TARGETS OF THE SCIENCE INTEGRATION IN EUROPEAN AND INTERNATIONAL SCIENTIFIC RESEARCH SYSTEM

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The modern society as a whole is facing several global problems. The mankind lives in a more and more complicated society, where the basic parameters get exponential perspectives.

The modern society is encountering a nonlinear growth of the volume of the information and communications, these being the underlying cause of the fragmentariness of perception of the world, development of stressful conditions in everyday life, raise of crises at the individual and social group level, increase in tensions in interethnic and religion relations, expansion of the terrorist actions and growth of social intensity as well as environmental degradation. The society system is therefore reaches essentially a nonequilibrium state, becoming very sensitive small internal and external impacts.

Problems in scientific policy typical to small countries are rather actual and difficult, possessing some specific aspects. In one of the works of Thorsteindottir [1] it is shown, that the small countries possess opportunities that the large countries don't have. The limitation of resources dictates to the given countries the necessity for creating of investigation system. Other characteristic thing is the limited part of scientific bureaucracy, the simplicity of information distribution, bat also insufficient coordination of scientific research.

On the basis of the analysis of scientific maintenance executed for some of European Union countries, it is shown: the mutual relation between science and authority; the choice and estimation of scientific research programs; the role of a state in managing a science; the problems of coherence and coordination of the European science [2]. The condition and lacks in the organization of scientific research works in Germany are submitted by Wolfrum R. [3]. The research of public sector scientific institutes in Hungary, Iceland and Ireland, has revealed the

role of an international scientific and technical connections [1].

For the majority of the countries, especially European Union states, there are identified three main sectors in the system of state science: universities; no university organizations and the governmental laboratories [4]. The important role is given to universities in which it is concentrated big volume of the state investigations. On the basis of study of the contribution made by American universities in the industry, Morgan R.P. [5] establishes that the universities science brings the real appreciable contribution to industrial investigations and applications.

A ratio between research activity and training in university system and their dynamics in some European countries is examined in the work of [6]. On the basis of the principle of unity, of investigations and education, by authors are revealed three models of ratio of investigation and training in universities: Humboldt's model, posthumboldt's model and the model until the Humboldt's one. The posthumboldt's model of universities is most full realized in the Great Britain, Sweden, Norway, and Netherlands. The characteristic fact is the division of expenses into training and carrying out of research works, for investigational and educational universities. The model until Humboldt model (France, Ireland, Spain, Hungary) distinguishes a big differentiation between educational and research institutions.

Disinvestment in sphere of the state science, demands the elaboration of new distribution mechanism of finances and realization of changes in priorities of financing [7]. In this process an industrial-university partnership takes-on special significance, as well as the use of the advanced and expensive equipment and devices. It affects the level of personnel potential qualification: the change of institutional balance; the growth of number of students; the increase of teaching loading; the narrowing of the autonomy of the state scientific institutes; the introduction of new practice of administration. Pavitt K. [8] argues that insufficient financing of university investigations in some European countries is caused by erroneous conception about the contribution of university science to the economic and social progress. According to the last years tendencies we can specify that it is necessary to proceed to the new organizational forms, focused on short-term projects; the discipline; the heterogeneity of subjects and computer science. As a result of the analysis of university research state financing in the USA, a proposal was express, to use wider American experience of pluralism in allocation of financing sources. Proffesor Richard Lester [9] of

MIT in the US has just completed an extensive review of 23 clusters as pairs in 6 countries. In particular, he looked at university/institute role in cluster development. He has led several major studies of national and regional productivity, competitiveness and innovation performance commissioned by governments and industrial groups around the world. They were very different depending upon the economic situation of the region – renewal, sustaining new economy, or for new clusters. Based on available metrics from Statistics Canada data, Denys Cooper [10] give profound analyses of the Gazelles and University Spin Offs, as well as NRC Spin Offs. The strength and vitality of universities remains essential for growth in the knowledge–based economy [11]. Universities must also be a vital part of the local 'economic community' by building the region's social capital and taking a leadership role in activities designed to enhance the region's absorptive capacity. Continued public support for both the teaching and research mandates of the university are essential if they are to succeed in these roles and contribute to the growth of their local and regional economies.

The statistical analysis of science financing parameters in Russia and in some of the countries from Central and Eastern Europe (which are developing in conditions of transition to the market economy), were presented in the works of [12, 13], where are analyzed the dynamic of the costs for research and products; the structure of costs by all science domains; the sources of science financing; the features of budgetary financing of the science; etc. The questions concerning adaptation of the scientific organizations to the market conditions, the problems of organizational structure reforming in science have been analyzed taking into account institutional features of the organization of scientific-research activity.

A special meaning in conditions of market relations obtains the definition of priorities in the state policy concerning research and development; the use of indirect stimulation methods in scientific and technical policy, the international scientific and technical cooperation [14].

Problems of science budgetary financing seems to be recent and for the big countries such as the USA [15], thus the important thing remains to be the revealing of the current priorities in financing of scientific research and development; studying the interrelation of the sciences, technologies and society. Munari F. [16] marks, that the state enterprises play the basic role in formation of national innovative systems, because they are focused more on the national priorities, rather than on

the solutioning of commercial problems.

During the increase of financing volume for research and development by private sector (in comparison with other sources including the state financing) it should be also changed the policy of the state. During formation of innovative potential in private sector the state should assume four basic roles: maintaining of organizational/administrative structure, acting as fiscal agent, providing the regulatory system and creating of the normative base.

In R&T areas, Canada has a long and proud history of research excellence and scientific Success [17]. For science and technology mobilization there are develop many governmental programs and actions. In November 2006, Canada's federal government released *Advantage Canada*, an economic plan to make Canada a world leader for current and future generations. The main scope is to turn the ideas into innovations that provide solutions to environmental, health, and other important social challenges, and to improve the federal and provincial economic competitiveness. The government's plan to achieve these goals is — *Mobilizing Science and Technology to Canada's Advantage*. It sets out a comprehensive, multi-year science and technology agenda. NRC (National Research Council Canada) has played a critical role in the development of emerging and mature cluster initiatives, acting as a catalyst for technological progress and economic growth in every region of Canada. Its successful clustering model encourages and supports local strengths while leveraging NRC's national and international resources, science and technology capabilities, networks and partnerships [18].

The correct estimation and comparison in domain of systems of research for different countries can serve as an important tool in improving of the process concerning science and scientific policy administration. The analysis of publication activity is the most used in science measurement [19]. The measurement of bibliometric parameters in sphere of research and their correlation to expenditures of the science is considered to be one of the simplest methods in definition of efficiency of the science. However it cannot serve to comparison of the sciences in different countries. According to the well known Dutch expert Van Raan [20] any comparisons (made on the bases of publications) between branches of knowledge will be incorrect. It is shown, that it is necessary the account not just of one, but of many factors, the analysis of their condition and dynamics [21].

Edler J., Boekholt P. [22], studying strategies and methods of internationalization of the science and innovations, show that during last period there is an intensive internationalization of national innovative systems. Authors revealed three basic aspects concerning the given process: international use of the knowledge and technologies received at a national level; the international scientific and technical cooperation; generation of knowledge and innovations at the international level. Taking into account several basic groups of countries such as USA, Japan, Netherlands, Great Britain, France, Switzerland, Malaysia and South Korea it was found out, that no one of the examined countries does not possess the strategy of internationalization. The typical problems for the process of internationalization are the unsatisfactory condition of personnel maintenance for research study and research products in the certain areas in correlation with brain-draining.

Mirskii E.M. [23] examining the interrelation between processes of globalization and science specify the formation of global science. For creating the world wide scientific space it is necessary to consider the resources and mechanisms of scientific-innovative policy, as innovative indicators.

Innovating is central to the success of technology companies. The CEOs of these companies must make a priority of ensuring that technical know how is effectively converted into value. The paradox is that they rarely do. *Resolving the Innovation Paradox* shows how to put innovation for longer-term growth in the center of the CEO radar [24]. One tool is distributed innovation. Distributed innovation offers companies two main benefits. First, companies raise revenue by using channels such as licensing and selling innovation projects. Second, companies extensively tap into external technical know-how, combining it seamlessly with their internal capabilities to develop "high impact" products and services. In this way, less constrained by their own internal technical capabilities, such firms gain in agility and effectiveness. *Resolving the Innovation Paradox* offers examples from companies such as Generics, Intel, Nokia and Samsung.

Though nowadays there is no perfect formula of the science and development efficiency, nevertheless the scientists recognize the positive correlation between investments made in science and economic growth [25]. The level of branch or company productivity depends not only on their own research, but also on ability to use the knowledge received from the outside. The most difficult problem which is defin-

ing the rate of return is estimation of external factors. The positive rate between research and economic growth can be easy determined analyzing the behavior of the market, training and rotation of the research staff, processes of transfer of technologies mechanisms formatting, etc. The important element of innovative activity, industrial competitiveness and economic growth is effective interaction between private and public sector [26]. The research of scientific and industrial connections has shown that the market of knowledge is characterized by a high information asymmetry, a low transparency and high cost of transactions. There are restrictions on investment in knowledge production, caused by a high risk degree. The interaction of science and industry is defined by some parameters, characterized by specific features for each of the countries, this way it specified the necessity to study national models of scientific industrial maintenance. Taking into account the examples of some countries, we can see that the success of industrial innovations can be determined not by the investments proportions, but by their orientation [27]. On the base of the examples of such countries as India, Brazil and South Korea was shown, that for implementation of research study and development results in business, the following conditions are important: transnational placement of research divisions; contract research study and product development, partnership between the industry, research laboratories and local universities. The method of Foresight [28] was suggested for maintaining the intensive development of scientific research and their results, and their efficient transforming into technological innovations. On the all institutional levels it is proposed to analyze a wide spectrum of public problems such as: estimation and regulation of the risks; prosperity increase of the population; health protection; education and training; social protection of the population; perception and understanding of the technological innovations by population.

The science and technologies are the key factors of economical, financial and political success not only in the developed countries. The current status of scientific and technological complex of former Soviet Union countries must be evaluated form the politic and economical point of view. Usual it is a discrepancy between official declarations about the priority of science, the necessities of state support and real state support [29]. The reorganization that affected these countries, cause decrease in scientific and technical potential, that bring irreversible consequences for economy [30]. The basic problem is brain-

draining or scientific emigration [31]. Global modern society transition to postindustrial society, for Russia is not a next linear development stage of technologies, but a qualitative shift of civilization process [32]. The transferring of science into direct productive force of the society specifies the necessity of an accelerated self-organization of the scientific community. The synergetic approach it is proposed as a solution for these problems.

The analysis of condition of Russian scientific complex, beginning from 2000 year, revealed new achievements in the field of scientific - technological sphere reforming [33], generated by a new state scientific policy [34]. As a way of overcoming the negative phenomena in scientific - technological sphere it is proposed a transition to innovative development.

Tendencies of the science development, connection between science and economy, problems of science financing and preparations of the scientific staff are the rectangular factors of scientific policy and the basic maintenances for scientific safety of any country. The system of economic relations undergoes qualitative changes, both at the national and global levels. These changes are far from being the last. Under the intensive process of globalization, real economic processes are becoming more and more complicated.

The present stage of the science development is characterized by not only of a rethinking of the scientific methodology but also by searching for the new organizational-administrative paradigms, which may increase management efficiency, organization and self-organization of the scientific activity under the purpose for its submission to the issues of social and economic development, acceleration of the process of introduction of new scientific knowledge and technologies, transition to the high level technologies and educational economy and the constant increase in the cultural level of the population.

Rezumat

Oportunitățile integrării ştiinței în sistemul european şi internațional

În lucrarea propusă este prezentată o analiză integrată a organizării ştiinței în diferite țări în vederea aprecierii structurii sferei ştiinței şi inovării în Republica Moldova în contextul integrării europene. Sunt abordate problemele formării structurii inovaționale în condițiile economiei de piață, problemele integrării activității intelectuale şi industriale în baza raporturilor specifice dintre politicile

inovaționale şi ramurile economiei. În baza evaluărilor realizate sunt stabilite şi propuse noi mecanisme ale organizării şi dirijării activității inovaționale, principii de dirijare eficientă a ştiinței, bazate pe o politică ştiințifico-inovațională şi integrare cu procesul de instruire.

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