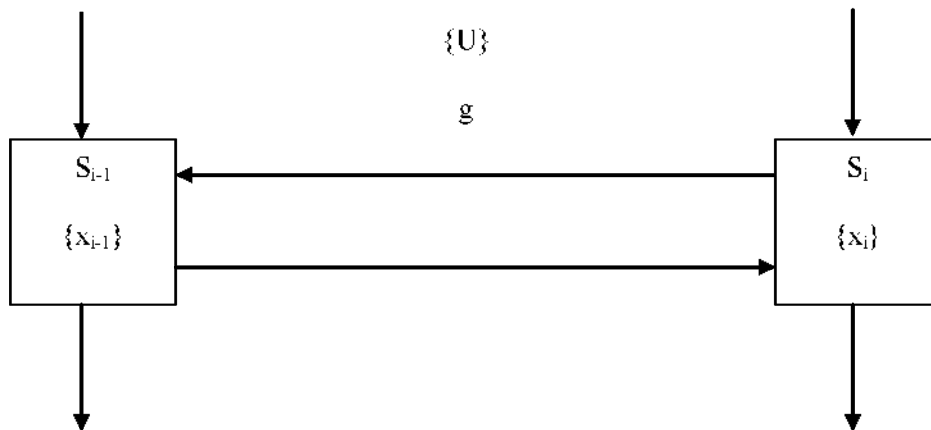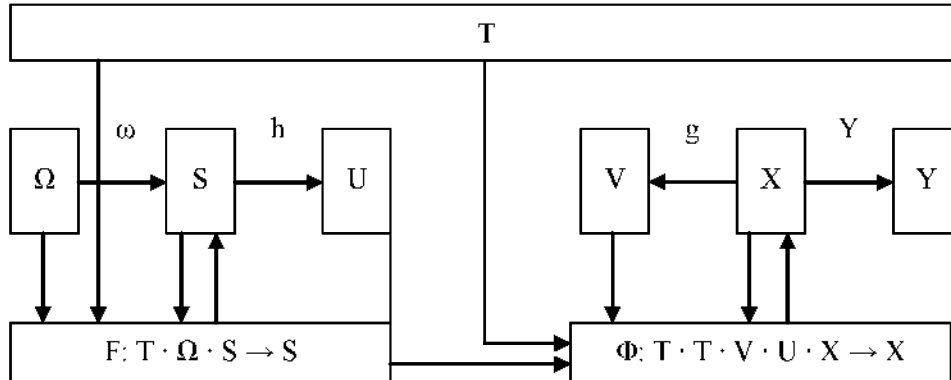

Figure 2. Systems on the same hierarchical level

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The interaction (coupling) function shall then be g: T X→ V. in figure 3, the main connections are shown, within the *hierarchical pattern*:

Figure 3. The main connections within the hierarchical pattern of the cybernetic system

For the National System of Education, the hierarchical pattern is shown thusly:

a) input vector

$$V_i(t)=\{V_1(t)...V_j(t)... V_n(t)\}\in I\subset R^+ \tag{7}$$

$V_j(t)$ – the vector of the input size "j" at the time "t" ;

I – the amount of the vectors of the input sizes;

R^+ - the amount of the positive real numbers. The composition of the input vector may be:

- The number of the unemployed registered with an educational level "i" (NS_i);
- The total number of the unemployed registered with the agencies for labour force occupancy (NS_t);
- The number of children registered in the pre-school educational system, regardless of age (N_{cp});
- The population of official age corresponding to the pre-school education (P_p).
- The population of age "i" contained in the pre-school education (E_j);
- Upper limit of the schooling official age (n);
- The population of age "i" (P_i)
- The transition rate from the primary education "h" to the inferior secondary education "h+1" in the school year "t" ($RT^t_{h,h+1}$);
- The number of the pupils included in first grade of the inferior secondary education "h+1" in the school year "t+1"($E^{t+1}_{h+1,1}$);
- The number of the pupils repeating the first grade of the inferior secondary education "h+1" in the school year "t+1"($R^{t+1}_{h+1,1}$);
- The number of the pupils included in the last grade of the primary education "f" in the school year "t" ($E^t_{h,f}$);

- The total number of pupils included in the tertiary education in the school year "t" (E^t);
- The population in the age group "a, the official age group corresponding to the tertiary education in the school year "t" (P^t_a);
- The total of the public expenses for education in the financial year "t" ($TCP0_{th}$);
- The inter-gross product in the financial year "t" for a certain level of education (PIB_t);
- The total of the private expenses for education level „h" in the financial year "t" (TCp_{th});
- The inter-gross product in the financial year "t" for the education level „h" (PIB_{th});
- The education level according to the ISCED classification;
- etc.

b) the command vector (calculation)

$$U_c(t) = \{U_1(t) \dots U_j(t) \dots U_m(t)\} \in U \sqsubset I_{sm} \tag{8}$$

$U_j(t)$ – the command vector at the time "t";
U - the amount of command vectors;
I_{sm} – the amount of the statistical-mathematical indicators.

Any $V_i(t)$ may be of the form:

- $\dfrac{Vi(t)}{Vj(t)}$ x 100/1000

- $\dfrac{Vi(t)}{Vi(t-1)}$

- $\dfrac{Vi(t)}{Vi(t-1)}$. 100/1000 – 100/1000

- $\dot{O}$ Vi(t)

- $V_i(t) – V_J(t)$

- $\dot{O}$ $\dfrac{Vi(t)}{Vj(t)}$ 100/1000

- Etc.

The composition of the command vector may be:

- $\dfrac{NSi}{NSt}$ x 100

- $\dfrac{Ncp}{Pp}$ x 100

- $\overset{n}{\underset{i=1}{\dot{O}}} \dfrac{Ei}{Pi}$ x 100

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- $[(E^{t+1}h+1,1 - R^{t+1} h+1,1) / E^t h, f] \times 100$
- $(E^t / P^t_a) \times 100$
- $(TCP_{th}/PIB_t) \times 100$
- $(TCp_{th} / PIB_{th}) \times 100$
- Etc.

c) the output vector

$$E_e(t) = \{E_1(t), \ldots, E_j(t), \ldots, E_p(t) \})\} \in E \subset R^+ \qquad (9)$$

$E_j(t)$ – the vector of input amounts "j" at the time "t";
E - the amount of the input vectors;
R – the amount of the positive real numbers.

The composition of the output vector may be:
- The ponderosity of the unemployed registered by levels of education (S_i);
- The gross rate of scholar inclusion of children into the preschool education (RB_p);
- The average duration of frequentation of the preschool education (DMF_P);
- The transition rate in the inferior secondary education ($RT^t_{h\,h+1}$);
- The gross rate of inclusion into the tertiary education (RBC^t);
- The percentage of the public expenses for education in the financial year "t" at the education level „h" ($CPIB^t_h$);
- The percentage of the private expenses for education in PIB, in the financial year "t" for the education level „h" (C_pPIB_{th});
- etc.

By using the model previously shown, the results of education and vocational training may be analysed on the labour market, which highlights the following:
- *The ponderosity of the active population (15-64 years of age), on the educational level*

The ponderosity of the active population has remained constant at the level of most of the educational levels, increasing in the case of those with a low educational level. Major differences are maintained on resistance averages.

The ponderosity of the active population has remained relatively constant for all levels of education. The sole exception may be noticed in the case of those people whom have only left the primary education or of those without any education.

Major differences are maintained on resistance averages. Thusly, the ponderosity of the active people whom have a high level of education is sensitively higher in the urban area. The situation is switched in the case of the active population with a low educational level in the rural area, compared to the urban area.

The ponderosity of the feminine active population in the age group of 15 – 64 is higher in the case of all levels of education, except for the professional one,

the most important differences by genders are also registered in the case of this level.

- *The occupational rate of the population aged between 15-64, by levels of education.*

The occupational rate of the population aged between 15-64 has not registered significant differences. The most important decrease of the occupational rate continues to occur in the case of the population with primary education or without any education in the urban area.

There continues to exist significant differences by resistance averages, especially due to the higher occupational rate characteristic to the rural area, by the activities performed in the agriculture.

Analysed in its evolution, this state of being indicates the increasingly greater difficulties which the people living the urban area encounter, with a low level of education for finding a job. It may also be noticed that the occupational rate of the superior secondary education (high-school, SAM) has slightly dropped compared to the previous year.

- *The occupational rate of the population aged between 15-24, by levels of education.*

The occupational rate of the young aged between 15-24 is sensitively lower compared to that of the population in the labour age for all educational levels.

The lowest occupational rates continue to be registered in the case of the young, with a low educational level, as well as of those with high-school education.

The young with postgraduate education as well as those with primary level education or without any education register the most important negative evolution of the occupational rate.

The explanation of this state is in fact the same with the one shown in the case of the previous indicator (the occupational rate of the population aged between 15-64).

- *The unemployment rate for the young aged between 15-24, by levels of education.*

The unemployment rate tends to affect more and more the young between 15-24 years of age, with a low level of education (gymnasium, primary or without education).

The unemployment rate in the case of the young in the urban area is higher compared to the rural area. This difference has slightly increased. However, when evaluating this situation, it must be taken into account that many young people in the rural area are part of the population occupied in the agriculture. The indicator highlights the still insufficient adaptation of the National System of Education to the requirements of the labour force market. The phenomenon of unemployment for the young also show the reservations of many companies of hiring the labour force without any experience.

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- *The insertion rate of the graduates to the various levels of education and vocational training onto the labour market.*

This indicator represents an important norm of the external efficiency of the system of education and training and impact of the various initiatives of reform. The transition from the educational institutions to the active life and integration into labour of the young represents an essential issue, with a strong economical and social impact. Unfortunately, the lack of some systems for monitoring the graduates of the various education levels or of some specialised inquiries at national level does not allow a real evaluation of the external efficiency of the national educational system.

The low rates of inserting the graduates into various forms of education and original vocational training have important repercussions over the motivation for participating in learning during the entire life and, implicitly, over the development of the human capital.

The analysis performed highlights the fact that by maintaining the current system of education in Romania negatively influences the national competition and prosperity and there may be stated four major deficiencies of it and namely: it is an inefficient education; it is not relevant; it is an equitable education; its quality is weak.

These deficiencies are rounded by the problem of the demographic decline that has great negative consequences on education.

Summary

In order to eliminate as much as possible these deficiencies or to diminish their negative effect, the following restructuring measures are recommended: *a new organisation of the cycles of education*, as the current structure of education has major deficiencies, such as: it neglects the early education; it fragments the mandatory education of 10 years by a useless national exam, after 8 years etc.; *the early education must become a public good and to be given special attention*, by taking into account the fact that the state has systematically underestimated and marginalized the most important period of education, *the early education*, meaning the one between 0 – 6/7 years of age; *it is necessary to implement a flexible curriculum and focused onto the competences necessary for personal development and economy of knowing*, as the current curriculum is seen by all factors involved in the educational process as being overloaded and of low relevance for the adult life as well as for the labour market; *the decentralisation and repositioning of the school in the local community must be accelerated*, by taking into account the fact that the System of Education in Romania continues to be over-centralised, the educational units not having any competence in the construction of their own budget and any flexibility in executing it, although the assignment of the budget for education is based on the *quota scattered from VAT* and a non-transparent total is made by the Ministry of Finances; *it is imperiously imposed to reform the policies in the domain of human resources,*

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as the waging of the human resource is a very bad one, and the social prestige of the teacher has been dramatically reduced, which leads to a decrease of the interest in the didactic career; *the encouragement of permanent education by taking actual measures,* as the rate of participating in education during the entire course of life places Romania onto the last position in Europe, which shows that in Romania, the continuous learning is almost inexistent or it is the option of a minority aware of the competitive advantage such an education confers; etc.

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ZNACZENIE ŚREDNIEJ EDUKACJI W RUMUŃSKIM NARODOWYM SYSTEMIE EDUKACJI

Streszczenie: Określanie instytucji średniej edukacyjnej jako podstawowej jednostki narodowego systemu edukacji średniej należy uwzględnić funkcję społeczną takiej instytucji w odniesieniu do struktur definiowanych w danym miejscu i czasie. Społeczna funkcja instytucji średniej edukacji jest określona przez strukturę uczenie – nauczanie - ocenianie, opartą na: ogólnych normach pedagogicznych i zasadach, które z punktu widzenia wartości ustalają priorytety dla tych organizacji na przyszłość; programach pedagogicznych akredytowanych społecznie, wskazując pewien podział pracy w instytucji średniej edukacji; otwartych pedagogicznych kanałach komunikacyjnych, które zapewniają efektywność instytucji średniej edukacji pod względem metodologicznym i w powiązaniu z obszarami edukacyjnymi oraz lokalną komunikacją.