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Abstract

Russia is striving to modernize its economy and diminish its reliance of exporting oil and gas. Building innovation economy is taking a central part in the Russian strategy for modernisation. This article tries to observe the process from point of view of the Russian small innovation companies and asks two questions: i) are the state support measures adequate and ii) to what extent are small innovation companies in Russia linked and aware of the international opportunities?

Contents

1 Introduction

Science and technology were two areas in which the Soviet Union managed to reach fair degree of success. However in line with the economic and political doctrine it represented centrally managed system where little or no initiative was tolerated and thus where bureaucratic but not entrepreneurial spirit was valued most.

After the collapse of the Soviet Union in the difficult economic conditions of the 1990s Russian scientists found themselves in dramatically different situation with little governmental attention and funding. As a result the number of active researchers plummeted. Many gave up their jobs and many just migrated to the West. The Russian science and innovation potential was still there but in dire straits.

During the last ten years together with the oil prices grew also the financial might and ambitions of the Russian government. One of these ambitions is to diversify the Russian economy and by making it knowledge intensive to diminish its dependence upon exports of natural resources. Regretfully the current approach of the authorities tends to favour the central planning and the Soviet management style trying to reinvent the state owned corporations in many industries and lately also in the field of innovation and technology.

In Russia the government sector of science is absolutely dominating, industry is supporting Research & Development /R&D/ at a very modest scale, and linkages between R&D sector and industry are weak. During the last ten years the Russian government has undertaken an effort to create market-oriented innovation system with a special emphasis in recent years on stimulating development of linkages between government R&D sector, universities, and private companies. However, just as before, state dirigisme is at the heart of this attempt and little emphasis is put on fostering the entrepreneurial spirit of different participants.

This paper tries to offer a glimpse into the problems that the Russian innovation system experiences on a macro level and the response of innovation SMEs in their attempt to offset the lack of support by establishing international partnerships. Thus in its focus are two issues: i) the adequacy of support for small innovation companies within the Russian innovation system and the ii) the interest and readiness of Russian small innovation companies to seek and exploit international opportunities in one form or another.

The paper starts with setting the theoretical framework and formulating the main research questions. Section 3 offers brief general review of the Russian innovation system and then focuses on the main governmental support instruments available for small innovation companies. Section 4 argues how strengthening the international dimension of the Russian innovation system may help filling certain gaps in both volume and adequacy of the existing support measures. Finally the paper offers a glimpse into the developments on the ground by investigating how capable and ready are Russian small innovation companies in utilizing various international opportunities. That is done through a small survey of 38 small Russian innovation companies that aims to probe their general level of interest and preparedness to recognize and exploit international opportunities.

The process of exploitation and development of a business opportunity in the field of commercializing innovation may certainly gain new impetus and drive if it is implemented in a global setting. Undoubtedly that will mean that Russian scientists as well as managers and entrepreneurs in innovation SMEs must develop business orientation and skills (Tovstiga et. al 2004) that may help them establish international joint ventures. Such strategy may effectively help them bypass the numerous problems occurring due to the imperfections in the operational interaction between the different stakeholders in the Triple-Helix model (Etzkowitz & Leydesdorff, 1995).

2 Theoretical framework

The presented research is of inter disciplinary nature and thus draws from several literature streams. The first includes studies of innovation systems (Freeman 1987, 1988, 1995; Lundvall 1988, 2003; Nelson 1992; Pelican 1988; Pavitt 1998), regional innovation systems (Cooke 1992) and quite importantly internationalisation of R&D (Patel & Pavitt 1991; Tidd et. al 1997; Patel 1997; Pavitt & Patel 1999; Patel & Vega 1999). With the exception of very few relevant studies (Carlsson 2006; Niosi & Bellon 1994, 1996; Bartholomew 1997; Fransman 1999; Archibugi et. al. 1999; Niosi et al. 2000) there are not many studies of the degree of internationalisation of innovation systems.

The second underpinning of the theoretical framework is anchored in the fundamental theories of International Business /IB/ (Hymer 1960; Vernon, 1966; Hennart 1982; Dunning 1988; Bartlett & Ghoshal 1989; Ghoshal & Bartlett 1990; Calof & Beamish 1995). However their scale and focus may be too wide for the specific research questions raised in the project and thus further narrowing of the theoretical framework is needed. From the wider domain of IB theories the article draws on theories dealing with internationalisation of firms in general and particularly with the internationalisation of SMEs (Johanson & Vahlne 1977; 1990, 2003, 2006; Welch & Luostarinen 1993; Johanson & Matson 1988).

At the same time the inquiry into innovation SMEs internationalisation aspirations and abilities clearly enters the field of international entrepreneurship (Miesenbock 1988; Knight & Cavusgil 1996; Oviatt & McDougall 1994, 1995, 2000; Chetty & Holm 2000; Zahra et. al 2005; Rialp et. al 2005; Zhou et. al 2007).

The international expansion of emerging market enterprises only recently started to attract attention by scholars conducting research within the field of international business. The researcher's interest was so far largely focused on the experience of larger companies from emerging economies such as India, China, Russia and Brazil (Liuhto&Vahtra 2007, Buckley et al. 2007, Yiu et al. 2007, Filatotchev et al. 2007). There is quite limited stream of literature dealing with internationalisation of innovation SMEs from Russia (Den Hamer et. al. 2000, Dezhina & Graham 2001, World Bank 2002, Bortnik 2004, Tovstiga et. al. 2004). Their contribution opens an exciting subject that deals within the cross point of various research streams depending on the view point of the researcher.

Within the formulated above framework of analysis this research explores the general environment with its focus on the interaction level between different actors in the Russian innovation system and the type, scale and availability of support to R&D organizations. Therefore the first research question could be constructed and formulated as:

> *RQ1) are the available support mechanisms for supporting small innovation companies adequate?*

Zahra and George (2002) conclude that greater attention has been given to the content of new venture internationalisation strategies than to the processes by which these strategies are developed and implemented. That is the starting point at the heart of the second research question. It focuses not on the internationalisation strategy per se but on the process that precedes its crafting by the Russian entrepreneurs and managers. Thus the second research question can be formulated as:

> *RQ2) are Russian innovation SMEs aware of the available international opportunities and capable to exploit them?*

It assumes and attempts to verify the extent to which Russian small innovations companies are isolated from the international markets and the opportunities it offers be it in financing, marketing, R&D, sales etc. Such “isolation” might be due to number of factors.

3 Innovation SMEs within the Russian innovation system

3.1 Overview of the Russian innovation system

Russian R&D complex consists of three large sectors: 1) government, including institutes of the Russian Academy of sciences and five other government academies, 2) higher education, and 3) the so called industry sector that also includes many government-owned R&D organizations[2]. The correlation between the three sectors is 29.6% (government sector) – 6.2% (sector of higher education) – 64.2% (industry sector)[3] (Indikatory nauki, 2009, p.80).

At the same time if observe at the structure of R&D expenditures by type of ownership, it becomes clear that in reality the government sector is much larger – 72.2% of all R&D is performed at government-owned R&D organizations, and only 13.9% is performed by private organizations[4] (Indikatory nauki, 2009, p.82). For comparison, governmental R&D organizations perform 11.1% of R&D in the USA, 10% in UK, 9.2% in Canada, 13.8% in Germany, 17.3% in France[5] (Indikatory nauki, 2009, p.312). By type of property (government-own budgetary organizations, federal unitary enterprises) the government science is the largest by the number of employees and by the amount of financing it receives from the federal budget - 77% of total R&D manpower employed at the government-owned organizations, 73% of organizations conducting R&D are state-owned (are in federal property) which represents slight increase over last 10 years.

The so called “industry R&D sector” includes both private companies and government-owned organizations. As of 2007 private companies contribute 29.4% of the national R&D expenses which shows decline compared with 2000 (32.9%) (Indikatory nauki, 2009, p.79).

The offered above numbers may indicate why the development of linkages between science and business is complicated – the government sector of science (dominant) does not have real stimulus to cooperate with industry (whose active in terms of R&D part is also government dominated). Furthermore the creation of small firms that in many countries happens through spin-offs from universities, in the Russian case is hampered by lack of research potential concentrated in universities, as well as legal

[2] These are former so-called “branch” institutes that were under auspices of different ministries.
[3] Data for 2007.
[4] Data for 2007.
[5] Data for 2007.

obstacles to creation of such spin-off companies by universities as government establishments.

After the dissolution of the Soviet Union the Russian government started a variety of activities in order to link R&D organizations, universities, and business sector. The major initiatives were undertaken in the following areas:

1. support of small innovative enterprises through R&D grants and creation of technical infrastructure (such as technology parks, innovation technology centres and such);
2. encouraging cooperation between R&D sector and private companies through support of joint projects;
3. creation of favourable legal environment for innovation (IPR regimes, etc.).

3.2 Support measures for small innovation companies

Small enterprises are among key components of the national innovation system because they are expected to be the bridge between research organizations and industrial enterprises and take at their own the risks associated with first stages of commercialization process. As Table 1 demonstrates the dynamics of the number of small innovative enterprises is negative.

Table 1. Dynamics in the number of small innovative enterprises in the economic sector "Science and science services"[6]

	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**
Number of small innovative enterprises, thousands	43,9	38,8	37,1	30,9	28,5	22,7	22,1	20,7
Change in the number of small enterprises, % to the previous year	-6	-11,6	-4,4	-16,7	-7,8	-20,4	-2,6	-6,3

Source: Science in Russia at a Glance – 2005. Statistical Yearbook. M.:CSRS, 2005, p.22.

Not only was the total number of small innovative companies decreasing but also their share among all small firms in general (Table 2). At the same time the firm size has grown from 7 to 10 employees which may be an indicator of the situation when weak

[6] The statistical information for the economic sector "Science and science services" was collected till 2005 and since then no data is gathered for small innovative companies. There are only sample surveys related to different aspects of functioning of small innovative companies.

firms die faster than new firms are born. And thus stable working companies at an expansion stage dominate the small enterprises sector.

Table 2. Indicators for small innovative enterprises registered in the economic sector "Science and science services"

	1998	2000	2002	2004
Number of small innovative enterprises, thousands	38,8	30,9	22,7	20,7
Share of small innovative enterprises in total number of small firms, %	4,5	3,5	2,6	2,5
Number of employees at small innovative firms, headcount (thousand)	263,1	191,9	166,0	200,4
Number of employees per one enterprise, headcount	7	6	7	10

Sources: Science in Russia at a Glance – 2005. Statistical Yearbook. M.:CSRS, 2005, p.22; Maloe predprinimatelstvo v Rossii - 2004. State Committee on Statistics of RF. Statistical yearbook. M., 2004.

The decrease in the number of small companies may be explained first of all by the fact that business/innovation infrastructure – tax, capital and financial markets, administrative barriers restrains emergence of a vibrant sector of small innovative enterprises.

Presently the share of industrial enterprises in Russia that are innovation orientated is rather low. According to State Committee on Statistics only 9.4% of Russian enterprises implement innovations (Indikatory innovatsionnoy deyatelnosti, 2008, p.16)[7]. Their share remained low throughout 2000 – 2006 fluctuating between 9.3% and 10.6%. As a comparison in the OECD countries this indicator varies from 25% to 80% with an average equal to 44% (OECD, 2002). Also the share of enterprises that is conducting R&D is decreasing (Table 3): if in 1997-1998 it was about 50%, in 2006 it was one-third of all innovative enterprises.

Table 3. Dynamics in the share of enterprises conducting different types of innovations (in percent to the total number of innovative enterprises)

Enterprises conducting:	**1998**	**1999**	**2000**	**2001**	**2002**	**2004**	**2005**	**2006**
R&D	54,3	35,1	42,7	35,5	33,6	30,7	31,6	33,4
Purchase of equipment	50,7	53,4	62,2	61,0	61,6	64,5	63,5	67,8
Purchase of software	17,7	28,3	26,2	25,0	23,9	28,5	27,2	26,9
Personnel training	18,9	20,1	25,4	22,9	23,6	25,4	22,5	23,0
Marketing	19,7	18,5	19,5	20,1	20,1	20,0	18,7	14,3

Sources: Intellectual Property in Science and Technology Complex. M.:CSRS, 2004, p.35; Science in Russia at a Glance: 2006. Statistical Yearbook. M.:CSRS, 2006, p.156; Indikatory innovatsionnoy deyatelnosti, 2008, p.20-21.

[7] Data for 2006.

Most of firms purchase new equipment – almost 70%, and thus the largest expenditures firms allocate for this purpose – 54.6% in 2006 (Indikatory innovatsionnoy deyatelnosti, 2008, p.45). However in mid-2000s there was an indication of a growing interest from side of large Russian industry, especially resource extracting, in financing R&D and in creation own in-house R&D divisions. Thus, R&D divisions were opened at large industrial groups like “TNK”, “YUKOS”, “LUKOIL”, “Norilsk Nickel”, “SYSTEMA”. However with the beginning of economic crisis these companies started to cut their expenditures of R&D as well as personnel at their in-house R&D divisions. Overall the volume of expenditures that firms allocated for R&D was low – 14%-18.5% in 2000-2006 in the total expenditures of enterprises on innovations (Indikatory innovatsionnoy deyatelnosti, 2008, p.45).

The main governmental instruments supporting Russian small innovation companies are (Dezhina, 2008):

- *Fund for assistance to small innovative enterprises*
- *offering access to technical infrastructure*
- *offering participation in “mega-projects”*

These 3 deserve thorough attention in an attempt to understand the logic, nature and scale of governmental support measures.

Fund for assistance to small innovative enterprises

Direct support of R&D at small companies is not large as it is implemented by one only Fund – the Fund for assistance to small innovative enterprises. The Fund was established in 1994 by the Russian government. The financial share of the Fund for assistance in the winning projects cannot exceed 50%. Initially the money was given out as loans at preferential rates. This strategy was passive in the sense that the Fund followed developing enterprises and did not directly stimulate completely new products. Working in this relatively low-risk way, the Fund was often successful, with an average level of return on credits of 66% (Bortnik, 2004).

Later the legislation was changed and the Fund now may give only R&D grants. Simultaneously federal appropriations to the Fund increased from 0,5% to 1,5% of the expenditures on civilian science, and at the same time the overall budget for civilian science grew in absolute terms. This allowed the Fund to begin to support companies also at the seed stage. That is done in two steps. The duration of the first step is one

year during which the group of researchers or newly created small firm receives seed financing (up to about 20 thousand US dollars per project). The small firm should conduct R&D, develop the prototype, patent their development and work out a business plan. At the end of the first year the firm should demonstrate commercial potential of its product. At the second step the firm should find co-investor who is interested in manufacturing of the firm's product or the firm should start own manufacturing of the new product. In this case it will receive next portion of financing from the Fund. After the two steps the manufacturing should be actually started, and Fund stops financing the project.

The results turned to be better than expected: 20% of the start-ups[8] entered the second stage of the Program, a fully satisfactory statistic considering the difficulty of finding additional sources of financing for small science-intensive firms. Aside of that, the Program raised interest among corporations, and some of them were willing to co-finance the program. At the present time there are some projects implemented in interests of such companies as Intel, LOMO, and AFC "Systema".

The Fund also develops a number of other initiatives important for growth of small innovative enterprises in Russia. In 2005-2006 two programs were started: TEMP and PUSK. TEMP is aimed to stimulate innovation activity at small enterprises by linking them to the government R&D sector. The goal of PUSK is to raise qualification of specialists working in innovation and technology commercialization spheres. It supports training of new teams that are interested in commercialization of science intensive products. The Program is implemented in cooperation with universities. This initiative in fact stimulates creation linkages between small firms and universities: the Fund supports R&D projects implemented by students at small firms, and university professors supervise them and cooperate in this way with small companies' leadership.

The Fund employs a set of basic criteria aiming to evaluate the effectiveness of its work. These criteria include: rate of growth of production by small enterprises (must be more than 15% a year), output per employee per year (must be at least $20,000), and the amount of newly created intellectual property which has been transformed into commercial products. By these criteria, about 50% of the small enterprises ever supported by the Fund for Assistance have been successful. Interestingly not much emphasis is placed on profitability. In this respect most of the measures seem somewhat similar to old Soviet standards: rate of growth of production of small

[8] Data for 2006.

enterprises, output per person per year, etc. These criteria, interesting and helpful though they may be, do not give a very clear picture of the profit potential of the enterprises and therefore are rather silent on the question of its sustainability in the long run.

The programs of the Fund, especially in the area of support of seed stage, are very important and seem to be a success. Unfortunately with a budget of about 30 million US dollars a year the Fund is not able to produce sizeable impact. It is a pity that the generally successful experience of the Fund is inadequately used by other government agencies.

Access to technical infrastructure

Small firms receive government support also through access to technical infrastructure the creation of which was financed from the federal budget. Among all types of infrastructure there is the one which may be considered as Russia-specific and thus deserves special attention. These are innovation-technology centres (ITCs). Innovation-technology centres represent conglomerates of small innovating enterprises that are located “under one roof”, i.e. in certain compact territory (in case of today’s Russia - even in one building since the scale of most ITCs is modest).

Usually the ITC is connected to research organization or university and thus ideally ITC should serve as a bridge between research organizations and industrial enterprises. Today there are about 60 innovation-technology centres in different regions of Russia, and about half of them were formed around universities. Some of them were established on exclusively federal support and others used combined federal and regional resources.

The evaluation of ITCs conducted in 2001 revealed that for small enterprises the most attractive features in ITCs are: privileged renting conditions, possibility to take part in investment programs, and geographical location. Instruments such as training programs, consulting services, and exchange of experience with other small enterprises located in ITC or gaining international experiences are considered much less important or often not important at all.

The government support for ITC did not last long, regional authorities did not have either stimulus or friendly legal conditions to support infrastructure, and regulations in ITCs themselves did not provide flexibility and turnover of small firms thus not stimulating them to grow. Now the government moved to the idea of IT-parks as a new

type of innovative infrastructure. The worrisome aspect, however, is that projects for the creation of new technology parks is advanced without serious study of the past experience of successes and mistakes. The newly established Special Economic Zones of which some are supposed to be knowledge intensive represent another good example. Strikingly In high-tech SEZ foreign companies are not really considered as hopeful residents, which severely limits the residents possibilities of international networking be it in exchange of ideas, technologies or labour skills (Zashev, 2008). That may represent one more vivid example of how little importance Russian policy makers give to the need for more internationally minded impetus with the Russian innovation system.

Mega projects

In 2002 the government initiated a new program aimed to foster technological development and to create stronger linkages between research organizations, universities, and industrial enterprises. The support was provided at the program basis, through open competition for budget funds. The program is called “Large innovation projects of national importance” (or megaprojects). In this program government provides funds for R&D implemented in R&D organizations or universities and which results will be further commercialized at partner industrial enterprises.

This initiative is aimed to demonstrate that investments in hi-tech may be profitable for industry. Since the risks in the innovative sphere are very high, the government takes the technological risks by giving privileged support to large-scale innovative projects, and thus creates conditions for high-tech business growth. The only criterion for selecting proposals was the requirement that after the project realization the commercial sales at least five times exceed budget allocations to the contractor under the government contractual agreement. This has to show Russian and foreign investors the advisability of investing into science intensive part of Russia’s economy.

The innovative projects were chosen by a commission consisting of not only government officials and researchers, but also business representatives, and this was a novelty for Russia. Each megaproject received from the federal budget 20 million US dollars for two years, which was quite a considerable funding for the Russian scientific-innovative sphere when the first projects started. The government had to provide not more than half of the needed funding, and the rest had to be obtained from interested investors. In fact, two-thirds from the total number of megaprojects received budget financing that was equal to or exceeded 50% of the total project budget (Table 4).

Table 4. Structure of budget financing for mega projects (data for 2005)

Leading organization in megaproject	Share of budget financing, %	Number of projects
RAS institutes	More than 75%	4
Government and non-government research organizations	50-75%	4
Non-government industrial enterprises	Less than 50%	4

Source: Ministry of education and science of RF

As of today 18 projects are under implementation in the following subject areas:

- Information technologies, communications and electronics;
- New materials and chemical technologies;
- New transportation technologies;
- Production technologies;
- Technology of life support systems;
- Ecology and rational use of nature;
- Energy-saving technologies.

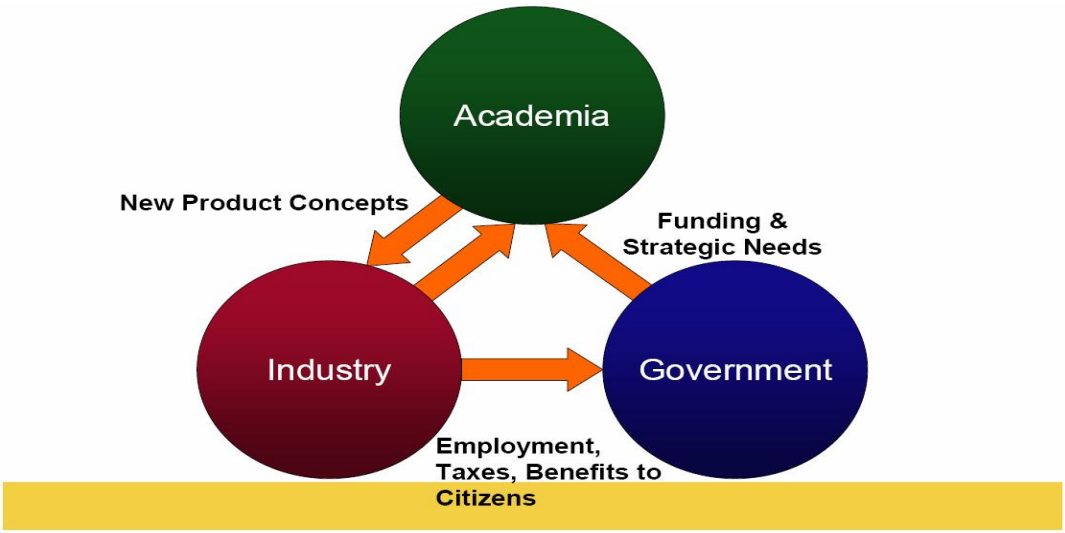
6 megaprojects were finalized in 2006 with very different results. By major criteria of (volume of sales) three are considered as a success. In our view, there are some flaws in the megaprojects as an instrument to stimulate business to innovate. The major flaw in the scheme is that financing of R&D is provided only from the federal budget, and companies do not support R&D. Another flaw is that R&D is conducted, as a rule, by research organizations (mostly government-owned) and universities, while companies join the project at the stage of manufacturing and sales. Such distribution of responsibilities does not stimulate business to increase in-house R&D and reminds the Soviet scheme of adoption of new technologies. In market economies another approach proved to be effective, when universities and business co-finance R&D. This approach also indirectly encourages the establishment of small innovative companies.

4 Adding the international dimension

4.1 International dimension role in the Russian Triple Helix model: a macro view

The first part clearly demonstrated that all governmental efforts are targeted after developing stronger links between the various players in the Russian innovation system. In recent decades three worlds of public research, business and government, which were once very much separate, started increasingly to converge. This convergence has been represented and explained by Etzkowitz through the Triple Helix model (Figure 1), which was further developed by Leydesdorff who has provided theoretical systems with which to develop the idea (Leydesdorff & Etzkowitz 1996, 1997; Jones-Evans, 1997).

Figure 1. The Triple Helix Model of Interaction between Government, Industry and Academia



Source: Source: (Etzkowitz & Leydesdorff. 1995)

The model captures multiple reciprocal relationships among institutional settings (public, private and academic) at different stages in the capitalization of knowledge.

One immediate conclusion is that the Russian innovation system in general and the support measures targeted after small innovation SMEs in particular simply lack volume. Just a brief comparison might underline that point. While the Russian state support for technology and innovation projects through START program amounted for approximately 17 million US dollars in 2006 (Fund for assistance, 2007), and through the federal goal-oriented program “R&D on Priority Directions on Science and Technology Development” (that includes all applied-oriented competition-based

projects and megaprojects) was about 325 million US dollars (Ministry of Finance of RF, 2006), in much smaller Finland in 2006 the state through its Finnish Funding Agency for Technology and Innovation invested €465 (approx. 605 million US dollars) in 2 157 R&D projects (TEKES, 2007).

Besides inadequate funding the Russian Triple-Helix is visibly suffering from a set of distortions in the interaction of the main actors – government, academia and i industry. The governmental involvement is all too big and all too inclusive. As a result the other actors prefer the role of idle consumers at the receiving end of governmental policies instead of more active players involved in mutually beneficial interaction. The Russian companies prefer to assume a role at the stage of manufacturing or sales instead of getting closer cooperation between business and academia. In the same way academia does not have somehow the initiative and the entrepreneurial spirit to establish closer relations with business but prefers to remain at the receiving end of various governmental support efforts.

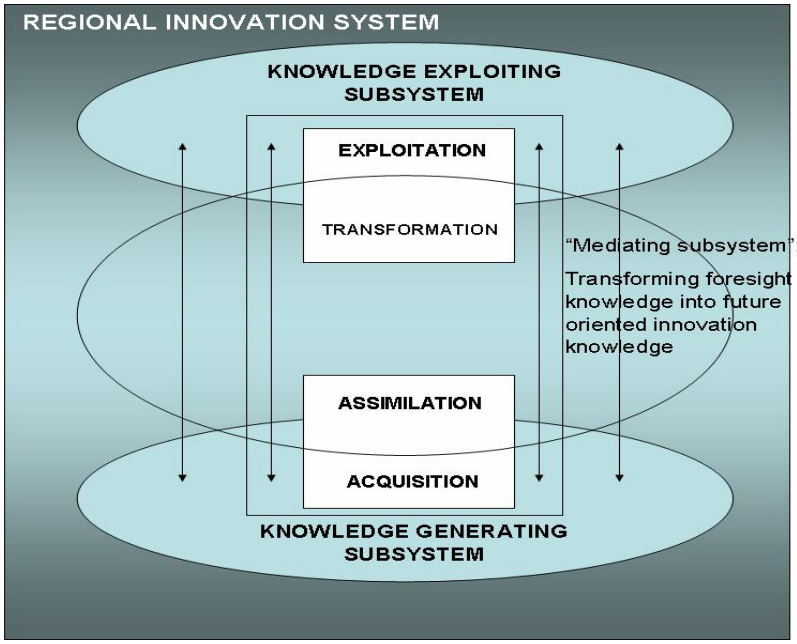
To make the situation worst, as described above, the Russian government fails to demonstrate systemic and coherent approach to supporting the cooperation between business and academia and furthermore the commercialization of innovation. Programs that demonstrate respectable rate of success are underfunded or abruptly stopped and /or replaced by other initiatives. As a result it seems the government has one too many ideas how to develop the innovation system and little patience to wait and monitor if a certain policy manages to bring tangible results. Further exacerbating the situation the government seems to lack mechanisms how to evaluate of an initiative works while many success criteria stem from some rather Soviet style economic definitions.

It is also clear that the main governmental efforts are aimed to increase cooperation between the various actors *inside Russia* - clearly no emphasis is given to developing international linkages be it international publications for researchers or commercialization that involves also international markets.

Another illustrative way to demonstrate the weaknesses of the Russian innovation system and the way its various players act and interact is offered in Figure 2. All data and analysis indicate that the biggest problem of the Russian innovation system is the lack of efficient and result oriented mediating system that can link the knowledge generating subsystem (academia) and the knowledge exploiting subsystem be it in the

form of industry, entrepreneurially oriented scientists, SMEs willing and eager to commercialize certain technology and offer it to the market, or venture capitalists specializing on innovation projects.

Figure 2. Innovative Capacity of a Regional Innovation System



Source: Uotila, et. al, 2006

What may seem to be the Achilles heel of the Russian innovation system may in fact be an excellent opportunity for foreign organizations that serve as actors within the mediating subsystem. It is not only foreign players that would be the beneficiaries in such interaction. Adding the international dimension may dramatically improve the entire system functionality. The knowledge generating subsystem may have much better opportunities to find interested partners in both R&D and the following it commercialization through participating in international research projects and networks.

The most important role for foreign companies and venture capitalists could be, however, in assuming the role of mediators between the Russian knowledge system and not only the Russian but the knowledge exploiting subsystem on a global scale. What could be the missing ingredients for this mutually beneficial cooperation is the lack of international opportunity recognition and exploitation (Zahra et. al., 2005) on the part of Russian scientists and entrepreneurs.

4.2 Innovation SME's necessity driven internationalisation: a micro view

In the 1990s many Russian scientists left the country. Of those who stayed many tried to set up their own innovation oriented companies. In most cases while the level of scientific and technological work was of very good quality, these scientist turned entrepreneurs experienced significant problems when it comes to the commercialization of their technology. In particular they lacked skills and capabilities in critical areas, including, assessing the market potential if their technologies, understanding and fine tuning of their product and / or service offering to customer needs and process and quality management. (Tovstiga et. al, 2004). Furthermore the problem was deepened by the fact that post-Soviet era generation of scientists and technologists needs to succeed in shifting their mindsets. Especially in their internationalisation process a change was needed from central-planning oriented thinking and management styles to more proactive entrepreneurial spirit and international mind.

However the current approach of the authorities, as presented above, also favours central planning and state control. Furthermore for many Russian innovation SMEs the support measures offered by the government are i) insufficient in volume, ii) instable due to abundance of new governmental initiatives and lack of patience testing and seeing the results of previous ones and finally iii) with somewhat unfocused set of performance criteria.

Within this policy setting it is reasonable to expect that both the government and companies will be interested to involve as much as possible international actors. Apparently the evidence indicates that that is not the case judged by governmental actions and priorities. In other words small innovation companies must internationalize by own means and desire. Thus in their case the motives are much less opportunity driven than necessity driven.

To what extent Russian innovation SMEs are aware of the existing international possibilities is relatively not researched topic and definitely not researched when it comes to reviewing their ability to be aware of and pursue international business opportunities. This article chooses the McDougall & Oviatt (2000) definition stating that IE is "the discovery, enactment evaluation and exploitation of opportunities across national borders to create future goods and services". This definition builds on the growing view that company's entrepreneurship centres on the recognition and

exploitation of opportunities. Reviewing prior international entrepreneurship research Zahra & George (2002) conclude that greater attention has been given to the content of new venture internationalisation strategies than to the processes by which these strategies are developed and implemented.

Within this theoretical setup and based on the above presented analysis of the Russian innovation system two research questions were put in focus:

RQ1) being subjected to inadequate support are Russian innovation small companies actively searching for international cooperation possibilities?

RQ2) how connected are Russian small innovation companies with the international business and innovations networks?

In order to check answer the two research questions a simple questionnaire was constructed and disseminated to small innovation companies from different Russian regions. The survey content is shown in Box A.

Box A. Questionnaire content

Name of Company
N of personnel

Q1. Do the top managers of your company command English language?
a) No **9** b) Average **16** c) Fluently **14**

Q2. Does your company participate in international conferences / exhibitions?
a) No **14** b) yes, less than 1 per year **19** c) Regularly **5**

Q3. Does your company have a subscription to specialized international journals?
a) No **29** b) Yes **9**

Q4. Have you been looking for foreign partners in the last 5 years?
a) No **12** b) we are actively searching at present **17** c) we are already working with foreign partners **11**

Q5. Did your company conduct market analysis about the actual demand of your product / service at a global scale?
a) No **16** b**)** Yes **22**

The first question deals with the command of English language among top managers in the surveyed company. The idea behind the question was that language skills widen international horizons in terms of ability to read foreign articles, keeping foreign correspondence and efficiently participating in international forums. The second

question has the obvious purpose to examine to what extent the SMEs have the natural curiosity and capability to participate in international conferences in their technology field as these are good way to compare company's own standing and check upon competitors as well as potential partners and clients.

The next question is also quite indicative. One of the more telling ways to evaluate the interest of given innovation SME in the global developments in their technology field is by checking if it is subscribed to specialized international journals. The latter help be informed and in touch with the latest developments on a global scale. The next question is the key one for research question 1 frankly asking if the company is searching for foreign partners. Finally as an indication about the need to position company's standing not in local but in a global context the questionnaire asks if the company has examined the international demand for its product / service.

The questionnaires were disseminated in 2009 to 82 companies from various Russian regions excluding Moscow and Saint Petersburg[9] and 38 answers were received – all of them provided by the company's top managers. Many of the companies were from the very innovation-technology centres described in section 3. The interviewed companies were relatively small. Only 3 companies had more than 20 employees, 10 companies had between 10 and 20 employees and 18 companies with personnel varying between 2 and 10 employees (7 companies did not disclose their number of employees).

The obtained results proved intriguing. Somewhat surprisingly it appears that most of the company's top management speaks some English with 37% fluently speaking and 42% speaking at intermediate level (even if that may mean many different things). Thus it could be observed that the language barrier is not really significant obstacle. More than half of the observed companies participate in international conferences – 50% participate occasionally (less than once per year) and 13% participate regularly. Still sizeable 37% do not participate at all.

Russian innovation companies seem not interested to invest in subscription for specialized (in their field) international journals magazines. Only 24% of the questioned companies do have subscription to some international journal. That could be

[9] At present the same questionnaire is disseminated to innovation companies from Moscow and Saint Petersburg the idea being to compare the internationalisation efforts and capabilities between companies from the regions versus companies from big international cities such as Moscow and Saint Petersburg.

interpreted as quite symptomatic as to some extent it indicates little interest towards what is done in the field internationally. Some respondents mentioned using for such purposes the Internet but it is questionable if it is realistic substitute for the focused and actual information stream offered by specialized magazines. That apparent reluctance to subscribe specialized journals is especially interesting provided that 58% of the companies declared to have conducted a market analysis dealing with the global demand for their product / service. It is worth mentioning that at 42% the number of companies that do not know if their product / service has global demand is significant.

The most interesting results appeared regarding the search for international partners. 11 companies (29%) informed to be already working with foreign partners and 12 companies (32%) neither had nor searched for a foreign partner. 45% of the companies informed that they are actively searching for foreign partners at present. That will mean that more than 70% are either utilizing cooperation with a foreign partner or actively looking for one.

To confirm this interest for foreign cooperation all companies were scanned for the presence of Internet site and its availability in English language. The main assumption behind such scan was that small innovation company looking for partners (foreign or domestic) will naturally seek maximum visibility. Due to the typical for their size financial constraints the optimal way for gaining visibility and publicity seem to be the Internet or that is setting up a web site and promoting it. If the company interests include also looking for foreign partners it will be ordinary to expect that the web site will have an English version. Startlingly from the 38 surveyed companies only 12 (32%) did have web sites. Even more astonishingly of these 12 web sites only 1 had its English version. Therefore there seem to be huge discrepancy between the intentions (45% seeking actively foreign partners) and actions (1 company only with web site available in English).

5 Conclusions

During the transition period the Russian government pursued a number of initiatives aimed at creation of market-oriented innovation system. Big attention was given, especially in recent years, to support of linkages among major actors of innovation system. A number of successful schemes were found, and some were effectively adopted from the foreign experience. At the same time the average picture continues to be very uneven and less prominent then it was expected. The major flaws in government regulations of R&D and innovation activity are: absence of systemic and consistent approach, of regular evaluation and correction, if necessary, of the government initiatives. Furthermore the dominant role of the government seriously hinders the development of entrepreneurial spirit within the innovation system.

Thus for many Russian innovation SMEs the support measures offered by the government are i) insufficient in volume, ii) instable due to abundance of new governmental initiatives and lack of patience testing and seeing the results of previous ones and finally iii) with somewhat unfocused set of performance criteria. In the absence of coherent policies and support measures it will be natural to assume that foreign partners will be quite welcomed for both the authorities and innovation companies. However the findings of this article indicate that neither is the case. There are no governmental programs targeted to encourage international cooperation of innovation companies. Furthermore the governmental incentives do not see any special role for the international dimension and somehow treat the Russian innovation system as an isolated object.

In the absence of adequate support by the government it will be natural to expect that Russian small innovation companies will seek their own ways of establishing international linkages. Indeed the findings of this article confirm that such companies are actively searching for foreign partners. Still while language proves not to be seemingly an obstacle the companies appear to be unprepared and inexperienced for international markets. The main problems identified are lack of elementary international marketing skills (visibility) and somewhat isolation from the international developments in their field that further exacerbates the creation of competitive and appealing message to foreign funders or partners.

Thus while Russian small innovation companies do recognize the existence of international business opportunities the majority of them are neither sufficiently linked

nor sufficiently prepared to utilize them. That calls for support measures by various policy makers and support organizations (business incubators, technology parks, special economic zones etc.). Such support measures need not be sophisticated: subscription for specialized international journals, assistance in attending international conferences, training managers in international marketing and entrepreneurship etc. are only part of the perhaps small but concrete steps needed.

International entrepreneurship is a process often triggered by the natural curiosity in a combination with growing international knowledge, skills and experience of entrepreneurs (also scientists). These are too difficult to be developed in the conditions of a relatively isolated domestic innovation system. Unless more entrepreneurship is inserted in the system and more emphasis is put on developing and nourishing international links the attempts to modernize the Russian innovation system will remain patchy at best. Unless Russian innovation SMEs are not given more tangible and focused assistance in their internationalisation attempts their abilities to do it with own means will remain quite modest.

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