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WORLD-CLASS UNIVERSITIES

Experience and Practices of Russian Universities

INTRODUCTION

Russia is undergoing a socio-economic transition to a new innovative economy, which requires new systematic reform. Throughout this transformation process, Russian higher education institutions are expected to expand their research activities. Research has, however, seldom been a competitive tradition or priority in Russian universities, which has impacted upon the quality of education (Dezhina, 2011). Given the less impressive performance of Russian universities in global higher education, the Russian government has initiated a series of policies to integrate research and education, ultimately to develop world-class education and research in Russia. This paper provides an account of these national policies and approaches, and analyses issues and challenges facing Russia and its higher education sector

RESEARCH IN RUSSIAN HIGHER EDUCATION

There are more than 1100 higher education institutions in Russia. Among them, 33.5% are granted the status of university, 18.5% are academies and 48% are institutes[1]. In total, more than seven million students are studying at Russian higher education institutions, with more than 5.8 million students in state public universities and more than 2.6 million students under budget financing.

During the Soviet period, there were only public institutions in the higher education sector. Since the breakdown of the Soviet Union, the higher education system has undergone reform. At the beginning of the 1990s, the higher education system in Russia included both public and private institutions. In the Soviet period, the number and size of universities was strictly limited. The other institutions were named "institutes". This did not necessarily mean that the level and quality of education in those institutes was insufficient. But there were only a limited number of higher education institutions with university status in the country with strong domestic and international reputations. Those of these universities within today's Russia were mainly in Moscow, Saint Petersburg, Kazan, and Novosibirsk. At the beginning of 1990s, the number of higher education institutions increased and former institutes were upgraded and granted with university status. This has brought serious challenges, as some of the institutes did not correspond to the

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norms of the university as it is widely understood. The main reason for such public reforms was to make all the institutions putatively equal for state purposes.

It has been argued that research has never been a competitive advantage of Russian universities (Schiermeier, 2010). Higher education institutions and the Academy of Sciences (a research powerhouse for most of the Soviet period) have not been closely integrated. Rather, there has been a clear-cut division of responsibilities: universities are traditionally confined to teaching and learning, while fundamental research is mainly conducted by the Academy of Sciences, the prestigious scientific and research institution in the country, and in industrial sectors. According to the Centre for Science Research and Statistics (2011), while progress has been observed, higher education institutions' involvement in research production is still low: there were 603 higher education institutions engaged in research and development (R&D) activities, only 17.05% of all R&D performing institutions in Russia in 2009. Only 6.53% of all the personnel participating in R&D are university researchers. Higher education institutions counts for 7.35% of Russia's total domestic R&D expenditure. In other words, university research has not played a primary role or been considered a core activity in both the Soviet and the post-Soviet systems.

It is in this context that the government of the Russian Federation has initiated and implemented a series of policies to develop research and higher education institutions and to integrate science and education over the past ten years.

NEW NATIONAL APPROACHES TO BUILDING WORLD-CLASS UNIVERSITIES

The first attempt to integrate higher education and basic research can be traced back to the late 1990s when the government adopted the programmes titled "State support for the integration of higher education and basic research 1997-2000" and "Basic Research and Higher Education". Universities managed to train qualified researchers, and to establish research and education centres. However, in addition to limited funding received, these programmes focused on building partnerships between the Academy of Sciences and universities, thus universities' research performance was only strengthened to certain extent (Dezhina, 2011).

In the mid 2000s, the government of the Russian Federation reiterated that the configuration of R&D needed to be changed, and science and education should be integrated and balanced. The government has consistently and actively invested in higher education sector. The budget financing has doubled from US$ 2,8 billion in 2006 to US$ 5.5 billion in 2009. Between 2010 and 2012, the budget for the innovation and infrastructure development in higher education institutions amounts US$ 310 million. In addition, a series of reforms has been initiated, including developing the Innovative University programme, establishing several "federal universities", supporting the National Research University programme along with a number of Targeted Federal Programmes. A group leading universities has also actively engaged in forming strategic plans and integrating into international networks. It is believed that such reforms will lead to more effective results than

that of the old education system, will enhance higher education quality and ultimately improve Russian universities' competitiveness in the world economy.

Developing Innovative University Programme

Between 2006 and 2008, the Innovative University programme was implemented in the framework of the National Priority Project[2] by the Ministry of Education and Science of the Russian Federation (MESRF) to promote innovation in the higher education sector. Two years' funding was granted to selected universities to develop new educational techniques and materials, to provide research and professional training to faculty members, and to improve infrastructure and equipment. Through a competitive application process, 57 universities were selected as innovative universities. Altogether, the government financial support amounts to more than US$ 1 billion (MESRF, 2012a).

Creating Federal Universities and Business Schools

Within the National Priority Project, other programmes include organizing federal universities and creating high-class business schools.

The Federal University Programme was introduced in 2005 to optimize regional educational structure and strengthening national university network (MESRF, 2012b). Receiving special status and funds from the federal government, the strategic mission of a federal university is to develop competitive human capital in the fields of education, science, culture and management, to promote both domestic and international academic exchange, to integrate research and education, to address strategic problems of innovative development, and to improve the competitiveness of leading industries within the regions (Dezhina, 2011). The selected federal universities are expected to upgrade education and research performance and to reach a position within the top 100 universities worldwide by 2020 (Spiesberg, 2011). Two pilot universities, the Siberian Federal University and the Southern Federal University were formed in 2006, through merging several regional universities with different profiles in the federal districts, thus becoming the largest institution in the country. So far, there are eight federal universities in Russia. The total budget for top universities is US$ 2.3 billion between 2010 and 2012. For Federal Universities it amounts for US$ 0.6 billion (MESRF, 2011).

In addition, two elite business schools were established in 2006, to address the country's critical demand for experienced personnel with executive-level training. The two schools are the Skolkovo School of Management, located in Moscow and built from scratch, and the Graduate School of Management at Saint Petersburg State University (MESRF, 2012c).

Implementing the National Research University Programme

In August 2009, the Ministry of Education and Science launched the Programme National Research University. As part of the governmental effort to modernize Russia's education and research system, this programme is intended to develop national research universities across the country. Specifically, the programme aims to enhance the quality of Russia's higher education and research, to create opportunities for technological advancements and to boost Russia's economic growth (Schiermeier, 2010).

National research universities, selected from among Russian higher education institutions, are expected to play a leadership role in strengthening university research. The main features of these selected universities are to generate innovative knowledge, to develop knowledge and technology transfer, to conduct both fundamental and applied research, to build an effective system of postgraduate education and to develop advanced training programmes. In other words, the mission of the selected national research universities is to contribute to national science and technology development, to train qualified workforce, and thus to improve Russia's competitiveness in the global arena.

A nationwide competition was organized to select the universities both in 2009 and 2010. 12 out of 110 participating universities were granted the status of "national research universities" in 2009, and 15 out of 151 universities were granted the status in 2010. Each selected university will receive federal funding (up to US$60 million) for the first five years, to support the innovative development programmes in priority fields selected by the universities (MESRF, 2009; Smolentseva, 2010).

In November 2009, the Russian Parliament passed legislation on the special and unique status for the two leading universities, that is, Lomonosov Moscow State University and Saint Petersburg State University. Under federal government budgeting, these two universities are entitled to employ additional admission criteria and examinations and issue their own degree certificates.

Training and Attracting Young Scientists

Another important programme, which aims to develop research and education in the higher education sector and to tackle the ageing of scientific personnel in particular, has been introduced within the framework of the Federal Targeted Programmes[3] and is called "Scientists and Science Educators for an Innovative Russia". A total of US$ 3 billion will have been invested between 2009 and 2013, of which 90% is granted by the federal government. More than 50% of the financial support is expected to support research projects, which involves a significant number of young scientists and students. The rest of the funding will be spent on upgrading infrastructure and research equipment for students and scientists (MESRF, 2012d). Despite arguments regarding difficulties in implementing the project and insufficient coordination, this programme has assisted the development of young scientists and increased their participation in

research and education. Statistics show that 14,5000 young scientists involved in the program in 2009, 34,400 in 2010 and 35,600 in 2011. In addition, more than 9,000 research contracts have been awarded annually.

Furthermore, this programme also aims at attracting young Russian scientists working abroad to direct research projects in Russia, through a programme called "Grant Opportunities for Russian Scientists Living Abroad". Through sustainable cooperation with Russian scientists who work and live abroad, the programme intends to promote the exchange of skills and experience for national scientific development, as well as to build scientific networks. For example, in 2011, 84 research projects are selected and financed with up to US$ 69,000 for each project per year[4].

Developing Networks of University Leadership

The above-mentioned universities have formed a network and become a basic platform to discuss issues and provide solutions in the field of higher education in Russia. The network activity leads to the creation of the Association of Leading Universities in Russia, initiated by several university rectors. The member universities include Saint Petersburg State University, Ural Federal University, Higher School of Economics, Lomonosov Moscow State University, and other federal universities and national research universities. Its current president is the rector of Saint Petersburg State University, Nikolay Kropachev.

The main task of the association is to address problems and issues facing top universities, and to provide governments with briefings and proposals to tackle urgent challenges. One of the challenges the association has been working on concerns transparency issues in the higher education sector and the state examinations system.

Meanwhile, another important organization for universities is the Russian Rectors' Union. It is an all-Russia public organization founded in 1992. It currently brings together upwards of 1000 rectors and presidents of public higher education institutions and 100 rectors and presidents from the most prestigious non-government higher education institutions.

The Union intends to coordinate Russian higher education development and connections in the fields of economics, law, humanities, and sciences. Among the key tasks of the union are the discussion of higher education development, in particular education and research, to provide policy recommendations to relevant government organizations, to maintain higher education quality, to strengthen the authority of the national education system in Russia and beyond its borders (the Russian Rectors' Union, 2012).

The union's core members meet with the Prime Minister and members of the Russian Government every year. These meetings end with the adoption of new government protocols, which to a great extent frame the work of the government authorities supervising the sphere of education, as well as the Russian Rector's Union, for the next year.

The Union takes an active part in developing legislation, by interacting directly with the State Duma and the Federation Council of the Federal Assembly. All drafts of laws regulating legal relations in the sphere of education and higher education undergo scrutiny from the Russian Rectors' Union and mandatory discussion at the regional councils of rectors.

Integrating higher education with business sector

It is also worth pointing out that the Russian government has adopted strategies to develop education and science through integrating the business sector and through collaborating in international science and educational activities.

According to Federal Law, higher education institutions and research organizations have special rights in terms of establishing commercial entities. The main aim is to convert intellectual property into economic development. It is estimated that about 1000 such entities will have been built by the end of 2012, most of which will be established within higher education institutions. These entities are small commercial organizations with, typically, ten or more qualified staff, and provide the opportunity to earn mid-level salaries for faculty members. For example, Saint Petersburg State University has been strongly involved in this project, as the university believes that commercial entities or companies offer opportunities both students and researchers and provide proper equipment and space to conduct research studies. Up to 2011, three companies were created within the university, that is, Saint Petersburg State University Centre for Geology Limited Liability Company, Saint Petersburg State University R&D Centre of Information Technologies Limited Liability Company, and the Innovative Centre of Transport Researches Limited Liability Company. The production of these entities caters to market demands. To support further innovation reforms, the university plans to establish business incubators within the university, so as to open new possibilities and create additional facilities for researchers. Such reform aims at encouraging young scientists to engage in research, to build up their competitiveness in the modern market economy and to seek possible investors for further development.

In addition, several government regulations are targeted to enhance higher education institutions' research capacity and integrate R&D within the wider Russian economy. These regulations include the following:

– to develop modern competitive high technology and productions through collaboration between higher education institutions and economic organizations in the field of R&D;
– to provide state support to develop higher education institutions' innovative infrastructure and innovative entrepreneurships;
– to create world-class research laboratories by inviting and attracting world leading scientists.

To realize such developments and support R&D in universities, solid financial support for research is required. A total of 82 higher education institutions have become winners of competitive funding under these government regulations and

laws. 12 universities in particular have benefited from the three above-mentioned regulations. There have been several other programmes of innovation development sponsored by state owned companies. The total budget of these projects increased from US$ 0.7 billion in 2010 to US$ 2.8 billion in 2011 alone.

A Summary of Russian National Reforms

Global competition in the educational services market has brought about new challenges in knowledge creation. It has been argued worldwide that, in a knowledge-based economy, research and innovation determines a nation's competitiveness and its position in the global market. Meanwhile, universities are leaders in education and research processes and play a role in the transfer of ideas into operational innovation. In particular, elite higher education institutions in any education system take a leading role in participating in international competition. In other words, one of the priorities that education policy needs to observe in order best to serve the nation is to build world-class universities with strong competitiveness. A world-class university typically exhibits a range of features, e.g. a concentration of talent, an abundance of resources, and appropriate governance (Salmi, 2009).

It is important that national policy address emerging challenges in the era of globalization. The development of any higher education institution is impossible without strategic planning from with the university itself. It is also true that appropriate measures need to be taken by the state. Policy governing the national educational system plays a key role in the process of building a world-class university. The state should inspire and develop awareness of the importance of building world-class universities. The state conducts educational policy and decides whether to aim for all education being of even or variegated quality and how many institutions the country can afford to support to pursue becoming world-class universities, and what national strategies are appropriate to the chosen course. As Salmi (2009) suggests, three basic strategies can be adopted to establish world-class universities: to select and upgrade existing universities, to merge a number of existing institutions and/or to create new universities from scratch.

In Russia, the higher education system combines these approaches, which is covered in the previous section. The federal government has chosen and granted two independently budgeted federal educational institutions, Lomonosov Moscow State University and Saint Petersburg State University. These two universities enjoy special features and are affiliated directly to the Russian Government. Such reform makes it possible for these two universities to set their own education standards, to extend research and education opportunities and to develop infrastructure and facilities. The other approach adopted by the Russian government is to establish a few federal universities by merging regional universities. This aims to extend cooperation in cultural and business activities within a region and ultimately to build world-class universities.

To summarise, all of the governmental measures reviewed in this section have created a solid basis for constructing world-class universities. These approaches

and the new management system allow both the government and institutions to adopt policies in accordance with the political, cultural and social development in different regions in the Russian Federation. It also pushes higher education development to a new level.

CHALLENGES FOR FURTHER INTEGRATION INTO THE GLOBAL HIGHER EDUCATION ARENA

In relation to the Russian context, this section will analyse the challenges and possible approaches to integrating education more fully with research, so as to develop a few Russian higher education institutions as world-class universities recognized worldwide. These challenges might also apply to other nations and their higher education systems.

The first challenge concerns public relations. Each relevant university's information policy needs to be directed at both the national and international levels. The information policy should include a full English version website, where practical information on study and research can be found. Universities should use a single institutional name to be employed in any database, education portals and websites. Most of Russian universities provide insufficient information in English on their official websites as well as at the disposal of different international rankings and databases such as Scopus and Web of Science. Russia does not need to create its own ranking tool specifically for its universities. The only aim of such a national ranking should be to assess the effectiveness of budgetary funding of universities. Universities must not shy away from global rankings, as these league tables can provide insightful information and inform future educational reform, which institutions will need to bolster their reputations. It is necessary for universities to be engaged fully in international processes in this modern networked society. In addition, at the governmental level, there has been awareness of the inadequate web visibility of national universities. Official recommendations of the Russian government have been formulated to tackle this issue.

The second challenge facing Russian universities is to strengthen internationalization strategies. To encourage collaboration with researchers and academics from other parts of the world, to continue promoting R&D activities within the higher education sector, and to expand collaboration at the governmental level are all strands for the possible enhancement of Russian universities in engaging in the global research community.

To develop international research collaboration, international researchers and academics should be invited not only as visiting scholars but also to participate and develop joint research projects. Between 2010 and 2011, the Government of the Russian Federation held an open grant competition, which is called "Megagrants" to support scientific research projects implemented under the supervision of leading scientists in Russian higher education institutions[5]. According to the competition criteria, there were no citizenship limitations or national priorities. This grant programme allowed researchers to create joint laboratories and develop new research products. The programme has enabled and encouraged Russian

scientists to collaborate with their international peers with the assistance of practical funding opportunities.

In addition, the increasing use of federal targeted programmes is also a significant development encouraging of international collaboration, as these programmes allow for targeted actions that transcend traditional administrative boundaries and their fixed duration provides a certain degree of adaptability. There is usually a trade-off between adaptability and stability, however, and this applies to the federal target programmes given the limited duration of their funding.

There have been recent increases in the number of higher education institutions and university personnel conducting R&D activities. The number of higher education institutions performing R&D increased from only 390 in 2000 to 603 in 2009, and the number of R&D personnel increased from around 40,000 in 2000 to about 50,000 in 2009 (Centre for Science Research and Statistics, 2011). Despite its being a relatively small proportion of the total R&D institutions and personnel in the country, the higher education sector was the only sector of significant R&D growth over the last decade. This is the result of deliberate government policy as outlined in the previous section, to integrate education and research activities better. The reasoning behind these moves is that academics who are regularly engaged in scientific research can pass on contemporary knowledge to students, especially graduate students, more effectively. Despite these obstacles, a group of leading universities has actively developed research in recent years. They have strategic plans for developing their research and for their integration into international networks. This is a healthy development, as it brings education and research activities closer together and offers a measure of research competitiveness with the academies of science. This should help to boost research quality and efficiency in Russia. Increased policy emphasis on R&D in higher education institutions is, however, leading to greater stratification of the Russian higher education system. This is no bad thing in itself, but should be based on a set of criteria broader than research performance and include indicators of teaching quality.

Special international projects, initiated by the Ministry of Education and Science of the Russian Federation and supported by relevant international governmental organizations are great ways to implement policies to develop internationalization. One of the best examples would be the collaboration between the Ministry of Education and Science and the German Academic Exchange Service. Two Russo-German programmes named in honour of Immanuel Kant and Mikhail Lomonosov are designed to support young researchers and postgraduate students in the field of social sciences and humanities, and natural and technical science respectively. At the university level, for example, Saint Petersburg State University has signed special agreements to collaborate with the German Academic Exchange Service, named after Dmitry Mendeleev. This programme is intended to assist researchers to pursue joint research and to find colleagues with whom to collaborate.

A third challenge facing Russian universities is how to combine the study process and learning outcomes. Education policy and its outputs should meet the

market demand for both employers and society, in this global knowledge economy. These are features of the post-Soviet transitional period and its consequences in Russia; previously, the university was focused on one and only one employer: the state. This feature is reflected in the curricula. Internship programmes are combined with study programmes. Careers centres and student unions have been established in all Russian universities, to facilitate graduates' employment seeking. One of the main problems facing Russian universities is how to build a stronger link between studies and learning outcomes.

A fourth challenge concerns integrating Russian higher education into the European system. The transformation of the country's educational system to conform to the bachelor-master's degree model has been a laboured process[6]. Notwithstanding that the old system had its advantages, we recognize that the two-degree system of bachelor and master's degrees allow Russian higher education institutions to be involved more deeply into international education activities. The transformation period has not been easy, especially for regional universities. But this does not mean that the quality of education changed for the worse.

A fifth challenge relates to university rankings and evaluation. Rankings are considered as part of broader features of evaluation and quality assurance. There have been both international and national rankings. In Russia, rankings have included Scientific and Publication Activity of Russian Universities, the Ranking of Russian Higher Education Institutions, the National Ranking of Russian Educational Institutions and the Scale of Scientific Visibility of Russian Higher Educational Institutions.

These rankings focus on scientific and publication activities, as it is believed that research activity and its productivity is evidenced by publications. The methodology and indicators include, for example, the average annual number of grants by Russian Foundation for Humanities per staff member, the average annual number of grants by Russian Foundation for Basic Research, the number of articles in the Russian Citation Index database and their impact, the number of journals recognised by the Higher Attestation Commission.

One can find out the dynamics of publication activities for each University by using the following indicators:

– the number of publications of Russian Universities in Scopus and Russian National Citation Index;
– Publications and grants by Russian Foundation for Humanities and Russian Foundation for Basic Research;
– the distribution of publication activities by the financing sources in Russian leading universities;
– the distribution of publication activity by joint collaborators; and
– publication activity in joint federal programmes.

So, it is necessary to note the following factors:

Firstly, the data on the number of publications and citations are relevant if observed within a definite period of time.

Secondly, the number of joint projects with Russian organizations is exactly checkable and there practically could not be any misunderstandings in how and

what to count, as opposed to the share of those articles produced with the international cooperation.

Thirdly, as for the Hirsch index – only applying to the last five years – a similar approach to timeframes should be adopted.

Russian universities are far behind many foreign universities in terms of research publication and its related indicators. Possible ways to improve the quality of Russian journals include inviting prestigious foreign scientists as editors, and translating abstracts from Russian into English. Russian scientists should also indicate their affiliation with their home university, when they sign work contracts with foreign partners. We need stricter administrative measures and reforms. Today a university cannot be highly evaluated in any international ranking if it has no or almost no publications by its researchers and academics in highly cited journals. Furthermore, if scientists would like to be known in world academic society, they should publish their research results in international scientific journals, books or proceedings.

Unfortunately, the number of publications in international science journals by Russian scientists is lower compared with that in domestic journals. Russian scientists, especially in the fields of social science and humanities, are used to publish their results mostly in domestic journals and papers. Partially it can be explained by historical isolation of soviet science, which has led to results and innovations traditionally being presented at the level of the national academic society. The second issue is language. In Russia, most journals are published only in Russian and are not translated in English. It does not necessarily mean that the quality of these journals or publications is insufficient and research outputs are not significant. Comparing the impact factor in Russian Citation Index, which is the national database of research papers and journals, with that of Journal Citation Reports for Russian journals translated into English, a similar value can be found. This language issue is very urgent not only for Russia but also for other countries with traditional publications in national languages, for example Italy. Conversely, in Germany, scientific journals are mostly published in English. Such a key feature increases both its competitiveness in the academic community and in the world academic rankings. The issue of language should be solved not only at the university level but also at the level of publishing houses and at governmental level. It should conduct reforms to create appropriate frameworks to make national journals visible among the international academic community.

The main feature of Russian scientists' presentations in international journals is the prevalence of publications in Physics and Chemistry, as compared with most other countries. The publications in others research field, especially medicine, social sciences and humanities, are almost unknown to foreign scientists, because more than 90% of them are only in Russian. Figures 1, 2 and 3 [7]demonstrate the distribution of publications in terms of research areas in Russia, China Mainland and Canada, based on the data from Scopus (2006-2010), and easily reflect disproportion.

A third issue concerns an academic division between the humanities, natural sciences and information technology. Russian humanities have also a strong

research heritage. Mostly they publish their results in monographs or papers in multi-authored monographs. The existing ranking methodologies do not always include statistics on monographs, despite the very latest modifications of Web of Science to introduce a Book Citation Index.

Another problem concerns the affiliation of the author, an issue subject to bureaucratic and political wrangling. Saint Petersburg State University has enhanced the rewards for publications in highly cited journals displaying the author's university affiliation.

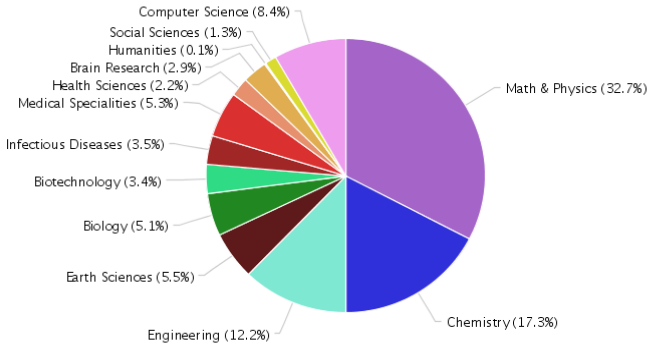

Figure 1. The distribution of publications in terms of research areas: Russia (2006-2010).

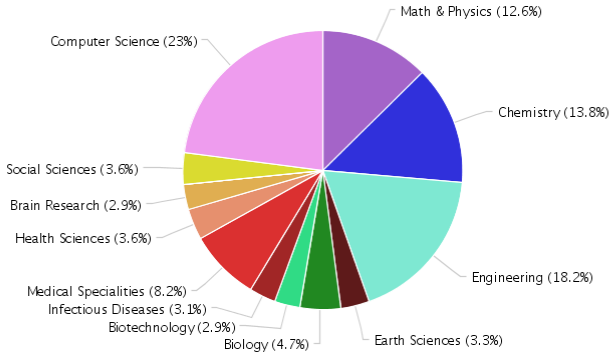

Figure 2. The distribution of publications in terms of research areas: China Mainland (2006-2010).

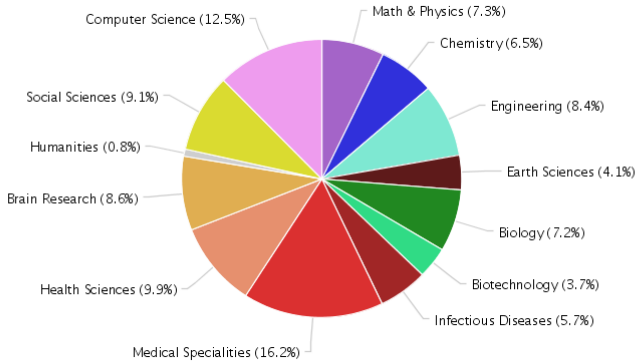

Figure 3. The distribution of publications in terms of research areas: Canada (2006-2010).

CONCLUSIONS

The progress reviewed in this chapter is not enough yet for Russia to create world-class universities. Lessons need to be learned from the country's unsuccessful experience. Despite the necessary national reforms to R&D and the integration of education and science in higher education institutions, the practical implementation of policies is not always achieved. The reasons include: gaps in national legislation, misunderstandings within university management, insufficient experience of the academic society in research grant management.

Universities should set achievable goals. It might be naïve to forecast a concrete date by which to expect that world-class universities have developed. Sustainable financial support to universities and funding for international research projects developed by faculties is not enough. It is necessary to organize expert oversight, free from administrative pressure and conflicts. Concerns have also been raised in regard to grant evaluation, especially those programmes supported by the state government. Transparent selection and evaluation procedures need to be assured, as well as expert commissions. Government and universities should be open-minded when choosing fields for research investments. Financial support and concentration should not only be oriented to market demands, but also be highly correlated to national research strengths and the facilities available.

To conclude, the Russian experience shows that a promising strategy for building world-class universities is to inspire system transformation at both the university and national government levels.

NOTES

[1] According to the Federal law *About Higher and Postgraduate Education*, the "university" is the institution of higher education that implements educational programs of higher and postgraduate education on a wide range of training courses (majors). It provides training, retraining, and (or) the

training of highly qualified personnel, scientific and pedagogical workers. It performs basic and applied scientific research across a broad spectrum of sciences, and is the leading scientific and methodical centre in its areas of activity. The "academic" is the institution of higher education that implements educational programs of higher and postgraduate education. It provides training, retraining, and (or) the training of highly qualified workers for a specific area of scientific and educational activities. It performs basic and applied research mainly in one area of science or culture, and is the leading scientific and methodical centre in their area of expertise. An "institute" is the institution of higher education that implements educational programs of higher education, as well as a rule, postgraduate educational programs of vocational education. It provides training, retraining, and (or) training of workers for a specific area of professional activity. It conducts basic and (or) applied research.

[2] In September 2005, President Putin initiated the Russian Federation's National Priority Projects to ensure political stability, to sustain economic and technological growth, and to improve the quality of life for Russian citizens. This programme aims at developing the country's welfare by investing the state's growing financial resources in four developmental aspects, that is, the public health, education, housing and agriculture sectors.

[3] Several reforms within the framework of Federal Targeted Programmes have been implemented since 2009. Such reforms include "Research and Development in the Priority Fields of Science and Technology Complex of Russia in 2007-2013", "Scientists and Science Educator of an Innovative Russia for the period 2009-2013", and "Development of Infrastructure of the Nano-Industry in the Russian Federation for the years 2008-2011". The total value of these financial support programmes has increased three times and adds up to US$ 1 billion. Federal Targeted Programmes have been recognized as effective tools to realize the state economic and social policies.

[4] Please see the official site of Federal Target program "Scientists and Science Educators for an Innovative Russia", http://fcpk.ru/catalog.aspx?CatalogId=1946.

[5] The competition was held according to the Governmental Resolution No.220 "On measures designed to attract leading scientists to Russian institutions of higher learning" (April 9, 2010).

[6] Under the Soviet system, specialist degrees were awarded after five years of study.

[7] Data on publication structure are obtained from SciVal Spotlight, analytical instrument by Elsevier, based on Scopus.

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