ISSUES OF POLITICAL STRATEGY IN DEVELOPING INNOVATION SYSTEMS

Abstract
Objectives: determining main trends of policy in the field of scientific research and innovations promoting in European countries.
Methods: economical – statistic and abstract – logical.
Results: the tendencies of policy in the field of scientific research and innovations promoting mainly in European countries were elicited. The comparison of the main criteria inherent to the world's innovation systems was made and significant divergences in the directions of development for the European, third world countries and Russia were determined. At considering the establishment of pan-European institution of science and innovation support we outlined the factors determining steady interaction between scientists' work and the spread of learning.
Scientific novelty: the analysis of research and development structure and their expenditure budget for the countries with various levels of per head income, determination of directions of innovation systems development for countries of Europe and Russia.
Practical relevance: making allowance for analysis of the world's innovation systems establishment in European countries at elaborating the national policy.

Keywords: world's innovation systems criteria, political economics of R&D, the area of studies.

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Introduction

As it is seen from the studies of sources in the field of scientific research and innovations [2; 4], the concept of strategic management of innovation systems in the modern context is in close correspondence with understanding the concept of policy applicable to research and innovations.

Designation of research fields were changing in the course of time and by early 1990 it has become evident that the term «policy» is not quite adequate to the field of research because many scientists engaged therein pinpointed their attention upon economic affairs in the sphere of technologies as well as on R&D management. The research area formed recently and called *political economy of R&D** focuses studies on the countries' «competitive advantages» and takes into consideration primarily structural economical indicators such as manufacture on an industrial scale and increase in employment correlating them with positive effects of innovation activities.

At the same time the objectives of «political economy of R&D» are determined by the function of social well-being in the countries that defines social priorities (for instance, transport, medicine, environment protection, etc.) and the structure of key branches of industry. The studies within the frames of this new discipline show that in the countries with different income per head we can also see the differences in the structure expenditure budget of research and development [1]:

1) the budget of private expenditures for R&D (as % of GDP) in the countries with high income per head (1,39%) is larger than social budget (0,70%) and the ratio of R&D /GDP makes nearly 2,09%;

2) in the countries with an average income per head private and social expenditures for research and development are practically equal (0,44% и 0,42%). An average indicator R&D /GDP amounts about 0,86%;

3) in the countries with low income per head social expenditures budget for R&D (0,39% of GDP)

* The English abbreviation for "research and development"= R&D.

is more than private expenditures budget (0,25% of GDP), apparently because the structure of industrial sector is not powerful enough to support high private expenditures.

As it can be seen from the national survey in the USA [1], most decisions on R&D expenditures are taken at the industrial enterprises. Thus, the corresponding processes of determining the objectives are not concentrated in the direct government control zone. The budgets of the American industrial enterprises form approximately 62% of all R&D funds. In Europe this indicator makes 54% at certain scatter of percentage (from 45% in Great Britain to 70% in Germany). In China, Singapore and Taiwan financing of enterprises as the share of general expenditures for R&D ranges from 60% and more. However, the government officials supervise innovation activity concerning R&D/GDP.

In China the value of this indicator over the period of 1996–2009 has grown threefold: from 0,6 up to 1,7%. And this rise happened to be within the period when Chinese gross domestic product annually grew by 12%. China expenditures for R&D in 2010 amounted to 141 billion dollars at nominal value of purchasing power that made more than 12% of all world's R&D expenditures.

Considering the facts of innovation development in Japan, China, South Korea and a number of developing economies we cannot but notice that in all these countries within the period of 1996–2007 rates of R&D growth were higher than in knowledge- intensive economies. In the European Community, the USA and Japan the growth of R&D expenditures was changing within the range of 5,4–5,8%, while in South Korea this index made 12%, in Singapore and Taiwan it was at the level of 9,5–10,5%.

European political leadership unwishes to put up with this situation. A report on Innovation Union 2011 [4] states that Europe must become «Innovation Union» where innovation firms will provide highly competitive employment opportunities, innovations will come up with decisions meeting today's demands of society. This organizational initiative is called upon competitive growth of economics (it is necessary to overcome the innovation gap in the regions of Europe), solving of several social and cultural problems (it is required to bring the studies to focus of social problems).

To implement EC program a system of three-level monitoring was worked out. The achievements on main directions according to «European Strategy 2020» are assessed at the first level (in particular, the shares of governmental and private investments in R&D as percentage of GDP) as well as the correspondence of development with the selected directions. The tool of assessment at the second level is the table of performance indices for «Innovation Union» (Innovation Union Scoreboard – IUS) [5] published for the first time in early 2011. The table presents data according to 25 key indicators of innovation activities and is kept up to date annually. The third level is closed by analytical strategic report being submitted once in two years.

At this stage the gap between the European Community and its world's rivals is kept and even extended, primarily, due to insufficient business community contribution to research and development. So, over the period of 2000–2007 despite GDP total growth the European Community demonstrated slowing down R&D intensity, within the term of 2007–2009 this indicator has grown a bit: from 1,85 to 2,01%. This growth can be explained by positive influence of economic reforms commenced after Lisbon Convention adopted in 2005. R&D intensity within the period of 2000–2009 has grown in 24 EU Member States (in particular, in 2006–2009) though in 2010 a number of countries failed to achieve the objectives stated in 2005.

Another matter of EU executive management's concern appears to be the fact that a part of innovation works are brought outside European borders. In 2008 24% of the world's R&D expenditures fell at the European Community while in 1995 this figure made 29%. Most obvious is the retardation in the private sector expressed as the ratio of business expenditures for R&D to GDP – in Japan and South Korea they are twice more than in Europe. In China business expenditures for R&D in 2008 made 1,12% of GDP therewithal since 2000 they grew 30 times faster than in the European Community.

The dynamics of staff assistance in the sphere of science and technologies make the Europeans possible to hope for the best. Annually the European Community trains 940 thousand of professionals who get diplomas of tertiary level in the field of new technologies (within the period of 2000–2008 the number of degrees conferred in EU countries grows annually by 4,9%). Each year in Europe 111 thousand of people get doctor's degrees what is twice as much as in the USA. However, the European Community invests in the higher education 2,5 times smaller than the USA and the share of private investments is very low. As can be seen from the above the economic effect in training of American specialists is higher if to count according to specific expenditures. A real break-through made China in 2009: six million of postgraduates commenced training while in the European Community

they amounted about three million and in the USA only 0,2 million. We should mark with concern that in Russia this figure hardly exceeded a million.

Establishing European practice of scientific and technical development

The founders of the economic trend adopted by the European Community believe that Europe must move towards technological development in the context of ever increasing world's competitiveness. But other experts express reservations due to the fact that current discourse in European innovation theme is grounded on its implicit definition as the means of providing for foodstuff supply or services on the market [2; 7].

In this regard it is helpful to address to history of establishing contemporary system of European science management. Research engineering at European level is presented under the slogan of research «Europeanisation». Moreover, the decision to organize pan-European agency of «boundary» research financing can be interpreted in different ways. For instance, it was also discussed as a part of advanced projects in further research integration. In the same way it may be considered within the frames of fulfilling the Lisbon agenda aimed at EU transformation into «the most competitive and dynamic economy in the world based on knowledge» [4].

As far back as 1950-s not long after the end of the World War II academic elites of some knowledge communities in Europe began to make effects for extending national research area. In substance, they strained after establishing of pan-European system of science financing in view of fundamental studies support and forming principles similar to that of National Scientific Fund in the USA.

At bottom, that was the attempt to import from the USA the institutes of research management without regard to local context. At that time the process of creating an organization at European level was restricted by weakness of European institutes and individual countries' strivings to national autonomy what, among other things, included accelerated search of national research areas being badly associated with each other. Obviously, more extended factors existed such as low level of market development including labour market and weak integration. As far as Europe intended to create a market «being destitute of nationality» to take into consideration «the stateless science» was far too much for that time. [6, p. 224].

Nevertheless, within the following decades the organizations of European level appeared in such fields as nuclear research and molecular biology. For instance, in 1952 European organization for Nuclear Research was created and later on, in 1957, EUROATOM what made a key milestone in forming the European Community. The European organization for Nuclear Research as a project was supported by the group of opinion leaders in physics providing its lobbying in the European governments. Keep in mind that the first Europe-wide scientific organization came into existence in a specific area of research that requires coordination of teamplay at supranational level, expensive equipment and adoption of international standards of its operation as well as safety and security arrangements. Furthermore, the field of nuclear physics was characterized by intensive competition with the USA.

In 1964 pan-European Organization of Molecular Biology was created and later, in 1974 a European biological laboratory was established.

Speaking generally, this initial period of creating Europe-wide organizations is defined by the influence of organized elites in some scientific fields and who had a bearing on higher political quarters. These elites acted as «change leaders» but there were no «change activists» due to underdevelopment of European institutions and lack of proper support at national levels.

European Organization of Cooperation in Scientific And Technological Research was founded in 1971 and European Science Foundation (hereinafter referred to as ESF) in 1974. These organizations support various directions of research including social sciences. This being said, their structure provides the basis for individual researchers' international cooperation but not for the science in a broad sense at the international level, i.e. they only render assistance in organization of international meetings or, as it is the case with ESF, just coordinate the national research programs arranging international expertise but don't possess their own funds.

ESF was founded as a part of large-scale program to draw the research financing and science support to the international level. ESF is ideologically associated with the concept of European Research Area that lays down a strategic aim of overcoming «harmful» fragmentation of science in Europe and achieving «better organization of European research work» in compliance with the provisions for the development of research area to be more dynamic configuration than «15 +1» [6, p. 220]. This program comprised other devices of financing, for instance, «ERANets», Technological Platforms and Networks of Excellence.

The necessity of Europe-wide organization of science and innovation support is explained by the experts in the following way: «the spacial range of positive effects in knowledge flows» considerably changes depending on institutional context as well as on characteristics of technological area. In particular, organizational borders can be interrupted by knowl-

edge flows. Such borders are evident between state research institutions and private companies but they also exist between various companies. The variety of knowledge can also explain some phenomena of its passing through area irregularity. Let us say, depending on specialty and the degree of the industry development division of incarnate knowledge can impede knowledge flows [3, p. 197].

The survey data among other things witness that advancement of implicit knowledge, being a necessary attribute of any study, and its absorption require more than simple geographic proximity. The significance of institutional context is also brought to the fore by the leading scientists studying the so-called «edge effects» [3, p. 198]. Within the frames of EU administrative fragmentation most often impede knowledge surplus. The intensity of knowledge flows considerably diminishes as far as passing through the borders of the countries even if they are neighboring. Thus, in the issue of such reasonings EU kept elaborating various programs of research. But governments still jealously safeguarded their sovereignty and were opposed to further expansion of EU role in the sphere of science and engineering. Consequently, all the programs originally had to be approved by the Council of the European Parliament and only then to be launched. To avoid this provision in 1983 «a framework program» amalgamating all research programs in technological fields was put into practice.

The program implementing could have become possible due to industrial development and formation of European political elite. However, the national support kept to be relatively low being reflected upon coordination types, from the one hand, and on adopted principles of principle of subsidiarity, from the other hand.

A special focus will be on the story of European Scientific Counsel establishing (hereinafter referred to as ESC) within the period between 2002 and 2004. In the late 2004 a decision was taken to include the program IDEAS into tenders according to the 7th EU frame program and to appoint ESC as an official executive. This proposal adopted in April of 2005 marked the change of missions, functions and ESC management.

The experts make pointed reference to participation in the abovementioned process of the then existing Director General of microbiological laboratory, professor F. Kefetos, and Kh. M. Gago, a physicist, having later become a political leader. In October 2003 an open letter of ESC establishing support signed by 45 Nobel Prize Winners from Europe was sent to a special research commissioner of that time, F. Basken. Moreover, the representatives of 52 research organizations in all fields from Europe signed another letter having become a trigger in a start of Initiative on European Science Development.

As it is believed and all the scientists beginning with Marshall outline that spacial separatedness weaken steady interactions and the spread of learning. Later economic geography and endogenous growth models explained the differences in regional special aspects of economic development growth by geographically stipulated specific character of knowledge outer effects, increase of deviations and restraints of economic advancement.

Based on the talking points including those mentioned above the European politics was formed on the principle of subsidiarity (confirmed in Maastricht Agreement adopted in 1992), what meant that EU could undertake actions only in the cases where the actions of other countries were not sufficient. In this way the concept of European added value in the research has been formed: «Until the present European added value was defined as cooperation of research teams in different countries. Now it is high time to give a new definition of the added value concept including the principle of making possible for the researchers in any European state to compete with other scientists on the ground of advantage. But to gain real advantage in the research competition must become a part of a new front-rank definition for European added value» [3, p. 225].

It is noteworthy to mention the problems emerged from adopting conditions of cooperation with ESF and special aspects of negotiations held in Great Britain, Italy, Spain, France and Holland. So, in Great Britain the scientists were in fear that their quite mature institutionalized system would be eroded by creation of the Scientific Counsel at the European level. «The position of British political Establishment will be better understood in the context of common skepticism to «everything European» and what is more definite, in relation to incredibility of the Scientific Counsel's capability to do away with bureaucracy» [6, p. 227–228].

Another example sets France: instead of opposing ESC establishment it took advantage of the debates to institute its own scientific counsel. Early in 2007 the National Agency of Studies was founded in France and allocation of research financing became implemented mostly according to project principle. Consequently, all the nations essentially changed their system of research financing as well. After ESF establishing the situation with national agencies for financing studies is better reflected in European Union Research Organizations Heads of Research Councils–(EURO-HORCs) [6].

Considered all, the processes of arranging science support at the European level should be interpreted as the sequence of attempts to slacken tension between «areas of research» and «national space of research» in this case being a restricting element. The propulsive force of these processes was academic elite or elites. They felt constrained within the frames of national research spaces and had a power to influence over politicians' intussusceptions of the given situation.

But there exists one exception — Framework Programmes being promoted by production sector and emerging European political elites; while all other organized structures were advanced by scientific and academic elites. Indeed, «Europe rich in effective resources» is one of seven leading initiatives constituting the Strategy 2020 EC. Hence, efficiency of resources use is the area of special attention in terms of innovation in the structure of seven EU programs (and its successor — «Framework Programmes for Research and Innovations Development up to 2020»).

It should not be left unmentioned that an essential role in expanding national research areas play biologists. But their role is somewhat different in terms of organizing biological laboratories and ESF. «Independent» biologists originally acted as academic elite, moreover, they used their experience and influence to form the European science elite. This came as no surprise: biologists were the group being especially restricted in the possibilities to carry out research since they had a certain experience and impact on the process of Europeanisation to lead others away in view of influencing political aspirations. This sphere is international and is based on up-to-date equipment and laboratories which are, as a rule, located in certain places. The access to these laboratories is extremely important both for an individual science worker and for a research team.

Foundation of such organization as ESF became possible due to mobilization of all European academic elites, conjoint work of political organizations of European level and reaching commeneurability of research areas. However, the given «technological approach» is opposed. A number of experts suppose that in many EU Member States the current vision of innovations holds us in ideologically vicious circle. It is obvious that «today's economic, social and ecological crises will not be resolved by a large quantity of the same technological phenomena that brought us to the current situation» [7, p. 79]. Making allowance for the scale and irreversibility of harmful impacts on environment and, hence, on the current and future generations we have practically no time for wishful thinking. In the soonest possible time the change of orientation for innovations from market forms to more socially significant and ecologically viable is in insistent demand. The situation calls for drastic measures to adopt more comprehensive concept of innovation comprising not only its technological forms but non-technological, social, institutional and behavioral forms.

The authors to support the above theses on this issue declare that environmental research and health survey are the key factors of all innovation forms because they stimulate making nonroutine technological, behavioral and ascertained decisions ultimately providing ecological stability, i.e. prerequisite for steady development of all other forms of innovation [2].

In practice, the abovementioned means the participation in «responsible innovations», i.e. in such processes where as far back at early stages we provide the analysis of potent adverse impacts of all new products, services and procedures on health, social medium and environment. Responsible innovations also involve the requirement of minimizing adverse effects of already existing products, services and processes as well as applying precautionary principle to avoid serious non-reversible losses. Moreover, responsible innovations must deal with ethic dilemmas that may escort the innovation what means the ability to admit mistakes and consequently, to change the course.

Europe must not miss a historical opportunity to take on a liability for the research programs, innovation policy of safe development and call the rest of the world for following this track.

Considering the possibility to utilize the given political measures in Russia applying the method of analogues we find out that the initiatives taken by the RF Government in summer and autumn of 2013 in relation to the Russian Academy of Science and Russian science as a whole are directed not so much to integration into global research areas as to destruction of national research space, to be more exact, what is left of it. And here we see the obvious interest of corporations being not at all Russian that show sluggish participation in this process but transnational companies. Unfortunately, in Russia we could hardly hear the votes supporting national science interests.

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