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**Research Career Development in Russia: the Role
of International Mobility**

Nadia Asheulova

St. Petersburg Branch of the Institute for the History of Science and Technology, Russian Academy of
Sciences

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St. Petersburg Branch of the Institute for the History of Science and Technology, Russian Academy of Sciences

Abstract

The paper presents the results of a research whose main interest was to analyze international mobility of Russian scientist at the different historical stages and its impacts on the professional trajectory of young researchers, his/her career development. The paper considers in detail the current challenges, barriers, new policy initiatives for international mobility in Russia. The findings highlighted that the mobility plays an important role in boosting academic career and can solve some problems of science organization. The ‘international mobility’ of scholars proves to be a significant new instrument for reproducing the scientific elite.

Keywords: reproduction of the academic staff, academic career, a young scientist, scientific network, ‘school of thought’, graduate school, research group, international mobility.

Introduction

Since the last decades, Russian science has undergone very important reforms with the aim of focusing on innovative development. It is therefore of strategic importance that a satisfactory recruitment of talented people to the science sector is secured, that the scientific profession is attractive for (potential) researchers. Employment opportunities, payment conditions, research facilities, career prospects are of major importance for career development.

Mobility plays an important role in boosting academic career. Participation in joint projects, international scientific events, publication of research findings in prestigious journals, internship in famous scientific centers, receiving grants from foreign foundations – all this leads to wider experience, young specialists’ higher status, and it opens up new opportunities in their own country. The international mobility enhances the citation index, helps to receive international grants and awards.

The international mobility proved to be one of the main ways of integrating the Russian science into the global scientific community. The Russian scientists’ participation in the

international labor division enables them to solve such a difficult problem of the post-Soviet science as a generation change and research career development.

Russia has seen several measures to encourage Russian scientists' mobility and programs are drawn up to attract Russian scientist emigrants to cooperation in science.

This paper presents the results of a research whose main interest was to analyze international mobility of Russian scientist at the different historical stages and its impacts on the professional trajectory of young researchers, his/her career development.

The questions that supported our research were:

1. What are the major changes that Russian science has since the beginning of the process for democratization and liberalization in S&T?
2. Does the international mobility have a profound effect on the professional trajectory and career development of young researchers?
3. What are the current challenges, barriers, new policy initiatives for international mobility in Russia?

International mobility of Russian scientist at the different historical stages

Russia is the country whose history has seen all types of international mobility: free movement of scientists in 18-19th centuries, forced emigration in the 1920s, isolation in Soviet times, mass emigration in the post-Soviet years, and a return to the practice of the brain circulation and the use of international mobility as a mechanism of integrating Russia into the global scientific community at the 21 century.

The Russian science emerged and benefited greatly from the international scientists' mobility. The Russian Academy of Sciences was established thanks to a famous fact: a number of talented young scientists came to Russia which resulted in creation of the Academy and science itself.

Both emigration and immigration were common for the world professional community. The Enlightenment saw sort of competition between European monarchs in attracting famous scientists. So, Catherine II managed to invite Leonhard Euler to St Petersburg, one of the leading mathematicians of that time, member of the Berlin Academy of Sciences under sponsorship of Friedrich the Great.

Scientists, when expressing their findings in the universal language and neglecting, to a certain extent, the state frontiers, tried to find the most favorable conditions for their researches. Specialists were not afraid of changing their usual social and cultural environment and went to other countries to work. When studying and preparing for scientific work, a prospective researcher, as a rule, tried to learn, as much as possible, a wide range of scientific concepts,

methods and methodologies, easily moving between universities and laboratories of different countries (Kolchinsky, E. I. 2003:202-216).

Beginning from the second half of the 19th century, Russian scientists started to go outside the country quite often to found there their own schools of thought. They were, just to mention a few of them, the 1908 Nobel prize winner Ilya Mechnikov, microbiologist S.N. Vinogradsky, sociologist and economist M. M. Kovalevsky, geographer P.A. Chikhayev, mathematician S.V. Kovalevsky etc.

The World War I put an end to the International of scientists, caused an outburst of patriotism and chauvinism in all countries. In Russia the first mass wave of emigration began.

Russia's scientists experienced lives full of tragedies. Almost each Russian scientist faced a painful choice in 1918: to stay in the country devastated by the civil war or emigrate. Those who stayed felt all troubles of that time: persecutions, hunger, cold homes, infectious diseases, horrible working conditions. Some of them were executed during the pogroms or the years of the Red Terror. After the civil war, Russia's scientist community had to adapt their priorities to the interests of government to get more funding for science. In the 1920s, many of them got a feeling that the authorities understood them and were ready for cooperation. However, a lot of scientists, who did not want to bow to the Soviet power, emigrated. In the autumn of 1922, the Soviet government deported from the country more than 200 people with members of their families. They were mainly higher education professors from various Russian towns. Among the intellectuals, declared dangerous for the regime, were sociologist P. Sorokin (he was number 1 on the list for the city of Petrograd), professor of mathematics D.F. Selivanov (head of Petrograd University), professor of biology M.M. Novikov (head of Moscow University), professor V.V. Stratonov (dean, mathematics department, Moscow University), B.P. Babkin (head of physiology department, Novorossiysk University) and others.

It should be remembered that the mass emigration of scientists from Russia in the post-revolutionary decade provided science of other countries with outstanding discoveries and inventions. Russian scientists abroad tried for a long time to maintain scientific ties with their colleagues at home, they started even to create a special Russian science in emigration (specialized organizations, philosophy clubs, etc).

The Soviet period of Russian science, starting from 1930, changed radically the international mobility of scientists. During the Great Terror, international scientific communication was almost forbidden, the renowned scientists, including the founders of the social history of science N.I. Bukharin and B.N. Gessen were executed. During Khrushchev's 'thaw' period, cooperation involved mainly scientists from socialist countries (German Democratic Republic, Poland, Czechoslovakia). Until the end of the 1980s, there was a total

control, exercised by the regime as well by the Academy bureaucracy. A comprehensive cooperation was impossible, most scientists in Leningrad did not even expect to go abroad or to be published there. Their contacts were reduced to correspondence, exchange of literature and occasional meetings at international conferences in the USSR. In the post-Soviet years there is a mass emigration of Russian scientists. At the 21 century we can see a return to the practice of the brain circulation and the use of international mobility as a mechanism of integrating Russia into the global scientific community (Asheulova, Kolchinsky, 2010).

Research methodology and respondents profile

This paper presents some results from the project “The international mobility of Russian scientists (on the basis of sociological research) funded by the program of Fundamental researches of Presidium of RAS «Traditions and innovations in culture and history». The research is conducted by the Centre for Sociology of Science and Science Studies, St. Petersburg Branch of the S.I. Vavilov Institute for the History of Science and Technology, Russian Academy of Sciences.

The main subjects of our study were:

- general working conditions of researchers;
- motives for international mobility;
- major barriers in considered field;
- international mobility rates, destinations, periods and frequency;
- forms and effects of international mobility;
- main impacts of international mobility.

In order to obtain reliable data about the problems considered above as a base for further analyses, as well as conclusions and recommendations for future actions, the method of a sociological survey was applied. The questionnaire was prepared, directed to the specified target group: the respondents who had experienced international mobility. In the study, both quantitative and qualitative approaches are used. The inquiry, based on purposive sampling and consisting of many open-ended questions, is focused on selecting information-rich cases to yield insights and in-depth understanding of the considered problems rather than empirical generalizations. With a purposive sample, the opinions of the target respondents could be gathered and examined. The purposive sampling technique was used in the survey, directing the questionnaires only to relevant respondents. The questionnaires were disseminated among researchers in paper form or electronically. In total 133 responded to our survey. Only 52 respondents had experienced international mobility.

Academic Career in Russia: institutional context

To explore the organization of academic science, Pierre Bourdieu's concept of the "field" will be used that is understood as a relatively autonomous space, where knowledge is produced, with its specific rules but which is indirectly connected with the social macrostructure. The idea is not that the field of science is isolated from external impositions and prescriptions but that these external constraints are translated into the language of the scientific field, integrated into the logic of its development. Scientists are connected to society through a lot of links: orders from various organizations including a government, a set of priority directions defined by government expert circles, but these outside impacts are translated into the language and codes of scientific knowledge, redistributed and transformed into research and development. The French sociologist calls this ability of the field to resist *refraction*: the more autonomous the field the higher the level of refraction. The heteronomy of the field is expressed in the fact that "not very competent – from the point of view of the field's specific norms – people are able to interfere in it acting on behalf of the heteronomous principles instead of being immediately disqualified (Bourdieu, 1997).

The field structure is formed by distributing academic capital between various agents (individuals, institutions). P. Bourdieu clarifies that the academic capital is a specific type of symbolic capital, and it is a recognition (or trust) which is granted by a group of the peers-rivals within the academic field. Authority (recognition of merits) in the scientific community depends on the "size" of symbolic capital, and its owners take part in defining the rules of the game, they become experts in their disciplines, they form judgments what is valid and what is outdated, what should be published in prestigious journals, and what shouldn't, who can be recruited for an academic position and whose application should be turned down. In other words, the agents establish the field structure in proportion to their "weight" that depends on the "weight" of other agents. At the same time, each "academic capitalist" is subjected to pressure from the structure of this space whose strength is in inverse proportion to its relative "weight".

Academic careers are pushed by aspirations of social agents to occupy a strategic position in the scientific space that is made up of academic merits: advantageous topic, research grants, an academic degree, publications in journals with high impact factors, participation in conferences and seminars. M. Sokolov says in this connection: "Academic career is the history of accumulation of the like symbols, a successful build-up of which secures in future a significant financial and symbolic rent" (Sokolov, 2009:14).

The more autonomous the academic field and transparent the rules (set and shared by the scientific community) of the game are, the clearer is how one can build a career, where one's talent can be invested in order to achieve a certain recognition. It is evident that there are no perfect academic systems but there are systems where academic merits are closely connected

with academic progress, with the holding of an influential disposition in the academic field. In the process, these merits are determined, first of all, by relevant circumstances, but there are systems where these links are weak, and the rules of the game are vague. We will look from this perspective at the Russian case of an academic career.

Organization of the Russian science is genetically connected to the Soviet way of doing science. Under circumstances of the party-and-government control of science, the issue of the academic field's autonomy should be addressed differentially: it existed in some disciplines, for example, in physics, mathematics; but mainly in humanities the functioning of the autonomy principle was slight. Nevertheless, Soviet science saw establishment of the institutional mechanism of academic advancement that can be presented as the following scheme: an elite Soviet school – an elite Soviet higher education institution – leading research establishment in the USSR or a chair (Vosproizvodstvo nauchnoy elity v Rossii: rol zarubezhnykh nauchnykh fondov, 2005: 30).

A postgraduate course at the Academy was the best way of training young talents for scientific work in future. Young people studied at the postgraduate school of the USSR Academy of sciences, worked in the same sector during their studies, obtained PhD and got up the scientific career ladder. The promotion mechanism involved: status of a leading specialist, head of research unit (section, laboratory, department), then he or she became famous, received distinctions, got elected member of the USSR Academy of sciences, corresponding member or academician which was accompanied by a high scientific status. That was the way the Academy system of generation continuity worked.

A scientist's career presumed a passage of the points in the "academic corridor" as a leading specialist, head of an organization unit (sector, laboratory, up to an institution's directorship), membership in the USSR Academy of sciences. It was not infrequently that a professional life was started and ended inside a single academic/research establishment; a long uninterrupted service at one and the same institution was an advantage and considered one of the academic merits. Working in elite institutes that obtained orders from the military-industrial complex was especially prestigious because they concentrated significant resources to conduct R&D, and they had good opportunities of achieving one's own goals. One structural feature of the Soviet science organization should be highlighted: its low occupational mobility due to its close nature. This drawback remained in the post-Soviet science.

The transformations of the macro-system have effect ultimately on the academic field whatever the degree of autonomy they possess. As Z. Bauman put it, the time of "interregnum" came, the situation of insecurity and uncertainty, when the old rights were not binding any longer and there were no new ones (Bauman, 2011). Russian science was subjected to the "pressure

from political and economic circumstances” and the academic capitalists, enticed by an economic interest and material advantage, lowered the refraction of the academic space. A devaluation of the academic symbols, that once constituted academic capital, took place; an institutional erosion began which had different manifestations: from election to the Presidium of the Russian Academy of sciences to the “turnkey defense of dissertations” (Yurevich, 2010).

Now we will outline the key positions that characterize the academic field of today and its social agents. The present higher education is characterized by mass enrollment, the number of post graduates grows with each year, but approximately only one-third of all those who have completed the course are able to defend a dissertation (Table 1).

Table 1. Postgraduate courses in Russia

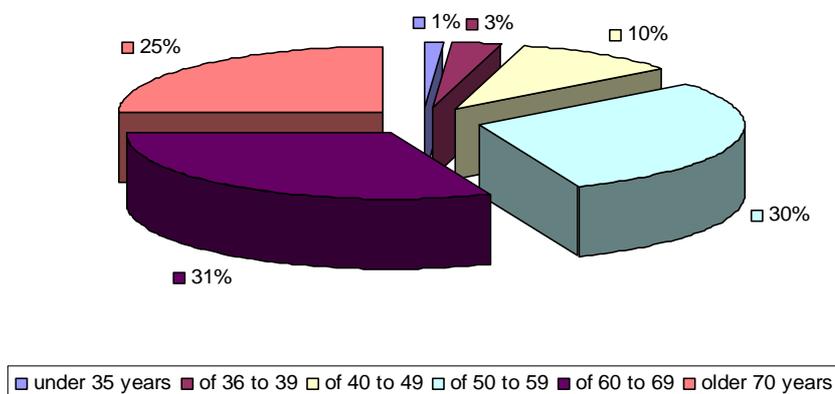
YEAR	Postgraduate courses (Person)			
	2007	2008	2009	2010
Enrolment (Total)	147719	147674	154470	157437
Entrants	51633	49638	55540	54558
Graduates	35747	33670	34235	33763
Graduates with defended dissertations	10940	8831	10740	9611

Source: Table 1.2. Postgraduate and doctoral courses // Science, Technology and Innovation in Russia: brief data book, 2007 – 2011 (2012) Ed. Mindeli, L., Moscow: ISS RAS

It shows that a post graduate school has to a large extent become a pastime without obligations which has made this academic institution – which early on trained the elite – loose its qualification. Nevertheless, the present-day postgraduates regard obtaining a degree as an “entrance ticket” to the academic field; a postgraduate course is a “point in the corridor” that one must pass. Each year sees the number of researchers drop which is determined by a number of factors: inadequate funding by government of research and academic institutions, a mass exodus of scientists abroad in the 1990s or their moving to other types of work, which was caused by low pay and lower social prestige of academic professions. It suggests that Russia’s science and education became uncompetitive compared with business and finance: “These days it is more prestigious for a young man to say ‘I work for Google’ than ‘I work for the RAS’” (Yusupov, 2012). Obviously, it is not an exceptionally Russian case but a common situation in other national markets of high-skilled labor.

Another feature of the national academic market can be singled out, that is continuous ageing of managers in charge of science and education, especially in the RAS institutions which hinders an inflow of young specialists into science (Figure 1).

Figure 1. Proportion of laboratories's leaders of the Research Institutions of St Petersburg Scientific Centre by age



Administrative positions in the Russian academic field are powerful enough: the administration controls material resources, makes decisions on employment and contract prolongations (legally, there is no permanent salary, all employees including those on the staff are subjected each year to competition). The administration’s work is not transparent, the rules of the game are vague for agents of the field, it is not always clear which criteria are decisive in the process of recruitment, or in assigning bonuses, in decisions on whether to pay money to a staffer for a business trip or not. The heteronomous (in relation to the academic field) factors are not rejected as irrelevant but could become sometimes priorities, which indicates a “low moral density” of the scientific community as well as a weak autonomy of the field.

These facts highlight another issue of a career progress in Russia: equality/inequality of opportunities. The term of “equality” has many meanings, so Alfred Schütz, to avoid a semantic confusion, links it to the concept of relevance. All objects (facts, features, persons) assigned to one and the same type and the same field of relevance are called homogenous (Schütz, 1956). The parts related to various areas he called heterogeneous. Equality and inequality in this sense are correlated with different degrees of perfection and achievements that belong to one area of relevancies. What merits are secondary and what are principal in accumulation of symbolic capital – earning of an academic degree, working in a research project, a status of a Skolkovo resident, an administrative job, taking part in a trainee program abroad – it is agents of this field who take decisions like these. They also structure the ranking of achievements and advantages. To put it differently, the status of the «homo academicus» must be determined only on the basis of academic merits related to homogeneity of the academic field. A. Schütz points out in this connection that it is only within each of these relevance zones that the degrees of merits and excellence can be identified, what can be correlated in the system of one area cannot be

correlated in other systems, so applying the criteria unrelated to one and the same zone of relevances leads to logical and axiological (moral) contradictions.

Building up the scientific space on the basis of friend/foe, nepotism, conspiracy, pursuit of one's own financial interest, so common in administrative circles, all these facts, heterogeneous to the academic field, do not add attractiveness to Russia's academic market whose actors can today choose where to work: in Russia or abroad.

Particular features of the Russian academic market with its opaque rules of the game and the scientific community's lack of consensus on significance of the academic symbols (academic degree, discovery, grant, administrative position, recognition abroad) hamper strategic planning of a professional biography, "modeling" of academic life, and form rather a situational approach (Frantsuz, 2004: 44). Choosing a field and place of one's professional self-realization depends on a combination of incentives: cognitive, social, economic. When considering social and economic determinants a young specialist has few arguments in favor of choosing a teacher's or researcher's job in Russia. Prestige of teaching in higher education or doing research is not high, and pay is much lower than the average in economy.

Cognitive incentives are related with realization of one's own cognitive abilities, conditions of academic work that could enable to solve research problems: well equipped laboratories, cohesive teams, access to the latest achievements. Recently, Russia has seen government take an interest in science, which was supported through funding, new labs have been founded in national research universities, as well as foundations that facilitate commercialization of developments. But obviously, these measures are not enough to change the situation. This leads to the idea that transmigration to scientific centers of the world level could be a necessary episode in an intellectual biography and the higher scientific productivity. The new generation of scientists see recognition in the global scientific community, the "network capital" as an important academic merit, a means that help attract extra financial and other resources to solve research tasks. However, business trips abroad, according to opinion polls hardly had any effect on academic (including administrative) promotion for Russian researchers. The point is that "scientists who have achieved high administrative positions in academic or research institutions become practically unchangeable occupying for decades the same key posts" (Vosproizvodstvo nauchnoy elity, 2005: 75).

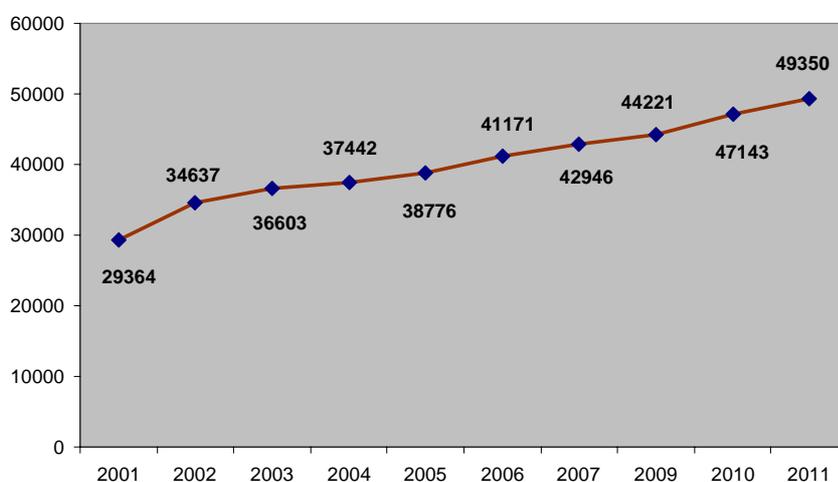
3. Results

International mobility has always played a prominent role in Russian science and in shaping of the scientific elite. Russian science has to a large extent been formed and enriched by the international mobility of scientists. The Russian Academy of Sciences owes its origin to

well-known fact: a pleiad of brilliant young scientists came to the country and their work resulted in the creation of the Academy of Sciences as well as science itself. It is also well-known that during the XVIII and in early XIX century many German scientists came to Russia and a lot of them became professors and adjuncts in the Saint-Petersburg Academy of Sciences and Russian universities. To be educated in leading European, especially German, universities and higher technical schools meant a lot for the successful professional career of Russian scientist in XIX – early XX century. International mobility of scientists acquires new features in modern society: it is institutional in its nature and is formed by new forms of social organization of science and unique traits of its competitive environment.

Russia’s joining the Bologna process in 2003 facilitates consecutive reforms in Russia’s higher education: transition to a multilayer system (baccalaureate and a master's degree), introduction of the credit system, and a standard attachment to a diploma have a positive effect on the international academic interaction. Mobility is based on exchange agreements between universities, and Russian teachers and students do their researches in foreign research centers. Nowadays the international mobility of Russian students grows up. It is popular to get education abroad (Figure 3).

Figure 3. Outbound mobile students (students from Russia)



Source: UNESCO Institute for statistics. Statistical tables, Table 18-B, Outbound mobile students (students from a given country URL:

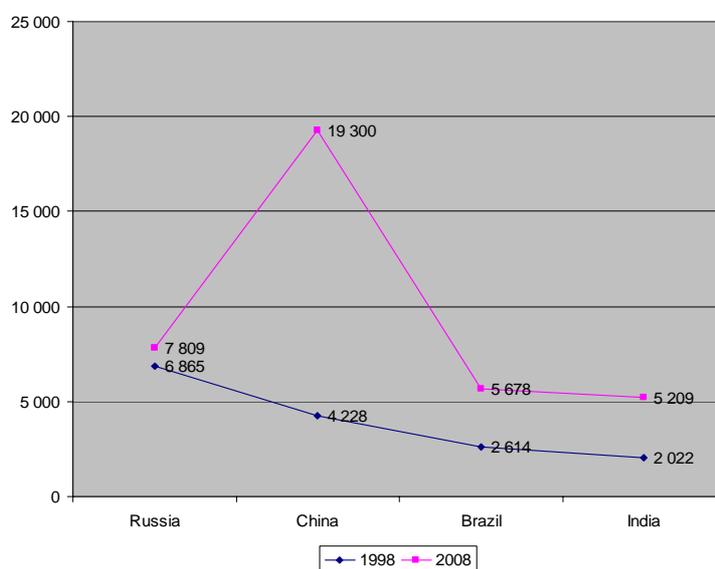
http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx?IF_ActivePath=P,50&IF_Language=eng

Some of the countries seem to be most hospitable to foreign students. Russia is truly captivating mostly for students from China (16798) and Kazakhstan (13720). In 2008/2009 there are 108565 foreign students studying in Russian universities. The leading exporters of students in Russia are countries from the Commonwealth of Independent States (Ukraine, Uzbekistan,

Belarus) and from Asia (India, Vietnam) also. But Russian educational system is not very attractive for students from West European countries (only 4,4% get education in 2010) (The number of students of educational institutions of the Russian Federation 2010).

The scale of the *international scientific mobility* in Russia cannot be compared with European and other countries and ought to be bigger. Russian scientists are not very active in scientific communication with their abroad colleagues. The growth of publications with foreign co-authors in 2008/1998 could be illustrative in this aspect (Figure 5). Russia lags behind vigorously developing transition economy countries. The growth percent is low, especially if compared with China.

Figure 5. Increase in the number of publications with foreign co-authors of BRIC countries 2008/1998



(Source: S&EI-2010, Table 5-39, Internationally coauthored S&E articles, by selected country/economy pairs: 1998, Table 5-40, Internationally coauthored S&E articles, by selected country/economy pairs: 2008 URL: <http://www.nsf.gov/statistics/seind10/appendix.htm>)

In Soviet Russia functioning of science, formation of the scientific community and reproduction of the scientific elite were inseparable from such an important element of self-organization of the scientific community as the “*scientific school*”. Scientific school played very significant role in Soviet science. But this idea is devalued in the eyes of new generation of scientists (including middle-aged, forty-year-old researchers). Their professional development fell on the 1990s with their institutional instability and intense outflow of highly-qualified specialists, who represented some established scientific schools. In this situation “personal characteristics” of a young scientist, his or her ability and talent not only for research work, but also for management, have become the dominant factor of reproduction of the intellectual elite.

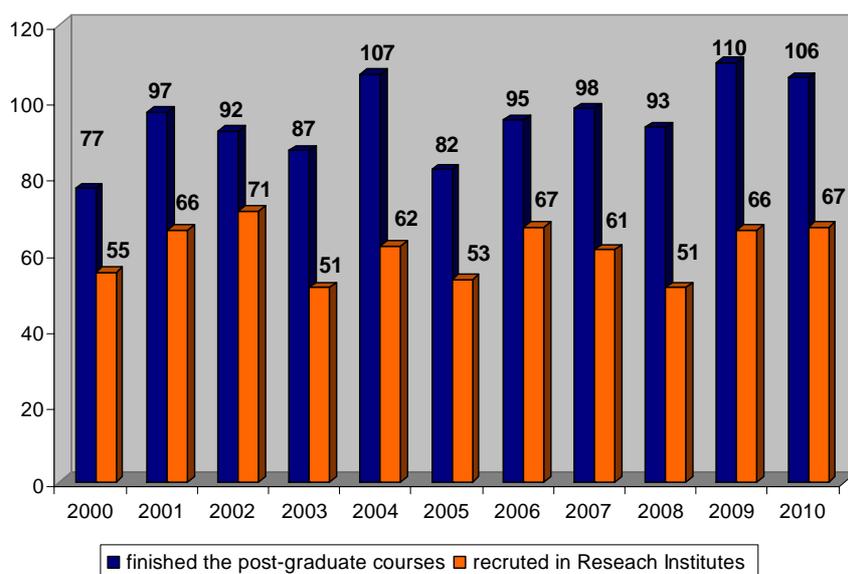
Young scientists got accustomed to new rules of the game: nowadays their professional viability depends not so much on government support, as on ability to obtain means of the implementation of research and development from additional sources. At this point Russian scientists' connections with the international scientific community, which were minimized during Soviet times, have acquired a new quality. We are speaking about programmes for the international mobility of scientists, research grants given by international foundations, internships, academic exchange between different institutes, etc. For local researchers those are new ways of entering into international research networks which are as a matter of fact transnational and open. It seems that today it is international scientific network that plays an important role in the process of functioning of science, reproduction of the scientific community; its significance is comparable to the role played by Russian research schools in the past. Nowadays mobility (both virtual, i.e. with usage of Information and Communication Technologies (ICT), and real) is a way to shape a "new generation" of scholars, who'll constantly have to prove their worth to their colleagues, to experts when applying for a grants, to managers and, after all, to public who wishes to know how tax money is spent and what are the practical benefits of research and development. And that is why modern scientist is a public figure: he or she is able to present himself, to expound clearly his or her achievements, to be involved in scientific networks and, of course, mobile.

Several years ago Russian scientists (members of the National Research University – Higher School of Economics) obtained data indicative of significance of international mobility (Vosproizvodstvo nauchnoy elity v Rossii: rol zarubezhnykh nauchnykh fondov, 2005). The study examined an impact of overseas internships on scientific potential and professional strategies of scientific elite. The authors noted that scientific potential of the majority of the respondents, who went abroad for internship, has risen to a whole new level; they also listed the positive results of internships, which was mentioned by scientists themselves: contacts with foreign colleagues, visits to academic conferences in Europe, possibility to conduct research at the global level, to use scientific equipment of high quality, to improve the academic qualifications and the material conditions. The main results of scientific internships are articles, published in international journals, and successfully defended dissertations. After their return to Russia those representatives of the academic elite are strongly attached to foreign research centers; they identify themselves with the international scientific community rather than with Russian science and thus contribute to involvement of Russian scientists into the international scientific community.

It also happens that young talented researchers are unable to find jobs at Russian institutions. Academician G. Georgiev gives an example of the Institute of gene biology, Russian

Academy of Sciences where all departments conduct researches at the world level and more or less supported with grants. Upon receiving PhD, young gifted scientists seek to go on working at the institute and not leaving the country. But there are not enough vacancies for young people (Georgiev, 2009). According to the statistical data of Department of Post-graduate Courses of St Petersburg Scientific Centre only 71% of PhD students recruited at the Research Institutes of St Petersburg Scientific Centre in 2010.

Figure 4. Recruitment of graduates in Research Institutes of St Petersburg Scientific Centre (2000-2010)



Source: Statistical data of Department of Post-graduates Courses of St Petersburg Scientific Centre, Russian Academy of Sciences, 2010 (Fokichev Yu.)

New forms of research and teaching which are actively introduced by educational management contribute to the intensification of mobility.

The emergence of high-status universities is a result of implementation of business strategy aimed at integration and differentiation of educational institutions, which led to formation of Federal universities. The main directions of development of these institutions are claimed to be “the arrangement of conditions for academic mobility of students, teachers and researchers, the integration of the university into the world educational space and the achievement of international recognition for university curricula in order to export educational services and technologies”. Thereby it is clear that the reorganization of institutes of higher education designed also for encouragement of mobility.

The Russian science drifts slowly to international cooperation, but this movement turns often into the brain drain from Russia: transparent rules of the game in the foreign academic markets, high quality of life and better opportunities for one’s own self-realization become decisive factors for Russian scientists in choosing places of residence.

Russian science will never resemble Soviet science. In these conditions, the role of international mobility is exceptionally important: it is difficult to overestimate it. Academic mobility gives Russian science an opportunity to enter into the international scientific community, to become a part of this community and to become truly international.

International exchanges of young researchers are based on such mechanisms as scholarships, internships, and grants. These exchanges were particularly useful for young researchers carrying out experimental work elsewhere if relevant equipment (such as large research facilities) was unavailable in the home institution. Foreign work experience has a positive correlation with publication output after return and number of international co-publications (Jonkers, Koen 2010).

International mobility plays an important role in boosting academic career. Participation in joint projects, international scientific events, publication of research findings in prestigious journals, internship in famous scientific centers, receiving grants from foreign foundations – all this leads to wider experience, young specialists' higher status, and it opens up new opportunities in their own country. The international mobility enhances the citation index, helps to receive international grants and awards.

We believe that there are reasons to assert that nowadays international mobility is an important new tool which enables to maintain the status of the scientific community and reproduction of the scientific elite; even more so: international mobility has become one of the most important means to integrate Russian science into the global scientific community. The participation of Russian scientists in the international division of labor allows us to solve a number of difficult problems of post-Soviet science, including the problem of generational shift.

Conclusions

Russia is a country whose history illustrates all types of international mobility: *free movement of scientists in 18-19th centuries; forced emigration in the 1920s; isolation in the Soviet times; mass emigration of scientists in the post-Soviet period*; and at last a return to the practice of *brain circulation and the resort to the international mobility as a mechanism of integrating the country into the global scientific community*. The career paths of the Russian scientific elite changed dramatically in comparison with Soviet times. Research and education in the Soviet Union formed a single system that influenced reproduction of the intellectual resources in the Soviet state. The scientific elite normally rose up the following ladder: an elite Soviet school – elite Soviet university or institute – a leading USSR research institution or a university chair. The Soviet science recruited talented and ambitious young people and enjoyed a

high social prestige and high salaries. In the Soviet Russia, the emergence and reproduction of the scientific elite was inextricably connected with a significant self-organizing element of the scientific community known as a 'school of thought' (*nauchnaya shkola*). The school of thought played a very important role in the Soviet science: not only the elite "reached maturity" there, but scientific work itself as a free activity could be fulfilled in a school of thought. In the post-Soviet period, schools of thought as a form of the scientific community's self-organization were destroyed, and with destruction of schools of thought a very important tool of the scientific elite reproduction was smashed. Today the international mobility becomes a new significant tool of the scientific elite reproduction and career development. But the scale of the international scientific mobility in Russia does not match what can be seen in the world. Besides that, Russia has seen several measures to encourage Russian scientists' mobility and programs are drawn up to attract Russian expat scientists to collaborate in science. The results of these initiatives are so far insignificant, time is needed. Russia ought to modernize its postgraduate schools. They should correspond to international ways of obtaining PhD. The recruitment of talented young people to science and technology is of crucial importance for Russia's competitiveness and well-being. The science professions in Russia must be made more attractive and the development of career for young researchers should minimize the difficulties. The strategic need to encourage and support the talented scientists by creating attractive working conditions.

International cooperation among institutions of higher education and research and industry, and short-term and long-term mobility schemes, should also be promoted to improve the research capacity and foster excellence among young scientists.

The Russian scientists' participation in the international labor division enables them to solve such a difficult problem of the post-Soviet science as a generation change.

A number of problems standing in front of young scientists in Russia can be solved in the context of integration into the global science. Participation in joint projects, international scientific events, publication of research findings in prestigious journals, internship in famous scientific centers, receiving grants from foreign foundations – all this leads to wider experience, young specialists' higher status, and it opens up new opportunities in their own country.

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