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RECORD

of the meeting in the USSR of American and Soviet Coordinators and Experts of the Joint US-USSR Working Group for Cooperation in the Application of Computers to Management in Regard to Topic 5, "Computer-Aided Refinement of Decision-Making and Education of High-Level Executives."

In accordance with the Agreement between the Governments of the USA and the USSR on Scientific and Technical Cooperation of May 24, 1972, and the Report of the US-USSR Working Group in the Field of the Application of Computers to Management signed in Moscow on November 28, 1973, as well as in accordance with the Protocol of the meeting in the U.S. of Coordinators and Experts in regard to Topic 5, signed in December, 1974, a meeting of Coordinators and Experts on Topic 5 was held in the USSR from September 18 to October 1, 1975.

The itinerary of the American specialists in the Soviet Union included visits to institutions of higher education, academic and branch research institutes, institutions of training and refinement, computer centers, and industrial and commercial establishments. A fully-documented itinerary in the Soviet Union of the American delegation on Topic 5 is found in Attachment I of this protocol. A listing of those individuals who participated in the meetings and discussions held during the visit is found in Attachment II.

During the visits to these institutions and organizations American and Soviet experts exchanged opinions on the main aspects of Topic 5 and provided detailed answers to all questions of interest to the participants of the meetings. The coordinators of both sides prepared plans for American-Soviet scientific and technical cooperation for Topic 5. The descriptions of the proposed subtopics are in Attachment III. The descriptions of specific activities recommended

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for immediate implementation are contained in Attachment IV. It is recognized by the coordinators for both sides for Topic 5 that these proposed plans must receive the approval of the American and the Soviet Co-Chairmen of the US-USSR Joint Working Group on Application of Computers to Management.

Both sides have agreed that an important problem for the next phase of cooperation for Topic 5 is the elimination of the terminology barrier between the experts. This should be realized in the joint preparation of a Glossary on the Application of Computers to Economics and Management. The construction of this Glossary must be a part of the activities of each visit and workshop carried out under this agreement.

It is agreed by both sides that one form of cooperation is the exchange of lecturers for specific courses in all subtopics of Topic 5.

Both the American and Soviet sides have agreed that the activities in the framework of Topic 5 will be aimed at methodological and practical results.

Done in Moscow this 30th day of September 1975, in duplicate in the English and Russian languages, both equally authentic.

John F. Lubin
US Coordinator for Topic 5

On behalf of
N.N. Ivashchenko
USSR Coordinator for Topic 5
M.V. Solodkov
Dean, Economic Faculty of
Moscow State University

ATTACHMENT I

Itinerary of American specialists in the USSR from September 18 to October 1, 1975, on Topic 5, "Computer-Aided Refinement of Decision-Making and Education of High-Level Executives."

Thursday, 18 September	Arrival of the delegation at the Airport Sheremechevo..
Friday, 19 September	Meetings at the Ministry of Higher and Specialized Education of the USSR; the Rectorate of Moscow State University; and Economics Faculty of Moscow State University.
Saturday, 20 September	Meetings at Moscow Institute of Management named after Ordjonikidze, and Institute of National Economy named after Plekhanov.
Monday, 22 September	Meeting at Leningrad Institute of Finance and Economics.
Tuesday, 23 September	Meetings at Tallinn Polytechnic Institute, and the All-Union Council of Scientific and Technical Societies, Tallinn.
Wednesday, 24 September	Meetings at the Training and Refinement Institute of the Ministry of Light Industry, Estonia, Tallinn; and the Tallinn Excavator Plant.
Thursday, 25 September	Meeting at the Interindustry Institute of Training, Riga.
Friday, 26 September	Meeting at the Riga Polytechnic Institute, and visit to Riga Wholesale Trade Office of Central Union and Latvian Union of Cooperative Societies
Monday, 29 September	Meeting at the Institute of Management of the National Economy, and visit to the Zil Automobile Plant.
Tuesday, 30 September	Meetings at the USA Institute, and the Central Economics and Mathematics Institute, Moscow.

ATTACHMENT II

US participants in the September 18-October 1, 1975, meetings in the USSR of Coordinators and Experts on Topic 5

D. Don Aufenkamp
Head, Computer Applications in Research
National Science Foundation

US Chairman, US-USSR Joint Working Group on Scientific and Technical Cooperation in the Field of the Application of Computers to Management

John F. Lubin
Associate Dean and Professor of Management
The Wharton School
University of Pennsylvania

US Coordinator, Topic 5, US-USSR Joint Working Group on Scientific and Technical Cooperation in the Field of the Application of Computers to Management

John E. Austin
Lecturer on Business Administration
Graduate School of Business Administration
Harvard University

Egon Loebner
Counselor for Scientific and Technological Affairs
US Embassy

Soviet participants in the September 18-October 1, 1975, meetings in the USSR of Coordinators and Experts on Topic 5

Ministry of Higher and Secondary Specialized Education of the USSR
Moscow
N.S. Ygorov, Deputy Minister
N.N. Ivashchenko, Deputy Chief, Main Department of Higher Educational Institutions; USSR Coordinator, Topic 5, US-USSR Joint Working Group on Scientific and Technical Cooperation in the Field of the Application of Computers to Management
A.K. Kalinin, Chief, Main Department of Scientific Research, Ministry of Higher and Secondary Specialized Education of the RFSSR
V.V. Semin, Deputy Chief, Department of Personnel
A.M. Tsiganenko, Deputy Chief, Department of Instruction and Methodology

Rectorate of Moscow State University
Moscow
F.M. Volkov, Pro-Rector
M.M. Maslov, Pro-Rector
A.S. Pankratov, Deputy Pro-Rector
V. Solodkov, Dean, Economics Faculty
A.N. Tikhonov, Dean, Computer Faculty
A.N. Leontyev, Dean, Psychology Faculty

Economics Faculty, Moscow State University
Moscow
I.P. Faminsky, Deputy Dean
U.N. Speranskaya, Deputy Dean
E.Z. Maiminas, Professor
U.N. Bronnikov, Associate Professor
G.N. Zoteev, Associate Professor
V.M. Yfimov, Senior Lecturer
V.J. Marshev, Senior Research Fellow
A.N. Sobronin, Postgraduate
A.V. Fadeyev, Postgraduate

Ozdjonikidze Institute of Management
Moscow
M.A. Bishaev, Pro-Rector
V.S. Rumyantsev, Dean
G.A. Bryansky, Dean
V.J. Mamontov, Chief of Chair
I.V. Kuznetsov, Doctor of Economic Sciences
I.A. Ivanov, Associate Professor

Plekhanov Institute of National Economy
Moscow
I.G. Popov, Pro-Rector
B.I. Iskyakov, Chairman of Department
V.U. Ozira, Chairman of Department
A.V. Korchagin, Chairman of Department
G.A. Yeremeyev, Chairman of Department

Leningrad Finance and Economics Institute
Leningrad
U.A. Lavrikov, Rector
L.S. Tarasevich, Pro-Rector
I.M. Syroyezhin, Chairman, Department of Economic Cybernetics
I.V. Romanovsky, Professor
S.R. Gidrovich, Senior Lecturer
U.U. Kurolepin, Senior Research Fellow

Tallinn Polytechnic Institute
Tallinn
N. Tiismus, Pro-Rector
R. Uksvarav, Professor of Organization and Management
M. Habakuk, Associate Professor of Organization and Management
O.R. Lillenurm, Chief of Department

All-Union Council of Scientific and Technical Societies
Tallinn
L. Savelyev, Chairman of Laboratory of Estonian Institute of Information
L.I. Saulin, Chairman of Department of Labor, Estonian State Committee
U. Runkla, Chairman of Department
I. Partelnoeg, Chairman of Department

Training and Refinement Institute, Estonian Ministry of Light Industry, Estonia
Tallinn
J.O. Portnoi, Director of Center of Scientific Organization of Labor
H.I. Cala, Chairman of Teaching Department

Tallinn Excavator Plant
Tallinn
I. Andel, Director

Interindustry Institute of Training
Riga
A.I. Andricson, Director
A.K. Krastinsh, Deputy Director
N.T. Ivanov, Dean, Management Faculty
M. Frobtuk, Dean, Economics Faculty
I.V. Staaran, Dean, Engineering Faculty
V.P. Nikishin, Chairman of Department
G.A. Forshin, chairman of Department

Riga Polytechnic Institute
Riga
I.N. Ilyin, Pro-Rector
A.I. Strakov, Pro-Rector
U.A. Freimanis, Pro-Rector
A.N. Borisov, Chairman of Department
I.A. Stazdin, Chairman of Department
L.V. Nitsetsky, Chairman of Department
O.B. Lyusin, Chairman of Department
L.P. Leontyev, Chairman of Department
A.P. Spalvinsh, Chairman of Department
U.A. Briedis, Chairman of Department
V.L. Nazarov, Chief of Computer Center

Riga Wholesale Trade Office of Central Union and Latvian Union of Cooperative Societies
Riga
R.I. Denisov, Director
G. Grivinsh, Chief of Computerization Techniques and MIS Department, State Planning Committee, Latvian SSR

Institute of Management of National Economy
Moscow
V.G. Shorin, Rector
L.I. Strelnikov, Pro-Rector
A.P. Polezhayev, Professor
A.S. Roshchin, Professor
V.S. Bobintsev, Associate Professor

Zil Automobile Plant
Moscow
V.V. Kalinin, Deputy General Director, Zil Corporation
A.P. Lizo, Rector, Zil Technical Institute
V.N. Mosin, Chairman of Department, Zil Technical Institute
M.N. Churaryov, Deputy Chief, External Relations Department

ATTACHMENT III

Description of Subtopics

1. System of Management Education and Training

1.1 Management Education in the USA and the USSR: System and Forms

Training centers--their types and orientation, financing, number and type of trainees.

Curricula of management training--curricular issues, academic and methodological.

Training activities in industry; survey of management development programs.

Interindustry aspects of management education.

1.2 Management Education of High-Level Managers

Definition of the term, "High-Level Managers" (High-Level Managerial Body).

Specific characteristics of training and development of high-level management.

Selection of candidates. Placement.

Continuing relationships between graduates and educational and training institutions.

Improvement in curricular and instructional methods for such trainees.

1.3 Management Education for Management Personnel of Enterprises in the USSR and Corporate, Governmental and Not-for-profit Enterprises in the USA

Definition of terms.

Methods of on-the-job training for personnel in this classification.

Differences at different levels in the organizational structure and in line and staff positions.

Curricula and course content.

Models of variations in curricula for managers and specialists, line and staff.

2. Planning and Forecasting Requirements for Managers and University-level Graduates for Industry and Government

2.1 Planning and Forecasting Requirements for University-level graduates in the USA and the USSR.

Definition and classification of specialists by type of higher education.

Methods of planning and forecasting requirements for specialists.

Procedures for collecting and processing basic information about such personnel.

Organizations for such forecasting and planning in the USA and the USSR.

2.2 Planning and Forecasting Requirements for Managerial Personnel in the USA and the USSR.

The nature of the managerial task.

Determination of current and future requirements for managers.

Methods of analysis for such determinations: factors involved, dynamics of the situation and environment, numbers needed.

Numbers of students and trainees in the management education system.

Classification and differentiation of management training by rank and function.

2.3 Mathematical Models Used in Planning and Forecasting Requirements for Managers

3. Methods of Management Education

3.1 Teaching Managers through Interactive Methods.

Descriptive summary of interactive methods of education in the USA and the USSR.

Experience of using interactive classroom teaching methods in schools of business and management in the USA.

Experience of using interactive classroom teaching methods in the USSR.

Methods and practices of the preparation of teaching "cases" in the USA and the USSR.

Exchange of experiences in teaching by the "case method."

3.2 Teaching Managers through the Use of Computers

Role of the computer in managerial decision-making in the USA and the USSR.

Qualitative and quantitative aspects of decision-making; role of systems analysis.

Methods of teaching with computer-based problems in managerial economics, mathematical model building and statistics.

3.3 Teaching Managers through the Use of Other Forms of Educational Technology

Descriptive summary of methods of instruction using other forms of educational technology in the USA and the USSR.

Forms of preparation for teaching managers through the use of educational technology.

Effects on learning of the "man-machine" relationship.

3.4 Psychological Aspects of Management Education

Relationship between group learning and individual needs.

Accelerated methods of instruction.

Improvement of efficiency of the management education process.

4. Simulation Gaming (Management Games and Collective Decisions Games) as a Training Tool for High-Level Managers

4.1 Simulation Gaming as a Tool for Learning Complex Decision-Making

The use of simulation gaming for studying the process of decision-making and for its improvement.

4.2 Effectiveness of Simulation Gaming in Training High-Level Managers: Theoretical and Experimental Research.

Development of methods of measurement for evaluation of effectiveness in the use of simulation gaming in training.

Investigation of the efficiency of simulation gaming as a teaching device for management education as compared with other tools.

4.3 Simulation Gaming and Computerized MIS (AMS)

Simulation gaming as a method of establishing communications between the managers and computer-based information system specialists.

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ATTACHMENT IV

Forms of Cooperation and Specific Activities for Topic 5

Subtopic 1

1. A working team will be selected made up of 10 individuals, 5 from the USA and 5 from the USSR, to work jointly on this project. The members are to be appointed by 31 December 1975.

2. Each side will prepare a working paper of the situation as they see it in management education and training in their own country for their colleagues of the other side by 1 April 1976. They will also send a collection of appropriate literature about this subject to their counterparts by that date.

3. During the Fall of 1976 and before 31 December 1976 each side will visit the other country for a period of 4-6 weeks. They will visit institutions of higher education, management training operations in enterprises, both public and private, and research centers in management and management education.

4. By 1 April 1977 each side will complete a working paper of their understanding and analysis of the system of management education and training in the other country. These working papers are then to be exchanged.

5. The USSR side will visit their counterparts in the USA in June 1977 for a working session of five days. During the visit each side will discuss each others working papers and correct and modify them based on the discussions held.

6. Each side will then complete their papers in final form, outlining their understanding and analysis of management education in the other country by 31 December 1977. The reports will also include specific recommendations for further joint cooperation in management education. The two reports will be published in parallel in one document in both English and Russian.

Subtopic 2

1. Two seminars will be conducted in theoretical and practical problems in planning and forecasting requirements for managers and specialists in the USA and the USSR. There will be 20 participants at each, 10 from each side. The first seminar will be held in the USSR in September 1976 and the second in the USA in January 1977. Each seminar will be for about five days.

2. A joint final report of the results of the presentations and discussions at seminars will be completed by 31 December 1976. In addition to summarizing the results of the meetings, the major purpose of the report will be to recommend specific further joint research efforts that might be valuable in this topic area.

Subtopic 3

1. Two joint working groups will be selected by 31 December 1975. Each will include 5 individuals.

2. Materials on Subtopic 3 will be collected and exchanged by January 1976.

3. Seminars will be held in the USA with 10 Soviet scientists and lecturers in April 1976, and in the USSR with 10 US scientists and lecturers in September 1976.

4. Materials of the seminars held in the USA and the USSR will be published (in both English and Russian) in January 1977 and June 1977 respectively.

5. Courses on the use of active methods, statistical models and computer techniques in management training will be developed and held: in the USA in November-December 1976; in the USSR in April-May 1977. Each side will select 3 lecturers for these courses.

6. Joint publications on Subtopic 3 will be published: collected articles in the second quarter of 1977; a monograph in the fourth quarter of 1977.

Subtopic 4

1. A working team will be selected composed of 6 individuals, 3 from the USA and 3 from the USSR, to work jointly on this project. The members will be appointed by 31 December 1975.

2. Each side will prepare a separate national survey paper for their colleagues of the other side, including a collection of appropriate simulation gaming literature from their country by 31 May 1976.

3. The USSR side will visit their counterparts in the USA in the Fall 1976, their visit to overlap the Annual National Gaming Council Symposium. During the visit each side will conduct instructional seminars, work on the joint report, and the USSR side will visit appropriate centers of simulation gaming. The USA side will visit in the USSR in the Spring of 1977, meet with their colleagues in seminars, work on the joint final report, and visit institutions of importance in simulation gaming in the USSR. The period in each country will be from 3 to 4 weeks.

4. Members of both sides will exchange literature about those simulation games available to them, including instructional material, administrators notes, and program decks for computerized games.

5. A joint final report of the effort will be completed for publication by the end of the academic year 1976-1977 which will include specific recommendations for further joint cooperation in simulation gaming.

F

The Main Scientific-Research Computer Center of the Moscow City Executive Committee

The Automation of Accounting and Administration in a Large Commercial Enterprise

The tasks confronting Soviet commerce demand the development of a scientifically-based optimal system of administration, providing for the sale of goods to the populace with minimal distribution costs and a high level of service efficiency.

The most convenient method for providing customers with non-food products is the large department store. In Moscow, for example, 11 large department stores and firms account for about 30% of the total turnover of industrial goods. The largest department store is the Moscow GUM, for which 1975 sales will total 570 million rubles.

But large department stores are distinguished by the complexity of their management. For their efficient administration, it is necessary to have complete and reliable information on all of the processes involved. However, the volume of management information is growing each year, together with the steady growth of the sales volume.

As the management of commerce is perfected, many indices which previously were not used in the information processes come to be included. Thus, inventories are recorded not only in terms of quantity and price, but also with an indication of consumer features, such as size, height, gradd, model, completeness, color, material, the type of heel and design for a shoe, etc.

Accurate, operational, all-encompassing information is absolutely necessary for the best use of commercial resources. It is possible to cope with the increasing flows of information only with the help of computers and the automated systems of management (ASMs) based upon the work of these machines.

The automated system of accounting, analysis, planning and management "ASM-Department Store" for large commercial enterprises is a complex of economic and mathematic methods, means of computer techniques and communications, and organizational and legal measures allowing the management and functional

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departments of an enterprise to carry out management efficiently under a new system of planning and economic stimulation. The main goals of the development and installation of the ASM is the perfection of the management of a commercial enterprise, and a guarantee of the best use of the material, labor and financial resources for increasing the sales volume, raising profits and profitability, and improving the efficiency of consumer services.

In an ASM, all of the tasks of accounting, analysis, planning and management are considered to be integrated, combined, inseparably interconnected and interrelated. The tasks of economic activity, now divided among many departments and people, are, through the use of computers, merged into a single system, in which they are dealt with effectively, reliably, and in any degree of detail necessary. It is just such a unified approach in developing and installing the ASM which forms the basis for the efficiency of the automation of management. The solution of separate, isolated tasks with computers does not justify the large hopes placed in them nor the expense of obtaining and developing new techniques.

In creating the ASM it remains necessary, as before, to divide individual functional tasks between various groups of employees, each of which bears the responsibility for fulfilling the work allotted to it. However, the nature of people's activity in a situation of automated management changes.

The totality of the tasks solved by the ASM can be divided into "informational" and "managerial." The former serves the goals of accounting and analysis, as well as receiving the necessary initial data for planning and management. The latter concern themselves with optimizing the plans and administration of commercial-economic activity; their bases are formed by economic-mathematic models which allow the optimization of a selected, special-purpose function.

In the ASM-Department Store the following subsystems are distinguished: the calculation of goods and materials values and financial means; the analysis of commercial-economic activity; the study and forecasting of consumer demand; current and long-term planning; operational management of commercial activity; and the management of goods inventories. The first three subsystems belong to the

category of informational tasks, ... nt tasks.

In the development and installation of the ASM-Department Store, one of the most important stages is the automation of the fulfillment of the accounting tasks. In discussing the administration of accounting with the ASM we are not talking simply about the fulfillment with computers of "routine tasks," but about a restructuring of stock-taking with the goal of extending the control and analysis indices, decreasing the time necessary for receiving accounting information, and the creation of data banks for fulfilling the tasks of the subsequent subsystems.

The basic and most labor-intensive portion of this subsystem is the accounting of commodity operations. This is connected first of all with the fact that the plan for commodity circulation, and its fulfillment, is the basic qualitative index of the work of a commercial enterprise and forms the basis of its economic activity. Secondly, the control over the safe-keeping of socialist property is of very great importance in commerce. Commercial enterprises contain huge amounts of valuables in the form of goods and materials. They are stored in numerous warehouses and subsidiary facilities, and the material responsibility for their safe-keeping is borne by a large quantity of commercial employees. The conditions of the transport, storage and sale of goods demands the maintenance of especially strict, daily control by accounting employees, in order to avoid the possibility of loss, spoilage, or theft.

The accounting for the sale of goods on credit to fadtory and office workers is one variant of commodity operations, but because of its large degree of labor-intensity and independence from the other forms of operations and statistical generalizations is assigned to separate sections of the tasks of the accounting subsystem. Various goods are sold on credit, with installment repayment periods of up to 24 months. Therefore, it is necessary for the computers to maintain accounts for money received from the bank in repayment for consumer debts.

The tasks of the accounting ... ASM-Department Store

are: control over the expenditures from the wages fund, the use of current indices

for wage scales, the maintenance of the size of the work force at an established level, the correct and complete use of working time, and the maintenance of labor discipline; accurate calculation of wages due to each employee in accordance with the quantity and quality of work completed, as well as the calculation of taxes and other deductions; the timely and correct reflection of payments from deductions on wages to factory and office workers, to the taxes budget, and to social security organs; and the drawing up of bookkeeping and statistical accounts.

The operational and statistical tasks of compiling, calculating and maintaining records for providing labor to enterprises are carried out on the basis of personal histories of all employees, recorded on magnetic tape in the computers. The information provided could be data on the deviation of the actual listed number of employees from the authorized personnel for all types of jobs, various types of generalizations (for example, the number of salespersons in the store with a secondary education and who have worked in the given enterprise for more than five years), detailed tables with a calculation of absolute and relative values (for example, where a person studied, in relation to their age bracket), operational and statistical records by department (for example, an analysis of the qualitative composition of individual categories of employees).

The drawing up of different types of bookkeeping, including the balance sheets, is the final stage of accounting operations. In the ASM-Department Store, a generalizing complex of accounting programs has been established for these goals, and carry out calculations based both on previous tasks and on independently considered indices. The drawing up of some of the types of bookkeeping is included in the complexes of tasks enumerated above, since these types of bookkeeping organically ensue from the concrete tasks fulfilled in them. On the other hand, the complex under consideration should include accounting tasks not included earlier (taking into account items of little value or which wear out quickly, etc.).

Conducting accounting with the ASM-Department Store makes it possible to

organically connect different types of accounting--bookkeeping, operational and

stastical. On a basis of unified initial data, information with computers can be provided operationally (which, in the absence of automation, is a feature of only operational accounting), with absolute accuracy (one of the demands of bookkeeping accounting), and in any type of generalization and grouping (characteristic of statistical accounting).

The processing of data by computer presupposes an integral system for the use of information. The detailed analytical data received begin to play an important role not only in accounting but for other goals as well. For example, control over the fulfillment of delivery contracts in terms of both promptness of the delivery and the assortment of goods, control over the selection of funds, control over prices, control over the presence of goods in sufficient assortments, the management of goods inventories, etc., are connected with the accounting of commodity operations.

The ASM-Department Store makes it operationally possible to supply information, at the demand of management, concerning the condition of goods inventories, relations with suppliers, the fulfillment of planning indices, the course of goods processing, etc. In addition to the possibility for any program to supply summary data at any time (for example, turnover or inventory records for the quantity-price accounting of goods), special basic information records for the information-research system are processed and collected, thus automating the delivery of answers to various managerial enquiries concerning the condition of the commercial-economic process.

The subsystem of the analysis of commercial-economic activity is based on information received in fulfilling the tasks of the accounting subsystem and uses bookkeeping materials and all types of data of the current accounting and of financial and intradepartmental checkups.

The use of verified and interconnected data makes possible a thorough and objective evaluation of the fulfillment of planning assignments for total revenue, operational expenses, profits, and profitability, not only for the department store as a whole, but for its individual commercial subdivisions as well.

In addition, a more critical evaluation of the plan itself, of its soundness and its tensions, can be given. Factors positively and negatively influencing the plan's fulfillment are revealed, and the degree of their influence is measured; tendencies and regularities of economic development, and hidden and unused reserves, are revealed; as a consequence, the appropriate generalizations, practical conclusions and suggestions are made. The actual usefulness of an economic analysis lies in the investigation of unused reserves in all sectors of the planning and management of the department store.

With the ASM, an economic analysis can be deepened and widened. To the traditional methods of comparison, grouping, substitution and coordination are added correlational analysis, linear, nonlinear and dynamic programming, theories of mass services, systems analysis, and the investigation of operations.

Without the study and analysis of consumer demand, a determination of its size for individual types of goods and of its tendencies to change, it is impossible to optimize planning and management. The given subsystem is divided into three groups of tasks: the study of satisfied and unsatisfied demand, and the forecasting of demand.

The initial information on satisfied demand is transferred to mechanical storage systems either beforehand (with the use of commodity punch cards) or directly at the time of sale on special cashier apparatuses. The data processed by computer is grouped together and presented to a previously specified section which analyzes the satisfied demand (the sale) by nomenclature, supplier, size, height, style, color, etc. All information can be supplied operationally on the basis of information from each working day. In addition, statistical generalizations of results received for a particular period (a week, a ten-day period, a month, a quarter, etc.) and a comparative analysis of the changes in the structure and the volume of the turnover of goods in a particular area are conducted to any degree of detail.

The study of unsatisfied demand is carried out with the help of polls, questionnaires, postcard enquiries, etc., as well as with the help of equipment

making it possible to transfer the data from cells directly to a mechanical information-carrier at the time they are received; the latter, from the point of view of the ASM, is preferable. By studying unsatisfied demand, it is possible to receive not only detailed information on consumer preferences, but also data of a sociological nature on the age distribution of customers, their residence, education, family and material situation, etc.

Statistical generalizations from data received from studying the populace's effective demand makes it possible to discover the structure of demand, its changes over time, the tendencies of its development (formation) or the dwindling of demand for individual types of goods. The forecasting of demand is connected with the use of a special mathematical apparatus.

The introduction of the managerial subsystems ASM-Department Store, based on the use of optimizing methods, has become particularly timely and necessary given a new system of management which allows a commercial enterprise operational independence in drawing up its commercial-financial plan. The approval of only two basic indices-- sales volume and profits --by higher organizations allows the department store to independently develop all of the remaining planning indices of its economic activity.

The plan for the sales volume is calculated taking into account the basic task of commercial enterprises: to satisfy to a maximum degree the constantly growing demand of the public for consumer goods. The sales volume is planned for the volume and structure for the department store and all its commercial subdivisions, for basic groups of goods and for several individual goods. The basic initial data are taken from the informational subsystems ASM-Department Store, and reflect the study and forecasting of consumer demand, the sale of goods during the preceding sales period, and the presence of goods inventories. Such an interconnection became possible because of the unity of the indices of the informational and managerial subsystems ASM.

The development of the methods, models and goods of optimal planning and management are directed towards fulfilling the basic goals of the ASM-Department

Store. Starting from the demand, a special-purpose function is introduced, which makes it possible to compare in numerical form the suggested various versions of plans and decisions contained in computerized models. A special-purpose function makes it possible to determine the exact meaning attributable to the concept of the optimal management of a department store, to replace intuition and experience with the appropriate calculations. A review of the various versions of the organization of management, with an evaluation of the special-purpose function, as well as the receipt and use of the data of all the remaining subsystems of the ASM-Department Store makes it possible to optimize the planning of the commercial activity of the department store, and to guarantee the profitability of the sale of each individual good and the profitability of the work of each individual section, stand, warehouse and department, and of the department store as a whole.

The basic goal of the subsystems of operational management of commercial activity is the guarantee of a constant supply of goods for sale with a wide and varied assortment, taking into account detailed consumer preferences. This condition must be particularly carefully fulfilled for goods in the range of basic (sufficient) necessities. As far as goods in the high-fashion range are concerned, it is necessary to conduct the appropriate commercial work with suppliers on the basis of the data received and processed.

The functions of the subsystems of management of goods inventories are the establishment of dynamic, extensive norms concerning the minimum level of inventories for each of the varieties of goods sold by the department store and, when that given level has been attained by actual inventories, calculation of the size of the batch of goods to be ordered. In the accounting process for commodity operations, control over the level of goods inventories is carried out in order to provide information necessary for operational management in cases when the established differentiated norms are deviated from, and to provide a calculation of the size of the batch to be ordered. The initial data for calculations are information on the sale of a detailed variety of goods, on the basis of which

the dynamics of the goods sales volume are discovered, leading to predictions on the sale of one good or another, for example, by using the method of the sliding average.

The management of inventories supplies is carried out on the principle of two levels. When specific types of goods reach the lower level, they are replenished until they reach the upper level. The upper and lower level are established for a particular period of time, a month, for example, and are reviewed regularly on the basis of demand forecasts.

The introduction of the ASM-Department Store makes it possible to determine several factors influencing the basic indices of commercial activity. These factors include: establishing the optimum level of goods inventories in the department store and reducing them by 3-5%; avoiding the stocking of goods which aren't in demand; avoiding losses involved in the markdown on goods which are unmarketable or which have lost their original quality; increasing the safe-keeping of material valuables and financial funds; and reducing the number of personnel engaged in accounting-tallying work.

Director of the Computer Center of GUM, Candidate of Technical Sciences V. V. Shoob

Assistant Director of the Computer Center of GUM, Candidate of Economic Sciences A. P. Bykov

The Experience of Constructing an Automated System of Management in a City Economy

The city of Moscow is a multidepartmental enterprise and develops as a unified whole in accordance with a single plan--the General Plan for the Development of Moscow. As in any other sector of the economy, the management of the city economy amounts to the distribution and redistribution of resources, directed towards the attainment of goals determined by the plan. However, in distinction to the industrial sectors of the economy, the city economy has one fundamental difference: its final product, which is measured not by physical criteria but by social and economic criteria, such as the growth of the people's welfare, the improvement of social-everyday and cultural services, etc. The

in physical terms--such meters, the quantity of servi provided, etc.--is directed towards obtaining this final product. The significant indefiniteness in the measurement (interpretation) of social-economic categories on the one hand, and the large quantity of different sectors (and consequently criteria for evaluating their activity) on the other, create the following difficulties in investigating the city economy as a management unit:

- alternatives and courses of action chosen are determined by criteria which are more speculative than formal;

- the evaluation of the effectiveness of the result obtained depends substantially upon the opinion of the expert at the time of the evaluation.

In addition, the complexity of managerial activity in social-economic systems consists of the fact that the manager (here and below the term "manager" will include both a managerial organ and an individual person possessing the right and the responsibility for decision-making) making the decision must correctly and quickly evaluate its optimality and influence on future development for a significant interval of time; if the correct decision is not made, the loss of efficiency of the economic activity (for example, in terms of resources) could attain an importance comparable to the work volume of a large enterprise.

As experience has shown, the perfection of management is most effectively attained through the introduction of computers, or, in other words, through the creation of an automated system of management (ASM).

The impossibility of completely replacing man with the computer and the necessity of increasing the efficiency of managerial decisions have led to the fact that the development of the methodology of constructing automated systems of management for social-economic processes is at the present time a pressing scientific-research problem.

In this work, one of the possible approaches to the development of an experimental methodology as a method of constructing systems of management for social-economic processes is suggested.

The basis of all management is the decision-making process, which basically includes:

- the collection and analysis of initial data;
- the compilation of a number of alternatives;
- the selection of the appropriate alternative, the correctness of which is determined by the possibility of comparing all alternatives or, at least, of choosing several of the best; and, to the present time, has remained the prerogative of the manager.

Let's look at the manager's role in a management system. Say that a number of decisions are made in drawing up a certain plan. At the beginning of the planning process, only the desired goal is known, but the "who," "what," "when" and "how" are not known. By the time the planning process is completed, not only the result is known, but the method for its attainment is known as well. In other words, we can note that new knowledge is obtained as a result of the planning process.(which is analogous to the case of making operational decisions). In this sense, the manager is similar to the researcher-designer, designing a new technique.

A manager drawing up a plan selects from among different versions, in a similar fashion to that of a designer, but the criteria of the selections don't become fixed. They simply add to the experience and knowledge of each individual manager, allowing him to correctly evaluate a situation in the system. However, it is known that the emphasis is basically placed on criteria received through calculations using reliably measured magnitudes.

Consequently, in a management system the manager on the one hand is a researcher-experimenter, whose task it is to construct adequate models of the decision-making process by means of comparison with actually-occuring processes, and, on the other hand, is a constructor, creating a normative procedure of decision-making which is effective only when it reinforces the professional certainty of the manager.

Such an approach to the importance and role of the manager in a system of

management of social-economic processes makes it possible to formulate the

method for a controlled experiment, as a means of constructing such a type of management system.

The essence of the proposed method for a controlled experiment consists of the following:

1. The decision-making process is a creative activity of the manager, analogous to the activity of a researcher-designer.

2. The automation of the decision-making process is directed towards enabling the manager to deal in arguments inexpressable in numerical terms and to construct alternatives and carry out their evaluation and the selection of the suitable alternatives; i.e., the creation by the manager of a new "instrument" for reinforcing his creative activity.

3. The totality of the system's processes is closed with respect to the problem being solved by the manager; i.e., the system is that which solves the problem.

4. The system effects the fixation of a "trajectory" of the decision-making process.

5. The models of the processes must be visual, constructed according to a blocking principle, and allow a set of enquiries of the type "What will happen if...?" and "What should be done if...?"

The suggested methodology was used in constructing an automated system of management of the distribution of living space.

The basic organization for the system is the Administration for the Calculation and Distribution of Living Space.

In accordance with the suggested methodology (see point 3), the basic organization is not considered as an isolated entity, but as an element in a system dealing with the housing situation. This system includes organizations carrying out processes from the planning of the allotment of construction sites to the actual distribution of each unit of living space. The processes taking

place in the system are represented in the form of a hierarchical tree, the top

of which is the process producing the final product - decisions."

The place of the basic organization is determined in the system by a set of processes officially assigned to it; the importance of the organization is determined by the importance of the processes in the system and does not depend upon its administrative status. This allows us to select a single criterion of evaluation of the activity of all of the organizations: the "weight" of their contribution in the final result of the system.

The processes taking place within the organization are divided into two categories: routine and creative. The automation of the routine processes presents only a few technical difficulties, since the algorithm of their fulfillment is firmly fixed.

The following elaborations are oriented towards raising the efficiency of managerial decisions made:

- the methodology of constructing informational-research subsystems oriented towards the meaaurement of current parameters of the management system;

- the model for evaluating long-term requirements depending upon the nature of operational management decisions;

- the model for evaluating the influence of administrative programs for the city's development on the condition of the housing problem;

- methods of short-term planning, carried out in the form of a dialogue procedure between the manager and the computer.

A short description is given below of each elaboration. We will note that each subsystem and model can work both autonomously and in a system.

The informational-research subsystem (IRS) has been realized in such fashion as to allow the manager to quickly and operationally be provided with information on any parameter of the system for the current period of time.

The informational-research subsystem includes a group of bodies of information, a complex of unified documents and regulations for the technological procedures for the selection, programming, processing, storage and output of data. The list of the basic indices included in the structure of the appropriate blocks

is determined by the requirements of the systems models and by the possibility of subsequent correctives in the perfection and extension of the system's models' possibilities.

The bodies of information consist of the following basic blocks.

Body A - of all persons in the city in need of housing space; Body B - of all of the city's housing space available for distributions; Body C - operational data on all those persons who have received housing space in the current year; Body D - a list of requirements of the applicants for housing space; Body E - the yearly plan for the distribution of housing space; Body F - the actual fulfillment of the plan; and several auxiliary bodies organized to satisfy the informational requirements of the system's models.

The unification of the documents makes it possible to insert information into the bodies, as well as to order and standarize the current work of all of the organizations involved in the solution of the housing problem.

In order to receive the necessary data in the IRS from a manager or model of the system , an enquiry concerning any totality of data located in the bodies is received. This enquiry can be presented in any form which is convenient for the manager, such as a reference, a report, or a test. An answer to the enquiry is received in a form analogous to that of the enquiry. Such a system for satisfying informational requirements provides for accessibility and operativeness for all levels of managers and models of the system. The formulation of standardized and nonstandardized forms for bookkeeping, accounting, and the establishment of results does not represent any difficulty.

A model for evaluating long-term requirements makes it possible to dynamically follow changes in the demographic and structural parameters of the families included in the distribution process arising both are a result of the distribution rules adopted and outside of these rules.

The model consists of two blocks:

- the block of the generation of requirements (this block basically takes into account demographic factors and movements of the population);

- the block of the decrease of requirements (this block basically takes into account the influence of plans and the distribution rules for housing space).

Taken together, the two blocks make it possible to give a forecasting evaluation of the qualitative and quantitative composition of the waiting lists for various intervals of time and to produce evaluations of the various alternatives for distributing housing space to the people, which in a certain sense corresponds to the task of managing the waiting list.

It is assumed that the processes for entering and leaving the waiting list are random and are examined differentially by categories and types of basic families. At the beginning, the probable characteristics of the process of entering and leaving the waiting list are found; these are used to determine recurrent relationships for average deviations in the size of the list, differentiated by categories and types of families. Calculations are conducted for one-month periods; their forecasting significance is determined through linear extrapolation from the current point in time with a minimum of deviations.

The size of the decrease in the waiting list is found from calculations using the second block of the distribution model. The basis for the distribution model is the method for determining the quantitative characteristics of the applicant's need for improved housing--the index of need. This method is uniform for all applicants. The index of need of each applicant is approximated using the sum of points allotted according to their characteristics within established paramaters.

All applicants are ordered by decreasing index of need. The further modeling of the distribution is carried out taking into account the qualitative and quantitative properties of the housing available for distribution and the rules and norms of distribution. The modeling of the distribution itself has a forecasting or evaluative nature for analyzing and selecting the most appropriate alternative. The actual distribution, i.e., the assignment of a specific apartment to an applicant, is carried out by the appropriate organ

endowed with that authority.

Using an imitation model for forecasting the waiting list, a manager has the possibility, through the analysis of initial information, of producing an evaluation of the influence of various alternatives for distribution on the movement of the list.

The model for evaluating the influence of administrative programs for the city's development on the condition of the housing problem takes into account the influence on the problem of providing for changes in the structure of the population and the available housing. Both structures are taken to be identical, in the sense that they constitute a pair of magnitudes. For example, the housing demolished in the city's reconstruction is equal to the population of that housing. In all, four categories (levels) of available housing and of the population are presented.

From one level to another and from the outside to the levels are introduced flows corresponding to the processes of the natural movement of housing resources (population) from one level to another (analogous to the Forrester model of city dynamics) and to the processes created by the programs accepted.

The influence of the programs is evaluated according to the condition of the levels before the programs' realization and after the programs' impact on the model.

With the help of this model, the manager can receive evaluations in the particular forms:

1. How will the condition of all housing categories (in m^2) and of the population (quantity of people) change given certain programs for housing construction and reconstruction and a long-term housing distribution plan in generalized indices (on the degree of dilapidation, on reconstruction, etc.).

2. How effective distribution programs will be for solving established tasks, such as the elimination of dilapidated housing, etc. (for example, a program for a certain period of time).

3. Which construction program will make it possible to solve the task of

attaining the established goals within a certain time period, etc.

The planning of housing distribution is externally similar to the task of distributing resources, but the specific characteric of the social-economic processes, described above, does not make it possible to use the methods of resource distribution theory. In the case being examined the essence of planning consists of the following:

- there is a fixed volume of housing space made available in the planning year,

- the sum of the yearly and long-term applications for housing space significantly exceeds the volume available for distribution,

- the quantity of applicants is great enough to make the task visible with a manual method of planning,

- construction is carried out through many financial sources and it is necessary to make calculations for each source,

- there are limitations and priorities in including applicants in the plan, depending upon existing goals for the allotment of housing,

- the solution of the tasks of effective planning for the city as a whole must provide for the specific requirements of each applicant for housing.

In connection with this, the complex of models for making planning decisions includes two groups. The first group of models of the yearly volume of planning realizes the task of planning the distribution of the entire volume of housing in accordance with allotment goals and between housing applicants.

The second group of models of quarterly planning makes it possible to assign the allotted yearly volume of housing space to each applicant for apartments of the planning year with an indication of the specific address and a set of the determined characteristics of the apartments, proceeding from the satisfaction of the applicant's actual needs. In this, the citywide task of keeping the assigned apartments as close as possible to the applicant's place of work is solved.

The dialogue nature of the models consists of the fact that the manager is

provided with [illegible] from basic (5-10) limitations given by the manager. The manager conducts the further drawing up of the plan by directly changing or fixing individual planning positions. A dialogue can be conducted both through DISPLAY and through a printed document.

Planning models make it possible for a manager to construct and analyze a multitude of distribution plans, effectively picking out the faults of the preceding version.

In this manner, the system examined is implemented as an element of a system solving the problem and is an instrument of the manager for obtaining arguments of a calculable nature and the possibility of constructing alternatives, evaluating them, and choosing the most suitable one. The system is closed with respect to the problems solved by the manager and the imitation models which he uses.

At each stage of his activity, the manager carries out the decision-making and the system reinforces his professional confidence.

The automation of the decision-making process at any point in the system is effected by a dialogue between the manager and the imitation models stored in the computer. In the system, the person making the decision is one of its active elements and, in connection with this, the possibility arises to introduce the measurability of nonformalized procedures of the decision-making process. This makes it possible to further correct and perfect the imitation models of the system and to adapt them to actual conditions.

Report on the Seminar of Soviet-American Specialists. Moscow, Main SRCC, 7-22 June, 1975.

THE PERFECTION OF THE MANAGEMENT OF MOSCOW'S COMMERCE ON THE BASIS OF THE INTRODUCTION OF AUTOMATED SYSTEMS OF MANAGEMENT AND COMPUTER TECHNIQUES

The Five-Year Plan of Development for the Economy of the USSR for 1971-1975 made demands for perfecting the system of managing commerce, for the fullest and most flexible satisfaction of the demand for consumer goods possible, and for improving commercial services to the public.

The commerce of such a large city as Moscow is, at the present stage, one of the most complex, varied and dynamically developing sectors of the city economy. As the production of goods grows and their variety widens, the volume of economic information on deliveries, sales and inventories grows sharply. Operational management, the organization of the management of the movement of goods of retail commerce becomes increasingly complex; at the present time, the existing level of management of the productive-economic activity of commercial organizations does not meet the growing needs. Achieving the rationalization of the management of the commercial process, improving service to the public, speeding up the turnover of goods, and increasing the profits and profitability of commercial organizations and enterprises creates the necessity of establishing an ASM in commerce.

The management of the city's commerce is carried out within a framework of rather firm limitations imposed upon trade by the general mechanism of a socialist planned economy.

Basic among these limitations are:

- the sum of money which must be received from the population in a given time period (the turnover);

- prices for consumer goods;

- commercial discounts;

- the quantity of goods of a certain type which are on the market (stocks);

- se (the volume of investments, limits on allocations for the managerial apparatus, etc.).

Within the boundaries of the indicated limitations, commerce must carry out the following functions:

a) determine which goods, and in which quantities, should be delivered to the commercial sector such that they will be completely sold and will guarantee the sector's profitability;

b) organize the receipt of goods from manufacturers and their distribution throughout the commercial network in those quantities and amounts of time which will entail the least expense;

c) organize the sale of goods to the public in such a way that goods will be available to the public at those places and at that time which will be most economical for the customer's time.

The introduction of an automated system of management of commerce (ASMC) will make it possible to fulfill these functions in the best manner possible; i.e., to achieve the maximum possible satisfaction of the public's effective demand with a given level of production and the budgetary allocations provided to the commercial sector.

At the present time, five automated systems of management are being developed for the commercial organizations of the Main Administration of Trade for Moscow. The work is being conducted in the direction of designing and installing management systems for the level of department stores, firms, markets, sectoral and main trade administrations, and wholesale organizations and enterprises, with their subsequent unification into a unified system of commerce management for Moscow.

In view of the fact that the methods of commercial organization, bookkeeping accounting and financial activity in commercial enterprises and organizations have common methods for formulating and processing information, the basic ori ction of creating standardized planning decisions for all of the levels of commercial

management

The basis of the standardized planning decisions (SPDs) which are worked out must be the principle of breaking down the system into its basic parts and uniting these parts into a unified system.

The standardizing of planning decisions will make it possible to sharply reduce the expenses for designing and installing systems, accelerate the process of putting them into operation, raise the quality of planning decisions, automate the synthesis of systems from standardized modules of tasks, and raise the efficiency of their functioning both within the commercial system and in conjunction with other sectors.

The functional construction of the ASMC for Moscow is based on the assignment of functions in fulfilling procedures characteristic for the city's commercial management process.

For local ASMCs, provided to more or less homogeneous organizations and functional structures, subsystems are formulated which are oriented towards the fulfillment of the tasks of the organization's conventional work: the management of the turnover of goods, bookkeeping accounting, personnel management, etc.

The following argument is advanced in favor of such a decision:

- in order for the subsystems of the ASMC to be workable and to actually contribute to the improvement of the management of commerce, they must be oriented towards concrete jobs. To presuppose that at the stage of its birth the ASMT will lead to a fundamental breaking up of the existing managerial apparatus would be utopian: the ASMC is still too weak for that, and it could not be permitted that the existing management apparatus should be destroyed without having a sufficiently strong one to replace it.

Consequently, the subsystems must be chosen such that they are at first oriented towards the existing functional subdivisions of the commercial management apparatus.

A functional-organizational principle is taken as the basis for constructing

a functional [illegible] of the existing structure and the specialization of the functional subdivisions of commercial organization.

It follows from this that the ASMC for Moscow will consist of the following basic list of subsystems:

- the study and forecasting of demand;
- the management of the turnover of goods;
- the management of the movement of goods;
- bookkeeping accounting;
- the management of labor and wages;
- personnel management;
- the management of financial activity;
- the management of the development of the commercial network and its material-technical base;
- the management of material-technical equipment;
- the informational-reference system.

The enumerated subsystems clearly exclude the term "planning," with the term "management" being widely interpreted to include control, analysis, planning, decision-making and bookkeeping.

Today it is justifiable to presume that the development of Moscow's ASMC will be based on relatively independent systems, each of which will serve a group of more or less homogeneous trade organizations and enterprises. Part of them will be closely tied informationally, but many will be mutually independent.

The proportional size of each of the functional subsystems and the concrete tasks of each system will be different.

Thus, it is insufficient to define the functional structure of ASMs such as the Moscow ASMC simply by listing their functional subsystems. It should also be defined by a list of the types of commercial organizations (enterprises) of which the management [illegible] with the [illegible] of a complex of tasks peculiar to that type only.

Proceeding from this position, the functional structure of the Moscow ASMT will be understood as that minimal selection of different complexes of tasks, oriented either towards a particular type of trading organization or towards a particular function, which in its totality will guarantee the management of the city's commercial system, encompassed by the Main Administration of Commerce of the Moscow City Executive Committee.

The functional structure of the ASMT on the basis of the given definition is not simple to construct. At the present stage of development it is proposed to include 8 systems in the Moscow ASMT. Of these, 7 are intended to serve concrete types of organizationa and enterprises and one is for general use by all organizations and buyers (Table 1).

Systems Included in the Moscow ASMT

Table 1.

No.	Priority of Development	Name of the System
	a) Systems of commercial organizations and enterprises	
1.	1	System of sectoral managements and the Main Administration of Commerce apparatus
2.	1	System for industrial goods firms and department stores
3.	2	System for industrial commerce
4.	1	System for foodstuffs commerce
5.	1	System of management of fruit and vegetables organizations
6.	2	System of large-scale industrial goods stores
7.	2	System of large-scale foodstuffs stores and large self-service stores.
	b) System for general use	
1.	1	Information-reference system

In developing a complex of tasks and a particular functional subsystem for a given system, two demands must be satisfied:

of systems;

- the maximum standardization of planning decisions between different types of systems.

It should be pointed out that the 8 types of systems enumerated above do not exhaust all of the possible types which would completely provide for the automation of the management of the city's commerce. In particular, the question remains open concerning the necessity of having special systems for the management of the supplying of the city with particular types of products such as milk and milk products, meat and meat products, bakery products, vegetables and fruit. If the problem is organized only within the boundaries of the formulation of orders for the delivery of these types of products, then it must be reviewed within the framework of the subsystem of the management of the movement of goods in the systems of the management of foodstuffs.

If the problem is widened to include questions of the amount of production and the delivery of goods to stores, then a special interdepartmental system must be created. It is still unclear as to which departments they should belong to; in any case, they go outside of the bounds of a single ASMT. At the present time these problems are being studied and, if necessary, the functional structure of the ASMT will be supplemented with the necessary quantity of other systems or functional subsystems.

The work of creating systems for industrial goods firms and department stores is most advanced in Moscow and Leningrad. Using the experience received from these and the existing anticipatory work, it is necessary to continue this work as being of primary importance, having supplemented the tasks of the subsystems of bookkeeping accounting with tasks from the subsystems of the management of the turnover of goods, the movement of goods and the forecasting of demand. The introduction of these complexes of tasks in the 11 firms and department stores in Moscow whose turnover of goods comprises 50% of the turnover of industrial goods will make it possible to receive a rather complete picture of

the commerce in industrial goods. On the basis of the experience received in the

widening of the technic base of the ASMT, it will be possible to move on to the introduction of the same tasks in the trade and commerce administrations.

For the second direction of primary importance, it is proposed to select a complex of tasks providing for the selection and analysis of statistical data and the planning of the turnover of goods. These tasks, first of all, play an important part in the process of administering trade and, secondly, can be introduced in the absence of an extensive network of peripheral structures only on a technical base of information-computer centers. The creation of an automated system for formulating and analyzing statistical bookkeeping will make it possible to obtain the informational basis necessary for planning, which is equally important for the study of demand and the management of goods inventories as well. At the same time, a data bank will be formulated for the functioning of an information-reference system.

The subsystem for managing the turnover of goods must come first, encompassing all of the city's commercial organizations.

In the same fashion, subsystems on a citywide scale for managing financial activity, labor and wages, and personnel can be created almost at once.

The subsystem of bookeeping accounting and of the operational management of the movement of goods is directly involved with initial documents and goods. For introduction on a citywide scale it is necessary to have a significant quantity of peripheral technical equipment directly in the commercial enterprises and marked improvements in the whole procedure for accounting for goods on their path from producers to consumers, including the development of new technical means. Therefore, the indicated subsystems will be introduced successively in individual large enterprises. The length of the introduction process will be completely determined by the tempo of the delivery of peripheral means (electronic billing machines and mini-computers).

The sequence of the introduction of the ASMT is determined taking into account the preparatory work and experience in Moscow and other cities in developing and introducing the ASMT, by the logical and informational connection

of tasks and subsystems and by the practical possibilities for satisfying the ASMC's demand for technical means and qualified personnel.

At the present time, the following complexes of tasks of primary importance are being developed and introduced in the system of the Main Administration of Commerce of the Moscow City Executive Committee:

(A) the complex of tasks of the subsystem "The Management of the Turnover of Goods," including the tasks of the current and long-term planning of the turnover of goods by volume and pattern, the current and long-term planning of guaranteeing goods, operational planning, review and analysis of the fulfillment of the plan for the wholesale turnover of goods by volume and pattern, and review and analysis of the fulfillment of the plans for commercial provisions for the wholesale turnover of goods.

The introduction of the complex of tasks will make it possible to develop optimal plans of the turnover of goods and guarantees of goods, as well as providing the directors of the commercial organizations and enterprises with reliable analytical data on the fulfillment of the plan for the turnover of goods necessary for shifting goods resources around and supplying them to stores and commerce administrations which are not fulfilling the plan for the turnover of goods. In addition, planning departments are freed from having to carry out work in collecting and delivering preliminary accounting data to the books and drawing up various reports, summaries, and information references;

(B) the complex of tasks of the subsystem "The Administration of the Movement of Foodstuffs," consisting of the tasks of the operational accounting for the fulfillment of wholesale orders for foodstuffs, control over the fulfillment of delivery contracts, control over the selection of stocks, the operational accounting for the sale of goods, and the accounting for goods inventories.

The introduction of this complex of tasks will make possible a more rhythmic, even delivery of particularly quick-spoiling goods, which will allow a lessening of losses due to the fact that in the stores milk goes sour, bread gets stale, and other products which have to be processed spoil;

(C) the complex of tasks of the "Organization of the Movement of Industrial Goods," including tasks of the operational accounting for the movement of industrial goods, control over the fulfillment of delivery contracts, control over the selection of stocks, and the management of goods inventories.

The introduction of this complex of tasks will make it possible to improve commercial work and economic ties and as a result will speed up the turnover of goods. Consequently, if goods reach consumers quickly, and if they can be moved through goods transport channels without delay, then above-normal inventories will be reduced, the turnover of goods will be increased, and spoilage and losses of goods will decrease;

(D) the complex of tasks providing for the centralization and automation of bills for goods sold on credit. The introduction of this system on a citywide level will produce a considerable economy in the personnel engaged in these operations and will make it possible to decrease long-standing arrears for credit payments;

(E) the complex of tasks of the information-reference system for operationally providing commercial directors with data on the basic indices of the city's commercial organizations and enterprises;

(F) the complex of tasks of the subsystem of the study and forecasting of demand.

The technical base for introducing the enumerated complexes of tasks in Moscow's wholesale commerce system should be a single, high-capacity Informational-Computer Center with one or two branches and a network of bases in commercial organizations and enterprises. This will make it possible to concentrate mathematicians, programmers and repair work in one high-capacity center, which will significantly increase the efficiency of the use of technical equipment and accelerate the development and introduction of the ASM in the city's commerce.

The indicated complexes of tasks are at various stages of active planning

and installation and will [illegible]

In the future, subsequent groups of tasks will be developed, making it possible to draw up optimal orders for industry, and operationally manage the movement of goods and the commercial network and its material-technical base, as well as other tasks of the ASMT.

The further perfection of the management of the city's commerce on the basis of the installation of ASMs and computer techniques will allow the public of Moscow to receive all the information necessary on the existence of goods and services in commercial enterprises, both in the form of answers to residents' enquiries and in the form of active suggestions with the aid of special technical means of mass information.

Director,
Informational-Computer Center of the Main Administration of
Commerce of the Moscow City Executive Committee, A. I. Vedeneyev

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10. Krivko, A. I. "The Processing of Information on Passenger Flow of a City and Research on The Dynamics of Passenger Flows on Computers". 3 pp; Moscow, April 1975.

    Data needs for the effective analysis of urban transport passenger flows.

11. Krupnik, B. Sh.;Varelopulo, G. A.; "Raschetnie Metod; Opedyelenia Strukturi Passayhiropotokov i Sostavlyenye Marshrytnikh Raspisanii Dvizhenia Gorodskikh Autobusov s Pomoshchyu IBM" (Calculating Methods of Defining the Structures of Passenger Flow and the Composition of Route Schedules of Urban Buses with the Aid of Computers) - Russian Text only - 22 pp. Ministry of Auto Transport, Russian Federation, Moscow, 1975.

    This publication describes the mathematical basis of the author's research into the modeling of urban bus passenger transportation.

12. Legostaev, E. A.; Maleev, B.B.; "Automated System of Control of the Moscow Subway". 9 pp.; Moscow, April 1975.

    A description of the composition of the Moscow Metro and plans for automated operation including train control, escalator control, microclimate control, passenger control and maintenance.

13. L'vin, M. E. "The Application of Computer Technology to the Management of Motor Transport for General Use". 9 pp.; Moscow, April 1975.

    A description of the automatic system of management for motor transport in the RSFSR (Russian Republic), including its structure and stages of development.

14. Oleinik, Iu. A. "Basic Directions of Work in the Perfection of Management of Freight Automotive Transport". 13 pp., Moscow, April 1975.

    A discussion of the auto Transport goals of the Soviet Union and the means of achieving them, including the means of shifting from the application of econometric methods of solving local transport problems to the creation of an all-union system of transport planning and management based on advanced methods and computer systems.

15. Podkladov, Yu. S. "The Operational Planning of Freight Conveyances with the Aid of Computers" 3 pp., Leningrad, April 1975.

    A description of efforts by the Leningrad Administration of Auto-Transport to improve freight transport services by local enterprises.

16. Podkladov, Yu. S. "The Planning of the Work of Buses on Their Routes" 9 pp., Leningrad, April 1975.

    A description of efforts by the Leningrad Administration of Auto-Transport to develop automated control of the bus system in Leningrad.

17. Podkladov, Yu. S. "The System of Centralized Receiving, Carrying Out, and Accounting of Orders for Taxis from the Population." 7 pp; Leningrad, April 1975.

    A description of the centralized automated taxi control system of the Leningrad Administration of Auto-Transport.

18. Shcheglov, G. S. "On the Joint Use of Conceptions of Information Languages, Integrated Data Processing and the Data Bank in Automated Systems Management of a Large Auto-transport Combine" 6 pp.; Moscow, April 1975.

    Technical analysis of several problems encountered in the development of an automated management system for an "autocombinat" (truck pool).

19. Shumilov, N. P. "The Automated System of Dispatcher Control of Taxis in the City of Moscow" 15 pp.; Moscow, April 1975.

    A description (with diagrams) of the central automatic taxi dispatch system being installed in Moscow.

20. Sinitskii, A. Z. "The Application of Economic-Mathematical Methods and of Computer Technology in Glavmosavtotrans (The Moscow Main Administration for Auto Transport)." 6 pp., Moscow, April 1975.

    An overview of the operations of the computing center of the Main Administration for Auto Transport of the Moscow City Council.

21. Varelopulo, G. A. "The Design of a Schedule of Motion of Rolling Stock on Computers" 5 pp.; Moscow, April 1975.

    A statement of the problem of timetable development for urban passenger transportation, alternate approaches to solution and parameters of the selected method.

22. Zhitkov, V. A. "The Automated System of Operational Planning of Freight Auto Transport." 4 pp.; Moscow, April 1975.

    Outline of a system developed at the Central Economic - Mathematical Institute of the USSR Academy of Sciences for the solution of routing deliveries from one sender to up to 1000 out of a potential 2000 receivers.

11. TOPIC 3 PROJECT DRAFT REPORTS

1. Main Scientific Research Computing Center of the Moscow City Executive Committee. "A Description of the System of City Administration in Moscow." 259 pp.; Moscow, June 1975

   A draft version of comprehensive description of Moscow, its physical characteristics, governmental system, current and planned management methods. Chapters include:

   1. General Description of the City
   2. Contemporary Status of the City
   3. The Structure of the Organization of City Administration
   4. The City Budget
   5. The Status of the City Administrative Organs
   6. The Functions of the Organs of City Administration
   7. Party Guidance of City Administration
   8. The Sphere of City Services
   9. The Systems Approach to the Administration of the City
   10. The Basic Principles for Formulating the Methodology of Evaluating the Efficiency of the Administration of the Unified Development of the City

   Appendix A. The Perfection of Scientific City Management
   Appendix B. Long Term Forecasting of Capital Investments in the Development of Branches of City Economy.

2. Main Scientific Research Computing Center of the Moscow City Executive Committee, "Characterization of Municipal Systems of Data Processing (Registered Technological Characteristics of Automated Management Systems of Municipal Services)." 63 pp+; Moscow, June 1975.

   A preliminary inventory of applications of computers to the management of the Moscow city government, with detailed descriptions of several systems. Chapters include:

   1. Paths of development of automation of the management of municipal services of the city of Moscow.
   2. Basic technological characteristics of automated management systems of municipal services of the city of Moscow.
   3. Projected solutions for automated systems of management of municipal services: a. material-Technological supply
      b. construction-the Central Moscow Building Agency
   4. The economic effectiveness of automation of management of municipal services of the city of Moscow.

3. Main Scientific Research Computing Center of the Moscow City Executive Committee. "Description of the Standard Methods of Design Development and Implementation of Large Automated Systems for Data Processing for the Needs of the City Management Authorities." 100 pp.; Moscow, June 1975.

A comprehensive manual for the development of management systems in Moscow, including detailed procedures to be followed, problems encountered and future planned expansion. Chapters include:

1. Introduction.
2. Methodological Basis of the Project Research.
3. Methodological Basis of the Analysis of the Forms and Volumes of the Documents Subject to Automated Processing.
4. Structure and Forms of the Documents for the Technical Project of the AMS.
5. Order of the Implementation of the AMS.
6. Existing Procedure for the Assembly of the Technical Equipment for the Data Processing.
7. Methodological Basis for the Evaluation of the Economical Effect of the AMS.
8. Problems of the Organization and the Management of the Large Automated Data Banks.
9. Problems of the Data Communications in the Automated Systems for Data Processing.
10. Order of the Development of the Large Problems.

III. OTHER REPORTS AND MATERIALS

1. The USSR Union of Architects
"The Effect of Municipal Environment on the Satisfaction and Progressive Needs of the People" 144 pp. - Russian Text only, Leningrad, 1974.

Proceedings of the conference "Leningrad - 2000" sponsored by the USSR Union of Architects.

2. The Main Administration for Construction of the Moscow City Council, "5,000,000 Squre Meters of Living Area - for Moscovites" 23 pp; Russian Text only - Moscow, 1971.

A pamphlet describing the organization and activities of Glavmostroi, the Main Administration for Construction of the Moscow City Council, including organization charts, plans, and pictures.

3. Kim, K. V. "Ob Effektivnocti Algoritmov Reshenia Dvukhkompon - yentnikh Zadach Lineinovo Programmipovania" (On the Effectiveness of Decision Algorithms in Linear Programming Problems of Two Components) - Russian Text only - 11pp. in "Ekonomika i Matematicheskiye Metodi" of the USSR Academy of Science, Moscow, 1974.

4. Posokhin, M. V. "Perspective Development of Moscow" from Zdanie magazine, 6/73; 32 pp.; Russian Text only.

A description of the general plan for the development of Moscow during the remaining years of this century.

5. Poliak, G. B. ; Sofronova, E. V.; "The General Plan and Budget of Moscow." 111 pp.; Moscow, 1973.

A description of the general plan for Moscow through 1980, including current and future budget expenditures necessary to achieve the planned development. Sections include:

I. The General Plan for the Development of Moscow and the Municipal Budget

II. Basic Tendencies in the Development of Moscow's Economy and Budgetary Expenses

III. The Development of the Basic Branches of the Moscow Economy and the Budgetary Income

6. Tkachenko, P.M.; Naumov, S. I. ; Loginov, A.A. ; Andreev, E. V. ; "The Control System for Implementing Decisions of the Executive Committee of the Moscow City Council." 13 pp.; Moscow, 1974.

A description of the automated management system "SIGNAL" dedeveloped by the Main Scientific Research Computing Center of the Moscow City Council for the control of the implementation of decisions of the Executive Committee of the Council.

7. Ullas, N. N. "New General Plan for the Development of Moscow." 24 pp.; - Russian Text only - Moscow, 1973

   A review of the development of Moscow from the Revolution to 1973 and a discussion of anticipated development under the general plan.

8. Complete organization chart of the Moscow municipal government.

National Bureau of Economic Research
1750 New York Avenue, N.W.
Washington, D.C. 20006

U.S.-U.S.S.R. Scientific and Technical Program of Cooperation in the Field of Application of Computers to Management

PUBLICATIONS RECEIVED: JUNE-AUGUST 1974

Topic 1
Econometric Modeling (development of forecasting models for analysis of various branches of the economy)

Aganbegian, Abel G. and Bagrinovskiĭ, Kirill A. The System of Optimal Intersectoral Models. Novosibirsk: 1970. 18 pp.

Paper presented at the Fifth International Conference on Input-Output Techniques. The authors discuss the interaction between four types of models in an interconnected system. The four types are: dynamic models of inter-industry relations of the national economy, models of allocation of manpower over large economic regions, models of long-run planning of programmed complexes and separate industries of the national economy, and models of separate economic territorial units.

Ekonomika i Matematicheskie Metody, IX, no. 2, 3, 4, 6 (1973) X, no. 1, 2 (1974) Moskva: Nauka.
(Economics and Mathematical Methods)

The journal, published through the Economics and Mathematics Institute of the USSR Academy of Sciences, began publication in 1965 and comes out six times a year. It contains sections on theoretical and methodological problems of planning and management, macroeconomic modeling, regional planning and management, enterprise planning and management, enterprise planning and management methods, etc. Includes contents notes in English.

MATEKON; Translations of Russian and East European Mathematical Economics, VII, no. 2 (Winter, 1970-71) White Plains, N. Y.: International Arts and Sciences Press.

This issue contains unabridged translations from Ekonomika i Matematicheskie Metody of 1970. Included are articles on modeling of economic growth, model of capital dynamics, demographic-economic forecasting, one-product national economic development model, etc.

Matematicheskie Metody Resheniia Ekonomicheskikh Zadach. Sbornik 3. Moskva: Nauka, 1972. 223 pp.
(Mathematical Methods of Solving Economic Problems)

Collection of selected papers submitted to the editors of Ekonomika i Matematicheskie Metody. Includes sections on linear programming, discrete programming, statistical methods, and modeling of management processes.

Matematicheskie Metody Resheniia Ekonomicheskikh Zadach. Sbornik 5. Moskva: Nauka, 1974. 164 pp.
(Mathematical Methods of Solving Economic Problems)

Collections of selected papers submitted to the editors of Ekonomika i Matematicheskie Metody. Papers on linear, convex, non-linear and integer

programming are grouped in the section on mathematical programming. The second section contains papers on calendar planning, dynamic programming, network organizations, time-tables and distribution. The concluding section deals with various aspects of the functioning of economic systems, theory and modeling of management processes and automated systems of management.

Moiseev, Nikita Nikolaevich. Matematicheskie Modeli Ekonomicheskoi Nauki. Matematika, Kibernetika, 1. Moskva: Znanie, 1973. 63 pp. (Mathematical Models in Economics)

The work begins with description of two classic models of Carl Marx--models of cost and of expanded production. Next several single- and multi-branch models of growth are discussed. The booklet concludes with a brief elaboration on problems involved in building a system of models.

Sub-topic 1.1
Econometric-mathematical modeling--development of methods and models for forecasting, planning, and decision-making at the national economic level.

Bagrinovskiĭ, Kirill Andreevich, ed. Matematicheskie Metody v Ekonomike (Modelirovanie i Reshenie Zadach) Novosibirsk: Nauka, Sibirskoe Otdelenie, 1968. 169 pp.
(Mathematical Methods in Economics; Modeling and Problem Solving)

A collection of papers by Aganbegian and others on application of mathematical methods to various branches of the economy. Some of the topics dealt with are equal distribution of resources, probability in forecasting, maximization of profits and economic equilibrium.

D'iachenko, V. Econometry, the Market and Planning. Moscow: Novosti Press Agency Pub. House, 1971. 127 pp.

The booklet deals with the use of mathematics and computers in the analysis, management and planning of the Soviet economy. A very general discussion.

Gubin, Boris. Raising the Efficiency of Socialist Economic Management. Moscow: Novosti Press Agency Pub. House, 1973. 111 pp.

Plans for improvement and increased efficiency of the economy are described. Improvement of economic management is seen as the most important aspect of economic policy. Extensive application of econometric methods and wide use of computers and business machines is anticipated.

Novozhilov, Viktor Valentinovich. Voprosy Razvitiia Sotsialisticheskoĭ Ekonomiki. Moskva: Nauka, 1972. 327 pp.
(Issues in Development of Socialist Economy)

Collection of the author's selected works written between 1923 and 1970. Included are essays dealing with application of mathematical methods to optimal planning and management of national economy and to determination of effectiveness of new technology.

Sub-topic 1.1.1.
Models and methods for long range
(15-20 year) economic forecasting

Aganbegîan, Abel G. An Optimal Approach in Long-Range Planning. Novosibirsk: Institute of Economics and Organization of Industrial Engineering, Siberian Branch of the USSR Academy of Sciences, 1972. 19 pp.

Paper presented at the International Conference on Long-Range Planning and Forecasting, Moscow, 11-16 December, 1972. A general description of the approach to long-range planning.

Aganbegîan, Abel G., Bagrinovskiĭ, Kirill A., and Granberg, Aleksandr G. Sistema Modeleĭ Narodno-Khozîaĭstvennogo Planirovaniîa. Moskva: Mysl', 1972. (A System of Models of National Economic Planning) 351 pp.

The authors analyze a system of models for long-term optimal planning of national economy. The models were worked out by the economists of the Siberian Division of the USSR Academy of Sciences. Significant space also devoted to discussions of regional models.

Akademiîa Nauk SSSR. TSental'nyĭ Ekonomiko-Matematicheskiĭ Institut. TSelevaîa Stadiîa Planirovaniîa i Problemy Priîatiîa Sotsial'no-Ekonomicheskikh Reshenii. Moskva, 1972. 306 pp.
(Goal-Oriented Stage of Planning and Problems in Acceptance of Socio-Economic Decisions)

The first half of the book contains papers devoted to analysis of various stages of goal-oriented planning. The second part includes examination of concepts and methods utilized in goal-planning. The collection attempts to bring to light major problems involved in such planning and to map out measures for their solution and incorporation into planning of national economy.

Men'shikov, Stanislav M. Problemy Postroeniîa i Ispol'zovaniîa Narodnokhozîaĭstvennykh Modeleĭ; Modelirovanie Ekonomiki SSHA. Novosibirsk: Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Ekonomiki i Organizatsii Promyshlennogo Proizvodstva, 1971. 329 pp.
(Problems Involved in Building and Utilization of Models of National Economies; Modeling of US Economy)

Models for long-range economic forecasting of the US are described and discussed.

Smirnov, Aleksandr D. Modelirovanie i Prognozirovanie Sotsialisticheskogo Vosproizvodstva. Moskva: Ekonomika, 1970. 214 pp.
(Modeling and Forecasting of Socialist Reproduction)

Interbranch models of socialist reproduction on an extended scale are examined. Methods for long-range forecasting of structural economic indicators are presented and results of experimental calculations are given.

Sub-topic 1.2.

Econometric-mathematical modeling--development of methods and models for forecasting, planning, and decision-making at the level of various branches (major divisions--agriculture, mining, manufacturing and industries) of the economy.

Bagrinovskiĭ, Kirill A. and Berlîand, E. L., eds. Matematicheskiĭ Analiz Ekonomicheskikh Modeleĭ. Chast' 1. Novosibirsk: Akademiîa Nauk SSSR, Sibirskoe Otdelenie, Institut Ekonomiki i Organizatsii Promyshlennogo Proizvodstva, 1971. 199 pp.
(Mathematical Analysis of Economic Models)

Among topics discussed in this collection of papers are: methods of building coordinated territorial production systems, solving the problems in management of multi-sectoral economy, non-linear model of resource distribution, methods for solving problems in maximization of profits, model of production equilibrium, and other cases of application of mathematics to economics.

Ispiriîan, Georgiĭ P. and Rozhok, Vladimir D. Matematicheskie Metody v Planirovanii i Upravlenii na Predpriîatiîakh Legkoĭ Promyshlennosti. Kiev: Tekhnika, 1974. 298 pp.
(Mathematical Methods in Planning and Management of Light Industry)

The authors present econometric models for solving problems of organization, planning and management of light industry. Determination of optimal assortment of products, optimal utilization of raw materials, management of reserves and calendar planning are discussed. Special attention given to methodology of building econometric models and to analysis of concrete problems. The given methods are seen as contributing toward automated management systems which are now being intensively worked on in the field of light industry.

Maksimov, Gennadiĭ T. Izuchenie Sistemy Gorodskikh Poseleniĭ BSSR Metodami Matematicheskoĭ Statistiki. Minsk: Nauka i Tekhnika, 1972. 150 pp.
(A Study of the System of Urban Settlements of the Belorussian Soviet Socialist Republic by Means of Mathematical Statistics)

The book is published through the Economics Institute of the Belorussian Soviet Socialist Republic. In it systems analyses of city settlements are examined. Algorithms of multi-measured analysis and unit-network of programs for calculations on computer "Minsk-22" are presented. Parameters of the structures of the city systems are defined. A complex classification system for the cities of Belorussia is worked out.

Ushatskiĭ, Sergeĭ A. Vybor Optimal'nykh Resheniĭ v Upravlenii Stroitel'nym Proizvodstvom. Kiev: Budivel'nyk, 1974. 168 pp.
(Choosing Optimal Decisions in the Management of Construction Industry)

With the aid of econometric methods the book sets forth methodology for problem solving in management of construction industry. Major part of the book is devoted to discussion of plans for construction and assembly work, calculation of standard reserves, as well as to optimal utilization of material and financial resources.

Sub-topic 1.2.1.
Models and methods for long-range planning, programming, and forecasting at the sector or sub-sector level.

Akademiia Nauk SSSR. Sibirskoe Otdelenie. Institut Ekonomiki i Organizatsii Promyshlennogo Proizvodstva. Reports to the IX Congress of the World Association of Regional Science, Copenhagen, 1969. Novosibirsk: Nauka, 1969. 61 pp.

Three papers are included: "The Development of Regional Science in Siberia," by A. G. Aganbegian, "Combining Branch and Territorial Planning by Applying Optimal Production Transportation Models," by D. M. Kazakevich, and "The Definition of the Scheme of Industrial Dislocation Within a Restricted Territory," by M. K. Bandman and V. S. Zverev.

Iakovenko, Evgeniĭ G. Upravlenie Ekonomicheskimi Parametrami Razvitiia Proizvodstva. Moskva: Nauka, 1973. 174 pp.
(Management of Economic Parameters of Production Growth)

Questions of increased production, technical and economic planning and production and adaptation of new products in machine-building industry are discussed. The basis for the suggested process for planning is a system of models of management of growth parameters and of improvement of production effectiveness worked out by the author. The functioning of this system is envisioned in automated systems of management of enterprise, as well as in traditional mode of management.

Poliak, Georgiĭ B. and Sofronova, Evdokiia V. General'nyĭ Plan i Biudzhet Moskvy. Moskva: Finansy, 1973. 92 pp.
(The General Plan and Budget of Moscow)

Long-term plans for the development of Moscow and its budget are discussed. The authors present the general plan to 1980 and the projected constructions plans to year 2000. The indicators of the major branches of the city's management are analyzed.

Sub-topic 1.3.
Econometric-mathematical modeling--development of methods and models for forecasting, planning, and decision-making at the level of firms and enterprises.

Akademiia Nauk SSSR. Tsentral'nyĭ Ekonomiko-Matematicheskiĭ Institut. Kompleks Modeleĭ Operativno-Proizvodstvennogo Planirovaniia Na Predpriiatii. Moskva, 1972. 74 pp.
(A Complex of Models of Operation and Production Planning of Enterprise)

Optimization of the system of internal planning and management of a factory and building of a complex of corresponding econometric models, is the subject of this work. The authors build and analyze an optimization model which describes the entire system. The work was conducted by the Group on Optimal Micromodeling from the Institute's Laboratory on Methodology of Automated Systems of Management.

Antoshvili, Mikhail E., Varelopulo, Georgiĭ A. and Khrushchev, Mikhail V. Organizatsiia Gorodskikh Avtobusnykh Perevozok s Primeneniem Matematicheskikh Metodov i EVM. Moskva: Transport, 1974. 101 pp.
(Application of Mathematical Methods and Computer Analysis to Organization of City Bus Transportation)

Mathematical methods and computer analysis as applied in organization and planning of a city bus transport system are discussed in this work. Studies of passenger flow, determination of bus routes and questions of management are considered.

Sub-topic 1.4.
Development of methods, languages, computer programs, and algorithms for use in econometric modeling (including solutions for block-recursive and econometric systems)

Dubovskiĭ, S. V., et al. Matematicheskoe Opisanie Elementov Ekonomiki. Moskva: Institut Problem Upravleniia, 1973. 2 vols.
(Mathematical Description of Elements in Economics)

The work attempts to create a standard universal mathematical descriptor system of elements in economics, with the goal of facilitating universal mathematical methods of solving problems of planning and creating a universal information system.

Sub-topic 1.5.
Development of methods, languages, and computer programs for the collection, storage and maintenance of data on the functioning of the economy, sectors, industries, and enterprises (including data on physical systems and attributes, such as capacity, which influence economic conditions)

Akademiia Nauk SSSR. TSentral'nyĭ Ekonomicheskiĭ Matematicheskiĭ Institut. Metody Unifikatsii Upravlencheskoĭ Dokumentatsii. Moskva, 1972. 45 pp.
(Methods of Unification of Management Documentation)

A term "document" is defined as a determined aggregation of information utilized in solving economic problems. The work examines the following methods of documentation of economic management: matrix method, network planning and management and adaptation of integrated systems for generating data.

Fedorenko, Nikolaĭ P., ed. IAzyki Ekonomicheskogo Upravleniia i Proektirovaniia Sistem. Moskva: Nauka, 1973. 151 pp.
(Language of Economic Planning and Management)

Published through the Section on Economic Cybernetics of the Academy's Economics and Mathematics Institute, this collection of papers is devoted to methods of analysis and perfection of the language of economic management. The utilization of management languages in systems of data processing and in planning automated systems of management is examined.

Katkov, Vladislav L. and Rar, Aleksandr F. Programmirovanie na ĴAzyke EPSILON. Novosibirsk, Nauka 1972. 60 pp.
(Programming in Computer Language EPSILON)

Computer language EPSILON, Developed at the Comptuer Center of Siberian Division of the Academy of Sciences in 1966-67, is described. Recommendations for its use and examples of programs written in the language are given.

Shemakin, ĴUrii I. Tezaurus v Avtomatizirovannykh Sistemakh Upravleniĵa i Obrabotki Informaĉsii. Moskva: Voennoe Izd-vo Ministerstva Oborony SSSR, 1974. 187 pp.
(Thesaurus of Automated Systems of Management and Information Handling)

Methodology for thesori compilation and rules for thesori utilization are presented. The use of thesori in manual and automated indexing is described.

Topic 2.
Computer Analysis Applied to the Economics and Management of Large Systems

Ignatov, Vladimir A., Man'shin, Geral'd G. and Kostanovskiĭ, Valeriĭ V. Elementy Teorii Optimal'nogo Obsluzhivaniĵa Tekhnicheskikh Izdeliĭ. Minsk: Nauka i Tekhnika, 1974. 190 pp.
(Elements of Optimal Servicing Theory of Hardware)

Servicing of hardware depending on its condition is described. Reliability of the elements in steady-state as well as in non-steady state regimes is analyzed. Optimization of individual and group preventive servicing of the elements and management of the technical servicing systems are discussed.

Upravlĵaĵushchie Sistemy i Mashiny. no. 1 (1973) Kiev: Organ Kiberneticheskogo ĴSentra Akademii Nauk Ukrainskoĭ SSR. 141 pp.
(Management Systems and Machinery)

English abstracts of the papers are included. All contributions deal with automated systems of management.

Sub-topic 2.1.
Modeling of physical systems - such as transport, energy, or communications networks - through computer simulation

Akademiĵa Nauk SSSR. ĴSentral'nyĭ Ekonomiko-Matematicheskiĭ Institut. Avtomatizirovannye Sistemy Upravleniĵa Predpriĵatiĵami. Moskva: Nauka, 1972. 214 pp.
(Automated Systems of Enterprise Management)

The work suggests measures worked out at the TSEMI for the development and installation of automated systems of management in industrial enterprise.

Akademiia Nauk SSSR. TSentral'nyi Ekonomiko-Matematicheskii Institut. Metodicheskie Rekommendatsii Po Sovershenstvovaniiu Sistemy Upravleniia Deiatel'nost'iu Nauchno-Issledovatel'skogo Uchrezhdeniia Na Osnove Sozdaniia Avtomatizirovannoi Sistemy Upravleniia. Moskva, 1973. 53 pp. (Recommendations on the Methods of Creating an Automated System of Management at a Scientific Research Institution).

The book suggests ways of increasing effectiveness in mangement of the TSEMI and proposes an approach for automating the management system at the Institute.

Dobrolíubov, Anatolii I. and Akunovich, Stanislav I. Avtomatizatsiia Proektirovaniia Sistem Upravleniia Tekhnologicheskimi Mashinami. Moskva: Mashinostroenie, 1974. 223 pp.
(Automation of Planning Systems of Management With Technology)

The book deals with problems of automation in specific areas of planning in engineering--planning, analysis and drafting of charts for operating technology equipment. Electrical and hydraulic relay-contact systems of operation of machinery are examined. The major emphasis of the work is on practical application of methods set forth.

Kandaurov, Nikolai N. and Shimanskii, Kazimir A. Printsipy Sozdaniia Otraslevykh ASU. Minsk: Izd-vo BGI, 1974. 128 pp.
(Principles for Developing Automated Systems of Management at the Branch Level of Management)

Major principles for development of automated management systems at the branch level are discussed. Prerequisites to these systems, problems in improving their management, classification of systems of management, stages of development, construction of projects, principles for typification of project decisions, classification of functions and technical, mathematical and informational provisions are discussed.

Levin, Iosif B. Tekhniko-Ekonomicheskoe Planirovanie v ASUP. Minsk: Nauka i Tekhnika, 1974. 317 pp.
(Technical and Economic Planning for Automated Systems of Management of Enterprise).

The book sets forth the major problems involved in building econometric models of planned accounts in enterprise and the integration of these models into an automated sub-system of technical and economic planning of automated system of management of enterprise. Special attention is paid to applications of computers in technical and economic planning.

Sub-topic 2.2.
Defining, characterizing (e.g. scaling) and deriving models that adequately represent the economic environment within which particular systems operate (including economic-physical interactions and influences)

Sadovnikov, Vladimir I. and Epshtein, Vladimir L. Potoki Informatsii v Sistemakh Upravleniia. Moskva: Energiia, 1974. 238 pp.
(Information Flow in Management Systems)

The book examines basic problems involved in description and analysis of information flow. A formulated method is examined and an example of its use in planning an automated information system is presented.

Subtopic 2.4.
Development of methods for the solution of large-scale mathematical programming problems--linear, non-linear, and integer--static and dynamic, of the type commonly encountered in modeling large physio-economic systems

Kharatishvili, Guram L., et al. Abstraktnaia Variatsionnaia Teoriia i Ee Primeneniia k Optimal'nym Zadacham s Zapazdyvaniiami. Tbilisi: Mecniereba, 1973. 108 pp.
(Abstract Variational Theory and its Application to Optimization Problems with Time Lags)

The work proves the quasi-convexity of filters which allows for obtainment from the necessary conditions of criticality the necessary conditions of optimality in the form of the principle of maximum for optimal problems containing time-lags in phased coordinators as well as in management.

Kotov, V. E. Preobrazovanie Operatornykh Skhem v Asinkhronnye Programmy. Novosibirsk: Akademiia Nauk SSSR, Sibirskoe Otdelenie, 1971. 29 pp.
(Transformation of Operational Schemes into Asynchronous Programs)

The thesis examines two models of computation--a model of sequential computation and a model of parallel asynchronous computation. The work ascertains the existence of an algorithm which transforms any object operational scheme into maximal asynchronous general A-programs which calculate these schemes.

Kravchenko, Tat'iana K. Protsess Priniatiia Planovykh Reshenii [Informatsionnye Modeli]. Maskva: Ekonomika, 1974. 181 pp.
(The Process of Adopting Planning Decisions [Information Models])

The book analyzes and builds models of processes of making planning decisions within the bounds of automated systems of planning.

Narin'iani, A. S. Asinkhronnye Vychislitel'nye Protsessy nad Pamiat'iu. Novosibirsk: Akademiia Nauk SSSR, Sibirskoe Otdelenie, 1971. 21 pp.
(Asynchronous Computing Processes on Memory)

In this thesis the author investigates questions resulting from examination of certain non-algorithmic parallel programs and systems. A model of a parallel computing process is introduced.

Narin'iani, A. S. Looking for an Approach to a Theory of Models for Parallel Computation. Novosibirsk: Akademiia Nauk SSSR, Sibirskoe Otdelenie, 1972. 43 pp

The paper, presented at the Symposium on Theoretical programming, Novosibirsk, 1972, emphasizes the necessity of creating a metaapparatus for classifying and comparing individual models. A version of such an apparatus is offered.

Zaitsev, Nikolai G. Matematicheskoe Obespechenie Avtomatizirovannykh Sistem Upravleniia. Nauka Upravleniia, 5. Moskva: Znanie, 1974. 64 pp.
(Software of Automated Systems of Management)

The author examines the structure and major components of computer software of automated systems of management. Important problems common to many systems are mentioned and programs for their solution are suggested.

Other related material:

Abramovich, K. G., comp. The Hydrometeorological Research Centre of the USSR. Leningrad: Hydrometeorological Publishing House, 1970. 42 pp.

The booklet outlines the major activities of the USSR Hydrometcentre. A chart demonstrating the hierarchical structure of the center is inserted.

Akademiia Nauk SSSR. Institut Ekonomiki. Planirovanie i Upravlenie Narodnym Khoziaĭstvom v Sotsialisticheskikh Stranakh. Moskva: Mysl' 1969. 389 pp. (Planning and Management of National Economies in Socialist Countries)

The book summarizes the methods of planned management of national economies of socialist countries. Special attention devoted to the theoretical bases and practical results of economic reforms conducted in the socialist countries.

Akademiia Nauk SSSR. Sibirskoe Otdelenie. Institut Ekonomiki i Organizatsii Promyshlennogo Proizvodstva. Sotsiologiia i Matematika; Mezhdunarodnyi Sbornik. Novosibirsk, 1970. 266 pp.
(Sociology and Mathematics; International Collection)

This collection of papers is devoted to mathematics applied to sociological research. Methodology, measurement, selection of topics for research, and modeling of social phenomena are among topics discussed. Contributions are from sociologists of the USSR and other socialist countries.

Braginskiĭ, Lev V. and Perlamutrov, V. L. Problemy Sovershenstvovaniia Kreditnykh Otnosheniĭ v Narodnom Khoziaĭstve. Moskva: Akademiia Nauk SSSR, TSentral'nyĭ Ekonomiko-Matematicheskiĭ Institut, 1973. 60 pp.
(Problems of Attainment of Credit Relations in National Economy)

The work attempts to define the problems and major directions of the credit-payment relationship in the Soviet national economy.

Larichev, O. I. "Metod Otsenki Proektov Provedeniia Prikladnykh Issledovaniĭ Razrabotok." Avtomatika i Telemekhanika, no. 8 (1972), 121-127.
("Method for Evaluation of Projects for Applied Research and Development")

The paper is concerned with estimating by many criteria the overall value of R&D projects. The solution method proposed concerns automated decision-making procedures.

Vaĭnshteĭn, Al'bert L. TSeny i TSenoobrazovanie v SSSR v Vosstanovitel'nyĭ Period, 1921-1928 gg. Moskva: Nauka, 1972. 189 pp.
(Prices and Price Formation in the USSR During the Restoration Period, 1921-1928)

The book examines prices and price formation during the beginning period of reconstruction in the Soviet Union and of development of the Soviet economy--period of the New Economic Policy (NEP). Rare statistical materials are included.

Voronov, IUrii P., ed. Izmerenie i Modelirovanie v Sotsiologii (Voprosy Metodiki, Organizatsii i Tekhniki Sotsiologicheskikh Issledovaniĭ). Novosibirsk: Nauka, Sibirskoe Otdelenie, 1969. 171 pp.
(Measurement and Modeling in Sociology)

Collection of papers on questions of methodology, organization and techniques in sociological investigation. English abstracts included.

World Congress of Sociology, 7th, Varna, September 1970. Papers presented at the Congress. Novosibirsk: USSR Academy of Sciences, Siberian Department, Institute of Economics, Department of Sociological Problems and Social Planning of Labor Resources, 1970.

A series of individually published papers submitted to the Congress. Listed in alphabetical order these are: Antosenkov, E. Labour Turnover in USSR National Economy: Socioeconomic Nature and Principles of Control; Artiomov, V. A., Kutyriov, B. P. and Patrushev, V. D. Free Time: Problems and Perspectives; Gerchikov, V. I. On System Character of the Objects of Social Management; Malinin, E. D. Social-Economic Problems of Raising National-Economic Efficiency of Developing New Regions in Siberia; Patrushev, V. D. Aggregate Time Balance of a Nation (Economic Region) and its Role in Socioeconomic Planning; Ryvkina, R. V. To the Study of Relations Between Different Kinds of Mobility; Sevastîanov, L. I. Representation of Social Factors in the Models of Optimal Settlement for New Industrial Regions; Zaslavska, T. I. Objectives and Methods in Planning Rural-Urban Migration.

Zagoruĭko, Nikolaĭ G. and Zaslavskaîa, Tat'îana I. eds. Raspoznavanie Obrazov v Sotsial'nykh Issledovaniîakh. Novosibirsk: Nauka, Sibirskoe Otdelenie, 1968. 194 pp.
(Recognition of Patterns in Social Research)

The book is devoted to issues discussed at a seminar held at the Department of Sociology of the Economic and Industrial Production Institute and at the Laboratory of Pattern Determination of the Mathematics Institute of the Siberian Division of the Academy of Sciences. The goal of the work is to test the methods of recognition of sociological patterns.

Zaslavskaîa, Tat'îana I. and Borodkin, F. M., eds. Social Problems of Labour Force. Novosibirsk: USSR Academy of Sciences, Siberian Department, Institute of Economics & Industrial Engineering, 1970. 125 pp.

A collection of summaries of papers containing the results of the studies of sociological problems of labor and labor resources conducted by the sociologists at the Institute. The papers were published during the period of 1966-1970 and were presented at the 7th World Congress of Sociology held in Varna, September 14-19, 1970.

R E C O R D

of the meeting in the USSR of American and Soviet Coordinators and Experts of the Joint US-USSR Working Group for Cooperation in the Application of Computers to Management in Regard to Topic 5, "Computer-Aided Refinement of Decision-Making and Education of High-Level Executives."

In accordance with the Agreement between the Governments of the USA and the USSR on Scientific and Technical Cooperation of May 24, 1972, and the Report of the US-USSR Working Group in the Field of the Application of Computers to Management signed in Moscow on November 28, 1973, as well as in accordance with the Protocol of the meeting in the U.S. of Coordinators and Experts in regard to Topic 5, signed in December, 1974, a meeting of Coordinators and Experts on Topic 5 was held in the USSR from September 18 to October 1, 1975.

The itinerary of the American specialists in the Soviet Union included visits to institutions of higher education, academic and branch research institutes, institutions of training and refinement, computer centers, and industrial and commercial establishments. A fully-documented itinerary in the Soviet Union of the American delegation on Topic 5 is found in Attachment I of this protocol. A listing of those individuals who participated in the meetings and discussions held during the visit is found in Attachment II.

During the visits to these institutions and organizations American and Soviet experts exchanged opinions on the main aspects of Topic 5 and provided detailed answers to all questions of interest to the participants of the meetings. The coordinators of both sides prepared plans for American-Soviet scientific and technical cooperation for Topic 5. The descriptions of the proposed subtopics are in Attachment III. The descriptions of specific activities recommended

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STATINTL

In accordance with the Agreement between the Governments of the USA and the USSR on Scientific and Technical Cooperation of May 24, 1972, and the Report of the US-USSR Working Group in the Field of the Application of Computers to Management signed in Moscow on November 28, 1973, as well as in accordance with the Protocol of the meeting in the U.S. of Coordinators and Experts in regard to Topic 5, signed in December, 1974, a meeting of Coordinators and Experts on Topic 5 was held in the USSR from September 18 to October 1, 1975.

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