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# The role of the public private partnership in the innovation cluster development

Ablaev I.M.<sup>a</sup>, Akhmetshina E.R.<sup>b\*</sup>

<sup>a</sup> Professor, doctor of science, Kazan Federal University, Institute of Management, Economics and Finance, Kazan, 420008, Russia

<sup>b</sup> Senior lecturer, candidate of science, Kazan Federal University, Institute of Management, Economics and Finance, Kazan, 420008, Russia

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## Abstract

The analysis of the indicators of the innovation activity for the last years reveals the ineffectiveness of the current innovation system and the necessity for its modernization. The article proves the perspectivity of the development of the innovation system by means of implementation the public private partnership (PPP) mechanism, dwells on the cluster approach as one of the most promising among the PPP mechanisms which presupposes the use of the innovation clusters as the key elements.

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## 1. Introduction

The necessity of Russia to find a way out of the stagnation trap set by Western countries requires the introduction of the effective tools prompting the economic growth in the country. In this respect the collaboration of the state and the business community in the form of the public private partnership (PPP) is the one of the most important conditions for the resumption of the economic growth and further development of the national innovation system.

The concept of the PPP in the innovation sphere consists in the coordination of the actions of the state and the business on the purpose of commercialization of the research and development sphere and implementation of the innovation into real sector of economy. It helps to direct the activity of the business entities from the resource-based economy towards development of the economy through the scientific and technological progress. And the efficiency of the scientific and technological progress and of its core – the innovation process – depends on the integrated efforts of the authorities, education, science, business, and their coordinated actions. This encourages the concentration of the investment from various sources within this or that form of the private public partnership in the priority spheres of implementation of the innovation projects.

According to the data of the international comparative analysis Russia has a relatively low percentage of the companies involved in the collaboration with the higher educational establishments and public institutions: merely 9% of the small and medium businesses as a fraction of all the innovative companies (for example, in China it is 19%), and two times less – the percentage of the big businesses (cf. Finland – 26%) [Ponomarenko, 2014].

## 2. Theory

Much has been done on approaching the matter of the PPP in the home and foreign economic research works [Bareyev, 2012; Ponomarenko, 2014; Biermann, 2012; Klijn, 2013; Tang, 2010]. According to the statistic data, in the

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Ablaev I.M. Tel.: +7 (966) 240–7000

E-mail address: [ildar\\_ablaev@mail.ru](mailto:ildar_ablaev@mail.ru), <http://kpfu.ru/Ildar.Ablaev>

Akhmetshina E.R. Tel.: +7 (917)396-88-91

E-mail address: [kiyamova-ksfei09@yandex.ru](mailto:kiyamova-ksfei09@yandex.ru)

USA and Europe the PPP is the most commonly encountered in the spheres of industrial and social infrastructure: road construction, construction of communications, hospitals etc., the PPP in the sphere of innovation is widespread in Japan and China and the USA as well. In most cases the PPP is the collaboration between the public authorities of various levels and the private business within the innovation cluster policy.

In this connection it is important to define the economic matter of the innovation cluster. In the modern economic literature it is conventionally treated as the optimum form for the realization of the PPP mechanism (the models of the PPP in the cluster development is given in table 1).

Table 1. The models of the PPP in the cluster development

Name of the model	Description of the model	Spheres of application
Operation model (contractual form, lease agreements)	The investor takes responsibility for the use of the object belonging to the state and receive compensation for it, and the state - the owner of the object - is responsible the performance of the public function before the consumers who pay for the services.  The state invests own funds into formation of the industrial park and is its owner, and the functions of the developer consist in delivering services on formation of the infrastructure of the industrial park and its operation. Such organizational form is oriented on the reservation of the state's right to influence the policy of the internal decision making within the cluster. The use of the budget funds considerably restrains the development of this model.	Business incubators, educational centers of the shared use of technologies etc.
Concession model	The investor deliver services to the final consumers and is authorized to offset the expenses directly from the fee for the use of the object, and at that the responsibility is taken by the business entity (concessionaire) and the state (concession provider) preserve the functions of control. Such scheme allows to carry out large public-oriented projects without heavy budget outlay.	The objects of social and public significance (institutions of secondary and higher education)
Cooperation model	The public functions conferred on the joint enterprise created by the public partner and one or more private companies. The scheme of the implementation of the projects is based on the budget financing of its infrastructure and the provision of the land (facilities, objects) with performing other at investor's expense	Innovation and knowledge-intensive projects: technoparks, educational industrial clusters etc.

Considering the innovation sphere it is logically to mention the innovation clusters that create the effect of cooperation and this, in its turn, facilitates the cost savings.

Many foreign scientists studied the theoretical and practical aspects of the cluster formation and functioning: Bathelt, H. (2014), Lantu, D.C. (2015), Lee, J. (2013), Lorenzini, E. (2014), Tsertseil, J.S. (2015), Yun, S (2013). The works of Burger, P. (2014), Chen, L. (2011), Wonglimpiyarat, J (2010) are focused on the financing mechanisms of the innovation clusters. Chan A. P. C. (2014), Cooke P. (2013), Klijn E.-H. (2013), Marques R.C. (2014), Pattberg, P. (2012), Tang, L. (2010) dwelled on the problems of the PPP problems and its development in the innovation sphere.

Nowadays the problem of the financial provision of the innovation clusters is a hot-button issue. Therefore there must be several sources that in aggregate will create the most favorable conditions for the innovation cluster functioning process. The mechanism of financing of the innovation clusters in Russia is shown in Fig.1.

Among the investment sources of the innovation clusters seen in Fig.1. the PPP mechanism is carrying weight. Therefore it is worth of being examined and analyzed in order to bring out its advantages and prospects for development. Furthermore, it is expedient to consider the international experience of the financing of the innovation clusters.

In whole the project market with adopted PPP mechanism is characterized by positive dynamics. For instance, in 2011 the demand exceeded 100 billion USD (see Fig.2).

Reasoning from the diagram in Fig.2 we can suppose that in 2012-2015 the demand will increase due to the annually growing number of the PPP projects (see Table 2).

Table 2. The PPP projects dynamics in 2013-2014.

Year	2013	2014
Number of the PPP projects	131	595

According to Unified information system of the PPP in Russia in 2014 there were 595 projects, 124 of them – in the initial state, 89 – in the preinvestment state, 250 – in the state of investment, 108 – in operation and 24 projects are on the final stage.

In Russia the cluster policy is the element of the PPP, though often the interests of the business and the authorities do not match. It is noteworthy that the basis of the cluster policy is the partners' freedom in choosing the most efficient methods and ways to objectives, which stimulates the creative productive activity of the partners and thereby encourages the healthy competition and diversification of the economy as a whole.

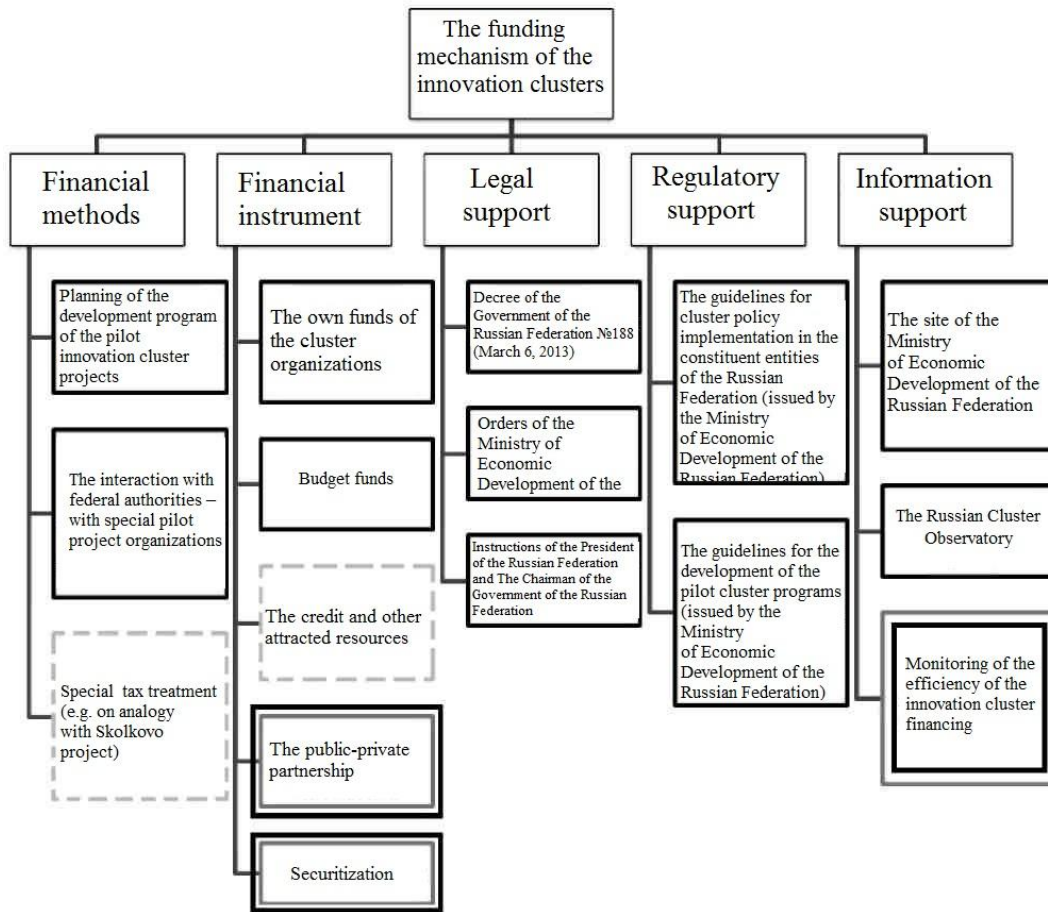


Fig.1. The mechanism of financing of the innovation clusters in Russia

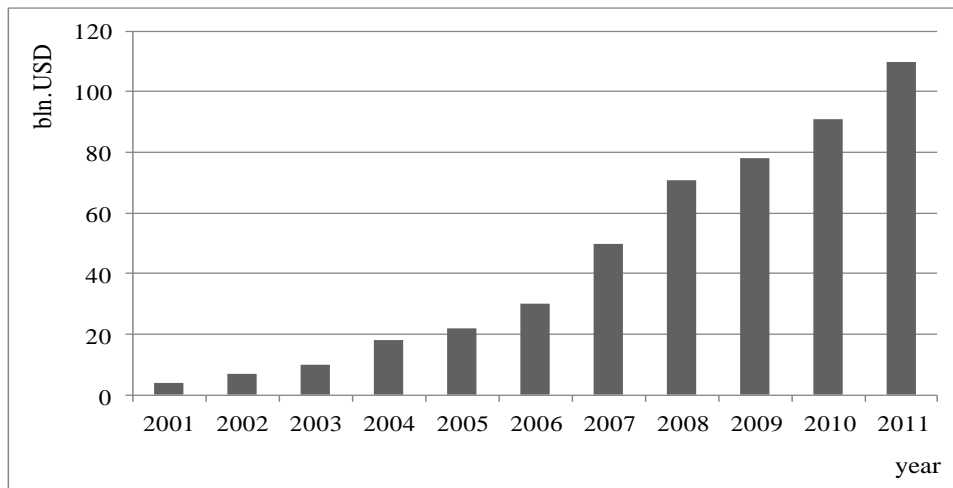


Fig.2. The dynamics of the demand for the PPP projects in Russia.

The commitment of the state, in our opinion, is to eliminate the barriers in involvement of the business entities into innovation sector; it consists in reducing of the commercial risk and of the investment return period. This can be achieved via a number of forms and ways, such as: direct financing, direct participation financing, indirect financing of the project stages.

Conventionally the innovation clusters are associated by their geographic location. However, we do not consider this factor the determinant. In our view, the important condition is the presence of a lot of innovation projects with common information space that unite the representatives of different sectors of economy.

We share the opinion of A.I.Kotov and O.V.Lobachev who suggest the idea that “the basis of the innovation cluster lays in the intellectual capital of the R&D centers, higher educational establishments, design offices, which in whole constitute the pool of assets that can be used for the innovation activity development” [Kotov, Lobachev, 2011].

Each cluster (including the innovational ones) can be characterized by the following parameters [Bareyev, 2012]:

- the main directions of the implemented technologies in the production processes;
- the list of firms – the cluster members;
- the list of the scientific research and educational establishments – the cluster members;
- the main parameters of the cluster development (the volumes of investment and revenue etc.).

On the basis of the competitive selection held by the Ministry of economic development of the Russian Federation in 2012, 25 Russian innovation clusters acquired the status of pilot project. In general all the selected projects has comprehensive possibilities for development and growth (see Table 3 [Tingaev, 2014]).

Table 3. Development of the pilot innovative territorial clusters: the key indicators

Indicator	The current value, bn. roubles (for the given years)	The anticipated value, bn. roubles (for the given years)	Dynamics of the indicator (for the given years)	The average Russian value, according to the Ministry of economic development of Russia (for the given years)
The total value of the revenue from the sales of the non-resource products in the home and the foreign markets	1, 862,8 (2011)	3 810,6 (2016)	Growth rate – 105 %	The rate of increase of the industrial production at current prices –58 % (2011-2016)
The total value of the private investment into production, development and promotion of the new products in	644,5 (2009-2011)	1 574,2 (2012-2016)	The ratio of the average annual volume in 2012-2016 to the average annual volume in 2009-2011 – 146 %	The total volume of the private investment – 23, 800 bn. roubles (2009-2011)
The total value of the outlay on the R&D	1, 110,0 (2007-2011)	968,8 (2012-2014)	The ratio of the average annual volume in 2012-2014 to the average annual volume in 2007-2011 – 145 %	2, 552 bn. roubles (2007-2011)

Financial sustainability of the cluster members is determined by the competitiveness of the pilot clusters and the presence of their powerful potential production. This, in its turn, prompts the attraction of the material resources for the realization of the large-scale research and infrastructural projects.

And this is the reason why the volume of the total revenue from the sales of the non-resource products in the home and the foreign markets was assumed as one of the key indicators for evaluation of the economic and financial capacity of the pilot cluster projects. As it is seen from the table above, the total value of this index in 2011 amounts nearly 1, 9 bn. roubles. The majority of the cluster members expect to increase the sales volume: by 2016 it is supposed to be 3,8 bn.roubles (with the growth rate equaling to 105%). Consequently, the dynamics of the industrial production on the territory of the pilot cluster projects is to exceed the corresponding average value in country as a whole 1,8times (it' is 58%, according to the forecast of the Ministry of economic development of Russia).

There are altogether 4 main economic sectors notable for the active projects based on the PPP mechanism that can be singled out among the whole range of existing programs (see Table 4).

Table 4. The PPP projects in the aspect of the sectorial belonging [Unified information system of public-private partnership in Russia]

Sectors	Housing and community amenities	Transport	Energy sector	Social services	Total
Number of projects	194	72	163	166	595
Amount of investment (bn. roubles)	88	350	46	387	871

The cross-sector overview shows that the clusters with the most influential investment possibilities are those that belong to the group “Chemistry and petrochemistry”: for the period 2009-2011 the amount of private investment

equaled to 501,8 bn. roubles (on average 125,5 bn. roubles per cluster of this economic sector), and in 2012-2016 the investment is planned to increase up to 1,2 tln. roubles [Tingaev, 2014].

Furthermore, the extent to which the programs in the sphere of the PPP are spread considerably varies from region to region (see Table 5). As it is seen from the table the leading regions in this aspect are Central Federal District and Volga Federal District (145 and 176 programs respectively). North Caucasian Federal District is noticeably behind other regions – only 8 PPP-projects. Crimean Federal District has a vast experience in the PPP sphere, despite the lack of the statistical data for this region up today.

Table 5. Distribution of the PPP projects in the federal districts of Russia

Federal district	Social services	Transport	Energy sector	Housing and community amenities	Total
Central Federal District	43	30	19	53	145
Southern Federal District	2	4	1	13	20
Northwestern Federal District	42	9	8	13	72
Far Eastern Federal District	11	1	9	36	57
Siberian Federal District	17	5	30	23	75
Ural Federal District	6	3	5	10	24
Volga Federal District	46	15	65	50	176
North Caucasian Federal District	5	2	0	1	8
Crimean Federal District	0	0	0	0	0

The leading regions include six federal subjects of Russia where the PPP mechanism is widely spread. Within them the leading positions are taken by Moscow, Saint-Petersburg, Leningrad Oblast and the Republic of Tatarstan (see Fig. 3).

The Republic of Tatarstan is one of the most dynamically developing regions in the Russian Federation. Far back in 2011 «Forbes» magazine recognized Tatarstan the most favorable region for business. According to the annual rating of the economic attractiveness of the regions based on the six criteria (labour force, demand for fast moving consumer goods, for durable goods, dynamics of economic growth, infrastructure, tax policy), suggested by the Russian magazine “Director General”, in 2015 Tatarstan acquired the 6th place, being viewed as one of the most perspective regions of Russia.

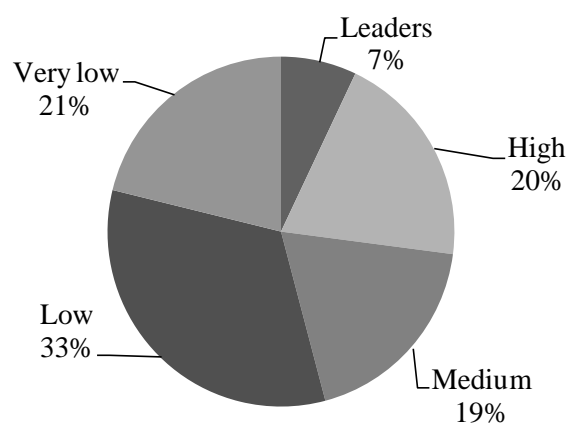


Fig. 3. The level of development of the PPP in the regions of Russia.

The Republic of Tatarstan in a remarkable manner combines nearly all factors of the investment prospects. According to the rating given by The National Rating Agency (NRA), Tatarstan ranked among the regions with high level of investment prospects. This rating is based on the 7 factors and in every respect Tatarstan is among the top 12, that favored the active position of Tatarstan in development and support of the PPP projects.

Realization of the PPP projects is recent phenomenon for the Republic of Tatarstan. Figure 4 illustrates the quantity of the PPP projects in various spheres, underway and already accomplished.

Thus, the PPP projects in multitude are being realized in the field of education and science and in the sphere of integrated territorial development. The latter implies formation of the special economic zones, technoparks, industrial parks, innovation centers and clusters.

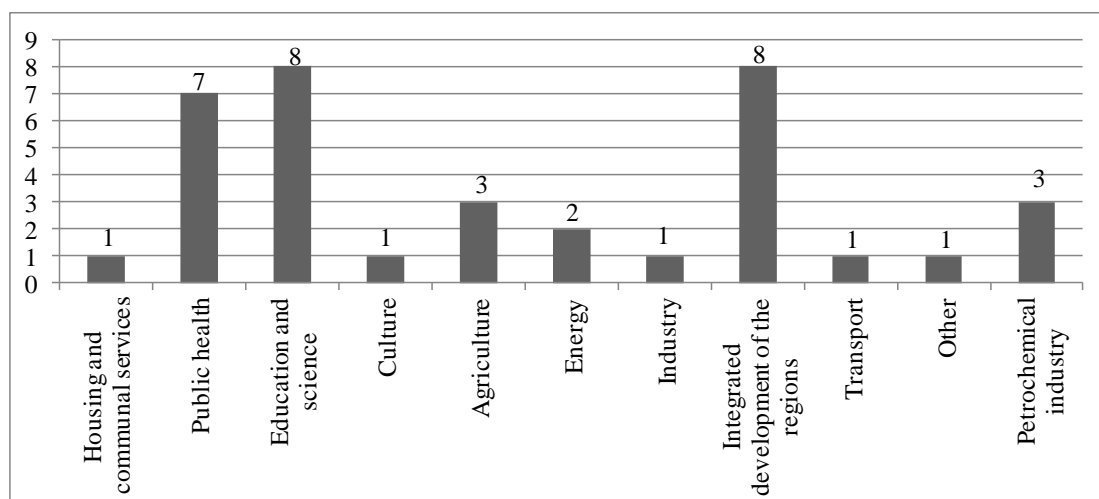


Fig. 4. Number of the investment projects in the sphere of the PPP in Tatarstan.

Within this aspect we may dwell on the case of Kama innovative territorial production cluster in the Republic of Tatarstan. The main parameters of the cluster are given in the Table 6.

Table 6. The main development parameters of Kama innovative territorial production cluster in the Republic of Tatarstan on January 1, 2014 [Development Program “Kama innovative territorial production for the period up to 2020”].

Development parameter	Parameter value
Investment volume, tln. roubles	40,7
Revenue volume, tln. roubles	600,0
R&D expenditures, tln. roubles	41,9
Increase in R&D expenditures, %	130,5
Increase in investment, %	770,1
Increase in revenue, %	86,9

Despite the high development potential of the cluster enterprises the growth rates of their main parameters characterizing their activity are restrained. Chiefly, the restrictive factors are as follows:

- The difficulty of raising funds necessary for the project realization (the investment volumes and sources of the development program “Kama innovative territorial production cluster for the period 2012-2020 are given in Table 7).
- The long-term economic return of the project due to its dimensions;
- The deficiency in highly qualified personnel necessary for the existing and greenfield high-tech productions;
- The deficiency of the unified development strategy.

Table 7. The investment volumes and sources of the development program “Kama innovative territorial production cluster for the period 2012-2020 [Development Program “Kama innovative territorial production cluster for the period up to 2020”], tln. roubles

Source of financing	Total	Federal Budget	Budget of the Republic of Tatarstan	Extrabudgetary funds
2012	242,2	25,7	14,5	202,0
2013	196,4	26,7	16,0	153,7
2014	197,1	24,7	11,5	160,9
2015	167,6	12,6	6,6	148,4
2016	59,2	7,2	6,1	45,9
2017-2020	29,3	0,7	3,8	24,8
Total value for the Program	891,8	97,6	58,5	735,7

The solution of these problems becomes possible only with the assistance of the public authorities and institutions of local governing and by means of PPP mechanisms. Moreover, the main supporting measures of the cluster activity include the development of the regulatory acts in addition to the regional legislative act about the PPP. And in our opinion, it is expedient to use the experience of Voronezh oblast in related to creation of the Center of the cluster development, the main purpose of which is realization of the cluster policy with innovative direction and attraction of federal, regional and private financial resources.

Nowadays the development institutions of the macro level that practice the mechanism of the public private partnership, raise finance for the innovation business undertakings and focus on formation of the clusters, are as follows:

- Industrial production, technical innovation and tourist recreational special economic zones (SEZ);
- The Investment Fund of the Russian Federation which on a competitive basis provide funding for the infrastructural projects of national and interregional value;
- The Venture Innovation Fund, The Russian Venture Company, The Russian Investment Fund (PBK), The Russian Investment Fund for information and communication technologies (Rosinfocominvest), the regional venture funds.

The institutions of the micro level are:

- corporate venture projects and funds;
- business angels, their network and alliances;
- nearly 60 domestic and foreign funds for R&D financing;
- more than 150 big financial companies and commercial banks;
- 34 domestic grant-making foundation, more than 200 foreign funds and financial organizations.

Petrochemistry is undoubtedly the sector with great perspectives for the PPP mechanisms. The development strategy of the chemical and petrochemical industry in the Russian Federation up to 2015 stipulated the use of PPP mechanisms for development of the chemical and petrochemical complex. [The development strategy of the chemical and petrochemical industry in Russia for the period up to 2015]. However it is noteworthy the emphasis in this sphere should be laid on the development of the large infrastructural projects with self-maintained economic effect or those that provide backing for development of the huge industrial objects and whole zones (clusters) [Sultanova, 2007].

The form of the partnership should be chosen in accordance with the specific purpose, the terms of the project, its members, the share of the state in the projects and many other criteria. Consequently, the chosen form of partnership determines the ownership conditions. The optimum distribution of property in its turn creates conditions for the efficient functioning of the partnership objects, for their optimum management and efficient allocation of resources.

In practice, nowadays the most common form of the public private partnership in Russia is concession, it is due to the Federal Law № 115-FZ " On concession agreements " (July 21, 2005).

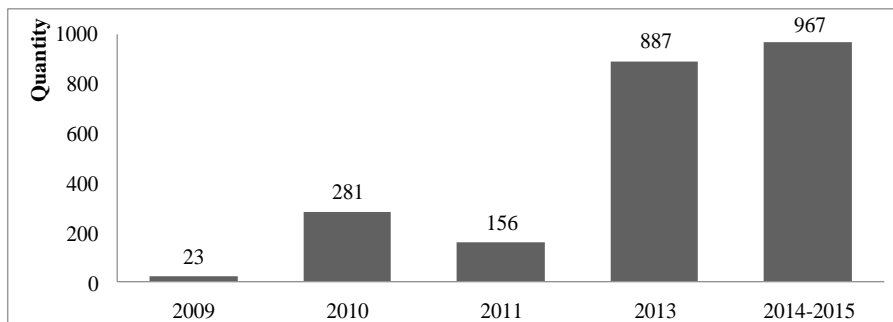


Fig.5. The growth dynamics of the concession agreements concluded

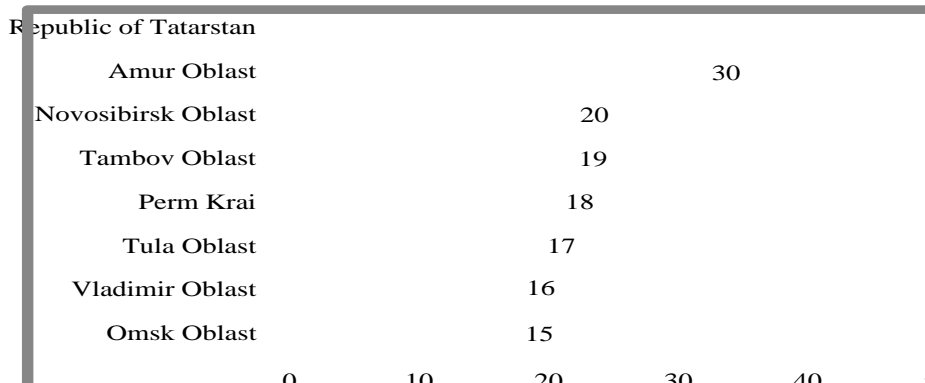


Fig. 6. The number of the concluded concession agreements in the regions of Russia.

According to the analytical reports of the Chamber of Commerce and Industry, 2013 and 2014-2015 show the take-off in concession agreements (See Fig.5).

The diagram above (Fig. 6) marks the regions, leading on the number of the concluded concession agreements.

### 3. Conclusion

Thus upon analysis of the materials on the PPP projects in Russia we may conclude on the positive dynamics in development of the collaborative interaction between the state and the private business, especially active this process is in Volga Federal District, Central and Northwestern Federal District.

It's noteworthy that the initial steps in formation of the PPP market in Russia have done and its further effective development depends on the initiatives of the state, its capacity and consent to run risks along with the private partner, and on the improvement of the current legislation, in particular passing the normative acts regulating the public private partnership in Russia.

As for the cluster development, in our opinion, the adoption of the foreign models of cooperation such as subcontracting and outsourcing would be helpful. Particularly these PPP mechanisms would be effective in the innovation clusters development.

Subcontracting represents the broad network of the subcontractors and is ministrant to the considerable reduction of the production profundity and to the possibilities of the quick renovation of the lineup by the industrial companies (contractors). Subcontracting is based on the specialization, the rational use of production capacities, the optimum use of the resources.

As for the outsourcing, the main peculiar feature of this agreement consists in that the employer recruits personnel, pays salaries, makes other proper payments under labor law, and then provides other company with these employees for participation in the production process, the production management and for performing other related functions.

In such a way, the public private partnership within the development of the innovation clusters contributes to reduction of the business risks associated with investment into the innovation technologies that helps to define the priority ways of investment attraction for their further effective application. Moreover, it stimulates the development of the brand new services and products, and also ensures the profitability of the innovation technologies, products and services. But for all that as the major irreversibility factors of cluster formation we should recognize the growing innovation receptivity of the business and its involvement into the cluster construction; development of the "triple helix" model - the interrelation of the science, the business and the state, who as the main cluster members gain competitive edge consequent upon the joint effects of scopes and synergy.

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