

ON COOPERATION OF THE UNIVERSITIES OF DIFFERENT COUNTRIES WITH COMMERCIAL ENTERPRISES AND LEGAL ASPECTS OF THEIR JOINT INNOVATIVE ACTIVITIES

*ANNA ANISIMOVA**

INTRODUCTION

It is known that a country's development is determined by the level of its scientific growth. First-class science cannot exist in all countries; moreover, it cannot be presented in all regions of developed ones. Science cannot be created by mechanical or artificial means alone, even if the set of all necessary elements (buildings, facilities, equipment and even people with scientific degrees) is provided. Today in Europe, Russia and the USA the model of the research university fulfills the function of producing new scientific knowledge. Technology transfer and scientific departments, which coordinate the scientific activity of techno parks and business incubators, are the main preconditions for such kinds of universities to function. These centers became a forge for new researchers in different spheres, and these centers' task is to solve the financial problems arising from their innovative scientific activities. Therefore, the perspective of this paper is a comparative analysis of research universities' activities and possible means of commercialization of investigation results according to current legal regulations. The most salient goals can be formulated as follows: consideration of universities' research activity in different countries in terms of their cooperation with private enterprises, and definition of the role of business centers, industrial parks, business incubators and all kinds of research labs in such cooperation; familiarization with examples of innovative scientific research by universities; study of the law relating to intellectual property.

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* Anna Anisimova, PhD candidate, Irkutsk State Technical University, Faculty of Business and Management, Institute of World Economics; anisimova_av_83@mail.ru

I. STANFORD UNIVERSITY, USA

We begin with Stanford University and its innovation center «Silicon valley», which appeared nearby the university as it started searching for means of financing due to reductions in government investments in science. New agencies and departments were created in many states. Their task was to develop cooperation between scientists from state research universities and businessmen.¹ Financing programs for relevant activities were put into effect in 13 states. The cost of investments in many of them were shared between businessmen and state governments.

Silicon Valley is distinguished by its great density of high-tech companies dealing with the development and manufacture of computers and their components, particularly microprocessors and software, mobile devices, biotechnology, etc. The emergence and development of the technology centers is related to the concentration of leading universities in large cities less than an hour's travel away, and also with the search for funding of new companies. Despite the creation of a number of other innovative clusters in the U.S. and other countries, Silicon Valley remains the leading center of this kind and receives one-third of all venture capital investment in the USA.²

One of the key moments in the Valley's development was the creation of Stanford Industrial Park. The institution leased 32 hectares of land belonging to it and began receiving income from land rental and lease, and the companies were able to use leasing services. Putting restrictions on leases for high-tech companies helped to solve one of the major problems of the university: Stanford alumni had the opportunity to find work in the immediate vicinity of their alma mater. Companies' problems connected with the search for highly-qualified professionals were solved.

The then-head of the industrial park, Frederick Terman, advised his students to establish companies around the university. He served, in particular, as a mentor to Hewlett and Packard, who founded the company known as Hewlett-Packard (HP).³ Varian Associates (inventor and manufacturer of klystrons) was the first company that moved in Stanford Industrial Park. Soon the offices of Eastman Kodak, General Electric, Shockley Semiconductor Laboratory, Lockheed, Hewlett-Packard and many other companies have also opened their businesses there. Terman is referred to as one of the 'fathers of Silicon Valley'.⁴

The experts recognized that for the new authorities' initiative to succeed a number of legislative acts should be repealed and new ones be adopted. For example, in 2001 in Texas a law was passed allowing state universities to create new companies for research on campus and to own shares in the capital of other companies. A similar law was passed in 2000 in

¹ 'Silicon Valley Archives' <<http://svarchive.stanford.edu/main.html>> accessed 29 July 2011.

² 'Silicon Valley History' <http://www.netvalley.com/silicon_valley_history.html> accessed 3 December 2011.

³ 'HP history' <<http://www8.hp.com/us/en/hp-information/about-hp/history/history.html>> accessed 30 July 2011.

⁴ Aleksandr Avseev, 'Kak zarozhdalas Silikonovaya dolina. Sostavnie chaste I dvizhushie sily innovazionnogo proryva' <http://www.chaskor.ru/article/kak_zarozhdalas_silikonovaya_dolina_18144> accessed 27 July 2011.

Ohio. A hindrance to commercial activities by state research universities could be the prevailing laws on freedom of information, as they forced universities to disclose details of their research. Almost half of the states passed amendments to such laws, under which universities were granted the right to keep portions of such information from the public. In Oregon, an amendment to the constitution was adopted to allow universities to receive a share of capital in new companies as compensation for technological development. In Oklahoma, an amendment of a similar nature was adopted to provide private companies with access to university research.

These legislative amendments were supported by many entrepreneurs and leaders of public research universities, who were able to revise restrictions on the use of staff time so that professors could legally participate in commercial trials. In addition, governments supported the creation of universities, venture capital funds for investment companies that were 'grown' out of their laboratories, business incubators and research parks on campus. Many of the initiatives were a response to technological changes and structural shifts in the economy. Finally, impulses to the commercialization of scientific research also came from public research universities, whose activities - in particular the ability to attract talented scientists - were increasingly dependent on research income. In most universities commercial research was not only allowed, but also welcomed.⁵

The Bayh-Dole Act, adopted in the United States in 1980, revolutionized the American technology industry. It forced universities to patent their research results and carry out their commercialization. The adoption of the Bayh-Dole Act in the U.S. was followed with a surge in innovation, as it allowed not only passing intellectual property created with federal funds to universities, but also the exclusive licensing of inventions which was the key to their commercialization. This integrated approach has yielded positive results.⁶

While the Bayh-Dole Act has to do with property rights and the commercialization of inventions created at the expense of government funds in universities, the Stevenson-Wydler Technology Innovation Act defines the property rights for inventions created through process of collaborative research between private companies and government laboratories. The basic principle of this law is to enable the creation of closer ties between laboratories owned by the federal government, conducting fundamental research, and private industry on the grounds that such links will be beneficial to both sides. The cornerstone of the Stevenson-Wydler Act is a cooperative research and development agreement (CRADA), which defines the conditions of joint activity between a federal government laboratory and a private enterprise.⁷

⁵ Galina Semeko, 'Tendenzii razvitiia gosudarstvennih issledovatel'skikh universitetov v SSHA' (2005) 5 *Ekonomika obrazovaniia*. See also: Schmidt, 'State push public university to commercialize research' (2002) 29 *The chronicle of higher education*.

⁶ 'Bayh-Dole Act Law & Legal Definition' <<http://definitions.uslegal.com/b/bayh-dole-act/>> accessed 3 December 2011.

⁷ 'Technology Transfer: The History. Stevenson-Wydler Technology Innovation Act' <<https://ipo.llnl.gov/data/assets/docs/TechTransfer.pdf>> accessed 3 December 2011.

The Bayh-Dole and Stevenson-Wydler Acts were intended to establish the intellectual property rights to property which was created by government funds, and moreover to inject inventions resulting from government funding into economic circulation. These laws call for the expansion of cooperation between research institutes, universities and laboratories engaged in basic research, on the one hand, and the domestic industry on the other hand. The purpose of this action is not to "trap" the results of the research in the laboratories, but to make them available for active use as an economic resource to promote economic growth and competitiveness of U.S. industry.

II. TECHNICAL UNIVERSITY OF BERLIN, GERMANY

Next, we consider the Technical University of Berlin⁸ (Germany), which positions itself as a producer of services for regional and interregional innovation systems. The service of knowledge generation and its transfer to the customer are given pride of place, as the most valuable capital is the knowledge that forms the basis for innovation. The ability to develop new knowledge and transfer it to business is not sustainable in and of itself. The quality of transmission of scientific knowledge, skills and new ideas into the economy should be a major determinant for innovation. Economic growth, job creation and, thus, the welfare of society depend on these elements. Therefore, scientific research should not be separated from the world economy. Every idea, its development and effects are related to the economy. This cooperation is manifested in a variety of university partnerships with businesses.⁹

In addition, the University prepares highly-qualified specialists and managers for a globalized labor market, supplying them with innovative knowledge obtained via research in the framework of instruction at TU Berlin and its partnership with enterprises in the area of production practices. Innovation is the foundation for progress and material welfare for all. At present it is of importance that economy, science, politics and society as a whole cooperate and collaborate in many important spheres of social life, such as efficient energy use or environmental protection.¹⁰

In global competition the one who identifies markets quickly and is able to meet their needs will be the winner. These benefits are achieved by enterprises due to products and services based on complex, multidisciplinary system technologies. Innovation requires close cooperation between basic science departments of universities and scientific research on production facilities. In order to accelerate the development cycle of innovative products, we need a new organizational concept of cooperation. This can help technical universities, which will make a significant contribution to the economy by their scientific achievements. TU Berlin also solves this problem with its

⁸ 'Technische Universität Berlin' <<http://www.tu-berlin.de/>> accessed 29 July 2011.

⁹ 'Unsere Ziele' <http://www.wissensforschung.tu-berlin.de/menue/ueber_uns/parameter/de/> accessed 27 July 2011.

¹⁰ 'TU Berlin gründet „Innovationszentrum Energie“' <http://www.innovations-report.de/html/berichte/energie_elektrotechnik/bericht-99715.html> accessed 25 July 2011.

newly-established modern laboratories. Within the special framework program not only the scientists of the university but also specialists from enterprises carry out their research in order to create market-relevant technology systems. The main task is the development of application-oriented technological solutions for future key markets. The effect is achieved primarily through the general use of available resources. This stimulates interest from third parties, because the "innovative laboratory" offers a platform for joint research activities that can be also financed from state funds. At present 75 foreign scholars work in the innovation laboratory and are taking part in the creation of new technologies in such spheres as 'Intelligent Networks', 'Security', 'Transport and Mobility', 'Health' and others. This conception is the basis for the further strategic development of TU Berlin.¹¹

The ideas for research strategies and their practical applications involve not only students and graduate students, but also engineers willing to attend training. They have optimal conditions for expanding the planned range of activities, as well as opportunities to collaborate with foreign partners. Long-term research strategies, the accelerated transfer of knowledge from science to practice, as well as research close to the market are provided to generate more rapid development of technology. Here one deals with innovative ideas considered beneficial for all partners.¹² In addition, TU Berlin implements the results in more than 300 companies, thereby successfully putting knowledge into practice. The results of regular surveys show that the university has a great influence on the revival of regional economies. In these regions the increase in the profit and number of workplaces at companies is marked owing to the cooperation of companies with the TU. TU Berlin not only helps in creating employment opportunities at enterprises, but is also a scientific institution and one of the largest enterprises in the city.¹³

An excellent example of innovation and technology solutions is the cooperation between Siemens and the Technical University. In addition to the support of talented people, one of the main areas of cooperation with the TU Berlin is the initiation of research projects. The current range of cooperation covers such aspects as information and medical technology, energy and sensing. The main competencies taken from the spheres of economics and management, materials science, physics and mathematics improve the quality of research, and workshops on specific topics are the primary communication tool. Promotion of talented people is based on longstanding and successful cooperation of both partners in the Center of Scientific Management. Here, students and young scientists have the opportunity to present their reports and

¹¹ Kurt Kutzler, 'Wissenschaft als Partner der Wirtschaft. Innovationen beschleunigen: Innovative Labs' <<http://ebn24.com/index.php?id=27484>> accessed 29 July 2011.

¹² 'Wissens- und Technologietransfer' <http://www.tu-berlin.de/menue/forschung/wissens-_technologietransfer/> accessed 2 August 2011.

¹³ Kurt Kutzler, 'Wissenschaft als Partner der Wirtschaft. Wirtschaftsmotor TU Berlin' <<http://ebn24.com/index.php?id=27484>> accessed 29 July 2011.

exchange theoretical knowledge, which helps in solving practical problems. The research report is the main type of communication in the Center.¹⁴

Next, let us consider an example of cooperation of the TU Berlin with the Daimler concern, which has been working with the scientists from the Technical University in the sphere of automobile and information technologies via joint projects. They have established an information and communication center, which coordinates the research work of other educational institutions. Students and graduates of the technical university are a source of experts with additional qualifications in automobile and information technologies owing to the development of a new course in "Automotive systems". This includes such technologies as night display, navigation devices, telephone and radio, functions which help the driver on the road. Presently the partners (Daimler AD and three departments of the University) are working on a new project. The specialists and scientists are creating new hardware and software for the car of tomorrow. As in any project, there are risks here too. The increasing number of new devices in the car distracts the driver's attention from the road. The partners are exploring possibilities for reducing such problems.¹⁵

For closer cooperation between the TU Berlin and enterprises a facility known as the Innovation Centre has been founded. Its purpose is the development of technologies for further successful product distribution on the market, along with the financing of innovations. The Center performs the following tasks: promoting innovation through cooperation, communication, knowledge transfer, improvement and advisory activities, technological integration of current and future devices by means of horizontal and vertical integration. The implementation of innovation means the development, distribution and constant improvement of the product. In order to create innovation, its potential should be measured. An innovation contributes into the development of fundamental technologies and makes it possible to predict its future influence on market development. The Innovation Center is also involved in the introduction process of innovations and organization of exhibitions. It has significant technical infrastructure, such as the necessary testing laboratories where final decisions are taken. In this infrastructure companies can test their inventions according to the market requirements. The Innovation Centre stimulates cooperative enterprises and educational institutions to enhance the systemic use of technical models and their commercialization.¹⁶

In general, the professionalization initiative of technology transfer was the most important step in the evolutionary development of the commercialization process of research results in Germany, and also an initiative that came from research institutes to industry. In European practice

¹⁴ 'Center for Knowledge Interchange gegründet. Siemens und TU Berlin verstärken ihre Zusammenarbeit' <<http://www.pressebox.de/inaktiv/technische-universitaet-berlin-wissenstransfer-wtb/boxid/25811>> accessed 2 August 2011. See also: Kurt Kutzler, 'Wissenschaft als Partner der Wirtschaft. Strategische Kooperationen mit Industrieunternehmen' <<http://ebn24.com/index.php?id=27484>> accessed 29 July 2011.

¹⁵ 'Welcome at DCAITI' <<http://www.dcaiti.tu-berlin.de/>> accessed 2 August 2011.

¹⁶ 'Wissensforschung an der TU Berlin' <<http://www.wissensforschung.tu-berlin.de/>> accessed 2 August 2011.

the application of scientific and technological activities (transmission and consolidation of the rights to the distribution of total income from an application, etc.) is usually governed by special legislation, which is constantly evolving and improving. The main tendency of the European legislative revolution is liberalization of conditions and development of incentives for efficient use of scientific and technological activities. The German Patent Act, for example, contains the rules for employers and employees with respect to intellectual property rights, regardless of whether the employee is working in a private or public institution. The law says that an employee has to offer the invention to the employer. The employer has the right to accept or refuse it. If the employer takes the invention, it can be patented. If an invention is patented, it can be used, in which case the employer must split the revenues with the employee. In the event the employer refuses the invention, the employee has the right to use it at his/her discretion.¹⁷

Most European countries, as well as the European Union itself (e.g. the European Framework Program) provide a budget for research projects only in conjunction with the responsibility to disseminate the results. Valorization of knowledge (technology) - the transformation of knowledge (technology) into economic and social benefits through target actions is usually implemented with the help of state support (government intervention). For example, in Germany, the University Framework Law defines technology transfer as the main task for universities and research staff.¹⁸

In Germany in 1980 reforms were carried out and a law has passed that state research organizations may receive two-thirds of their income from commercialization without reductions to their budget. This reform was designed to encourage public research organizations to develop industrial technology and increase the competitiveness of the German economy more actively. A second reform was carried out at the end of 1990. The success of the adoption of "Bayh-Dole Act" in the U.S. served as an example for the introduction of similar legislation in Germany. In 1998, the state funding mechanism was changed. Institutions financed by the state received the opportunity to earn income from commercialization without reductions to their budget.¹⁹

III. UNIVERSITY OF WROCLAW, POLAND

Now we turn to the University of Wroclaw (Poland), which is one of the oldest universities in Central Europe. In 2002, it celebrated its 300th anniversary. Today it is a modern university. 40,000 students, doctoral and

¹⁷ 1998 German Patent Act (*Patentgesetz*) (FRG).

¹⁸ 'The Sixth Framework Programme' <http://ec.europa.eu/research/fp6/pdf/fp6-in-brief_en.pdf> accessed 3 December 2011.

¹⁹ Vladimir Ivanov, Svetlana Klesova, *Innovacionnoe razvitie i kommercializaciya tehnologij v Rossii i v stranah ES: opyt, problemy, perspektivy* (2006). See also: 'Laws, Directives, Guidelines' <http://www.tu-berlin.de/menue/about_the_tu_berlin/laws_directives_guidelines/parameter/en/> accessed 28 July 2011.

graduate students study in ten departments. The pride of the University are its Nobel laureates: Theodor Mommsen, Philipp Lenard, Eduard Buchner, Paul Ehrlich, Fritz Haber, Friedrich Bergius, Erwin Schrödinger, Otto Stern and Max Born.²⁰

Like other universities presented in this paper, the University of Wroclaw has a creative academic connection with enterprises in the country, such as through the 'Lower Silesian Incubator of Entrepreneurship'. This is a joint venture not only with the University of Wroclaw, but also the Wroclaw University of Technology, Agricultural University of Wroclaw and Wroclaw Technology Park. It was created for students, graduates and university staff from higher education institutions in Wroclaw and the Polish Academy of Sciences to enable them to apply their ideas on the basis of economic platforms and open their own businesses. The premises of the 'incubator' are rented for scientific research as well as tests by creative students, graduates, young teachers and employers of firms at low prices. This fact is very important for high-tech research, which is underfunded by the state. A cooperation agreement was signed in May 12, 2006, according to which 443 m² were allocated, equipped and renovated for scientific research.²¹

In addition to lower rents the Incubator provides the following benefits for research faculty, students and entrepreneurs along with those who want to conduct research:

'- Accessibility of laboratory equipment under the most convenient conditions,

- Close vicinity of other innovative companies,
- Organization and advisory services,
- Scientific and business aid,
- Support for transfer of newly-developed technologies,
- Comfort and safe business environment,
- Friendly surroundings,
- Advanced laboratory for diagnostics of physical, mechanical and electric characteristics,
- Laboratory of photochemical processes,
- Laboratory with low temperature, high pressure and vacuum

equipment,

- Laboratory and prototyping workshop of biotechnological processes,

- Laboratory and prototyping workshop of multimedia technology and transmission techniques,
- Photometric laboratory'.²²

The University of Wroclaw, Wroclaw University of Technology and University of Natural Sciences, acting through the Academic Incubators created in these schools, may receive investment from the entrepreneurs of the academic LSIE.²³ The mission of the 'Lower Silesian Incubator of

²⁰ 'University of Wrocław' <<http://international.uni.wroc.pl/en/s3.php>> accessed 28 July 2011.

²¹ 'Dolnośląski Akademicki Inkubator Przedsiębiorczości' <<http://www.technologpark.pl/sub.php?p=65&lng=pl>> accessed 28 July 2011.

²² 'Lower Silesian Incubator of Entrepreneurship' <<http://www.technologpark.pl/sub.php?p=71&lng=en>> accessed 28 July 2011.

²³ 'Dolnośląski Akademicki Inkubator Przedsiębiorczości' <<http://www.technologpark.pl/sub.php?p=65&lng=pl>> accessed 28 July 2011.

Entrepreneurship' is to be a place where ideas are turned into commodities of market value.²⁴

The next example is the 'Wroclaw Centre of Technology Transfer', which was established in 1995 within the framework of the EU and intended to assist in bridging the gap between universities and industry, as well as to establish scientific contacts with universities in other countries including Stuttgart (Germany) and London (England). Thus, the center was founded in response to the need for a link between science and economics. It is a self-supporting unit of the Wroclaw University of Technology, considered at the same time to be a non-profit organization. The main goal is improvement to the efficiency and competitiveness of produced products through innovation. It is aimed primarily at promoting the use of research in modern economies, as well as the creation and development of entrepreneurship in the broad sense.²⁵

The Center is a member of the Enterprise Europe Network - the world's largest infrastructure which brings together European business support organizations. As a result, small and medium-size businesses can get all the necessary services to fulfill their potential and develop innovative opportunities in one place.²⁶ In 1999 the Centre launched the Regional Contact Point for the EU Research Program, which enables the development of a more simplified model of participation of researchers and companies in research projects and the receipt of funds to implement these projects. Accomplishments of the WCTT in 1995-2010: more than 30,000 undergraduate and graduate students were trained, approximately 14 thousand hours of consulting were provided, nearly 350 applications to receive EU funds were submitted, approximately 250 technological inspections were held, over 60 contracts for the international transfer of technology were signed, and nearly 140 innovative enterprises were founded.²⁷

It was necessary to create a legal framework for intellectual property protection and for research and commercialization, as was done in other countries. The resolution introducing rules for the use of intellectual property № 79/2011, authored by the University of Wroclaw and submitted by its rector, came into force on June 30, 2011.²⁸ The document is designed to protect a creator's interests in intellectual property and the scientific achievements of the university. The rules include the right to patent and

²⁴ 'Misja i cele' <<http://www.technologypark.pl/sub.php?p=102&lng=pl>> accessed 28 July 2011.

²⁵ 'Wroclaw Centre of Technology Transfer' <<http://www.wctt.wroc.pl/page/wroclaw-centre-for-technology-transfer/>> accessed 28 July 2011.

²⁶ 'About the Enterprise Europe Network' <<http://www.enterprise-europe-network.ec.europa.eu/about/about>> accessed 5 December 2011.

²⁷ 'O WCTT' <<http://www.wctt.pl/page/o-wctt/>> accessed 27 July 2011.

²⁸ Zarządzenie Nr 79/2011 Rektora Uniwersytetu Wrocławskiego z dnia 30 czerwca 2011r. w sprawie wprowadzenia Regulaminu korzystania z wyników pracy intelektualnej powstałej w Uniwersytecie Wrocławskim. <http://bip.biuletyn.info.pl/php/strona.php3?bip=bip_uniwr&id_dzi=15&lad=c&id_zal=5602&id_men=46&id_dok=4586&powrot=1&slowo_szuk=&archiwum_szuk=&gdzie_szuk=>> accessed 5 December 2011.

control, division of property resulting from research between the employee and the university, and spin-off principles.²⁹ The rules are based on Polish legislative protection for intellectual property. This includes the Commercial Code and the Act on invention, the Act on trademarks, the Act on copyright and others. The country acceded to an agreement comprising part of the WTO's (1996) TRIPS (Agreement on Trade-Related Aspects of Intellectual Property Rights), which brought the significant changes in the legal protection of intellectual property rights (in particular, to the Act on copyright of July 2000.)³⁰ TRIPS - an international agreement constituting part of the documents establishing the World Trade Organization - establishes minimum standards for the recognition and protection of the core of intellectual property.³¹

The current legislation in Poland in the field of intellectual property rights protection corresponds to the TRIPS Agreement and EU legislation. Recently in Poland there have been significant changes in the legal field concerning the protection of industrial and intellectual property. They were intended to harmonize existing law with modern international standards and came as the result of international agreements signed by Poland. The most important current regulations now in effect are contained in the Copyright and Related Rights Act of 1994. Concerning the protection of inventions and utility models, Poland has signed the Washington Treaty, the Patent Cooperation Agreement (in force since 1990), Strasbourg Agreement Concerning International Patent Classification (1997), and for trademarks: The Madrid Agreement Concerning the International Registration of Marks (since 1991), Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks (since 1997), Vienna Agreement Establishing an International Classification of graphics characters (1997).³²

In Europe, the European Investment Fund (EIF) was found for protection of intellectual property, one of whose objectives is to encourage the creation of an innovative community based on knowledge. The European Investment Bank participates in this initiative via the European Investment Fund. EIF is a branch of the European Investment Bank, involved in supplying venture capital. It pays special attention to the development of small and medium-sized innovative enterprises established on the platform of the universities. EIF also manages a portfolio of guarantees on loans from the European Investment Bank, which operates more than 70 banks and financial institutions of the European Union. With capital of 2 billion Euro, the overall

²⁹ Regulamin korzystania z wyników pracy intelektualnej powstałej w Uniwersytecie Wrocławskim 2011

<http://bip.biuletyn.info.pl/php/strona.php3?bip=bip_uniwr&id_dzi=15&lad=c&id_zal=5602&id_men=46&id_dok=4586&powrot=1&slowo_szuk=&archiwum_szuk=&gdzie_szuk=> accessed 5 December 2011..

³⁰ Tatyana Cheklina, 'Opyt stran-chlenov WTO po zashite nazionalnih interesov na vnutrenem i vneshnem rynkah' (2002) 8 Mirovaya ekonomika i mezhdunarodniye otnosheniya 105.

³¹ Agreement on Trade Related Aspects of Intellectual Property Rights 1994 (TRIPS)

<http://commerce.nic.in/TRIPS_matter_amended.pdf> accessed 5 December 2011.

See also: TRIPS <http://www.wto.org/english/tratop_e/trips_e/trips_e.htm> accessed 26 July 2011.

³² Tadeusz Smuga and others, *Poland your business partner* (2008).

effect of the guarantee programs for loans is estimated at about 20 billion Euro in loans.³³

It should be noted that in the EU the conditions for scientific and technical activity are defined by applicable legislation, *i.e.* they are not the subject of contracts and agreements. The key conditions of scientific application and technological activities funded from the budget in European practice include the following:

- Responsibility for the commercialization of research results;
- Encouraging the participants of commercialization;
- Ensuring a “fair share” of income from commercialization of its key players (researchers and research organizations).³⁴

IV. IRKUTSK STATE TECHNICAL UNIVERSITY, RUSSIA

Lastly, we present the Irkutsk State Technical University, which is the easternmost national research university in Russia. More than 30 thousand students, postgraduates and doctoral students study there. The University actively cooperates with 150 leading industrial companies and engineering companies, including ‘Rosatom’, ‘NC Rosneft’, ‘Irkutskenergo’, and many others. The university is a member of the Russian Nuclear Innovation Consortium and houses the corporate training-research centers of ‘TNK-BP – Management’ and ‘Irkutskenergo’, whose main task is to provide industry with highly qualified staff in the Baikal region and to introduce scientific developments. Training according to the agreed additional educational programs allows companies to shorten the period of professional development and adaptation of young specialists by a factor of between 3 and 5.³⁵

The University is a leader in innovation in the region. The first Science and Technology Park in the Irkutsk Region, ‘Technopark ISTU NO’, was established. It includes 19 high-tech business enterprises (10 of which were established under Federal Law (FL) № 217³⁶), 12 IT-structures, a business incubator, technology transfer center and other structures.

The university develops the innovative development programs of state companies and creates technological platforms. 15 state-owned companies

³³ ‘European Investment Fund’ <<http://www.eif.org/>> accessed 27 July 2011.

³⁴ Nadezda Ermakova, ‘O kommercializacii tehnologij i zarubezhnom opyte v oblasti regulirovaniya prav na rezultaty nauchno-tehnicheskoy deyatelnosti’ (2009) 4 *Voprosy gosudarstvennogo i munitsipalnogo upravleniya* 17.

³⁵ Irkutsk State Technical University, *Kratkaya spravka Irkutskogo Gosudarstvennogo Universiteta* (2011).

³⁶ ‘Federalnij zakon Rossijskoj Federacii ot 02.08.2009 № 217-FZ ‘O vnesenii izmenenij v otdelnye zakonodatelnye akty Rossijskoj Federacii po voprosam sozdaniya budzhetnymi nauchnymi i obrazovatelnyimi uchrezhdeniyami hozyajstvennyh obshestv v celyah prakticheskogo primeneniya (vnedreniya) rezultatov intellektualnoj sobstvennosti’ (2009) 142 *Rossiyskaya gazeta*.

have decided to involve NO ISTU to implement innovative development programs.³⁷

At present 19 high-tech enterprises established by the university operate as a part of 'Technopark ISTU NO'. The 'Scientific Research and Design Institute - Mineral Processing Technologies' now plays the leading role. It has designed for the past 10 years and put into operation 22 mining and processing facilities, which have enabled an increase in Russian gold production by 10-12 tons per year (about 10% of the annual gold production of Russia). Another example of a successful high-tech company is 'Thermostat'. It specializes in the development of nano-structured planar heating elements that provide reduction of energy consumption up to 35%. These elements offer higher fire and electrical safety standards in comparison to traditional heating elements. The volume of output in the first year of the company showed high profitability. Large public companies such as 'Rostekhnologii', 'Russian railways' today are expressing interest in this technology.³⁸

A small-scale innovative enterprise for organizing the production of modern medical lasers used in the treatment of oncological diseases has been founded. The unique laser with a double transformation of the frequency developed in ISTU makes it possible to carry out painless surgery-free diagnostics and treatment of oncological diseases in a short time. The advantage of the laser is in its 1.5-2 times lower price in comparison with foreign pulse analogues. The engineered laser is now being tested in the Irkutsk Regional Oncological Center.³⁹

In order to protect intellectual property rights the University needs relevant legislation to be implemented. Except for the above mentioned Federal Legislative Act № 217, intellectual property protection is governed by Article 44 of the Constitution of the Russian Federation and some other acts on intellectual property protection. The Russian legislation includes over 100 legal acts.⁴⁰ In addition, Russia has joined a number of international intellectual property conventions. It is proof of how the government of the Russian Federation tends to make use of the principles of European legislation in its own lawmaking. Additional rules successfully applied in European and American legislation (but absent so far in the Russian one) can be further integrated into applicable legislation of the Russian Federation, or into draft legal acts such as the Act on Technology Commercialization (Technology Transfer). Drawing intellectual and scientific-technical activity results into economic turnover is considered as one of the key directions for improving of the Russian economy, to enable the realization of national

³⁷ Irkutsk State Technical University, *Innovacionnyj potencial Nauchno-issledovatel'skogo Centra Irkutskogo Gosudarstvennogo Universiteta* (2010).

³⁸ Irkutsk State Technical University, *Spravka o Tehnoparke Nauchno-issledovatel'skogo Centra Irkutskogo Gosudarstvennogo Universiteta* (2011).

³⁹ Irkutsk State Technical University, *Innovacionnyj potencial Nauchno-issledovatel'skogo Centra Irkutskogo Gosudarstvennogo Universiteta* (2010).

⁴⁰ See also: 'Ukaz Prezidenta Rossijskoj Federacii ot 22.07.1998 № 863 'O gosudarstvennoj politike po vovlečeniju v hozyajstvennyj oborot rezultatov nauchno-tehnicheskoi deyatelnosti I obektov intellektualnoj sobstvennosti v sfere nauki I tehnologij' (1998) 141 Rossijskaya gazeta; 'Postanovlenie Pravitelstva Rossijskoj Federacii ot 02.09.1999 № 982 'Ob ispolzovanii rezultatov nauchno-tehnicheskoi deyatelnosti' (1999) 183 Rossijskaya gazeta.

interests and boost the scientific and technical complex of the country. This will generate increases in gross domestic product. It is regarded as a great chance to create new capacities, to increase productivity and quality of work, and to enhance the prestige of scientific and technical activity in the country.⁴¹

CONCLUSION

Considering the innovative activity of research universities of the USA, Germany, Poland and Russia it is possible to state that the directions of their scientific activity are, as a matter of fact, quite similar. They aim to serve their national economies. Along with the main task - to prepare professionals for economic sectors - research universities deal with issues related to the development of the innovation economy. To this end they establish techno parks, business incubators and innovation centers having direct professional and scientific interaction with business.

As regards the legislation on intellectual property protection, there are legal acts and rules governing the application of scientific results in each country. These acts and rules are being improved and amended following scientific and technical progress. Thus, the main tasks and legal conditions of their realization can be formulated as follows:

- Stimulating investments of small- and medium-scale enterprises in scientific research, encouraging them to interact with scientific organizations, universities, large-scale business; assistance in realization of joint innovation projects;

- Developing legislation on the use of budget funds for co-financing the private sector in public-private partnership projects;

- Enacting legal rules on developing public-private partnership in technology commercialization;

- Enacting a legal act creating a grant financing mechanism.

In conclusion, it should be noted that the above examples demonstrate the role of national research universities in the development of national economies. Owing to financing projects they not only create workplaces, but also have a positive influence on the economic development of cities and countries that support this strong alliance between science and the economy. Thanks to their scientific ideas and elaborations the universities create new platforms for knowledge transfer and give opportunities to undertake significant fundamental research. Outstanding scientific achievements are the best basis for economic growth and social well-being. The research universities mentioned in this work claim themselves to be the recognized centers of science in Germany, Poland, Russia and the USA. Their aspiration

⁴¹ Petr Syshkov, Ekaterina Popova, 'Cel sovershenstvovaniya zakonodatelstva – sozдание stimulirujushih uslovij pri kommercializacii tehnologij' (2008) 2 Innovacii 24.

to enhance knowledge and technological progress is guided by the principle of constantly improving the quality of life for all people.