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THE STATE OF UNIVERSITY-BUSINESS COOPERATION IN SAINT PETERSBURG

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The article is dedicated to current trends in University-Business Cooperation (UBC) in Russia on the example of Saint Petersburg. UBC plays an important role in the success of all the stakeholders of the process: higher education institutions (HEIs), students, employers and the government. The ongoing interaction between HEIs and employers helps achieve a high quality and relevance of education as well as to diminish the gap between the competences the employers expect and the knowledge of graduates and to develop the national economy. The benefits for stakeholders are presented in the paper. Saint Petersburg has 72 HEIs and is called one of the 100 best cities for students globally. Some universities in Saint Petersburg hold high positions in Russian and world rankings. All universities are interested in cooperating with employers. The models of UBC in Saint Petersburg are analyzed and examples of each type are given in the paper. One of the most important indicators of the efficiency of UBC is the employment of graduates. The current state of UBC in the city is assessed by analyzing the employment rates of graduates.

Keywords: University-Business Cooperation, Saint Petersburg, HEIs, Strategy 2020, Strategy 2030, stakeholders, graduates' competences, higher education, quality of education, R&D, employment rate

1. INTRODUCTION

In European countries, strategies and programs to support the development of a knowledge economy and UBC have been implemented (both at the level of the EU and at the level of a given country). Successful cooperation with the support of

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the authorities was one of the driving forces for building a competitive economy on the European continent, which is one of the main priorities of the Europe 2020 strategy. The goal of UBC is to improve the quality of education in accordance with the requirements of the labor market and the economy as a whole. The strategy “Europe 2020”, developed in 2010, includes key priorities for the economic development of Europe until 2020 (European Commission, 2010):

- economic development based on knowledge and innovation;
- sustainable economic growth;
- increase in the level of employment.

According to this program, 75% of the population at the age of 20-64 should be employed; 3% of the EU's GDP should be invested in research and development by 2020. In Russia, the relevant issues were mentioned in “Strategy 2020” (Government of the Russian Federation, 2008) and in the state programs “Economic development and innovative economy” (Government of the Russian Federation, 2014). In Saint Petersburg – Strategy 2030 and the program “Economic development and economy” (The Government of Saint Petersburg, 2014).

One of the main goals of the subprogram “Development of professional education” of the state program of the Russian Federation “Development of Education” for 2013-2020 (Ministry of Education and Science, 2013) is an increase in the level of employment of graduates. The strategic goal of Russian policy in education is an increase in access to quality education that corresponds with the requirements of the innovative development of economy, with modern demands of the society and each citizen.

In order to reach these goals, HEIs should prepare specialists who are able to face recent market challenges and have a wide range of professional interests, knowledge and skills. Therefore, the view of employers cannot be separated from the educational process.

Universities are the main reservoir of knowledge and innovation while companies have the necessary material and technical base. Nowadays, there is a big gap between the competences employers expect and the knowledge of graduates. However, this gap could be diminished by stimulating cooperation between universities and employers. According to a professor from Melbourne University, Patrick Griffin, who has conducted a survey among a large number of different employers, the most important competence in the future will be the ability to creatively solve complex problems together. It includes a creative approach to business, communication, teamwork, critical thinking. But in order to develop these competencies and make them practice-oriented, it is necessary to revise and reorganize the educational process. Considerable work is required to expand the interaction of universities and employers on a wide range of issues (Khairutdinov, 2016).

2. OVERVIEW OF THE EDUCATIONAL SERVICES MARKET IN SAINT PETERSBURG

Considering the tendencies in UBC in Saint Petersburg and HEIs of Saint Petersburg as the object of the current research, it is important to pay attention to the description of the educational services market of the city.

The system of higher education of Saint Petersburg consists of 72 HEIs: 43 state and 29 private HEIs. According to Figure 1, 37% of the total number of Saint Petersburg's state HEIs (16 HEIs) are technical. It reflects the capacity and profile of Saint Petersburg's industry. There are 8 HEIs (19%) in the culture and arts sector (including ballet, theatre, music and fine arts). It is widely known that St. Petersburg is considered the cultural capital of Russia. There are 4 universities for the humanities (7% of the total number of universities) including the Pedagogical University. The category "other" includes 4 universities which don't correspond to any mentioned category: St. Petersburg State University which has a special status; Agrarian University, Hydrometeorological University and the University of Physical Education. There are 4 economic and 3 law universities. It should be noted that a lot of universities offer economic and law educational programs.

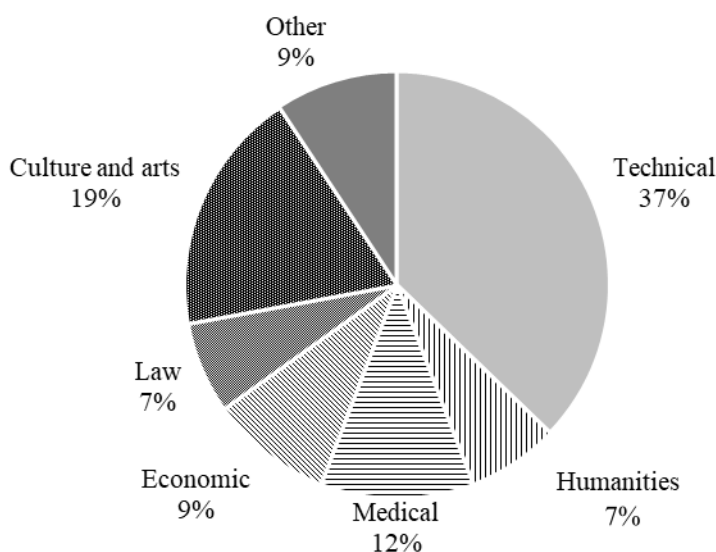


Fig. 1. State HEIs of Saint Petersburg by fields of study

Total funding for higher education in Saint Petersburg from all sources is more than 82 billion rubles (644 million euro) (Maksimov, 2017).

One of the indicators of the state of HEIs is enrollment campaign rates. More than 90,000 students were enrolled at universities in Saint Petersburg in 2017 (all programs of higher education are taken into account) in comparison with 87,000 students in 2016. More than 211,000 people get a full-time education at Saint Petersburg's HEIs, whereas the population of the city aged 17-24 years old is 485,000 – this means that full-time students constitute more than 43% of this age group (Maksimov, 2017). Saint Petersburg's HEIs save their positions by the number of enrolled students while having the highest passing grade of the Unified State Examination in Russia.

Saint Petersburg's HEIs are also attractive for Russian and foreign school graduates. Most of all tuition free students (69%) in Saint Petersburg are non-local. The proportion of foreign students enrolled in full-time education programs in Saint Petersburg was almost 13% in 2017 (Maksimov, 2017).

The good image of Saint Petersburg's universities, in particular among foreigners, results from their participation in international HEIs rankings such as Times Higher Education, QS world university rankings, Academic Ranking of World Universities and others. Saint Petersburg was also called one of the world's 100 best cities for students (78-th place, Best Student Cities ranking).

It is important to underline that more than 485,000 people study and work in the STEM¹ industry in Saint Petersburg – it is about 15.8% of the labor force (Maksimov, 2017) Scientific and innovative activities develop rapidly as well. The number of people carrying out R&D was approximately 76,900 in 2016. The expenses for R&D reached 169 billion rubles (13.3 million euro) in 2016.

Analyzing UBC in St. Petersburg it is important to give a short description of St. Petersburg enterprises' structure because St. Petersburg is a huge industrial and scientific center. There are more than 700 enterprises in the fields of heavy machinery, robotic technologies, transport engineering, shipbuilding, chemical and pharmacy industry, food industry, etc. and 264 Science Centers. The hospitality industry is highly developed as well.

All of the data mentioned above shows that Saint Petersburg's HEIs provide a high quality of education and have great potential. This is the result of the collective fruitful work of the Saint Petersburg government, federal authorities, scientific and educational institutions, university staff and students. Nevertheless, the potential for improving the quality of education is high enough.

3. PRINCIPLES OF UNIVERSITY-BUSINESS COOPERATION (UBC)

UBC is a form of cooperation in which each party receives a certain advantage, both economic and organizational. The synergetic effect of the interaction brings

¹ Science, technology, engineering and mathematics.

additional benefits not only to the actors of the interaction, but also to stakeholders, including the region, society as a whole, the state.

The types of UBC are based on what a university can give to business and what business can offer to a university, as well as on the synergetic effects that result from this cooperation. In Russia such cooperation is carried out in several directions:

- short – or long-term professional internships for students and graduates;
- business participation in education programs' development,
- participation in monitoring the quality of educational activities,
- workshops or lectures from business representatives,
- providing students with real business cases,
- sponsorship of projects within educational institutions;
- creation of specialized departments in universities;
- joint R&D and outsourcing;
- R&D commercialization, establishment of startups and small innovation enterprises;
- innovation entrepreneurship;
- long-term cooperation in clusters.

Considering the types of UBC in theory, it is possible to propose the following classifications (Viktorova, 2017, p. 120):

By number and types of organizations:

- one university – one firm;
- one university – several firms;
- several universities – one firm;
- many universities – many firms (clusters).

By level of cooperation:

- strategic partnership in many areas at the level of university management – company management;
- medium level in one or several directions at the level of a faculty or university department – a division of a company;
- spontaneous partnership in one direction at the level of scientists – the personnel of the company.

By field of cooperation:

- in the field of education: modernization of curricula, mobility of students, scientists and staff, postgraduate education, entrepreneurship education;
- in the field of scientific research: joint R&D and/or commercialization of R&D;
- in the field of management.

Geographically:

- regional;
- interregional;
- international.

In reality, as universities provide education in many areas, the most common types of UBC are “one university – many organizations” and “one department –

many organizations”. From the business side, it is “one organization – several universities”. There the spectrum is not so wide and depends on the business profile.

In the EU there is some research dedicated to graduates’ competences, to employers’ satisfaction with graduates’ qualifications, to the efficiency of UBC, etc. In Saint Petersburg as well as in Russia there is no systematic approach to research and studies of UBC. However, several aspects of UBC are analyzed by state Ministries and Committees, statistics centers, employment centers, HR and consulting companies, universities, individual researchers:

- The Ministry of Education collects information on graduates’ employment in all regions of the Russian Federation;
- Higher School of Economics carries out surveys within the framework of the project “Economics of education monitoring” for the Ministry of Education (all educational levels: pre-school, school, vocational education, higher education and continuing education);
- The Committee on Science and Higher Education carried out research on employers’ satisfaction with graduates’ competencies (vocational education) until 2015;
- Most of the universities collect information on their graduates’ employment;

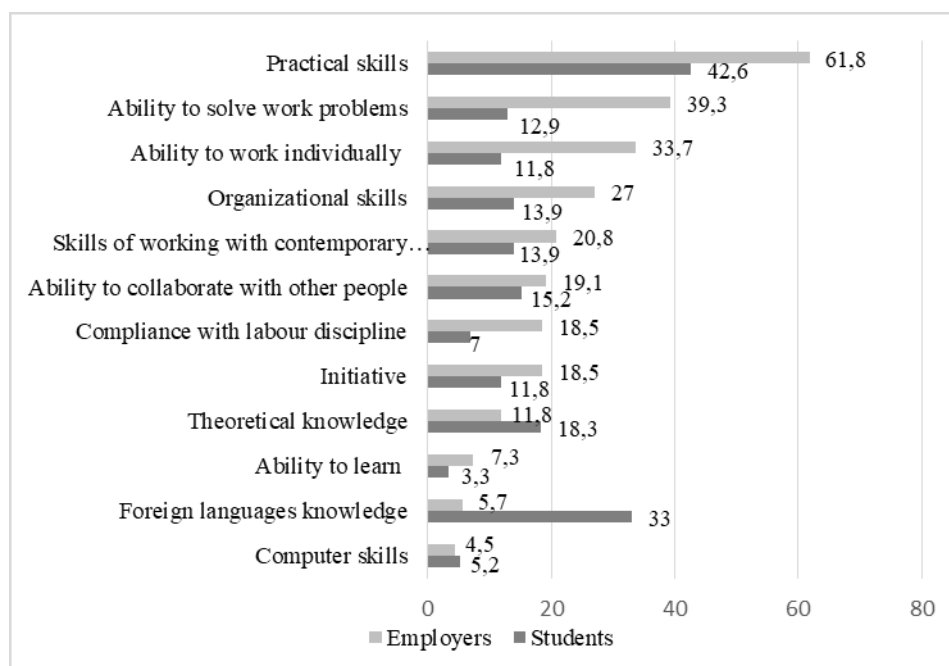


Fig. 2. The lack of skills for successful employment (percentage of respondents – employers and students; respondents could choose several answers)

- Ancor Company together with its partners annually publishes the results of the study on largest employers' companies from 15 significant sectors of the country's economy;
- The company PwC Russia provides annual reports and forecasted labor market analytics, etc.

The results of the survey (Rudakov, 2018) of the Higher School of Economics concerning graduates' competencies in comparison with labor market needs in Russia are presented in Figure 2.

As it is seen from the Figure, the students suppose that they mostly have a lack of practical skills (42.6% of respondents), foreign language knowledge (33%) and theoretical knowledge (18.3%). Employers agree that students lack practical skills (61.8%), but in two other cases they think absolutely the opposite (5.7% and 11.8%, respectively). Employers believe that students mostly lack the ability to solve work problems (39.3%), the ability to work individually (33.7%) and organizational skills (27%). This contradiction reflects one of the largest problems – the gap between graduates' competencies and employers' expectations – which can be solved only by the close cooperation of business and HEIs.

4. UNIVERSITIES' BUSINESS PARTNERS

For successful training of future specialists, it is important to give them an opportunity to get acquainted with the production and business processes of real companies from the first years of study. In order to provide students with professional practice, universities look for partner organizations in business. Leading universities in Saint Petersburg have career centers that help students find professional internships. Moreover, universities keep in touch with their alumni. All the universities have a lot of business partners. The examples of partners of 4 universities are given below:

- Saint Petersburg State University of Economics (UNECON) cooperates with key partners, including banks, consulting and industrial enterprises, factories, etc. Moreover, each department has its own partners from business who usually participate in examinations and provide students with internships. Different positions – from a waiter and an operator to a manager and an administrator – are offered to students. Scholarships from commercial partners for the amount of 150 thousand rubles per month (1860 €) are paid in the university. The university's biggest scholarship partner is "Alfa-Bank", its' share in scholarships from commercial partners is 2/3. VTB Bank pays to some students of the university the allowance of 300 thousand rubles (3 737 €) per year. Usually, this is 30,000 per person. The allowance is paid on one occasion only (UNECON Career Centre, 2018);

- Saint Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University) cooperates with Russian and foreign companies such as Sberbank, Dr.Sc. Web, Veem Software, Ariston, Luxoft, PG, EY, Afanasy Group of Companies, Deutsche Bank Technology Center, Bosch, Biocad, Laser Center, Siemens, Alfa Bank, MTS, Kronstadt Group of Companies and many others. With these and other employers, the Center regularly conducts joint events: presentations, seminars, workshops, trainings, business games, etc. (ITMO Career Centre, 2018);
- The biggest university in Saint Petersburg, Saint Petersburg State University (SPbSU) cooperates with such big companies as Intel and Yandex. Motorola provides SPbSU's students with internship opportunities together with Exigen Services. The best students might be sent for an internship in BHB Billiton (Babelyuk, Solovyeva, 2018, p. 95).
- National Research University "Higher School of Economics" (HSE) cooperates with such companies as Microsoft, IT-Online, Sinergy Innovation, Intel, Pay-Online, Coca-Cola, EY, MTS, English First, CityGroup, SAP, McKinsey and many others. Twice a year a Career Day is held at HSE to provide students with actual job and internship opportunities. Also students can always check current job proposals on the HSE Career Center website. The association of alumni also supports the university both financially and by vacancies and participation in events (Denezhkina, Posshkov, Shcherbin, 2016, p. 154).

The modern model of UBC is clusters. In Saint Petersburg there are 13 clusters focused on IT, energy, transport, medicine, environment-friendly technology, etc.

5. UBC IN THE FIELD OF EDUCATION

In accordance with requirements from the Ministry of Education, business representatives participate in the examination process at Russian universities. Universities attract public authorities or representatives from small or big companies to participate in the work of examination commissions. Thus, universities increase the competitiveness of their graduates, and employers have an opportunity to assess the level of their professionalism and invite the best of them to their organization. For example, in order to test the professional competences of graduates more than 1,550 business representatives took part in examination commissions at Saint Petersburg State University in 2017.

5.1. Curriculum development and the creation of special departments

Another form of UBC is business participation in education programs' development. Employers are invited to share their opinion and give their recommenda-

tions during the process of education programs' development. This is a good opportunity for universities to integrate real business practices into educational programs to form the required competences for students. In Saint Petersburg there are currently not many applied master's programs, most of them are academic. This determines the importance of developing practice-oriented programs. For example, in Saint Petersburg State University of Economics (UNECON) the master's degree program "Management of industrial enterprise resources" was created by a network of 11 partners of the University – industrial enterprises, Russian and foreign universities and research centers. During the preparation of the program, an agreement on the cooperation between SPbSUE and PJSC "Svetlana" was signed. The network applied master's program "Management of industrial enterprise resources" is aimed at forming industrial enterprises' management capable of solving tactical and strategic tasks. The program's competencies in organizational, managerial, analytical and research activities allow graduates of the program to cope with problems in management and the rational use of all types of resources in Russian and foreign industrial enterprises. The program is unique because HEIs of the north-western region of Russia do not currently have such educational programs. This, along with the high relevance for the labor market, as well as the availability of requests from a number of partner enterprises (PJSC "Svetlana", JSC "Zvezda Energetika" and OJSC "MZ Arsenal", "Izhorskiye Zavody", shipbuilding enterprises of the Russian Federation, etc.) allow us to assume significant development prospects and demand for the program. The program is planned to launch in 2019 (Vetrova, Bobrova, 2018, p. 118).

The initiative to create an educational program may come not from universities, but from the real sector, which is interested in forming graduates' competences in accordance with business specificity and the level of enterprises' development. One of the most progressive enterprises in the field of UBC is JSC "UEC-Klimov". JSC "UEC-Klimov" is a leading Russian designer of gas turbine engines for military and civil aircraft. The gap between the quality of graduates' education and the required parameters led a few in the management of the enterprise to organize research aimed at forming a graduate competency model. On the basis of the created model, two HEIs of Saint Petersburg (Peter the Great Saint Petersburg Polytechnic University and Baltic State Technical University "VOENMEKH") developed new educational programs. Moreover, in Peter the Great Saint Petersburg Polytechnic University and Baltic State Technical University "VOENMEKh" special departments of JSC "UEC-Klimov" were created. More than 100 students currently study in these departments. Interaction with students begins in their first year with an introduction to a profession and a potential place of future work. All students have internships in the enterprise under the guidance of managers and leading specialists. The topics of graduation theses are coordinated or proposed by JSC "UEC-Klimov" and related to the real tasks in the industry. In cooperation with universities JSC "UEC-Klimov" is developing reference books and training manuals for students. In these books real cases from the enterprise are proposed (Ilina, 2018, p. 163).

The energy company “Gazprom” also has its own specialized department that opened in 2014 in UNECON. The department is engaged in scientific research in the interests of the company, the development of master's programs for the training of specialists for various departments of Gazprom as well as specialists who will work on the pipeline “Power of Siberia”. The department supervises all post-graduate students who write a PhD dissertation on a topic relevant to Gazprom (The department of Gazprom in UNECON is open, 2014).

5.2. Contests from business partners

Business partners of the National Research University “Higher School of Economics” organize contests for students. The themes of the contests are diverse: entrepreneurship, software development support, innovative activities, consulting, finance, art and even beauty contests. The following are possible prizes offered to students: both short-term and long-term courses, including international ones, sums of money – from 50 to 100 thousand rubles, internships in companies, consultations with experts, grants for their projects’ implementation, laptops and smartphones.

Professional contests or case-championships organized by employers in cooperation with universities also might be considered as an alternative way for students to obtain practical experience.

For example, UNECON actively participates in three significant contests (Denezhkina, Posshkov, Shcherbin, 2016, p. 161):

- The Young Tax Professional of the Year competition is organized by the company EY. It takes place in two stages. The winners of the first national stage go to Amsterdam to participate in the second international stage. The award for the first place is a 30-day world trip.
- The AKIG Group of companies supports scientific competition. The winners are given the opportunity to participate in internships as well as in paid educational programs for 50, 100 and 150 thousand rubles.
- UNECON also participates in the Positive Hack Days forum, organized by Positive Technologies. Sponsors of the forum are Kaspersky Lab, ICL and Club-Mate.

Students’ achievements are an important indicator of the quality of education of Saint Petersburg’s HEIs. According to global scientific and economic trends, the IT-sphere has become increasingly important nowadays, that is why IT-graduates are in high demand on the labor market. In this regard, ITMO-University and Saint Petersburg State University deserve special attention. In 2017 they participated once again in the International Collegiate Programming Contest (USA). The team from ITMO- University came in first place and got a gold medal, while the team from Saint Petersburg University took the 4th place (the first place winner from 2016) and a gold medal (the total number of participants was 46,000 students from

3,000 universities from 103 countries) (http://news.ifmo.ru/ru/university_live/achievements/news/6682/). It is worth noting that teams from Russian universities started to participate in this contest in 1993 and since then they have won 12 times (11 of them were teams from HEIs in Saint Petersburg). This demonstrates that Saint Petersburg is the world leader in STEM and particularly in IT education.

6. UBC IN R&D

Cooperation in research and development activities is a huge field for collaboration between universities and business because it includes a resource base, scientific potential, and personnel reserve. While in European countries this is one of the main trends of UBC, in Russia it is not developed enough. Joint research increases the efficient use of resources and the competitiveness of universities and business.

UBC in R&D is divided into stages of work presented in Figure 3. Commercialization is the final stage of R&D. It is a transfer of R&D results to production. Therefore, in HEIs with a high level of R&D, outsourcing from companies in R&D is one of the main incomes of the university and scientists.

In Saint Petersburg and the whole of Russia, the leaders in R&D are technical HEIs. Saint Petersburg National Research University of Information Technologies, Mechanics and Optics (ITMO University) is one of the leading innovative infrastructures in Russia. In 2016 the budget of the university's R&D activities was 2.34 million rubles (around 30000 euro). The top research fields at the university are (Results of R&D in ITMO University, 2016):

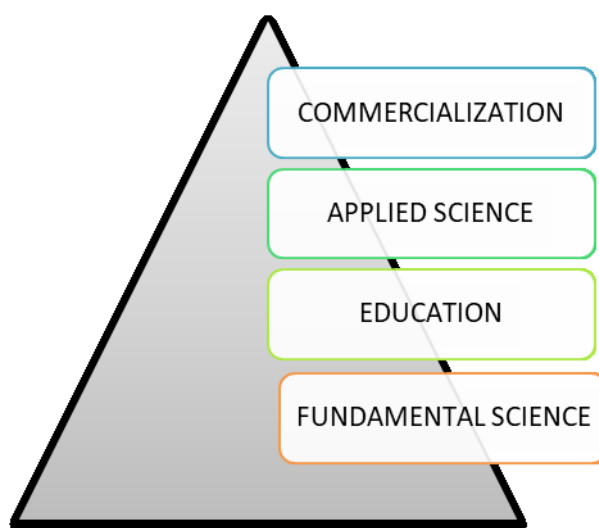


Fig. 3. Stages of UBC in R&D

- IT and Information Security;
- Smart Technologies and Robotics;
- Photonics and Quantum Communications;
- Life Sciences and Translational Medicine;
- Natural Sciences and "Smart Materials";
- Art & Science and Lighting Design;
- Ecology and Urban Science.

In 2016 398 R&D projects were realized in ITMO University by 13 international research centers that unite local and international scientists, graduate, postgraduate students and postdocs. ITMO University actively works with the Development Funds, the Ministry of Education and Science, the Ministry of Industry and Trade and other specialized funds for attracting financing: it allows subsidizing up to 50% of the partner company's expenses for R&D (Results of R&D in ITMO University, 2016).

In the period of 2014-2016, ITMO's customers of scientific research were the world's leading companies: Boeing, Ford Motor Company, LG Electronics, Vienneghien cuu dien tu tin hoc vo tu dong (China), DESY (Germany), EMC International Company (UK), FMC Technologies (Norway), Huawei (China), KITECH (Korea), Laapeenrante University of Technology (Finland), Norwegian University of Science and Technology (Norway), Philips Healthcare (Netherlands) (Results of R&D in ITMO University, 2016).

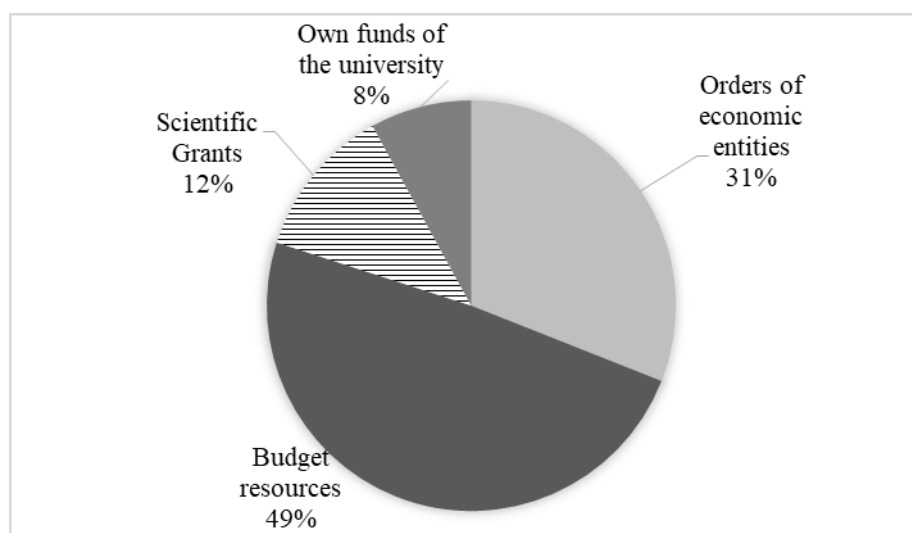


Fig. 4. Structure and scope of scientific research at ITMO University in 2016 (Results of R&D in ITMO University, 2016)

Another example is Peter the Great Saint Petersburg Polytechnic University. The Polytechnic University is a large multidisciplinary research center that holds leading positions in Russia and the world in several scientific areas.

Infrastructure of innovation activity consists of the following units (Science in Peter the Great Saint Petersburg Polytechnic University, 2018):

- Research Planning Office is responsible for informational, analytical and organizational support to developing the University's research activity. The Office comprises:
 - a) Planning sub-office;
 - b) Dissertation Board sub-office;
 - c) Sub-office for scientific conferences and seminars;
 - d) Sub-office for young scientists' development;
 - e) Office of scientific periodical journals.
- Polytechnic Technology Park comprises:
 - a) Intellectual Property Department;
 - b) Business incubator "Polytechnic";
 - c) Center of Youth Technical Creativity" (Fab Lab Center).
- Office of Audit in Research and Development comprises:
 - a) Sub-office for participation in R&D competitions;
 - b) R&D monitoring.

Joint Institute of Science and Technology (JIST) is a new form to organize research, innovative and industrial activity. JIST's main purpose is to foster the launch of research works and positioning the university specialists onto the market.

The University is involved in several projects in the field of high-tech production funded by the Ministry of Education and Science of the Russian Federation (Science in Peter the Great Saint Petersburg Polytechnic University, 2018):

- In cooperation with JSC Rocket and Space Corporation "Energia": the project "Creation of high-tech production of high integration functional modules for robotic space systems, as well as special and general civilian applications". The total budget of the project is 300 million rubles (around 3.8 million euro).
- In cooperation with ATC-"Semiconductor Devices": the project "Development and organization of serial production of a high-tech complex for the diagnosis, prevention and treatment of oncological diseases of various localizations by photodynamic therapy". The total budget of the project is 20.1 million rubles (around 256627 million euro).
- In cooperation with LLC "IBS Expertiza": the project "Creation of a Russian counterpart of the system software for the centralized management of personal mobile devices and platforms in corporate networks". The total budget of the project is 285 million rubles (around 3.6 million euro).
- In cooperation with ATC-"Semiconductor Devices": the project "Development and organization of production of medical diagnostic dental laser complex". The total budget of the project is 28.8 million rubles (around 359277 euro).

Within the framework of scientific activity, the university actively cooperates with large enterprises, organizations and institutions – leaders in the relevant industries: OJSC Kirovsky Zavod, OJSC Proletarsky Zavod, SUE Admiralty Shipyards “JSC” Baltic Shipyard, “OJSC” “Severnaya Verf”, JSC “Center for Shipbuilding and Ship Repair Technology”, JSC “LOMO”, JSC “Zvezda”, OAO Klimov, PJSC “Severstal”, and many others (Science in Peter the Great Saint Petersburg Polytechnic University, 2018).

Nowadays all educational programs include internships. The specifics of doing business do not always allow a large number of students to get access to quality practice in the enterprise itself. Therefore, universities are looking for new ways of interaction with employers.

Since 2013 a new format of conducting practice has been tested at the Higher School of Technology and Energy of the Saint Petersburg State University of Industrial Technology and Design (HSTE SPbSUITD). This format is called “The innovative weeks” (Tereshkina, Atrushkevich, 2018, p. 185).

The innovative weeks is based on the European experience of Lillebelt University of Applied Sciences (Odense, Denmark) and the University of Applied Sciences (Tampere, Finland). From 2013 to 2015 Innovative weeks were held in the Nordic countries. They demonstrated a high efficiency of this form of training.

In the beginning, the students of HSTE SPbSUITD were observers and participated in project teams during the innovative weeks in Finland and Denmark in order to adopt the European experience. The innovative weeks were modified in accordance with the specifics of the educational system in Russia and the national mentality. As a result, the format of the innovative weeks was included in the curriculum of Management program. Business representatives who participated in the project were satisfied with the solutions offered by students. A number of students were provided with places for practice and further employment (Tereshkina, Atrushkevich, 2018, p. 186).

As the examples show, technical universities have many industrial and business partners with which they realize joint projects. Some of the projects are funded by the Russian government. However, UBC in R&D is not developed enough for universities’ humanities and social sciences departments.

Creation of Technoparks and Incubators on the basis of universities is one of the main trends in Russia. It gives students an opportunity to obtain the experience of doing business as well as to test their ideas, attract potential investors and create new competencies. Technoparks and startups established on the basis of HEIs are supported by the government through specialized programs and funds.

The infrastructure for supporting innovations has been formed in Saint Petersburg (Investment portal of Saint Petersburg, 2018):

- Clusters’ Development Center (1);
- Clusters (13);
- Technology Transfer Centers (7);
- Innovation Technology Centers (12);

- Technoparks (14);
- Business Incubators (4).

The Clusters' Development Center was established in 2014 to support and coordinate all the clusters in Saint Petersburg. In 2015 there were 9 clusters, 38 joint clusters' projects, over 430 companies with more than 61,000 employees. In 2018 there were already 13 clusters, 631 companies, 104 projects (Technopark of Saint Petersburg, 2018).

Technopark of The Electrotechnical University «LETI» is the oldest technopark in Saint Petersburg. It has been operating for 25 years. Presently, the technopark unites 44 small innovative enterprises operating in the priority directions for the university (in accordance with the volume of science-intensive products) (Fig. 5).

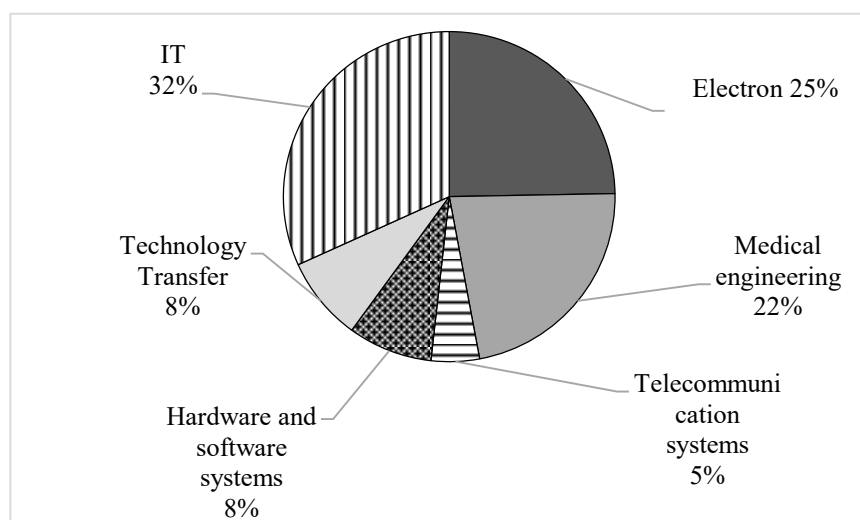


Fig. 5. The profile of the technopark LETI

The total profits from selling scientific and technical products in 2016 was 1 208 million rubles (94 million euro). Startups of the technopark as independent legal entities introduce the results of university development to the market, improve the educational process and contribute to the growth of university staff qualifications (Infrastructure of "LETI" technopark, 2018).

In order to promote the development of small and medium science intensive enterprises, Innovation Technology Centers have been developing since 2005. For example, The Innovation Technology Center of Saint Petersburg State Mining University unites more than 200 resident companies with total turnover of more than 1 billion rubles (77.5 million euro). The number of specialists in science-intensive fields is more than 2500 people (Committee on Science and Higher Education, 2018).

7. EMPLOYMENT OF GRADUATES

One of the most important indicators of the efficiency of UBC is the employment of graduates in the first year after graduation. The Ministry of Education and Science of the Russian Federation collects this data and publishes reports on employment of graduates in all regions of Russia.

Table 1. Employment and unemployment rates of graduates in federal districts of Russia in 2016 (Ministry of Education and Science of Russian Federation, 2017)

Federal districts of Russia	Employment rate	Unemployment rate	Threshold requirement
Ural	80%	20%	75%
Volga	79%	21%	75%
Northwest	79%	21%	70%
Saint Petersburg	78%	22%	70%
Central	76%	24%	70%
Siberia	76%	24%	70%
Moscow	74%	26%	65%
Far East	73%	27%	70%
South	70%	30%	65%
North Caucasus	52%	48%	45%

As can be seen from the table, Saint Petersburg has a high employment rate: 78% of all graduates are employed and 3-4% of them are individual entrepreneurs.

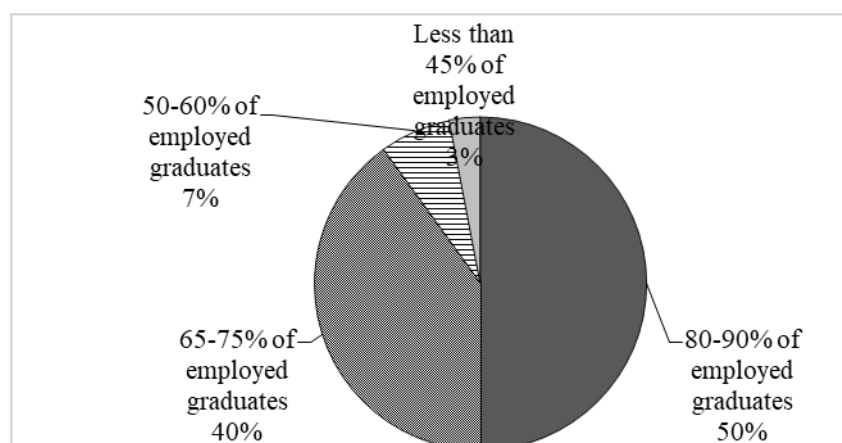


Fig. 6. Employment rates at universities in Saint Petersburg (first year after graduation) (Ministry of Education and Science of Russian Federation, 2017)

As can be seen from the diagram, 50% of all universities in Saint Petersburg have a high employment rate of their graduates. Most of these universities are specialized (Saint Petersburg State Chemical Pharmaceutical Academy (SPCPA) – 90%; Emperor Alexander I Saint Petersburg State Transport University – 90%; International Banking Institute – 90%; Saint-Petersburg Medico-Social Institute – 85%).

Most of the universities in Saint Petersburg have a high employment rate. That demonstrates that their graduates are in demand on the labor market. However, in some universities the rate is 50% or lower. This is most typical of Art and Design universities and could be explained by the low need for such specialists in Saint Petersburg. Moreover, some graduates (especially graduates in Art, Design and Foreign Languages) prefer working for themselves without official registration as an entrepreneur. Consequently, formally they are unemployed, but in reality they are not.

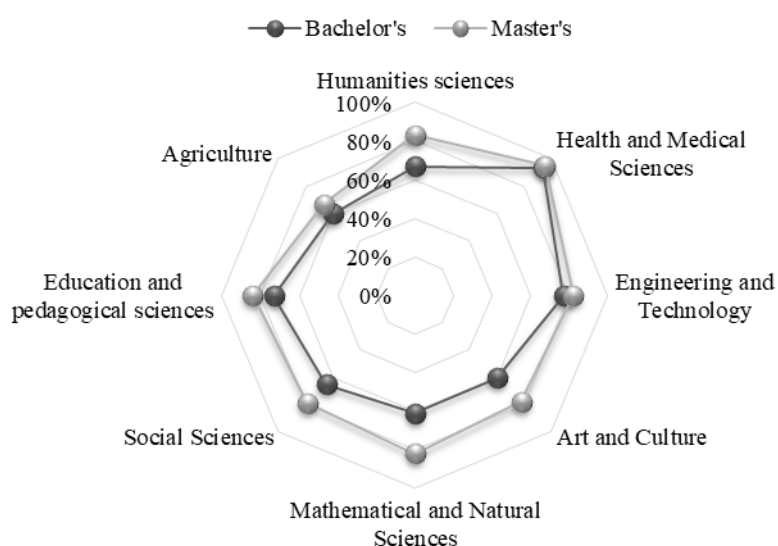


Fig. 7. Employment rates of graduates in Saint Petersburg by fields of study in 2016 (Ministry of Education and Science of Russian Federation, 2017)

As the graph shows, in almost all fields of study the graduates of a master's degree program have a higher employment rate than the bachelor's graduates. Only in Health and Medical Science as well as in Engineering and Technology the level of education does not play an important role in the case of employment. Excluding the graduates of Agriculture, 80% of master's graduates in different fields are employed. The lowest employment is in the fields of Art and Culture, Agriculture, Mathematical and Natural Science.

According to the Federal State Statistics Service of Russian Federation, there are the following trends on the Russian labor market (Federal State Statistics Service of Russian Federation, 2017):

- nearly 60 percent of Russians are employed in fields unrelated to their academic degree;
- while 45% of wage-earners work in the field of their major, among self-employed people only 27% have a job corresponding with their major. The worst situation is for those who are engaged in a family business. There, an academic degree is useful only for 12%;
- 80% of graduates are employed in the first year after graduation, 9% cannot find a job at all, and 33% cannot get a job related to their academic degree.

One of the reasons of the inability to find work related to academic degree could be the fact that the number of graduates of some majors is much higher than the real demand for them on the labor market. For example, lawyers and economists are 10 times more numerous than the market needs, while there are not enough specialists in the fields of IT, science and health. Another reason is that during the study and participation in professional internships students understood that they are not satisfied with the field of study they have chosen. Therefore, they change it after graduation. This situation is especially typical for Tourism and Hospitality.

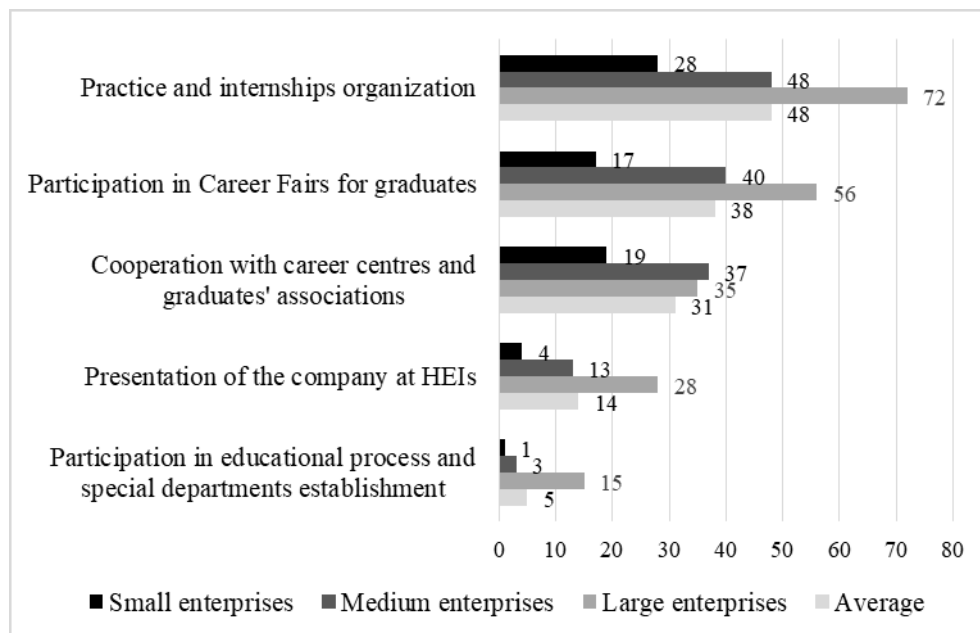


Fig. 8. Forms of UBC for graduates' employment (percentage of companies searched for graduates) (Bondarenko, Lysova, 2016)

These tendencies reflect some changes in the universities: the number of tuition free places for economic and humanities degrees is decreasing and at the same time the number of technical degrees is increasing.

The paper would be incomplete without analysis of the forms of UBC used by companies for graduates' recruitment. Figure 6 is based on a survey carried out in 2015 by the Higher School of Economics.

The analysis is based on the answers of 1019 top managers of Russian companies from 6 sectors of the economy: industry, communications, construction, transport, trading and business services. SMEs and large companies prefer different forms of cooperation with HEIs when searching for potential highly qualified employees. Large enterprises are active in all forms of UBC. The biggest part of large enterprises (72%) organizes internships for students to select the most appropriate form. More than half (56%) participate in Career Fairs. Medium enterprises along with large enterprises cooperate with career centers and graduates' associations. Participation in the educational process and the creation of special departments are the least developed form (5% on average). This means that the level of UBC in Russia is low and it is essential to develop it.

8. CONCLUSION

It is important to emphasize that UBC is very important for the knowledge economy in Russia and in Europe. The existing big gap between the competences the employers expect and the knowledge of graduates could be decreased only by increasing UBC with the support of the government. For this purpose, many strategies and programs developed by governmental institutions involve this aspect as a significant component of national economic growth.

Saint Petersburg is one of the most attractive cities in Russia for both Russian and foreign students. HEIs rankings show that Saint Petersburg's universities provide a high quality of education and have great potential. The universities are involved in scientific and innovative activities.

In conclusion, the following statements are applicable for UBC in Saint Petersburg.

- There is a lack of research on UBC in Russia.
- Most models of UBC that exist in Europe are presented in Saint Petersburg.
- The models of UBC in Saint Petersburg are not developed equally. Such types of interaction as business participation in education programs' development, sponsorship of projects within educational institutions, innovation entrepreneurship are not common for HEIs and business in the city.
- There is a lack of cooperation in the humanities and social sciences fields of study.

- The efficiency of higher education in Saint Petersburg can be seen from the high employment rate of recent graduates. However, while employment of graduates of technical universities is 85-90%, the lowest employment rate is among graduates of art and design universities as well as the ones from some commercial universities.
- The majority of people in Russia (60%) are employed in fields unrelated to their first academic degree. This indicator is even higher for individual entrepreneurs.
- The quality of education is highly appreciated by employers. In the meantime, it is necessary to work closely with key partners in the fields of education, scientific research and entrepreneurship.

Universities, employers and governmental authorities are interested in graduates with good professional experience, key competences and skills. Consequently, only by working together can they achieve the common goal.

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WSPÓŁPRACA UNIWERSYTECKO-BIZNESOWA W SANKT PETERSBURGU

Streszczenie

Artykuł poświęcony jest aktualnym trendom we współpracy uniwersytecko-biznesowej (UBC) w Rosji na przykładzie Sankt Petersburga. UBC odgrywa ważną rolę dla sukcesu wszystkich interesariuszy procesu: uczelni wyższych, studentów, pracodawców i rządu. Bieżące kontakty między uczelniami a pracodawcami pomagają osiągnąć wysoką jakość w edukacji, a także zmniejszyć lukę w oczekiwaniach dotyczących jakości kompetencji i wiedzy absolwentów. Korzyści dla interesariuszy przedstawiono w artykule. W Sankt Petersburgu znajdują się 72 uczelnie i jest to jedno ze 100 najlepszych dla studentów miast na świecie. Niektóre uniwersytety w Sankt Petersburgu mają wysokie pozycje w rankingach rosyjskich i światowych. Wszystkie uniwersytety są zainteresowane rozwojem współpracy z pracodawcami. Przeanalizowano modele UBC w Sankt Petersburgu i podano przykłady każdego z nich. Jednym z najważniejszych wskaźników skuteczności UBC jest zatrudnianie absolwentów. Obecny stan UBC w mieście ocenia się, analizując wskaźniki zatrudnienia absolwentów.

Słowa kluczowe: współpraca uniwersytecko-biznesowa, Sankt Petersburg, uczelnie wyższe, strategia 2020, strategia 2030, interesariusze, kompetencje absolwentów, szkolnictwo wyższe, jakość edukacji, badania i rozwój, stopa zatrudnienia