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SOME ASPECTS OF THE APPLICATION OF ANALYTICAL
TECHNIQUES IN U.S. GOVERNMENTAL PROGRAM MANGEMENT

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INTRODUCTION

During recent years developed countries have paid increasingly more attention to the development and implementation of complex, large-scale programs in different spheres of public policy: space investigation, exploration of new territories, rational use of natural resources, environmental protection, etc. Some of the more remarkable examples of such programs are:

- the formation of the Bratsk-Ilimsk Territorial Production Complex; the construction of the Baikal-Amur Railway; and the development of the Nechernoziemnaja zone of the RSFSR in the USSR;
- the TVA experience; the construction of the Trans-Alaska pipeline in the USA;
- construction of the Shinkansen Railway in Japan.*

The programs were developed and implemented by countries with different socio-economic systems, and in diverse spheres of governmental activity. They are also characterized by different scales, goals, degree of government involvement and other features. However, in spite of existing differences, one can find some common methodological and organizational aspects in the management of large-scale programs. Analysis of these aspects along with the generalization of experiences, both positive and negative, gained by different countries could provide a basis for improving public management. In this respect IIASA with its ability to organize international and multidisciplinary scientific teams to tackle problems of program management plays a role that can hardly be over-estimated.

This paper attempts to elucidate the integration of some analytical approaches into U.S. government program management.**

* Some of these programs were the subject of IIASA's research activities. See for example, H. Knop (ed) IIASA CP-76-003; H. Knop (ed) IIASA CP-77-3.

** The decision to choose U.S. experience in program management as a subject for this WP was influenced by the fact that the author is a research fellow at the Institute of USA and Canadian Studies of the Academy of Sciences of the USSR.

In the last decade much literature devoted (directly or indirectly) to different aspects of program management at the governmental level was published in the U.S. First of all we should mention here publications by A. Wildavsky and D. Novick on program budgeting and management; E. Quade and G. Fisher on the use of systems analysis for public administration; J. Wholey and H. Hatry on program analysis and evaluation, etc. Working on this paper the author has profited from some of the ideas presented in those publications.

PROGRAM APPROACH: GENERAL REMARKS

The increasing attention given to programs, as a tool for public policy design and implementation, is the result of:

- growth in the dynamics and scale of national economies;
- complication of interrelations between different regions as well as different sectors of economies;
- growth in complexity of socio-economic problems throughout all sectors which require coordination at all levels to tackle the problems;
- need to increase efficiency and effectiveness of governmental expenditures;
- necessity to identify all possible consequences, both direct and indirect, of governmental policies and actions;
- long-range character of many governmental efforts.

On the other hand, these reasons in their turn, have increased the attention given to a systems consideration of complex problems in public decision-making. Nowadays the design and implementation of large-scale problems, both in different spheres and at different levels of governmental organizations is a typical illustration of such a consideration.

The term "program" is widely used in the existing literature devoted to problems of public administration and management. This term is used when one speaks about different and divergent topics: the budget item, promises to tackle any public policy problem, a

production plan of an industrial firm, a comprehensive technological project, etc. Even the Working Glossary on science policy prepared by the staff of the Congressional Research Service gives a rather unprecise definition: "Program (is) a set of actions to implement an agency's mission, or a major part of the mission".^[1] Nevertheless, the use of a "program" as a key term of a so-called program (program-objective) approach to the allocation and utilization of governmental resources requires a more precise definition. The following might be offered as one possible version: program is a set of interrelated actions of different kinds (socio-economic, scientific-technological, organizational, legislative, educational, etc.) that are united by precisely defined goals, terms of realization, and coordinated between actors, and provided by specially allotted resources.

Keeping in mind the above definition we can outline the following major elements of a program approach:

- development of the system of program goals and objectives which must be coordinated, non-conflicting, precisely defined and (if possible) quantified;
- formation of the program as a hierarchically built system of subprograms of major and supporting activities (in accordance to the system of program goals);
- apportionment of proper amounts of resources (financial, material, labor, etc.) specially for the given program;
- organizational support of the program, i.e., foundation of a special body (or choosing a special unit or executive within an existing agency) responsible for the design and/or implementation of the program and also being in charge of the proper use of the available resources;
- analytical support of program decision-making, i.e., application of advanced analytical methodology at all stages of program management from design up to control of performance.

Obviously, it is possible to continue this list. But from our viewpoint the list could be a criterion to judge whether the program approach has been used in a particular case or not.

A current practice of public management shows that it is difficult to find a complex, large-scale program where all the elements mentioned above have been realized, although there exist examples of programs where: (a) goals were identified in detail and performance measures were developed; or (b) the organizational mechanism of program management was precisely designed; or (c) analytical methods of decision-making were intensively and effectively used, etc. Thus the problem of integrating the components of a program approach into a united system is, to our mind, acute.

ANALYTICAL METHODOLOGY

An analytical support of program decisions is one of the most important elements of a program approach. In comparison with the others, this element appears to have been developed in a relatively better way. Some specialists (D. Novick, E. Quade, J. English, J. Wholey, and others) point out that application of advanced methods of decision making can increase the effectiveness of governmental program management.^[2]

An increasing use of analytical techniques for program management is a natural tendency in the rationalization of public decision-making processes. (The "rationalization" is meant here as the use of certain rules and procedures to support decision-making in addition to experience and intuition of decision-makers.) At the same time it is the program approach to public budgeting (in contrast to the requirements or resource approach) that allows the direct comparison of program outputs with inputs (i.e., expected results with program costs) and thus set a framework for the application of analytical techniques.^[3]

When used properly, these techniques make it possible for decision-makers to answer the following questions:

- what are the objectives of a program and what are their priorities?

- which alternative of program implementation is the best,* and which criteria were used for its identification?
- is an ongoing program effective, efficient and to what extent?
- what is the best way to modify the program in the future (to increase the program funds, to decrease them, or to terminate the program)?

It one tries to trace the evolution of analytical techniques used for supporting government decisions in post-war years, one can easily discover the following sequence:

operation research ---> systems analysis ---> policy analysis.

Complication of the methodology was caused by the fact that the problems to be solved were becoming more complicated. According to E. Quade: ". . . systems analysis may be thought of as encompassing operations research (as originally conceived) plus economic considerations and inquiry into goals and their interaction with means; policy analysis may be thought of as encompassing systems analysis but with an additional concern for the distributional impacts of policy. In addition, policy analysis places more emphasis on implementation and political and organization considerations".^[4]

Figure 1 shows the relationships between the analytical techniques.

In the field of program management it is possible to outline two different analytical approaches:

1. program analysis - support of choice of the alternative for program implementation and a detailed analysis of the impacts of the alternative chosen (at the stage of program design).
2. program evaluation - investigation of the real (both intermediate and final) outcomes of the program to support decisions on the modifications or termination of the program (at the stage of program implementation or after its completion).

* From the decision-maker's point of view.

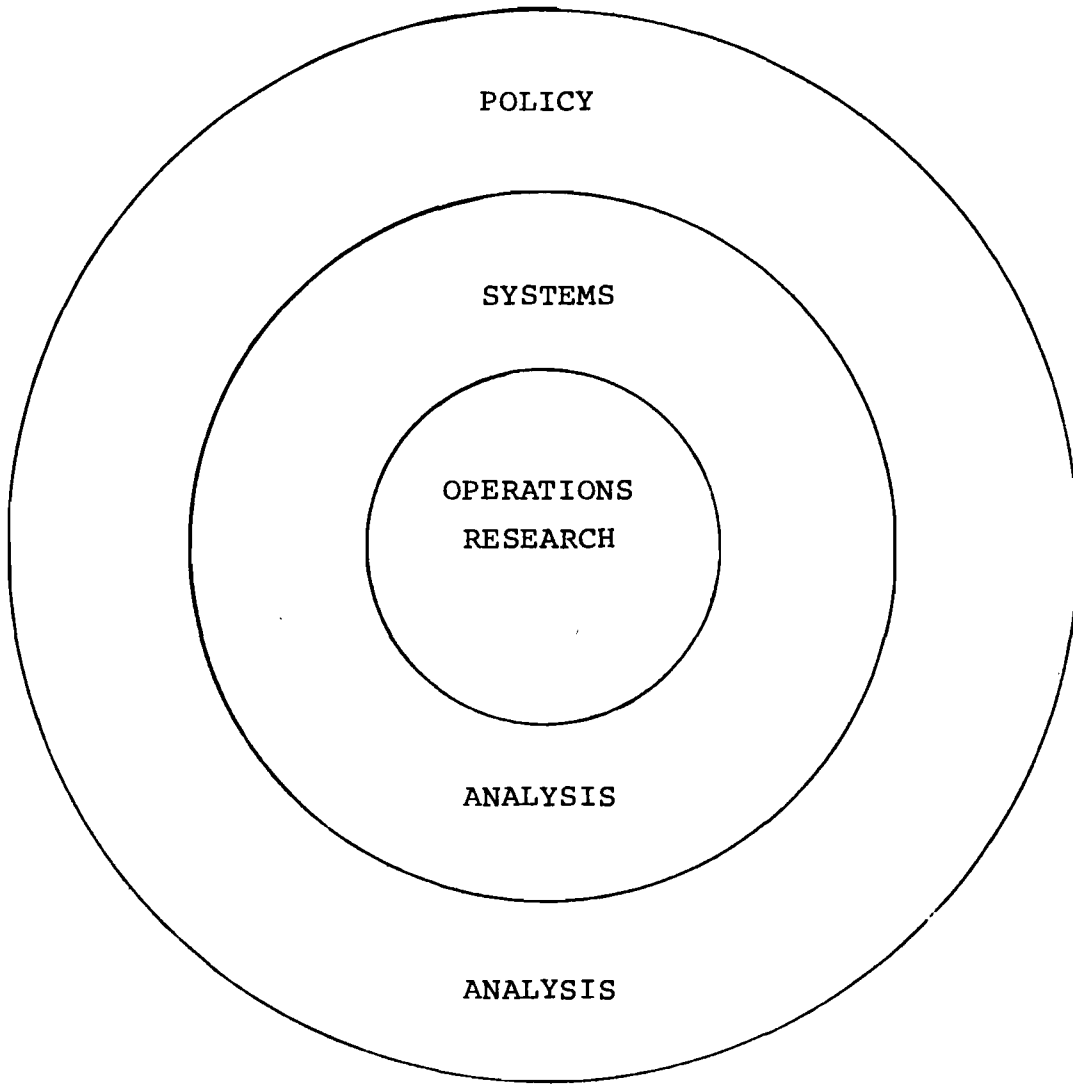


Figure 1

H. Hatry explains connections between these two approaches as follows:

"A related activity to program analysis is program evaluation. The latter assesses the past performance of existing programs. The findings of program evaluations provide important information which is needed for program analysis, since program analysis normally considers an existing program to be one of the alternatives to be examined. Program analysis is essentially focussed on future activities."^[5]

Specific techniques used within the framework of program analysis and evaluation are diverse and may include, for example, scenario-writing, the critical path method, cost-benefit, cost-effectiveness, and many other techniques and procedures. A choice of specific techniques depends on the purpose of the analytical investigation; scale, sphere and other parameters of the program under consideration; qualification and habits of the analytical staff and other factors.

Table 1 shows in schematical form the process of program management that includes both program analysis and program evaluation. This table is oversimplified, the real practice of budget decision-making and program management is more complex. However, the picture allows the presentation in a structured form of these processes and also shows the possible role of analytical methodology in public administration.

We will concentrate on program evaluation which, as J. Wholey wrote, "has become somewhat fashionable in the past few years".^[6]

PROGRAM EVALUATION

The increasing attention given to program evaluation in the U.S. government or more precisely - a shift of emphasis from the sphere of design and analytical validation of programs to problems of performance control and management has been caused by a number of socio-economic, procedure-organizational and political reasons.

Table 1 USE OF ANALYTICAL METHODOLOGY IN THE PROCESS OF PROGRAM MANAGEMENT

STAGES OF PROGRAM LIFE CYCLE	CONTENT OF STAGES	ANALYTICAL APPROACHES	ANALYTICAL TECHNIQUES
<p style="text-align: center;">program design</p>	problem identification goals definition alternative design criteria determination alternative selection analysis of possible impacts (both direct and indirect) of alternative chosen	<p style="text-align: center;">program analysis</p>	questionnaires interviews experts work scenario-writing critical path method cost-benefit cost-effectiveness cost-limitations . . .
	<p style="text-align: center;">program approval</p>		legislative actions
<p style="text-align: center;">program implementation</p>	identification of the actual program results (efficiency, effectiveness, etc)	<p style="text-align: center;">program evaluation</p>	field experiments demonstrational projects comparative evaluation ratings questionnaires interviews cost-benefit . . .
<p style="text-align: center;">program modification (if needed)</p>	improvement of the program activities program management improvement		
<p style="text-align: center;">program termination</p>	final summing up		

↓
 program management
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The main missions of program evaluation are to give information about factual expenditures on programs, to identify to what degree the program goals have been reached, to provide control of the quality of program management, and to improve the program implementation through correct control and preparing decisions for the future based upon the program results in the past. The evaluation has to provide both an effective feedback from program operations and activities with the development and modification of new programs. The importance of these goals is caused by difficulties in predicting government expenditures impacts and also by the scarcity of available resources.

According to F. Lewis and F. Zarb from the U.S. Office of Management and Budget (OMB), the evaluation is defined as "relatively structured, systematic analysis of operating programs designed to assess their stated objectives or to assess their efficiency".^[7] The U.S. specialists in public management point out that for many years program evaluation was the dark continent of public administration, a barely recognized function of administration.^[8] Only in the late 1960's did activities concerning both the development of appropriate methods and the fulfillment of evaluations of federal programs begin to grow very rapidly.

In May 1970 a special memorandum from the U.S. President was sent to the heads of federal agencies. The memorandum required that the program evaluation be used on a large scale. Then the activities in this field increased. For example, in 1969 (financial year) federal agencies spent 20 million dollars for civil program evaluations. In 1972 this figure increased five times as much and reached 110 million dollars.^[9] In 1975, only the 17 largest federal departments and "independent" agencies of the U.S. spent 116 million dollars for program evaluation. Together with the evaluation expenditures made by OMB and GAO these figures exceeded 200 million dollars.^[10]

From 1971 to 1973 there were more than 1000 program evaluations in education systems only. It would be a mistake to think that wide spread evaluation activities in the early 1970's was caused only by the introduction of the MBO (Management by

Objectives) system at the federal level of the U.S. government. It is more complicated. If considered in detail, program evaluation to a considerable extent appears to be a managerial mechanism, which functioning has a long history in federal agencies and can be exercised (to different degrees) within any system of public decision-making. However, both the scale and success of program evaluation activities depend on the final orientation and peculiarities of the management system accepted in the government. In addition, the same complex of political and socio-economic problems influences both the evolution of program management concepts, and the choice of appropriate techniques for their implementation.

Many U.S. scientists in the field of public administration explain the great attention given to program evaluation with purely political reasons. For example, S. Chitwood points out that J. Kennedy's and L. Johnson's governments promoted the Planning-Programming-Budgeting (PPB) system, but since 1969 Nixon's administration emphasized on program evaluation and the measurement of performance of government operations.^[11] Further, an increasing interest in methods of program evaluation has been caused by the growth in the amounts and scale of federal programs in the 1960-70's. The experimental character of some of those programs, considerable duplication of their functions and lack of effectiveness and efficiency - all these factors required a more detailed inspection of program results.

PROGRAM EVALUATION AND SYSTEMS OF PUBLIC DECISION-MAKING

The final stages of development of the program approach in the US differed from each other both in the degree of "introduction of the rationality" into the methods of public administration and in emphasizing the different management functions. It is of interest to examine briefly how the program evaluation has been introduced into different systems of public decision-making.^[12] The PPB system emphasized mainly on program planning and design and paid little attention to the measurement of program results.^[13]

However, the analytical methods widely used for decision support within PPB have influenced greatly the whole sphere of the investigation of the consequences of public expenditure. Program budgeting and systems analysis within the PPB system have constituted the necessary structure of this investigation "in terms of efficiency and effectiveness".^[14]

Simultaneously with the decline of PPB at the federal level of American public administration, the MBO mechanism was being developed. The executives of OMB defined the possible relations between program evaluation and the new system as follows:^[15]

Firstly, "management by objectives", including the process of identification and specification of major short-term objectives, makes possible a more precise statement of the many economic and social goals which are defined with difficulty under usual procedures and conditions.

Secondly, MBO improves the organization of the evaluation activity itself as in this case the processes of developing the evaluation work plans are put into order and structured. Also MBO improves the monitoring of the schedule and administrating of the evaluation activity.

Thirdly, MBO implies that the evaluation becomes the main instrument for the retrospective investigation of all the program results and activities, because performance control is one of the basic components of the system. In this respect, the program evaluation is characterized as the foundation for future rational policy decisions and for effective program management. For these reasons the importance of studies, methods, procedures and criteria of program evaluation is stressed.

In spite of the fact that the official opinion of OMB may, of course, reflect the desire to embellish the potential of the new system (in order to provide its faster introduction into practice), we should point out to simplicity, common sense and concentration upon program objectives and results as the obvious merits of MBO.

For the last two years in the U.S., such possible innovations in the field of public management as the Sunset Bill and the Zero-Based Budgeting Approach have been widely discussed. If they are adopted fully or even partially, the role of evaluation in program management will increase.

For example, Sunset Bill specifies that governmental programs "will be subject to a systematic evaluation . . . to determine if the merits of the program justify its continuation at a level less than, equal to, or greater than the existing level".^[16]

CONCLUSION

This brief outline of some of the aspects of the application of analytical methods in governmental program management shows that the development and realization of large-scale complex programs plays an increasing role in the economies of developed countries. Simultaneously with the growth in the scale of public programs and their impact on society, the significance of analytical methods used for the rationalization of program decision-making processes is increasing. The complexity of socio-economic programs developed for tackling diverse and complex problems faced by society results in the need for application of advanced, precise and sophisticated methodology.

Current practice provides many examples where program analysis has been supplemented by program evaluation. However, the U.S. experience of program management at the federal level shows that only isolated features of a program approach have been implemented and these features have not been incorporated into a complete system.

Further studies of the experience gained by different countries in the sphere of application of a program approach are important for improving the methodologies and processes of public management.

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