

Use of Information Technology in the Government of a State

Pavel E. Golosov, Vladimir I. Gorelov, Oksana L. Karelova

Abstract—There are visible changes in the world organization, environment and health of national conscience that create a background for discussion on possible redefinition of global, state and regional management goals. Authors apply the sustainable development criteria to a hierarchical management scheme that is to lead the world community to non-contradictory growth. Concrete definitions are discussed in respect of decision-making process representing the state mostly. With the help of system analysis it is highlighted how to understand who would carry the distinctive sign of world leadership in the nearest future.

Keywords—Decision-making, information technology, public administration.

I. INTRODUCTION

DEVELOPMENT of the world in a new millennium represents the steady tendency of active use of human resources. Thus, resource and social parameters: education, quality of life, diseases — actual quality of human resources, and also energy and raw stocks occupy the top places in a list of priorities. There is a preparation of the local national staff, formation of a middle class — the national educated elite with its interests and aspirations. There is a redistribution of financial streams and commodities. These processes continue non-uniformly, a number of countries, which economies are based on sale of natural renewed and not renewed resources, are sharply behind the mentioned world tendencies. This leads to social intensity in the world community and necessity of its structural reorganization. There are also precursors of overall system crisis that is partly dictated by the migratory process of unqualified labor, extremism and terrorism. There are fears that social intensity will lead to religious opposition in spite of the fact that the underlying reason of this intensity is the economic factor instead of creed.

As the amount of waste products will only increase and their distribution does not depend on frontiers, top priority is guaranteed to solving environmental problems. At the same time, the only way of keeping this under control is through the unity of all countries, without any exclusion; a new ideology, and new styles of management at all levels are necessary.

Having introduced our vision on instruments and mechanisms of state and corporate management we are stepping into decision-making aspects. Decision-making is the

major function of management at any level, including the governmental one. Preparation of a decision is based on the triad: setting of targets (determination of a target or a system of targets), formation of evaluation criteria for a decision's efficiency, and development of possible alternatives.

II. SETTING OF TARGETS

The state will exist eternally – this is a fundamental axiom when setting a target in the governmental management. A necessary condition for a state to exist over a sufficiently long term is development. Therefore, any state must ascertain continuous development as its primary target. In academic literature, it is called sustainable development. However, as the state does not exist in isolation, the laws of competitive existence come into force and not only the fact of development itself becomes important, but its qualitative characteristics as well. Since the target is sufficiently vague (the universal community develops as it is anyway), this target is replaced by a sub-target (to build communism/socialism/capitalism, to double GDP, to catch up and overdo, etc.). Here, the first questions start, and the major one is formed thusly: Is this sub-target dominant in a system that ensures the most efficient development? It is impossible to receive a substantiated answer to this question due to the lack of methods that would provide reliable estimates of the consequences of decisions' implementation and developed analysis methods, while the arrangement of a sub-target support is provided with qualitative methods through diffusion of responsibility, that is, expert opinions, various expert examinations, meetings, approvals, etc. The additional difficulty is that nearly any sub-target is permissible, i.e. ensures development of the state, yet, the extent of its difference from an optimal one is not studied. This particular point allows working on a great number of development plans (alternatives). Thus, as early as at the first stage of an objective determination when making decisions, the possibility of a major error occurs.

Construction of a system of development targets for any state is a process of a mechanical (conglomerate) combination of targets by various areas (economy, healthcare, education and others). However, it is obvious that, instead of existing on their own, all areas of the state's "life" represent an interconnected and inter-dependent system that possesses a synergetic effect.

Today all priority determination methods are subjective to a certain extent. The first group of methods combines various methods of expert evaluations where the subjective property of the evaluation is obvious. The second group of methods

Pavel E. Golosov and Vladimir I. Gorelov are with the Russian Presidential Academy of National Economy and Public Administration (e-mail: vigorelov@mail.ru).

Oksana L. Karelova is with the Moscow State University of Linguistics.

includes those based on the paired-comparison principle. Most researchers of decision-making believe that these methods yield only a qualitative answer as opposed to the quantitative one. At the same time, paired comparisons are often conducted on the basis of qualitative indexes and not the quantitative ones, which inevitably lead to the evaluation being subjective. This particular defect of the method of construction of a system of development targets makes it possible to lobby the interests of certain groups. No objective instrument exists to enable an unbiased and well-reasoned building of a system of development targets that would result in the most efficient outcome.

III. CRITERIA

The choice of criteria that characterize the target implementation and enables to evaluate the results in any way at all is very subjective. In practice, it is reduced to the choice of a decision-maker. Everyone understands that the manifold of the criteria choice is great and subjectivism is unavoidable. However, this question occurs: how fully do the chosen criteria reflect the actual situation? Is there a guarantee that the use of instrumental surveys will yield objective results? It should be pointed out that in the current practice [3], the criteria choice is made out of a positive multitude, while negative influences are not considered as a rule. Thus, there is no question of a completeness of the criteria system and, subsequently, of the system's objectiveness as well. Moreover, historically the economic criteria are mostly used, while social and environmental criteria are both more rarely used and much worse developed. To combine these criteria into an aggregated indicator mechanically is a difficult and cumbersome business and, if one were to speak more precisely and based on the current developed methods, it is impossible as well. Naturally, such indicators are worked out, yet, the weight factors in them are puzzling, to put it mildly. The most prevalent indicator of this kind is the popular Human Development Index, although it is absolutely unclear why all criteria within it have equal weight.

Each country develops its own indicator (i.e. a target function) which is a folding of criteria that characterize its development level. For instance, in Russia [3], the target function consists of four indicator groups, where each group is represented by its own influence rate (group weight). The composition and number of the indicators vary, while the groups' weights remain the same. A similar situation is true for other countries too. Thus, at the criteria selection stage, a possibility of an error also exists – either resulting from the criteria selection or in the course of the target function's formation.

It appears that the current methods of the decision-making support allow for a possibility of a major error and cannot be relied on fully. For this very reason, governmental management uses old-time methods of decision-making based on the paired comparisons of alternatives. The voluntarism degree in this decision-making method is extremely high (for instance, look at the debates between Hillary Clinton and Donald Trump [5]) and there is no certainty at all that the

suggested alternatives are optimal or at least neutral. Moreover, it is fairly arguable that suggested alternatives of development lobby interests of an individual group of the population, as opposed to the overall population. Consequently, putting forward such alternatives for application provokes an occurrence of a greater number of problems than the current ones cause.

In the age of information technology development, such decision-making at the governmental level is futile, to say the least. The fast development of new technologies and an increase in consumption, as well as the availability of information in the world have led to qualitative changes of society. It is possible to assert with confidence that the world community is in a system crisis.

System crisis mentions three components [6]-[12]:

- Economic. Crisis here is caused by a break in the incomes received from the use of knowledge that is typical for developed countries, and the incomes from the sale of energy and raw materials resources in the countries – energy donors.
- Social. Crisis in this sphere is caused by growing inequality in a degree of quality of life in the different countries and aspiration of the developed countries to keep the leading position.
- Ecological. The reasons for ecological crisis are obvious enough: thoughtless and escalating use of non-renewable natural resources and the uncontrollable growth of waste products, the amount of which has exceeded a threshold boundary.

The world that is overcoming the crisis will hopefully carry out by means of coordinated policy aimed to reach steady development and this direction it is to be supported by all parties of the world community. In any other case, crisis will result either in military conflicts (present situation in the Middle East), or in the world economic crisis, or in a global ecological accident. And these possible outcomes can be both carried in time, and take place in common. Today, unfortunately, we see attempts to solve a problem by military conflicts and if they will not give desirable results, world war is quite possible.

In our opinion, it is time to switch to modern decision-making methods based on a number of simple rules:

- It is time to accept that any decision causes a synergetic effect in all areas of human life and activities. It means that whichever criteria we select for the development evaluation form, a system and an impact on any of them causes all others to change. Connections between the criteria can be determined through logic and regression factors based on statistical data. The method is set forth in a book by one of the authors [1] and the analysis of the results are stated, for instance, in [2], [3].
- To reduce the uncertainty in the decision evaluation, the entire range of criteria, both positive and negative ones, must be considered. The problem of the criteria choice is, without doubt, subjective and cannot be uniquely solved. It would be desirable to note a widely known estimation of distribution of such an approach to versatile

parameters. It is an Index of Development of Human Potential (IDHP) formulated by World Bank experts in 1995 [16]:

$$\text{IDHP} = (A + B + C)/3 \quad (1)$$

where A is the resulted gross national product (GNP) per capita, B is the educational level, C is the index of life. The reason why GNP, educational level and life expectancy equally influence human potential is not absolutely clear. But, nevertheless, the introduction and wide circulation of such estimations speaks about the necessity and urgency of such a search.

- At the same time, scientists understand well enough that designing an integrated estimation, parameters have a different degree of importance. As nobody knows how to define precisely the importance of parameters, the weight of degree of importance is artificially introduced based on the opinions of experts. The problem of the artificial introduction of weight is that this weight is not equal for different territories, and therefore, it is impossible to unify an estimation. It is clear that the artificial introduction of weights of parameters is a deadlock method.
- Nevertheless, despite the subjective quality of the selection of both actual criteria and their number, the statement could be the following: With a good coarse division of the complete space of factors that affect development, selection of a criterion out of any coarse division and the one that characterizes it is not a matter of principle, as the analysis outcomes are virtually the same. This narrows the criteria selection problem down to the problem of a coarse division, which reduces the uncertainty in the decision-making. The actual number of divisions determines the detail level of the development state and, with a greater number of divisions, allows forecasting this development more precisely.
- Ideally, we can consider a four-level system [13]-[15]: development of the universal community (at the level of strategies), next level — steady development of group of the countries, a more detailed level of the country development and development of the country's part through an agreed system of peaceful development priorities. There are priorities of development, inherent only to it and determined by its background, for any society living in any territory. Culture, creed, financial streams and aspirations of the elite are various for different territories, and the purpose — development of the society, even declared, — is identical. It means that all efforts, at all levels of hierarchy from family up to the world community, may be coordinated (Fig. 1). The decision of a problem of the coordinated steady development is reduced to definition of the most effective value of the criterion function describing the society condition in each territory:

$$F = \sum \lambda_i x_i, \quad (2)$$

where λ_i is a system weight of i parameter, x_i is the normalized value of i parameter.

As a result, we receive **levels of the coordinated realization of effective steady development** which we shall present as the circuit in Fig. 1:

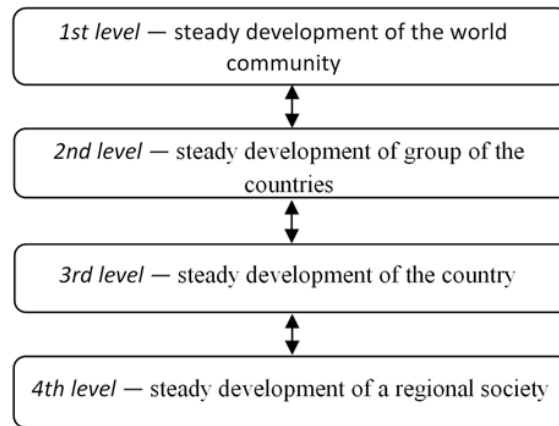


Fig. 1 Levels of management of the coordinated realization of steady development

From the point of view of a state policy, the first two levels define the foreign policy of states, and the last two — internal policy.

- The system lives, i.e. communications in a system can be kept, can be changed, new communications can appear and old communications can disappear. Therefore, monitoring which allows to define the current strategic purposes, tendencies and policy of development, as well as to define the conformity of objects with a view to their true realization, which is to achieve constant and steady development of regional society, is necessary.
- As for construction, consolidated weights form the vector of development reflecting the average interests of local society development. The same vector is formed by the internal and external claims of the elite realized through state policy. The distinction between these vectors forms a measure of non-realized opportunities of the country development, and defines a stage of its development. We shall notice that it is unpromising to approach the interests of society development to the interests of national and international elite, as priorities of society development are objective unlike the priorities of the elite.
- If at any moment the interests of the ruling elite coincide with the priorities of society development, there is a fast development of the country — “economic miracle”. Society development is determined by the motivation of the people. The nature of the Japanese, German, Swedish boom is exactly this.
- If the divergence between elite priorities and territory begins there is, first of all, a delay of rates of territory development that subsequently leads to its decline. It is just necessary to remember that priorities vary all the time

and do not stop on the achieved result. The reasons for the attenuation of “economic miracles” are exactly this.

- Efficient society management is the maximal approximation of the policy carried out by the state leadership to the priorities of society development at each moment in time. The possibility of such management is realized through corresponding legislative and financial mechanisms.
- Concrete ways of development, including the best, *are individual* for each society. That is why, in particular, one can conclude that the transferring of experience of development from one country to another has strictly limited frameworks. There are ways of realization of development priorities, depending on culture, religions, as well as the developed system of values and opportunities, for each society at each moment in time. Thus, democracy can be interpreted as the coincidence of a vector of society development with a vector of accepted political decisions.
- Determining priorities of development, we estimate at once the future result of management. Therefore, the decision of a problem of management has a property of short-term forecasting. Expanding the view from separate components to development of society in global leads us to long-term Foresight [4].

It would be great if, instead of making unreasoned political decisions that hinder the universal community’s development and distracts from the real dangers menacing our civilization, at least developed countries move towards to the new, more responsible level of decision-making and where leaders of the development of all humankind, rather than the satisfaction of some part of its community. Currently, the world is far from solving the problems of sustainable development; on the contrary, there is a growing opposition between different states. It is a dead end. It is necessary to change the ideology of development and the first step in this direction is the sustainable development priorities of countries. Those who are faster will understand and will become the leaders of development.

REFERENCES

- [1] V.I. Gorelov. Cognitive model of sustainable development. 30th volume of "International Journal of Information Technology & Business Management", 2014. ISSN 2304-0777
- [2] V.I. Gorelov, O.L. Karelova Системное моделирование в социально-экономической сфере. (System modeling in socio-economic sphere) Химки: РМАТ, 2012.-185с
- [3] V.I. Gorelov. Управление развитием регионов. (Management of development of regions) Москва, Экон-Информ, 2007, 163с.
- [4] P.E. Golosov, V.I. Gorelov. Notes on World’s Sustainable Development, 2015 ICCBES, ICCBES-742
- [5] The final Trump-Clinton debate transcript, annotated. <https://www.washingtonpost.com/news/the-fix/wp/2016/10/19/the-final-trump-clinton-debate-transcript-annotated/> The Washington Post. By Aaron Blake. (October 19, 2016)
- [6] Anker R. Gender and Jobs: Sex Segregation of Occupations in the World. Geneva, International Labour Office. 1997.
- [7] Booyens E. An Overview and Evaluation of Composite Indices of Development // Social Indicators Research. 2002, Vol. 59- p. 115–151.
- [8] Bourguignon E., Chakravarty S. Multidimensional Measures of Poverty. Delta Working Paper. Paris, 1998, p. 98–112.
- [9] Deleeck K., van den Bosch K., de Lathouwer L. Poverty and the Adequacy of Social Security in the EC: a Comparative Analysis; Aldershot: Avebury. 1992.
- [10] Eedderke J., Klitgaard R. Economic Growth and Social Indicators: An Exploratory Analysis //Economic Development and Cultural Change. 1998, №46 (April)- p. 455–489.
- [11] Eurostat. Analyzing Poverty in the European Community (a). -Eurostat News – Special Edition, 1990.
- [12] Eurostat. Poverty in Figures. Europe in the Early 1980s' (b). - Luxembourg: EUROP, 1990.
- [13] Evstegneev D.V., Ledashcheva T.N. About methods of alternatives ranging at the optimal development strategy chose for modelling system //V International congress on mathematical modelling. Book of abstracts, volume II.- Dubna, 2002. – p.147-148
- [14] Evstegneev D.V., Ledashcheva T.N., Gorelov V.I. About complex system of territory evaluation //V International congress on mathematical modelling. Book of abstracts, volume II. - Dubna, 2002. – p. 146-147
- [15] Gorelov V.I., Evstegneev D.V. Methodological bases of cognitive models construction in ecology //V International congress on mathematical modelling. - Dubna, 2002.- p. 78-86
- [16] Human Development Report, New York, Oxford University Press, 1995, ISBN 0-19-510023-9