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## THE ROLE OF THE PLAN

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Planovane Hospodarstvi, 12, 1964, pp. 23 - 31.*

### ABSTRACT

The economic reform of 1960's in Czechoslovakia attempted switch to the Socialist Market Economy. That raised the question of compatibility of central planning with the market mechanism. This paper tries to show, that the Soviet-type Command planning is truly incompatible with market. The plans that would be compatible must be flexible, nonobligatory and probabilistic. They must not prescribe specific compulsory targets, but rather recommend ranges of desirable output and other indicators, and they should be frequently adjusted to changing conditions.

**Note: Ideas contained in this paper arose during collaboration and discussions with Pavel Pelikan. He is the author of some concepts and terms (like the distinction between a system with a closed program and one with conditional or unconditional reflexes) which he also formulated in research paper at VUNP "Uvod do kybernetiky pro ekonomicke aplikace" (introduction to cybernetics for applied economics). (1964.)**

**During the preparation and implementation of the new economic system the concept of the plan and its role in a system based on the market mechanism were questioned. One of these questions relates to the compatibility of the price mechanism with planned management of the economy. We should also ask whether it is necessary to first eliminate disequilibria by the old methods and then initiate the new management system or the other way around; whether the plan will play substantially the same role in the new system as in the old; and, finally whether the old planning methods are at all compatible with the new management system?**

**At first, answers to these questions diverged widely but today there are some answers on which the majority of economists**

**agree. However, there is still no agreement about the role of the plan, and about the methods and forms of planning that would be consistent with the new management system. It is not my intention to answer here all these questions in detail, I just want to focus on the role of the plan using what we may call the cybernetic approach to the problem, that is to view the role and the forms of the plan from the standpoint of information flows, decision making processes, degree of organization, and goal seeking behavior.**

**If we assume that the socialist economy is a system with goal-seeking behavior, that is there exists an agency of central management, which consciously attempts to regulate the economic development in order to reach certain social goals, then the plan must provide us with**

- (1) the goal at which economic development aims;**
- (2) a forecast of feasible paths of economic development;**
- (3) the program of actions for economic units**

### **Plan as a Goal**

**Generally, it is not necessary, and it is hardly the rule that the goal at which a system with goal-seeking behavior aims is formulated explicitly. Often the goal is built into the structure of the system so that the system demonstrates goal-seeking behavior without being aware of it or in other words without being goal-conscious. Many non-socialist economic systems function in this way, but the socialist countries formulate their goals explicitly. The first phase in formulating social goals is a sociopolitical matter, and in the economic field it is a matter of economic policies. Targets formulated in this way should be the basis for choosing one of the possible programs of actions. But, if they are formulated only in their most general form, such as, for example, securing a maximal growth of living standards, the development of socialist democracy, etc., it is difficult to use them as criteria for decisions that people and economic units (enterprises, etc.) make. Without additional information a worker on the job or even a manager of an enterprise, would have difficulty to decide which of their possible actions would better correspond to the goals of society as a whole. In the**

**present system of economic management this problem was solved by giving every economic unit a concrete quantitatively precise target. The role, of transforming the general social goals into specific targets for individual industries, enterprises, etc., was played by the economic plan. Coordination of activities of economic units with social goals was accomplished by imposing the plan as a mandatory directive; its fulfillment was a duty, which was further reinforced by a system of material incentives for plan fulfillment.**

**Such an approach assumes that**

- 1) only the central agency can ascertain which actions of subordinate units are in harmony with the social goals of the socialist economy;**
- 2) the central agency has sufficient information and a suitable algorithm for fixing concrete targets for subordinate units correctly;**
- 3) economic units cannot fulfill social goals on their own without the plan as an intermediary;**
- 4) these units have no interest in fulfilling the social goals directly.**

**Today we can see that these assumptions are obviously incorrect; which does not necessarily mean that their opposites are true. To use the plan as concretized goals may be to a certain extent and under certain circumstances useful. But in majority of cases target mediation by the plan can be directly harmful.**

**This negative side of target mediation by the plan is one of the important points of criticism brought against the old management system and also against the old concept of the role of the plan. In the past, the awareness that the concrete targets fixed by the plan, were only means of reaching more general goals, was obliterated. Instead the plan fulfillment became an aim, or an end in itself. Once the plan had been fixed, its fulfillment became the criterion for judging the satisfaction of social needs, rather than social interests being the criterion of how beneficial was the plan fulfillment.**

**Objections could be raised here as to the accuracy of this statement, since it can be argued that five-year plans were never valid for the whole period of five years, and annual plans in the later years of the five-year plan deviated from the original plan. But these deviations were due only partly to the awareness of disharmony of the plan with social goals; rather they often deviated because the original plan was unrealizable.**

**If we consider our limited information gathering and processing capacity, the fact that the center often obtains purposely distorted information, and that there has never been a perfectly accurate and faultless algorithm for creating an optimal plan, then we must admit that, even if the planning bodies work from correctly determined social goals, the plan can never be constructed without mistakes. That is to say, there is no guarantee that as judged by social goals any action other than the one prescribed by the plan is worse than an action leading to plan fulfillment. All the more so, since the plan is constructed under assumptions about development of economic conditions which may or may not take place.**

**Reality practically always deviates from the conditions assumed by the plan. Thus, we can say that it is possible to equate plan fulfillment with the satisfaction of social goals, only if we completely overlook the laws of economic information and decision-making processes. If we pay due regard to these laws, however, we shall discover that not only is the statement valid, but that an endeavor to fulfill the plan accurately may actually contradict the social goals. From what we have just said it does not follow at all that every non-fulfillment of the plan is correct. Thus the question arises how do we know when the deviation from the plan is socially useful and when it is not? Perhaps this is impossible to know so that it may be better not to admit any deviations whatsoever. But this question is put wrongly, because it is still based on the assumption that the plan is the direct aim of the activities of enterprises.**

**The new management system is based on the idea that it is possible to create a situation within the economy in which the goals of the economic units are directly harmonized with social goals. In other words, that it is possible to achieve a direct harmony between group and social interests and that**

**this harmony need not be achieved through the mediation of the plan fulfillment. This is a substantial difference between the proposed new management system and the reform of the old system in 1958. All that concerned us at that time was improving the system of plan fulfillment through incentives.**

**The new system tries to put the market mechanism to action, because only in this way does the producer become responsive to satisfying the need of the consumer. A price change and the subsequent change in gross income causes the individual aim of the producer (to maximize gross income) to correspond to the short-run social goal (to maximize the satisfaction of the consumer). This of course is valid, if the producer does not enjoy the advantage of a monopoly. However, it is always possible to restrict monopoly conditions substantially by central interventions'. Under the old management system, it was difficult to really make the producer interested in fulfilling the plan and it was not clear to what extent the plan really corresponded to needs. Thus, a two-fold deviation was possible which caused a conflict between production and consumption. The producer's interest to deviate from the plan was accompanied by an interest to satisfy the consumer better.**

**At this point it may be useful to examine relation between direct and indirect methods of control. In past discussions the use of indirect methods was very often questioned since the use of direct ones was considered simpler. This, however, is true only if control per se is the aim. We need central control only for achieving some, not all social goals. For example the fast adjustment of production to changes in consumption is best performed by the indirect control methods that do establish a direct link between the interests of producers and consumers. On the other hand, with direct control methods it is possible to achieve a harmonization of interests only indirectly through mediation by plan.**

**Consumer demand should be subordinated to the plan only if spontaneous producer-consumer interaction would contradict the goals of socialist society. The plan has the important role of harmonizing interests if the goal is to achieve such volume and structure of production that would suit consumers' demand and simultaneously create conditions for a further rapid economic development, which implies necessity to create production capacities in suitable**

proportions. But investment construction is a long-term process. The plan as the information about probable future needs is thus a necessary basis for the decisions that are to ensure dynamic equilibrium. So conceived, the plan will serve to reach the aim but it will not itself become the aim. Only through the central balancing of the plan is it possible to acquire information how the approximate overall demand for, the production of specific products will develop. But this information should not be used as a directive, because the important thing is to produce what is really needed and not merely what was planned.

Related issue is the question how to evaluate the outcomes of economic development. In discussions the following argument was aimed at the new economic system: with free prices it will not be possible to evaluate precisely how well specific enterprises or branches fulfill the plan. This argument, of course, again pays homage to the old concept that the plan is a fixed target point and any deviation from it is economically unfavorable. In reality, the target, in view of changing conditions, is variable. Thus, it is sensible to evaluate results relative to a variable target and not measure them against an ossified plan. If we know that an enterprise fulfills the plan by 102% or 99%, this still does not say anything about whether it produces really useful and needed products. The evaluation of the enterprise according to the percentages of plan fulfillment implies the replacement of real goals by the plan.

### **The plan as a forecast of economic development**

This function of the plan has been greatly underestimated in the past. It used to be emphasized that plans are more than merely prognoses of economic development that they actually determine how the economy is going to develop. In a centrally planned economy the plan cannot be only a prognosis but, on the other hand, a plan that is not also a forecast of future development, cannot be realizable. Experiences show that none of the five-year plans remained valid for five years. This means that these plans contained incorrect predictions of the possible development of the economy.

**Economic development depends on both objective and subjective factors, which can be broadly classified as follows:**

- 1. Conditions that are independent of the human will (i.e.. natural causes);**
- 2. Conditions, which during the construction of the plan, must be taken as given and are also considered to be objective conditions, yet they also depend on levels of human activity (such as technology, consumption of raw materials per unit of output, labor productivity, etc.);**
- 3. Conditions of a subjective character (consumer preferences);**
- 4. Central economic decisions.**

**If consumers' preferences are to be respected, then conditions 1 to 3 must be considered exogenous during the plan's construction. It is, of course, possible to consider only 1 and 2 as exogenous, and decide the structure of consumption centrally rather than give people freedom of consumer choice. But such an approach would contradict the goals of socialism.**

**If the plan is to be realistic, it must be based on the prediction of changes in exogenous factors. The central body can decide only within the bounds given by exogenous factors. If these factors were to determine development uniquely there would be no room for central decisions, so that every plan going beyond forecast, would create economic disturbances. This is fortunately not the case and exogenous factors leave enough room for central decisions to influence the economic development according to social goals.**

**But even here it is true that the plan must start from the forecast of exogenous factors and central decision can operate only within the boundaries these factors permit. By crossing these boundaries the plan would become unrealizable, and instead of providing coordination, it would spread chaos in the economy.**



**A completely accurate prediction of the changes in exogenous factors is never possible for the following reasons: Planning activity in the center is based on very limited information about the past and present state of the economy. This is caused by the restricted capacity of the center for receiving, storing and processing information. Also, during the transmission to the center information gets distorted (whether intentional or not).**

**The limitation and distortion of information increases the indeterminacy of decisions about the future development of exogenous factors. This appears, for instance, during the operation with aggregated magnitudes. When the weights of various components are being changed it is difficult to foresee the consequences of these changes.**

**Exogenous factors are interdependent so that during their development they influence each other in a complex way. A full description and calculation of these mutual influences is practically impossible. Thus, it is possible to consider only the most important effects and abstract, from the others. But this again heightens the indeterminacy of predictions.**

**In the development of exogenous factors there always exists an unavoidable amount of, unexpected influences, which cannot be predicted accurately, even if we knew the perfect algorithms for forecasting. Such fortuitous influences include changes in weather which influence significantly the crops and thus the whole economy; international trade and political situation which, through demands on the armaments industry and size of the army, can strongly influence the economy, and lastly, changes in the tastes of the population, such as various fashion trends, etc. One of the most important factors in the economy, which is very difficult to predict, is the development of science, and changes in technology. Often there are sudden new and unexpected discoveries in science, which can substantially change production technology. On the other hand expected breakthroughs do not necessarily happen.**

**From what has been said, it follows that any forecast can only be of the probabilistic nature. From this in turn follows that the plan that is based on such forecasts can be only a probabilistic and not a deterministic plan. The plan can predict only with certain probability that some volume of**

**production will correspond to the future needs of society. This probability is smaller the longer is the period for which the plan is made**

**Instead of fixing one plan figure, it might be more appropriate, to find the probability distributions of desired quantities of products. This, of course, would involve enormous effort. It might be more feasible to find floors and ceilings for planned indicators. The planned indicators would then fall between these two limits with high probability.**

**The probabilistic concept of the plan is closely related to what have been already said about the relation between the plan and social goals in the old and new systems. The fact that it is possible to draw the plan only in the probabilistic sense results from the nature of information processes and therefore, it is valid under any circumstances. If the plan has been constructed deterministically, than the indeterminacy resulting from the impossibility of perfect forecast was eliminated by an arbitrary decision of the central planning body, which did something that is beyond its powers. A deterministic formulation of the plan cannot be based on information that does not exist, it is thus in that degree arbitrary and cannot have proper coordinating function. The elimination of uncertainties, which remain in the plan, due to the impossibility of an accurate forecast, can make sense only if it is based on additional information.**

**This means that during economic development, the plan should be corrected whenever the new information is available. Additional information can be obtained also by combining central and decentralized decisions. Thus, the demand for constancy and compulsory character of the plan targets contradicts the goals it is supposed to achieve. The plan must be supplemented by a process of flexible adaptation to changing conditions, by a mechanism reacting to unforeseen changes and by a mechanism of fine tuning of the plan according to conditions which have not and could not have been foreseen when it was originally made.**

**The Plan as a Program for Actions.**

**The program of a system with goal-seeking behavior must contain either decisions about its activities or the method of**

**making decisions (algorithm) given the information about the changes in the environment in which is the system situated and goals of the system. The plan as the program for actions is thus based on the plan as a goal and the plan as a forecast. In other words, it is necessary to determine a program of actions, which given the assumptions about the development of exogenous economic factors, will lead to achievement of the specified goals.**

**In systems with goal-seeking behavior we encounter several qualitatively different types of programs. With some simplification we can classify them into following three groups:**

- 1.Systems with a closed program.**
- 2.Systems with unconditional reflexes.**
- 3.Systems with conditional reflexes (learning systems).**

**This differentiation is based on the relation between the decision-making algorithm and the information received from the environment. Systems with a closed program have no input of information from the environment. Their activity is given exclusively by the program, which must contain all necessary information and decisions for all the subsequent activities of the system.**

**A system with unconditional reflexes contains in its program algorithm according to which decisions are made based on currently received information from its environment. In this case the actions of the system are not all determined by the program ahead of time without possibility of change, only the algorithm is permanently fixed. A system with unconditional reflexes is therefore capable of changing its activity depending on changes in its environment but it always reacts in the same way.**

**The learning systems (with conditional reflexes) use information not only for its decisions according to a given algorithm, but also for determining the extent to which their decisions correspond to the goal criterion. The program does not provide a permanent algorithm but, rather, means by which the decision-making algorithm can be adapted to serve better the goals of the system. This group also includes**

systems that can adjust their organizational structure and adapt it to changing conditions (so-called self-organizing systems).

Before we discuss these three types of programs further, let us observe that at present the economic plan belongs to the first type (more precisely, it has a closed program character), whereas the new Czechoslovak economic system is presumed to have the character of the third type of program. This of course does not depend only on the plan itself but primarily on the character of the system in which it operates.

To clarify matters, let us take an example from the sphere of machinery. A music box is a system with a closed program part of which is contained directly in its structure and part in the cylinder. An electronic gadget like the well-known tortoise may be a system with conditional reflexes. The music box can play another tune if another cylinder is put into it but no change of cylinders will make it a system with conditional reflexes. The incapability of processing data from outside which follows from its relatively primitive structures will prevent this. On the other hand, it would certainly be senseless to put a closed program into the above-mentioned electronic gadget. The same can be said about economic systems. A certain character of the plan as a program corresponds to a certain organizational structure and control system (which is often called a “model” according to Brus). To change the character of the program assumes the creation of a new “model”. It would be equally senseless to program the new economic system with the old types of plans, just as it is senseless to program a computer with a cylinder from a music box.

The differences in the three types of programs lie primarily in the quantities of information they require. Let us assume that we are concerned with a five-year plan. If it is a closed program, it must contain initially all the information necessary for the entire five years of activity. A closed program must from the beginning eliminate all degrees of uncertainty. It is obvious that with extensive and complex systems such a program would have to contain an immense amount of information. Because information contained in the plan cannot be created from nothing but can only come out of processing the information transmitted by the economy, planning, as closed programming of economic development,

**requires as a consequence an extremely great amount of administrative work and administrative apparatus. This in turn produces further problems, because the transmission of information in such an apparatus is slow and the information becomes distorted.**

**Even though the plan was, according to the old system, substantially a closed program, it was a little improved by occasional response to current information however; the response was performed by centrally prescribed algorithms. To this extent the plan was a combination of a closed program and a program with unconditional reflexes.**

**A system with a closed program must initially contain a built-in forecast of the development of the environment for the entire period of its functioning, because once it has been started, it functions “blindly.”**

**On the other hand, higher types of programs assume that information is being transmitted to the system during its functioning not only by the program but also by the environment. Thus, the program may contain much less information and its creation does not require as much administrative work. Of course, requirements on the quality of information processing, and the decision-making connected with it, are greater. Also, the subsystems, which are directed by this type of program, must have more complex algorithms for decision-making. It is simpler to decide about production in an enterprise, if the volume and the assortment of production, supplies of raw materials and investment, the number of employees, price and average wages, etc., are prescribed from above than if one obtains a plan from above which must be elaborated on the basis of one's own market analysis, technology, and so on**

**In systems with the higher types of program, requirements for accuracy of forecast are not so great or, rather, the probability concept of plan is more compatible with them than with systems having closed programs. Systems, which learn, or self-organizing systems know how to react to unforeseen circumstances and adjust their behavior accordingly. There are differences also in the requirements on the environment in which the systems operate. Since a system with a closed program “works” blindly, all deviations in the real state of the environment from the predicted state,**

have disturbing effects. As long as disturbances do not surpass certain boundaries, the whole system functions according to its program and does not react to the changed conditions at all. It can happen however, that the actions of the system become senseless, that it loses its original purpose becomes an end in itself or brings results, differing from the ones originally intended. The action of such a system can, in the end, lead to results quite contrary to those which were aimed for. A clock, running in a deserted, bombed house is paradoxical. The cycle of an automatic factory in Lem's "Planet Eden" is nonsensical. It produces perfectly, but for no one; it solves its products once they were completed and produces the superfluous products again.

When the disturbing influences cross certain boundaries, however, the system with a closed program breaks down and is no longer able to function. Systems with higher types of programs (on the other hand) can adapt themselves even to unforeseen circumstances, functioning equally well, or even better. It is these unexpected and unforeseen changes in the environment that affect the highest types of systems and become the source of their inner changes, their self-organization and qualitative development.

Such systems in an environment rich with random changes and impulses, often develop and improve themselves faster than those which function in quiet unchangeable one. Closed program systems do not have the capability of spontaneous internal improvement and for them maximum isolation from the surrounding environment is ideal. Any random changes are considered negative and threaten their function. Systems -which learn and are self-organizing know how to suppress negative consequences of random influences and exploit all arising positive changes for their development and improvement. They adapt themselves to changes in the environment and know how to maintain dynamic stability

The same can be said about the plan. As long as the plan is a closed program, the economy is hardly adaptive to random, unforeseen changes coming from the environment. Fluctuations in the weather, changes in international politics and changing circumstances in foreign trade have a very unfavorable effect on the economy. The rigidity and compulsory nature of the plan do not permit utilization of

**random circumstances -- such as new, unexpected, scientific and technological inventions --as a source of progressive development. Every new discovery invention or innovation, which has not been reckoned with in advance in, the plan, can be put into practice only with great difficulties. The extensive development of the economy and the slow technical progress has not been caused by the ignorance or ill will of people but by the above-mentioned role of the plan.**