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## **Interaction of the State and Business in the Formation of an Innovative Structure after the Example of CATU Zheleznogorsk**

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*In the given article we consider the experience of innovative activity of CATU Zheleznogorsk, the city, which has got its status due to large defense enterprises, situated on its territory. In the result of conversion programs, and also because of reduction of the defense order, they have detached non-core productions from those enterprises. In the given article, we also represent results of our innovative potential research on the given territory, analysis of the results of the British and American programs' activity on creation of workplaces for the former employees of the defense branch. And we have suggested certain measures for inclusion of the CATU Zheleznogorsk's innovative potential into the development of innovative Russia.*

*Keywords: innovative potential, regional innovative infrastructure.*

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The course for innovative socially-oriented type of Russian economical development is pronounced in the conception of the long-term social-economical development of the Russian Federation for the period of 2008 – 2020. This transition to the course, which is qualitatively new for this country and which applies innovative sources of growth, is a serious task, which demands participation of all the subjects of the Russian Federation, including the Krasnoyarsk Region.

Professor of the Stanford University Henry Etzkowitz has suggested a model of innovative development, which he has called a «Triple Helix» (Etzkowitz, 2010). In his model he presupposes that university becomes the core of the innovative development, and it is the leading element in generation of innovations in collaboration with business and state. Thereat, national innovative structure must consist of regional ones, but not copying each other and taking into account their peculiarities and recourse capacities.

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Small high-technological enterprise (Bukharov, 2008) is suggested to be considered as a final product of University, which concentrates in itself not only innovative technology and specialists of a certain sphere, but also an enterprise, which team of specialists possesses a high level of competences for the work under the modern market conditions.

Here, University acts as a generator of small science-intensive enterprises. This ideology has been successfully realized in Tomsk within the frames of the Tomsk State University of the Systems of Control and Radio-Electronics (Mekhanik, 2010) and of the National Research Tomsk Polytechnic University (Chubik, 2010).

In the given works (Verkhovets, 2010) there is suggested a model of innovative structure of the federal university – as an autonomic educational institution, the model is built on interaction with territorial-administrative units and enterprises (financial industrial groups), which function on the territories. We have singled out (Kirko, 2010) 5 typical territories of the Krasnoyarsk Region, which vary by their social-economical development and situated in various climatic conditions, and these territories have been used for complex researches of their innovative potentials.

One of such territories is the CATU Zheleznogorsk, which is characterized by extremely high scientific-technical and industrial potential. The Zheleznogorsk City is a center of a closed administrative-territorial unit (CATU).

Zheleznogorsk has got its special status due to its city-forming enterprises: FSUE «Mining & Chemical Combine» (MCC), the Scientific-Production Association of Applied Mechanics n.a. M.F. Reshetnyov (OJSC «Information Satellite Systems» n.a. Academic M.F. Reshetnyov), the Chemical Plant – a branch of the OJSC «Krasnoyarsk Machine Engineering Plant» and

FSUE «SCAT № 9 affiliated to the SpetsSroy of Russia».

The FSUE «Mining & Chemical Combine» (MCC) is one of the leading Russian enterprises, which create a complete technological complex in the sphere of civilized handling of the spent nuclear fuel (SNF) of power reactors and closes the nuclear fuel cycle. At present time, MCC's core types of activity are the following:

- Spent nuclear fuel transportation and storage;
- production of heat at the heating station in order to supply heat and hot water to Zheleznogorsk;
- Decommissioning of defense complex objects;
- construction of a «dry» and exploitation of a «wet» spent nuclear fuel pool;
- Creation of the plant, producing MOX-fuel for fast neutron reactors;
- Creation of the Experimental-Demonstrational Center (EDC) for radio-chemical SNF processing. (<http://www.sibghk.ru/>).

OJSC «Information Satellite Systems» n.a. Academic M.F. Reshetnyov» (OJSC «ISS») is one of the most dynamically developing head enterprises of the Russian Aerospace Agency which deals with development, production and exploitation of space facilities of communication, management, and information retranslation, television, navigation and geodesy. (<http://www.iss-reshetnev.ru/>).

The Chemical Plant is a branch of the OJSC «Krasmach» (<http://krasm.com>). The main kind of activity of the Chemical Plant is production of ballistic rockets for submarines in their refueling sector and carriage of firing tests of the propulsion systems, and also utilization of the exhausted rocketry. Beyond its core activity, the Chemical Plant has also civilian productions: cryogenic production output, polymerized

products extrusion, plastic goods casting, and production of polypropylene fabrics. Since 2006, they have started an experimental production of oil catalytic refining.

«SCAT № 9 affiliated to the SpetsSroy of Russia» is one of the largest construction enterprises of the Krasnoyarsk Region. During recent years it has built and put into operation: several constructions of the Mining-Chemical Combine, the Semiconductor-Grade Silicon Plant, blocks of apartments in Zheleznogorsk with a total area of 39.1 thousand m<sup>2</sup>, and domestic wastewater purification plants with a capacity of 63 thousand m<sup>3</sup> of wastewater per day and so on. (<http://www.idc24.ru>)

1999 should be considered as a starting date of active formation of the innovative structure in Zheleznogorsk, the year when the fond «International Development Center – Zheleznogorsk» (IDC) was organized (<http://www.usst9.ru>). Its organization had been caused by removal of the carbon-uranium reactors from operation (АД, АД-1 and АД-2). In the result of their decommissioning, they have got a lot of free highly-qualified personnel, and as a consequence, it became necessary to create and to develop new enterprises in order to adjust those released people and to supply them with job.

As for today, IDC renders support on all the stages of realization of capital-investment and innovative projects – starting form

conception development of a business idea and reconstruction of an industrial field up to fulfillment of representative functions in the organs of power. The center assists to develop a business-plan and a company development strategy, to define the impact of risks, to carry out a financial analysis, and to evaluate the market cost of one's business. The fond provides its assistance in managerial personnel recruitment, businessmen and specialists re-training and qualification improvement. In the course of 11 years of IDC's work in Zheleznogorsk, they have realized more than 40 projects, including creation of new projects and development of existing high-technological plants, more than 1000 people have been trained according to their programs, which contribute to development of the entrepreneurial skills.

For example, in Fig. 1, there are presented enterprises, which industrial bases have been formed with the use of technologies and working experience of one of the city-forming enterprises of OJSC ISS.

**OJSC «ISS»** has generated such enterprises as:

«**SPA AM – Pazvitie**» – development and production of ground antenna systems (GAS) with reflectors diameters up to 9.5m.;

«**Prima Telekom**» – development and production of antenna-feeder devices for radio-television and communication receiving and

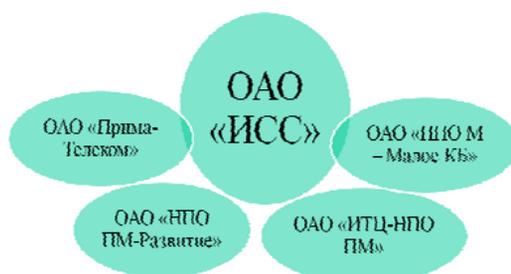


Fig. 1. High-technological enterprises, which have technologies and working experience of one of the city-forming enterprises of OJSC ISS in their basis

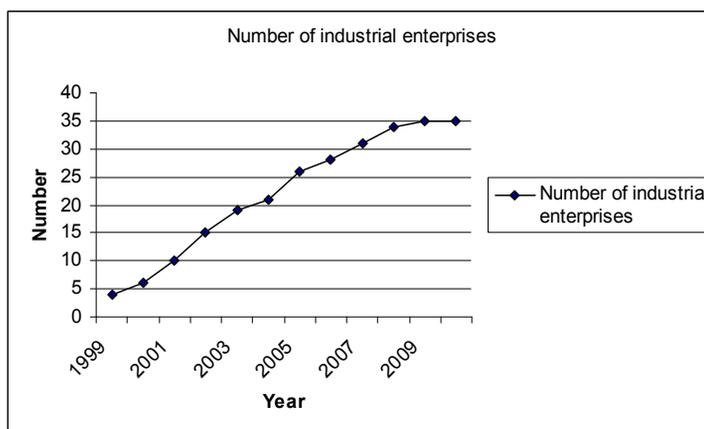


Fig. 2. Dynamics of growth of the number of enterprises, which have got financial support since 1999

transmitting equipment of various frequency ranges;

«SPA AM Minor DB» – development and production of automatic modular heat-supply stations, plate heat exchangers and high-pressure pumping stations;

«Experimental-Technical Center of SPA AM» – complex test operations upon the electronic component base of equipment of various applications.

Active collaboration with international programs (1999-2006 – the Russian-American Program “Initiative of Atomic Cities”, 2004 – up to present time – the Program of British-Russian Partnership «Atomic Cities» (CNCP) (<http://www.cncp.ru/>)) has let us raise funding in the amount more than 10 million USD in order to realize 35 industrial projects.

In Fig. 2, we present a dynamics of growth of the number of enterprises, which have got financial support since 1999, and in Fig. 3, there is a dynamics of the number of employees, being occupied at those enterprises.

As it is seen from the graphic, up to 2009 we observe an intensive growth of the number of the enterprises and the people, working there. Slow-down of the speed of the enterprises’ and the employees’ number growth after 2009 can be

explained by the phenomena of the economical crisis. This statement is proved by the general recession of production volumes of companies in this period (Fig. 4).

As it has been mentioned above, many high-technological companies of the city have been organized within the frames of city-forming enterprises and in the result of conversion processes in the period of 1990-2000. And their formation has also been caused by the underfunding from the part of the State. In the course of this period, most non-profile companies had to be formed inside the city-forming enterprises, i.e. there were created «quasi-companies» according to the terminology of (Mechanik, 2010), or «embryos» according to the terminology of (Bukharov, 2008). Some of them have ceased their existence because of market competitive conditions (thereat, the specialists have retained their jobs at the city-forming enterprise with all their social guarantees), and some of them have been singled out as independent high-technological firms. Thus, for example, «SiET» Ltd. (development of commercial technologies of radiation processing of various kinds of production and their industrial implementation) and «The Scientific-Production Center of Electronic Equipment» Ltd. (production and

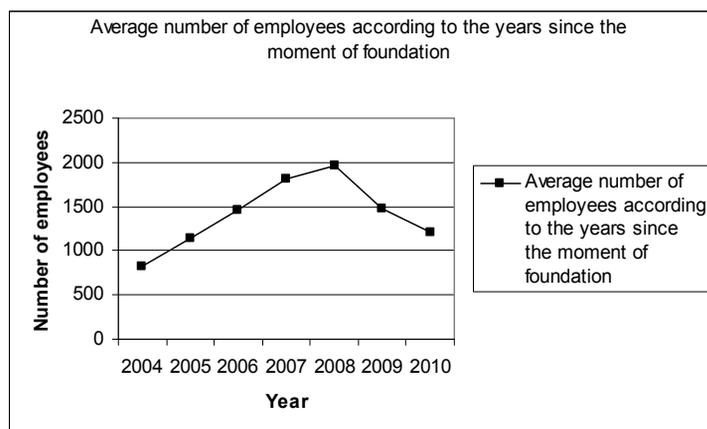


Fig. 3. Dynamics of number of employees, being occupied at high-technological enterprises of Zheleznogorsk

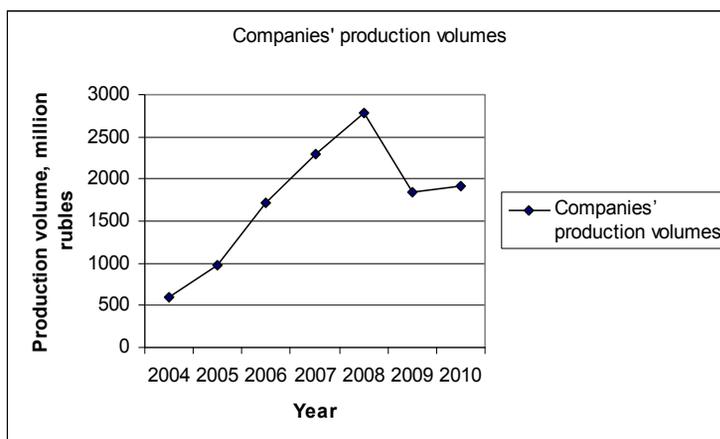


Fig. 4. Dynamics of production volumes of the Zheleznogorsk high-technological companies

realization of smoke optical-electronic detectors) have been organized by the former specialists of FSUE MCC;

- Active support of the Zheleznogorsk administration;
- American-Russian and British-Russian programs, which have financed the projects, have become the accelerators of the innovative process development.

In Fig. 5, there is a comparison of graphics of dynamics of production volumes realization of the enterprises, which have obtained grant support, and of those, which have not got additional financing.

Proceeding from the graphics, we come to the conclusion that the enterprises, having obtained grant support:

- had had a higher dynamics of growth of production volumes before crisis;
- were much later influenced by the crisis;
- have much earlier started their recoveries after the crisis.

What concerns Zheleznogorsk, to the mind of authors of the present article, they have practically realized the model of innovative development of «Triple Helix» by Henry Etzkowitz (Etzkowitz, 2010). The only peculiarity of its realization has

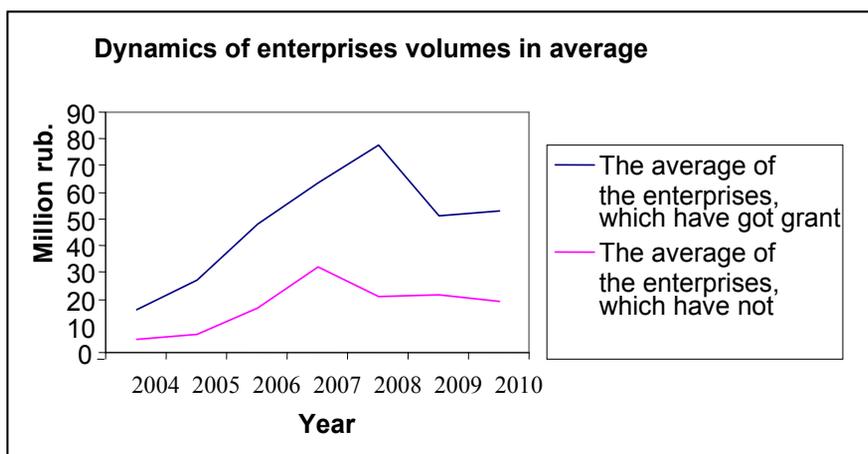


Fig. 5. Dynamics of production volumes realization of the enterprises, which have obtained grant support, and of those, which have not got additional financing

became that fact, that enterprises of the defense complex have become the locomotive of the innovative process instead of University, and local business has played the role of Intergovernmental programs.

Taking into account that fact that there are 10 similar CATUs in Russia and there are concentrated huge scientific-technical potential, having been accumulated by the Soviet and later by the Russian people, we come to the conclusion that this potential is under-estimated and under-used in the formation of the innovative system of Russia.

In order to use actively the potential of CATU in development of innovative Russia we are to:

1. adopt the RF law, being analogous to the US Law, dated 1986 concerning the federal

transfer of technologies (<http://ictt.by/>), which has made obligatory for the scientists and engineers of all the federal laboratories (analogies of the Russian CATUs) to transfer technologies and demands to take into account the technological transfer activity in the course of estimation of the work of specialists,

2. adopt a special program, being similar to the British-Russian program – CNCP, which will stimulate the innovative development of the CATU in the civilian sector,

3. work out and to adopt normative documents, which will make the procedures of technologies transfer easier (selling of licenses) – transfer of technologies of the Russian defense complex enterprises to the civilian complex with a due account of all the measures of mutual responsibilities.

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## **Взаимодействие государства и бизнеса в формировании инновационной инфраструктуры на примере ЗАО Железногорска**

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*В статье рассматривается опыт инновационной деятельности ЗАО Железногорска, города, приобретшего свой статус благодаря находящимся на его территории крупным оборонным предприятиям. В результате конверсионных программ, а также снижения оборонного заказа из этих предприятий были выделены непрофильные производства. Также в статье приведены результаты исследования инновационного потенциала на данной территории, проанализированы результаты действия британской и американской программ по созданию рабочих мест для бывших работников оборонной отрасли. Предложены меры для вовлечения инновационного потенциала ЗАО в развитие инновационной России.*

*Ключевые слова: инновационный потенциал, региональная инновационная инфраструктура.*

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