



Economic Cybernetics: Yesterday and Today

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ECONOMIC CYBERNETICS: YESTERDAY AND TODAY

Brief Review

The most promising application of the theory and methods of cybernetics in a socialist economy apparently is to the problems of national economic planning and management. It was not by accident that in 1967, as in previous years, economic cybernetics underwent — as did the most progressive branches of science — a rapid growth of scientific achievement. For the first time, a specific review of the scientific forces engaged in this field was made at the First All-Union Conference on Economic Cybernetics (October 1966). Scientific and practical results were summed up and systematized. At the conference, the long-range trends of joint research and organizational measures were outlined. Work has progressed successfully along most of the lines recommended by the conference. Scientific relations and creative cooperation were strengthened. The number of organizations working in the field of economic cybernetics has increased substantially. At the present

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time, holding a second All-Union Conference on Economic Cybernetics has become an urgent question. This major project will be undertaken next year by the Ukrainian specialists.

Creation of a Scientific Council for Optimal Planning and Management of the Socialist Economy of the USSR Academy of Sciences must be considered a decisive success. The council was set up on the basis of the former three scientific councils on various economic problems. The first session of the council (September 1967) confirmed its great possibilities. The council includes representatives of the USSR Gosplan, of many economic planning organs, and of ministries engaged in economic experimentation connected with the economic reform and those engaged in developing automated branch control systems. During its meeting, the council received a telegram to the effect that the Uzbek SSR had adopted a resolution calling for the development of economic-mathematical and cybernetic methods and for the introduction of electronic computers for use in its national economy.

We hope that the creation of this council will

mark a new and higher stage in the development of economic-mathematical methods and economic cybernetics. The efforts of the organizations represented in the council will be focused on designing, working out, and introducing an optimal control system of the socialist economy. The increased need for further improving the forms of control of the socialist economy, as well as actual achievements in the realm of economic cybernetics, makes urgent and entirely realistic the elaboration of an optimal control system of the socialist economy, based on a unified plan with overall coordination of research and development and with continuous exchange of experience in the course of experimentation.

The Scientific Council on Cybernetics of the USSR Academy of Sciences, which is coordinating the work in all branches of this science, is also most actively participating in the joint work. Almost half of the scientific-research and other organizations coordinated by the council (about 500) are working on pressing economic and national economic problems. With further integration among various scientific branches and trends on the basis of a common cybernetic methodology, both the work of the Section of Economic Cybernetics set up by Academician V. S. Nemchinov and the work of all the other theoretical and applied sections are finding direct economic application.

Above All — Consolidation of Creative Forces

The decree of the CPSU Central Committee on enhancing the role of the social sciences determines further plans for the development of scientific-research work in economic cybernetics. This important decree also helped generate considerably greater interest in economic-cybernetic research on the part of representatives of the exact, engineering, and a number of social sciences working in the field of cybernetics. In addition to the Central Economic-Mathematical Institute (TsEMI) of the USSR Academy of Sciences, which specializes in the application of mathematics and computers in the national economy, extensive work in economic cybernetics

was undertaken by the Institute of Technical Cybernetics of the USSR Academy of Sciences, the Institute of Cybernetics of the Academy of Sciences, Ukrainian SSR, the Institute of Mathematics, and the Computer Center of the Siberian Department of the Academy of Sciences, and by a number of other organizations. In 1967, the subjects of economic-cybernetic research were considerably broadened in these organizations, as well as in other scientific-research institutes and higher educational institutions, which set up special subdivisions for economic cybernetics, analysis of economic systems, and designing automated economic control systems.

We must also point out that an ever greater number of economic planning organs are undertaking the systematic development and introduction of automated control systems on the basis of computers and economic-mathematical methods. In addition to the Main Computer Center, the USSR Gosplan has created several structural subdivisions to carry out scientific-research work in the fields of national economic planning and in the use of economic-mathematical models for plan calculations. At the present time no less than twenty union ministries have adopted plans for the introduction of automated branch control systems and, with the help of scientific-research organizations, have undertaken extensive work along this line.

As heretofore, the Ukrainian SSR is first among the union republics in the use of mathematical methods and computers. Its governmental and planning organs pay great attention to the developments in this major field. The Baltic republics are also active in developing their economic-cybernetics research. Thus, Estonia has set itself the task of designing an optimal system for republic administration.

The Transcaucasian republics also have intensified and improved economic-cybernetics studies. Here, branches of the Scientific Council on Optimal Planning and Management of the Socialist Economy have been set up, as well as branches of the Scientific Council on Cybernetics. The Central Asian republics are showing great interest in the development of economic-

cybernetic research; in the very near future we may expect those republics to carry out extensive development in research and in the application of economic-mathematical models and automated control systems.

Scholars like to say that there is nothing more practical than a good theory. For this reason, let us describe, even though briefly, the theoretical accomplishments that have taken place during the past year in the field of economic cybernetics. The most significant among these, in our view, is the formulation and widespread recognition of the concept of an optimal control system for the socialist economy, which should be designed and, according to the plan, successively introduced throughout the national economy of the USSR. The further rapprochement and combination of efforts of numerous organizations — having various specialties and working in both theoretical and applied fields — are based on this concept. Naturally, we are still far removed from the accurate formulation of a theory of the optimal functioning of the socialist economy. However, the very fact that the question of formulating such a theory has been raised, as well as the work done in this respect by the Central Economic-Mathematical Institute in collaboration with other organizations, is of great significance in developing the Soviet science of economics and in concentrating the attention of scholars on problems of improving administrative control.

The importance of a systems approach as a basic tool in economic-cybernetic research and development has unquestionably increased during the past year. A great deal was done in the field of the general theory of systems and in its economic and national economic applications. The practical economic and engineering experience acquired in designing automated systems for national economic control is being interpreted and consolidated. It has now become entirely possible to provide an accurate formulation of the basic principles and methods governing a systems approach in economic research and development. The Section of Economic Cybernetics of the Council on Cybernetics, USSR Academy of Sciences, is contemplating a special symposium

devoted to these problems for the beginning of 1968.

Information and Its Theory

Research in the field of information theory was noticeably stimulated by the practical demands which arise in designing optimal control systems for the socialist economy as well as in designing and applying automated control systems at various national economic levels. It is a question of a broader understanding of the role of information in economic and other control processes and of designing scientific tools for the use of a theory of information not only in communications systems but also in complex multipurpose economic control systems.

In the process of designing automated economic control systems, we must measure and optimize the usefulness of the information, its meaning, symbols, and a number of other aspects. To this effect, mathematical and other methods previously unavailable for the classical theory of information are already being used. Obviously, the time has come to undertake the creation of a general theory of information to encompass the various aspects of such a complex scientific concept. So far, development along this line has been determined mainly by the needs arising in the course of economic-cybernetic work within the national economy. The Section on Economic Cybernetics of the Scientific Council on Cybernetics, USSR Academy of Sciences, played a great role in organizing this research. Currently, it is preparing for a representative conference on the subject.

A better understanding of scientific problems helped formulate the practical method used in studying the flows of economic information by economic planning organs, department systems, and industrial enterprises. In May 1967, on the initiative of the Section of Economic Cybernetics of the Scientific Council on Cybernetics, the Economic-Mathematical Institute, and the GOSINTI [Government Scientific-Research Institute of Scientific and Technical Information] of the Azerbaidzhan SSR held a symposium on

the methodology of research on economic information flows. Representatives of many leading scientific-research organizations and national economic organs summed up practical experiences and formulated basic concepts of the methods. The material submitted at the symposium will be published by Nauka Publishing House in 1968.

In 1967 there was a particular upsurge in research on the creation of a general methodology for designing automated branch control systems, on the practical development of individual blocks [bloki] for these systems, and on the checking out of individual elements of such systems. A special conference will be convened by the Central Economic-Mathematical Institute for an all-round discussion of methods for designing such systems on the basis of a standard model developed for the USSR navy. Later on, along with general methodology of systems design, TsEMI intends to organize the development of standard systems by groups of branches of the national economy.

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Soviet researchers in the field of economic cybernetics have addressed various international congresses and conferences and have strengthened their creative ties with the other socialist countries. In the past year, substantial achieve-

ments have been scored in the theory and practice of economic cybernetics. Thus the GDR has undertaken the experimental introduction of a system of planning and accounting information in light industry on the basis of matrix models. Bulgaria is doing extensive research and design work for the purpose of setting up a unified governmental network of economic computer centers. Hungary has scored outstanding successes in the practical utilization of economic-mathematical models in national economic planning. Poland, along with its traditional economic-mathematical research, has undertaken extensive work on problems of economic information.

The basic task for the near future is the further intensification of joint research in the field of developing the theory and in successively introducing the optimal control system in the socialist economy. The mass reinforcement of the army of economists who are studying the problems of economic cybernetics with specialists in the exact, natural, and social sciences also raises the question of recognizing this specialty on a national scale. We must not only train young specialists in the field of economic cybernetics, but also think of awarding scientific degrees to the deserving representatives of this branch of science. All this will contribute to developing theoretical research in economic cybernetics and to working out specific projects of a system of economic control.