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USSR Report

ECONOMIC AFFAIRS

(FOUO 12/79)

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ORGANIZATIONAL-ECONOMIC EXPERIMENTS IN SCIENCE, TECHNOLOGY

Moscow VOPROSY EKONOMIKI in Russian No 9, Sep 79 pp 53-61

/Article by V. Pokrovskiy: "The Organizational-Economic Experiment in the Sphere of Science and Technology"/

/Text/ The practice of organizational-economic experiments at different levels of the development of science and technology attests to the extensive possibilities of utilizing this form of approving new management ideas. In particular, the new system of the planning, financing and economic stimulation of new equipment, the introduction of which was begun in 1969 in the electrical equipment industry, created a great economic interest of organizations in increasing the scientific and technical level and economic efficiency of research and development. This system, by analogy with a number of sectors of physical production, calls for the formation at scientific organizations of three economic stimulation funds: the economic incentive fund, the fund for sociocultural measures and housing construction and the fund for the development of the organization. The guaranteed economic impact from the introduction of the results of scientific research and experimental design operations and their scientific and technical level are the main fund-forming indicators. The decree of the CPSU Central Committee and the USSR Council of Ministers, "On the Improvement of Planning and the Intensification of the Influence of the Economic Mechanism on the Increase of Production Efficiency and Work Quality," provides for the formation of the three mentioned funds of economic stimulation at the scientific research, planning and design and technological organizations of all sectors of industry. Consequently, the receipt by scientific organizations of a portion of the economic impact (the profit), the creation of which they promoted, is becoming the principle of their economic stimulation.

The positive influence of the mentioned system of economic stimulation and material encouragement affected the increase of the economic impact from the utilization of the results of research and development and the increase of the quality of newly assimilated items. In particular, in the 10 years of the use of this system in the electrical equipment industry the growth rate of the total annual economic impact from the development, assimilation and introduction of new equipment was nearly fourfold greater than the growth rate of the deductions for incentive funds, the average annual growth rate

of production of the highest quality category was fourfold greater as compared with the growth rate of the total production volume in the sector. In seven years of work according to the new system in heavy and transport machine building the total annual economic impact of new equipment increased nearly threefold, while the proportion of the output of products of the highest quality increased approximately 3.5-fold.

The set of experimental measures, which were implemented during the adoption and subsequent improvement of the system of the planning, financing and economic stimulation of work on the development, assimilation and introduction of new equipment, promoted the concentration of the forces and assets of scientific organizations and enterprises on the most important and urgent directions of scientific and technical progress. The efficiency of the research and development being performed increased, the introduction of their results was expedited, the material, moral and administrative liability of the clients and performers for the success and guaranteed technical and economic indicators of the performed work was increased.

At the same time an increase of the promise of themes was ensured, which promoted an increase of the proportion of research and pioneering work: in the electrical equipment industry from 1969 to 1978 by approximately 2.5-fold, in heavy machine building and the chemical industry from 1972 to 1978 respectively by more than 1.5-fold and by nearly 4-fold. The annual percent increase of the economic impact for the national economy from the introduction of measures on new equipment is more than 20 percent in the electrical equipment industry and about 5 percent in heavy machine building. The proportion of products with the State Seal of Quality in the total volume of commodity production was nearly 5-fold greater than the all-union indicators in the electric equipment industry and more than 2.5-fold greater in heavy and transport machine building.

The development and expansion of such an organizational form of the integration of science and production as scientific production associations promoted the improvement of the structure of the sectorial and territorial management of the sphere of the development of science and technology, the improvement of the location of the scientific and technical potential and the assurance of the rational combination of centralized and decentralized management. The main advantage of scientific production associations, as mass investigations of their activity showed, consists in the considerable shortening of the period of the development and assimilation of new equipment (by one-third to one-half), which ensures the use of unified comprehensive long-range plans for the entire "research-production" process and the elimination of the organization of this process on the basis of "receipt-delivery." According to the data of USSR Gosplan, of all the developments not being used in the national economy more than half are not being used due to losses of time on coordination during the delivery and acceptance of stages of work.

Scientific production associations as an integrated system increase the liability for the end result of scientific research and experimental design operations on the basis of the increase of the importance of promising

directions of scientific and technical progress, which have a profound influence on the corresponding sectors (subsectors) of the national economy, by speeding up the process of renewing their production equipment base. Under the conditions of scientific production associations the indicators of the efficiency of their activity, particularly the economic impact per ruble of expenditures, the turnover rate of working capital, the receipt of patents per 100 workers and others, increase rapidly. This is confirmed by the data of a comparative analysis (made by the State Committee for Science and Technology) of the indicators of the operation of a group of scientific production associations and similar scientific organizations which did not belong to associations:

Indicators	Results of activity	
	37 organizations	21 organizations belonging to 12 scientific production associations
Impact per ruble of expenditures (in rubles/ruble).	1.6	2.3
Patents obtained per 100 workers (each) . .	1.4	3.1
Proportion of most important operations (percent).	6.1	17.3

In order to intensify the cost accounting methods of managing the activity of sectorial scientific research institutes and design bureaus, at a number of scientific organizations of the electrical equipment industry an experiment was begun in 1977 on the conversion of the evaluation of the activity of the organization from the indicator "the amount of performed work" to the indicator "the amount of completed and delivered work." The scientific research institutes and design bureaus are provided with working capital in a fuller amount, while they receive all the assets, which cover their expenses and form the profit, from the client after completing the work and delivering it to him. The mentioned decree of the CPSU Central Committee and the USSR Council of Ministers calls for the gradual conversion of scientific research, planning and design and technological organizations to the system of settlements for work, which has been completely finished and accepted by the client, instead of the stage-by-stage payment for the work. This conversion should be completed during the 11th Five-Year Plan. With such a system of settlements the scientific organization and each of its workers are interested in the rapid completion of the work, since the financial situation of the organization, the possibilities and amounts of the economic stimulation of the collective of workers depend on this. On the whole the cycle of development of new equipment is shortened, the efficiency of scientific research and experimental design operations is increased as a result of the more rapid introduction of their results and the reduction of losses from the immobilization of capital during the investment period of the development of the new equipment.

The further conducting of experiments in the sphere of science and technology can be effective on the condition that their organization will be based not only on the generalization of the already existing practice, but also on theoretical studies on these questions. Beginning in the 1960's the problems of social and economic experimentation found a definite reflection in scientific literature.[1] It is true that economic experiments in the sphere of physical production are mainly analyzed.

The difficulties of performing economic experiments as applied to scientific and technical development are connected first of all with such a feature of this sphere as the probabilistic nature of the results of scientific research and experimental design operations, which complicates the evaluation of the achieved results. Moreover, in the sphere of science and technology the possibilities of selecting similar groups of subjects for experimentation are limited, which in many instances hinders the performance of a comparative analysis of the obtained results. A significant distinction of economic experimentation in the sphere of science and technology is also linked with the significantly greater influence of the subjective factor in this sphere on the results of the experiment as compared with production.

With respect to the sphere of science and technology it is possible to formulate in the following way the essence of the organizational-economic experiment: it is one of the specific methods of analyzing the systems of the organization of the economic activity of the scientific production collectives for the purpose of verifying hypotheses about the influence of the changes being made on the results of the activity of these collectives and the elaboration of measures on the extensive use of the proposed improvements in the practice of managing scientific and technical development. Consequently, the organizational-economic experiment is one of the important stages of the scientific elaboration of the problems of improving management in the sphere of the development of science and technology.

A complicated problem of organizational-economic experimentation is the establishment of the limit of its use. At times it is assumed that some special restriction as compared with, for example, natural science

1. See, for example, R. V. Rybkina, A. V. Vinokur, "Sotsial'nyy eksperiment" /The Social Experiment/, Novosibirsk, 1968; L. I. Lopatnikov, "Ekonomicheskiye eksperimenty v promyshlennosti" /Economic Experiments in Industry/, Izdatel'stvo "Ekonomika", 1968; A. Z. Kupriyan, "Metodologicheskiye problemy sotsial'nogo eksperimenta" /Methodological Problems of the Social Experiment/, Moscow State University, 1971; V. A. Silin, A. S. Sukhov, G. T. Vlasenkov, "Ekonomika: poisk, eksperiment" /Economics: Research, Experiment/, Izdatel'stvo "Znaniye", 1978; "Provedeniye sotsial'no-ekonomicheskogo eksperimenta" /The Performance of a Socio-Economic Experiment/, Tallin, 1977; "Problemy upravlencheskikh novovvedeniy i khozyaystvennogo eksperimentirovaniya" /Problems of Management Innovations and Economic Experimentation/, Tallin, 1978.

experiments is characteristic of this type of experiments. It seems to us that the determination of the scale (framework) of organizational-economic experiments is directly dependent only on the specific tasks of the experiment.

The collective of an individual institute or their groups (for example, in the experiment on the payment for completely finished research and development); all scientific organizations (and even enterprises) of the sector (as was the case, in particular, during the conversion to the new system of the planning, financing and economic stimulation of work on new equipment of the electrical equipment industry and other sectors); individual collectives, which govern scientific and technical development in the promising directions of technical progress on the scale of the national economy of the country (to which the analysis of the dynamics of the creation of scientific production associations attests) could be the basis for performing an organizational-economic experiment.

The study of the practice of preparing organizational-economic experiments in the sphere of science and technology shows that not only the scientific ideas, which were elaborated with respect to scientific and technical development and served as the basis of practical recommendations on the performance of the experiment, but also the already existing practice of management in this sphere and other sectors of the national economy are their source. For example, the idea of directing the activity of sectorial scientific research institutes and design bureaus toward the end results served as the theoretical basis of such an organizational-economic experiment as the approval initially in one sector of the new system of the planning, financing and economic stimulation of work on new equipment. While the well-known Shchekino method of wages, which has proven itself to be good in industry, was the basis of the experimental system of planning of the standard of the wage fund, which is reduced by years, per ruble of the amount of work of the institute and the extension of the rights of the director when paying those who perform a greater amount of work on time and ahead of time with a higher quality.

In the first case the idea was materialized, as was already noted above, first in the electrical equipment industry, and then in another 14 sectors by the introduction of a system of supply orders, as well as by the establishment of the dependence of the economic stimulation of workers on such ultimate indicators of their labor as the economic impact and the scientific and technical level of the results of the work. In conformity with the adopted decree on the improvement of planning and the intensification of the influence of the economic mechanism the completion of the conversion of scientific research institutes, planning and design and technological organizations to the cost accounting system of the organization of work on the development, assimilation and introduction of new equipment on the basis of supply orders is called for by 1980. Pilot (experimental) enterprises, scientific production associations and production associations will also be converted to this system in industry.

In the second case the concentration of the efforts of specialists on the solution of important scientific and technical problems, the considerable increase of the efficiency and quality of the work being performed and the acceleration of the rate of its introduction in the national economy is being ensured by permission to use the saving of the wage fund from the release of workers for supplement wage payments and the payment of bonuses.

The All-Union Institute of Welding (VISP), at which the organization of research and development has been improved, has been operating according to this system as an experiment since 1974: the subdivisions have been specialized and consolidated, the accounting of the work being performed according to specially established forms has been introduced for evaluating the personal contribution of each performer, standards of time for various types of jobs have been specified and are being used, official instructions for the main categories of workers have been compiled, long-range and day-to-day planning has been improved, the themes of the institute have been combined, are linked with the main directions of its specialization and have been concretized as much as possible for the conditions of the plants of the sector. The performance of a larger amount of work with fewer people became possible in practice only on the basis of a set of measures on the increase of the efficiency and quality of the labor of all staff members, first of all the designers and process engineers. The themes have begun to be worked out more carefully, the subjects have begun to be distributed more strictly, in conformity with the profile and specialization of the performing departments, which made it possible, in particular, to utilize the advantages of standardization and to increase the proportion of the re-application of previously found technical decisions.

At the institute the organization of designing is being improved, the stages of designing and the deadlines of their completion have been delimited, comprehensive schedules of work on each theme have been created. The performers of subsequent stages of the designing are involved in the work, as a result of which follow-up operations are eliminated, the patent search is improved, the workload of the performers of different skills in the departments are optimized, the scientific organization of labor is applied more and more extensively and advanced know-how is used. All this made it possible to coordinate incentives more closely with the results of the labor of the collective and the individual staff members. Thus, the actual amount of work of the institute, which one staff member accounts for, increased in 1977 as compared with 1973 by 11 percent. The supplementary payments for the overfulfillment of the plan assignments with a high scientific and technical level of the developments were 7.6 percent of the average annual salary with a saving of 102,000 rubles from the wage fund. The obtained saving was used for supplementary payments and the payment of bonuses to the institute staff members, who overfulfilled the standard plan assignments with a high work quality, which considerably increased their interest in speeding up the periods of the development, assimilation and introduction of new equipment. The scientific and technical level of research and development was improved, their economic efficiency increased.

The positive results of the experiment at the All-Union Institute of Welding attest to the substantial influence of advanced methods of remuneration on the efficiency and quality of the labor of the workers of science and technology. With an increase of the amount of work being performed in four years by 3.1 percent the actual number of workers decreased by 6.5 percent. The periods of the performance of research and development were cut to two-thirds, the number of received patents increased nearly twofold. The influence of the institute on the technical and economic indicators of the enterprises of the sector increased appreciably. Thus, the actual economic impact obtained from the use of the developments of the institute increased from 3.67 million rubles in 1973 to 4.4 million rubles in 1977, the impact per ruble of expenditures increased.

When preparing an organizational-economic experiment first of all it should be proven that one current organizational-economic form or another does not meet the present conditions and as a result specific organizational-economic forms, which are proposed to replace the current ones, are formulated. At the same time the possible unfavorable consequences of the experiment should be carefully analyzed and the sphere of its application should be established.

However, the practice of conducting organizational-economic experiments at present is such that this preparatory work, as a rule, is carried out by representatives of the collective, the future participant in the experiment, with the involvement of scientific research organizations (subdivisions) of economic specialization and higher management organs under the control of those institutions of state management, which will make the decision on the conducting of the experiment. An official document, which in one form or another sets down the main principles on the conducting of the experiment, is the result of such work. The standards connected with the form being experimented on and its practical use are also reflected in the same document.

The lack in official documents on the conducting of an experiment of criteria of its success, in our opinion, is a serious shortcoming of the preparation of nearly all organizational-economic experiments. This is explained by the complexity of their elaboration, as well as by the fact that there are no specialists on the elaboration of criteria of the effectiveness of experiments. All this complicates the analysis of their performance and the evaluation of the expedience of making changes in the conditions of the performance of one experiment or another. The making of changes is inevitable, since owing to objective causes it is difficult, and at times even impossible to immediately take into account all the factors which influence the course and results of the experiment. It is even more difficult to study their interaction. For example, in the sectors converted to the new system of the planning, financing and economic stimulation of work of new equipment, it was necessary to repeatedly make more precise the individual principles and standards.

Now the refinements, as a rule, are made by a joint decree of the organs which made the decision to conduct the experiment, which by no means is conducive to the efficiency of the performance of this work. Therefore at the

stage of the drafting of the program of the experiment (which for the present, incidentally, is also not always compiled) it is already advisable, in our opinion, to carry out the legal examination of those questions which might be liable to changes, and to differentiate the responsibility for their solution according to the levels of the hierarchy. A kind of mechanism of the "inscription" of the experiment into the system of current legislations will thereby be provided.

The immediate participants in the organizational-economic experiment should be informed beforehand about the goals of the experiment, so that they could visualize more precisely their role and tasks in conducting it. Therefore, after the issuing of the decision on conducting an organizational-economic experiment time must necessarily be left for the completion of its organizational preparation. The practice of gradually converting the industrial ministries to the new system of the planning, financing and economic stimulation of work on new equipment showed that this system has been adopted most successfully in those sectors (heavy and transport machine building, the chemical industry), where the training and instruction of the experiment participants had already been carried out beforehand, the experience gained by other sectors had been examined in detail, its positive and negative aspects had been analyzed collectively, exercises like "business games" had been conducted and so on.

The organizational-economic experiment in the sphere of science and technology causes some difficulties in the activity of collectives and faces their members with nontraditional problems. In particular, with the conversion to the evaluation of the activity of scientific research institutes and design bureaus according to the indicator of the amount of completed and delivered work the staff members of the economic services had to be taught en masse without delay the methods of calculating the economic efficiency of scientific research and experimental design operations and standardizing the working capital. At times direct losses also arise for individual workers and collectives of entire subdivisions and organizations. For example, in the electrical equipment industry during the first year of work according to the new system the proportion of the bonuses decreased at approximately 20 percent of the organizations.

Moreover, so far no special system of incentives has been created for participating in organizational-economic experiments. As a result, the encouragement of the participants is becoming, as a rule, the goal of their performance in the sphere of science and technology (as well as physical production), which is not included in the main tasks of experiments. Thus, the measures of stimulation of the participants are being realized not directly, but indirectly through the existing paragraphs of the conditions for performing the experiment. In a number of cases it can be observed how "new" organizational forms of the experiment are being developed for the sake of one ultimate goal--the receipt of additional remuneration.

The problem of the criteria of the efficiency of the organizational-economic experiment if only in a general wording, in our opinion, also requires a

solution. The method of analyzing the dynamics of the main indicators of the activity of the organization (sphere), in which the experiment is being conducted, is used most often for such an evaluation. This has the result that all the achievements are ascribed to the influence of the experiment. For example, the effectiveness of the new system of the planning, financing and economic stimulation of work on new equipment in most cases is connected with the overall positive trend of the dynamics of such indicators as the impact from the adoption of the new equipment, the proportion of products with the State Seal of Quality in the total volume of industrial production of the sector, the number of developed and introduced objects of new equipment and so forth.[2] The elaboration of the mentioned criteria would make it possible to single out clearly the achievements which resulted directly from the experiments being conducted.

The comparative evaluation of the effectiveness of organizational-economic experiments is encountered considerably less frequently, which, as was already noted, for the sphere of science and technology is explained first of all by the difficulty of selecting the test object. However, here it is possible to use the method of comparison with average indicators of similar systems, which are not covered by the experiment. Let us illustrate this possibility by the example of the same new system. The analysis showed that in the sectors, which have been working for a long time according to the mentioned system, the proportion of products of the highest quality category in the total production volume of commodity production is 1.5- to 2-fold higher than in other sectors. The comparison of such an indicator of efficiency as the period of recovery of the expenditures on the introduction of more advanced equipment for the ministries which have and have not been converted to the new system, also testifies in favor of the former, at which this period is nearly one-third less, the period for the performance of research and development is 10-15 percent shorter.

It seems to us that when evaluating the effectiveness of a specific organizational-economic experiment it is advisable on the basis of a comparative analysis of the trends of the dynamics of the main indicators before the experiment and during its performance to calculate the difference (in absolute values) of the indicators which reflect their dynamics under the conditions of the experiment and with a simple extrapolation of the trends prior to the experiment. The ratio of this difference to the actual change in the parameter being analyzed will show the proportionate share of the

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2. See, for example, V. Astaf'yev, "The Management of Scientific and Technical Progress in a Sector" (VOPROSY EKONOMIKI, No 2, 1978, pp 100-106); N. Ryzhkov, "Economic Levers for Expediting the Development of New Equipment in Heavy and Transport Machine Building" (PLANOVOYE KHOZYAYSTVO, No 8, 1978, pp 10-17). The author of this article also does not avoid such evaluations (see "Povysheniye effektivnosti nauchnykh issledovaniy i razrabotok (voprosy teorii)" /The Increase of the Effectiveness of Scientific Research and Development (Problems of Theory)/, Izdatel'stvo "Ekonomika", 1978, pp 125-126).

experiment in the overall indicator of the effectiveness of the development of the system in question. The detailed calculation made by us according to such indicators as the annual economic impact from the introduction of new equipment and the increase of the output of products of the highest quality category in the sector of heavy and transport machine building for the period of work according to the new system (1972-1978) showed that the "contribution" of this system is respectively 37 and 30 percent.

The study of the course of the experiment on the basis of a set of indicators should be carried out, in our opinion, by specially created analysis groups like, for example, the temporary scientific and technical commission, which was formed by the State Committee for Science and Technology in 1974 for generalizing the work experience of the Ministry of the Electrical Equipment Industry and the Ministry of Heavy and Transport Machine Building according to the new system of the planning, financing and economic stimulation of work on new equipment. The opinion of the group of independent experts, as practice shows, is of interest and of great importance for people who make management decisions. In particular, the sufficiently extensive information of the executives of other sectors of industry and the workers of the sphere of science about the results of the evaluation of the experience of the Ministry of the Electrical Equipment Industry and the Ministry of Heavy and Transport Machine Building substantially accelerated the process of converting the scientific organizations, associations and enterprises of other sectors of industry to this system (as a result 15 industrial ministries are already operating now according to this system).

The possible measures on developing organizational-economic experiments in the sphere of science and technology should be aimed first of all at the expansion of those already being conducted with allowance made for the directions stipulated by the decree of the CPSU Central Committee, "On the Further Improvement of the Economic Mechanism and the Tasks of Party and State Organs," and the decree of the CPSU Central Committee and the USSR Council of Ministers on the improvement of planning. Among them there are first of all the methods of combining the sectorial and territorial management of the development of science and technology, the promising forms of the realization of scientific and technical goal programs, the new forms of organizational structures of the management of scientific and technical progress, which make it possible to overcome departmental alienation. In particular, the extension to all industrial ministries (departments) of the new system of the planning, financing and economic stimulation of work on new equipment, which has shown itself favorably, is planned on the national economic and sectorial levels. Such a measure, first, will make it possible to create a unified economic mechanism of the sphere of development of science and technology in all the industrial sectors of the national economy and, second, the important problem of the more complete satisfaction of the interests of the users of the new equipment will be solved with the making of some refinements.

The scientific institutions, which have been converted to the system of stimulation of work on new equipment, receive deductions for the incentive

funds only of their own sector. This leads to some linking up of scientific research institutes and design bureaus on the performance of research and development of intrasectorial importance. At the same time, as the analysis showed, a large part of the economic impact is localized in the user sectors (for example, in the chemical industry it is two-thirds). In order to increase the interest of developers in seeing to it that they would first of all meet the requirements of all consumers and would aim at the greatest total efficiency of the equipment being developed, it is advisable upon completion of the conversion of all industrial ministries and departments to practice the intersectorial transfer of assets for incentives within the sectors which are operating according to this system. The principles of the new system should also be used more extensively when organizing the performance of work of an applied nature and development at scientific organizations of the system of the Academy of Sciences. Suitable experience already exists at a number of scientific research institutes of the Siberian Department of the USSR Academy of Sciences. They have been allowed to form economic stimulation funds by means of the assets received from industry, which stimulates the scientific collectives to deal with questions of the introduction of the results of basic research in the national economy.

The improvement of organizational-economic experimentation also includes such important tasks as the increase of the level of systemicity of the organization, the conducting and evaluation of the results of experiments. It seems to us that, for example, the following experiments: the integration of the methods of program-goal planning and management at all the levels of the hierarchy of management with specific organizational structures and means of stimulation for the end result; the approval of economic standards of scientific and technical development for the purposes of the planning and evaluation of the activity of scientific collectives, are of primary importances as global organizational-economic experiments.

In our opinion, in order to coordinate the scientific achievements in the area of organizational-economic experimentation with the needs of the national economy of the country it is necessary in the plans of scientific research on problems of the improvement of the economic mechanism of managing the national economy for provision to be made for the corresponding stages which ensure experimental verification under real conditions of the proposals being elaborated by scientists. At the same time the analysis, generalization and dissemination of the know-how of organizational-economic experimentation should be continued. This, no doubt, will make it possible to increase the theoretical validity of the experiments being conducted, the level of their completeness and the reliability of the evaluation of the obtained results.

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REGIONAL ASPECT OF DETERMINING ECONOMIC EFFICIENCY

Moscow VOPROSY EKONOMIKI in Russian No 9, Sep 79 pp 43-52

[Article by M. Gokhberg: "Regional Aspect of Determining National-Economic Efficiency"]

[Text] The decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Raising Efficiency of Production and Quality of Work" of 12 July 1979 points to the need of a radical elevation of the level of planning and management and efficiency of public production.

Attainment of maximal efficiency in all parts of the national economy of the country is possible in consequence of a comprehensive systems approach to the solution of both sectorial and territorial problems. This presupposes the creation of a scientifically based system of evaluating the efficiency of public production and optimally combined sectorial and territorial principles of managing the country's national economy. At the same time, analysis of the experience of territorial preplan studies[1] shows that it is distinguished by a lack of identical character in approaches to the problem of assessment of public production.

Calculations of efficiency used in sectorial and territorial institutes are not distinguished by a unity of methods and indicators. In same cases, they determine absolute efficiency and in others--relative efficiency, using for this purpose all known indicators. No accounting is made or no complete accounting is made of interrelated expenditures on service installations and related production facilities and replenishment of working capital, shifting and training of work force despite the fact that they exert a significant influence on the effectiveness of distribution of productive forces and development of regional economy. Nonproduction expenditures are underestimated, although it is known that their share in the total volume of capital investment in the country's central regions reaches one-third; it is even higher in the northern and eastern regions. Insufficient account is taken of regional expenditures on the development of the production infrastructure (transport, power, water supply, sewerage, construction base and the like), which are as much as 20-30 percent of the total size of capital investment for production construction.

In transport calculations rates are used in some cases and shipment cost in others. No calculations are made to validate sizes of enterprises or effectiveness of concentration of production and its consequences in large cities and agglomerations, in oblasts and rayons that are supersaturated with industrial production; no account is taken, full or partial, of expenditures on compensation of damage from the taking of valuable agricultural and forest lands and the elimination of contaminated water sources and air space. Calculations of variants are frequently replaced with qualitative assessments; the comparison of variants is made on the basis of capital investment without taking into consideration operational outlays (production costs). There are many cases of planners and scientific workers thinking that the economic validation of variants constitutes an "internal" element of the process of planning and scientific work, for which reason the results of such computations are not included in the completed work. In a number of cases, it is argued that an ostensible need exists for curtailing the volume of explanatory notes. The time factor is rarely taken into account. Occasionally the determination of generalizing indicators of efficiency for the region as a whole, for sectors of the economy and also for modernized and newly located enterprises is made difficult by the absence in the forecasts of sectorial institutes of ministries and departments of the necessary range of reference indicators for the territory as a whole, making it possible to calculate derivative indicators of efficiency.

No unified approach exists to the studied problem even in publications dealing with problems of distribution of productive forces and of the economy for regions of the USSR. The analysis of many works has made it possible, albeit with a certain amount of conditionality, to single out the following two principal directions: (1) denial of general regional efficiency together with an acknowledgment of particular categories of effective development of sectors of the economy in the regions; (2) combination of generalizing indicators pertaining to the sphere of material production of the regions with local indicators for sectors; the approach to the determination of efficiency which takes into account sectorial and regional interests on the basis of a system of interacting economic models is of serious value. Naturally, the second direction may be considered as the only correct one, but in instances of its use the following defects are encountered when recommending these or those indicators: they do not encompass the whole system of taxonomic and economic ties and all basic elements of production (direct) and related expenditures; in a number of cases they are not oriented toward the real possibilities to be found in territorial statistic and forecasting projections. They are not always based on experimental verification and they frequently do not follow the aim of combining sectorial and territorial planning. In some forms of preplan work (in rayon plan compilations, resettlement plans and general plans of cities), little attention is paid to problems of evaluation of production efficiency and urban-development solutions.

All this requires the development of unified approaches to the determination of efficiency of public production in territorial preplan work. The situation is made more difficult because the presently used system of indicators

of efficiency of public production included in the Methodical Instructions of Gosplan SSSR for the Development of State Plans of Development of the National Economy of the USSR (1975) do not provided for its use in assessment of the efficiency of material production of the economic region (kray, oblast, ASSR) and other regions in preplan work. On the other hand, the use for this end of all indicators without exception of the methodical instructions is made difficult by the collection and processing of excessively large information, which at the present time is not fully taken into account by statistical organs and is not determined over the long range in regional researches because of objective difficulties.

The formulations contributed below in the form of a proposal for the development of a unified approach to the determination of the efficiency of public production in territorial preplan studies are based on the achievements of contemporary Soviet theory and practice,[2] the use (with consideration of necessary correctives) of indicators of the Methodical Instructions of Gosplan SSSR and close connection to indicators of the plan and territorial statistics. These proposals are verified by means of experimental calculations in the process of working out different forms of territorial forecasts for the Central Economic Region of the USSR.

A criterion of national-economic efficiency is the ability to secure the maximum possible growth of national income with minimal expenditures of living and embodied labor. On the basis of these requirements, the criterion of efficiency of production of an economic region of any rank must aim at its maximum contribution to the national income of the country (union republic) with planned (or predicted) reduction of expenditures of living and embodied labor and also improved material-physical structure of the production of the region aimed at increasing its all-union specialization and deepening of the complexity of the economy and raising the population's living standard and preserving (restoring) the ecological equilibrium of the environment. Such a formulation takes into account the "open" character of the region's economy, the main goals of its development and also the fact that the resource part depends on the relation of accumulation to consumption funds being formed for the country as a whole. Experimental calculations showed that the use of the following indicators of efficiency is practicable in territorial preplan studies for the evaluation of efficiency of material production and its sectors:

(1) living labor (labor productivity, economy of manpower and wage fund as the result of its growth);

(2) fixed capital as a whole and its active part[3] and as auxiliary indicators--capital-labor ratio, work shift coefficient, use of capacity, relation of the dynamics of growth of the cost of machinery and equipment to their productivity, required in the calculation of the output-capital ratio;

(3) capital investments (specific capital investment or capital intensiveness);

(4) materials intensiveness of production determined on the basis of territorial balances (in the form of sizes of use of the most important material expenditures in physical form, for example, rolled ferrous metals, fuel, electric power and so forth per million rubles of cost of products of industry and its sectors or correlation of their growth rates).[4]

These indicators make it possible to reliably assess forecast variants, to quickly disclose a less efficient variant and to devise a solution.

The use of regional generalizing indicators of efficiency in territorial preplan studies on the basis of national income is hindered by the fact that this category is calculated for the country and union republics taken in their entirety. In addition to this, the practice of planning and accounting of normative net production on the basis of the Methodical Recommendations of Gosplan SSSR (in this connection its volume was determined according to norms per product unit on the basis of wholesale price, excluding material expenditures taken into account in it) showed that this indicator on the level of enterprises, associations and sectors of industry reflects more correctly than gross production the results of production, eliminates the distorting effect of repeated counting of material expenditures and in a more real fashion helps to plan labor productivity, the output-capital ratio, wage and material-incentive funds. The gradual transition of industry and other sectors of material production to the system of planning according to the method of normative net production will make it possible to determine its planned and actual size for the territory of an economic region (kray, oblast, ASSR) as a whole.

Despite the absence of territorial intersectorial balances, the means exist for computing net production for oblasts, krays and ASSR's on the basis of statistical reports, but in this connection a part of the produced turnover tax of a given region for products sold outside its borders will have to be ignored or determined through computation, which would be quite difficult.

For territorial preplan studies there is the possibility of utilization of generalizing indicators of efficiency of material production on the basis of produced net production. At the same time, the present-day orientation toward end national-economic results "does not mean that gross (commodity) production will never be used in national-economic planning or in the economic mechanism. It can be used as a generalizing indicator of growth of production volume on the scale of industry of the country, union republic or economic region for the determination of correlations of growth rates of means of production to objects of consumption and for other national-economic purposes."[5]

Various points of view exist on the use of national income (net product) as a generalizing indicator in territorial preplan studies. Thus, Academician V. Nemchinov, A. Vedishchev, A Probst, Ye. Silayev, L. Telepko and other scientists have observed that it is a basic indicator of efficiency. R. Shniper considers it practicable to use this indicator in analysis of interregional efficiency. V. Kistanov, acknowledging the importance of the indicator of national income (net product), has called it supplementary in relation to the indicator on the basis of the aggregate social product.

It also appears to us that the indicator of net product for interregional comparisons is of limited usefulness because of differences in industrial structures. It would be more advantageous to use it in determining the share of individual economic regions and zones in the production of net product for the country or a union republic. This indicator considered dynamically illustrates the contribution of the region to the country's national income. Regions are distinguished by uniqueness in the structure of material production; consequently the comparability of any generalizing indicators of efficiency is most relative. For example, the share of the Central Region in the production of net product of the RSFSR is approximately double that of the Northwestern Region. But at the same time this does not mean that the former region is more efficient than the second. Such a statement would not be right either theoretically or practically.

For general interregional comparisons of efficiency, indicators of labor productivity (output of net product of material production and its sectors by one worker) and growth of net product per ruble of capital investment (output-capital ratio). For sectorial interregional comparisons, it is advantageous to use indicators of labor productivity and output-capital ratio on the basis of net production, capital-labor ratio and profitability for the most important types of products.

Practice has shown that the most effective method of using the adduced expenditures for the comparison of separate products of regions is their comparison with closing outlays. Indicators of the adduced expenditures make it possible to measure together simultaneously current outlays on the production of the most important products in different regions, which is of importance to the solution of problems of rational distribution of production. This method is being successfully used in regional researches. But any assessments--be they intraregional or interregional--require some kind of criterion; one such could be the use of all-union average sectorial and even the best indicators according to economic regions. Such a method permits one to determine deviations of regional indicators from those that serve as criteria and on the basis of subsequent analysis to establish the reasons for their deviations. The nature of such an approach may be illustrated in the form of the following inequality:

$$З_{п}^{ip} \leqslant З_{п}^{ic} \rightarrow З_{п}^{iл}, \qquad (1)$$

where $З_{п}^{ip}$ stands for presented expenditures per product unit of the region for which a forecast is being made; $З_{п}^{ic}$ stands for an average sectorial indicator; $З_{п}^{iл}$ stands for the best indicator of the economic regions. Here it is necessary to take into account the complexity of developing criterional indicators for the long term. The most accessible method for this is extrapolation.

On the basis of the indicator of net production, it is practicable to determine the chief generalizing regional indicator of labor productivity:

$$П_т = \frac{ЧП}{Т_м}, \quad (2)$$

where $П_т$ stands for labor productivity in the sphere of material production; $ЧП$ stands for the cost of net production of material production; $Т_м$ stands for the number of workers. In this case, the use of the indicator of net production makes it possible to reflect more precisely the contribution of the region to the growth of productivity of collectivized labor. For calculating regional indicators of efficiency of capital investment, the following formula may be used:

$$К_{от} = \frac{ЧП'}{К_м + К_с}, \quad (3)$$

where $К_{от}$ is the yield on capital in the sphere of material production; $К_м$ and $К_с$ stands for capital investment (direct and related); $ЧП'$ stands for growth of net production. Calculations show that the indicator has a tendency to reduction (by 12-15 percent over 10-15 years) because of the growth of capital intensiveness stemming from changes in the structure of the economy, one-time expenditures on the introduction of new equipment, technology and so on. Thus, for example, wholesale prices for individual types of new equipment in the textile industry grew by a factor of 1.5-3.0, while labor productivity grew only 15-50 percent.

The number of persons employed in material production is reflected in the labor balance, while capital investment is computed with the direct count method. For separate sectors of industry and the national economy not included in sectorial studies for the perspective period, it is possible to determine them with the help of approximate calculations. For some sectors, especially in the nonproduction sphere, the absolute size of capital investment can be determined through a forecasting of the dynamics of their relative share in the total structure of capital expenditures. When calculating effectiveness of capital investment according to the indicator of growth of net production per unit of capital expenditures, it is important to take into account both direct investment in material production and simultaneous expenditures in the nonproduction sphere. But it would not be right to relate all capital expenditures of the nonproduction sphere to interrelated expenditures for the region. Capital expenditures for higher and secondary specialized education for science and scientific services are of all-union importance. It is therefore more logical to include capital investment in regional calculations in housing, social-cultural and municipal construction, the share of which in total capital investment aimed at the development of the economy of the Central Economic Region reaches 26-27 percent.

The tendency to lowering of the indicator of yield on capital (roughly 15 percent over 10-15 years because of the mounting growth of the cost of fixed production capital compared to the growth of equipment productivity and also

because of the rapid increase in the cost of the passive part of fixed capital and insufficiently full use of their active part) makes feasible the use of supplementary indicators to explain the dynamics of the indicator of yield on capital. As supplements to the regular indicator of yield on capital, the following auxiliary indicators are proposed in a regional context: (1) the relation of net production to the cost of the active part of fixed production capital; (2) the correlation between growth of cost of equipment and its productivity; (3) indicators of use of fixed capital (use of capacity, machine shift coefficient and so on).

It is interesting to note that the use of indicators (of cost of gross and net product) for an evaluation of the comparative efficiency of production of a region affects primarily the absolute results of the computations, but has an insignificant effect correlations of variants. Our calculations showed that the following are important conditions for the carrying out of such calculations: (1) use of a single method of evaluating efficiency for the sphere of material production of the region as a whole, its most important sectors and territorial units; (2) a comprehensive approach to the assessment of efficiency, presupposing calculations on the basis of indicators of use of living and embodied labor, capital investment (with account being taken of related expenditures) and material outlays. Such an approach makes it possible to detect a less efficient part for the purpose of revising the forecast variant; (3) as generalizing indicators of efficiency of material production of a region it would be reliable to use not one but several indicators characterizing fuller utilization of expenditures of living and embodied labor. Consequently in adding to the general indicators, as proposed above (see formulas 2 and 3), it would be possible to use for determination of the dynamics of efficiency of material production of regions an indicator of efficiency of use of fixed and working capital determined on the basis of the following formula:

$$Э_{\Phi} = \frac{ЧП}{\Phi_{ос} + \Phi_{об} + \Phi_{э} + \Phi_{н}} \qquad (4)$$

where $ЧП$ stands for the cost of net production; $\Phi_{ос}$ and $\Phi_{об}$ stands for the cost of production fixed and working capital; $\Phi_{э}$ stands for the cost of production capital used in the restoration and maintenance of the ecological equilibrium of the environment; $\Phi_{н}$ stands for the cost of nonproduction fixed capital (facilities of the social-everyday infrastructure). Since determination of the indicator of working capital for regions over the long term is burdensome, it is proposed to use as an alternative the indicator of efficiency of fixed production capital:

$$Э_{о.п.} = \frac{ЧП}{\Phi_{ос} + \Phi_{э.ос} + \Phi_{н}}^{6}. \qquad (5)$$

In the procedure of Gosplan SSSR, it is recommended to define the indicator of material expenditures as the ratio of their sum (without amortization deductions) to the volume of social product, gross and commodity production (work). But in territorial preplan studies this indicator is not determined because of the absence of reporting and long-term intersectorial balances within the context of krays, oblasts and ASSR's. The computations we made showed that in preplan territorial studies it is advantageous to calculate indicators characterizing the social needs of the economy and the population of the region and also the possibility of their satisfaction from local production. Taken in the dynamics for the most important types of products, they characterize changes in the comprehensiveness of development of a region's economy. These indicators may be calculated on the basis of long-term material balances, at the basis of which there are scientifically based norms of production and individual use. Among such indicators, it is practicable to determine the use of the most important forms of material resources (rolled metal, fuel, electric power) expressed in physical terms per million rubles of the gross production of the industry of a union republic, economic region and other regions as a whole and its chief sectors. Of course, the indicator of materials intensiveness expressed in monetary terms would be more effective, but it would be unrealistic to count upon the development of an intersectorial balance in a regional context in the immediate years ahead.

Such calculations are pertinent for the development of economic regions of the European part of the country, since the conception of their development over an extended perspective stems from the need to hold back the rates of growth of power- and fuel-intensive and metal-intensive production operations, especially those of them whose products are used primarily far from their borders. Another approach to this problem is unacceptable because it would be in opposition to the economic specialization of the given region and would bring about the growth of material expenditures as the result of increased transportation costs.

The indicated indicators of materials intensiveness may be used for the assessment of variant solutions in the process of long-range forecasting of regions.

Despite certain defects in the method of adduced expenditures, its use in territorial preplan studies is most helpful for the comparison and evaluation of efficiency of production of basic types of products, variants of distribution of production and resettlement, selection of types of raw materials, fuel and transport. The method of adduced expenditures helps to select the optimal variant of a concrete solution, which has a positive effect on the overall effectiveness of the forecast solutions. Consequently its use in the development of long-range territorial forecasts of any form not only does not contradict proposals for the creation of a unified system of evaluation of the efficiency of public production but also presupposes its use in the indicated system.[7] Calculations of adduced expenditures may be successfully used in regional schemes, in rayon planning and in general plans of cities and other types of planning studies.

The practice of territorial preplan work shows that the effectiveness method of adduced expenditures is diminished because of incomplete accounting of related expenditures for the development of related production operations and of the production and social-everyday infrastructure, for compensation of the damaged caused by allocation and construction, for example, the taking of valuable lands for nonagricultural purposes, their flooding and underflooding [podtopleniye],[8] for measures for restoring the environment, for shifting and securing of workers and their families and so forth). Such cases are frequently encountered in the solution of problems of location of enterprises and their modernization.

Analysis of contemporary practice and procedures of validating the effectiveness of locating and modernizing enterprises in territorial forecasts and sectorial technical-economic validations (technical-economic reports) showed the nonidenticalness of the solution of this problem. But planning organs attach important significance to a comprehensive approach to validation of location and modernization of large enterprises in preplan work of all kinds, considering it as a significant factor in boosting efficiency of public production.

In sectorial and regional schemes, projects and schemes of rayon planning and other studies, proposals for the location of large new construction projects and the modernization of existing enterprises are not always properly validated. It is necessary for ministries and departments when compiling long-range schemes of development of sectors to establish a number of indicators characterizing the effectiveness of location and modernization of enterprises. Our calculations have shown the feasibility of using the method of grouping of indicators of enterprises being modernized according to size of growth of capacity (production) expressed in monetary terms per unit of capital investment and subsequent computation according to the formula:

$$\Theta_p = \frac{M^2 - M^1}{K}, \qquad (6)$$

where Θp denotes effectiveness of modernization; M^2 and M' stand for the capacity of the enterprises following and prior to modernization; and K is the size of capital investment. The obtained indicators may be compared with similar data of newly constructed enterprises. This method, which has been used in calculations for 122 machine-building enterprises (for 78 percent of the enterprises this indicator was 1-5 or more rubles per ruble of capital investment and for 22 percent it was below one ruble), permits the use of data of preliminary sectorial forecasts and listings of enterprises.

For more detailed calculations there may be used another method of determining the indicator of effectiveness of modernization:

$$\Theta'_p = \frac{П^1(Ч^1)}{Ф^1_{ос} + Ф^1_{об} + Ф^1_{н}}, \qquad (7)$$

where $\Pi'(Y')$ stands for growth of profits (of net production); ϕ'_{oc} and $\phi'_{o\delta}$ stand for the cost of fixed and working production capital; $\phi'_{н}$ stands for growth of cost of nonproduction capital (housing, cultural-everyday and municipal construction). In addition to this it would appear necessary to determine the indicator of efficiency of use of living labor and capital investment.

Effectiveness of concentration of production and settlement in regions is determined extremely rarely in preplan territorial studies. At the same time, group location of enterprises creating conditions for the combining and cooperation of basic auxiliary and technical servicing production facilities and also objects of the production infrastructure is most effective. The combining of metallurgical and nitrogen plants makes it possible to lower specific capital investment by 10-15 percent, of petrochemical production facilities by 25-35 percent and production cost by 10-15 and more percent in comparison to separate enterprises. Group distribution of enterprises makes it possible to create common networks and structures for transport and water supply. At the same time, there is attained the reduction of estimated cost of construction by 3-10 percent, operational expenditures by 10-15 percent and need in the territory by 10-15 percent, length of railroad routes by 18-20 percent and engineering systems by 10-15 percent.

Such calculations are no less important in studies on the distribution of installations of the agroindustrial complex and the development of a system of rural settlement. Thus, enlargement of villages in the course of restructuring the system of rural settlement frequently contributes to the reduction of specific capital investment by 10-15 percent and operational expenditures by 10 percent. Concentration of production, auxiliary and technical servicing facilities of the agroindustrial complex in production zones of rural settlements makes it possible to reduce one-time expenditures by 16 percent and operational expenditures by 6-8 percent compared to dispersed construction.

Despite adverse social and economic consequences from the development of large cities, the opinion is frequently stated of the high effectiveness of the industry of these cities, which directly or indirectly justifies the desire of of ministries and branches to locate in them new enterprises or to significantly expand those already in operation. In a number of instances, the efficiency of industrial production in large and medium-size cities is determined as proof of this on the basis of a comparison of indicators of output per worker and yield on capital (for gross production) for separate enterprises or sectors. At the same time, a comprehensive systems national-economic approach is absent and social-economic consequences of the development of large cities and direct and related one-time expenditures are not taken into account. There is the absence in such calculations of the elementary requirements of comparability needed for the determination of efficiency (consideration of the special features of sectorial structure, specialization and sizes of enterprises and identicality in the selection of analog enterprises). The calculations performed as a whole for industry of the Central Region and for 5 of its large sectors and 42 enterprises (with their differentiation according to number of personnel, level of specialization and

the like) made it possible to draw certain conclusions. In the determination of the comparative efficiency of industry in cities of different size, there should be fully taken into account capital investment in construction of analog enterprises (with account being taken of related expenditure extra-area systems and building of transport, water supply, sewerage, electric and heat supply and also expenditures for municipal services in proportion to the number of workers). One-time expenditures on extra-area systems and the building of industrial enterprises in large cities of the Central Region are 10-15 percent higher and expenditures on municipal services are 15-20 percent higher than in small and medium-size cities (computed per capita of the population). The average cost of engineering preparation and equipment of the territory and provision of services and utilities reached 150,000-200,000 rubles in the largest cities and 120,000-140,000 rubles in large cities[9] and 60,000-80,000 rubles per hectare in medium-size and small cities. As a result, total capital expenditures on the construction of analog enterprises in large cities turn out to be approximately 15-18 percent higher than in small and medium-size cities. The calculations failed to confirm a direct dependence of indicators of labor productivity, yield on capital and profits for industry as a whole and its main sectors and analog enterprise on city size. In this connection there should be taken into account that comparisons of the efficiency of all industry and its sectors for cities of different size is of a most conditional character because of structural differences.

In the solution of the problem under consideration, it is necessary to take into account also the fact that certain advantages of concentration of industry, science and culture in large cities cannot compensate for the adverse ecological and social consequences of their excessive development. As effective measures of regulating the size of the population of large cities, increasing importance is being given to prohibition of modernization and expansion of existing enterprises, which would require growth of industrial-production personnel, preferential development of the service sphere owing to the release of portion of workers from material production, location of enterprises and facilities for serving the population and providing municipal services in the suburban zone with account being taken of permissible radii of accessibility, the withdrawal and moving of enterprises that are not suitable or harmful in a sanitary sense and so forth.

The assessment of solutions in the distribution of productive forces must stem not only from the criterion of a quantiative effect but also from the necessity of creating most favorable conditions for labor, everyday life and recreation of the population. The development of an effective unified system of indicators of assessment of the efficiency of public production in territorial preplan work is possible if it is based on a comparable system of reporting indicators systematically worked out by statistical organs. The development of unified approaches to the evaluation of the efficiency of public production in sectorial and territorial preplan work of all kinds is an important means of validating plans of economic and social development.

FOOTNOTES

1. Territorial preplan studies comprehend composite elements of the unified national-economic complex of the country, union republics, economic regions, krays, ASSR's, oblasts, industrial rayons, a variety of which are the newly developed territorial production complexes, industrial centers, urban settlements and agglomerations. This type of preplan studies, in addition to schemes of development and distribution of the productive forces of the country, union republic and economic regions of varying rank, includes schemes (plans) of rayon planning, general plans of urban and rural settlements, long-term forecasts of development of large cities and agglomerations, sectorial investigations, planning forecasts (technical-economic validations, technical-economic reports and the like) connected with the disposition of economic sectors and resettlement on the territory of the country.

2. We have in mind the works of academicians A. Aganbegyan, L. Kantorovich, V. Nemchinov, N. Nekrasov, N. Fedorenko, T. Khachaturov; A. Granberg, G. Granik, V. Ivanchenko, V. Kistanov, L. Kozlov, V. Krasovskiy, V. Mozhin, V. Novozhilov, S. Shatalin and other scientists, the works of the Economics Institute of the USSR Academy of Sciences [AS USSR], the Central Economico-Mathematics Institute AS USSR, Scientific-Research Economics Institute attached to Gosplan SSSR, Council for the Study of Productive Forces attached to Gosplan SSSR, Economics Institute and OPP [expansion uncertain] of the Siberian Department AS USSR, Central Economics Scientific-Research Institute under Gosplan RSFSR, and publications on problems of efficiency in location of productive forces and the economy of regions of the USSR for the period 1965-1979, Standard Procedure of Determining the Economic Effectiveness of Capital Investment (Moscow, 1969) and a number of sectorial methods of determining the economic effectiveness of capital investment.

3. For the purpose of determining the results of intensification of production on the basis of growth of its technical equipment.

4. Indicators of materials intensiveness expressed in monetary terms are not determined due to the absence of regional intersectorial balances.

5. See "Plan Indicators and Criteria of Evaluation" (EKONOMICHESKAYA GAZETA, No 35, 1979, p 5).

6. Formulas 4 and 5 may be most effectively used for intraregional calculations, inasmuch as in such a case structural differences are excluded that would sharply distort results, something which is to be found in interregional comparisons.

7. In this connection, as Academician T. Khachaturov pointed out, "adduced expenditures were proposed for a comparison of variants in planning and projection, and no consideration was given to their use in the determination of the full magnitude of the effect; the fact is that the norm of effectiveness is not the mean but its lower permissible limit" (PLANOVOYE KHOZYAYSTVO, No 6, 1974, p 19).

8. Investigation of the practice of setting aside agricultural land and of the system of computing compensations for the damage done showed serious shortcomings in this field: land was set aside without adequate validation of reasons; the amounts of compensations cover 10 to 50 percent of real aggregate expenditures on restoration of the land and its fertility and do not compensate for the gains lost; the compensating amounts are frequently used for other purposes and do not provide for the restoration of land of farms or rayons where the withdrawal was made; as a result, the responsibility of the landholders is lost both in regard to its withdrawal and in regard to its restoration on the principle of "a hectare for a hectare"; any sizes of compensations do not hinder withdrawals since they are planned in the estimated cost of new constructions and comprise only a small part of the latter.

9. In industry expenditures per hectare of industrial territories comprise 51,000-56,000 rubles for enterprises of the petrochemical industry, 107,000 rubles for basic chemistry and ferrous metallurgy, 25,000-41,000 rubles for machine building and metalworking, 48,000 rubles for food industry and 66,000 rubles for light industry.

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TERRITORIAL PRODUCTION COMPLEX MANAGEMENT

Moscow VOPROSY EKONOMIKI in Russian No 8, Aug 79 pp 154-156

/Article by Ye. Lomanov: "The Management of Territorial Production Complexes"/

/Text/ The annual theoretical science seminar on management problems was held in February 1979 in Tarusa. This year the problems of managing territorial production complexes were submitted for discussion. The seminar organizers were the Center for Problems of the Management of Social Production of the Economics Department of Moscow State University imeni M. V. Lomonosov, the Scientific Council for the Problem "The Organization and Economics of Scientific and Technical Research and Development" of the State Committee for Science and Technology, the Scientific Council "Socio-Economic and Ideological Problems of the Scientific and Technical Revolution" of the USSR Academy of Sciences and the Moscow Institute of the National Economy imeni G. V. Plekhanov.

Representatives of ministries and departments, scientific research and sectorial institutes, VUZ's of Moscow, Leningrad, Riga, Kiev, Kishinev, Krasnoyarsk, Novosibirsk, Gor'kiy and other cities and enterprise executives took part in the work of the seminar.

In opening the seminar, Doctor of Economic Sciences G. Popov (Moscow State University) emphasized that the rapid development of the scientific and technical revolution and the complication of intersectorial ties had been responsible for the need for the comprehensive study and solution of the questions pertaining to this area. With the increase of the scale of social production and the number of sectors the processes of specialization and the social division of labor, as well as the integrational trends are intensified. All this requires the planned coordination of all economic contacts. Therefore, the importance of the coordination of the activity of sectorial and territorial organs, the coordination of the plans of development of individual sectors and the comprehensive solution of economic and social problems is increasing more and more. One of the forms of the comprehensive solution of the intersectorial questions of management, which are connected with the economic utilization of specific territories, is the territorial production

complexes (TPK's), the formation of which has received new stimulation in recent years.

The reports and communications at the seminar on the nature of the broached problems can be conditionally divided into three groups: the general theoretical problems of the management of TPK's, the functional and organizational problems of the management of TPK's, the management of TPK's by components of production.

In his report Academician A. Aganbegyan stressed that TPK's are determining to a greater and greater extent the face of the individual regions of the country; the social infrastructure is also being developed intensively. The gained experience of the formation and functioning of TPK's makes it possible to refine a number of theoretical and methodological theses. First of all when solving the question of the expedience of developing one TPK or another it is necessary to proceed from its contribution to the increase of the efficiency of all social production, to correctly determining the leading sectors of the TPK and their agglomeration on the territory and to combine their technological process into the "spacecraft" system when using natural resources. The questions of the planning of TPK's within the national economic plan and the formation of management bodies of TPK's are also important methodological problems. The creation within USSR Gosplan of a body for the planning and coordination of the development of TPK's would be one of the forms of the solution of this problem; in the regions its functions could be performed in part by territorial scientific research institutes for the complete utilization of the resources of the region.

Developing several tenets of the report of A. Aganbegyan, Doctor of Economic Sciences G. Dzhavadov (Moscow State University) noted that when forming and organizing the management of TPK's it is necessary to take into account the favorable experience of the program-goal management of intersectorial scientific and technical programs, the mechanism of whose drafting and their inclusion in the national economic plan have more or less been worked out. It would be advisable when forming TPK's to organize special-purpose financing and material and technical supply, having transformed the TPK's into objects of planning.

In the opinion of Doctors of Economic Sciences L. Davydov and A. Sysoyev (Moscow State University), on the methodological level the question of the classification of TPK's is especially important; they propose to classify them by using a matrix system.

At present territorial production complexes and industrial centers with a common production infrastructure, complexes of the "producer-consumer" type and territorial sectorial complexes (the Volga Motor Vehicle Plant and the Kama Motor Vehicle Plant) are operating in the national economy. The diversity of the complexes is a reflection of the diversity of the organizational forms of the objects of management, the result of the process of the division of labor and cooperation in social production. As was noted in the report of Doctors of Economic Sciences N. Kalinin, I. Bautin and Ya.

Peterson (Moscow State University), for the present there is no unanimous point of view on a number of questions: the place of TPK's in the system of the territorial division of labor; the definition of TPK's; the composition and interrelations of the components of the complex; the types of TPK's and their classification; the factors influencing the formation of TPK's; the mechanism of the management of TPK's. The authors made a number of proposals on these problems, devoting particular attention to the improvement of the management of TPK's. On a territory questions arise, the solution of which requires consistency in the activity of the organs of sectorial, territorial and intersectorial management, the establishment of the best territorial production ties, the improvement of the intersectorial proportions of the development of production. All these factors in interrelation with the integrational processes of the planned formation of a stable structure of production on the scale of the entire country and the individual economic regions cause the need for the development of the organization structure of the management of TPK's of an economic region.

G. Ruban (Kishinev) told about the development of the organizational structure of the management of TPK's of an economic region using the example of the Moldavian SSR, T. Belyakov (Krasnoyarsk) told about the experience of organizing and managing the territorial production complex in Krasnoyarskiy Kray.

Kh. Luyk (Estonian SSR Ministry of Forestry and the Conservation of Natural Resources) characterized the experience of organizing the management of the use of nature in the Shale Basin (Estonian SSR). The statement of Candidate of Economic Sciences R. Papayan (Moscow State University) was devoted to the problems of organizing TPK's in Siberia and the Far East. In spite of the considerable initial outlays on the production and social infrastructures and the expenditures on the transportation of products, the production efficiency of the TPK's of Siberia and the Far East for a large number of indicators is higher than in the European part of the USSR. Here the transportation costs are being reduced to the extent that the completeness of production within the TPK's is being ensured. At the same time the existing practice of organizing TPK's does not ensure the adequate consolidation of forces for the designing, construction and placement into operation of major projects, the components of TPK's are not being planned comprehensively, but by sectors. At the design stage miscalculations are occurring with respect to the interrelated types of production, in the construction process the untimely delivery of materials and equipment and the need for personnel are threatening the timely placement into operation of the planned facilities. The production and social infrastructures are especially suffering. The speaker proposed one of the possible plans of the organization of the construction of TPK's.

The formation of the mechanism for managing TPK's requires the solution of the complicated questions of providing management personnel. Personnel problems should be strictly linked with the main goals and tasks of TPK's and their role in the national economic complex. Since program-goal structures are considered the most acceptable organizational form of the management of

TPK's, in the opinion of Candidate of Economic Sciences A. Panov (Higher Party School, Gor'kiy), it is legitimate to raise the question of the program-goal approach to the training and use of managerial personnel of regional and sectorial programs. The development of a mechanism of the cooperation of the executives of the enterprises and subdivisions belonging to TPK's is also of great importance. They can be advisory groups like the council of directors, committees or working groups for individual questions and so forth. It is important for these organs to have a legal and organizational makeup and to be a part of the official plan of the management of the TPK's.

A number of reports at the seminar were devoted to questions of the formation and operation of TPK's, the forms and methods of control as applied to them. At present the formation and operation of TPK's are backed by a uniform legal base. The problems of developing the legal concept of the TPK as a unified subject of legal regulation, which reflects its economic nature and role in social production, in the opinion of N. Barabasheva (Moscow State University), require the close cooperation of economic and legal sciences and the clear definition of the goals and nature of the TPK. In speaking about the types and kinds of control as applied to TPK's, Candidate of Legal Sciences V. Igitov (USSR Ministry of Higher and Secondary Specialized Education) noted that it is necessary to clearly delimit the functions of the organs of control, which operate under the conditions of TPK's, to make more precise their interrelations with other organs of control both horizontally and vertically.

A number of reports were devoted to the foreign experience of managing regional programs.

Summarizing the seminar, G. Popov noted that the entire group of production complexes, being a dynamic unity, is constantly being developed, improved and manifested in new forms. The solution of the problems facing the socialist economy during the period of developed socialism presumes the emergence of new modifications of the complex systems. At present the intensive development of a new complex--the management complex--is taking place in the system of the unified national economic complex. Therefore, the solution of the problems of managing TPK's is an important task facing economic science, and the held seminar is one of the forms of its solution.

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REARRANGEMENT OF SOVIET ECONOMIC MECHANISM

Paris CENTRE D'ETUDES PROSPECTIVES ET D'INFORMATIONS INTERNATIONALES (CEPII) in French Sep 1979

[Text] Brezhnev said to the 25th Party Congress: "The Central Committee is against hasty and precipitate reshufflings of the leadership structure and of established methods of administration. One must consider and then reconsider before speaking. But if we are already certain of our fact, if we have already understood that the constantly expanding economy is now too restricted within the framework of the existing economic mechanism, then we must resolutely improve it."[1]

Apparently the party is now certain of its fact. After a public discussion, though quite insignificant, some options were determined. First, by the party, itself, "in a recent decision of the Central Committee concerning the future improvement of the economic mechanism and the duties of the party and state organs"[2]. Then, jointly, by the Central Committee of the party and the USSR Council of Ministers in a decree entitled,"Improved Planning and Stronger Action on the Part of the Economic Mechanism With Respect to Attaining Greater Production Capability and Quality of Work."

In the present state of the documentation the latter decree was made known to us thanks to:

- a commentary of about 4,000 words in PRAVDA, 29/07/79.

- the publication of the text, itself, three times longer, in No 32 of the newspaper, EKONOMICESKAJA GAZETA[3]. The decree appears as a series of 63 articles (the longest being sections in paragraphs) grouped under three main chapter headings: the first, devoted to improved planning; the second, to the more specific matter of investment operations; the third, to economic incentives for producers.

The following pages contain the text of the decree--rendered as faithfully as possible with regard to structure and contents[4].

Improved Planning

The planners are asked chiefly to think immediately in terms of aims (to resolve a socio-economic matter of national interest) rather than to confine themselves to the means (to stimulate the production of a sector). The plan must be able to set forth priorities--sectorial or territorial--in order to improve economic structures. Another aspect of the same concern regarding the "attainment of aims," is that everything must be done to improve the yield from productive resources, to avoid their waste (art. 1).

Statement of Plans

The overall system of the plans includes "technological development programs" over a period of 20 years, made by the Academy of Sciences, the GKNT, and the GOSSTROJ of the USSR[5]; projects that are mainly oriented toward economic and social development," with the GOSPLAN of the USSR as chief architect; five-year and annual plans.

Doubtless in order to avoid the statement of these plans from appearing merely arithmetical, strict time limits for their transmission to the organizations concerned are indicated. Thus, the GOSPLAN must calculate a five-year draft plan one year in advance; submitted by their administrative ministry to the groups[6] and enterprises, these figures will help them to elaborate their own five-year draft plans, which then go to the GOSPLAN. Finally, the latter must give the Council of Ministers a coherent five-year draft plan five months in advance (art. 2).

The time limits accorded the GOSPLAN seem all the more tight since it is necessary to detail the five-year plan by years: real and financial statement of affairs, reserve resources. Detailed salary and incentive standards thus must always be established on the basis of an actual prospective effort (art. 3). In addition, prior to the start of a five-year period, the GOSPLAN must define programs having technological, social, economic, or territorial aims: for example, the parcelling of the BAM zone, the reduction of manual labor, the economizing of fuel and metal (art. 6).

Finally, the annual plans are based on the aims and the standards of the five-year plans, but with the more specific dimension that their actuality confers on them. They are elaborated on the initiative of groups and of enterprises, which in particular include the range of their

production according to the contracts made with their clients. The overall administrative senior organizations at that point formulate yearly plans, by branch and republic, the aims of which cannot be inferior to those of the "annual portion" of the five-year plan. And everything must be completed in such a way that the Council of Ministers of the USSR will be informed by the GOSPLAN of the annual draft plan four months in advance (art. 4). The technical quality of the annual plans, their compatibility with the actual means of the enterprises, their control at all levels are the object of special attention (art. 5).

The Indicators of the Plans

The following articles in the decree describe the system of the indicators and economic standards of the plans, that is, the kinds of aims the realization of which will make it possible to appraise to the utmost the results of the producers' activity. These indicators cover production, work and social development, financial questions, investment operations, technological innovation, and supplies.

The decree mentions 20 5-year indicators (detailed by year), which include in particular the rate of increased value, production in actual quantities, increase in work productivity, the salary rate of production in roubles, the maximum employment ceiling, profit, the putting into operation of production capabilities, the authorized ceiling of state investments, the technological innovations to be made, the main supplies needed (art. 7). In a general way, the choice of indicators that are kept is for the purpose of emphasing better use of resources and better quality products.

The annual indicators are necessarily the same type. Nevertheless, a distinction is made between those that characterize the activity of the ministries on the one hand and of the groups and enterprises on the other. In addition, at the latter level in particular, the indicators take on a more concrete and precise nature. Thus, among the production indicators appears the volume of sales, reflecting the manner in which the contracts for deliveries to clients are filled. (art. 8).

Taking into account the role of planning in actual terms, the GOSPLAN must bring into focus in 1979-1980 more refined instruments to measure the quality and useful characteristics of products, especially of equipment (the production of which up to has been evaluated in tons)(art. 9).

The Technological Dimension of Plans

Various measures are designed to emphasize the thematic side of the plans. Thus the latter will include chapters that summarize all of the

social-type objectives. (art. 12). But the technological dimension of the tasks to be resolved is stressed most of all. Along with their technological tasks, to extend over a period of 20 years, the GKNT, the GOSSTROJ, and the Academy of Sciences will present to the GOSPLAN programs that will make it possible to resolve, from the stage of basic research to that of production, major technological problems. The responsibility for these programs is entrusted to leadership administrations (art. 13). The technical standards that define the quality of equipment must be revised in 1979-1980 (art. 14). The materials for the equipment of enterprises must answer to the most exacting technological standards, a scrupulous control of the application of this principle to be made by the GOSSTROJ and the GKNT. The latter organization must also evaluate the technical level of the Soviet production of equipment in 1979-1980 (art. 15).

The Organization of Trade

Estimated balance sheets of resources and the use of products, all the more detailed as the aimed at perspective becomes closer (10 years, 5 years, 1 year), pave the way to the normal provisioning of the various users (art. 16)...The detailed range of the products to be traded and their time limits for delivery will be established by the suppliers and clients, with the participation of the State Committee for Material and Technical Supply (GOSSNAB). The latter is to be the chief architect of the implementation, in 1980, of a network of stable trade relations among the economic operators. Within this framework, the groups and the enterprises, the supply centers, the transport organizations, and the commercial establishments make five-year contracts. The ranges of anticipated products in these contracts are detailed annually (art. 17-18).

In order to assure a better supply of consumer goods, the USSR directorates general of the Ministry of Trade and the Industrial Unions[7] make five-year agreements aiming at improvement in consumer goods, by means of fluctuation of prices and commercial margins (with the consent of the State Committee for Prices). These agreements serve as a basis for the making of detailed annual contracts for delivery between groups and enterprises on the one hand and commercial establishments on the other (art. 21). Contractual relations likewise establish the reciprocal responsibilities of commercial wholesale and retail establishments (art. 22).

The Search for Balance

Articles 23 to 29 of the decree contain various provisions having as their common purpose a search for economic balance at all levels. The

availability of manpower first of all, with a view to assuring sufficient resources for all planning perspectives and in all regions (art. 23). In addition, emphasis is placed on financial and monetary balance; the GOSPLAN in particular each year must establish, with the help of the Ministry of Finance and of the GOSBANK, a register of management monetary receipts and expenditures (art. 24). Likewise, stress is placed on the necessity of harmonizing the sectorial aspects of plans with their territorial implications (art. 25), of strengthening the participation of regional authorities in the elaboration of the plans in cooperation with the federal authorities (art. 26-27). The latter in particular must deal with matters of parcelling the land, effecting a territorial division of balances by products, finding solutions for specific regional problems, establishing plans for the localization of branches (art. 28).

2 - The Matter of Investments

This part of the decree deals with measures that aim at increasing the yield from invested capital, accelerating the putting into operation of production capabilities, reducing the total amount of current bills for investment, and augmenting the participation of machines in the investment structure (art. 31). In order to improve the counstruction sector, stress is laid chiefly on the implementation of stable five-year plans, covered by the necessary resources for work, equipment, and materials (art. 32).

Investments are allocated to the directorates that are responsible for the various sectors of activity connected with the planned increase in production. Resources are appropriated to them for the creation of additional production capabilities, by creation or extension, only if the existing capabilities, once modernized and re-equipped, are still inadequate (art. 33).

An adapted system of indicators is to encourage the builders to favor the execution of their final obligations: the putting into operation of constructed capabilities. These indicators notably include the "sale value of construction," that is, the total amount for the work represented by the programs, ready for exploitation, and delivered by the builder to the one who is charge of the work (art. 35). This type of indicator, as well as the execution of the tasks concerning production and profit, serve as criteria to determine the bonuses for the personnel of the construction enterprises (art. 36). Beginning with 1981, the estimate of the "construction sale value" will serve also as a basis for settlements between the ones in charge of the work and the constructors. The latter will not receive further discounts for work in progress. They will be financed through bank loans; interest rates will increase in case of nonobservance of time limits. The progressive generalization of this system should lead

to the delivery of completed installations that are fully equipped, financed through the aid of loans from the STROJBANK (State Bank for Construction) (art. 37).

The decree also provides for a series of measures concerning the constitution of lists of investment programs, the establishment of estimates, the financing of construction enterprises, supplies for construction yards, salaries and bonuses for the building trade employees (art 38-44). From 1979 to 1981, the organization of this sector is to be modified, taking into account what industry has produced, with the "construction and assembly groups" as the basis (art. 45).

3 - Responsibility and Incentive

This concluding portion of the decree defines the measures intended to encourage producers to execute the plans. Basically, these measures provide for planning over a five-year period for groups and enterprises and a consequent continuing share in overall resources: this, taking into account the final results of their activity and of the obligation to assume a continuing growth in the matter of resources to be supplied to the state budget.

The final results that determine the economic incentives for producers above all are the carrying out of the plans for delivery, in accordance with the range and within the established time limits of the orders received; an increase in production; improvement in the quality of products and an increase in profit (art. 46).

The total amount for incentive funds will come from the application of continuing rates, beginning with the 11th plan. They will be differentiated yearly and modified according to the annual plans. For each group or enterprise, they will be part of the general incentive quota provided at the level of the ministry in charge of the branch. Producers of production and consumer goods of particularly high quality will be favored.

The incentive fund is divided into funds for bonuses, funds for socio-cultural and habitat accomplishments, and funds for development. Their allocation is determined by the directorate of the group and the labor union committee, with the active participation of the personnel. Each of the three funds is used strictly in accordance with its assignment. The sums that are not used by the end of the fiscal year are not returned to the budget.

The bonus fund is drawn from the profit and depends on the execution of production plans, the quality of production, and regard for the list of orders; funds for socio-cultural and habit accomplishments represent

30 to 50 percent of total incentive funds, according to local needs. The development fund is sustained from levies on profit, amortizations for renovations, and the proceeds from the sale of fixed capital that is fruitless to the group; it serves to self-finance investments for modernization, which are included in their totality in the investment plan of the ministry in charge and are covered as a priority by real resources (art. 47).

The Part of the Ministries and of the State

Article 30 of the decree aims to reinforce the responsibility of the ministerial apparatus with regard to the drawing up and the forwarding of plans. In addition, it threatens the officials with disciplinary and pecuniary sanctions in the event that they accept a revision downward of the plans of the groups and enterprises depending on them. The directors of the latter in that case would then be deprived of at least 50 percent of their bonuses.

Further, a new rule for the distribution of profit has been instituted, beginning with the 11th plan. As they become ready, the industrial ministries will be allocated, in accordance with a fixed rate for the five-year period, a portion of the profits that are intended for the overall development of their sector. Also, 50 percent of the profits realized over and above the plan will be at the disposal of the ministries.

Finally, the levies on the profits owed the state cannot be touched because of nonexecution of plans and will be guaranteed by decreasing the ministerial share.

Incentive for Technological Progress

A fund for technological development, set up at the level of each ministry, serves to finance research-development projects and also to balance the extra expenditures accompanying technological innovation at the initial stage of its application.

The various Soviet organizations for study and research-development will be made responsible for their own administration before 1980. Technological innovation will be the subject of contracts, with specified parameters for the products ordered. This system assumes that one will specify the various intervening services in the projects, their time limits, the necessary resources, and the final results expected, including those at the macro-economic level. As in the building trade, settlement will be made with the research-development organizations upon definitive receipt of their studies; and they will be financed with the help of bank

loans, with the commitment being met by abrogation through the present system of settlement through progressive payments. The research-development organizations will have funds for bonuses, development, and socio-cultural accomplishments (art. 51).

The system already in effect for incentives toward innovation through prices is being developed. Increases are added to the wholesale price of production goods bearing the trade union label of quality, whereas second class products are reduced.

Up to 70 percent of the additional profit from the increases for better quality is deposited in the bonus funds for the production and research-development establishments involved. Analogous modifications in the wholesale and retail prices encourage the offer of quality consumer goods (art. 52).

Salary Incentives

The introduction of a stable salary rate per product unit should lead to an increase in work productivity. The establishments that effect overall salary savings compared with this rate may distribute the excess among the workers who perform several jobs and, more generally, among the personnel who accomplish a given volume of work with fewer members. Increases in salaries for plurality of jobs and reductions in personnel can amount to 50 percent of the base salary for workers, 30 percent for foremen, 50 percent for builders and technicians (up to a limit of 1 percent of the remunerations of the establishment). The adoption, on the initiative of the personnel, of higher standards of work entitles them to exceptional bonuses; there could also be an increase, up to 20 percent, of the salary rates. Parallelly, social security contributions are increased (art. 53).

Teamwork

The grouping of personnel by teams is to become a routine form of work organization in industry and the building trade. Within the limit of available resources and of the various existing ratios, the team has the right to determine the total amount for salaries and bonuses,"taking into account the actual contribution of each person with respect to overall work"; to designate the candidates for salary increases; to recommend to the directorate and the trade union committee a change in job for a worker according to the quality of his work; to designate the prize winners of "the socialist emulation" award at the team level, etc. (art. 54).

Supplementary and Final Provisions

Incentives for better utilization of fixed capital, exploitation assets, land, water, and costly raw material complete the decree (art. 55). The decree mentions the importance of contracts between suppliers and clients and their reciprocal obligations (art. 56-57). While the system that it introduces directly concerns only industry and construction, the orderly regulation of other branches of activity, such as provision of material and technical supplies, especially transports, is judged necessary to its proper functioning (art. 56-60). The various Soviet directorates involved are called upon to take the regulatory measures needed to make it possible to implement the text (art. 62-63).

FOOTNOTES

1. PRAVDA, 25 February 1976.

2. Mentioned in SOVERSHENSTVOVANIYE KHOZYAYSTVENNOGO MEKHANIZMA EKONOMICHESKAYA GAZETA, No 33, August 1979. No text is available concerning this decision, which was also announced in PRAVDA, 28 July 1979.

3. No 33 of the same newspaper also contains a commentary on the text in the article cited in the preceding note.

4. Sections 1, 2, and 3 of the following analysis refer to the chapter headings of the decree; the numbers in parenthesis, its articles. In addition, the liberty has been taken to introduce certain sub-titles, not included in the original text, in order to more clearly present its organization.

5. GKNT: State Committee for Science and Technology.
GOSSTROY: State Committee for Construction.

6. The groups of enterprises (or "production unions") constitute the chief form of organization of the basic industrial operators, notably since the decisions of April 1973. Between them and the technical ministries, one finds the intermediary organization of the "Industrial Unions."

7. That is, two administrative organizations.

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END