

Developing University-Industry Technology Transfer

Tomsk, October 12-13, 2006

A joint workshop sponsored by Organization for Economic Cooperation and Development (OECD), the U.S. Civilian Research and Development Foundation (CRDF), and Tomsk State University and held in cooperation with the Russian Ministry of Science and Education and the Tomsk regional government.

Opening Remarks

Mr. V.I. Zinchenko (Deputy Governor for Research, Innovation Policy and Education, Tomsk Region) greeted the workshop participants and noted that the workshop was taking place concurrently with a Siberian Innovation Forum that addressed how Siberian regions could achieve a greater links between their science establishments and local industry. He emphasized the need to encourage the greater participation by younger Russians in science and innovation. Mr. S. A. Gubin (Co-ordinator of international programs, Russian Federation Ministry of Science and Education) echoed Mr. Zinchenko's remarks and outlined the efforts that the federal government was making to support innovation programs. He emphasized that federal policy makers were keenly aware of Russia's need for the development of a knowledge-based society.

Three special programs for innovation were outlined by M.V. Shubin (Deputy General Director, Foundation for Assistance to Small Innovative Enterprises – FASIE). These programs targeted supporting higher educational institutions, attracting young students to science and innovation and promoting the commercialization of new technologies. Mr. I. Whitman (OECD) and D. Giebink (CRDF) greeted the participants and summarized their respective organization's efforts to support the development of technology commercialization that draws on international best practices.

Session 1: The importance of federal and regional governments in promoting university-industry technology transfer.

Recent economical and political changes in Russia have stimulated governmental support for the innovation activity of universities and local industry. This session examined the federal and regional frameworks for innovation and how federal and regional governments may successfully work with universities to promote links to industry.

Regional governments are on the front lines of economic changes and must directly formulate employment and related industrial development policies. Mr. V. I. Zinchenko briefly discussed the Tomsk regional government's efforts in developing and implementing a program for supporting innovation. He noted that some of his region's efforts were experimental and he thought they would be applicable in other Russian regions. In addition, he believed that a region's innovative potential was directly linked to modernizing its educational system. Conducting technology audits of local industry and linking these industries with the local science city (naukograd) form a key part of the

Tomsk region's innovation program. He noted that such an approach required a change in psychology and drew on help from EU-TACIS experts. He also viewed strong universities as important anchors for developing more innovative industry and believed that student business incubators could play an important role.

Regions operate within a legal and administrative framework largely defined at the federal level. Mr. S.A. Gubin described the Russian Ministry of Education and Science's plans for the creation of technology transfer organizations. He briefly summarized a daunting list of obstacles facing federal, regional and university officials who are working to promote technology transfer, namely: lack of demand for technology, insufficient development of venture capital, underdeveloped legal institutions and economic practices, incoherent state policy in the field of intellectual property and technology transfer, low level of science funding, inexperienced personnel shortcoming in small innovation enterprises and technology transfer offices and state tax policies that at times work against small innovational enterprises.

According to Mr. Gubin, federal policy makers are well aware of these problems and are developing long-term strategies to deal with them. A federal target program "R&D in priority fields of science and technology development in Russia for 2007 - 2012" will be one of the main instruments for implementing this strategy. In addition, there is a several-year state program to create high technology parks. State funding has over the past several years increasingly helped fund the development of technology transfer offices, over one third of which were at universities.

Mr. Gubin admitted that the current legal framework for intellectual property and innovation activity was unsatisfactory. A revision of the Part 4 of Civil Code dealing with intellectual property was underway. This revision will touch upon, among other things, regulating the exclusive rights for technologies created with federal funding and defining private investors' rights. Moreover, a number of federal legal acts to encourage intellectual property development are currently being jointly elaborated by the Ministries of Education and Science, Finance and Economic Development. More favorable tax treatment for innovation was also being considered.

International cooperation has been especially useful in developing an innovative infrastructure within universities. Mr. Gubin listed a number of indications of success for the Research-Education Center (REC) program with the CRDF.

The Foundation for Assistance to Small Innovative Enterprises (FASIE) has actively supported innovative projects in Russia through a competitive grant system since its founding by the Russian government in 1994. A number of university researchers have successfully competed for FASIE's START grants, which seek to commercialize new technologies by funding small businesses. Mr. M.V. Shubin summarized FASIE's recent activity in its various programs.

According to Mr. Shubin, FASIE's START program grew strongly between 2004-2005, more than doubling the number of concluded contracts and almost doubling the amount

of total financing. FASIE's other programs have also shown strong growth. Mr. Shubin views START as a key mechanism for creating a national Russian innovation system. As such, it would support the government's desire to diversify the economy and develop high technology manufacturing and service industries. Such industries would make Russia more competitive on world markets and improve the quality of life for Russians. The START program has directly aided the creation of about 1,200 new small businesses and its efforts are almost equally distributed across Russia.

Mr. Shubin also described FASIE's TEMP program, which aims to help small businesses license intellectual property that was created by government research institutes, and its PUSK program, which targets funding for specific technologies and partners universities with other research organizations commercialization. FASIE's work with INTAS has finished the agreement stage and is awaiting implementation.

Bringing an international perspective to the session, Ms. Ellen Hazelkorn discussed government support for university-industry cooperation based on her experience at the Dublin Institute of Technology (DIT). She described two U.K. programs for strengthening the link between university research and industry: the University Challenge Seed Fund and the Knowledge Transfer Partnerships. The former sought to support collaborative research and provide finance for bringing research to the point of commercialization; the latter, to assist young graduates by providing high level training.

Ms. Hazelkorn also described other similar programs in Scotland, Canada and Ireland. Each of these countries recognizes the importance of knowledge-intensive industries and services for future economic growth and has structured government support to nurture the links between its educational establishment and commercialization ventures. The Dublin Institute of Technology has responded to Irish government support by establishing an active knowledge transfer management program. DIT has a dedicated team to manage research and interaction with industry. The program is overseen by a director and includes an Office of Innovation and Industry Services (IISO) in each of DIT's six faculties. DIT also has a Product Development Centre that has assisted more than 400 young companies through initial start-up and early growth stages.

Open discussion.

The discussion focused on issues surrounding the current Russian legislative framework for intellectual property, especially how ownership is determined. A number of participants agreed that the current legislation and related rules were insufficiently developed. Some thought that it was a matter that needed correcting, while others believed that it was possible to work around these problems. Even the legal right of a university to participate in commercial ventures was considered legally unclear by some participants.

One participant, reacting to repeated examples of patent grants as indicative of research success, asked how many of the cited patents were foreign. There was a general agreement that foreign patenting by Russian universities was still rare as it was

prohibitively expensive for them. One participant, in response to a question, mentioned that regional funds could be used to help fund foreign patent filings.

Financial issues also surfaced during the discussions, including regional support for R&D work and providing tax breaks for innovative organizations.

Session 2: Establishing university-industry relations.

University and industry relations can vary considerably in their closeness. Industry may simply be an employer of university graduates or it may actually fund university research and education programs. This session examined some of the closer university-industry relations, with a particular focus on technical innovation. A number of specific Russian innovation projects were examined.

Mr. S.V. Mel'chenko (General Director, Tomsk Center for Technology Transfer) opened the session with a discussion of new practical methods of interaction between universities and industry in the framework of Russian legislation.

Although Mr. Mel'chenko agreed with others that the Russian legislative environment is unclear about the intellectual property rights of universities and their researchers, he believed that creative legal approaches, such as using middlemen or owning part of commercial ventures, rather than directly managing them, could be satisfactory solutions to these legal issues. Such an approach could also solve the problems related to doubts about a university's legal right to participate directly in commercial ventures. He noted that similar arms length arrangements work in France and Germany.

The Tomsk Center for Technology Transfer has successfully functioned as such an intermediary for several successful commercialization projects. To protect the rights of individual inventors, he suggested that commercialization organizations, such as his own, be required to give up the rights to intellectual property if they fail to commercialize them within a specified time period.

Two successful technology commercialization projects from Tomsk were described – EleSy for process automation (N.Ye. Rodionov) and the Tomsk Scientific Center for nanotechnology (G.Ye. Rudenskiy). Both organizations showed the potential for greater links between science and industry. It was also noted that Tomsk's Enterprise Fakel, which was founded in 1967, was a path-breaking attempt to establish a more innovative industrial culture within the Soviet Union. Unfortunately, the Fakel experiment was considered politically unacceptable and ended in the 1970s. Today, the Tomsk region has quickly embraced the opportunities to develop the links between science and industry and is following a strategy of using small to medium-sized enterprises.

Experience in developing industry-university links in two other Russian regions, Nizhnyy Novgorod and Biysk, were described, by R.K. Korotkov and Ye.A. Monastirniy respectively.

Mr. Korotkov described how a regional network was established to support technology transfer across the entire Volga Federal Region. He noted that this network, based on universities and scientific research institutes, had fifteen members and held periodic meetings to exchange practical information. The network has been mutually beneficial to members competing for START support.

The Altay region's science city in Biysk, according to Mr. Monastirniy, has launched an active program to link its universities to industrial partners. A first step in its program involved conducting detailed evaluations of local industries' readiness to produce competitive products. While the program's managers at first encountered considerable industry skepticism, they have since successfully completed these evaluations and begun developing strategies to upgrade production, including commercializing new technologies. In this way, the Biysk science city aims to encourage a demand-pull relationship between industries and university researchers.

Non-Russian experience in developing university-industry relations was described by Mr. Alistair Brett (Technology Commercialization expert for the European Union) and Mr. Bernard Nieuwendijk (Dutch Institute for Knowledge Intensive Entrepreneurship, University of Twente).

Mr. Alistair Breet stressed networking as a key element to international technology commercialization. He noted that about seventy percent of U.S. university licensing deals result from established personal contacts. Moreover, networking can deliver answers to specific questions, i.e., it facilitates the sharing of specialized knowledge among university technology transfer specialists. He cited the Association of University Technology Managers, Association for Research and University Industry Links (U.K.) and Eurasian Association of Technology Managers as important or potentially important networks for university technology managers.

Mr. Bernard Nieuwendijk described how the University of Twente has used its Institute for Knowledge Intensive Entrepreneurship to support its students' interests in founding businesses. The university's Temporary Entrepreneurial Position (TOP) program stresses learning to become an entrepreneur by doing. Over the past two decades the university has seen a rapid growth of spin off companies in its TOP program. About 400 out of the original 500 companies still survive and they account for almost 3,000 jobs in the region. TOP entrepreneurs receive an interest-free loan to the amount of 14,500€ and supervision from a business mentor and a technical mentor from the university. He also stated that the university has also integrated entrepreneurship into its curriculum, permitting it to be selected as a minor theme.

Open discussion.

Considerable discussion centered on the current legal environment. Some participants questioned the use of middlemen as a solution to the current murky legislative situation. Such an approach meant giving up control and rectors weren't generally predisposed to doing that. On the other hand, other participants thought that since universities have little

managerial experience, using middlemen presented a viable alternative to managing enterprises directly. The issue of faculty moonlighting and the ownership of intellectual property created by faculty members while moonlighting also raised legal issues.

Other issues raised during the discussions were: the need for tax breaks on imported equipment for new startups, how to involve students in practical work on innovation, the advantages of getting regional support when competing for federal financing, the creation of retraining programs for industry and developing industry's receptivity to university evaluations similar to those accomplished by the Bysk science city.

Session 3. Creation of startups and small companies. Cooperation between small companies, universities and industry

This session examined how the interests and capabilities of industry are taken into consideration when start-ups and small companies are created.

Drawing on his experience in establishing a startup in Canada that was based on years of his own scientific research, Mr. Valeriy Tolstikhin (Founder and Chief Technology Officer, OneChip Photonics) gave a detailed presentation on some of the practical issues faced by entrepreneurs. He delineated three stages in bringing his idea to market: Discovery – uncovering and understanding basic principles; Innovation - creating value by offering new services; and Business -- identifying, finding and serving the customers. Each of these stages involved different sources of financing. Discovery required extensive government and corporate funding of his research. Innovation, while benefiting from some initial government support, drew largely on venture capital. Business involved funds from the acquisition and initial public offering. He noted that anyone considering how to commercialize new technology faced a series of choices in which greater rewards came with higher risks. Furthermore, the decision to establish a spin-off required assembling a team of people with abilities quite different from those of the scientist who originally developed the idea.

Mr. Ya. A. Kovernikov (Technology Transfer Office, Tomsk State University) described the involvement of Tomsk State University and its faculty in creating and overseeing small enterprises. Tomsk State University's TTO is has conventional responsibilities, which include supporting its research faculty in obtaining grants, providing market and patent research for potential commercial technologies, monitoring license agreements and supporting the creation of small enterprises. In the past three years the university has founded 11 small enterprises. However, it has experienced a range of problems: attracting investors, establishing clear intellectual property ownership, and restrictions by federal agencies on the use of university funds as capital for small enterprises.

The director of a local Tomsk high-technology startup, Mr. A.N. Soldatov summarized some of the major issues that confronted him in founding his company to produce specialized medical lasers. Among the major issues were: overly bureaucratic demands by funding organizations, inflexible reporting requirements imposed by funding agencies,

lack of domestic demand and difficulties with certifying organizations. Mr. Aleksandr Bulavin (Executive Director, Innovation and Technology Business Incubator “Accord” in Tomsk) described the functioning of his organization, which is closely related to Tomsk Scientific Center of the Russian Academy of Sciences and provides marketing and support for the development of new technologies. He reported on a number of the incubator’s successful developments.

Overcoming the legal, mental and economic barriers in commercializing technologies was the focus of Yu.A. Tkachenko’s (Deputy Directory of the Technology Transfer Organization, Nizhnyy Novgorod) presentation. Mr. Tkachenko stated that he now draws on his prior business experience when working at the TTO. He emphasized the need to attract experienced businessmen when conducting assessments of the business potential of various technologies. Moreover, he cautioned about forcing scientists to become businessmen, as he believed that business and science were two distinct cultures. According to Mr. Tkachenko, enforcing intellectual property rights posed a deeper problem than did the structure of the legislation.

Open discussion.

During the open discussion, Mr. Tolstikhin clarified that the university owned the intellectual property rights to his inventions, even though his research was largely funded by Canadian government money. Although this give the university nominal power, in practice the university’s interests, helping students and supporting job creation, made it quite flexible in managing its intellectual property. While some Russian inventors are reluctant to approach TTOs, Mr. Kovernikov stated that Tomsk University’s ability to help them has attracted inventors and encouraged them to participate actively in audits. In general, Russian TTOs do not yet cover their costs and need outside funding. Finally, one participant noted that intellectual property enforcement is a sine qua non of establishing successful venture capital firms and the lack of enforcement is impeding the expansion of venture capital support for new firms.

Session 4: Managing contract research within a university.

This session examined the university resources dedicated to handling industrial and government funded research contracts and how these resources are linked to the university’s TTO.

Mr. V.G. Zinov (Dean, Department of innovation technology business, Academy of the National Economy, Moscow) discussed the pro-active role of a TTO in developing a university’s contracting possibilities with industry. In his view, it’s important to remember that a TTO is a service to help the university earn money, not an end in itself. Furthermore, a university should be motivated to capitalize on its intellectual property rather than permit its free exploitation.

In considering any research contract with industry, Mr. Zinov emphasized the importance of a university's proper evaluation of its considerable background intellectual property. In other words, many contracts will draw on past intellectual property and this past work should be considered in evaluating each partner's contribution.

According to Mr. Zinov, TTOs have three primary functions: legal, technical and managerial. These functions go way beyond the traditional functions of past departments for the introduction of inventions and involve a TTO in the process of determining a university's R&D strategy. Today's TTOs are major university departments and he questioned if some university administrations correctly understand their importance.

Imperial Innovations, the technology commercialization organization of Imperial College, underwent a major change, according to Mr. Brian Graves (Head Engineering and Technology, Imperial Innovations, U.K.). In mid 2006 Imperial Innovations became a publicly traded company and raised over 26 million pounds in a stock flotation. It currently has equity holdings in over 60 spin-out companies, maintains over 96 license agreements and manages 204 patent families (with over 2,000 patents filed).

In establishing relations with businesses, universities must push themselves to understand exactly what businesses want from them. In general, according to Mr. Graves, they are seeking competitive advantage, i.e., they need to stay ahead of their competitors. This goal differs significantly from a university's goals, which focus on education and knowledge creation. Nevertheless, universities and industries can find common ground. In establishing research contracts it's important to keep clear what each party contributes (e.g., background intellectual property, funding, and the inventive contribution) and what each will own (e.g., the background intellectual property, arising intellectual property, and the exploitation rights).

According to Mr. Graves, the ideal terms of a research contract for a university would give a university rights to arising intellectual property, grant access rights to business sponsor inside and outside the field, establish publication rights, provide free use rights for research and teaching and establish the timing and amounts for financial return.

G.Ye. Dunaevskiy (Vice Rector for Research, Tomsk State University) addressed one of the more difficult issues for Russian universities, securing resources for managing R&D and technology transfer. He reported that the university had made progress in getting adequate funding for its R&D work, but that major problems remained unsolved. The state budget's thematic plan only provides about 8 to 10 percent of needs. The Bortnik Fund only supports the creation of small enterprises, not universities. While grants are especially useful, the university lacks customers for its technologies and is stuck in a technology-push model. Thus, the university remains concerned about how to secure a future for its young scientists.

Presenting a lawyer's perspective, Ms. Romanova (Head of the Patent Service, Saratov State University) discussed intellectual property management for research contracts. She noted that many of the previous presentations had touched on the question of the legal

ownership of university intellectual property. She maintained that a careful drafting of research contracts could help avoid many of the ownership problems. For example, she noted that it was important to distinguish background, arising and ancillary intellectual property in contracts. It was also essential to consider other issues such as the rights to use the intellectual property from one contract in doing research under yet another contract. In addition, it was important to make sure that the research results did not require the use of previously patented inventions. Ms. Romanova detailed a number of other issues, such as the right of the government to free usage for state needs and the fact that thematic plans were not considered state contracts. She concluded by listing several unresolved legal issues relating to different types of R&D funding.

Open discussion.

During the discussion several participants noted that innovation was much closer to business than it was to science. When asked about the ideal size of a university TTO, Brian Graves noted that Imperial College expects each TTO staff member to manage about 25 disclosures annually. While one participant doubted the relevance of Imperial College's new structure for Russian universities, Mr. Graves pointed out that Imperial Innovation started as a conventional TTO. One participant noted that Russian universities needed to use their TTOs more in seeking outside research funding.

During the discussion, it was noted that the lack of intellectual property enforcement was hurting universities that have strong information technology departments. "Why should they invent when they can't earn money from their inventions?" one participant asked. This issue led to a discussion of the legislative changes needed to clearly give universities the right to be owners of the intellectual property created by their staffs.

Closing Remarks

G.Ye. Dunayevskiy thanked those who had made formal presentations and those who actively participated in the discussions. A number of useful issues had been raised. He noted that several good points had been made on the need to improve legislation that affects universities efforts to establish efficient TTOs. He asked rhetorically that each participant consider in light of these discussions: what can we propose to universities to help them facilitate technology commercialization and better market their technologies?