

PROJECT MANAGEMENT IN USSR: YESTERDAY, TODAY, TOMORROW

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SUMMARY

For the past 30 years many Soviet organisations and specialists have been engaged in what the West called Project Management (PM). However, PM in the USSR has not been regarded as a separate field of professional activity.

It is significant that until recently in our country the term Project generally meant design or engineering documentation, and the term Project Management was not applied at all.

During these same years the international "Project Management World" was built up. This is the World of the national and international professional associations; the World of congresses, seminars and conferences; the World of books and journals; the World of specialized companies and departments; the World of software and other PM-tools; the World of Project Managers.

Soviet specialists had no close contacts with each other, nor did they have any contacts with the external "PM World". Western specialists in their turn had very poor information on PM development in the Soviet Union. Some of them did not even suspect that such a field of activity existed in this country.

Now that the Soviet Project Management Association has been established and has initiated international contacts, it is timely to review the field of PM in USSR.

This paper is an attempt to survey the history of PM development in the Soviet Union, to present some directions and results of the theoretical work, and to analyze the experience and the trends of development of PM practice in the Soviet environment.

HISTORY OF PM DEVELOPMENT

The main stages of development of PM are shown in Fig. 1.

Project Management (PM) in the Soviet Union is deeply rooted in the Industrialization of the thirties. The growth of the construction industry and expansion of cereal production called for the development of new methods, particularly some methods based on Gant Diagrams and Cyclograms [1-3].

This period that lasted till the early sixties laid the foundation for PM methods.

Network Methods

The development of modern PM methods started in the USSR after the first Network methods appeared in 1959 (Critical Path Method, PERT). The papers [4,5] that were published in the early sixties were the first publications on network methods in the USSR. Zuchovitsky & Radchik's book [6] appeared then, and it has remained one of the best on the subject to this day.

By the early seventies the use of PM based on network methods had become widespread. More than 2500 papers had been published. Many students had studied these methods. Specialized departments or groups had been created in many organizations. By 1967 more than 900 large-scale construction projects had been executed with the help of these methods.

Software Systems for Management of Projects.

The first software systems for management of projects appeared in USSR in the beginning of the seventies, and they were rather high advanced for that time. They included time and cost analysis and resource allocation, and were based on interesting (maybe even today) ideas and algorithms.

Multi Project Management

It was characteristic of the Soviet Union that the goals of an organization/company typically took precedence over the goals of projects.

This was the reason why in the middle of the seventies PM development moved from the management of separate projects towards the management of an organization/company which carried out many projects simultaneously. In this period multi project software systems emerged.

Integrated Systems

In the eighties computerization in the investment sphere made great progress. CAD systems were developed. Computers were used for making estimates, for calculations of required quantities of materials, for registration of work and resources, for book-keeping and salary calculations and for many other purposes.

It became clear that all Project participants worked in a common information environment and all information flows and computer applications were closely connected. This stimulated the current stage of PM development - the stage of Integrated Systems.

The Directions of PM Research in USSR.

The development of PM in the Soviet Union in all stages represented above was stimulated by the works of western specialists. However some of the Soviet scientists obtained rather original results and invented some promising methods. We have no ambitions to produce a full review of PM research in the

USSR, but try only to present the work which appears to be most significant from our point of view.

Modelling of Projects.

Network models more general and powerful than model of the CPM-type or of the MPM-type have been designed. These models, so-called Generalized Network Models (GNM), to our mind, are useful especially for construction projects (See Fig. 2).

With these models one can reflect by means of a simple network technique such factors as the variable durations of activities, the coincidence of activities, and the links between activities not only of "Not Earlier" type but also of "Not Later" type. The corresponding algorithms for GNM analysis have also been designed.

The first publication on GNM theory were works [8,9]. Further developments of GNM theory appear in works [9.10.11].

Resource Allocation Algorithms.

There have been developed a number of original heuristic algorithms of resource allocation which facilitate a sophisticated logical analysis of situations, capability for self-training, and an advanced "User-Computer" interface (See Fig. 3).

The general idea of these algorithms is that resource allocation is considered as a process. The algorithm continuously analyses the situation, and for each moment chooses the most suitable procedure from the bank (open for enrichment) of heuristic procedures of resource allocation (See [12-15] and others).

We believe that these algorithms might be useful for PM expert systems development.

Software Systems for Multi Project Management.

Multi Project Management Software Systems (See Fig.4) developed in the Soviet Union are based on new approaches and permit hundreds of projects to be processed simultaneously.

Those systems are designed to be used by a project-oriented organization/company, as a Portfolio of Project Management, at various stages from strategy planning to operating control. The methods which are the essence of the systems allow one to take into account the goals of the organization as well as its resource capabilities ([15-18] and others).

Stochastic Models of Projects

Models which take into account the stochastic nature of various elements of projects are illustrated in Fig.5. The distinctive feature of these models is that the stochastic elements include not only activity durations or link parameters but also quantities of available resources, dates of supply, costs, etc.

These models are able to provide an estimation or optimization of project risk/reliability. Risk/reliability here means the probability that any given parameters (not only of a time nature) do-not-satisfy/satisfy certain restriction (See [19-22] and others).

Simulation Models for PM

Simulation models for PM (See Fig 6) invented in the USSR combine the advantages of heuristic methods of resource allocation and of the method of stochastic modeling. By means of simulation models one can work with those project aspects where the traditional models fail. It is important that one can add the new simulated factor - project control-to the traditional ones - activities and resources (See [23], [24] and others).

Computer Aid for Preparing Project Data

The preparation of the initial project data-network, resources and costs for each activity, etc. requires a lot of time and labor. So methods of computer aid for preparing the initial project data are considered in the USSR as very important (See Fig. 7). These methods use a collection of standard projects or project-analogs and cost and resource calculations based on state and local standards.

A significant part of the necessary project information can be extracted from design data. That is why there is a continuing growth in the development of interface CAD-PM by modern researchers.

The main approaches and concepts are summarized in publications [7], [15], [21], [25] and others.

We would like also to emphasize the most recent works [26-28], which may well uncover new prospects in PM methods.

PM PRACTICE IN THE SOVIET ENVIRONMENT

From the preceding it can be seen that the Soviet Union has been activity involved in Project Management progress. Groups of professionals were shaped, a lot of students and managers obtained appropriate experience, scientific research was undertaken, and software systems were developed. PM methods were implemented in hundreds of organisations, and helped improve performance in thousands of projects.

However for a country of the size of the USSR, PM methods were not spread widely enough, had little overall effect, and had little influence on management culture, or on economic development.

Why has this occurred in a country where such large numbers of large projects were undertaken during the 1960-1990 period? Why did the period of the enthusiasm of the sixties turned into a period of doubt or inertia in the seventies-eighties?

This apparently paradoxical situation is illustrated in Fig.8.

Negative Tendencies in the PM Sphere in the USSR

To answer these questions one must take into account the specific peculiarities of the Soviet environment, the existed level of management, and the economy. A detailed discussion on the features of the Soviet environment is hardly possible in this paper, but we would not like to pass over those features that determined and surroundings of each project hampered the PM development in our country.

These features were mainly related:

- in the economy - to a dominance of state property, and to contractor monopolism which stimulated high expenses, but not project completion
- in organization - to a dominance of established bureaucratic structures, and to lack of flexible project-oriented structures
- in management - to a dominance of administrative management, and to underdevelopment of economic methods including PM methods
- in information technologies - to an underdevelopment of information infrastructure, and to low provision of computers, and nets of communications.

And one of the main features, of course, was the isolation of the Soviet economy from international experience and world achievement.

In that environment the low demand on PM methods was easily explicable. The Soviet economy was based on a highly centralized, administrative direction, with corresponding decision making, and a rigid vertical structure. Officials and managers often acted to please their momentary ambitions, which almost never included reaching economically effective decisions. Thus they needed neither PM methods, nor any other effective management methods. (See Fig.9).

We could mention some other causes of delay in PM deployment, but of more particular nature. In the construction industry, for instance, one could mention the chronic misbalance between planned dates of project completion and real contractor abilities (See Fig.10), and lack of economic motivation for suppliers and contractors to perform their obligations. The artificial assigning of duties to project participants caused a lack of agreement as to their actions, and did not allow them to create joint project-oriented structures (See Fig.11).

Thus it was natural that PM methods did not play a significant role in our country. All successful applications of PM methods as far as we know became possible only thanks to the efforts of enthusiastic specialists and managers.

Prospects for PM Development in the USSR

It is now clear that positive changes in the PM field in Soviet Union will depend on "perestroyka" of the environment surrounding projects.

Taking into account the modern tendencies in Soviet economy we can distinguish trends in the development of this environment.

They are related:

- in the economy - to transition to a market economy
- in organization - to transition to the wide-scale implementation of project-oriented structures and other market structures banks, exchanges, consulting and intermediary firms, etc.
- in management - to transition to economic methods, including PM methods and other market oriented methods
- in information technologies - to creation of new information infrastructures.

The mentioned trends are illustrated in Fig. 12.

Thus if the Soviet economy really starts to transform into a market economy, and to integrate into the world economic system then a new stage of PM development will be reached.

The necessary foundation for PM progress exists in the USSR even today: Soviet specialists, engineers and managers are rather well educated; the problem of computer provision is now partly solved thanks to the PC explosion; and Soviet professionals are starting to establish a variety of international contacts.

But there is the other side of the coin. Not only is PM development not possible without deep changes of the Soviet environment, but also those changes are hardly possible without PM. The reason is that "Project Management is the Management of change" [29].

While the established structures were not interested in changing the existing state of affairs, they rejected PM.

Now that great changes have been started in the USSR, hopes for raising the demands for PM to a much higher level are appearing.

In our opinion it is impossible without PM to successfully carry out many of the contemplated projects, and among them the largest project - "Perestroyka of the Soviet economy and social life".

That is why Soviet PM specialists think that it is very important to develop the national PM association and to foster international contacts with organizations and institution which relate to PM.

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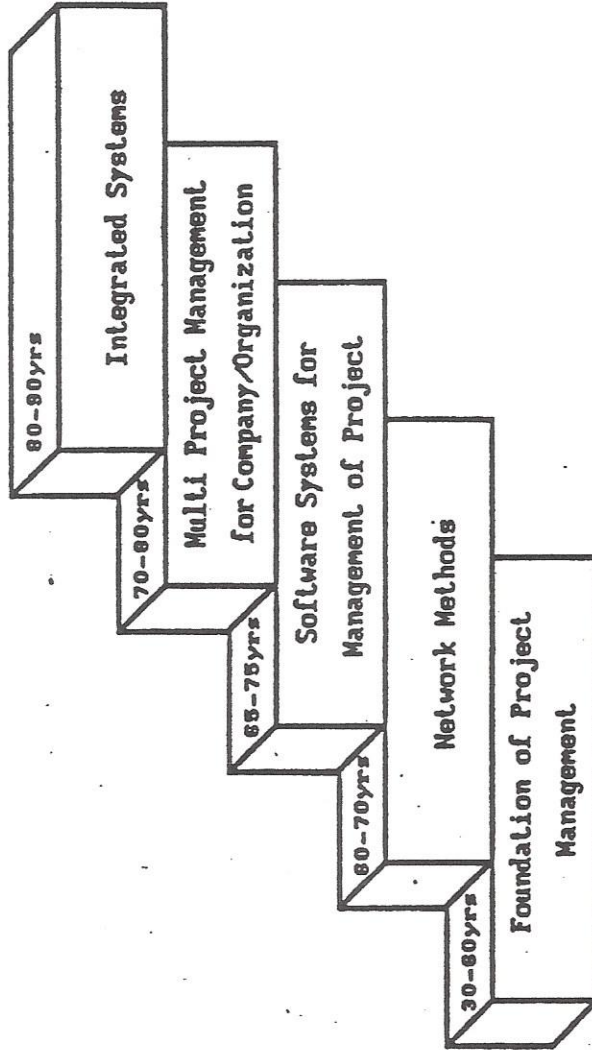
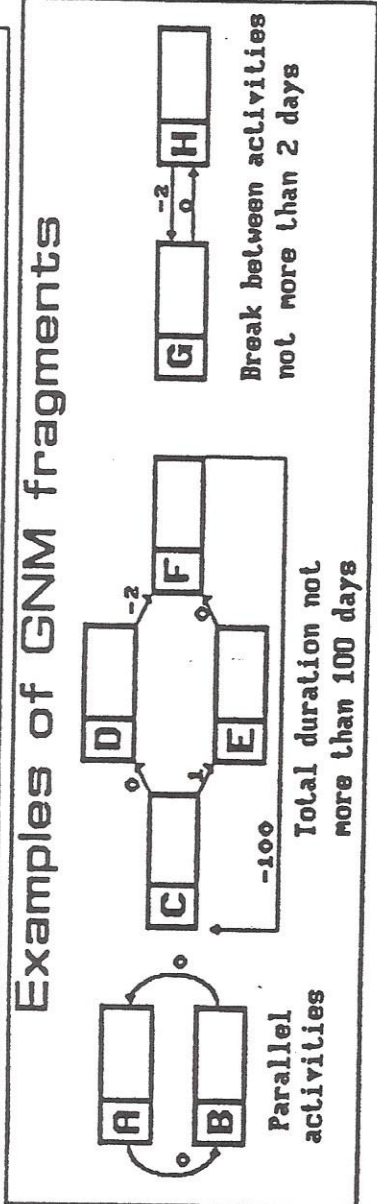
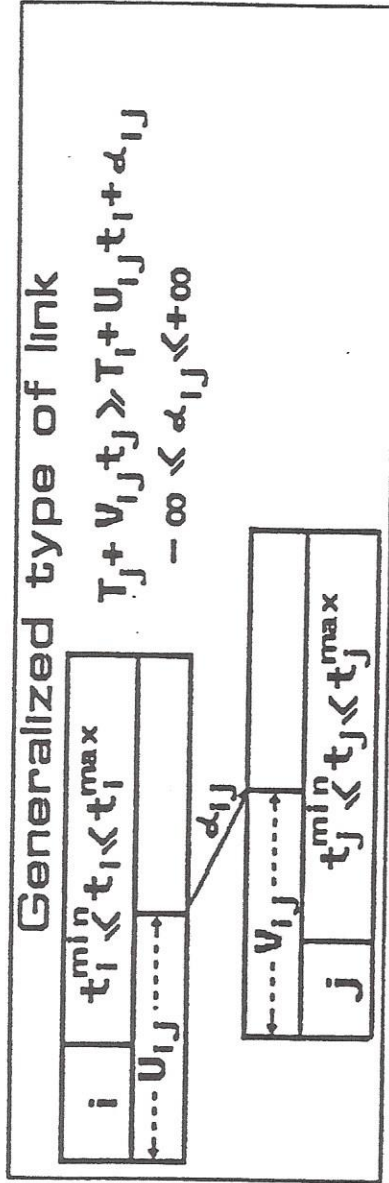


Fig. 1. Main stages of the PM development in USSR



Authors: A. Adelson-Velsky, V. Voropajev, M. Sheinberg, O. Ducarsky, B. Lebed.

Fig. 2. Generalized Network Models.

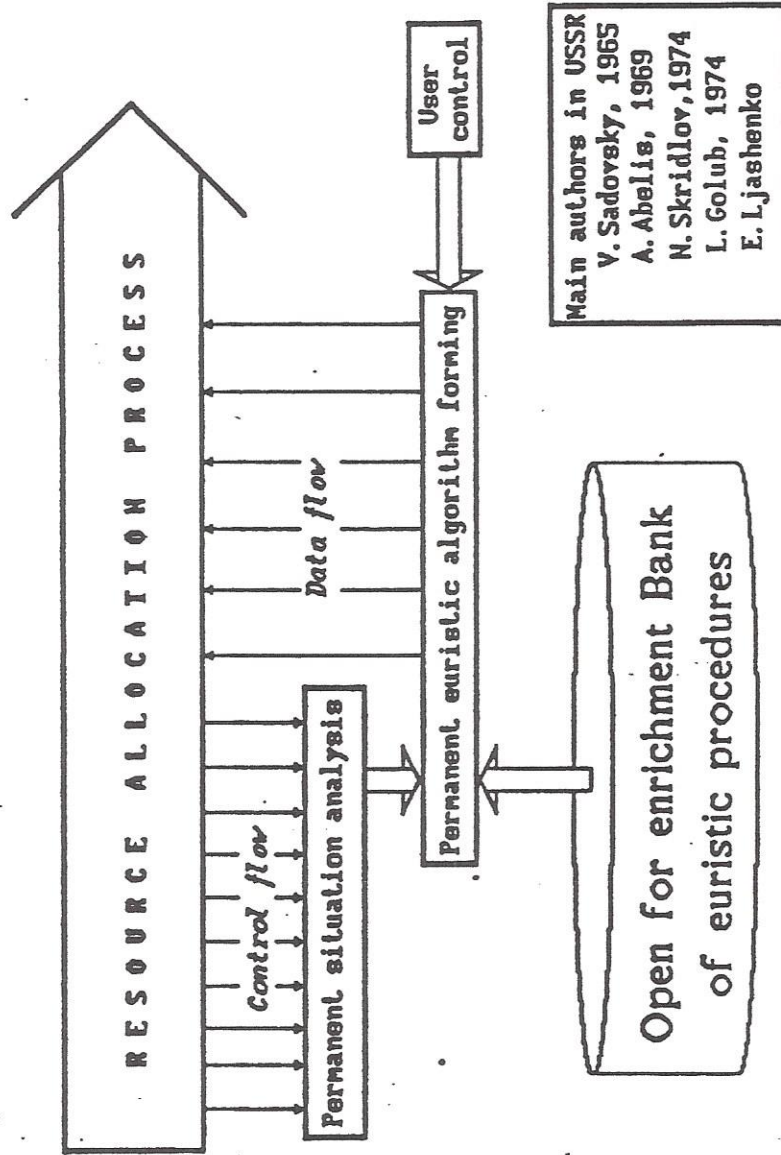


Fig. 3. Resource allocation. Conceptual scheme.

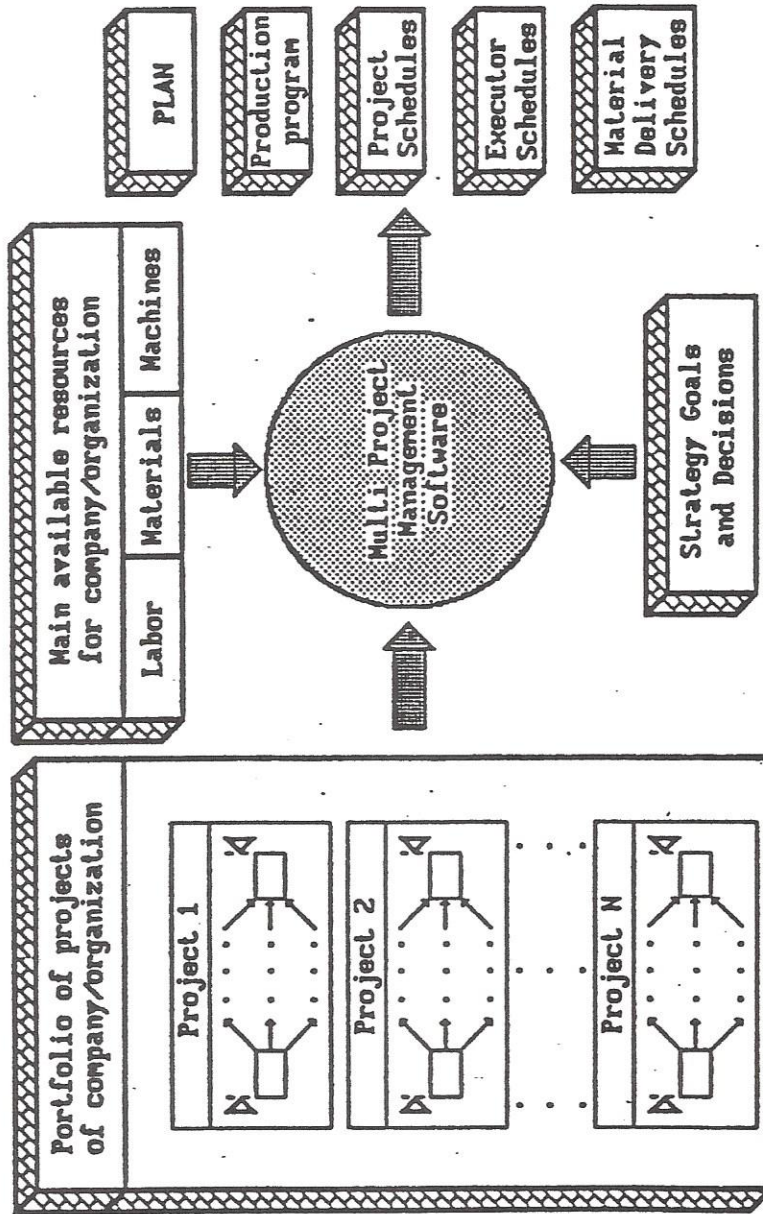


Fig. 4. Multi Project Management of Company/Organization. Conceptual Scheme.

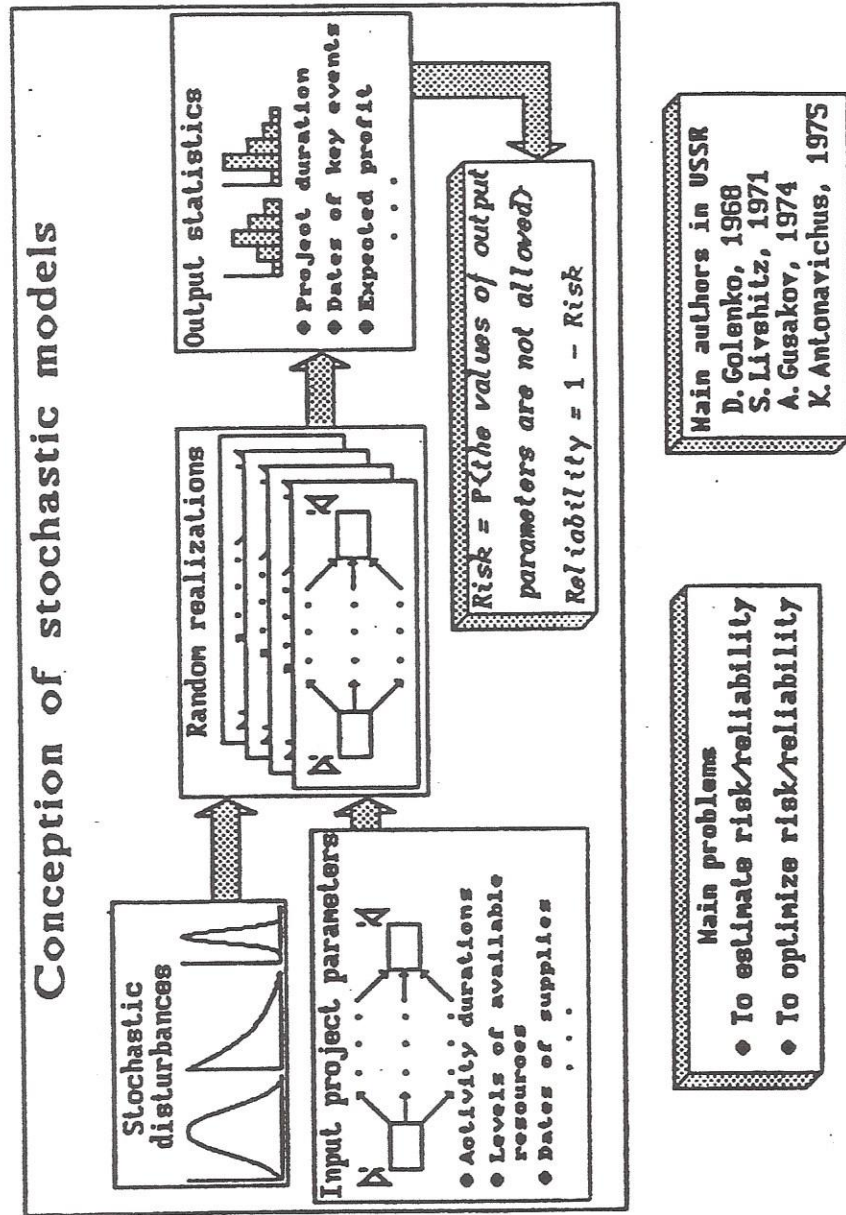
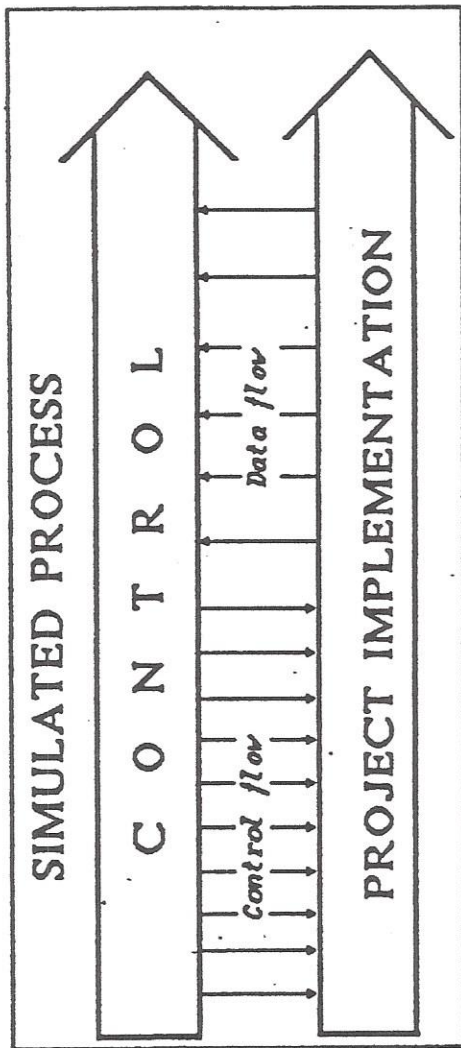


Fig.5. Stochastic models of project



Traditional simulated factors:

- project activities
- project resources

New simulated factor:

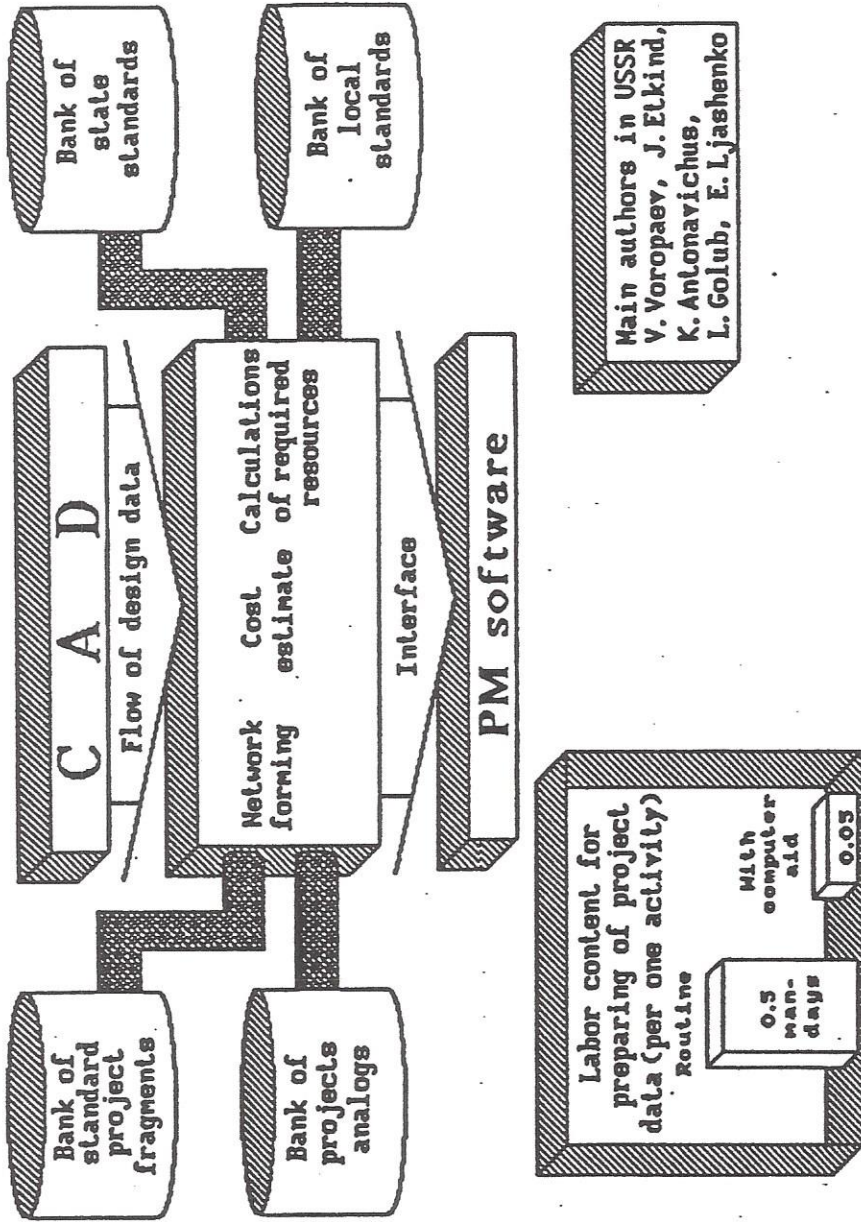
- procedures of project control

Main problems

- To estimate project main parameters (under given procedures of control)
- To choose the best control procedures

Main authors in USSR
 Y. Kulicov, 1983.
 Y. Sutt, 1986

Fig.6. Simulation models for PM



Main authors in USSR
 V. Voropaev, J. Elkind,
 K. Antonavichus,
 L. Golub, E. Ljashenko

Fig. 7. Computer aid for preparing of project data

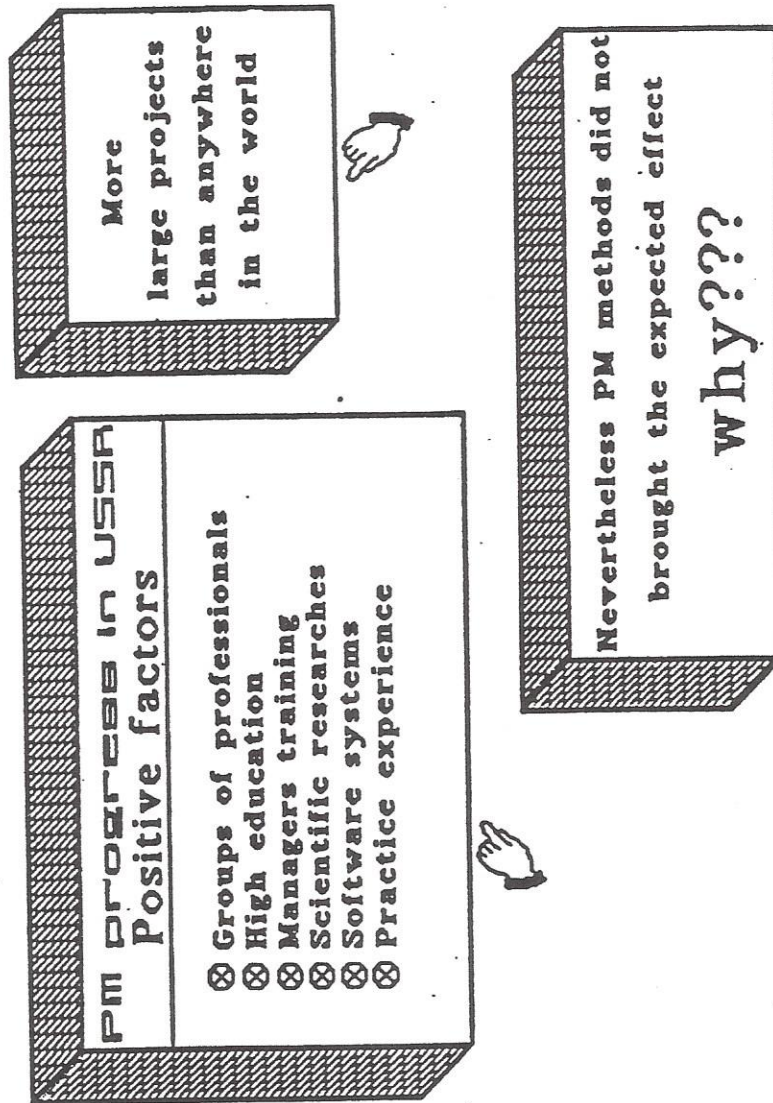


Fig. 8. PM progress in USSR. Positive factors.

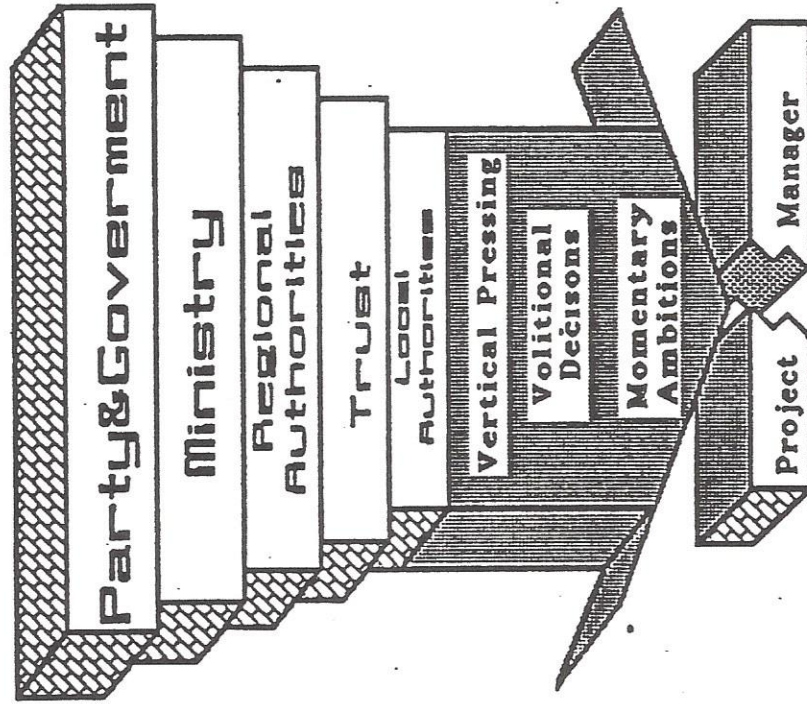
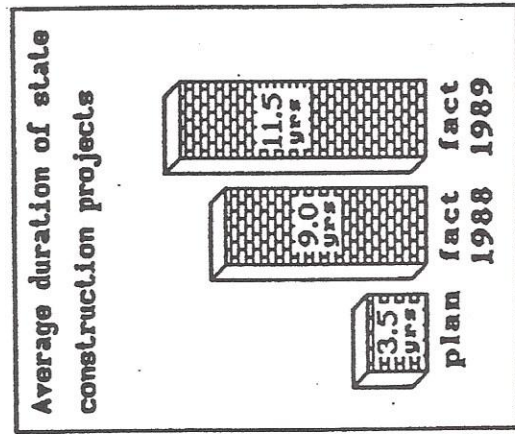
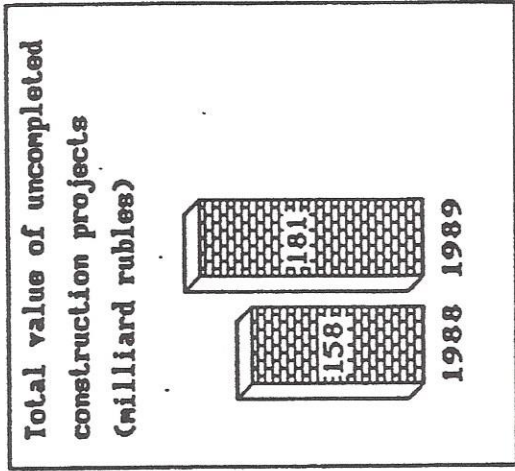


Fig. 9. Administrative system - lack of motivation for application of management methods



Only 50% construction projects of Plan were completed in 1989

Fig. 10. Chronicle disbalance between plans and real abilities

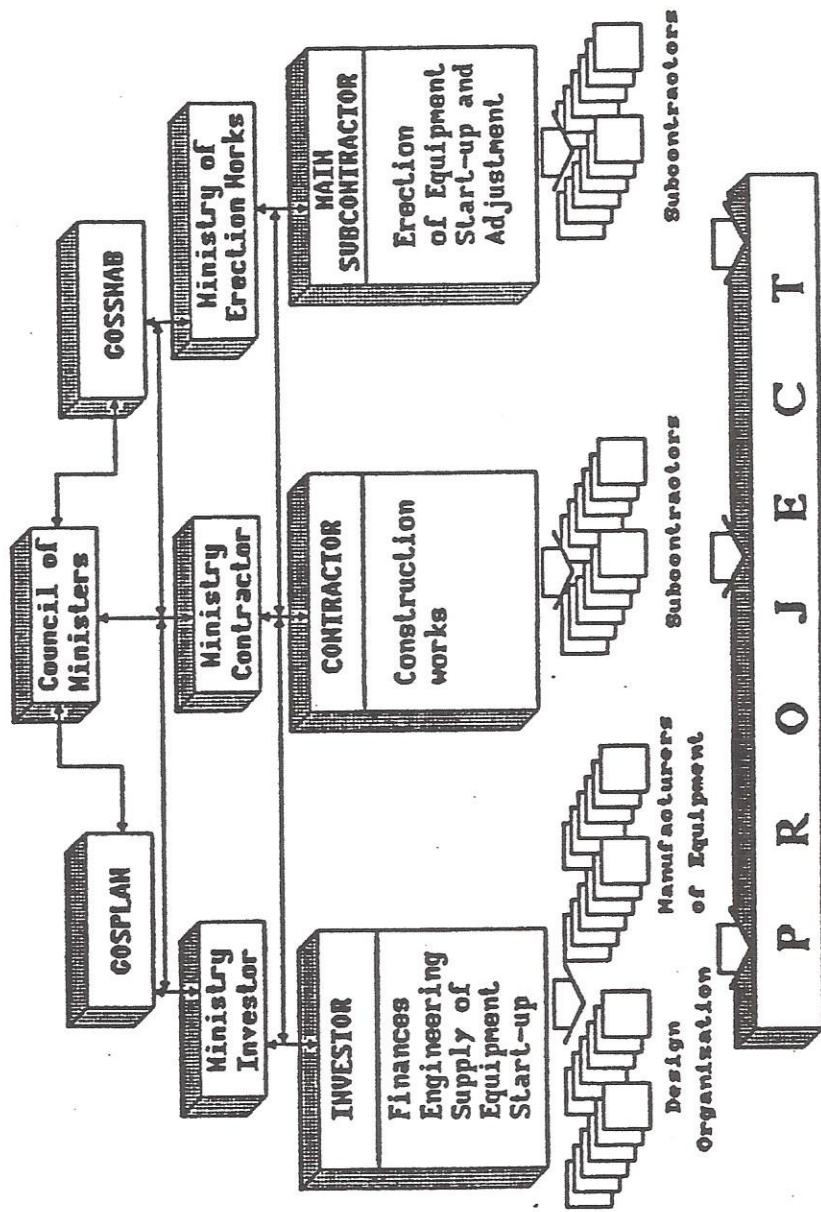


Fig. 11. Typical participants of construction projects: duties and coordination

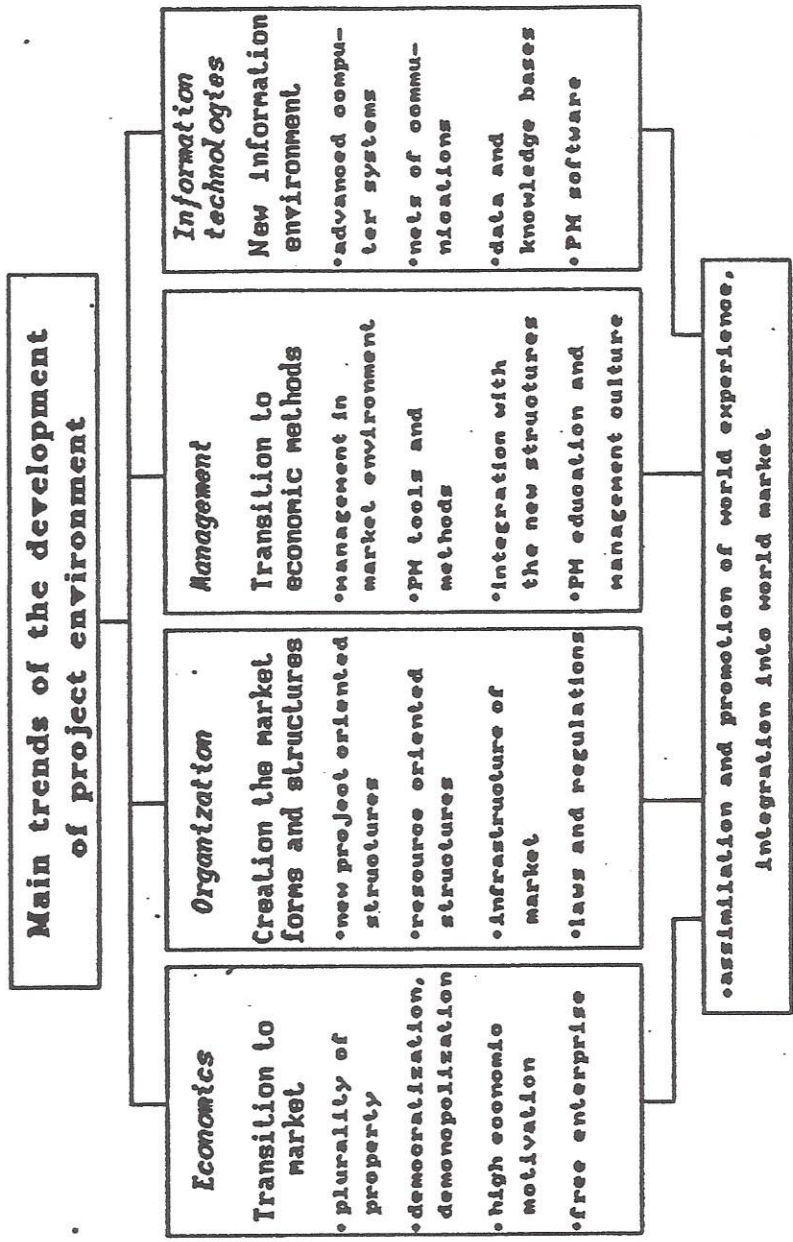


Fig.12. Perspective trends of PM development in USSR