Theme: Universities as interactive partners - Evaluating implications

**Triple Helix in the making: A Case of Public-Private Partnership in Russia**

**Author information**

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**Key Words**

Innovation system, partnership, Russia

**0-4 JEL Classifications:** L3

**Research (case review) objective:**

To analyse how a particular collaboration to bring results of academic work of a university (*professor*) to the commercialization (*by investor*) was organized and what was the role of the public sector (*government*) in this process.

**1. Introduction**

Soviet Science, Technology and Innovation (STI) system was in place already by the end of 30ties. It had a clear centralized structure along the lines of governmental responsibilities, with military industries being particularly in focus. The command-based economic system was reflected not only in how the management of innovation was organized, but also in the focus of the branch ministries and their academy and university

research support structures. This was also reflected in the spatial distribution of industry. Research institutes located in one soviet republic were focusing on the main industry without any chance to differentiate their research activities. The command-orientation was diminishing the range of strategic economic options open to the STI system's agents, which became obvious when the tight links between universities and industries broke as a result of the Soviet Union collapse. It was only due to the efforts of the researchers who became managers in order to save their research institutions and succeeded in bringing unique discoveries to the level of marketable applications that research organization survived in a completely new environment. Twenty years of market economy in the Russian Federation allow drawing some lessons with regard to survival and reorientation of research. For the purposes of this paper the author will examine the reasons behind and the conditions, which allowed to create conditions for the university research to be brought to the market in the form of a ready-made product.

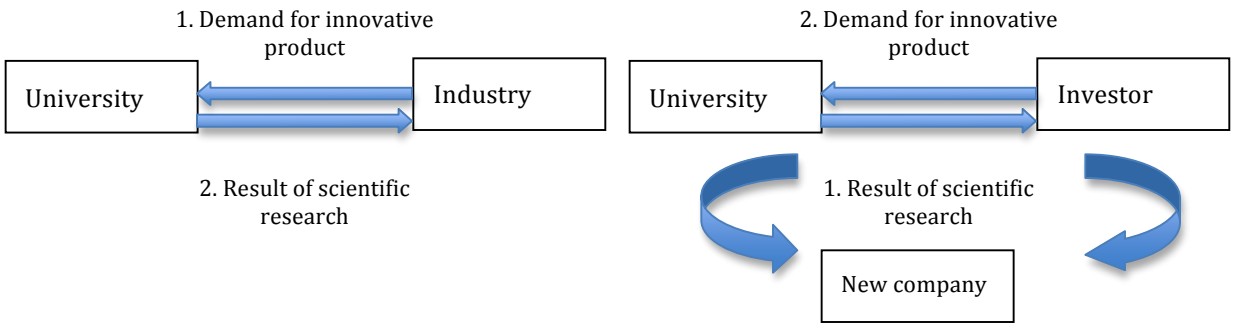
This paper analyses a specific case of partnership between the (public) university professor and an investor, who was interested not only in making profit from a particular project, but also had motivation to bring up work of a talented team of Russian researchers, which might serve an ambitious goal of supporting STI system through a specific ad hoc action.

**2. State-of-the-art and conceptual insighgts**

Some authors argue that the leitmotif of adjustment of the science and technology system in post-soviet Russia has been going through two main phases; a phase of preservation of the potential, and a phase of restructuring of the former links and interdependences. Today market dictates demand for innovative solutions and applied

research. Some universities are creating infrastructure for commercialization support of scientific product and, further, development of enterprises. This process is called "moving towards entrepreneurial university", where theory of triple helix was of big help since early 2000s. There are other ways of making benefit from research and innovation done in the universities like the one described in this paper: some professors are getting offers from the entrepreneurs (many of whom are former students) to engage in profit-oriented activities (Figure 1). In the Figure 1 two simplified modalities of university-private sector collaboration is presented. In the first modality the dialogue is between the private sector (a company) and the research institute is established to get a particular technology as a result of scientific research, whereas in the second modality the university research is already in place and the intermediary (an investor) is critical for bringing up a new company. It is important to understand that a partnership in the second case does not end at the level of technology prototype as further research is needed to improve the prototype product.

**Figure 1. Simplified Modalities of PPPs for Innovation**




From the point of view of Porter and Stern [2001], the context of innovation is embedded into the national system of innovation, which, in turn, specifies innovation

infrastructures. Higher education component of the innovation system – universities – play significant role in bridging the technologies development and companies. In this case, it does not matter whether the company is already in the market and searching for the new technology to improve its product, or it is a company specifically created to promote a new technology resulted from the research of a particular team in a university. In the latter case the issue of capital availability (investment) into promotion of a new technology is critical. Here the role of the public (administrative and legislative elements) sector might be helpful in order to create incentives for the investors to take part in a risky development. Thus to bring the political entities, industrial organizations and academic institutions to work together in order to improve local conditions for implementation of innovation strategies [Etzkowitz, 2008] is important.

Another significant aspect of partnerships in innovation area is brought by the approach to the STI system itself. The functional approach [Lepsky, 2009] to the innovation system answers the question of what should be done to organize innovative development, whereas the actors-specific approach to the innovation system answers the questions like: *by whom, why and for what is the innovation; who serves as a subject of innovation? who how and for what will be cooperating for integration?* – among others.

That is why it is important to see the structure and the actors of the system in the first place as this allows to work with concrete entities and their needs (bottom up approach) which will feed that functionalities of the innovation system. This process might result in the need to create new structures to achieve strategic STI goals clarified from the functional approach.

## 3. Methodology

This analysis looks at different levels of the public-private partnership (PPP) relationships, from the STI system level (historical, post-soviet) transformations to micro-level implications of the Triple Helix approach – by focusing on a specific case of collaboration between the private sector and a (public) university. It is focused on a particular case of a company, which was established in the middle of the past decade in order to implement an ambitious innovation technology project, "soundness of which is confirmed by a wide range of research areas it is engaged in: from fundamental issues …to implementation of technological processes and venture risk analysis" as stated in the web page of the company under discussion.

The qualitative methodology is based on a combination of face-to-face interviews and analysis of secondary sources. The process of the emergence of collaboration is first analyzed from the available secondary source material, whereas the underlying motivations and actor strategies are explored through interviews with both sides of the partnership. The economic evaluation of the company's activity is provided at different points of the company's history in order to reflect on the collaboration of the parties' understanding of the partnership in these specific circumstances.

The system-level understanding of the partnership is provided by the secondary sources, i.e. interviews in the media with the "outsiders" – governmental bodies, independent researchers from the same field, business and academia representatives with knowledge in this specific area or with similar experiences.

In practical terms, the author conducted a number interviews with the representatives of the partnership –both academic and business partners. Important issue

is that the investor (also part of the private side of the subject partnership) – the main initiator of the partnership creation – was interviewed by the media on different occasions, which allows to see also his position about the partnership creation and the future development of the company. Information from the secondary resources, including the web site of the company and other related publications from 2006 to 2013, was also used by the author as a reference material on the partnerships' development.

**4. Findings and interpretation**

This analysis is currently taking place as a part of a bigger research project on the role of public-private partnerships in innovation system of the Russian Federation. However, some findings are already available and lend support to the argument/hypothesis that ad-hoc collaborations are viable and successful, but their future might be at least unsustainable or under threat if there is no supporting state policy for such unique collaborations.

Textbox 1. provides some facts and milestones about the unit of analysis – the company created as a result of match of results of the research and the investors' interests. The activities of the company were guided by 20 years of research experience

Textbox 1. SuperOx – Foundation Facts and Recent Developments

As per the introduction of the company on its web site: SuperOx was established in 2006 as an innovation science and production company to implement an ambitious innovation technology project – creation of superconductors capable to radically change the whole electrical power industry.
SuperOx activities are guided by the 20-year experience of investigating the compound oxide MOCVD at the Chemistry Department of the Moscow State University. In the 1990s this research group put much effort in obtaining HTS based on single crystal substrates and created microwave prototypes for ultra high frequency communication systems.
The soundness of the project is confirmed by a wide range of research areas SuperOx is engage in: from fundamental issues of metallurgy and nano-level physics and chemistry to implementation of technological processes and venture risk analysis.
Relying on the gained intellectual capital, SuperOx also launched projects in other spheres (solar energy and promising methods of cancer treatment).
Today SuperOx is a full-fledged participant of the innovational process with a distinct mechanism of selection, examination and testing of the innovation chain.
Source: www.superox.ru

of a professor at the Moscow State University – one of the leading universities in the Russian Federation. “The soundness of the project is confirmed by a wide range of research areas it is engaged in: from fundamental issues of metallurgy and nano-level physics and chemistry to implementation of technological processes and venture risk analysis.” , - as stated in one of the sources speaking about the company.

The *main characteristic* of this partnership is that it was created as the Modality 2 (see above) collaboration. It started from the long-term interest to and, as a result, experience in the semiconductors area of a particular researcher (referred as the Researcher for simplicity in the below discussion). His first publication on the subject is dated already by year 1984 when the high-temperature superconductivity was in the loop worldwide. The breakthrough discovery in the field of took place in 1986 by Alex Müller and Georg Bednorz (Nobel Prize in Physics in 1987), but development of application of this discovery took time and it is still undergoing. Although the Researcher argues that research in this field “was cooling down after a boom of interest”, he retained his interest in the area and was coming back to further experiments to pursue his research of possible applications. This brings us to *another specific feature* of this partnership – the existence of long-term scientific research and experience in a specific field maintained by the University partner. It is important to remember that this experience was directly “financed” by the public sector and could have not been advanced that far without this support. The latter shows us the initial role of the public sector in the whole collaboration.

The initial creation of the partnership idea is dated back to year 2002, when the Investor, made initial contact with “a local purely scientific project” and promoted it into

"a research and production venture with a strong intellectual potential and big international prospects." [website of the company] After the initial investment through the foundation[1] established in 2003 by the Investor with the purpose of "restoring the best traditions of pre-revolutionary Russian patronage of art and science."

According to the Researcher, issue of mutual trust and understanding between the investor and the Researcher himself was the main stimulus for cooperation after the very first contact between the two in the beginning of 2000th. The next step was the ability of the scientific partner (the team of the Researcher in the Moscow State University) to create the conditions for further development of the commercially viable prototype. It was fully coordinated by the academic partner in the collaboration for the first years of the partnership, which was uneasy due to organizational and administrative issues in the University. Not only the applied research was the issue, but also the administrative issues like organization of the purchase of the new equipment and/or development of special equipment which was too expensive or non-existent at that time. Another issue of the academic partner was the need to create a team of researchers on the basis of the laboratory in the University. The Researcher was able to bring together some of his talented postgraduates, although many of them were already working successfully in both public and private companies in Russia and abroad. In the very first phase of the project development the homebase of the project in the laboratory was seen as a positive element: there was an option to use PhD student as researchers without financial compensation or with quite a low level of compensation. Still, the issue of retaining such

[1] http://www.hcfoundation.ru/

talented researchers in the team of experienced graduates remained[2]. At the same time, the Researcher as a leader of the team had to cover all the issues both in the scientific and organizational areas. The issue of "uneasy faith of scientific business" was mentioned during the interview. Still, all the organizational issues were of less importance taking into consideration the ability of the project to build its own infrastructure from the technical and scientific point of view and to move towards the development of the prototype. The unexpected issue which emerged in this process and remains until now is the issue of market organization: demand for such an innovative product should exist in order to go beyond the prototype to construct the full technological chain as a final step towards industrial production of the prototype.

It is important to mention that the investor also was biased by his role in the public sector as he hold the position in the Russian Parliament before he became the Chairman of the Board of Directors of the company. One of the reasons to resign from the role in the Parliament was mentioned in his interview as "the wish to more actively take part in the business…of the project "SuperOx", the first stage of which was completely outsourced to the scientific team[3], whereas now the need to have a ready product from the prototype consumes quite a lot of … time". Still in 2011, although the State Programme on Support to Research on Superconductors under the State Corporation of Atomic Energy of Russia was adopted with budget of about RUB 4 bn, the company SuperOx was suffering from limited State support to its already advanced

[2] Here the issue of dissatisfaction of the academic leader of the project played an important role as he tried to keep "invisible team" without promising real financial return to his current and former talented scholars. Convergence of views on human capital between the project's investor and the scientific leader was another factor of the partnership's success.

[3] http://www.rbcdaily.ru/finance/562949983845964

developments[4]. Still, some funding for the company's development was received through the state tenders. The issue with this process was that the requests and technical requirements for the applicants are often developed by a somewhat competitors of the companies potentially interested in bidding. Unfortunately the practice of either nonprofessional formulation and/or budgeting of such requirements also exists. Sometimes these requirements are tailor-made for the developers of these technical requirements themselves. This was mentioned as a shortcoming of the state financing of the R&D. Still state support is not significant enough for further financing of the "development" part of projects[5].

As a result of tremendous efforts, SuperOx benefits now also from one of the main innovation-oriented state initiatives: the Skolkovo Foundation[6], where it became a resident of the Nuclear Technologies Cluster directly supervised by the President's Council of economy modernization and innovation development of Russia reporting to the Prime Minister. Active role of the private investor in the top management of the company resulted in developing the market-oriented approach of the company with the ambition to become a world leader (as per the presentation by the Investor at the meeting in November 2012[7]). At the same time, the head of this Cluster in Skolkovo mentioned another issue of technological companies – not money or investment, but, again, issue of

[4] http://www.infox.ru/science/lab/2011/07/07/Svyerhprovodnik.phtml
[5] In Russia the R&D is explained by the acronym "NIOKR" – science, research (NI) and experimental design (OK) work, where the latter is done on the basis of the Terms of Reference developed in the first, NI part.
[6] www.skolkovo.ru
[7] http://community.sk.ru/press/b/weblog/archive/2012/11/22/rezidenty-fonda-skolkovo-prinyali-uchastie-v-soveschanii-s-glavoy-pravitelstva-rf.aspx

gaining new markets, which requires technological viability and international reputation, as well as membership in global supply chains and in the world technology cooperation.

Other issues emerged from the interviews and study of secondary sources includes issue of he transfer from the alma mater to the world of business due to technical and investment requirements. This transfer weakens the links between the University and the newly created company, moving the issues of R&D behind the more business oriented development goals. Still, the emotional atmosphere in the university team was mentioned as an important element of the success of the partnership as most of the founders of the team were coming from the scientific background and it was a stress from them to start thinking in business terms. New challenge is also to move from the "why?" area of scientific approach to the "how?" area of technological approach which requires another thinking and education. "Sciences are not technologists!" as mentioned in one of the interviews. Here the issue of higher and professional education is coming into the loop: "you do not need a PhD to look after the equipment", which brings the technologists' and equipment operators' training programme into the loop for the attention from the State.

In the process of interviewing the parties of collaboration from both private and university area it became clear that the main resource of these partnership, the human capital, might not be sufficiently prepared to enter into collaboration and needs at least some time for learning, adjustment and mechanisms for adaptation. This particular case of an – economically - quite successful partnership shows that even a success story might not be a success in full term for all the parties involved, although today this company "is a full-fledged participant of the innovation process with a distinct mechanism of selection, examination and testing of the innovation chain." The founders argue that "their

extensive experience enabled them to formulate their own concept of innovation development as well as to assess the role of government and its strategic goals on the way to innovation."

These kinds of case studies create insights into the key parameters to make a science-private sector collaboration successful which might be considered by the decision makers for further replication of technology-driven partnerships.

**5. Conclusions and Policy Implications**

The crisis of the innovation system of the Russian Federation was driven by the structural changes in geography and economy of the country, which was not accepted by the main actors of the system till the end of the 90ties. The need to find economically viable solutions to support market-oriented partnerships is critical. Coming back to the national level, this issue reflects an imbalance between supply and demand in the STI system in the country. The first wave of survivors benefited from the knowledge commercialization.

The case analyzed for the purposes of this paper benefited from the soviet school of science. It demonstrates a very successful on-going project benefited from the initial trust and collaboration between the personalities representing the university and the private sector. The role of mutual understanding and seed money investment are mentioned as the main factors of success. Still, the issue of the third partner in this collaboration – the state as an intermediary and framework creator for the innovation support – remains far from perfect as both private and academic entities of the partnership claim.

The classic distinction between the main features of the STI policy in the Russian Federation (i.e. the mission and diffusion-oriented polices) is an important factor to be

understood by the decision-makers. Innovation-oriented projects of national significance are usually single projects with clear government agenda and budgeting approach. The demand-driven collaborations, in turn, have more clear connection with the system approach as they emerge in the nodes of intersection between research and innovation-related activities in the already existing universities and the private sector needs. A clear distinction should be made between the two models at the decision making level and reflected in the policy accordingly to make distinction when designing policies for PPP/science-industry relations.

The role of the State as a supporting and stimulating partner should be further reexamined and strengthened in a number of areas of its direct responsibility, namely: the existing state mechanisms of innovation support; the education system as a foundation for innovation and production; the legal framework and packages for seed innovation and flexible schemes for partnership.

**7. Directions for further research**

The author identified the need in more bottom-up approach to the triple helix theory as demonstrated by the case presented in the paper. Further research should be done to further explore such cases to identify factors of their success or failures. Specific typology of bottom-up partnerships for the purposes of triple helix application strengthening in the Russian Federation could be developed subject to the availability of data.

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