

## Public-private partnership as an effective tool for supporting the innovation process

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**Abstract.** The paper analyzes the interaction between the government and private businesses at different stages of the innovation process. We provide some examples of effective government policies to encourage the innovation process in the world. During our research we made classification of government stimulation measures in condition of crisis period. This paper also decomposes the international experience in implementation of the projects of public-private partnerships.

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### Introduction

Government and private businesses are the main economic agents in the world. Involving the private business in the innovation process, the government provides sustainable economic development and high level of employment.

A lot of countries have started using the mechanism of PPPs for the construction of transport infrastructure, and then the interest in such agreements began to show regional and municipal authorities for construction of social facilities.

With the development of various forms of cooperation in the 1990s the Public Private Partnership (PPP) has become a key instrument of government policy in worldwide scale [1; 2].

One of the first countries, which developed the mechanism of PPP, became the UK, where the government adopted the first program aimed at encouraging public-private partnership - "Private Finance Initiative» (PFI) [3]. The programs of the European Union are very good examples of effective coordination of research activities and the usage of PPPs in the innovation sphere.

At the end of XX and the beginning of XXI century, the growth of the significance and the scope of innovative activities of enterprises in all industries has become the universal global trend. In the future, this trend will continue and spread to those countries, where there is the main part of R & D still financed by government.

Many experts considered that there was a shift of innovation model of economic development from the individual enterprises towards the complex of technological companies, nowadays the model of «universities - production - government» is dominating [4].

### The Main Part

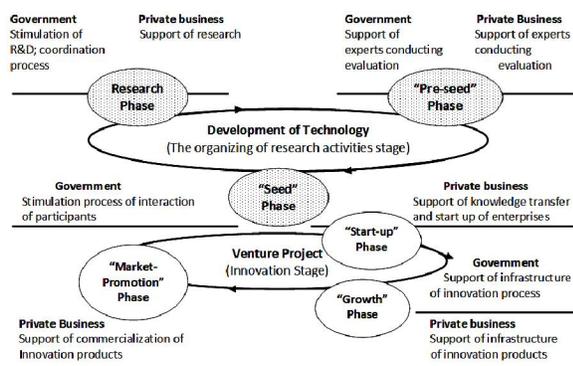
Traditionally, the private businesses rely on their own capacity for creation of new products. This process has long remained successful because it provided for the innovative companies a competitive advantage by being able to penetrate the market first with a new product. It required a significant resource potential for conducting the numerous scientific researches. Thus, the innovation process was exclusively the prerogative of large corporations.

In condition of acceleration of innovation activity in the world, reducing of product life cycles, and stronger competition it increased the requirements for innovation. Due to this, it had raised the level of price for maintenance of its own infrastructure of innovation development, and it encouraged to establish the business cooperation with research centers and other participants of innovative processes to outsourcing issues of innovation chain organization.

As a result, since 1980s a lot of enterprises began moving from the policy of "closed innovation" to "open innovation" policy, where firms use both internal and external resources to accelerate the process of creating innovations [5].

In the conversion process of "open innovation" private business have opportunity for choosing the best research & development from the external environment, thereby reducing the cost and time for researching, and maximize the beneficial effects of the commercialization of innovations.

Every year the scale of participation in the process of innovation development are expanded and modified. Schematically the current interaction of government and private business at different stages of the innovation process was represented below.



Prepared by using [6; 7; 8; 9; 10; 11; 12].

**Figure 1. The interaction of public sector and private businesses at different stages of the innovation process**

The government also became an active participant of the innovation process, acting as regulatory agent, promoting of private business and supporting of innovative enterprises. While the public sector has a number of advantages for the development of innovations, which cannot be done by private business, including the reduction of risks as the public sector is more resistant to market changes; ability to carry out the large-scale projects and mobilize a great number of resources; ability to conduct research in a wide scale; opportunity to diversify the usage of state property without risk of non-profit period.

Recently, in developed and highly developed countries the expenditure on research & development (R&D) in real terms, rising faster than the growth of the national GDP. For making significant progress in innovation the leading countries had two times increase in research funding over the past 15 years (eg, Finland, Israel, Singapore - 60-90%, which allowed them to gain a strong position in the world on innovative development terms of the economy).

Characterizing the sources of funding in research & development in highly innovative countries-leaders we should notice the growing role of the private sector. The governments of these countries not only increase the expenditure of R&D budget in monetary terms, but also try to encourage private companies and universities to introduce innovative technologies. That is why the share of budgetary allocations will gradually decrease. The countries which have succeeded in stimulating private business for conducting development are Israel, Japan, China, Malaysia, and Singapore.

Currently, the government has the basis of research funding in Brazil and India (over 60% finance on R&D) and still plays an important role in financing R&D in France, Canada, the UK (over 30% of financial resources). For most countries there is a

trend of slower growth of public funding of research & development to GDP growth (with the exception of Korea, Singapore, and Brazil).

The universities are actively involved in the innovation process only in Japan, Canada, USA, Switzerland and Brazil.

Such process as subsidization, tax benefits, deferral of taxes, introduction of a tax free regime for a fixed period of time, government procurement are the main instruments of fiscal policy for stimulating business innovation in many countries. It was shown in many researches that in small countries the effect of stimulating the private sector is not always significant, and the large countries can only estimate the effectiveness of measures at the global level.

It is remarkable, that at the end of XX and the beginning of XXI century, the growth of the significance and the scope of innovative activities of enterprises in all industries has become the universal global trend. During the period of 1995-2003 years the scope of the business sector in the national R&D expenditure in the USA increased from 71.8 to 75.0 %, in Sweden - from 74.3 to 76.1 %, in Japan - from 70.3 to 72.7 %, in Germany - from 66.5 to 71.3 %, in France - from 61.0 to 67.0 %, in Great Britain - from 65.0 to 66.0 %, in South Korea - from 73.7 to 74.5 %, in China – from 18.0 to 39.0 % [13]. In the future, this trend will continue and spread to those countries, where there is the main part of R & D still financed by government.

British analysts emphasized a very high concentration of innovative activity in the particular countries and the leading companies. So, the enterprises of three countries - the USA, Japan and Germany - account for 73% of the list of 700 largest high-tech companies in the world, and besides the U.S. accounts for only 40%.

Three leading high-tech industry - the equipment production for information technology, automobile industry and pharmaceuticals - account for more than 57% of R&D in the top of 25 companies. In the UK, this concentration is even higher - on pharmaceuticals and aerospace production accounted for 56% of all companies in research & development [14].

In the condition of economic crisis the potential of innovation for private sector has decreased dramatically. Investors try to avoid any risky investments, the company faced with difficulties in obtaining long-term loans. In this regard, it is useful to consider what additional measures were taken by various governments to encourage the participation of business in the innovation process.

The measures of government stimulation in condition of crisis period can be classified into five groups:

1. Implementation of sales support (including through public-private knowledge transfer and environmental technologies). This government purchases, guarantees quick payment of bills on innovative procurement.

2. Prevention of depletion of working capital, including measures as the export credit and insurance, factoring for accounts receivables, reduction and ability of delays in tax payments. The incentive measures include the reduction and delay of tax payments (in France the government provided temporary tax exemption for companies which spending for R&D, conducting in 2005-2008) tax incentives; incentive schemes (in Portugal the government have extended the maximum rate of the tax credit on R&D to 82.5 % of total expenditure on R&D the highest rate in Europe).

3. Increasing access to financial resources, mainly to credits by the additional capitalization of bank, increasing the inventory of existing loans and guarantees, increasing level of funding the government support, accelerated process of value-added tax refund for innovative enterprises.

4. Supporting for enterprises to assistance their investment levels by investment grants, accelerated depreciation and financing R&D projects. The incentive measures include: direct grants to companies, universities, R&D funding for small and medium-sized enterprises.

5. Selective subsidies. The incentive measures include: government investment in R & D, purchasing the equipment for researches in the universities.

A lot of countries have adopted measures supporting employment in sphere of R & D and preventing the "brain drain" process of skilled staff.

The mechanism of Public-Private Partnership (PPP), in nowadays existing form, formed in the late 1980s, when the governments of highly-developed countries tried to find ways for attracting private investment, especially in infrastructure sphere. The PPPs problem was that private investors required yields significantly higher than the interest rate of government bonds, even if all project risks were paid by government. As a consequence, the examples of public and private partnerships have been individual, and their projects were implemented at higher prices.

With the development of various forms of cooperation in the 1990s the PPP mechanism was viewed as a key instrument of worldwide government policy [1].

It was also concerned the industrialized countries (the United Kingdom, Germany, the USA), and the new developed countries (China, India, South Korea, Latin America), where there is a great necessity of infrastructure projects [2].

By the early 2000s, the concept of PPP has increased significantly, and American economists (S.Linder) [8] described several of its meanings in various conditions of its emergence – as a reform of the management system; as an issue of conversion; as a risk-sharing scheme; as the restructuring of the system of public service provision; as the separation of powers.

In neoclassical economics papers the PPP is the subject of traditional welfare analysis, in which assesses the effectiveness of the impact of PPPs on public welfare.

In institutional economics papers the PPP is regarded as a management strategy which helps to minimize transaction costs. Within the frameworks of the government regulation the PPP is viewed as an appropriate strategic approach to fostering economic and social development, which combines efficiency, flexibility of the private sector with long-term prospects and social interests of the public sector.

**Table 1. The main indicators of realization of Public-Private Partnerships' projects in basic economic industries**

Regions	Number of PPP projects, unit			Sum of investment in PPP projects, billion dollars		
	1990	2000	2009	1990	2000	2009
East Asia and Pacific Region	12	46	78	1.9	17.8	16.7
Europe and Central Asia	1	26	37	0.07	20.9	46.5
Latin America and Caribbean countries	38	95	42	10.6	38.4	40.5
Middle East and North Africa	1	11	10	0.01	4.1	6.0
Southern Asia	4	13	36	0.1	3.0	33.4
Central and Southern Africa	2	29	15	0.04	3.5	13.7

Prepared by using [15; 8; 16; 17; 18; 19].

In developed countries, the PPP has demonstrated its efficiency in economic sectors such as transport, education, health service, recycling service. In countries with rapidly developing economy (China, India, Latin America) there is common agreement of PPP in the construction of basic infrastructure items (highways, water and power facilities).

The listed data indicates a significant increase of investor's interest in PPP projects in the development of basic economic industries. Sum of investment in such projects during this period increased significantly.

Most countries started using the PPPs for the construction of transport infrastructure, and then the

interest in such agreements began to show some regional and municipal authorities for the construction of social facilities.

The international experience shows that the PPP in innovation is not based on the interaction of individual projects, both in the construction and operation period of infrastructure facilities, where all roles, rights, responsibilities and risk allocation are spelled out in details. In the sphere of innovation the PPP entity can be defined as "fellowship" or as based on research and innovation relationship, and with its assistants public and private businesses jointly facilitate the innovation process.

There are two goals of the agreement between the government and business in the sphere of innovation. First goal is a conducting of joint research & development, in which the company has ability to use the results of R&D for its own needs. The second goal is a participation in the formation of the infrastructure for research & development. Business can participate with the government in management and financing of the existing infrastructure (techno parks, business incubators) – in this alternative the conditions of Public-Private Partnership are unique and individual.

Beginning with the late 1990s in the UK it was elaborated, actively investigated and realized in practice its own form of PPP, it's a new form of interaction between the public and private economic sectors - Private Finance Initiative (PFI) [20].

Another European model of PPP was presented by the program of Alphabus / Alphasat, its total value is 440 million euro. This program is an illustration of a significant involvement of government (represented by the French space agency CNES and interstate EKA) to increase the competitiveness of national participants in the international markets.

A good example of effective coordination of research activities and the usage of PPP in innovation sphere is the programs of the European Union. The first such program was developed in 1982 year, it was ESPRIT program (European Strategic Programme and Development in Information Technology), which contained several important new features, which later became the fundamental principles of Research policy of the European Union. Firstly, the parties agreed that the researches which carried out in the framework of this program will not be focused on finished (ready) products. Its goal is to solve scientific and technical problems of world economy. Secondly, the private business was firstly attracted to financing of R&D [21].

Creation of the European Institute of Technology (EIT), conducting a training program for high level scientific experts, creating of innovation, is

an example of creating and funding entities to support research on the basis of PPP.

Many experts considered that there was a shift of innovation model of economic development from the individual enterprises towards the complex of technological companies, nowadays the model of «universities - production - government» is dominating [4].

Nowadays, it is observed some acceleration in economic growth in many countries by network of innovation infrastructure facilities, which is the link between all elements of the innovation strategy.

According to the researches of World Bank's experts the middle-income countries, which today were named as "rapidly developing countries" (countries of Eastern Europe, Asia, North Africa), are planning in a medium-term perspective to get the status of a developed economy mainly by a creation of institutional infrastructure for technological entrepreneurship [13].

The governmental programs of creation a network innovation infrastructure facilities allow us to solve the problem of not only national, but also regional scale. For example, in Korea the process of creating a network of innovative facilities was even called "the decentralization of innovation".

## Conclusion

Nowadays, the innovative infrastructure facilities are not only a driving force of economic growth, but also an instrument of government policy in the sphere of science, technology, and employment.

Analysis of international experience of transition to innovative development shows that the basis of transformation is a desire to improve the competitiveness of the national economy in the context of increasing globalization of the world market. Thus, there is a reinterpretation of the content of the innovative development in the leading OECD countries. The new strategy of innovative development includes the exercise of economy modernization with the practice of policies: the development of government research institutions; the formation of intermediate innovation institutions (innovation parks, business incubators); the increase of technological capacity of industrial enterprises.

For this modernization it is necessary to provide an effective government regulation in the innovation sphere, which includes: the development of new forms of public-private partnerships (PPP); the purposeful and systematic funding for basic scientific research and development (R&D) in all spheres of the national economy; the creation of an effective system of knowledge transfer from the sphere of its producing within its consumption; the

intensification of international trade forms of intellectual property.

The fundamental basis of modern strategy of innovative development, according the international experience, is a development of the institute of public - private partnerships in the sphere of innovation.

International experience suggests that public-private partnership (PPP) has become one of the priority development tools of the fifth and sixth technological structures of industries. In OECD countries, which have a great experience of the commercial production of the fifth and sixth industrial technological structures, the innovation-oriented enterprises mainly operate in the private business sector.

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