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Preoccupations and Results in the Field of Economic Cybernetics

Cybernetics, a young science, regarded as one of the greatest achievements of mankind, represents a fundamental science for the basic activity of society — the goods production. This fact is the result of the general impetus of the contemporary science, which becomes a decisive factor of progress and civilisation.

Over the past 30 years the Department of Economic Cybernetics, as well as its associated laboratories, has carried out a large amount of work in the field of theory and applications. In cooperation with economic enterprises of various profiles, the department mentioned above contributes in an important manner to the elaboration of efficient management systems.

The department has carried out fundamental research concerning the cybernetic-economic models aimed at solving problems of great importance for the national economy, problems emphasized by the careful study of the party and state documents, by the advice given by the President Nicolae Ceaușescu himself-concerning the role and the orientation of cybernetics in the framework of a high rate of development of our national economy.

In this way, important results have been obtained concerning the elaboration of economic growth models, development forecast models of particular economic sectors as well as the use of modern mathematical methods to elaborate the models for optimisation and development of economic processes.

The work "Economic Cybernetics" by Professor Manea Mănescu, member of Romanian Academy, is of paramount importance in establishing the directions of research in the field of economic cybernetics. He introduces here the fundamental concept on general cybernetic system of national economy, on economic space and economic time.

These concepts based on the profound knowledge of the socialist realities in Romania and on the use of high level cybernetic-mathematic tools open a vast field of study and research towards establishing simulation models

run by computer concerning the components of the general cybernetic system of the national economy; at the same time they represent the foundation in training the economists — to be with the aim of using modern optimisation methods and techniques in the economic activity.

According to Professor Manea Mănescu's thinking the orientation of model elaboration activity must start from several basic hypotheses. One of these refers to the fact that the national economy, as well as its structural components, can be approached as cybernetic systems controlled by command and control parameters defining the proportions, and the main technological-economic indices of their operation. Another hypothesis, of logistic natures states that the cybernetic-economic system control mechanism must ensure the permanent correction of optimal evolution, taking into account any charges, the disturbances within or outside the system. Another hypothesis starts for the character of "penetrating" into the future associated to a decision. In this respect it is necessary to consider this within a large temporal and spatial perspective. Therefore, it is necessary for the decision to take into account the alert and complex character of quantitative and qualitative charges characterising all activities, especially social production, and also to take into consideration the mobility, the structural units, the continuous generation of new situations progress to them.

By using the concept elaborated by Professor Manea Mănescu, the promotion of forecast modelling and macroeconomic planning within the department of economic cybernetics and its laboratories of the Academy of Economic Studies in Bucharest is based on the fact that economic and social changes, of high dynamics, which characteristises the evolution trajectories, within national and world economic space, require more and more the elaboration of long-range development strategies, in forecast of economic-social phenomena with the view of producing decisions on economic policy.

The conversion of forecast into an element of management expresses in connection between current and future activity, between plan and forecast. This allows one to elaborate and argument the plan in the perspective of economic time and of long-range evolution trajectories within the economic space of the general cybernetic system of the national economy.

The characterisation of these research directions in the field of economic cybernetics consists of the elaboration and solution — according to Professor Manea Mănescu's cybernetic-economic concepts — of some forecast and planning models at the national economy level, as well as at the level of branches, territory or sectors of activity. Such activities represented the object of several colaboration contracts through *macroeconomy* regarding:

— the use of input-output models to forecast and planning;

— the optimisation of development profile of the chemical fertilizer branch over a time horizon of 10 years;

— the modelling of economic-social development in territorial profile, of the structure by branches of territorial units, of social services and utilities;

— the forecast of consumption and resources of some highly demanded goods (e.q. sugar) for the year 2000, this allowing one to establish the dynamics of consumption levels on categories of population, and also the directions for the evolution of agriculture production and the required investments in agriculture and food industry;

— the forecast of main development directions of science and technology in Romania.

The direct productive activity in basic economic units represents an ample domain of concern. Major contribution towards solving by means specific to economic cybernetics and economic data processing the problems of economic practice have been achieved in this way.

Among most important achievements in microeconomy obtained by contract-based research one can quote;

— the implementation of managerial information system in a section of an electronical factory, as well as the marketing data processing system, thus achieving the increase of efficiency;

— the commissioning and current use, by teleprocessing, of a computer aided design system for large ships, in cooperation with a specialized design institute, this achieving saving in metal consumption and quality and efficiency improvement;

— the commissioning of data processing systems for metallurgical industry enterprises, aimed at scheduling production in steel plants, roll mills, marketing, quality assurance, managerial information systems;

— the elaboration of data processing system for foreign trade for a specialised enterprise;

— the elaboration of optimisation models and systems for irrigation works in Romania and Syria, in cooperation with other universities and specialised design institutes;

— the production of data base programs concerning the staff of Ministry of Education by using original fast information retrieval techniques and teleprocessing equipment.

A direction with interesting results is that concerning algorithms and programs for solving optimisation models of economic processes. The programs are implemented a Romanian-made Felix computers; among them one can mention:

— REMUS — a program package for estimating and calculating production functions, trend functions, econometric functions, which can be used for a wide range of economic problems; — Nonlinear programming system of programmes;

— PERT-RES — development of VERT program package, optimising also the resources required by complex activities;

— MUSCEL — a package for lage data base systems, having real time information retrieval facilities and using teleprocessing;

— CROCODIL — a package used for economic material cutting;

— SWITCH — for the management of terminals such as displays, teletype or intelligent terminals and HASP stations;

— CODEN — a package for automatic coding of 100,00 units;

— SYSREP — for annual and on-the-spot planning of repair work.

One of the main objectives of the Department of Economic Cybernetics and its laboratories is connected to the training of experts in the field of economic cybernetics as part of the education in the Department of Planning and Economic Cybernetics. The students take part directly to the solution of economy problems, to the choice of optimal solutions concerning models and system elaboration, as well as to the use of computers as basic wears of introducing cybernetics in economy.