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Formation of the integrated innovative infrastructure of the Eurasian economic union as a factor of increase in knowledge intensity of economies of member countries

In the article the creation of the integrated innovative infrastructure did not lead development of integration within the Eurasian Economic Union to noticeable increase in knowledge intensity of GDP. The short period of existence of the Eurasian Economic Union and shorter period of functioning of the integrated innovative infrastructure did not lead to noticeable activation of the hi-tech sector in economies of member countries. Low level of knowledge intensity of GDP is characteristic sign for all countries of EAEU, except Russia that demands development of more detailed and financially secured programs of increase in knowledge intensity in member countries. The results of the research will be interesting to appropriate authorities of public administration of the member countries of EAEU, supranational structures of the Eurasian economic commission dealing with the issues of formation of innovative infrastructure and development of the hi-tech sector and also the scientists dealing with issues of development of science and an innovation in integration regional associations. On the basis of the received results it is necessary to correct national innovative policies of member countries of EAEU and actions for strengthening of integration in the direction of scientific and technical cooperation within EAEU. The empirical analysis was carried out on the basis of gaps in the researches connected with support of scientific and technical cooperation within EAEU.

Keywords: The Eurasian Economic Union, industrial and innovative infrastructure, cooperation in the scientific and technological sphere.

Introduction

In the conditions of acceleration of world processes of scientific and technical and technological development and considerable strengthening of the competition in the world markets of hi-tech products all states meet an important problem of intensive updating and effective use of material and technical resources of the research organization.

Processes of introduction of innovations, actively advanced last years, in the conditions of the current period of instability and uncertainty appeared in new economic reality of the Eurasian Economic Union. Feature of our time is formation of new priorities, new calls and new approaches to the solution of the problems arising in front of Kazakhstan and other countries of the Eurasian Economic Union (EAEU) [1]. The large-scale changes happening today in the world economy also directly influence not only a situation in economy and policy, but also in the scientific and innovative sphere [2]. They create new opportunities for the accelerated innovative development, but also at the same time set restrictions with which all subjects of innovative activity should reckon [3]. Innovative plans and strategies of the enterprises of all levels are exposed to revaluation and adjustment. Proceeding from it, the main objective of the current stage of the research was receiving operational assessment of relevance of carrying out innovative changes in conditions of new economic reality of the countries of the Eurasian Economic Union.

Purpose

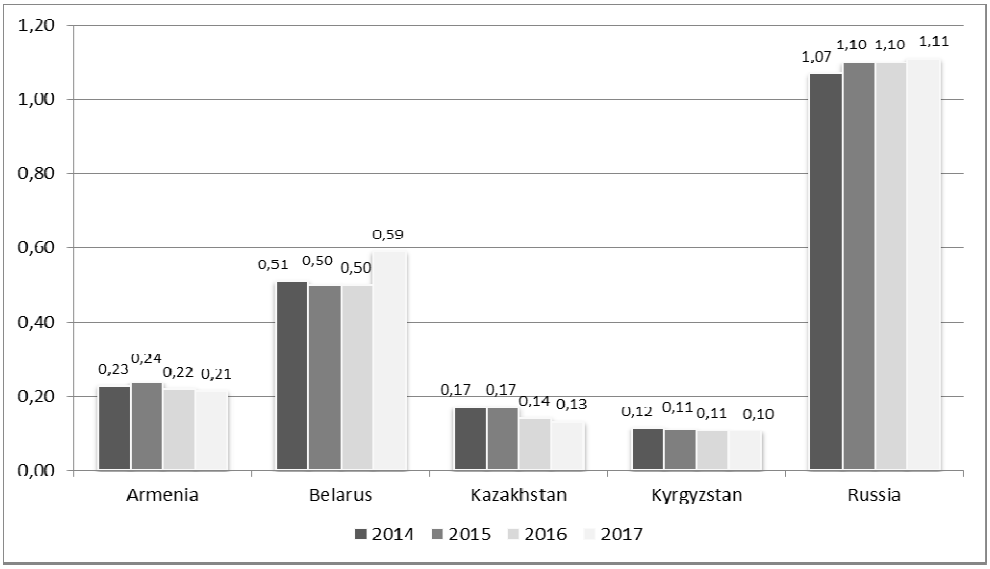
The research is directed to studying of interrelation between formation of the integrated innovative infrastructure of the Eurasian Economic Union and development of the hi-tech sector in national economies of member countries. The research objective consisted in finding out how high creation of the integrated objects of innovative infrastructure in the Eurasian Economic Union will allow member countries to increase knowledge intensity of GDP.

The empirical analysis was carried out based on data of Department of industrial policy of the Eurasian economic commission, statistic data of national statistical authorities of member countries of the Eurasian Economic Union. The short time period of the research does not allow to reveal more deep and close ties between formation by the integrated innovative infrastructure and indicators of knowledge intensity, however

further continuation researching in this direction will allow to solve a problem and to receive more reliable results.

Main results

Effectiveness of organizations' activity research within the integrated innovative infrastructure should be considered through noticeable improvement of key indicators of scientific innovative development of a national economy. As a key indicator we determined the level of knowledge intensity of GDP as the ratio of gross internal costs of research works in the reporting period to GDP by the countries (Fig. 1).



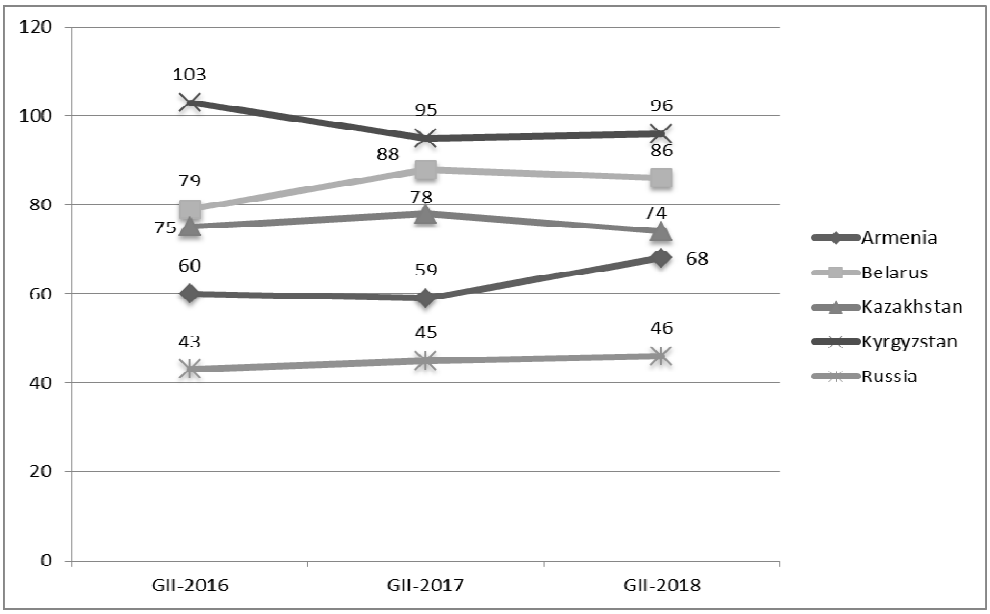
Note. Compiled by the author from source [4–8].

Figure 1. Dynamics of knowledge intensity of GDP over the EAEU countries

Apparently, from the Figure 1, the knowledge intensity indicator only in Russia conforms to requirements of OECD, i.e. more than 1 % of GDP is redistributed to the sphere of scientific research. Indicators of Belarus tend to increase and approach to standards of OECD, but on influence of innovative infrastructure of EAEU it is not necessary to carry it. In Belarus traditionally financing of research works is rather high in comparison with other countries of EAEU, except Russia. Other three countries: Armenia, Kazakhstan and Kyrgyzstan show very low level of knowledge intensity, which also tends to decrease. These unfavorable indicators of knowledge intensity of GDP of the countries of EAEU, led to the low level of the global index of an innovation (Fig. 2). Apparently, from the Figure 2, only Russia is included into 50 most innovatively active countries of the world though its indicators in the rating of innovative development also tend to decrease. This rating as a summary indicator gives a full picture of innovative development, including the review of a political situation, situation in education, the level of development of infrastructure and business of concrete national economy.

In general, these figures show that creation within EAEU of the integrated innovative infrastructure as scientific public laboratories, did not result in notable results of increase in scientific capacity of the countries of EAEU. In the separate directions on the contrary tendencies to deterioration are observed that demands development of more detailed and effective actions for development of the integrated innovative infrastructure within the Eurasian economic commission. Besides, more considerable financial investments to the research sphere of such countries as Armenia, Kazakhstan and Kyrgyzstan are required to bring closer the indicators of knowledge intensity to the minimum requirements of OECD.

Understanding that only innovations is a key to intensive development of national economies and that only effective NIS are capable to promote the rapid advancing growth, finds reflection in program and target documents and scientific publications of scientists-experts of all studied countries of EAEU [9, 10].



Note. Compiled by the author from source [11].

Figure 2. Dynamics of the global index innovation (GII) over the EAEU countries

In the EAEU State Parties in a number of the priority directions the modern scientific and technical potential is created which at its effective use and updating has to become the most important source of acceleration of social and economic development. The list of the existing objects of innovative and industrial infrastructure of the EAEU countries in 2017 structured on their specialization is provided in table 1 [12].

Along with standard forms, such as SEZ, industrial parks, technoparks, scientific and technological centers and the research organizations, there are also territories of the advancing social and economic development, zones of territorial development, the innovation and industrial clusters, science cities that in general is characteristic for the Russian practice of providing infrastructure. Also it testifies to wide support system in Russia of regional innovation systems that needs to be used actively in practice of other member countries of EAEU.

Among the material resources used in science, the special place belongs to modern complexes of the scientific equipment, difficult unique experimental installations and devices. Creation of infrastructure of scientific research is almost exclusive zone of responsibility of the state which possesses about 80 and more percent of the park of scientific devices and the equipment and with joint property (with private enterprises and the foreign organizations) it exceeds 90 %.

Building and modernization of material and technical resources of science in EAEU were carried out, in many cases, without binding to solution of major social and economic and scientific problems. As a result loading of the expensive equipment is not always optimum. Besides, the budgetary restrictions complicate process of updating of fixed assets of science, result in need of use morally and physically worn-out equipment. There are problems of full load of devices, the experimental equipment and the unique scientific installations (USI) connected with backwardness of cooperation communications and shortcomings of planning of research and development, a problem of creation and a promotion to the market of services of difficult analytical and measuring complexes instead of separate devices. Systematically, the equipment cost is increased and exceeds possibilities of some organizations for its acquisition and modernization. Institutions are forced to be guided in many cases by acquisition of the inexpensive equipment, which is not making basic changes to technological capabilities of researches. For these reasons receiving significant scientific results and carrying out breakthrough developments becomes more and more problematic [13].

Table 1

Objects of innovative and industrial infrastructure of the countries of EAEU in 2017

Object of innovative and industrial infrastructure	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia
Special economic zones (SEZ)	3	7	10+ 57 free warehouses	4	33 (in those 19 with industrial function) + 1 in Crimea
Territories of the advancing of social and economic development					14
Zones of territorial development					20
Industrial parks	5	6	15	1	190
Technoparks	3	10	23	3	160
Business incubators	3	16	50	3	200
The innovation clusters					25
Industrial clusters					59
Science cities					14
Free port					1 (5 planned)
Scientific and technological centers	About 15	About 140	About 70	About 10	More than 200
The organizations which are carrying out research and development	20	530	350	30	3 570

Note. Compiled by the author from source [12].

The solution of these problems lies in the course of creation and support of the centers of collective use of the scientific equipment in which loading of the equipment is significantly higher due to active involvement to work with its use of researchers of the country of residence and other EAEU members. Creation of network structure of the centers of collective use as new institute of cooperation in the sphere of use of material and intellectual resources of scientific and technical cooperation on space of EAEU will allow to increase efficiency and quality of research and development, it is essential to lower costs of their carrying out, to raise real fixed assets capacity of the research organizations and knowledge intensity of innovative products.

Formation of interstate network of the organizations of EAEU is carried out on the basis of points of concentration of knowledge, competences and technological capabilities, elements and the accumulated experience of functioning of innovative infrastructures of the EAEU members and the European experience. For formation of such network identification of the specialized leading organizations in the states of EAEU is provided with universal scientific installations, the skilled and experimental equipment, test benches, grounds, etc. [14]

Proceeding from it, creation of network of the centers of collective use (CCU) is recommended which will be designed to provide a possibility of carrying out researches to a wide range of scientific and research teams from the EAEU State Parties on the modern and expensive equipment, including unique scientific installations and also a possibility of increase in efficiency of use of such equipment.

Within formation of CCU network identification of the specialized leading organizations in the State Parties of EAEU is provided having universal scientific installations, the skilled and experimental equipment, test benches, grounds and other unique funds, existence of network structures of the centers of collective use and formation on their basis of uniform innovative research infrastructure of EAEU.

Main objective of formation of interstate network of the centers of collective use in the sphere of innovative cooperation of the State Parties of EAEU is creation of conditions for:

1) access for researchers to modern infrastructure of carrying out research and development in the priority directions of innovative development on the principles of collective use of the scientific equipment;

2) supports of development of schools of sciences of EAEU on scientific and methodical and material and technical resources of CCU;

3) increase in the level of scientific research and quality of education by formation of network of the modern research complexes meeting the international standards on technical and operational characteristics of the instrument park.

The interstate format of cooperation of research teams promotes increase in interstate competitiveness and appeal of CCU. Formation between national CCU and scientific partners on space of EAEU of interstate research network is the result of this activity.

In total with other recommended actions creation of network of the centers of collective use of the equipment will promote formation of a system of interstate cooperation of innovative infrastructures and will allow to reach qualitatively new level of global competitiveness of national economies of the Eurasian Economic Union.

Conclusions

The considered directions of interaction of subjects of national innovative systems within implementation of joint projects and network forms of supranational support of innovative activity within EAEU reflects current trends, such as:

– use of the combined sources (the states and private) financings of research and innovative activity, including from institutes of development;

– creation of preferential terms for innovators, including long terms of transfer to operation, grace periods of investment, lack of sanctions when obtaining negative results;

– orientation not only to national scientific shots, but also creating favorable conditions for development of innovative business, attracting huge number of innovators from around the world;

– accurate distribution of spheres of responsibility: the administration of the organization of innovative infrastructure undertakes all bureaucratic and organizational issues, and inventors are engaged only in developments;

– leading to positive results of implementation of joint innovative projects to increase in scientific and innovative potential of any national economy in general, through creation of the competitive knowledge-intensive sector of economy and strengthening of the export potential non-oil goods that is very relevant for all member countries of EAEU.

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Еуразиялық экономикалық одақтың интеграцияланған инновациялық инфрақұрылымын қалыптастыру қатысушы-елдер экономикаларының ғылымисыйымдылығын арттыру факторы ретінде

Мақалада Еуразиялық экономикалық одақ шеңберіндегі интеграцияны дамыту және интеграцияланған инновациялық инфрақұрылым құру қаралды, бұл нәтижесінде ЖІӨ-нің ғылымисыйымдылығының елеулі артуына алып келмеді. Еуразиялық экономикалық одақтың жұмыс істеуінің қысқа кезеңі және интеграцияланған инновациялық инфрақұрылымның жұмыс істеуінің қысқа кезеңі қатысушы-елдердің экономикаларында жоғары технологиялық сектордың айтарлықтай жандануына әкеп соқпады. ЖІӨ-нің ғылымисыйымдылығы төмен деңгейі, Ресейден басқа, ЕАЭО-ның барлық елдері үшін тән белгі болып табылады, бұл қатысушы-елдерде ғылымисыйымдылықты арттырудың егжей-тегжейлі және қаржылық қамтамасыз етілген бағдарламаларын әзірлеуді талап етеді. Зерттеу нәтижелері инновациялық инфрақұрылымды қалыптастыру және жоғары технологиялы секторды дамыту мәселелерімен айналысатын Еуразиялық экономикалық комиссияның ұлттықтан жоғары құрылымдарына, сондай-ақ интеграциялық өңірлік бірлестіктерде ғылым мен инновацияларды дамыту мәселелерімен айналысатын ғалымдарға қызықты болады. Алынған нәтижелер негізінде ЕАЭО-ға қатысушы-елдердің ұлттық инновациялық саясатын және ЕАЭО шеңберінде ғылыми-техникалық ынтымақтастық бағытында интеграцияны күшейту жөніндегі шараларды түзету қажет. Эмпирикалық талдау ЕАЭО шеңберінде ғылыми-техникалық ынтымақтастықты қолдауға байланысты зерттеулердегі олқылықтар негізінде жүргізілді.

Кілт сөздер: Еуразиялық экономикалық одақ, индустриялық-инновациялық инфрақұрылым, ғылыми-технологиялық саладағы кооперация.

А. Шеломенцев, А. Таубаев, Г. Амирова, Н. Касымова

Формирование интегрированной инновационной инфраструктуры Евразийского экономического союза как фактор повышения наукоемкости экономик стран-участниц

В статье рассмотрено развитие интеграции в рамках Евразийского экономического союза и создание интегрированной инновационной инфраструктуры, что в результате не привело и к заметному увеличению наукоемкости ВВП. Короткий период существования самого Евразийского экономического союза и более короткий период функционирования интегрированной инновационной инфраструктуры не привели к заметной активизации высокотехнологичного сектора в экономиках стран-участниц. Низкий уровень наукоемкости ВВП является характерным признаком для всех стран ЕАЭС, кроме России, что требует разработки более детальных и финансово обеспеченных программ повышения наукоемкости в странах-участницах. Результаты исследования будут интересны соответствующим органам государственного управления стран-участниц ЕАЭС, наднациональным структурам Евразийской экономической комиссии, занимающихся вопросами формирования инновационной инфраструктуры и развития высокотехнологичного сектора, а также ученым, занимающимся вопросами развития

науки и инновации в интеграционных региональных объединениях. На основе полученных результатов следует скорректировать национальные инновационные политики стран-участниц ЕЭАС и меры по усилению интеграции в направлении научно-технического сотрудничества в рамках ЕАЭС. Эмпирический анализ проводился на основе пробелов в исследованиях, связанных с поддержкой научно-технического сотрудничества в рамках ЕАЭС.

Ключевые слова: Евразийский экономический союз, индустриально-инновационная инфраструктура, кооперация в научно-технологической сфере.

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