

# Coordination of Innovative Infrastructure in Territories of Advanced Development: Models and Mechanisms

A Byankin<sup>1</sup>, G Burdakova<sup>1</sup>

<sup>1</sup>Komsomolsk-on-Amur State Technical University, Komsomolsk-on-Amur, Russia

E-mail: office@knastu.ru

**Abstract.** The development of technological entrepreneurship in the regions of advanced social and economic development is closely connected to the creation of innovative and supporting infrastructure in the territory. Every educational, scientific, production infrastructure element has a certain function and operates with a view to achieve their goals. However, to provide comprehensive conditions for the development of business, identification of promising areas of innovation activity chains "education - science - technologies - business", there is a need to develop integration programmes and cooperation to fulfil objectives of the development of technological entrepreneurship. Higher educational institutions as centers for the development and commercialization of innovations that have educational and innovative (scientific and production) infrastructure, should act as cooperation integrators between all the stakeholders and create favourable conditions for the development and activation of science-intensive business [1-3]. The goal of the research is to develop models and mechanisms for the coordination of innovative infrastructure in advance development territories. The authors have studied the main elements of educational, scientific, production and support infrastructure in Priority Social and Economic Development Area "Komsomolsk" and identified the essential objectives and activity areas. The design project of a Coordination Council has been proposed as a platform for the discussion of issues and development of coordinated measures aimed at addressing the challenges of a territory. The cooperation mechanisms are identified for the purposes of the future unification by areas of activity, that provide for joint efforts of the representatives of the innovation infrastructure of a higher educational institution and a region.

## 1. Introduction

A Priority Social and Economic Development Area is a territory with a special legal status for businesses that provides a number of tax benefits and administrative incentives for investors. The goal of creating a Priority Social and Economic Development Area is the creation of favourable conditions for attracting investments, ensuring advanced social and economic development and comfortable environment for the life of the population. The Priority Social and Economic Development Area "Komsomolsk" was established in 2015 by Ruling of the government of the Russian Federation of 25 June 2015 No. 628 [4].

At first, the Priority Social and Economic Development Area "Komsomolsk" was aimed at the cooperation with the existing hi-tech aviation and machine building companies. Later this list was enlarged.

Today the Priority Social and Economic Development Area "Komsomolsk" includes 8 platforms that work to bring home hi-tech and innovative production; provide all-year sports and tourist services;

develop deep wood processing; implement agricultural industry projects; develop the mining industry; machine processing; lifting and transporting equipment production, machine building, food industry and other types of production.

Three of the eight platforms are situated in Komsomolsk-na-Amure: two industrial ones (Parus and Amurlit mash) and one agricultural industry platform; the other 5 spaces are created in satellite cities (Amursk, Solnechny) and in the Verkhnebureinsky region of the Khabarovsk krai.

We should say that almost all residents of the Priority Social and Economic Development Area "Komsomolsk" are represented the previously existing companies, though the idea of the Priority area is to attract investors and found new firms. In other Priority Social and Economic Development Areas in the Far East it is usually the case. However, in Komsomolsk-na-Amure there are higher risks for the implementation of investment projects, in particular in industrial production.

This is why the issue of support infrastructure for newly created businesses is so acute in the region [5].

State University of Komsomolsk-na-Amure as a "resource center for the development of economy, innovative business and social and cultural environment in the region" [6] has some innovative infrastructure facilities. Today it includes: Technical park of the University with a joint scientific and research lab "Composition materials and science-intensive technologies", a "Laser technologies and equipment" lab, an "Automation" lab, a digital production center, a machine-assembling section, a resource center, the Center for the collective use of "New materials and Technologies", the Engineering center "Innovative materials and technologies", the education and scientific innovative center for energy saving, the Scientific and educational center "Industrial robotics and advanced industrial technologies", the Center for innovative technologies in construction, an experiment tank, small innovative companies [7].

The sections of the innovative infrastructure of the University can develop and commercialize R&D at all the stages: fundamental research, applied scientific and research activities, testing, design, technology, production of samples, training and capacity building for human resources, small batch production of science-intensive products.

At the same time, thanks to the creation of the Priority Social and Economic Development Area "Komsomolsk" and the implementation of the long-term plan for comprehensive social and economic development of the city, Komsomolsk-na-Amure now has other objects of innovative infrastructure with different functions that are aimed at fulfilling objectives of advanced development of the territory [8]. First, this infrastructure is aimed at the development of engineering education for pre-school and school children: Children technical park "Quantorium" (established in December 2016), the Innovative interactive center "Heuristics" (Children's Technical Park to be commissioned in 2019), the Engineering school (to be commissioned in 2019). Children's technical parks are created with a view to provide an environment for the advanced development of children at the age of 5-18 years in science and technology and to teach them basic skills of creative thinking. In total, 6 quantumiums will work in technical parks, namely Robo, IT, Aero, Cosmo, Nano and Bioquantum. The innovative interaction center "Heuristics" will have an additional engineering lab, e.g. a hi-tech workshop and a vessel design lab. So, there is a belt of educational institutions in the city that educate students on various levels (general compulsory, extra curriculum, vocational training, higher education) and provide them with the necessary skills for future investors and innovators.

Besides the educational and scientific infrastructure, Komsomolsk-na-Amure has support and production facilities: Komsomolsk-na-Amure regional business accelerator, Center for Certification, standards and tests, the Interregional center of competences, the industrial park "Parus".

The main purpose of the business accelerator (est. in late 2018) is to help small hi-tech manufacturers to manage their activities and develop, to support them in addressing the problems at the initial stages. In the business accelerator there is a Service Center "My business", that includes the Regional Agency for the support of businesses; the Support Fund for small businesses in the Khabarovsk region; the Far Eastern agency for supporting innovations (Center for certification, standards and testing; the Regional engineering center); remote working place "My documents".

Residents enjoy benefits in the form of "accelerating services" (law, accounting, consulting, education, etc.), offices and production facilities [9].

The centers for certification, standards and testing (on the basis of the Technical park of the University) were established in order to provide documentation support for all the stages of design, development and technological preparation of a factory. The center is a state facility that supports small and medium businesses in production industry that are registered in the Khabarovsk krai. It provides consulting services on the issues of the existing system of compliance assessment. It collects the necessary documentation for obtaining certificates, compliance declarations, testing protocols and state registration license. It fully supports the compliance justification procedure and lab testing at all the stages in all formalities [10].

The Fund for the support of small and medium businesses affiliated with the administration of Komsomolsk-na-Amure was created for improving the business environment. The main types of support provided today are:

- financial (beneficial investment loans, non-refundable subsidies, grants);
- free business consulting;
- information support (educational programmes, workshops, themed seminars);
- ensuring the access of SME to loans from banks and raising the awareness of SME about the conditions of these loans.

The industrial park "Parus" (under construction). Once the construction is complete, the company will provide the following services: turn-key construction; sale and rent of production facilities and land plots; legal, consulting, logistics, security services. Engineering infrastructure of the park will include power supply, gas, heat and water supply [11, 12].

In order to coordinate the activities and control over the implementation of the agreement on the establishment of a Priority Social and Economic Development Area "Komsomolsk", a Supervisory Council was created that would promote the implementation of PSEDA residents' projects. One of the most important areas for the Supervisory Council is to assess the efficiency of PSEDA, to consider and approve future-oriented PSEDA development plans and to monitor their implementation. In principle, the main purpose of the Supervisory Council is to develop solutions for the infrastructure support of the advance development territory residents [13].

We can also point out that every innovative facility is mainly free in its activities, though they are the elements with the common function, e.g. to create innovation-activity chains: "education - science - technologies - business". The innovative infrastructure can be viewed as an integrated set of educational programmes on different levels and innovative facilities and relevant management mechanisms that are aimed at the creation of a skill set that is necessary for successful innovative, scientific and business activities.

The relevant control mechanism can be created within the Coordination Council that should establish cooperation of the stakeholders and promote development of harmonized decisions and efforts. The Coordination Council is responsible for:

- detailed planning of the contents and objectives of every infrastructure facility;
- design of future development areas within innovative activity chains "education-science-technologies-business";
- development and introduction of cross-cutting integrated programmes, modules, engineering and technical projects;
- promotion of coordinating cooperation between infrastructure facilities for the purposes of development.

The main goal of the Coordination Council is to create a platform for discussion of issues and development of harmonized solutions aimed at addressing the development challenges in the region and at boosting technological business activities.

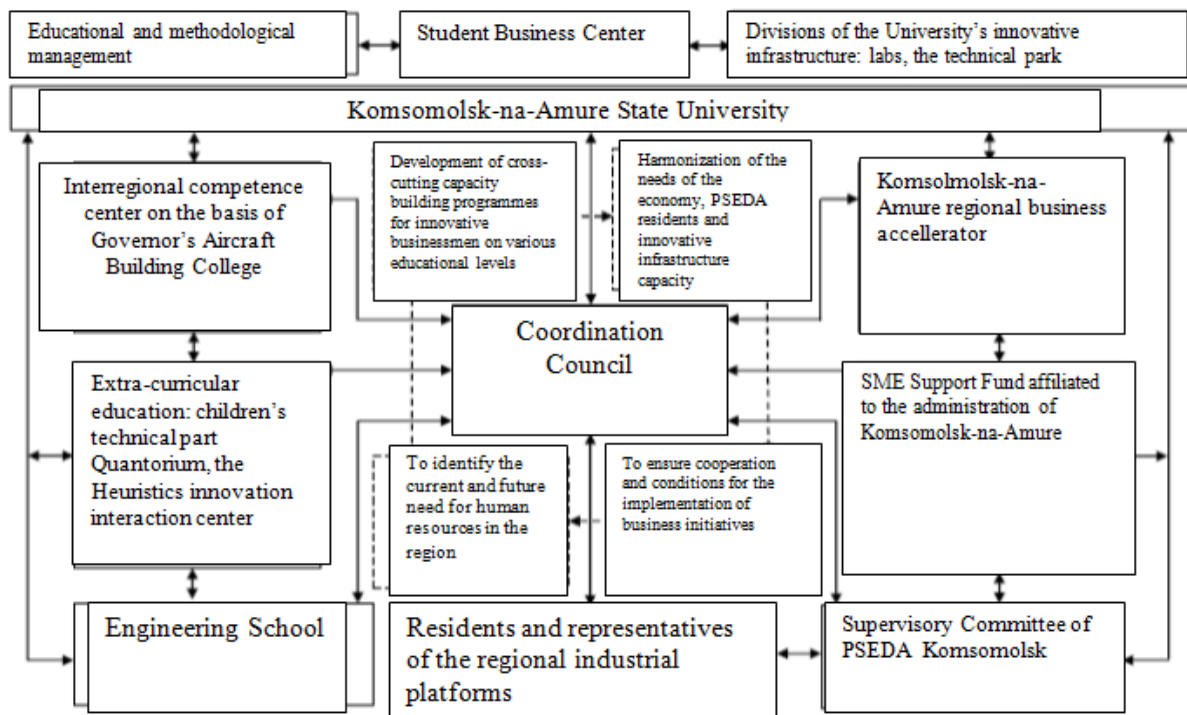
The Coordination Council should include:

- representatives from educational institutions: Municipal educational institution "Engineering school", the Children technical park "Quantorium", a new Innovative interactive center "Heuristics",

the Interregional competence center on the basis of "Governor Aircraft building college", Federal State Budgetary Educational Institution of Higher Education "Komsomolsk-na-Amure State University";

- representatives from innovative infrastructure facilities and the technical park in the Komsomolsk-na-Amure State University;
- representatives of support agencies in the region: Komsomolsk-na-Amure regional business accelerator, the Fund for the support of SME affiliated with the Administration of Komsomolsk-na-Amure, the Supervisory Council of PSEDA "Komsomolsk";
- residents and representatives of industrial platforms in the PSEDA region (Figure 1).

Along with the regular members, the Coordination Council can temporarily include other representatives (SME, management and experts from industrial companies of the region) with a view to address local problems and development challenges.



**Figure 1.** A cooperation model for the innovative infrastructure of PSEDA "Komsomolsk" and the University.

Komsomolsk-na-Amure State University should have a special place in the Council. From one hand, as an educational center of the region, the university is a talent pool that is necessary for the development of the region. Here the University can train relevant professionals by uniting all the innovative educational organizations in the city (the engineering school, children technical parks, the Interregional competence center) with a view to create cross-cutting areas and innovative activity chains "education-science-technologies-business" [14, 16].

On the other hand, having quite a developed innovative infrastructure, the University can become a platform for the development of technical and technological solutions and meeting production needs of PSEDA residents and organizations from other regions [17, 18]. The University implements project-oriented training programmes and engages students in the development of solutions, thus creating an innovative businessman that produces goods and services that are in demand. Under the comprehensive influence of all the infrastructure facilities, the Komsomolsk-na-Amure regional business accelerator, the Fund for the support of SME, the Supervisory Council of PSEDA "Komsomolsk" and the Industrial Park "Parus" are all involved in this process. The Coordination Council members work like other Public councils on a pro bono basis.

If necessary, it is possible to establish a special Fund for the financing of the development and implementation of large projects and initiatives. For example, if the University funding is granted as part of a tender for the implementation of specific projects. The Support Fund for small businesses also has the necessary funding. Some projects of the Coordination Council can receive state support in the form of grants. The Council meetings can be held both in an extended format (for the review of the concept, territory development plans, priorities for the working plans) and in terms of topics (plenary sessions) with participation of necessary experts. For example, in order to join efforts, to develop cross-cutting capacity building programmes, the cooperation between the Educational and Methodological Office of the University and representatives of general secondary education, vocational training, extracurricular education institutions is needed.

In order to address issues of meeting production needs of PSEDA residents, meetings of their representatives with scientists, innovative students, innovative infrastructure experts and the technical park of the University can be held. To implement specific projects on the creation of small businesses, the authors of the project, the representatives of the Regional business accelerator, the Support Fund for urban business, etc. take part in the meetings [19]. The cooperation mechanism for the participants in the Coordination Council by areas is shown in Table 1.

While conducting their operational activities, the innovative infrastructure representatives are often oriented towards current challenges that are identified by the managing ministries and agencies. However, this is not enough, and every element of the infrastructure should be involved in the identification of the common vision of the business and territory development, and make a relevant contribution into the creation of cross-cutting areas in the chain "Education-science-technologies-business".

## **2. Conclusions**

1. Today the Priority Social and Economic Development Area "Komsomolsk" includes 8 platforms that work to bring home hi-tech and innovative production; provide all-year sports and tourist services; develop deep wood processing; implement agricultural industry projects; develop the mining industry; machine processing; lifting and transporting equipment production, machine building, food industry and other manufactures.

2. The sections of the innovative infrastructure of the University can develop and commercialize R&D at all the stages:

3. As part of creating a Priority Social and Economic Development Area (PSEDA "Komsomolsk") and implementing the long-term plan for the comprehensive social and economic development of the city, Komsomolsk-na-Amure actively develops educational, scientific, support and production facilities.

4. Today innovative infrastructure of the University and PSEDA do not fully cooperate.

5. The mechanism for managing the cooperation of the innovative infrastructure of the University and PSEDA can be assigned to the Coordination Council.

6. The main goal of the Coordination Council is to create a platform for discussion of issues and development of harmonized solutions aimed at addressing the development challenges in the region and at boosting technological business activities in cooperation with all the stakeholders.

7. All the activities of the Coordination Council are included into a continuous chain: - identification of a need - description of an innovative activity chain - creation of an innovator - creating of conditions for business development - cooperation with the regional cluster [20].

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**Appendix A**
**Table A1.** The Cooperation Mechanism for the participants in the Coordination Council by areas.

Representatives of the Coordination Council	ES	CTP	ICC	KRBA	SFSME	SC	RRIP	KASU	Areas of activities of the Coordination Council
Engineering School (ES)		1,3	1,3	1	1	1	1	1,3	<ol style="list-style-type: none"> <li>1. Concept, territory development plan review, setting objectives for event programmes.</li> <li>2. Identification of the current and future need for human resources in the region.</li> <li>3. Ensuring cooperation and conditions for the implementation of business initiatives.</li> <li>4. Harmonization of the needs of the economy, PSEDA residents and innovative infrastructure capacity</li> <li>5. Ensuring cooperation and conditions for the implementation of business initiatives</li> <li>6. Meeting production needs of PSEDA residents and representatives of industrial platforms</li> </ol>
Children’s technical parks (CTP) Quantorium, Heuristics	1,3		1	1	1	1	1	1	
Interregional competence center (ICC)	1,3	1		1	1	1,2	1,2	1,2	
Komsomolsk regional business accelerator (KRBA)	1	1	1		1,5	1,5	1,5,6	1,5,6	
the Support Fund for small businesses in the Khabarovsk region (SFSME)	1	1	1	1,5		1,5	1,5,6	1,5,6	
Supervisory Council of the PSEDA “Komsomolsk” (SC)	1	1	1,2	1,5	1,5		1,2,5,6	1,2,4,5,6	
Residents and representatives of industrial platforms in the region (RRIP)	1	1	1,2	1,5,6	1,5,6	1,2,5,6		1,2,4,5,6	
Komsomolsk-na-Amure State University (KASU)	1,3	1	1,2	1,5,6	1,5,6	1,2,4,5,6	1,2,4,5,6		