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FEATURES OF FUNCTIONING OF TECHNOPARKS IN RUSSIA AND EU COUNTRIES

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Abstract: The article is devoted to the analysis of the issues technoparks development in Russia and the EU countries. Method of system analysis; formal-logical method; method of comparative analysis; method of structural analysis is applied in the research. The study found that technology parks should maintain close ties with state agencies of all levels to achieve high efficiency. In turn, state structures can support the science park in many ways, as a founding partner, sponsor, service provider or client. The roles and responsibilities assumed by public authorities and administrations at various levels depend on their interest in the economic development of their territories, on the functional features and the management of technology parks. All these points must be taken into account by investors when they make a decision to participate in the technology park in a particular area.

1 Introduction

Technology parks all over the world act as specific instruments for solving both national and local / regional problems. These issues are actualized significantly at such stages of social development as economic stagnation, crisis, post-crisis recovery of economy, which fully applies to the current situation in the global economy in general, and in Russia in particular [1,2].

It should be noted that, despite attempts to scale down public funding of research section and various supporting institutions recently undertaken abroad, high importance of public assistance in addressing issues of innovation development, business start-ups, technological upgrading, sustainable development of the economy, maximizing the scientific and educational potential of countries and regions to ensure economic growth and innovation development remains and has increased recently [3-6].

2 Theory and methodology of the study

The theoretical basis of the research is domestic and foreign approaches to the analysis of the efficiency of technology and science parks in different countries. Public support of technology business incubators in technology and science parks [7-9], networking of technology parks and business incubators [10,11], changing of approach to generating demand and supply for business incubators of

different generations [12-14] have been actively discussed in recent decades. Several issues related to the organization of the efficient functioning of technology parks and business incubators, including in developing countries [15,16] were raised in foreign and domestic research, such as their funding from various sources, including public funds [17], the development of small innovative enterprises [18]. Special reviews of best practices are used as a basis for analysing the features of foreign technology parks and business incubators [15,19-22], as well as official analytical reviews of the EU [23, 24].

The results of a survey conducted in 2012 by experts of the International Association of Science Parks (IASP) [25] among residents of 129 scientific and technological parks in EU and other IASP information material (in total the association includes more than 360 technological and scientific parks from all European countries) are used as a statistical and informational basis.

Study of functioning of the best technology parks in Russia was carried out on the basis of official information on their activities, as well as special scientific research in particular regions and technology parks [26-29].

3 Results of the study

The survey results showed that the universities (in total – 95 %) received the highest assessments of impact on the

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success of functioning of science and technology parks, 66.1% of the respondents rated universities as very important. Also, the majority of respondents (84%) assess the direct involvement of public authorities at all levels (local, regional and / or national) in the activity of technoparks as important, 58.1% of respondents rated it as "very important". Thus, the most important partners (more than 50% of responses) for residents of European technology parks, are (in decreasing order of aggregate amount of answers) universities and government organizations, external investors, banks and financial institutions. It should be noted that Russian researchers [30-35].) point out a special role of universities, as well as for the scientific and educational environment in general, for successful innovation development and establishment of technology parks and business incubators.

Another important issue is the issue of the involvement of public authorities and administrations at various levels in functioning of technology parks as their founders and property owners. The study of the form of ownership of technology parks in EU showed that most of them are characterized by the prevalence of public or mixed forms of ownership. The public sector's share makes up almost 55% of all property and it clearly dominates over other forms of ownership when creating technoparks and science parks in EU.

The mixed form of ownership is represented by the association of several owners. The mixed form of ownership, which accounts for slightly more than 30%, is represented by the combination of several owners, both private property owners and government structure, with a large number of co-owners in European technology and science parks the number of co-owners of property per technopark is on average 3.3 owners (in some technoparks this value is more - up to 5-7 co-owners). (see Table 1, compiled by Setting up, Managing and Evaluating EU Science and Technology parks [23]). Private ownership, which includes only individuals, representing the sole owner is only 14.5%, in the general structure of ownership of technological and scientific parks in the EU

Table 1 Structure of owners of mixed ownership of EU technological and scientific parks

Ownership	Proportion in the total volume of mixed ownership
Local authorities and administrations	89.9%
Regional authorities and administrations	10.5%
National authorities and administrations	10.5%
State universities	57.9%
Private universities	5.3%
State banks	21.1%

Public funds	10.5%
Private funds	31.6%
Chambers of Commerce and Industry	21.1%
Private companies	52.6%
Other organizations	21.1%

Table 1 shows that the dominant owners of mixed ownership in European technology and science parks are local authorities and administrations (89.5%), and among private owners - private production companies that control more than 50% of the total size of the mixed form of ownership of technoparks. Private universities and funds make up about 33% of private sector owners in technoparks. As for Russian technoparks, the analysis showed the following.

Having various possibilities for attracting public sources of support for technology parks has led to forming various types of technology parks that differ in their forms of ownership (founders), basis for appearance, and peculiarities of functioning. All these types can be grouped into several groups (Table 2).

Table 2 Grouping of Russian technoparks by forms of ownership and features of functioning

Name of group	Features
Technoparks - commercial projects	The business model of such technoparks is built in such a way that the management company takes financial part in the projects of residents, i.e. participates in the creation of successful technology businesses to meet the needs of the market in new high-tech developments. The effectiveness of this business model is confirmed by the high level of employment of leasable areas of the technopark by residents to 96 %
Technoparks - the academic environment with public-private partnership	The factor to success of such technoparks is in close proximity to large scientific centers with high concentration of academic environment. They are the center of attraction not only for research staff but also for small innovative and start-up companies interested in mutually beneficial cooperation with scientific and educational research institutions in order to use their human and scientific potential and developed technological base, as well as experience in implementing scientific ideas
Technoparks of state ownership with special	The business model of these technoparks is characterized by the existence of the most favorable

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conditions for residents	conditions for residents. The group is represented by technoparks in Moscow, where the functioning of technoparks is carried out in close cooperation with the Department of Science, Industrial Policy and Entrepreneurship of Moscow with the active support of the Moscow City Government.
Technoparks - members of the European Community Business and Innovation Centres (EBN)	The business model is accredited by the European Community, fully complies with the requirements of European standards. It is characterized by a developed infrastructure supporting the development of small and medium innovative, including nanotechnology businesses.
Technoparks created through the implementation of the comprehensive program "Establishment of Technoparks in the Sphere of High Technologies in the Russian Federation"	They were created on the initiative of the regional authorities with the support of the Ministry of Communications and Mass Media of the Russian Federation with the aim of developing new high-tech companies. The activity is aimed at comprehensive support of projects at all stages of the innovation process: from the creation of a prototype to the introduction of new technologies into batch production.

1.	Nano-technological centre "Technopark", Moscow	Private	Extrabudgetary funds
2.	Science Park of Moscow State University, Moscow	State-Private	Federal Budget Extrabudgetary funds
3.	Science and Technology Park of Novosibirsk Science Campus (Academpark), Novosibirsk Region	State	Federal Budget Regional budget Municipal budget Extrabudgetary funds
4.	Technopolis "Moscow", Moscow	State	Regional budget Extrabudgetary funds
5.	Technopolis "Strogino", Moscow	State	Federal Budget Regional budget
6.	Innovation and production technopark "Idea", Republic of Tatarstan	Public-Private	Federal Budget Regional budget
7.	Autonomous Institution "Technopark - Mordovia", Republic of Mordovia	State	Federal Budget Regional budget Extrabudgetary funds
8.	Ulyanovsk nano-technological center, Ulyanovsk region	Private	Extrabudgetary funds
9.	AST "West-Siberian Innovation Center (Tyumen Technopark), Tyumen Region	State	Federal Budget Regional budget
10.	Technopark in the sphere of high technologies	State	Federal Budget Regional budget

As it can be seen from Table 2, there is a sufficiently large variety of technoparks in Russia according to the forms of ownership, the basis of appearance and the features of functioning. This creates a broader basis for ensuring the successful development of technology parks in the country, depending on the goals and objectives of their functioning.

A more detailed analysis of the ownership structure of Russian technology parks showed that it is characterized by the predominance of state ownership, including the most effectively functioning technology parks. In particular, among 10 most efficient technoparks in Russia there are 6 technoparks with state ownership, 2 technoparks with state-private ownership and only 2 technoparks with a private ownership.

The list of these technoparks with the indication of the form of ownership and the main sources of financing their activities is given in Table 3.

Table 3 The rating of technoparks with a high level of operational efficiency (above the Russian average by 10% or more)

№	The name of the technopark	Form of ownership	Sources of funding
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	"IT Park", Kazan, Republic of Tatarstan		
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The national leader in the number of technology parks is Moscow (30 objects or about 28 % of all technoparks in Russia), Sverdlovsk Region (9 objects), followed by the Republic of Tatarstan (8 sites), the Moscow Region (6 facilities) and the city Novosibirsk (5 sites). At the same time, different regions demonstrate different volume, level and directions of regional and local support of the created technoparks.

The high concentration of technology parks in Moscow and the high level of efficiency of their functioning (the four technoparks of Moscow are among the top ten most effective technology parks in Russia: the Technopark Nanotechnology Center, Moscow State University Science Park, Moscow Technopolis and Strogino Technopolis) is due to the high interest of Moscow Government in the creation of specialized sites for the development of high-tech companies, a high concentration of scientific and educational institutions, which have substantial groundwork for the development of high-tech economic activities and scientific research, as well significant number of industrial facilities best suited to forming of technology parks. The interest of the Government of Moscow is also focused on providing substantial quantities of preferences for residents and management companies of technoparks, which cannot be found in other regions. For example, despite the high concentration of technoparks in the Republic of Tatarstan, regional authorities do not grant benefits to residents of the technopark, and in Tyumen and Ulyanovsk regions there are no benefits for anyone, including management companies of technoparks.

In addition to the 10 most efficient technology parks, 8 technoparks with an average level of efficiency of functioning (10-85% of the average) are of interest. These are such technological and scientific parks as the Technopark of High Technologies of the Khanty-Mansiysk Autonomous Region-Ugra, Technopark in the High-Tech Industry Zhigulevskaya Dolina (Samara Region), Technopark in the High Technologies Area, IT Park (Naberezhnye Chelny), Technopark Slava Moscow, Technopark Mosgormash, Kosmos-Neft-Gaz (Voronezh Region), Industrial Technopark IKSEL (Vladimir Region), Composite Materials and Fibers (Republic of Dagestan).

4 Conclusion

A comparative analysis of the socio-economic and technological development of the regions with the best functioning technology parks, has shown that among the leaders there are those technoparks that are created and function in RF regions with a developed structure of industrial production, a high concentration of human and intellectual capital, and also constant leaders in various

ratings assessing the level of socio-economic status, investment attractiveness, innovative development and so on. The main key factors in the efficiency of functioning of the mentioned technoparks can be considered:

- Close proximity to major scientific centers and academic environment (MSU Science Park, Science and Technology Park of Novosibirsk Science Campus (Academpark)).
- High interest of regional government bodies in diversifying the economy and following the Strategy of Russia's scientific and technological development and corresponding regional strategies (Innovation and Production Technopark "Idea", AST"West-Siberian Innovation Centre (Tyumen Technopark)).
- Presence of extra-budgetary financing, when private investors are focused on meeting market needs, including high-tech developments (Nanotechnology Centre "Technopark", Ulyanovsk Nanotechnology Centre).
- Effective fiscal and financial support of the technopark from the regional authorities (Technopolis Moscow, Technopolis Strogino, Autonomous Institution Technopark-Mordovia).

The study of the mechanism of creation and forms of ownership of domestic technology parks showed that technological parks with all basic forms of ownership have been formed and are functioning successfully in Russia. At the same time, the state order is one of the most important sources of funding for technological parks, both abroad and in Russia.

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References

[1] STAUDT, E., BOCK, J., AND MUHLEMEYER P.: Technology centres and science parks: agents or competence centres for small businesses? *International Journal of Technology Management*, Vol. 9, No. 2, pp. 196-212, 1994. doi:10.1504/IJTM.1994.025570.

[2] VEREMEENKO, S.A., SMETANOV, A.YU.: Strategy of support of small high-end business in the conditions of financial crisis, *Higher education today*, Vol. 2015, No. 4, p. 56-59, 2015. (Original in Russian)

[3] BAGRINOVSKY, K.A., BENDIKOV, M.A., KHRUSTALEV, E.YU.: *Mechanisms of technological development of the Russian economy: Macro and*

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- mesoeconomic aspects*, Moscow, Nauka, 2003. (Original in Russian)
- [4] LYASHENKO, E.A.: Evaluation of the dynamics of the development of technopark structures in the Sverdlovsk region, *Izvestiya Ural State Economic University*, Vol. 56, No. 6, p. 86-94, 2014.
- [5] RADIONOVA, E.A., GRITSKIKH, N.V.: About the state support of development of technoparks as a basic element of innovative infrastructure, *New science: Theoretical and practical view*, Vol. 75, No. 4-1, p. 156-159, 2016.
- [6] CALVO, N., RODEIRO-PAZOS, D., FERNÁNDEZ-LÓPEZ, S.: Science and technology parks as accelerators of knowledge-intensive business services, A case study, *International Journal of Business and Globalisation*, Vol. 18, No. 1., pp. 42-57, 2017. doi:10.1504/IJBG.2017.10001185
- [7] ABETTI, P.A.: Government-supported incubators in the Helsinki region, Finland: infrastructure, results, and best practices, *The Journal of Technology Transfer*, Vol. 29, No. 1, p. 19-40, 2004.
- [8] ATHERTON, A., HANNON, P.D.: Localised strategies for supporting incubation: strategies arising from a case of rural enterprise development, *Journal of Small Business and Enterprise Development*, Vol. 13, No. 1, p. 48-61, 2006.
- [9] TANG, M.F., LEE, J., LIU, K., LU, Y.: Assessing government-supported technology-based business incubators: Evidence from China, *International Journal of Technology Management*, Vol. 65, No. 1-4, p. 24-48, 2014. doi:10.1504/IJTM.2014.060956
- [10] SCHWARTZ, M., HORNYCH, C.: Cooperation patterns of incubator firms and the impact of incubator specialization: empirical evidence from Germany, *Technovation*, Vol. 30, No. 9, p. 485-495, 2010.
- [11] BOLLINGTOFT, A.: The bottom-up business incubator: leverage to networking and cooperation practices in a self-generated, entrepreneurial-enabled environment, *Technovation*, Vol. 32, No. 5, p. 304-315, 2012.
- [12] BRUNEEL, J., RATINHO, T., CLARYSSE, B., GROEN, A.: The evolution of business incubators: comparing demand and supply of business incubation services across different incubator generations, *Technovation*, Vol. 32, No. 2, p. 110-121, 2012.
- [13] MONTONEN, T., ERIKSSON, P., ASIKAINEN, I., LEHTIMÄKI, H.: Innovation empathy: A framework for customer-oriented lean innovation, *International Journal of Entrepreneurship and Innovation Management*, Vol. 18, No. 5/6, p. 368-381, 2014. doi:10.1504/IJEIM.2014.064719
- [14] ERIKSSON, P., VILHUNEN, J., VOUTILAINEN, K.: Incubation as co-creation: case study of proactive technology business development, *International Journal of Entrepreneurship and Innovation Management*, Vol. 18, No. 5/6, p. 382-396, 2014.
- [15] CORREIA, A.M. M., DE LOURDES BARRETO GOMES, M.: Potentialities and limits for the local economic and innovative development: a comparative analysis of technology parks located in the Northeast region of Brazil, *International Journal of Innovation and Learning*, Vol. 15, No. 3, p. 274-298, 2014. doi:10.1504/IJIL.2014.060877
- [16] DHEWANTO, W., LANTU, D.C., HERLIANA, S., PERMATASARI, A.: The obstacles for science technology parks in a developing country, *International Journal of Entrepreneurship and Innovation Management*, Vol. 8, No. 1, p. 4-19, 2016. doi:10.1504/IJTLLID.2016.075180
- [17] SCANDIZZO, P.L.: Financing technology: an assessment of theory and practice, *International Journal of Entrepreneurship and Innovation Management*, Vol. 32, No. 1/2., p. 1-33, 2015. doi:10.1504/IJTM.2005.006816
- [18] MINGALEVA, Z., MIRSKIKH, I.: Small innovative enterprise: The problems of protection of commercial confidential information and know-how, *Middle East Journal of Scientific Research*, Vol. 13, SPLISSUE: p. 97-101, 2013.
- [19] BERGEK, A., NORRMAN, C.: Incubator best practice: a framework, *Technovation*, Vol. 28, No. 1, p. 20-28, 2008.
- [20] NOSRATABADI, H.E., SHABANI, R., FAZLOLLAHTABAR, H.: A hybrid FGAHP-ME methodology for evaluating science and technology parks with pairwise comparison analysis, *International Journal of Entrepreneurship and Innovation Management*, Vol. 13, No. 2, p. 133-153, 2013. doi:10.1504/IJISE.2013.051789
- [21] ERIKSSON, P., MONTONEN, T., VILHUNEN, J., VOUTILAINEN, K.: Incubation manager roles in the co-innovation context, *International Journal of Entrepreneurship and Innovation Management*, Vol. 20, No. 5/6, p. 285-299, 2016. doi:10.1504/IJEIM.2016.10000638
- [22] SHAIUROVA, N.S.: Comparative analysis of the concepts of the technopark movement in different countries, *Economics and Entrepreneurship*, No. 12-2 (65-2), p. 980-983, 2015.
- [23] European Commission: *Setting up, Managing and Evaluating EU Science and Technology parks*, An advice and guidance report on good practice, Luxembourg, Publications Office of the European Union, p. 211, Oct., 2014. Available: http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/stp_report_en.pdf, doi:10.2776/7340, 2014.
- [24] European Commission, *Benchmarking of Business Incubators*, Final report, Centre for Strategy & Evaluation Services, Feb. 2002. Available: https://www.google.sk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjBh_u1_3YAhXQzqQKHe7JB-

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- EQFggnMAA&url=http%3A%2F%2Fec.europa.eu%2FDocsRoom%2Fdocuments%2F2769%2Fattachments%2F1%2Ftranslations%2Fen%2Frenditions%2Fpdf&usg=AOvVaw1qVwpWnC2_yj6FXD8XTP2U, 2002.
- [25] IASP (International Association of Science Parks). 2012, world stp statistics, Available: <http://www.iasp.ws/statistics>, 2012.
- [26] LYASHENKO, E.A.: *On the problems of financing technopark structures as institutes of innovative development of the region*, In the collection: Proceedings of the Ural State Economic University: a collection of scientific articles. Ekaterinburg, 2016, p. 82-87, 2016.
- [27] KOTELNIKOV, N.V., NAGAEVA, A.V.: Analysis and prospects for the development of the technopark as an object of innovation infrastructure, Bulletin of the Tomsk Polytechnic University, *Engineering georesources*, No. 6., p. 126-133, 2014.
- [28] GAIDARULY, E., MALININ, V.L.: Comparative analysis of business incubators and technology parks in different regions of the Russian Federation, *Young Scientist*, No. 1 (105), p. 329-335, 2016.
- [29] MINGALEVA, ZH.A., SHAIUROVA, N.S.: Interaction of state and local authorities in the creation and development of technology parks, *Ars Administrandi*, Vol. 9, No. 2, p. 176-194, 2017. doi:10.17072/2218-9173-2017-2-176-194.
- [30] ARISTOV, M.V., ARISTOV, V.M.: Technoparks in Russia - innovations to improve the quality of educational services, *Scientific notes of the International Banking Institute*, No. 9, p. 127-130, 2014.
- [31] SVIATSKII, V., REPKO, A., JANAČOVA, D., IVANDIČ, Z., PERMINOVA, O., NIKITIN, Y.: Regeneration of a fibrous sorbent based on a centrifugal process for environmental geology of oil and groundwater degradation, *Acta Montanistica Slovaca*, Vol. 21, No. 4, p. 272-279, 2016. <http://actamont.tuke.sk/pdf/2016/n4/2sviatski.pdf>
- [32] LURIE E.A.: University technopark: the time of recognition, *Innovations*, No. 5 (175), p. 3-16, 2013.
- [33] MAYUROVA, A.S., KUSTIKOVA, M.A., MAYUROVA, M.V.: Technoparks of Russia are a reliable partner for education, *On the way to a new school*, No. 2, p. 93-95, 2014.
- [34] MINGALEVA, ZH., MIRSKIKH, I.: On innovation and knowledge economy in Russia, *World Academy of Science, Engineering and Technology*, No. 66, p. 1032-1041, 2010.
- [35] ROGOVA, E.M.: Efficiency of the functioning of business incubators as an element of the spin-off strategy of universities, *Innovations*, No. 10 (180), p. 58-63, 2013.

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