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Economic Cybernetics

"In our days, cybernetics is playing an ever more important part in the scientific management of production processes, of economic life, in facilitating human labour and in increasing its social productivity, in the general progress of human society".

Nicolae Ceauşescu

From the message by the President of the Socialist Republic of Romania to the 3rd International Congress of Cybernetics and Systems

Bucharest 1975

I. CYBERNETICS — AN ACTIVE FACTOR IN THE DEVELOPMENT OF CONTEMPORARY SCIENCE

The qualitative changes in the dynamics and structure of the contemporary society, of technologies and production seem to be more and more a result of the impact of science and technology, the process of reproduction as a whole. The revolution in science and technology marks a radical turning point in the development of the productive forces and profound transformations in the entire socio-economic structure. In contrast to the changes engendered by the previous development of science and technology, the present revolution in science and technology lends society an extremely alert tempo characterized by constant and rapid transformations in all fields of human activity; the intensification of the interdependence between production and science represents the essential motive factor of the socio-economic development.

As an outcome of the dialectical and historical materialistic world outlook, the forecast on the turning of science into a direct productive force has become a reality.

1. *Cybernetics within the framework of the revolution in science and technology.* On the vast site of human brain power and creation, under conditions specific to the present stage of development of our society,

a new branch of science, CYBERNETICS, came to appear nearly thirty years ago.

Related to the entire history of the development of science, the nearly 30 years represent an extremely short period of time on the temporal coordinate. However, man knew how to amplify time, succeeding in conquering through cybernetics new depths of nature and society and in filling in new and important blank spaces on the map of human knowledge.

Cybernetics is ever more considered as one of the greatest achievements of human genius. As far as man succeeds to ever more precisely and efficiently turn to account the potential values of cybernetics, its place and role are more and more strikingly standing out within the framework of the development of contemporary science; we can speak about the beginning of a CYBERNETIC REVOLUTION in the development of knowledge.

The applications of cybernetics have made an important contribution to the contemporary revolution in science and technology in the automation and optimization of production processes, in the increase of social labour productivity, in the management and organization of economic activity, in the manysided development of society.

The appearance of this new field of the science of forcasting systems simulation and of the growth models has enriched the stock of knowledge with new opportunities of investigation, analysis and decision-making.

Through its very object, cybernetics is a science based on the dialectical materalistic method. It tackles the study of the surrounding world by setting out from the premise of the perpetual motion within both macro- and micro-universe, of the complex relationships and correlations which characterize any entity in the surrounding world, be it in nature or society.

In the consistent application of the methods of cybernetics, in the first place, to the study of the economic-social phenomena and processes, we must always take into consideration the thesis of the unconditional pre-eminence of the qualitative aspect, of the economic essence, the multilateral analysis on the basis of the dialectical and historical materialism of these phenomena and processes. Such an application of the systemic outlook specific of cybernetics to the study of the surrounding world outlines in a new light the interaction of the various components of the phenomenon or process under study, the way of its coupling with the exterior and, finally its way of development. Significant in this respect is the cybernetic interpretation of the system of the national economy, the new way of understanding the mechanism of its functioning and evolution.

It stands to reason that the researcher's philosophy, his class position, the way in which he conceives the application and use of results are of decisive importance for the results of any science, first and foremost social sciences.

The gnoseological functions of cybernetics, the investigating possibilities created by it obviously and decisively intensify and complete the scientific stock of the contemporary researcher. In the field of economic research, they become a real instrument in organizing the management and in coordinating economic processes.

2. *Cybernetics — a synthesis of contemporary science.* The necessity of knowing the phenomena of nature and society has engendered — throughout history — the continuous preoccupation of man for the initially schematic and then ever more complex representation of the surrounding reality. Synthetizing and combining scientific achievements, mankind has succeeded in analysing and ever more profoundly and comprehensively interpreting the various phenomena and their probable evolution. On this basis, nature and society could be consciously acted upon to the benefit of man.

The impetuous development of science in the 18th, 19th and 20th centuries has powerfully enhanced the profoundness and complexity of scientific investigations. Whence some problems in connection with the understanding of the dynamics of phenomena in their multiple interrelationships and other problems regarding the synthetizing and processing of the huge factual and informatic material stored. Human genius has overcome these difficulties owing to the synthesis of the whole gains and achievements and has set up a new discipline in the field of knowledge, i.e. cybernetics, and in the field of working techniques, the electronic computer.

The appearance of cybernetics as a necessity was based on the entire social practice and experience, on the high level of knowledge, on the latest scientific gains of man. Referring to it, Norbert Wiener showed that cybernetics was a synthesis of sciences mainly achieved from physiology, automatics and mathematics.

The universal character of the cybernetics principles is thus emphasized by its multidisciplinary structure, by the complexity of the investigation methods and instruments among which we mention modelling and optimization, the systems theory, operations research, the simulation techniques, the informatic systems with the extensive use of the electronic computers.

More and more scientific branches from biology to social sciences, from technical sciences to arts and culture have gradually made their contribution to the development of cybernetics.

The synthetic character of cybernetics is also expressed by the fact that it has led to the systemic approach of the phenomena and processes studied by the other branches of science and it has allowed the discovery of principles and laws of great generality of the dynamic systems of any kind, e.g. the principle of order, control and adjustment, the principle of feed-back, the transmission of data, etc.

Having appeared as a contemporary synthesis of science, cybernetics has, in its turn, contributed to the further development of human knowledge by achieving new syntheses.

In the field of economic sciences, cybernetics has mainly developed through the substantiation of economic cybernetics. The cybernetization of the production processes, the changes in the production activity on the basis of cybernetics are to be found in our socialist society as aspects of the development of the production forces, of the improvement of the relations of production, of the amplification of man's conscious role in the development of the entire society.

Within the general framework of the upsurge of contemporary science, of its assertion as a decisive factor of progress and civilization, cybernetics is one of the fundamental sciences for the development of the basic activity of society — the material production.

II. ECONOMIC CYBERNETICS — AN INSTRUMENT FOR IMPROVING THE MANAGEMENT OF ECONOMIC — SOCIAL ACTIVITY

The studies on the application of cybernetics in the management of production from enterprise to national economy, in the scientific working out of the technologically and economically optimum solutions and alternatives are particularly topical from the practical point of view.

1. *The scientific outlook* on management has covered the decisive spheres of social life: the political, economic and social activity, the formulation of options and decision-making.

The management of the national economy, the decision making in its inner structure are increasingly enhanced by the new values they have acquired through the contribution of the modern methods of economic cybernetics and informatics.

Emphasizing the importance and role of the management science and the applications of cybernetics, the President of the Republic, Nicolae Ceauşescu, pointed out: "Among the new fields having appeared in the contemporary scientific research, the science of economic processes management, of production and work organization, is playing an important part, the science of management having compelled recognition in many countries of the world. Very good results are obtained in production on the basis of the modern technical means of computation and automation, of the analysis instruments provided by the most recent fields of economic cybernetics and informatics".

The planned, long-term management includes forecasting as an important premise in substantiating the strategy of decisions of economic growth.

In drawing up the forecasts and the main directions of the long-term development of the country, we start from the objective laws of social development, from the concrete relations of our country, and from the trends of the revolution in science and technology at world level.

In the conditions of the socialist system, the forecasting activity is not only necessary but it also has an ever larger field of action due to the unitary character of the economy, which allows to work out scientific models of economic-social growth. On the basis of the socialist ownership of the means of production, an organic unity between forecasting and planning can be ensured, these activities taking place within a democratic framework, with the large and active participation of the working people.

In our practical economic management we have worked out and used the methods of economic-social specified in the five-year plans as well as

in the forecast for the next 20—25 years. These models reflect the entire mechanism of economic and social growth and development, and their realistic characteristic, proved by direct economic-social practice, imposes them as powerful and efficient instruments of knowledge capable of helping us in the exploring and forecasting activity for longer periods of time.

The mobilizing force of these models, their stimulating realism are based on the scientific concept of dialectical and historical materialism, on the profound knowledge of the realities of the Romanian society, on the practical experience of socialist construction in our country. All this points to the necessity, actually proved by practice, of constantly blending the new methods of political and economic management and investigation with the management methods promoted by the Party as the only possible way of scientific research work, of getting a clear image of an economic growth model.

The fifth model of development is being carried out at present and the sixth five-year model is being substantiated. These models set the trajectories of development within the national economic sphere.

A task of main importance for the economic research is thereby obvious: to work out on a scientific basis the means and methods for the "en route" adjustments of these trajectories of economic-social development.

What is required from the economic research is not only to emphasize the way of quantification of the optimum values of the control parameters, but also to analyse and study the anatomy of the national economic and social growth models, the structure and intensity of the economic and social processes in order to ensure the means and methods which should allow the rapid correction of deviations from the optimum trajectories, the elimination of the disproportions which may possibly occur.

2. *An important direction of applying* in our country, the concepts of economic cybernetics in the science of management, to which the efforts of specialists in production, education and research have been oriented, is the *achievement of economic-mathematical models for the preparation and working out of plans.* Noteworthy in this respect are the results obtained in *macroeconomy*, in the working out of the static and dynamic input-output table, the models on technical progress quantification, the study of the production factors and the drawing up of the production functions for the national economy and for its main branches, the models for optimizing investments at a branch level, the techniques of organizing technical-material supply, the studies on economic forecasting, demography, on forecasting the development of scientific and technological research, the models for forecasting the economic and social development throughout the territory

În *microeconomy*, positive results have been obtained in connection with: the optimum distribution of the production targets among enterprises and within them by sections, workshops and jobs; the optimization of production and product-mix; in the organization of equipment repairings and overhaul; the optimization of stocks, the working out of the complex administration systems at the level of economic units and subunits, etc.

III. THE EXTENSION OF THE APPLICATIVE RESEARCH OF CYBERNETICS TO THE ECONOMIC-SOCIAL SYSTEMS

Starting from the objectives of economic growth, the studies in the field of economic cybernetics may offer a wide range of practical solutions as regards the working out of economic-mathematical models at enterprise and branch levels for the national economy as a whole and territorially that should intensify the economic planning activity.

1. *Considered from the cybernetic point of view*, the economy appears as an extremely complex and controlled system. In this light, the national, the branch and the enterprise economies appear as *cybernetic systems regulated* through the planning and follow-up systems, the reference magnitudes being defined as tehnical-economic parameters established by the single national plan.

The study of the national economy as a cybernetic system, made up of systems interconnected through direct and inverse links, makes it possible to go deeper into the investigation, to extend knowledge and to scientifically explain the extremely complex processes and phenomena which are taking place in the economic-social sphere.

The *economic cybernetic systems* which differ qualitatively from other systems contain as an essential element *the direct and conscious presence of man in the order, control and adjustment functions.* The main characteristic of the mechanism whereby this function is fulfilled is to ensure a permanent correction of the optimum evolution, taking into account the changes and disturbances occured in the evolution of the system inside or outside it.

The modelling method has opened new ways and prospects for the study of the economic mechanism. Problems of utmost importance, such as the quantification of technical progress, the structure and dynamics of economic growth, the analysis of the correlation and proportionality among the branches of the national economy and their impact on final consumption, the optimization of production processes, the optimization of investments, the optimization of the accumulation-to-consumption ratio, the economic growth over the territory, etc. have been tackled by means of this method with very good results.

2. *The cybernetic model of an economic system includes* both the parameters characterizing the condition of the system (the condition variables) and those concerning the functions of management, adjustment and connection with other systems of the economy (the control parameters). In socialism, the entire society is interested in the most favourable development of the economic proccesses taking place in the system of the national economy. Therefore, the society continuously follows up the evolution of the system and, as a result of the analysis of the data obtained, it decides on the measures which should be taken in order to influence the behaviour of the system along the planned direction.

The economic processes connection and their dynamics are essential characteristics of the cybernetic systems. This makes us consider the economic systems, in a cybernetic sense, as open, adjusting systems, continuously subject to the action of some more or less independent factors

in relation to the system. The adjustment mechanism of any economic cybernetic system must permanently secure both the *optimum evolution* of the activity specific of the respective system and the prevention and *elimination of the disturbances* which may occur. The control and adjustment mechanism of the economic system is of particular complexity due to the multitude of interdependence connections with the system and with factors outside it. As we advance on the scale of the economic cybernetic systems from micro- to macro-economy, the complexity of the control and adjustment activity increases in its ampleness.

The notion of a programme, as an essential element in the economic systems management, becomes ever clearer in the cybernetic concept. The programme, specific of each cybernetic system, may be considered its model only to the extent to which it mirrors the demands of the real system.

Socialism operates by means of the programme on the scale of the national economy as a whole, securing conditions which allow the implementation of a unitary mechanism in the management and guidance of social life. It has particular advantages as regards the optimum adjustment of the entire economic cybernetic system. The planned economy achieves the feed-back in the most efficient way because it can ensure the correction of the entire economic system. The main instrument through which the state interferes in management, control and adjustment is the single national plan. It is, in fact, the previsional model of the economic system, of our socialist society as a whole. The social and economic dynamism lends as well a dynamic charater to the plan. That is why the plan can be considered as a growth trajectory in the economic sphere, defining the main directions of social development. The maintenance of the preestablished trajectory is achieved either by influencing the structure of the system or by introducing corrections of the initial programme such as the change of certain proportions, rates in the development of the economy, of certain initial or final conditions, constraints in connection with various categories of resources, etc.

It can be rightly said that through its scientific functions, through its high applicative values, economic cybernetics has concentrated an important research stock and has become in our days an open and fertile field of knowledge for human activity.

3. *The progress of economic cybernetics* is characterized by several main orientations and trends both in connection with the object and the methods of study. Linked to these orientations and trends is also the expansion of the fields of application of economic cybernetics favoured and amplified by the development of economic informatics, by the improvement of the working instruments and technique — the electronic computing systems.

The cybernetic way of thinking, of organizing and managing the economic systems and processes is an indisputable reality whose validity is fully confirmed by the achievements of cybernetics in the economic life. The application of the methods of economic cybernetics to solving the problems of economic organization and management has become a constituent element of main importance in the scientific management of society.

IV. THE MAIN CHARACTERISTICS OF THE ECONOMIC CYBERNETIC SYSTEMS

The substantiation of the system concept is one of the major preoccupations which have been characterizing the object of economic cybernetics during the last few years. The positive results obtained in this respect have also been facilitated by the fact that it has become possible to work with the economic systems and processes on real cases, within the large set of connections in which they are developing.

1. *The studies* made so far mark their dynamic character as an essential particularity of the economic cybernetic systems. The dynamic character of the economic processes conceived as cybernetic systems derives both from the action of the objective laws of the development of society and from man's conscious interference. An essential element of the dynamic outlook of the cybernetic systems, of the economic ones in particular, is that their dynamic properties concern not only the system as a whole but also the entire set of interactions among the elements of the system and their connections with the outside world. *Hence, economic cybernetics becomes the science of the dynamics of the big complex systems*, in which man, as a decision-making factor, is holding an essential place. Generally, the economic cybernetic system is an aggregate made up of an economic process, of the social body which is running it, the data system and their processing. These three constituent elements are interconnected and each of them has connections with the exterior as well. Their connection is characterized by a continuous flow of data within which the one concerning the evolution of the economic process stands out as essential.

Since these data are stored at various levels and adequately processed, they allow the social body to act operatively and efficiently for the purpose of guiding the economic process.

Within this system, man can interfere at any moment in order to lend a certain evolution to the process, in keeping with the data received from both inside and outside the system.

This cybernetic way of understanding the economic system has led to the ever more precise shaping of a new kind of inverse connections in the ensemble of the interconnections between man and the processes run by him.

2. *A major orientation of the studies of economic cybernetics* has been since the first years of its appearance as a science the setting down of the conditions for the optimum evolution of the economic cybernetic systems. The concept used in approaching the problem has developed in time, switching over from the full overlapping of the evolution of the phenomenon with the required programme to a permanent, dynamic adjustment of the phenomenon to the multitude of objective conditions in order to get as close as possible to the optimum values which have been previously established.

An outstanding tendency in this respect is the problem of establishing the equilibrium and stability conditions for the economic cybernetic systems in various stages of their dynamics. From the point of view of economic cybernetics, this is the feature of the system not to deviate from

its optimum dynamics but within admissible limits which should not affect the final implementation of the desired performances, i.e., the established tasks and objectives.

The securing of a previsional dynamics of the economic cybernetic system implies a thorough study of its structure, of the connections which are formed within the system and between the system and the exterior of the way in which the system and its connections are developing in time. In this connection, the study of the equilibrium aims at finding the means with the aid of which an economic cybernetic system can be maintained on a range of trajectories as close as possible to the optimum one.

3. *The previsional study of the economic systems* has been enjoying an ever greater attention during the recent years. The economic and social transformations which are taking place in the world today, their very alert and complex character make still more necessary the working out of long-term development strategies with a view to substantiating the decisions on the economic policy. Being essentially an insight of the future, decision-making requires the consideration of the system dynamics and of the structural transformations characteristic to contemporary economy. Therefore, forecasting must be achieved at the moment of decision-making, being one of the essential conditions in substantiating the strategy of economic social growth decisions. The estimation of the far off effects of the decisions made at present, especially the examination and change occurred in these decisions within the framework of the foreseeable action of the economic and social factors have become imperative demands of the management of society. Hence, forecast, is capable of outrunning the knowledge of events in the long run, of exploring development alternatives, of setting out evolution trends, thus placing at the disposal of the factors of social management further information for the preparation of the decisions in keeping with society's needs for progress.

Economic cybernetics has powerfully amplified man's foreseeing possibilities of investigating the economic phenomenon, at the same time, marking an important moment in their understanding, interpretation and management.

4. *The use of cybernetics' methods* and, first and foremost, of the economic-mathematical models which describe the economic systems in their dynamics, requires the utilization, processing and turning to account of a huge volume of data in order to substantiate decisions. This requires the *setting up of an* adequate *information system* which should allow the securing of these data by using the modern electronic computing technique.

Through its capacity of mirroring the dynamic picture of the economy, through the place it holds in the mechanism of guiding the economic life and in ensuring the information-analysis-decision circuit, the economic information system can be characterized as the nervous system of the national economy. Its structure and capacity must therefore suit the nature of the economic processes, the major demands of the economic management, the accuracy and importance of the decision-making act.

The necesity of controlling and guiding the fulfilment of the single national plan, of studying the efficiency of the planning system, of the financial-banking one, of the goods circulation system, of the system of foreign trade and

international economic cooperation, of the remuneration systems, etc. in order to continuously adjust them to the demands of the economic-social reality, is the basic condition determining the scope and configuration of the information system, the volume and nature of the data collected and processed in view of the decision-making act. The structure of the information system must ensure a rational equilibrium between the centralization and decentralization degrees in the processing and transmission of data, an adequate information at the level of each constituent compartment of the national economy: economic unit, central, ministry, local administration, central and synthesis economic institutions. Considered in this way, it can be said that the economic information system represents a set of connections among units, sub-branches, branches, institutions and other economic bodies that makes it possible to bled the decision-making capacity and efficiency in taking the necessary steps for the management of the national economy in its entire complexity.

V. PREOCCUPATIONS OF THE ROMANIAN SCHOOL OF ECONOMIC CYBERNETICS

The substantiation and development of the systemic concept of the national economy represent an important contribution of the Romanian school of cybernetics. Looking upon the national economy as a cybernetic system made up of a large number of subsystems linked among them through direct and inverse connections, it is possible to get acquainted with and scientifically interpret certain extremely complex phenomena occurring inside this system. This concept integrates the plan as the main instrument for the exertion of the command, adjustment and control functions of the socialist state, by taking it as a model of development within the cybernetic system of the economy.

Consequently, the essential components of the national economy are to be found as effectuating cybernetic macro-systems, such as, for example, the population, production, transports, circulation of goods, science, technology, education, management, economic relations and international cooperation. The relations between these systems are to be found in the form of direct and inverse connections with which the social control parameters are integrated too.

In order to forecast Romania's future development, the interconnection between the economic-social cybernetic macro-systems is synthetized through the national income, while its formation and distribution are regarded as a distinct macro-system by means of which not only the connection but also the social control are being exerted.

1. At present, starting from the results obtained in the economic-mathematical modelling of the future development of the Romanian economy, we are concerned with *the working out of the model of our national wealth growth in a dynamic conception.* We propose to include into this model, to a full extent, the national economy as a whole of Romania's society and to solve the methodological problems of national wealth quantification so that we can improve our models of economic-social forecast as well.

Firstly, we tackle *the anatomy of fixed assets* by types of ownership, by sectors of the national economy, beginning with industry ; then, we approach *land as the main means of production in agriculture* aiming at establishing a methodology of land estimation by categories of economic utilisation and, connected with this, the fixed assets afferent to activities meant to raise its productive capacity, such as mechanization, irrigation, chemification, preparation, improvement, etc.

In our conception, the model of national economy dynamics comprises as fundamental economic cybernetic macro-systems the followings : national wealth, population and labour training, the national income connected with its distribution system, scientific and technological research, economic relations and international cooperation, the social management to which the economic information system is directly linked.

The connections and the inner composition of these component parts form a complex structure which must be modelled correspondingly. The direct and inverse connections among such components stress the following essential circuits :

— The first contains the process of accumulation, the formation of the national fund for socio-economic development, the setting up of the investment funds and of the fixed assets, as the main component of the national wealth and as a growth incentive ;

— The second one contains the natural resources, and the raw and related materials circuit ;

— The third one contains the population macro-system, manpower, the educational system and the scientific and technological research macro-system as sources of another basic component of the national wealth — the creative capacity of the nation.

2. Another important line in the preoccupations for applying economic cybernetics, which we consider an important contribution of the Romanian school of cybernetics to the development and sanctioning of economic cybernetics, is *the working out of the model of the nations' wealth growth.*

We approach this problem by starting from the idea that in our days, one cannot conceive a national model of economic-social development without seeing the interdependence between the national economies and the world economic evolution. The two models are closely linked and we cannot rigorously substantiate the national growth model of the national wealth without forecasting at least the main problems of the world process of growth of the nations' wealth. In this respect, we take into consideration the fact that at present, in the world, important gaps exist between development levels of various countries as well as disproportions and disequillibria resulting from the unfair relations among states, generated in the first place by the colonialist and neocolonialist practices. The demands for progress of mankind, the assertion of more and more independent states in the international arena firmly require the radical transformation of this state of things, the ensurance of all countries' free access to raw, energetic and technological materials resources, the taking into consideration of each and every people's interests, the aspirations of all nations to progress and civilization, to a free and sovereign development.

Making a brilliant scientific analysis based on the principles of dialectical and historical materialism, permeated with political and scientific clear-sightedness, the President of the Republic, Nicolae Ceauşescu, militating constantly and actively has outlined and substantiated the content of the new international economic order for the building up of a more righteous and better world.

On this profoundly scientific, theoretical and practical background, we intend to work out the nations' wealth model, enhancing the value of the previous experience by the way in which we shall tackle the problems of world economy modelling in the light of the dialectical and historical materialism.

We want to work out this model as a dynamic and simulation one, meant to allow us to identify ways and means for the achievement of the optimum trajectories for increasing the nations' wealth in the world economic sphere characterized by the tendency of building up a new economic order for a better and more equitable world.

VI. TRENDS AND ORIENTATIONS IN CYBERNETIC RESEARCH

The studies in the field of cybernetics in general and of economic cybernetics in particular have led to important results revealing new aspects in the knowledge of the most varied fields of human activity.

The results of these studies formed the object of an important volume of works and studies which were presented at prestigious international meetings of scientists. Such a prestigious event reflecting the latest preoccupations and trends in this field and rallying over 1000 scientific personalities, academic teaching staff, specialists and researchers from over 30 countries was the 3rd International Congress of Cybernetics and Systems.

Owing to the attention and permanent support granted in our country to the development of science in general and of cybernetics in particular by the party and state leadership, this Congress has enjoyed the high sponsorship of the President of the Republic.

The organization of the 3rd International Congress of Cybernetics and Systems in Romania proves the appreciation enjoyed by the Romanian school and the results obtained by the Romanian scientists in the field of cybernetics in general and of economic cybernetics in particular.

The themes and problems tackled in the scientific works which were presented marked the profoundness, the newness and the originality of studies in this field, representing a prospecting of the new and a remarkable demonstration of the applicability of the science of cybernetics in all fields of life.

The Congress proceedings *were directed with priority towards economic cybernetics* as a basic field of cybernetics.

The variety and complexity of the studies and research in the economy reveal *the large field of application offered by cybernetics*, the intense and deep impact of economic cybernetics on the management, organization and forecast of the entire economic activity.

By setting out from the present trends in the development of cybernetics — the ever more imperative penetration into the most varied fields— the Congress has marked *an increased tendency towards applications, towards the use of theoretical research in practical activity.*

The Romanian scientists' contribution to this process is extremely rich and valuable. We have today remarkable results of the application of cybernetics to such fields as : economy and sociology, technics and technology, education and instruction, culture and arts.

The Congress has marked important theoretical and practical contributions of the Romanian scientists to such problems as : economic growth modelling, territorial forecast and planning; the optimization of industrial processes ; the multisectoral modelling and the input-output method ; the modelling of research and education impact on economic development ; the cybernetic conception of the information system of planning ; the optimum macro- and, micro-economic management ; management systems design in industry, agriculture, transports, marketing ; the information-decisional analysis and design ; production programming and control ; the environment.

The complexity and dynamism of the present economic and social processes determine the penetration of cybernetics into all fields of social activity and ever more impel it as an objective demand of the current stage of development of the contemporary society. Economic cybernetics lends new values to the creative and investigating capacity of man in the study of economy and society, contributing to the improvement of economic activity, to the development of technics and science, to the stimulation of material production and to the increase in the peoples' national wealth.