

IN THE DIRECTION OF THE EUROPEAN RESEARCH AREA: THE ROAD MAP FOR BELARUS

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The coordinated movement of the countries of the Eastern Partnership (EaP) in the direction of the common European space requires coordination of policies in separate areas of cooperation. The different level of development of the partner countries predetermines distinctions in the necessary changes and reforms which will be carried out by the governments of these countries during their movement to the general purposes. Nonetheless, the transformations are oriented towards the unified norms and standards which organize life and activity in the EU. Moreover, the European space itself is in the process of constant changes. During the formation of national policies, this fact demands to take into account not only the actual condition and modern regulation practices accepted in the EU, but also the orientation towards the future reference points and purposes of changes, which today act as guidelines of transformation of the European space itself. Thus, during coordination of the movement of the partner countries, it is necessary to use such an approach which allows to reach coordination and to preserve the difference of national policies and a unique situation of each of the EaP countries, and to accept as reference points both present position in the EU countries and directions of the future changes. A prototype of such an approach can be the method of open coordination applied actively in the EU countries since 2000, which is used during coordination of policies of the member countries in the achievement of the general purposes of development.

The Eastern Partnership, within the framework of the 4th thematic platform «Contacts between people», underlines a special direction of development of scientific researches and workings-out. The definition of a way to approach the EU practices and reference points in this area (within the scope of the offered method of open coordination) requires elaboration of a "road map" for Belarus, as well as such criteria and indicators which make it possible to define relative progress in transformation of the sphere of scientific researches and workings-out in respect of both EaP countries and 27 EU member states. The offered document is a "road map" for Belarus, it describes:

1. Reference points and directions of transformation of the sphere of scientific researches and workings-out in Belarus
2. Criteria and indicators to evaluate the actual condition of the sphere of scientific researches and workings-out and to promote workings-out in the direction to approach the European norms and standards

3. Strategies of transformation of the sphere of scientific researches and workings-out in the direction to approach the European norms and standards
4. Problems and technological steps to eliminate them in the course of the implementation of strategic plans

1. Reference points and purposes: the European research area

1.1. Long-term objectives

The long-term objective of development of the sphere of scientific researches and workings-out of Belarus (other partner countries) can be formulated as: **inclusion in the United European research area**. The united European research area (ERA) is a logical continuation of the European integration processes. The advancement of the general purposes of construction of economy of knowledge, the increase of competitiveness of the European economy, and the achievement of bigger social justice and inclusiveness, formulated by the Lisbon strategy, demanded bigger coordination and complementarity of policies of separate countries in the field of scientific researches. The European research area was intended as the all-European open space of knowledge and technologies and aimed at uniting researchers, research institutes, business, and politics in order to achieve bigger circulation of knowledge, business competition, and cooperation over borders.

The general directions of development of the European research area (determined by the EU Council of Ministers in 2008) say that by 2020 all participants should benefit from:

- 1) «Fifth freedom»: free circulation of researchers, knowledge, and technologies;
- 2) Attractive conditions of conducting researches and investments into the knowledge-intensive branches of the economy of Europe;
- 3) Healthy scientific competition and a corresponding level of cooperation and coordination.

In particular, future development of the ERA is aimed at:

- offering the attractive all-European market for researchers, as well as the united markets of knowledge, innovative products and services;
- building mutual trust and a constant dialogue between society and the scientific-technical community;
- receiving advantages from supported publicly scientific researches and technological base, infrastructure of a world class and potential in Europe;
- providing joint participation in working out of researches, programs, and policies in the sphere of education and innovations at all levels;
- taking into account, on the basis of the general prediction, the basic problems by organizing the strategic partnership including the European community, member countries, and associated states;

- providing a possibility for Europe to express a common opinion at international forums and in communication with its basic international partners¹.

The ERA also includes a transnational prospect, recognizing the importance of cooperation not only between member countries, but also between the EU and its neighbors. The initiative of the Eastern Partnership supports this all-European trend and allots tasks to develop the sphere of scientific researches of the region. The basic priorities of such cooperation are formulated within the framework of the 4th thematic platform of the Eastern Partnership «Contacts between people». This thematic direction underlines intensification of interaction between citizens of the EU and partner countries in the most various directions:

«Interaction between citizens of the EU and partner countries, especially youth, should be recognized as a factor promoting the process of changes and allowing to carry out the control over this process and, therefore, it will be supported. <...> Cooperation can also be implemented within the framework of popular EU programs and external assistance, in particular, in such directions as education, including language learning, youth, and scientific researches»².

1.2. Reference points and purposes of the Work Program of the 4th Platform for 2010-2011

The main objective of the Work Program of the 4th Platform for 2010-2011 concerning scientific researches, is formulated as follows:

“Increase of the participation of Eastern Partners in the opportunities for cooperative research, capacity building, and researcher mobility, offered by the Seventh Framework Program”³.

The Work Program separately emphasizes the active role of civil society in the implementation of the purposes of the EaP platform 4:

*“In addition to the usual stakeholders involved in education, research, youth, and culture, **civil society** will be actively associated in the implementation of the work program, in particular through the Eastern Partnership Civil Society Forum which will **provide regular recommendations, input, and feedback on the implementation of the Platform 4 work program; and the Jean Monnet networks**”⁴.*

The question of development of contacts in the field of scientific researches is revealed in detail in separate directions of the Work Program, in particular:

- to increase the mobility of researchers, as well as mobility related to learning;

¹ http://ec.europa.eu/research/era/vision/era_vision_and_progress_en.htm

² Announcement of the European Commission for the European Parliament and the European Council, Brussels, 03 December 2008, http://ec.europa.eu/external_relations/eastern/docs/com08_823_ru.pdf

³ Platform 4 'Contacts between People'. Core objectives and proposed Work Program 2009-2011 // http://ec.europa.eu/external_relations/eastern/platforms/docs/platform4_261109_en.pdf

⁴ Ibid.

- to use possibilities provided by the program and Jean Monnet networks;
- to increase the participation of research institutes from the EaP countries in the 7th Framework Program for Research and Technological Development (FP7).

In all directions, it is planned to stimulate bigger involvement of institutes and separate researchers into tools of cooperation and EU cooperation. An important part of the Work Program is to inform about each of directions, including the implementation of special presentation events for the partner countries under the aegis of the European Commission.

The purposes and directions of the work program for 2010-2011 are equipped with program tools of support and financing. The basic tool of support of scientific researches in the EU is the **7th Framework Program for Research and Technological Development (FP7)**. Elements of this program (as well as some other thematic programs of the EU) are already now available for Belarus (and other partner countries), in particular:

a. Tools of support of a regional and bilateral dialogue in the field of science and technologies:

7th Framework Program already includes its support to the networks created in order to facilitate a dialogue between stakeholders of the EU countries, associated countries, and the countries of the Eastern Partnership in the field of science and technologies. The following networks are working now:

- **IncoNet.EECA** (S&T International Cooperation Network for Eastern European and Central Asian Countries, a scientifically-technological network of cooperation for the countries of Eastern Europe and Central Asia). This network includes all countries of the Eastern Partnership.

- **Black Sea ERA-NET**. It is a network similar to IncoNet.EECA, which includes the countries of the Black Sea Region, i.e. 5 countries of the Eastern Partnership, except Belarus.

In 2010, the 7th Framework Program provides additional tools to deepen cooperation between research centers in the countries of the Eastern Partnership through the **ERA-WIDE call for proposals**. It is supposed that at least one project for each of the countries of the Eastern Partnership will be financed.

The greatest prospects are given if the country requests association to the FP. Such a request can be sent after signing Protocols to the Partnership and Cooperation agreements with the EU. Nowadays, Belarus has no formal possibilities of access to association in the Framework Program because the Partnership and Cooperation agreement, coordinated with Belarus in 1995, has not been ratified by the EU countries. As for the other countries of the Eastern Partnership, only Moldova and Ukraine have directed their requests to receive an associated status.

b. Tools of information support

Informational support about possibilities of participation in the 7th framework program, including consultations on preparation of relevant applications, is provided by National information offices (National Contact Points (NCPs)). Such centers are created in all countries of the Eastern Partnership. In Belarus, such a Center has been working since 2004⁵.

c. Researcher Mobility

The researcher mobility is supported by the Jean Monnet⁶ and Marie Curie⁷ programs and the tool of EURAXESS⁸ (the last two are a part of the 7th framework program). The Marie Curie program supports a wide layer of activity providing mobility, including the support of doctor's and early post-doctor's researches (tools: World Fellowships, Initial Training Networks, International Research Staff Exchange scheme (IRSES), International Outgoing Fellowships (IOF)). The Jean Monnet program is aimed at supporting researches, growth of knowledge, and discussions on questions of European integration.

Questions of the researcher mobility are separately considered in the block "Education" of the Work Program of Platform 4 for 2010-2011. It underlines the importance of standardization to increase the mobility in the spheres of science and education. In particular, it stresses the necessity of the EaP countries' adaptation of the European Qualification Framework, European Credit Transfer and Accumulation System (ECTS), inclusion of the countries in the NARIC network (National Academic Recognition Information Centers), which will allow to solve the questions of divergences of national systems of qualifications, recognition of diplomas, results of researches, and training periods in the EU.

2. Criteria and indicators

The movement in the direction of the United European research area demands to define a grid of indicators, allowing to measure the actual condition of the EaP countries and their progress in the achievement of the purposes designated above, taking into account the following contexts:

- socio-historical context: the evaluation system is to be based on a profound knowledge of the actual condition of processes of de-sovietization and democratization in the partner countries. The use of formalized criteria applied to evaluate development of the countries which are in other socio-historical conditions, leads to inadequacy of understanding and estimation.

⁵ National information office of Framework programs of scientific researches and technological development of the EU in Belarus// <http://fp7-nip.org.by>

⁶ http://ec.europa.eu/education/lifelong-learning-programme/doc88_en.htm

⁷ http://cordis.europa.eu/fp7/mariecurieactions/home_en.html

⁸ <http://ec.europa.eu/euraxess/index.cfm/general/index>

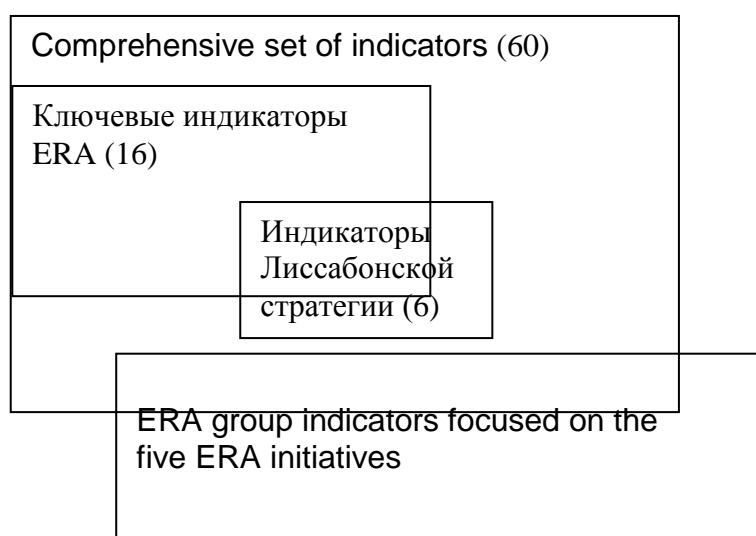
- regional context: the evaluation system is to be aimed at forming a new European region by creating a common system of indicators and communication concerning methods and ways of development.

- all-European context: the system of indicators and criteria should be coordinated with the all-European tendencies and processes⁹.

It is expedient to base this grid on the existing (developing) EU indicators and a system of progress measurement of the European research area (ERA) and to add a system of criteria reflecting the national and regional specificity.

2.1. European system of research area monitoring

Nowadays, monitoring of the European research area (ERA) is carried out with the help of the network of 60 indicators, grouped as follows:



Ключевые индикаторы – ERA Headline indicators (16)

Лиссабон - Lisbon-oriented indicators (6)

The general structure of the network of indicators groups indicators in several directions¹⁰:

The Five Components of the ERA

Component 1- Knowledge Activities: Volume and Quality

“The ERA defines the European way to excellence in research and is a major driver of EU competitiveness in a globalised world”

⁹ Vadalazhskaya T., Yahorau A. Concept of further development of the EaP CSF // European Transformation Center, 18 March 2010, <http://eurobelarus.info/content/view/3870/53/>

¹⁰ См. ERA Indicators and Monitoring. Expert Group Report. October 2009 // <http://ec.europa.eu/research/era/docs/en/facts&figures-expert-group-indicators&monitoring-eur24171-2009.pdf>

Component 2 - *Knowledge Triangle: Flows and dynamics*

“Strong interactions within the “knowledge triangle” (education, research and innovation) are promoted at all levels”

Component 3 - *Fifth freedom: intra and extra-EU openness and circulation*

“The ERA provides a seamless area of freedom and opportunities for dialogue, exchange and interaction, open to the world”

Component 4 - *The Societal Dimension*

“The ERA is firmly rooted in society and responsive to its needs and ambitions”

Component 5 – *Sustainable development and Grand challenges*

“The ERA is firmly rooted in society in pursuit of sustainable development”

The Four types of concern for the ERA monitoring

Type A1 – Member states (MS) level policy actions

Type A2 – EU level policy actions

Type B – ERA progress; state of the ERA

Type C – ERA effects; Lisbon objectives

These directions set a summary table of indicators (See Table 1) in which the crossings of lines and columns have parameters to be measured and monitored. Each of these parameters has measurable quantitative and qualitative indicators (60 indicators in total).

A similar structure of the network of indicators, with a number of additions, can be applied to monitor the advancement within the framework of the Eastern Partnership, considering the long-term objectives of inclusion in the European research area. Additions should include a possibility to monitor processes:

- of formal rapprochement with the EU normative space (signing of framework agreements, acceptance of standards of regulation of EU in separate areas, in particular, signing of the agreement on partnership and cooperation, reception of the status of association at the Framework program, adaptation of the United qualification framework, European system of credit transfer and accumulation, etc.);
- of actual approach to the EU standards and practices (real comparative indicators of development of the sphere of science and researches where the level of development of the ERA is a reference point);
- of multilateral rapprochement in the region of the Eastern Partnership;
- of the national specificity, in particular – the existing in the EaP countries restrictions and barriers of mobility, openness, freedom of scientific and research activity, access to results of scientific researches, etc.

As a first approximation, for construction of a network of indicators for Belarus (a country of the Eastern Partnership), it is possible to offer the following structure (See Table 2):

At this stage, the biggest problem is to define accurate parameters for monitoring of processes of multilateral interaction at the level of the Eastern Partnership because meanwhile it is difficult to identify the direction and formal frameworks of this interaction. As for other criteria, it is necessary to consider the aspect that multilateral interaction is very weak, and there is no certain policy of interaction between the countries in the field of scientific researches. The suggested criteria can look idealistic for the countries of the Eastern Partnership; however, they allow to set reference points of general development, i.e. such criteria have not only a descriptive character (allowing to describe the state of affairs), but also order directions to change the existing policy.

The building of the "Road map" to develop the sphere of scientific researches requires a concrete definition of all components (columns) at all levels (lines). This work, obviously, will demand additional researches. **At this stage, we can only present a situation analysis in the sphere of scientific researches and workings-out in Belarus in most general lines, selectively being guided on the ERA standards of measurement and the structure of the network of indicators offered above for Belarus.**

3. The situation analysis in the sphere of science and researches in Belarus

The situation analysis cannot have an abstract character of general arguments and should be adhered to concrete points: to the executor or the addressee(s) of the "road map"; to concrete circumstances and conditions of activity of this addressee during the actual moment of time; to problems in the implementation of the purposes and reference points set by the "road map". The basic addressees of the "road map" are:

- scientific research and expert institutes, centers, communities concentrating mainly in the sphere of civil society of Belarus, as well as in the spheres of business, the state, and higher education;
- Civil Society Forum of the Eastern Partnership and its working groups;
- official governmental structures of Belarus, the countries of the Eastern Partnership and the EU, involved in the work within the framework of the 4th thematic platform of the Eastern Partnership.

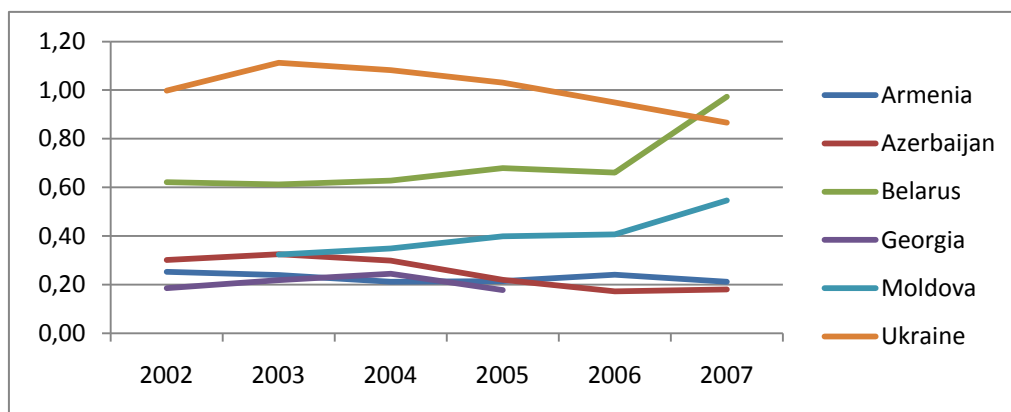
Nowadays, it is impossible to carry out a full-fledged analysis by all criteria offered above; we offer only a preliminary cut below, which will allow to define, as a first approximation, the necessary steps and actions. Such an analysis will include three basic components: a) quantitative comparative comparisons of development of the sphere of scientific researches and workings-out; b) comparative comparisons of cooperation of Belarus and the countries of the region of the Eastern Partnership to

the EU; c) a qualitative review of the basic problems and obstacles in development of the sphere of scientific researches and workings-out.

3.1. Belarus against the background of the countries of the Eastern Partnership: some quantitative comparisons

As for the other countries of the Eastern Partnership, Belarus has rather good indicators of development of the scientific research sphere. According to 2007 data, the share of expenses on science and research (in % from the gross national product) in Belarus was higher than that in the other countries of the region. Besides, the expenses on the sphere of researches and workings-out grew, which is not characteristic of the other countries (except Moldova) where dynamics was the opposite (see Diagrams 1, 2). If to compare indicators of expenses on science of Belarus to those of the EU neighboring countries, its position is within a wider regional tendency: Belarus spends a tad less than Lithuania (0,8% from GNP) and Latvia (0,7%), and a tad more than Poland (0,56%)¹¹. However, Belarus lags rather considerably behind the integrated indicators of expenses of the whole European Union (EU-27) on researches and science (1,7%-1,8% from GNP).

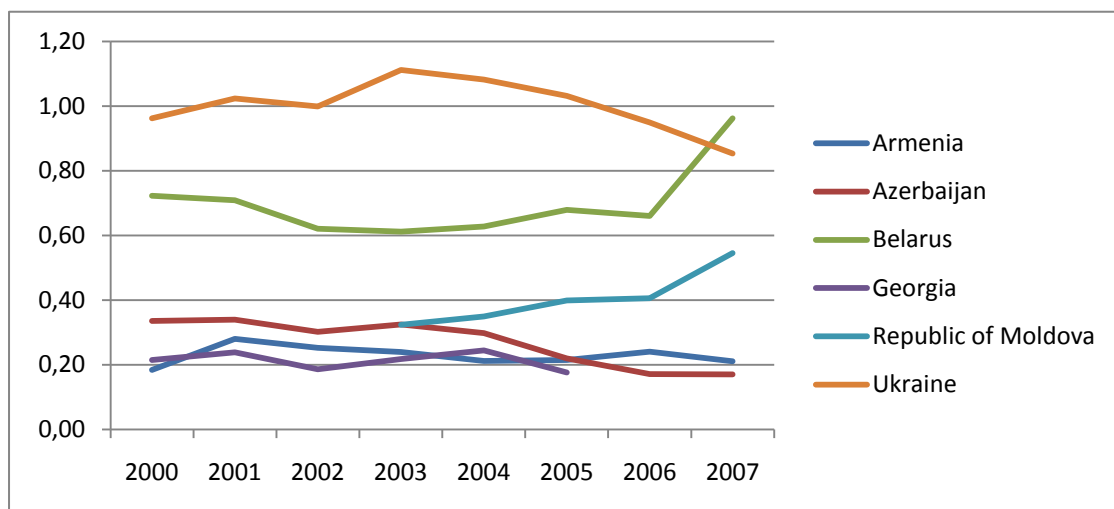
Diagram 1. Expenses on science and research (state and private ones, GERD), % from GNP



Source: World Bank

¹¹ SCIENCE, INNOVATION AND TECHNOLOGY IN THE REPUBLIC OF BELARUS – 2008. Statistical book, State Committee on Science and Technology, Ministry of Statistics and Analysis of Belarus, 2009

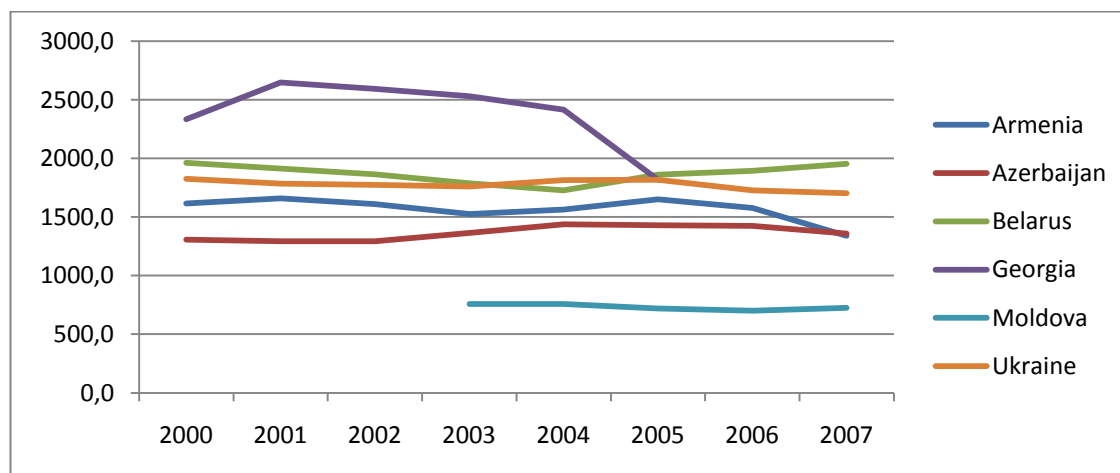
Diagram 2. State expenses on science and researches (GOVERD), % from GNP



Source: UNESCO

The human potential of Belarus for development of the sphere of researches and workings-out is high. By 2007, Belarus had reached the leaders by the quantity of scientific research staff per capita, showing since 2004 steady positive dynamics. In the other countries, there was a stable situation (Azerbaijan, Moldova, Ukraine), or indicators worsened as in case of Armenia and Georgia (Diagram 3). It is necessary to notice that the majority of scientific and research organizations in Belarus (in total 329 organizations in 2008¹²), in which scientists work, belong to the budgetary organizations of the state-run sector and universities (basically, state-run ones as well). The quantity of non-state research organizations, working in the spheres of private business or the third sector, remains quite low. In a sense, it reduces competition in the sphere of science and researches, thus influencing the general quality of scientific researches.

Diagram 3. Quantity of researchers per one million population

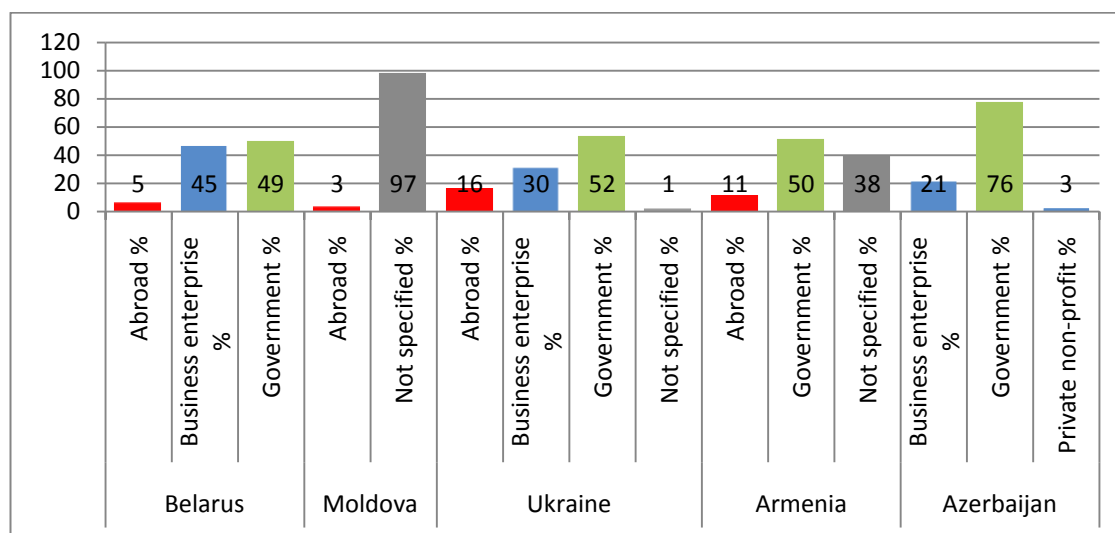


Source: UNESCO

¹² Bohdan N.I. Belarus in the context of Innovation Indicators of European Innovation Scoreboard // <http://umconference.um.edu.my/upload/43-1/papers/097%20NinaBohdan.pdf>

In the structure of expenses of Belarus on science and researches, the state expenses dominate (49%), which is basically characteristic of the region. Nevertheless, a comparative share of state financing in Belarus is a little bit less than that in the other countries of the Eastern Partnership; the business share in financing of researches (45%) is rather high. However, it is caused more likely not by an objective state of affairs, but by the specificity of the national statistical account, traditionally overestimating the share of the non-state sector. The share of foreign financing is 5-7%, which is higher than in Moldova and Azerbaijan, but it is less than in Ukraine and Armenia (Diagram 4)

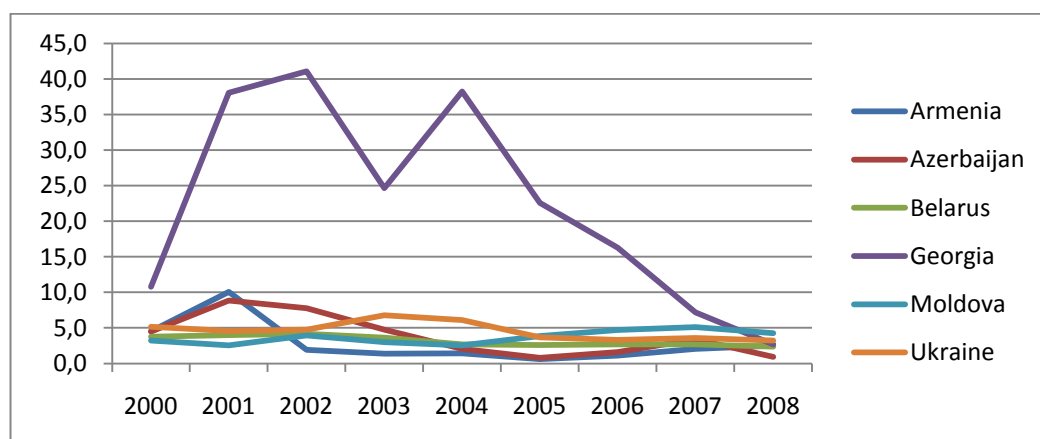
Diagram 4. Financing structure, 2007, in shares per each sector



Source: UNESCO

Regardless of the good potential of Belarus, the return from science and researches remains not high. The share of export of hi-tech products in the general share of Belarusian export decreased in 2000-2008, which testifies about the presence of problems in the implementation of innovative workings-out.

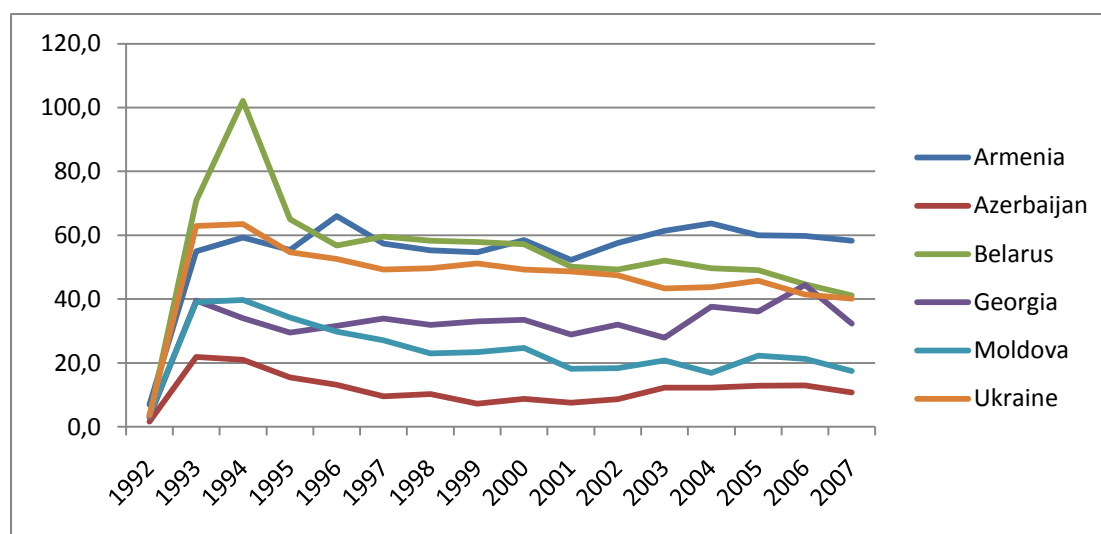
Diagram 5. Share of hi-tech export in the general share of the made export, %



Source: World Bank

The quantity of publications in scientific magazines since 1994 in Belarus constantly decreases, that is a disturbing factor in spite of the fact that this indicator is rather high if compared to the other countries of the Eastern Partnership. Besides, the indicator reflects dynamics of publications in technical and natural-science areas, not mentioning the humanitarian area, in development of which, in general, it is difficult to say anything at all on the basis of “firm data” which could be indexes of citing or a quantity of publications in TOP-100 global publications. However, the fact that in Belarus there are no English-language humanitarian magazines and all state-run humanitarian scientific editions are under a severe ideological control, allows to doubt in the presence of big successes. Among non-state editions, it is possible to note only single magazines: the journal *Topos* of the European Humanities University (the Belarusian university in exile located now in Vilnius, the Lithuanian Republic), devoted mainly to the sphere of philosophy and social sciences, the independent academic journal on political science *Political Sphere*, published by a group of Belarusian political scientists; as well as the independent intellectual journal *Arche*, and electronic bulletins published by not numerous independent institutes (IPM, BISS, NISEPI). Independent editions are limited in their circulations and possibilities of distribution, and cannot compensate a lack of a communicative infrastructure in humanitarian areas.

Diagram 6. Articles in scientific and technical journals, per one million population¹³



Source: author’s calculations based on the data of the World Bank

3.2. Regional cooperation and cooperation with the European Union

The countries of the Eastern Partnership have a similar, inherited from the USSR, structure of scientific research institutes in which National Academies of Sciences

¹³ Description: Scientific and technical journal articles refer to the number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences.

and higher education establishments dominate, as well as a high (but not implemented) potential of network cooperation. Attempts to create a common scientific and technological space of the CIS and **Eurasian Economic Community (EAEC or EurAsEC)** have failed because of the general inviability of these formations and a not enough developed infrastructure and financing of researches. In the region, bilateral cooperation develops more fruitfully; Belarus has interstate cooperation agreements in the sphere of science and researches with Ukraine, Armenia, and Moldova; there are negotiations about cooperation with Azerbaijan. Belarus co-finances scientific and technological programs with Ukraine, and in 2010 it prepares similar joint programs with Moldova and Armenia. Belarus will allot 6 million Euros for questions of international cooperation in 2010.

The basic obstacle for cooperation of the EU and Belarus in the sphere of science and technologies is the absence of an adequate international legal base: the Contract on Partnership and Cooperation with the EU (PCA) is not ratified, and accordingly the Cooperation agreement in the field of science and technologies (S&T Agreement) is not signed. Nevertheless, Belarus has possibilities of participation in joint scientific research projects. Such cooperation is implemented within the framework of programs ISTC (International Scientific and Technological Center)¹⁴, INTAS, as well as the 6th and 7th framework programs (they act as the basic tools of financing). Within the framework of ISTC in 1994-2006, Belarusian scientists carried out 88 projects (the financing volume is about 33,2 million US dollars); within the framework of INTAS, Belarus took part in the implementation of about 4,5% of projects (from 3 299). With the financial assistance of the 6th framework program, 22 projects have been implemented (the EU financing was 1,25 million Euros); the level of success of Belarus' participation is estimated in 16%, which is higher than in Ukraine which has implemented a bigger quantity of projects (93 projects and 13,99% of success)¹⁵. As of 2009, there were 106 applications were submitted to participate in the 7th framework program and 12 were financed. Among the participants of the 6th program, structures of the National Academy of Sciences dominated, among the 7th - Belarusian universities did¹⁶. The European programs support mobility of scientists (Marie Curie program), but participation of Belarusian researchers in them remains low enough.

¹⁴ <http://www.istc.ru/>

¹⁵ Success of participation is estimated as a relation between the submitted projects and the projects which passed the competitive selection

¹⁶ Olga Meerovskaya. BELARUS Contry Report (last updated 20 July 2010, source: BellSA). IncoNet EECA // <http://www.increast.eu/en/154.php>

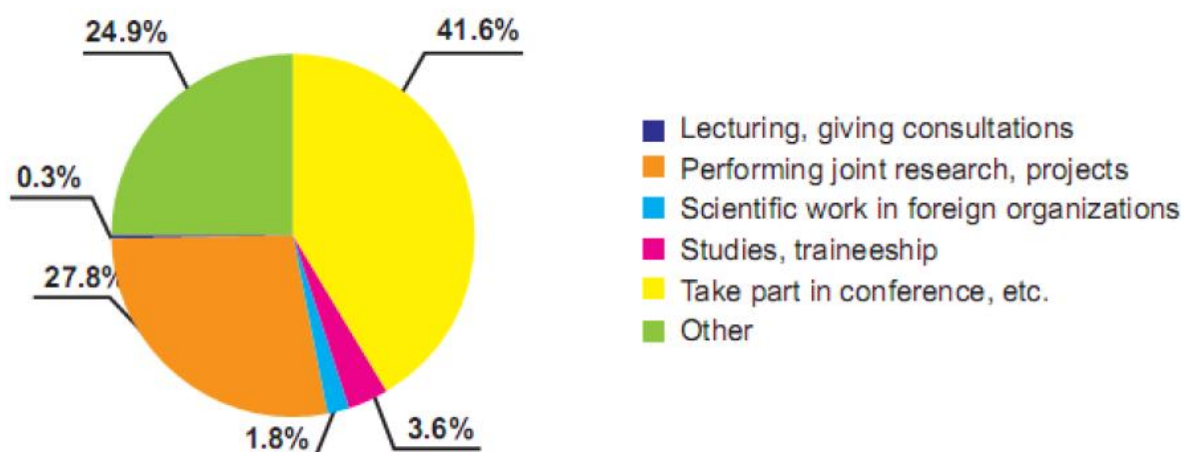
Table 1. Participation in Marie Curie program, separate countries, 2008/2009

Nationality	Number	Share of total of %
Russian Federation	59	15,5
Ukraine	15	3,9
Moldova	5	1,3
Belarus	4	1,1

Source: Science, Technology and Competitiveness key figures report 2008/2009¹⁷

The level of mobility of scientists remains low enough for the majority of the countries of our region, which has negative effects in the form of weak international integration and even isolation of national scientific communities, small notability of national scientific workings-out, and frequently their low competitiveness in the international market. The quality of staff mobility also leaves much to be desired. In the general share of researchers who worked abroad, only a third was involved in joint research projects¹⁸:

Diagram. Researchers who worked abroad, purposes of departure, 2008



Source: Bohdan N.I. Belarus in the context of Innovation Indicators of European Innovation Scoreboard // <http://umconference.um.edu.my/upload/43-1/papers/097%20NinaBohdan.pdf>

3.3. Actual problems and obstacles in development of the sphere of scientific researches and workings-out in Belarus

It is necessary to admit that Belarus has a very high potential for development of science, technologies, and researches, however, this potential is implemented in a

¹⁷ <http://ec.europa.eu/research/era/docs/en/facts&figures-european-commission-statistical-annex-2009-en.pdf>

¹⁸ Bohdan N.I. Belarus in the context of Innovation Indicators of European Innovation Scoreboard // <http://umconference.um.edu.my/upload/43-1/papers/097%20NinaBohdan.pdf>

very weak degree. The development is hampered by a number of substantive problems which have to do with infrastructural and financial questions and with the general condition of freedom, openness, and publicity in science and higher education of Belarus. The pendency of these problems causes stagnation of the sphere, and in the long-term period it threatens with a waste of the previous accumulation. It is possible to define problems completely only if there is a detailed analysis which implementation now is problematic because of the existence of **problems in the methodology of gathering statistical data and a small quantity of special researches.**

The methodology of gathering and analyzing statistics concerning the condition of the sphere of scientific researches and workings-out poorly corresponds to the international standards. As a result, there is no adequate display of the real condition of development of science and researches. Questions of the real quality of scientific workings-out, mobility of scientific staff, their quantity, the real volumes and structure of financing, inter-sector interaction, influence on economic and social development, as a rule, remain without any adequate answer.

Special studies of the sphere of science and researches could compensate the lack of statistical data. However, there is a small number of such studies in Belarus because of the low interest of the state in the reflection of the real situation in science (which, however, can happen to be not so bad in comparison with the other countries of the region).

Among other problems in the field of science and researches in the country, it is necessary to mention:

1) Nationalization of the sphere of scientific researches and workings-out. In Belarus, there is practically no developed infrastructure to carry out independent researches. The basic expenses on science are allotted by the state; the contribution of business and foreign investors remains insignificant. In the country, there is a significantly low number of independent research groups, scientific and analytical centers. All science and researches are practically completely concentrated in state-run and near-state institutes; in structures of the third sector and business scientific workings-out are practically not conducted. It influences both quantity and quality of researches. The absence in the country of the healthy competitive environment leads to self-isolation of scientists concentrated in the Academy of Sciences and universities. The international level is only reached by individual representatives of the academic community of the country. In Belarus, there is a limited quantity of scientific magazines, especially in the sphere of the humanities. The infrastructure is not development - as a result, there are not enough researches of a high level, thus many spheres of life and activity of Belarus remain not studied. Today, we do not have adequate knowledge of the condition of education, culture, science, regional development, the quality of life and many other things in the country. The effect of such ignorance is the low efficiency of reforms in these spheres.

2) *Distress of the humanities.* If scientific researches in natural and engineering sciences are in a rather good condition, the sphere of the humanities in Belarus is developed very poorly. The ideological control limits possible subjects of researches; scientists who raise sharp and vital topics, are isolated and lose a possibility to work in Belarus¹⁹. The state support of the humanities is very weak, while external sources of financing are poorly used by Belarusian scholars.

3) *Absence of dialogue and publicity.* Different research and scientific groups have a low level of communication with each other. On the one hand, this is the consequence of the absence of a normal infrastructure; on the other hand, this is the consequence of isolation on the part of the state of independent analytical and research centers. There is practically no information interchange; results of researches are not publicly revealed and spread. There are no mutual criticism, reviewing, and discussions of implemented researches and their results between state-run research structures and independent ones. An additional factor is restrictions of freedom of scientific activity, absence of academic freedoms in Belarusian universities and state-run scientific institutions.

4) *Low level of information awareness and participation in international programs.* While there are a lot of opportunities of attraction of external financing, their use looks weak enough. The information awareness of the scientific research community and its activity in the use of already open possibilities is the lowest. The priority is to intensify the use of the existing European tools of support.

5) *Restrictions of mobility of scientists.* In Belarus, the researcher mobility is restricted avowedly or non-avowedly; there are administrative obstacles for departure abroad for students, post-graduate students, teachers, and scientific workers.

4. Strategic directions of actions

Belarus' strategy to approach in the direction of the EU united research area breaks up into several basic parts:

1) Formal adaptation of framework requirements

a. At the level of the governments of the countries of the Eastern Partnership and EU, it is necessary to begin negotiations about signing of framework **agreements on partnership in the field of scientific researches and reception of an associated status in the 7th frame program**. In case of Belarus, the signing of such agreements is complicated by the question of the absence of the Partnership and Cooperation Agreement with EU. A temporary replacement of this agreement can be the discussed now Joint Interim Plan, which signing can form the basis to start negotiations about profound cooperation in the sphere of scientific researches.

b. It is necessary to begin negotiations about **adaptation of norms and standards of European statistics** in the field of science, technologies, and researches.

¹⁹ E.g. see the problem of the employment ban http://community.livejournal.com/zabarona_na_prf/

2) Development of infrastructure of scientific researches

a. Support of state-run and non-state scientific and research centers and their infrastructure. In Belarus, support to scientific and research centers should be expanded by financing their infrastructure and supporting their research work in concrete thematic areas.

b. Researches in concrete thematic areas, including special researches of the sphere of manufacture of knowledge. Lacks and lacunae in the statistical material should be compensated by special researches. Such researches should be implemented by joint teams of experts from the countries of the Eastern Partnership and EU. To develop the very sphere of researches, it is necessary to launch the system of regular evaluation and monitoring of this sphere (the organization of researches about researches); there is a need in researches in many other thematic areas: education, culture, regional development, etc.

c. Support of the infrastructure of publicity and communications at the national and regional levels (publishing work, edition of scientific magazines, conferences and thematic expert round tables). Both at the level of the countries of the Eastern Partnership and at the national level, it is necessary to expand support of publishing work, edition of scientific magazines, conferences, and thematic expert round tables.

d. Support of the mobility of researchers, scientists, and experts. Such support can be carried out through the existing programs, however, its focus should be more oriented to support regional cooperation of the countries of the Eastern Partnership. For mobility stimulation, it is necessary to eliminate the existing restrictions on departure and exchange of scientific staff.

3) Expansion of openness and availability of European programs of support

a. Expansion of informing and involving of research staff (both state-run and independent research structures) in European programs. Belarus' civil society should expand **informing and involving** of research staff (both state-run and independent research structures) in European programs of support. Today, the problem, in many respects, is not that Belarusian researchers do not have enough accessible tools of support, but that they are not informed enough and competent to use them.

b. Expansion of publicity and openness of national information points and offices of European programs, in particular the National Information Point for FP. National information points and offices of European programs, in particular the National Information Point for FP, should expand **publicity and openness** of their activity. As a rule, such information points are created at the state bodies and the information on programs reaches only a limited quantity of addressees. Structures of civil society should be involved both in the work of such structures and in monitoring and control of their activity.

4) Stimulation of publicity and public dialogue on results of researches, examinations with inclusion of representatives of the state, the academic community, independent experts, and civil society organizations, as well as representatives of the EU and EaP countries. The results of scientific researches and examinations implemented in Belarus with the help of means of European programs and tenders, should provide an obligatory component of the organization of wide public discussions.

Table 1: System of indicators to monitor ERA: general structure of indicators network

Components of the system		Component 1. Knowledge manufacture: volume and quality	Component 2. A knowledge triangle: flows and dynamics	Component 3. Fifth Freedom EU-wide mobility, single market for knowledge inside and outside the EU	Component 4. Social aspect	Component 5. Sustainable Development and Grand Challenges
Levels						
Type A. Policy actions	Type A1 Member States level	Public investment RD Attractiveness policies Incentives for private RD investment	MS Knowledge Triangle policies Coordination of Triangle policies within MS	Preparation of interoperability of HE and R systems Open public procurement Attractive conditions for researchers	Societal platforms involvement of stakeholders TA (Technology Assessment)	SD policies and actions
	Type A2 EU-level and coordination across MS	FP volume & structure ERC Joint progr. Speaking with one voice in international for a ESFRI & instruments	Coord. Of Triangle policies within EU EIT (European Institute of Technology) EU innov. policy and publicprivate interactions	Common market for knowledge and its production factors across EU High performance EU-wide info systems	Societal platforms involt of stakeholders TA (Technology Assessment), foresight Ethical principles Cohesion and equity	Strategic partnerships between community & MS SD policies and actions
Type B ERA progress state of the ERA		Integration – coordination among MS of public R funds	Intra-MS and intra EU flows between HER-I Publicprivate interactions & flows	Intra-EU collaboration Knowledge flows competition in EU for K production factors Access to complementary K & capacities across EU World class R infrastructure	Science society activities Common Foresights Social, regional, geographic cohesion	Joint SD activities
Type C ERA Effects – Lisbon objectives		Knowledge activities (Volume, quality) World class research Structural change: - Knowledge intensity - Specialisation (sectoral, geographic) - Dynamics of firms Revealed attractiveness of ERA Linkages – networks between ERA and the world; openness of ERA to the world			Trust & dialogue between society – S&T Public attitude to S&T equity: geographic, social, gender	EU leadership in addressing global challenges and reaching SD goals

Table 2: General structure of a network of indicators for Belarus / region of the Eastern Partnership

Components of the system		Component 1. Knowledge manufacture: volume and quality	Component 2. A knowledge triangle: flows and dynamics	<i>Component 3.</i> Fifth Freedom openness and knowledge circulation	Component 4. Social aspect	<i>Component 5.</i> Sustainable Development and Grand Challenges
Type A. Policy actions	Type A1. Framework level of EU-27, progress and condition, ERA effects	Public RD investment Attractiveness policies Incentives for private RD investment FP volume & structure ERC Joint programs Speaking with one voice in international fora ESFRI & instruments	MS Knowledge Triange policies European Institute of Technology EU innov. policy and public private interactions	Interaction of higher education and researches Open public procurement Attractive conditions for researchers Common market for knowledge and its production factors across <i>EU</i> High performance EU-wide info systems	Societal platforms invovlt of stakeholders TA (Technology Assessment), foresight Ethical principles Cohesion and equity	SD policies and actions Strategic partnerships between community & MS SD policies and actions
	Type A2. EaP Level, coordination inside the EaP (multilateral interaction)	Joint programs General research infrastructure and tools	?	Regional interaction of higher education and researches Attractive conditions for researchers Common market for knowledge and its production ?	?	Strategic partnerships between countries ?

	Type A3. National level (partner countries) and bilateral interaction with EU	Public RD investment Attractiveness policies Incentives for private RD investment	Countries' Knowledge Triange policies Coordination of Knowledge Triange policies Inside the country	Interaction of higher education and researches Open public procurement Attractive conditions for researchers Barriers /bans/ restrictions	Societal platforms invovlt of stakeholders TA (Technology Assessment), foresight Ethical principles Cohesion and equity	SD policies and actions Strategic partnerships between countries / region & EU / Belarus and EU
Type B. Progress type and condition of the national sphere of scientific researches and workings-out, degree of integration with ERA	Integration – Coordination with EU policies Adaptation of EU standards in the field of science and technologies	Intra-EaP and intra EaP flows between HE R-I Public-private interactions & flows	Collaboration with EU (volume of participation in EU programs) Knowledge flows competition for K production factors Access to complementary K & capacities Inside the country and in EU World class R infrastructure	Science society activities Common foresights Social, regional, geographic cohesion	Joint SD activities	
Type C. Effects of development of the sphere of scientific researches	Knowledge activities (Volume, quality) World class research Structural change: - Knowledge intensity - Specialisation (sectoral, geographic) - Dynamics of firms Revealed attractiveness of the sphere of scientific researches Linkages – networks between the sphere of scientific researches of Belarus and EaP, Belarus and EU, and the world; openness of the sphere of scientific researches to the world	Trust & dialogue between society – S&T Public attitude to S&T equity: geographic, social, gender	Belarus' and EaP's leadership in addressing global challenges and reaching SD goals			