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The entrepreneurial university in Russia: from idea to reality

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Abstract

An entrepreneurial university plays an important role in realizing economic innovations and increasing global competitiveness and social welfare. Government needs to stimulate entrepreneurship education and encourage development of entrepreneurial universities. Incremental, sustainable, and long-term government initiatives consistent with the triple helix concept are necessary to modify the rigid higher education sector. The Russian model of an entrepreneurial university appropriate for the demands of the 21st century is explored. A case study of its leading university of technology in transition to an entrepreneurial university presents a few challenges faced and key lessons learned. The future of entrepreneurship education and entrepreneurial universities in Russia is discussed.

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1. Introduction

The nature of innovation is complex and depends on a number of factors. Institutional infrastructure, economic system, legal framework, knowledge base, and government policies are a few which impact innovation development. International linkages [1], global access to science [2], and knowledge production are found to stimulate innovation. Historically, the overall strategy for innovation development was to increase R&D inputs [3]. However, innovation is a dynamic and nonlinear process [4], and the alternative approach for innovation development is proposed [5,6].

The triple helix arrangements between government, academia and industry are key economic drivers for innovation and sustainable development. The triple helix partnerships foster development [7], facilitate technological advancement [8], and create an environment for innovation [5]. Engineering these partnerships

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coincides with technological and scientific discoveries [9]. Transforming these discoveries into innovative products and services results in economic and social improvements [2], maintains competitive advantage, creates jobs [3], and drives economic growth [10].

An entrepreneurial university plays an important role in successful implementation of the triple helix arrangements. The university is a natural incubator, the commercialization engine of research, and a source of new knowledge and technology. By embedding entrepreneurship education the university has potential to strengthen the triple helix partnerships and enhance the effectiveness of the triple helix model. It is acknowledged that the university is the driving force behind the triple helix system and an agent of innovations, industrialization and sustainable development, but government support might be required [5,6].

Government support is crucial for the emergence of entrepreneurial universities. For example, the US government actively promoted entrepreneurship education [11,12] and encouraged the emergence of entrepreneurial universities. Stanford and MIT are a few success examples [13]. In Russia, it is a daunting policy challenge to modernize its rigid higher education sector inherited from the Soviet period. However, in the last decade the government has harnessed Russia's creative and innovative capacity and provided an environment for the growth of investments in R&D, and emergence of entrepreneurship education and regional innovation clusters.

The main objectives of this article are to explore the process of transition towards an entrepreneurial university in Russia, the government's role, key lessons learned and a few challenges remaining. The article is divided into three main parts. The first describes the past and present triple helix relations in Russia. The second section examines the new university's role, its transition, and initiatives to establish successful trilateral interactions using a local University of Technology as an illustrative example. Finally, key lessons and a few challenges are described, policy recommendations are proposed, and a future of the entrepreneurial university and entrepreneurial education in Russia is discussed.

2. Triple Helix Interactions in Russia

The triple helix model of the university-industry-government relations has been virtually nonexistent in Russia until recently. The gaps between its institutional spheres are rooted in Russia's historical characteristics. Prior to the 1990s, institutions were fragmented with a little scope for collaboration in terms of domains of responsibility. Universities were primarily teaching institutions with low levels of academic research. The primary research institutions were Academies of Sciences focused on basic research, while its branch institutes conducted applied research. The Soviet companies, i.e., state-owned enterprises, developed autonomously and were isolated from both universities and research institutions. The government heavily invested in the military R&D. The universities, research institutions and industry had little incentives to innovate and collaborate given the realms of the Soviet economy.

As a result the innovation behaviors and entrepreneurial activities of universities, research institutions and industry were passive. The innovation infrastructure did not exist, and personal incentives to innovate were lacking. Even though the triple helix players were present, they were differentiated, and the triple helix system was dysfunctional. Since 1990s, the Russian economy has changed dramatically, and the government made active steps to provide a sustainable basis for technological progress and sustainable development. Over the last decade, the government has proposed a series of initiatives to develop the concept of an entrepreneurial university, build innovation infrastructure, and develop entrepreneurship education.

The Russian government encouraged universities to become active drivers of the triple helix system. In the late 1990s the key challenge was to stop the dissolution of national research institutions and universities due to scarce financing and a massive loss of researchers to the West. The government implemented a number of policies to strengthen and restructure universities and research institutions. Universities were given research prerogatives and the value of knowledge generated at universities was acknowledged. In addition, universities undertook the task

of becoming agents of the economic and technological development, disseminators of entrepreneurship, and knowledge commercialization engines.

There are three distinct stages of government involvement in the development of the innovation infrastructure in Russia. The initiatives for innovation development came from universities beginning in 1999, and it took a few years for the government to respond. In 2005-2008, the federal government established science and technology parks across Russia. In 2009-2011, legislature was passed to facilitate and ease innovation development. And in 2011-2012, the government provided federal grants to create entrepreneurial universities and regional innovation clusters.

A series of government initiatives supported the innovation infrastructure. The government actively encouraged the development of science and technology parks, technology transfer offices, innovation centers, spin-off programs, etc. Technology incubation centers were set up within local universities, and their entrepreneurial capacity and ability to generate, manage and promote start-ups were encouraged. In 2005, science and technology parks, i.e., special economic zones, were established throughout Russia. In addition, the Russian Venture Company, a government institution, was created in 2006 to stimulate creation of the Russia's venture industry and the allocation of the government's venture investments. ROS NANO is another federal venture fund established in 2009 for the development of nanotechnology.

Skolkovo, a large innovation and education center to be built in Moscow in collaboration with Massachusetts Institute of Technology, is the recent government's initiative. In 2012-2014, the government is planning to invest around \$3 billion in its development. Currently, more than \$200 million has already been allocated to 400 Skolkovo's residents. The government provides multiple benefits to the residents including tax cuts to ease their innovation and entrepreneurial activities. In addition, another government's initiative, "Innovative Development of State Corporations", requires each large state company to invest \$1 billion to the establishment of the Skolkovo's endowment fund.

The Russian government introduced a favorable regulatory environment to support innovation development. In 2009-2010, the government passed the Federal Law 217 and Federal government decrees 218-220 [14,15] to create opportunities for effective bilateral collaboration between the three institutional spheres. The Federal Law 217 is similar to the US's Bayh-Dole Act with the objective of encouraging innovation and research by companies and universities. The Law created a collaborative environment between universities and companies, encouraged the involvement of scientific and technological institutions in the innovation process, and stimulated innovation development. It encouraged companies to establish partnerships with universities and get engaged in joint R&D activities and technological innovations.

Three federal government decrees were passed in order to stimulate R&D, establish bilateral university-industry interactions, and support leading researchers. The Federal Government Decree 218, "The Federal Support of Cooperation Development Between Higher Education and High Tech Industry (April 9th, 2010)", allocated \$633 million during 2010-2012 for the joint industry-university projects to encourage R&D by universities, establish bilateral industry-university interaction, and stimulate development of innovative products, technology, and production processes. Projects funded were selected on a competitive basis according to the following 3 selection criteria. First, a project proposed by a research institution and a company must require joint R&D at the research institution. Second, the company needs to match the government grant with its own funding. Third, at least 20% of federal funding is to be used for R&D. Each individual project was awarded up to \$10 million for 3 years.

The Federal Government Decree 219, "Federal Support of the Innovation Infrastructure Development in the Higher Education Sector (April 9th, 2010) awarded up to 267 million during 2010-2012. The goal of the program is to support innovation infrastructure development such as business incubators, engineering centers, certification centers, transfer technology centers, information centers, and innovation consulting centers. Funding is also allocated for the development of entrepreneurial education and technology transfer consulting services. All

research institutions of higher education in Russia are eligible to compete, and each winner is awarded up to \$1.7 million per year for up to 3 years.

The Federal Government Decree 220, "Support of Leading Scientists in the Higher Education Sector (April 9th, 2010)" awarded \$400 million in 2010-2012 to leading researchers on the competitive basis. Total of forty researchers received up to \$5 million for 2 years with a possible extension of up to 2 years. Joint applications between a researcher and a research institution were considered. The grant winner is expected to form a research team, establish a research lab, and make contribution to his/her area of research. The total individual compensation of the leading researcher can't exceed 60% of the grant.

The recent government's priorities in the context of the triple helix model are to facilitate trilateral collaboration as a part of Russia's strategic economic development. In 2011, the government established a large grant programs to encourage transition of distinguished universities to become entrepreneurial universities. In 2012, the Ministry of Economic Development became the organization in charge of the regional innovation cluster development to establish, recognize, and stimulate the development of regional innovation clusters across Russia. Ten regional clusters will be selected on a competitive basis, and each will be awarded \$80 million in the development funds for the next 5 years.

It is a daunting policy challenge to implement the triple helix model in Russia. Even if the Association of Business Angels of Russia and the Association of Russian Venture National Organizations created venture industry, the initiatives to create the triple helix strategy came from universities. A few leading universities took active steps in promoting entrepreneurship education, transition toward an entrepreneurial university, and creation of regional innovation clusters. The first technology incubator in Russia was established in 2005 in Tomsk. The incubator was built within a local University of Technology with aspirations to become an entrepreneurial university.

3. Transition toward an entrepreneurial university

Until recently Russia did not have entrepreneurial universities. Tomsk State University of Control Systems and Radioelectronics (TUSUR) is a University of Technology striving to become the core of a regional innovation cluster and the first entrepreneurial university in Russia. Its traditional mission evolved from education to include research and knowledge commercialization. The university has legal control over its academic resources and intellectual property emanating from its academic research, it dedicates 41% of its budget to research, and it is capable to transfer its technology through patenting, licensing, and incubation. The university grants all intellectual rights to the inventor. Team projects and "learning by doing" teaching methods, independent study plans, and access to innovation infrastructure complement the traditional engineering education at the university. Students are encouraged to become entrepreneurs in advanced areas of science and technology and are offered opportunities to incubate their technological projects. The university encourages interdisciplinary research, promotes entrepreneurial education, and collaborates with industry to establish joint research funding. It has a developed innovation infrastructure, scientific collaboration and joint R&D projects with industry, and a cluster of firms closely associated with the university.

TUSUR is a top Russian University of Technology in applied research with developed innovation infrastructure. It is a public university known for its programs in nanotechnology, telecommunication, electronics, and entrepreneurship education. It is a member of the Russian Association of Entrepreneurial Universities ranked in the top-ten universities in Russia in terms of innovative technologies and entrepreneurship indicators. On the road towards becoming an entrepreneurial university, TUSUR is one of the first Russian universities to undertake reorganization as a whole institution and modify its mission to promote entrepreneurship education, innovation in technology, and knowledge commercialization. The university has an extensive infrastructure to ease the transition from an idea, to product development and the first product sales. The infrastructure includes a student

business incubator, technological incubator, science park, knowledge commercialization office, patent office, marketing department, start-up consultation services, and an association of spin-off firms.

The association of spin-off firms, “UNIC”, is a high-tech innovation and technology cluster. It is a geographic concentration of the university as the core and the interconnected high-tech firms. “UNIC” is an interface between university research and its industrial application. The firms have R&D capabilities, innovative products, and complete production cycles, and get engaged in collaborative research projects with the university. In 2011, “UNIC” accounted for 80% of hi-tech revenues in the region, invested \$14 million in TUSUR, and earned \$506 million in total revenues.

“UNIC” is a result of bottom up initiatives by TUSUR’s leadership. Since 1999 to 2005, the university actively modernized its mission and stimulated the development of innovation infrastructure. The government's initiatives followed up to assist the university’s vision and funded the establishment of its innovation infrastructure. In 2005, a science park, Tomsk Economic Zone, was established to assist innovation and product development in telecommunication, electronics, material science, nanotechnology, biotechnology, and medical technology. The Federal Law 217 eased the formation of the spin-off firms by the university. The Federal Government Decrees 218-219 encouraged bilateral collaboration between the university and industry and strengthened its innovation infrastructure. There are 3 companies in Tomsk receiving \$10 million grants according to the Decree 218 to establish collaboration with TUSUR, conduct joint R&D, and develop innovative high tech products, technology, and production processes.

During 2012-2014, the university has been awarded a \$10 million federal grant to facilitate its transition to an entrepreneurial university. The grant’s objectives are to increase cooperation between the university and its business environment, to develop recommendations on how to form innovative clusters of interdependent industries and adjoined regions, and to make “UNIC” the growth cluster for Tomsk and Russia.

In 2011, a series of government initiatives aimed at strategic regional development. For example, the “INO Tomsk 2020” is the grant to develop regional infrastructure and promote economic growth. The development of innovation infrastructure is a one of its objectives. Another federal initiative is the Innovation Cluster Development Program (2012-2016) with the purpose to maintain competitive advantage of educational, research, and innovative capacities of the region. TUSUR is recognized as the core of the Tomsk Regional Innovation IT and Electronics cluster. The cluster includes 5 local universities, more than 100 companies, 3 research institutions of Academy of Sciences, and local government departments. It offers open membership for companies and research institutions working in the area of IT and electronics in the region. The program will fund the development of the cluster’s telecommunication infrastructure, innovation infrastructure, certification and prototyping centers, and international marketing centers. In addition, the cluster plans to create its own venture fund.

The Russian government provides long-term initiatives to strengthen the basic elements of a triple helix model consistent with the triple helix strategy. The government initiatives fund the development of innovative firms, clusters of high-tech firms, and regional innovation clusters. A new legal framework has been developed to minimize the costs of knowledge commercialization, to support the emergence of entrepreneurial universities, and to encourage industry-university links. The government’s grants promote bilateral and trilateral cooperation on regional and national levels.

4. Future of entrepreneurial university in Russia and policy recommendations

The effectiveness of the triple helix model in Russia is difficult to assess. The transition towards an entrepreneurial university is underway, the basic elements of a triple helix regime are active, and each helix has been strengthened through various government initiatives. There are no formal evaluation methods available to measure the trilateral collaboration. The main obstacles remain institutional gaps that hinder the effective application of the triple helix system; the lack of institutions to promote a culture of trust, transparency,

collaboration, and effective governance; a lack of synergy between academia, industry, and government; dysfunctional innovation infrastructure; weak industrial capacity for R&D; and lack of collaboration.

The transition towards an entrepreneurial university in Russia appears to be insufficient to generate a new wave of more systematic trilateral interactions leading to a greater capacity for innovation. The university's activities alone isolated and unrelated to the industrial policies but devoted to the incubation of companies, creation of science and technology parks, and knowledge commercialization are unable to produce significant impact on the system of innovation. Technology parks and business incubators do not generate much spin-off activities. Bureaucracy and lack of resources at the university fail to commercialize university's research.

Successful transition towards an entrepreneurial university in Russia depends on domestic demand for R&D. There is a mental and cultural gap between the university and industry, and companies underinvest in their R&D. Tax incentives and bilateral research grants can encourage firms to develop their R&D capacity, get engaged in joint research projects, and use the university's innovation infrastructure, resources, and human capital.

Innovation interaction and collaboration in Russia might be difficult. The reasons for a lack of collaboration include differences in organizational missions, human resources policies, and reward systems. The government initiatives need to remove the constraints that impede the development of the 'triple helix culture'. The federal government's research grants create conditions for bilateral and trilateral cooperation, increase the level of interaction between the firms, universities and government.

Strong government support is required to guarantee success of the triple helix culture in Russia, emergence of entrepreneurial universities, and acceptance of institutional change. The government needs to continue to provide institutional capacities and funding that would make triple helix more effective as a model for innovation and sustainable development. The basic elements of a triple helix regime need to be strengthened by long-term grants to support the emergence of entrepreneurial universities, innovative firm formation, and regional innovation clusters. In addition, a non-profit foundation with the mission of supporting institutional change and entrepreneurial culture as well as a national fund to reward the best models of an entrepreneurial university need to be established.

5. Conclusion

Russia has a developed system of production and a system of research, but the two systems historically were isolated and interactions between actors were too insignificant to generate innovations. Over the last decade, a number of steps have been taken to stimulate innovation, build innovation infrastructure, encourage trilateral cooperation, and promote entrepreneurial culture. Universities initiated the transition towards an entrepreneurial university. Government initiatives encouraged development of innovation infrastructure, provided a legal framework to establish bilateral collaboration between the triple helix players, and encouraged transition toward entrepreneurial universities. Development of the regional innovation clusters of economic growth and encouragement of trilateral university-industry-government interactions are major components of the future strategic development of the Russian Federation.

The results of innovation development in Russia are inspiring. There are numerous entrepreneurial activities, and awareness of the triple helix model is growing. Over the last decade, Russia has built an innovative infrastructure, created entrepreneurial culture, and moved towards an entrepreneurial university. Universities were the original drivers of the triple helix model. TUSUR is the example of the first entrepreneurial university in Russia and the core of the regional IT and electronics innovation cluster.

Entrepreneurial universities are still in their infancy in Russia, and it is crucial to continue to strengthening their entrepreneurial potential. Government grants need to provide incentives for continual transition toward entrepreneurial universities and join R&D activities between university and industry. It is important to align the transition with Russia's long-term economic growth strategy to create an endogenous innovation capacity necessary for transition to a knowledge-based society.

A few lessons can be learned from the Russian experience. In developing countries, traditional values and institutions might be the major obstacles to the triple helix model of university-industry-government. Government intervention is required to create conditions for synergetic cooperation between the triple helix players. A series of government initiatives might be necessary to introduce working mechanisms of knowledge commercialization and technology transfer, to encourage creation of innovation infrastructure, entrepreneurial universities, and regional innovation clusters.

Achieving sustainable change remains a fundamental challenge. Long-term and consistent government initiatives are required for the successful implementation of the triple helix model and transition toward an entrepreneurial university to create fundamental institutional changes accepted over time. The most advanced stage in the development of a triple helix regime in Russia is not in place and might require years to arrive.

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References

- Saxeian, A., & Hsu, J.Y. (2001). The Silicon valley-Hsinchu connection: technical communities and industrial upgrading. *Industrial and Corporate Change* 10:4, 893-920.
- Calestous, J., & Yee-Cheong, L. (2005). *Innovation: applying knowledge in development*. UN millennium project task force on science, technology, and innovation. United Nations Development Program. Sterling: Earthscan.
- Millbergs, E. (2004). *Measuring innovation for national prosperity*. National innovation initiative – innovation framework report, version 3.0, IBM corporation, 1-18.
- Epquist, C. (1997). Systems of innovation approaches – their emergence and characteristics. In C. Equist (Eds.), *Systems of organizations* (pp. 35-43). London: Pinter/Cassell.
- Etzkowitz, H. (2001). *The triple helix: university-industry-government innovation in action*. New York: Routledge.
- Etzkowitz, H. (2008). *The triple helix: university-industry-government innovation in action*. New York: Routledge.
- Asheim, B.T., & Coenen, L. (2004). Knowledge bases and regional innovation systems: comparing Nordic clusters. *Research Policy* 34, 1173-1190.
- Schacht, W.H. (2010). *Cooperative R&D: federal efforts to promote industrial competitiveness*. Washington, DC: Congressional research service, 78-95.
- Dawes, S.S., & Eglene, O. (2004). *New model drawn from multi-national research*. Center for Technology in Government. Working paper series, 1-17.
- Drucker, P.F. (1988). The coming of the new organization. *Harvard Business Review* 66 (1), 45-53.
- Bok, D. (2003). *Universities in the market place. The commercialisation of higher education*. Princeton: Princeton University Press.
- Schramm, C.J. (2006). *The entrepreneurial imperative*. New York: Harper Collins.
- Etzkowitz, H. (2007). *MIT and the rise of entrepreneurial science. Studies in global competition*. London: Traylor & Francis.
- Federal law 217, Russian federal law.
- Federal government decree 218-220, April 9th, 2010.