



## University-industry Partnership as a Key Strategy for Innovative Sustainable Economic Growth

Ekaterina Panarina<sup>a</sup>

<sup>a</sup>Perm National Research Polytechnic University, Komsomolsky Avenue, 29, 614099, Perm, Russia

### ABSTRACT

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The intensified global competition for factors that drive the competitiveness of entrepreneurial ecosystems forces policymakers to seek new models of economic growth. The current Russian model, based on the exportation of natural resources, has become increasingly obsolete. Today, to achieve growth targets, Russia must move from the redistribution of mineral resources to intensify innovation activity and develop technology-intensive products. Universities and industry are two partners of the entrepreneurial ecosystem that can connect to merge the discovery-driven culture of universities with the innovation-driven environment.

### 1. Introduction

Innovation is increasingly becoming the foundation of the world's leading economies, economies in which long-term prosperity and development depend on technologically based intellectual products. These new products make possible the creation of companies that can foster long-term sustainable economic growth—in short, new economic perspectives to create, harness, and leverage technology-based intellectual capital. Russia's potential for growth is recognized by the World Economic Forum's (WEF) Global Competitiveness Report 2013; however, the report also acknowledges that the country is currently falling behind India, China, and Brazil (BRICS countries) in terms of competitiveness.

Russian large and expanding consumer market, a solid telecommunications infrastructure, and abundant natural resources are being central to Russia's competitiveness. However, underdeveloped institutions, stifled competition, declining quality of education, underdeveloped financial markets, and low levels of business sophistication are the country's key competitive challenges. The lack of sufficient funding and a supportive environment for startups has translated into a shortage of new ventures.

When building a comprehensive innovation system, Russia should focus on upgrading technological capabilities through higher public expenditures on research and development (R&D). This would enable the country to access its innovative potential,

which to a large extent is based on strong R&D capacities and an innovative environment.

### 2. University-Industry Partnership as a key strategy for innovative sustainable economic growth

Fostering collaborative university-industry partnerships to enhance commercialization efforts has emerged as a critical imperative to sustaining global competition. As shown by countries such as the United States, innovation and business competitiveness are greatly enhanced through the activities of research universities. US universities through their research and the products of their research have assumed a vital role in growing vibrant economies (Cohen, Nelson, and Walsh 2002; Rosenberg and Nelson 1994; Mowery and Nelson 2003).

The success of high-technology regional clusters in the United States such as Silicon Valley in California and Route 128 in the Boston area have connected a large number of companies and major research universities (in California, the University of California at Berkeley, Stanford University, and the University of California at San Francisco; in Boston, Harvard University and MIT). Many new firms in these regions have been created through efforts to commercialize technologies developed at regional universities.

To build a knowledge-based economy, Russia needs to similarly integrate business elements into its education system, with the plan being to drive innovation by strengthening links between higher education, research, and business practices. In

2012, Russian president Vladimir Putin announced in a formal address that Russia's universities must be revamped to become key players in the economy of the country. As a long-term strategy, higher education has to become a strategic asset that links with industry to strengthen the national economy by enhancing and accelerating technology-transfer initiatives.

In this paper we propose for the establishment of stronger ties between education and industry when Russian universities create what are known as Centers of Competence. These centers can be used to promote innovation and business competitiveness in the Russian economy. World-class research universities are at the forefront of creating such partnerships (Making Industry-University Partnerships Work 2012), and it is these partnerships that result in a broad range of beneficial activities that provide regional and national economic outcomes. As partners, educational institutions and industry can invest in technological advancement, plan strategically, and greatly affect the competitiveness of local and regional economies. Therefore, Russian universities should go beyond the traditional funding of discrete academic research projects and establish long-term strategic partnerships with industry to improve innovation in Russia.

Centers of Competence (CCs) will link innovative technologies developed by research universities with industry partners in an effort to target relevant market needs. Government agencies will also be a key component of these endeavors with supportive policy, as for example grants, reduced taxes, etc.

Coupled with government support and outside investment these collaborations can help to solve pressing social and economic challenges. The CC will be a hub for leaders in science, education, business, and government where R&D projects will be transformed into marketable high-tech products and services. The CC will help create regional innovation clusters and eventually lead to the advancement of the country's competitive position and economic growth.

### 3. Russia's innovative initiatives of economic growth

Positive notable changes to Russia's innovation policy in recent years have been accrued at the center of the government's agenda. The new government strategy "Innovative Russia 2020" foresees large increases in funding for research, commercialization, and innovation infrastructure. The strategy implies an increase of the share of innovatively active companies from the current 9.3% to 40–50% by 2020, as well as growth of Russia's share of the global high-technologies market from the current 0.3% to 2%. Under these plans, by 2020 the number of

patents registered by Russian companies in the European Union, the United States, and Japan is expected to reach about three thousand. Total budgetary funding on innovations in the next ten years is estimated at approximately \$530 billion, which includes expenses on education, science, and a number of other fields.

However, on a global scale, these numbers are still low. In 2013, the United States, China, Japan, and Europe (excluding Russia) accounted for about 80% of the total \$1.6 trillion invested in R&D around the world. For instance, in 2013, the amount that Russia spent on R&D as a percentage of GDP was a mere 1.5%; the percentage of total exports that were innovative products, works, and services was 3.8%; and only 9% of Russian organizations were involved in innovative activities. Despite the existing potential in the sphere of human capital and research activities, the level of innovation in Russia is very low. The United States remains the world's largest R&D investor with a projected spending of \$465 billion in 2014. At the same time in 2013, for the first time, China accounted for the largest number of patents filed throughout the world.

In April 2012 the government adopted a list of innovative territorial clusters (mostly in the central area of Moscow and St. Petersburg) that would receive public support until 2018. The first establishment of an innovation cluster is noteworthy: the Skolkovo, which is an innovation hub built near Moscow to provide researchers, entrepreneurs, and investors with a platform to focus efforts on IT, energy efficiency, biomedicine, space, and nuclear technologies. However, unfortunately, these initiatives so far have had only a limited impact on enabling sustainable economic growth in the country. Respondents who participated in Ernst & Young's attractiveness survey Russia 2013: Shaping Russia's Future suggest that a shift to a more collaborative approach would help to improve Russia's innovation and technological capacity (table 1). Their top recommendations are as follows:

- Facilitate R&D collaborations between foreign and local companies. A number of these partnerships have been forged in the recent past, for example, Alcatel-Lucent signed an R&D pact with SC Rostekhnologii, Russia's largest high-technology corporation, to accelerate the deployment of advanced long-term evolution or 4G mobile services, new network systems, and groundbreaking transmission technologies.

- Strengthen links between universities and industry. Encouraging collaboration between industry and academia would help to improve Russia's innovation climate. This would strengthen the foundation of entrepreneurship and innovation

**Table 1:** Measures Most Needed to Improve Russia's Technology and Innovation Capacity (Source: Russia attractiveness survey (total respondents: 206), 2013, Ernst & Young.)

Measure	Percentage of respondents who named the measure a top-three priority
Facilitate R&D partnerships between foreign investors and local companies	25%
Focus on collaborations between universities and industry	19%
Increase incentives for companies to invest in R&D and innovative technologies	17%
Establish policies that support the development of emerging technologies	16%
Support and facilitate the establishment of high-tech projects and techno parks	14%
Develop a culture of innovation and creativity	14%
Increase government support for the commercialization of innovative projects	14%
Focus on public-private partnerships in technology	13%
Develop joint research programs	11%
Support the development of industrial parks and industrial zones	10%

Can't say	18%
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#### 4. Center of Competence at Perm National Research Polytechnic University

National and local governments in many countries stimulate their economies by forming “Science Parks” or “Technology Centers” or what we call “Centers of Competence” (CCs). Based on a review of the relevant literature, for the purposes of the present research we have developed the following definition of a Center of Competence: an entrepreneurial, flexible, innovative eco-structure that integrates knowledge produced by universities with industry expertise, and utilizes the support of government and local communities to create strategic synergies that boost economic growth.

We propose the creation of a CC at Perm National Research Polytechnic University. It would be the first CC in the Perm region and would be designed as a hub of science (knowledge produced by the university), industry (the major economic sectors), local government (funding and financial support through programs and grants), and society (the entrepreneurial community). The Perm CC would support innovations from the early stages of development to commercialization. Its mission will be to accelerate the commercialization of discovery-driven innovations from universities and to foster and accelerate the exchange of ideas between researchers on campus, through better access to informational, financial, technological, and human resources.

Perm National Research Polytechnic University is well suited for the design and implementation of a CC. In 2009 the university received a status of a “national research university,” one of only twenty-nine other universities in Russia to achieve this status. Thus, Perm is an ideal location for an entrepreneurial center blending technology, engineering, applied science, and education. The center will become a catalyst for innovation through the integration of resources, and it will focus on launching innovative projects by utilizing state and regional programs and promoting entrepreneurial activity. CC initiatives will be focused on generating cross-disciplinary solutions, creating interdisciplinary knowledge, and developing new technologies and processes. We strongly support the implementation of a CC at Perm National Research Polytechnic University, as it will represent a significant step towards economic development and successful competition in the region and beyond. Innovation, science, and human capital will serve as the cornerstones of the new innovative system designed to serve social and economic needs.

#### 5. Center of Competence as an ecosystem for innovation development

The Center of Competence (CC) will become a tool for integrating knowledge, expertise, and supporting entrepreneurial activity. Designed as a flexible system, and managed to ensure competitive growth, the CC will assist with the implementation of innovative strategies for creating competitive companies in the Perm region.

The CC will help to pool the following components within an integrated management system for innovation development: business, government, academia, professional associations, and the local community (figure 1); within the CC a flow of qualified specialists, active entrepreneurs, creative youth, and government agencies, together with science and education, will define the innovative development of economic sectors.



**Figure 1:** The CC as an ecosystem for innovation development

The Center of Competence will link industry and the university as well as assess public/private resources for mutually beneficial needs (e.g., facilitate tech transfer and startups; administer industry contracts and out-reach efforts; provide innovation services to internal and external researchers/organizations; utilize industry retirees to promote innovation and entrepreneurship; increase research funding and seed capital opportunities; train and mentor start-ups and small businesses; and facilitate collaboration between large companies and recognized researchers). These efforts should intensify technology transfer and commercialization, and attract venture capital and other private investment resources, leading to the creation of a vibrant technology and innovation-driven ecosystem in the Perm region.

The objective of the CC as the core of communication between these different elements is ensuring the integration of knowledge and processes, and stimulating the emergence of an innovative culture. The CC will help companies in the Perm region strengthen their competitive edge, build dedicated teams of specialists with new comprehensive competencies, and drive the shift to an innovative management model.

The suggestions below provide examples of how we might better position the CC to achieve the goals stated above:

1. Create an executive advisory board to advance the reputation and capabilities of the center. Work with the advisory board to identify potential cooperation with enterprises in the region and to establish partnerships with those entities.
2. Motivate faculty members to lead research in the area of their expertise with connections to market needs.
3. Pursue funding through the local and federal governments to sponsor research initiatives of faculty and graduate students.
4. Organize business plan competitions for university students to build entrepreneurial skills and develop an innovative culture. Create cross-disciplinary teams to compete such as engineering, science, information systems, etc., in which interdisciplinary student teams will be required to write business plans focused on new technologies.
5. Develop a focused strategy that includes leading areas of expertise for the university such as mechatronics, nanotechnologies, aerospace, energy, and information systems technology.

Long-term collaborations made though the CC will give rise to new technologies helping to transform industries while modernizing the role of the university. However, collaboration is not going to be easy. As a rule, for most universities, partnering with industry does not come naturally. Most Russian academics are not engaged at all in collaborations with industry. When Russian universities do form partnerships with industry, too often the potential for synergy is thwarted by communication failures.

The most productive collaborations are strategic and long-term; they are built around a shared research vision and may continue for a decade or beyond, establishing deep professional ties, trust, and shared benefits that work to bridge the cultural divide between academia and industry. The collaboration requires strong university leadership, faculty who understand business, academics who have worked in industry, and making industry university partnerships a clear priority.

The key recommendations for universities to foster successful collaboration with industry are the following:

- Make industry-university partnerships a strategic priority and communicate the message regularly to the entire academic community.
- Create an advisory board of executives from selected industry sectors and the highest level from the university who will develop an understanding of the key scientific and technological questions companies are seeking to answer. As a first step, a joint steering group including senior academics and company executives should be formed.
- Assess the core academic strengths of the university and the core research competence of local companies to identify promising opportunities for collaboration.
- Design incentives for university faculty and provide resources to manage a cultural shift that puts a clear priority on engaging with industry for mutual benefits.
- Encourage industry involvement. The university must utilize people capable of building and managing partnerships. Collaborations only work well when they are managed by people who cross boundaries easily and who have a deep understanding of the two cultures they need to bridge.
- Create opportunities for academics, company researchers, and executives with shared interests to come together and develop a dialogue. For example, informal exchanges over lectures or seminars can bring both sides together to spark conversations and lead to new relationships.
- When a partnership has been launched, have an executive board meet regularly to encourage strong two-way communications between academics and senior company officials. The chair should follow up regularly with members to keep the dialogue flowing and encourage impromptu feedback on the project from both sides at any time.
- Develop two-way exchanges to build a substrate of academics who understand industry. The university should encourage professors to get internships in industry and invite industry researchers to teach.
- Create long-term strategic partnerships that focus the university's creativity and talent on future innovations that can be taken to market by industry and deliver economic benefits within five to ten years.
- Encourage diversity. Innovation works when there is diversity. Invite to the projects individuals from different disciplines to contribute to the whole process. Collaboration of ideas, people, and places should be systematic.

Redefine the role of the research university as a source of competence and problem solving for society.

Julio A. Pertuze, Edward S. Calder, Edward M. Greitzer and William A. Lucas, in their "Best Practices for Industry-University Collaboration" (2010), propose a set of seven guidelines that companies should follow to get the most out of their research collaborations with universities. The guidelines partly correlate with the key recommendations for universities stated above: longer-term projects, continuing relationships, assigning project managers who make the contract feel like a partnership, and enabling these managers to invest the time and effort to generate effective knowledge flows between the university and the company.

## 6. Conclusion

In the end, we emphasize that bold, visionary partnerships between industry and university are able to accelerate innovation and help deliver solutions to pressing economic and social challenges. Universities should collaborate with industry, and the role of the research university should be redefined for the twenty-first century as one that goes beyond teaching and public service to tackling key social challenges and helping drive economic growth. The university in the twenty-first century should be viewed not just as a generator of ideas but also as a source of knowledge and competence that can benefit society.

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