INNOVATIVE ACTIVITY FUNDING: ANALYSIS OF PRACTICE IN UZBEKISTAN

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Abstract

Innovations are considered as factor of economic growth not only of individual enterprises, but also a national economy as a whole. That is why countries have a great focus on financial supporting and promoting innovations. Insufficient support of innovations causes low return on scientific research and less economic effect from Research and Development (R&D). Therefore funding is indispensable condition to create new products by innovative ideas. The present study focuses on studying the features of innovative activity funding in the current global scenario, identifying the world leaders and trends in innovative activity funding. Uzbekistan's experience in this area was selected for the empirical study. By analyzing the main source of funds and the factors which promote development of innovative activity was identified impact of some factors on change in scientific and technical output.

Keywords: *innovations, innovative activity, R&D, sources of funding, Gross Domestic Expenditure on R&D.*

In the past few decades the role of the human capital, science and knowledge as factors of economic growth steadily increased in the world economy. Countries are getting on the path to innovative development and they are not only the developed countries. Many developing economies, for example, China, India, Singapore, the countries of Central and Eastern Europe demonstrate impressionable results of innovative activity. Year in, year out they are increasing expenditure on R&D to achieve sustainable economic growth.

According to The Global Competitiveness Report 2015-2016, 38 out of 140 countries of the world are at the innovation-driven stage. They are European countries (26 countries), the USA, Canada, Japan, the Republic of Korea, Singapore, Australia, Hong-Kong, Taiwan, etc. 20 countries of the world are on the way to transition to innovation-driven stage (countries of Latin America, South-Eastern Europe, Malaysia, Russia, Turkey, Oman).

Studying the world experience in the formation and development of national innovative system and using modern tools of innovation activity funding has an importance for all countries which are transitioning to innovation-driven stage.

In 2015, Asian countries accounted for 35% of the global total innovation spending among the 207 largest spenders, surpassing both North America (33%) and Europe (28%). For example, South Korean company Samsung is the biggest R&D spender in Asia and the second in world. It invested USD $14.1 billion to R&D sector in 2015. Besides, we can observe a rapid development of high-tech branches in other Asian countries. In transitional economies of Asia the needs in innovations steadily growing, though participants of market economy are rendering financial support of innovative activity with various degrees. A private sector, commercial banks, insurance companies and other categories of institutional investors who have got a current demand for innovative goods, do practically not participate in funding of innovative research. That is why in several countries, for example in Uzbekistan, the government still stands to be the biggest contributor to R&D funding. The current stage of economic development of transitional economies needs a qualitatively new mechanism of investments' mobilization to support innovative ideas and revise a financial support methodology to benefit researchers of national innovative system. Hence, issues of timely innovation activity funding, choosing sources and methods of financial support are very topical at modern times.

Global review of innovative activity funding

According to "Main Science and Technology Indicators" database of The Organization of Economic Cooperation and Development, the world leaders in Gross Domestic Expenditure on R&D in absolute terms (current PPP) are the USA, China, Japan, Germany, South Korea, France and United Kingdom.

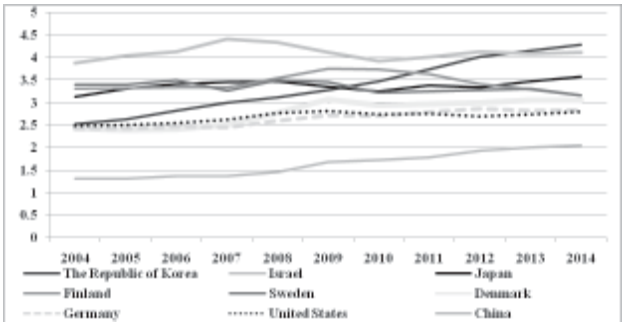
Table 1 - Gross Domestic Expenditure on R&D (current PPP), millions US Dollar

Country	*2004*	*2006*	*2008*	*2010*	*2012*	*2014*
United States	305 640	353 328	407 238	410 093	436 078	456 977
China	70 131,70	105 580,60	146 126,60	213 460,10	292 062,90	368 731,60
Japan	117 598	138 564,90	148 719,20	140 607,40	152 325,60	166 861,30
Germany	61 314,40	70 185,40	81 970,70	87 882,60	100 697,10	106 780,80
South Korea	27 942,40	35 413,10	43 906,40	52 172,80	64 862,50	72 266,80
France	37 976,10	41 986,90	46 547,90	50 764,90	54 829,90	58 750,30
United Kingdom	32 015,80	37 022,70	39 396,90	38 165,60	38 811,90	44 174,10

It can be seen from Table 1, there is a positive trend of expenditure on R&D in 2004-2014. As for gross expenditure on R&D, the United States is in a leading position with spending of more than USD 450 billion. Over the given period the volume of investments in R&D in China and the Republic of Korea has increased by 530 % and 260 %, respectively. There is a strong indication that both countries are paying a great deal of attention to furtherance of innovation activity. Thus, total investments done by aforementioned seven countries amount to more than 70% of world expenditure on R&D.

Nevertheless, top ten leaders with the highest expenditure on R&D as a percentage of GDP include, inter alia, South Korea, Israel, Japan, Finland, Sweden, where this indicator exceeded 3-4% of GDP in recent years.

Fig. 1.Gross Expenditure on R&D as a percentage of GDP for selected countries, %



In 2014 leaders in "Gross Domestic Expenditure on R&D as a percentage of GDP" index appeared to be the Republic of Korea (4,29 % of GDP), Israel (4,11%) and Japan (3,58 %).

As it can be observed from data above, the Republic of Korea's expenditure on R&D as a percentage of GDP has a stable upward trend in spite of global financial crisis since 2008. Due to broad involvement of private sector and corporations in intensifying innovation processes, the Korean Government achieved growth of this indicator from 2,53% to 4,29% of GDP during 2004-2014.

In the world practice, success of innovation policy usually depends on investment activity of business entities which are able to run large-scale applied researches and experimental development. The result of them will be innovative goods, services or modern technologies, which are in great demand in markets. Business entities actively participate in cross-border funding of R&D as it can be seen from Table 2.

Table 2 - Gross Expenditures on R&D in selected countries by source of funds

Countries	R&D source of funds, share of total (%)			
	Business	Government	From abroad	Other domestic
Korea	75,7	23,9	0,3	1,1
Japan	75,5	17,3	0,5	6,7
China	74,6	21,1	0,9	3,4
Germany	66,1	29,2	4,3	0,4
USA	60,9	27,7	4,5	6,9
France	55,4	35	7,6	2,0
United Kingdom	46,6	27	20,7	5,7
Russia	28,2	67,6	3,0	1,2

In countries such as South Korea, Japan, China a share of business in R&D funding exceeds that of their governments and contains more than 70% of the total R&D spending. Participation of business entities in R&D funding in these countries was achieved due to favorable investment climate, tax and other incentives widely used. Consequently a burden on the state budget has decreased.

By studying innovative activity funding in global spectrum we have revealed several trends, inherent to actors of world economy over the past decades: First, the role of innovation as a factor of economic growth and competitiveness of nations is increasing, and prompting interest of governments and private sector to invest more resources into R&D; Second, economic development enlarges a share of non-governmental sources in innovation activity. The state serves as a provider of financial support for basic research and an innovative infrastructure creator. In countries, which pursue an innovative way of development, a role of public institutions is characterized by the transition from direct funding of innovations to creation of regulatory framework to stimulate and foster development of private innovative business; Third, in innovation activity funding have appeared professional investors, special funds, experts on evaluation and financing of innovation projects are getting tightly involved in innovation activity. They may supervise such projects inception till mass production of innovative goods. These professionals and institutions are often united into special industry – venture financing. They promote collaboration of institutional and private investors with scientists and developers.

It must be noted that in the world economy one can observe considerable growth of innovative activity in developing countries such as China, Korea, India, Israel - etc. R&D funding also indirectly fostered a dynamic increase in high-tech production, volume of export, as well as the number of researchers and scientific publications in several countries. Thus, innovation leadership of the United States, Japan, Germany in the past century is challenged by newly emerging countries who can sustain dynamic competition.

Uzbekistan's practice review: To analyze the current situation of R&D funding in Uzbekistan we have determined the share of each source of funding. During 2004-2014 the main source of R&D funding was the state budget whose share of resources in the general structure raised from 38,7% in 2004 to 57,8% at the end of the analyzed period. Own resources of the organizations had a negative tendency and reduced from 27,6 to 21,6% in 2014. Although an absolute value of customers' investments retained upward trend, overall their share went down from 27,6% in 2004 to 15,9% in 2014. Both a share of foreign investors and that of other non-public funds in R&D financing remain insignificant.

Table 3 - The structure of R&D funding sources in Uzbekistan, %

Years	Total investment	Budget resources	Non-budget funds	Own resources of organizations	Resources of customers	Foreign investors resources
2004	100	38,7	5,6	27,6	27,6	0,5
2005	100	44,7	6,5	17,2	31	0,6
2006	100	51,1	6,3	15,9	23,8	2,9
2007	100	47	4	19,5	16,2	13,3
2008	100	46,9	5,4	20,5	25,6	1,6
2009	100	53,8	2,8	17,7	23,6	2,1
2010	100	60,7	5	10,7	21,1	2,5
2011	100	63,2	2,5	12,2	21,7	0,4
2012	100	56,9	2,3	16,8	23,4	0,6
2013	100	58,8	1,4	19,8	19,1	0,9
2014	100	57,8	3,9	21,6	15,9	0,8

Resources of the state budget in Uzbekistan are being channeled to financial support for public and international scientific and technical programs, to funding unique scientific objects, research institutes, archives, as well as to compensation of experts and a salary of research fellows.

Since 2002 there is an established funding mechanism in Uzbekistan. According to it budgetary resources aimed to fund scientific institutions are allocated on the basis of grant contracts with research teams, or with a relevant budgetary structure. Such contracts are to be concluded with those who win a competition for the best research project. According to the Resolution of the President of Uzbekistan "About Measures on Improvement of Coordination and Management of Science and Technologies Development " transition from basic maintenance of research institutes to financing projects to solve scientific and technical tasks stimulated research teams, mobilized efforts to achieve real results, resolved actual problems hindering development of science and technology, and their practical implementation.

A comparative analysis of structure of distribution of the government investments on R&D in 2004 and 2014 showed that their main share is on applied researches and constitute 68% and 58% of the total volume of financial support in 2004 in 2014, respectively. For this period share of fundamental research did not change and remained at the level of 25% whereas that of development considerably grew from 7% to 17% through 2014.

Search and use of an optimum set of sources and methods of innovations funding ensure a continuity of innovative process, as well as foster starting up and development of businesses leading to opportunities to implement innovations in production processes.

Research methodology

The present analysis of global trends refers to the OECD "Main Science and Technology Indicators" and "Science and Engineering Indicators 2016" of the USA National Science Foundation. The required material is collected from different journals, organization sites, annual reports, after collection of them has been arranged in a systematic way to draw conclusion.

Analysis of Uzbekistan's practice is carried out based on data from 2000-2014 editions of statistical bulletin "The Main Indicators of Science and Technology Potential and Innovations in the Republic of Uzbekistan". The correlation and regression analysis were conducted to identify an influence of such factors as the number of organizations involved in innovation activities in Uzbekistan and Gross Expenditures on R&D.

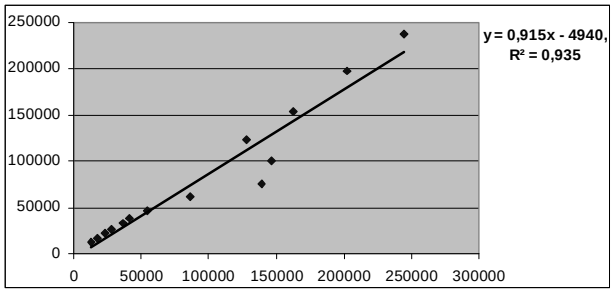
Objectives of the study

To analyze the modern global trends in innovative activity funding and their influence on innovative policies' formation in transitional economies; To study the main sources of innovative activity funding in different countries; To identify the factors influencing volume of scientific and technical output in transitional economy of Uzbekistan; To suggest ways to improve innovative activity funding in the Republic of Uzbekistan.

Hypothesis: Gross Domestic Expenditure on R&D and the number of organizations involved in R&D activity exert significant influence on growth of the volume of scientific and technical products.

Analysis: For an assessment of the factors promoting development of innovative activity in the Republic of Uzbekistan we have carried out the correlation analysis between the volume of scientific and technical production for 2000-2014 and assessed such factors as number of organizations in Uzbekistan who are carry out R&D, and Gross Domestic Expenditure on R&D. In summary, we can do following conclusions: First, there is an inverse relationship between the total volume of scientific and technical production and the number of organizations engaged in R&D (the ratio of correlation is "-0,83"); Second, although one can observe a dynamic growth of volume of scientific and technical products, the number of organizations which are engaged in R&D decreased from 418 to 304 in 2000 through 2014; Third, direct interdependence between the volume of scientific and technical production and Gross Domestic Expenditure on R&D was very tight with a correlation of 0,97.

Figure 2 : Regression relationship between scientific and technical production and Gross Domestic Expenditure on R&D in Uzbekistan



Apparently from Figure 2 we can notice that 1% increase in R&D funding causes an increase in volume of scientific and technical production by 0,915%. At the level of reliable approximation (R^2 = 0,935), results of the analysis seem acceptable and hence, infer that enhancing Gross Domestic Expenditure on R&D boosts the volume of scientific and technical products.

Comprehensive government support of innovative activity at the initial stages is attributed by necessity of creation of competitive national innovative system (NIS). However, due to limitedness of the state budget efficiency and stability of NIS in the long term depends on participation of various classes of institutional investors. Transformation of public fund to venture type fund would considerable diversify sources for financing of applied research and innovative development in Uzbekistan. Such type of a public-private partnership had been successfully realized in such countries as Israel, Sweden, Russia, Kazakhstan, Latvia, etc.

Conclusion

Innovation activity funding in the world economy does not pursue the aim only to increase the competitiveness of national economies or particular companies, but also to ensure a stable economic growth through commercialization of scientific achievements and encouraging the economy to a qualitatively new innovative development stage.

On the innovative development way only existence of the institutes engaged in R&D isn't enough to achieve desired goal – creating innovative-driven economy. Strong financial basis of innovative activity has, besides public financing, to be replenished with financial support from corporate and private investors whose activity directly depends on timely introduction of innovative elements to production processes.

Thus, fostering innovations in Uzbekistan through institutional approach is not fully justified, since it is not only about the quantity of R&D sponsoring institutions. More effective way of boosting innovation-driven economy might be conditioned by the volume of funds and diversification of finance sources. It seems possible when public and private sectors would engage in partnership and create venture capital funds. By use of such funds there can be built new research institutes whose successful operation would depend on permanent funding by capital which could enjoy tax benefits as well.

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