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EVALUATION OF RESEARCH AND INNOVATION POLICIES: THE CASE OF RUSSIAN UNIVERSITIES

In recent years, evaluation and impact assessments (IA) of research and innovation (R&I) policies have become of interest both to researchers and policy makers. The latter use the results of such assessments when developing new regulations and monitoring the implementation and effectiveness of policies already in place. The practice and methodology of policy evaluation and IA are characterised by the diversity of approaches used and the existence of a number of unresolved methodological problems. At the same time, efforts are being made to define conceptual frameworks for policy evaluation and IA, categorise relevant studies and cases, and draft recommendations.

This paper looks at public policies and programmes aimed at stimulating R&I in Russian universities. For this purpose, 299 universities were surveyed in 2013-2014 to reveal their demand for the relevant policies in 2006-2012 and the effects they had. Based on survey results we assess the impact of the policies on universities and suggest recommendations regarding the improvement of state regulations and further conduction of similar assessments.

JEL Classification: O38.

Keywords: university; research and innovation; policy; evaluation; impact assessment; Russia.

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Introduction

The rapid development of research and innovation (R&I) in universities to increase their competitiveness, contribute to technological modernisation and achieve other national goals has been the mainstream of Russian science, technology and innovation policy since the late 2000s. This is confirmed both by the government's documents[3], and the significant increase in the scale and scope of the policies used.[4]

In recent years, the need to support university research, both as a source of knowledge and an industrial innovation catalyst (Rosenberg, Nelson, 1994), and also as a driver of long-term economic growth (OECD, 2015; Stevens, 2011), is recognised worldwide. While some countries (i.e. Hungary, Czech Republic, Croatia, Poland, Turkey, New Zealand, Peru) have carried out reforms of national university systems[5], others (like the Netherlands, Great Britain, Japan, the United States) are tightening the terms of university support by increasing their requirements to include scientific outcomes, defining priorities and implementing policy evaluation and IA procedures (Georghiou, 1995; OECD, 2003, 2012). As for Russia, the state funding of university research is not only continuing, but is in fact intensifying.[6] In 2012, the President of the Russian Federation set major goals in the fields of education and science for the period up to 2020.[7] Among other things, they include no less than five Russian universities entering the top-100 global universities by 2020 and a larger share of higher education institutions (HEI) in gross domestic expenditure on R&D (GERD) – from 10% in 2013 to 11.4% in 2015.

[3] 'Strategy for the Development of Science and Innovation in the Russian Federation up to the year 2015' (approved by the Inter-Agency Commission for Science, Technology and Innovation Policy on 15 February, 2006, Protocol No. 1), 'Concept of Long-term Socio-Economic Development of the Russian Federation for the Period up to the year 2020' (approved by Order of the Government of the Russian Federation No. 1662-r dated 17 November, 2008), 'Strategy for Innovative Development of the Russian Federation 2020' (approved by Order of the Government of the Russian Federation No. 2227-r dated 8 December 2011), 'Principles of Russian Federation Policy on the Development of Science and Technology up to 2020 and Beyond' (approved by the President of the Russian Federation on 11 January, 2012, Pr-83) etc.

[4] Among others, the creation of and support for national research university (NRU) and federal university development programmes, financing joint high-tech projects of companies and universities, development of university innovative infrastructure, implementation of programmes to raise the global competitiveness of leading Russian universities (the '5-100 Programme').

[5] Thus, in the early 2000s, to counteract the trend of 'brain drain' the Government of New Zealand proposed a package of special measures to support university research (Davenport, 2004).

[6] This strategy is in line with OECD recommendations regarding the completing of reforms 'in the R&D sector by taking a large proportion of research from the Academy of Sciences to universities' (OECD, 2014a).

[7] Presidential Decree 'On measures to implement state policy in the field of education and science' dated 7 May 2012 No. 599.

Measures and finance supporting these objectives are provided by the Government state programmes 'Science and Technology Development' and 'Education Development'. These programmes stipulate funding for joint high-tech projects led by Russian universities and companies, attracting leading foreign scientists to universities, a state task for R&D in universities, and other relevant policies.

Meanwhile, the contribution of the targeted support for universities' research into Russia's 'presence' in global science is uncertain. In 2005-2014 the country's share in Web of Science and Scopus decreased from 2.46% to 2.05% and from 2.35% to 1.89% respectively. This is partly due to the fact that R&I policy evaluation and IA procedures in Russia are implemented in an extremely formalised and fragmented manner (formative evaluation) using a variety of quantitative indicators, roughly as follows.[8] The government (or a ministry) draws up a list and sets target dynamics for indicators reflecting the course and/or effects of different state programmes or policy measures. While, for instance, for the 'Science and Technology Development' state programme, target indicators and their values are largely available[9], for a number of other public programmes and policies they remain uncertain and access to them is restricted. Specific organisations appointed to monitor them (often in collaboration with the Government or the ministry in question) define the monitoring indicators and create special information resources gathering data on their dynamics, which can be accessed only by its direct 'customer' (i.e. the government or the corresponding ministry) or with the customer's permission.

The indicators used to monitor certain R&I policies are geared predominantly towards measuring expenditure and often do not fit the purpose for which the relevant measures were intended. For example, in 2009, Federal Law No. 217-FZ was adopted, authorising state universities and research institutes to set up spin-offs (in order to commercialise intellectual property). The implementation of that law has been largely monitored based on the number of businesses set up under this law. This indicator has also been used to measure research and higher education institutions' performance which in turn led to the formal establishment of about

[8] In (OECD, 2014b) it is also stated that R&I policy evaluation and IA procedures in Russia are extremely formalized and hardly ever applied.

[9] As experience of state programmes (including the 'Science and Technology Development' state programme) shows, the values of their target indicators can be revised both due to a reduction in funding for such programmes and for other reasons.

2350 spin-offs (as of September 2015[10]). The real reason for setting up these new businesses, as well as their problems and performance, still remains a mystery.

The current practice of monitoring R&I policies in Russia also ignores feedback from users to allow the adjustment of previously adopted decisions or take account of monitoring results when developing new measures of support. Clearly, monitoring carried out in this way does not show whether the state support provided for universities' R&I activities really meets their needs and influences their performance. At the same time, the necessity to obtain, analyse and use such information is dictated not only by the scale and dynamics of direct state support for universities (in the absence of significant shifts in their competitiveness), but also by the stricter demands on the effectiveness of state expenditure (including on R&I) under the pressure of the macroeconomic and budgetary restrictions of the forthcoming period.

Under these conditions, in 2013-2014 we arranged a survey aimed at assessing the demand for R&I policies[11] and their impact on Russian universities as direct beneficiaries of state support.[12] The paper is structured as follows. First, we provide a literature review of R&I evaluation and IA theory and practice. After the methodological section we present the results of the survey. We discuss the results and lessons learned in the concluding part of the paper.

Literature review

The emergence and development of R&I policy evaluation and IA studies are largely linked to the significant growth in state support for R&D and innovation over recent decades (OECD, 2014b), and the changing perception of the role of the state in the economy (Mazzucato, 2013). The dynamics of these processes together with budgetary restrictions worldwide increased public demand for evidence-based R&I policy. Data on government spending on R&D and innovation and their impact on economic growth, competitiveness, quality of life, environment and other areas of human life has been required to measure the effects of and justify the demand for state support, and to adjust existing (and develop future) state programmes (OECD, 2012, 2014b; World Bank, 2010).

[10] https://mip.extech.ru/reestr.php.

[11] In this paper we refer to the assessment of demand for and impact of R&I policies rather than the broader concept of policy evaluation which also includes evaluation of policy design and implementation (OECD, 2014b).

[12] Surveys of beneficiaries are widely used in R&I policy evaluation and IA practice (OECD, 2014c).

R&I policy evaluation and IA procedures have been implemented since the 1980s. For example, between 1985 and 1993 the German Federal Ministry for Research and Technology (now BMBF) commissioned 50 major evaluation studies of regulatory measures (Kuhlmann, Holland, 1995). Despite the fact that all these studies were performed by independent research institutes, the objectivity of those assessments remains questionable (Kuhlmann, 2003). In 1997 the Japanese government adopted recommendations for the regular assessment of state science and technology policy, which began to be used while implementing national plans and strategies in the field of science and technology (Shapira, Furukawa, 2003, p.167). Since 2005 in the US special attention has been paid to the evaluation of programs and projects implemented by federal agencies, including federal science programs (Jordan, 2010).

The rationale for the formation and development of the institute of policy evaluation is to use its results for the improvement of ongoing programs, the enhancement of public support for science (World Bank, 2010), and the promotion of the socio-economic development of countries (Mackay, Horton, 2003). The principal difficulties in assessing research policies refer to the nature of scientific knowledge, the economic effects of which are difficult to measure (Godin, 2010; Gassler, Schibany, 2011). As a result, despite the expansion of R&I policy tools and regulations, credible and recognised assessments of their effectiveness are scarce (Edler et al., 2013). The currently available data is characterised by heterogeneity of methodologies and forms of representation – from academic research to formal reports on the effectiveness of regulatory measures.

The approaches used to evaluate R&I policy are quite diverse (Guy, Arnold, 1993). The assessments may occur at various stages of preparation, adoption and implementation of decisions: ex-ante assessment (prior to the implementation of the support measures or programs), interim (during the implementation) and ex-post (de facto) evaluation (OECD, 2012). For these purposes various quantitative and qualitative methods can be used including logical or economic models of the innovation process (Rood, 2013; McLaughlin, Jordan, 2004; Stern, 1993), case studies, surveys, regression analysis, bibliometric analysis (Abramoa et al., 2009) and other techniques (i.e. surveys of the beneficiaries (i.e. Newman et al., 1991)). The results of such empirical studies vary depending on the methodology employed, and therefore the interpretation must be carried out with a certain degree of caution (Cunningham et al., 2012).

R&I policy assessments may be conducted by government departments (Shapira, Furukawa, 2003) or specialised research organisations (i.e. KISTEP in Korea or public research institutions in Netherlands), with the involvement of experts with broad and specialised knowledge in various scientific and technological fields.

Despite the variety of approaches to the evaluation and IA of R&I policies, in countries where these procedures have already become routine, fairly simple techniques are mostly applied. This may be explained both by the large quantity of programs and projects to be assessed and the limited public funds that can be spent on such purposes (Shapira, Furukawa, 2003, p.188).

The criticism of current approaches to policy evaluation and IA concerns the impossibility of consideration of all its effects, prematureness when identifying these effects (i.e. before the manifestation of a number of outcomes), biased 'evaluators' etc. (Kuhlmann, 2003). A low practical value of policy evaluation results, often being the case, is related with a low involvement of stakeholders in the process, and a lack of adequate indicators and unified methodology for analysis (Teirlinck et al., 2013). Application of a variety of metrics for the purpose of policy evaluation allows particular regulators to gain short-term benefits and reach local objectives (Derrick, Pavone, 2013; Gershman, Kuznetsova, 2013).

The practice of evaluation and IA of R&I policies in developed countries (USA, Japan, Norway etc.) is expanding by improving the approaches used and the regulatory framework, the creation of new tools for collecting and analysing data, and the formation of specialised databases (OECD, 2012). Special programmes similar to the National Science Foundation's 'Science of science and innovation policy' have been launched in several countries.[13]

Despite the variety of instruments used for the evaluation and IA of R&I policies, they can be organised into two groups. The first is the so-called academic exercises ('science-based evaluation'). The practical application of their results is usually at the discretion of the authorities concerned (Rossi, 1987). The second group is the so called 'utilisation-focused evaluations' (Patton, 1997). They are not associated with any research methods (which may be different), but focused on the regular collection of information that is used for government decision-making, and the attention is constantly 'on the intended use by intended users' (Ramirez and Brodhead, 2013). However, implementation of the results of policy evaluation

[13] For example, one such project, entitled 'The knowledge base for research and innovation policy (FORFI)' is implemented in Norway. Access: http://www.forskningsradet.no/prognett-forfi/Forside/1253954307289.

(obtained by the implementation of both the first and second group of tools) in state regulation depends on a variety of factors, including decision-making level, the degree of involvement of state representatives in the evaluation, transparency of research results, and others (Mackay, Horton, 2003; Weiss, 1999).

The current study belongs to the first group of 'academic exercises'. We attempt to systematise the main instruments of state support for university R&I, estimate the demand for these instruments from their beneficiaries and the effects achieved. We also suggest recommendations to improve the effectiveness of the studied policies.

Methodology

Our first step was systematising major state R&I policy measures related to universities within the time period of 2006–2013 (see Table 1).

Table 1 – Major public policies to support R&I at Russian universities

Competitive measures	Non-competitive measures
Targeted financing for universities' innovative education programmes in 2006-2008 (57 winners)	Allowing PRIs and universities to commercialise their scientific output through spin-offs (since 2009)
Financing the programmes of National research universities (29 currently), (since 2008)	Performing R&D within innovation development programmes of large state-owned companies (since 2011)
Supporting innovative infrastructure of universities and their co-operation with industry (since 2010)	Taking part in Russian technology platforms (since 2010)
Attracting leading scientists and PhD students to Russian universities (since 2010)	Tax incentives for R&D and innovation

The first group was represented by the following competitive measures:[14]

- Targeted financing for universities' innovative education programmes in 2006-2008. Although the funds earmarked for this programme were predominantly intended to develop university education activities and their use was strictly regulated by the conditions of the

[14] Some measures in this group were initially intended solely for universities, but in 2012 the Government expanded the range of potential recipients to include state research institutes meeting certain criteria.

competition, a portion of the funds could still be used to develop universities' innovative infrastructure, which was the reason to include this policy in the survey.

- Financing the programmes of 29 universities categorised as 'national research universities' (NRU). The programmes have been aimed at developing the educational, research and innovation activities of a university. The winners annually have to report to the Government on the progress of these programmes. Those who do not meet target indicators can lose their 'NRU' status. However, there has been no precedent for this so far.

- Targeted financing to develop universities' innovation infrastructure, involve them in joint projects with high-tech companies and attract leading scientists to Russian universities. In this regard, three Government regulations were adopted in 2010 establishing rules for the corresponding competitions. These documents are still in force (with certain amendments introduced in 2012 and 2015).

The second group (non-competitive measures) included the following:

- Allowing state universities to commercialise their scientific output through spin-offs (Federal Law N 217 of 2 August 2009). The Law did not include any requirements on the amount or proportion of contribution for founding parties.

- Performing R&D within the innovation development programmes of large state-owned companies. At the time of the survey, 47 state-owned enterprises (SOEs) were due to develop innovation development programmes. The list of SOEs and the corresponding guidelines were first adopted by the Government in 2010 and updated in 2015. The involvement of universities in the development and implementation of innovation development programmes was set out in the guidelines (see Gershman, 2013).

- Taking part in Russian technology platforms. The technology platforms were established in Russia in 2011-2012 in accordance with rules set by the Russian Government in 2010-2011. At the time of the survey, there were 30 on the list of technology platforms (see Proskuryakova et al., 2015). Despite the lack of a formal competition for universities to 'enter' technology platforms (and innovation development programmes of SOEs), universities still have to satisfy the criteria set by the relevant regulatory documents and must have relevant experience and research results in the given scientific fields, among other things.

Finally, tax incentives for R&D and innovation activities included only those tax incentives that universities were able to use during the studied period. These include exemption

from VAT (for R&D financed by the Russian Foundation for Basic Research (RFBR) and the Russian Foundation for Humanities (RFH)[15]; for R&D performed by HEIs under contracts with other organisations; for transactions involving intellectual property rights and for some other cases), accelerated depreciation of fixed assets used only for science and technology activities, tax credits for R&D and innovation (in accordance with the list of activities established by Article 262 of the Tax Code of the Russian Federation), and also property tax allowances which could be provided by the regional authorities.

The logic of the survey questionnaire was different for competitive and non-competitive policy measures (Figure 1). In the first case revealing the effects of applying a particular measure was preceded by questions regarding the reasons for not taking part in the competition, or for failure in it. For non-competitive measures, the questions only related to reasons why they were not used.

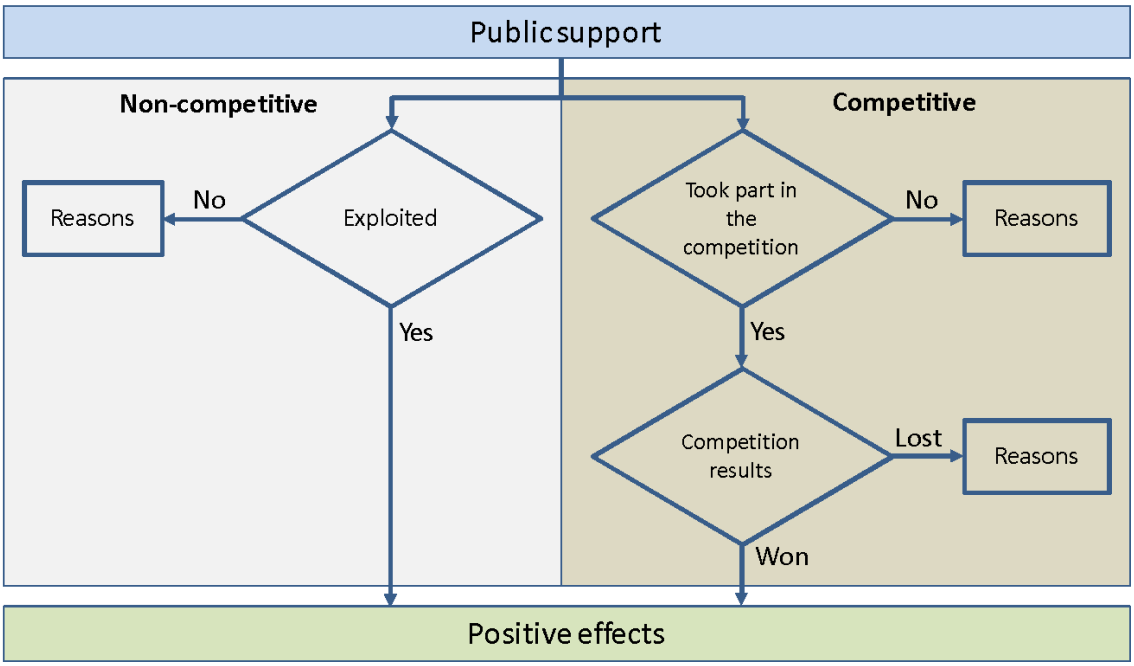

Figure 1. Survey scheme

The sample was formed from the general population of HEIs carrying out R&D, i.e. 560 HEIs in the country (HSE, 2014). The sample comprised 299 organisations situated in 25 regions across Russia. 29 national research universities were included in the sample which,

[15] Since the Federal Law on establishing the Russian Science Foundation has been adopted only in 2013, the latter was not included in the survey.

however, could have caused a slight bias in the survey results slightly increasing the proportion of universities taking advantage of relevant policy measures. At the same time, the sample did not include the M. V. Lomonosov Moscow State University or the Saint Petersburg State University.

The majority of surveyed universities (87.6%) were state universities (owned by the Russian Federation), which was in line with the relevant characteristics of the general population (HSE, 2014). R&D personnel accounted for 20.8% of total staff (over one quarter at NRUs).

Virtually all universities in the sample had research centres, scientific laboratories or other similar structures. Roughly half of the universities had established innovative spin-offs and intellectual property centres and less than one third of the sample had technology parks, technology transfer centres and business incubators. This in turn could slightly affect the survey results in terms of the demand on state support instruments.

Survey results

Competitive measures

The participation of the surveyed universities in the competitions for direct state support serves not only as an indicator of their awareness of R&I policy measures, their receptiveness towards innovation and the quality of the university management (including the ability to prepare applications for these competitions in line with the set criteria and in the short time frames), but also as a preliminary assessment of the potential impact of these measures. The involvement of the respondents in the competitions for direct R&I support was on the whole fairly high, but varied between certain programs (Figure 2).

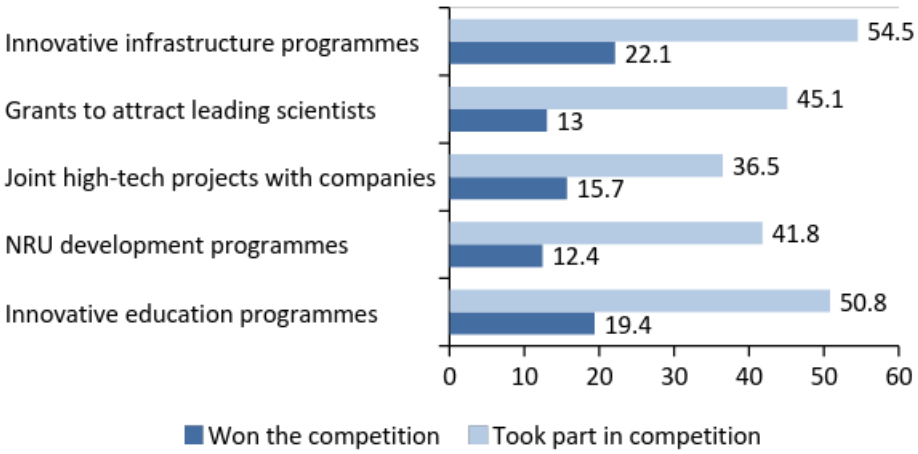

Figure 2. Results of universities' involvement in the competitions for direct state R&I support (percent of respondents)

* In the case of joint high-tech projects the applicants are not universities, but companies which (according to the competition criteria) have to involve universities in developing and implementing these projects.

The rather high activity shown by universities in innovation education programme competitions in 2006-2008 (50.8% of respondents) is worth noting, as this was the first round of candidates for direct state support not only for university education activities, but partly for research (as the programme funds could be spent on scientific equipment) and innovation purposes. The participating universities (467 participants, 57 of which were winners) received first-hand experience of preparing complex strategic documents, which were extremely useful for their involvement in such competitions in subsequent years.

Thus, innovation infrastructure development programmes led in terms of the number of participants and winners: roughly half of all respondents competed for support from such programmes and one in five were successful.

The ratio of participants to winners in these competitions (Figure 2) suggests that, all things being equal, universities decided to take part in them also taking into account the number of possible winners, which is generally known in advance. That is, university activity in competing for direct state R&I support is in some way linked to a preliminary assessment of the likelihood of success, the possible number of winners and the amount of state finance. The reasons for not taking part in the competitions may serve as a certain indicator of the match between state support and the real needs of universities.

Respondents often did not take part in the competitions when they did not meet the criteria, which, in our opinion, is a consequence of the targeted nature of the majority of R&I policy measures included in the survey. For example, in the NRU programme, not meeting the criteria was mentioned by more than half of those not participating[16] (52.9%); in the innovation infrastructure development programmes – 33.8% (university R&D did not require the use of innovation infrastructure); and for grants to attract leading scientists – 30.5% (because of the mismatch among the research carried out and the scientific fields stipulated in the competition).

There were other reasons for which respondents ignored their opportunity to access competitive state R&I support (Figure 3).

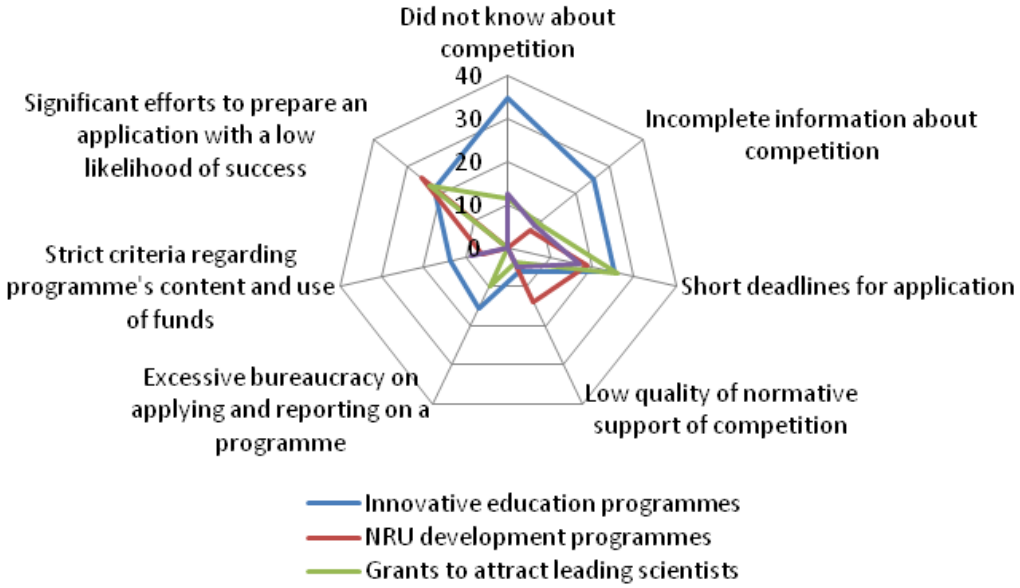

Figure 3. Reasons for not participating in the competitions for state R&I support in 2006-2012 (percentage of respondents not participating in a given competition)

More than one third of the respondents not participating in innovative education programme competitions in 2006-2007 mentioned a lack of information about the competitions. However, only about 10% of the surveyed universities did not participate in competitions held in subsequent years. This could be due to both the gradual improvement of information support

[16] It is important to note that at the time of carrying out the survey, Russian legislation distinguished three types of higher education institution: universities, academies and institutes, and only universities could take part in the competition for the NRU status.

from the government and the aforementioned 'learning' effect of the competition for innovative education programmes.

For roughly a quarter of the respondents the main reason for not participating in the competitions was the short deadline for application. It is important to recognise that the need for short deadlines in preparing these applications was at the very least unobvious, as this led to a decrease in the quality of applications and their assessments, as well as future failures to achieve the goals set in the corresponding programmes.

One of the barriers reported by the respondents not participating in the competitions was the considerable effort required to prepare an application. In part, it shows a lack of experience of Russian universities in struggling for competitive funding. However, if taking into account respondents' references to excessive bureaucracy (both in terms of preparing the applications and reporting), their need for a simplification and reduction of application requirements is very high.

Considering certain subjectivity of the universities that lost competitions, their answers regarding the reasons for their failures (Figure 4) could serve as an indirect indicator of the quality of Russian R&I policy-making.

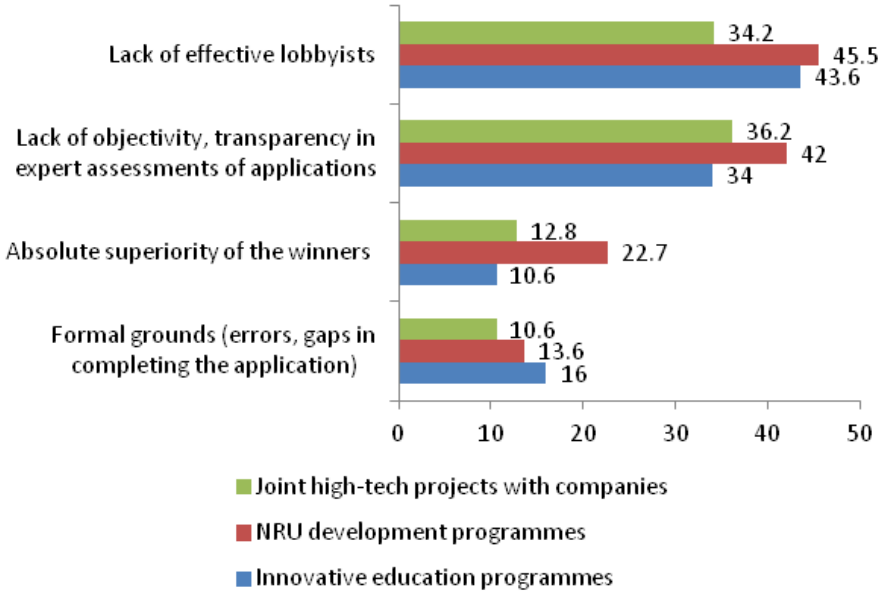

Figure 4. Reasons for losing the competitions for direct state R&I support (percentage of respondents having lost the corresponding competitions)

It is worth noting that while 41.5% of 'unsuccessful applicants' for innovative education programmes in 2006-2007 pointed to their lack of experience in preparing such applications, within just a few years (NRU development programme and others) this share dropped to only 20.5%. In our opinion, this suggests that Russian universities have gradually acquired the necessary skills, abilities and experience to take part in various competitions.

We believe that reasons such as the lack of objectivity or transparency in expert assessment of applications and the lack of effective lobbyists require additional analysis. These and the other reasons for 'failure' mentioned by the respondents are important not only for ex-post policy assessments, but also while developing and implementing new measures. However, the survey results suggest that the real effects of direct state support for university R&I activities in 2006-2012 differ from those expected.

Non-competitive measures

The survey showed that universities' demand for non-competitive measures also varies among policy instruments. While more than half of the respondents (55.9%) had small businesses set up to use intellectual property, 27.4% took part in the innovation development programmes of SOEs and 41.5% in technology platforms.

Respondents explained their 'ignorance' of non-competitive measures slightly differently to the competitive measures examined before. For example, the absence of small businesses was explained by the R&D related to humanities or social sciences (44.7% of respondents which had not set up such businesses). Not participating in innovation development programmes and technology platforms was explained by not satisfying the criteria for these instruments (50.7% and 46.9% of respondents not participating in innovation development programmes and platforms respectively).

The next most popular answers of the respondents vary depending on the specific nature of the measures. More than one third of universities which did not establish small businesses (34.1%) explained this as being due to the shortcomings and incompleteness of the legal framework, while 15.2% pointed to additional time needed to learn how to create such spin-offs and gain profits from intellectual property. Among the other barriers, 11.4 to 13.6% of respondents mentioned a lack of intellectual property suitable for use through the spin-off

mechanism, a lack of success in searching for partners to set up a business, and the uncertain prospects of using intellectual property in this way.

Considering that a major goal of setting up university spin-offs was to make use of research outcomes, the highlighted problems do not allow this goal to be achieved. A number of amendments made to the regulations regarding the creation and functioning of these businesses in recent years are a sign of the existence and significance of these problems.

As for not participating in innovation development programmes and technology platforms, respondents explained this by the lack of 'invitations' from SOEs and initiators of technology platforms (23% and 32.6% respectively); the incomplete or fragmented information on these policy instruments; and the lack of collaboration with SOEs.

Tax incentives for R&D and innovation

Universities' demand for tax incentives for R&D and innovation as well as factors affecting that demand were assessed based on the respondents' answers to the questions regarding the use of the allowances set out in the Russian Tax Code specifically for HEIs (Gokhberg, Kitova, Roud, 2014; Kitova, 2015).

Targeted tax incentives, i.e. those specifically intended for HEIs, include zero rate of income tax (income tax exemptions) when meeting five conditions (Article 284.1 of the Russian Tax Code). These include the R&D and educational activities accounting for at least 90% of the educational organisation's income, which is not satisfied by the majority of leading Russian universities receiving income not only from educational activities, but also other sources (use of intellectual property, providing scientific, technical and engineering or other services, etc.). Although this rule has been in force since 2011, the regulations needed to implement it only appeared at the end of 2011, which could not allow many universities to apply the exemption in 2011.

By the end of 2011, less than a quarter of the surveyed universities (23.7%) had applied the income tax exemption. However, the majority of other universities did not use it as they did not meet one of the conditions: the share of R&D and educational activities in their income did not reach the required 90% (61.8% of respondents who did not apply the exemption in 2011). This criterion is viewed by a number of experts as being unjustifiably strict, excessive and not in line with the income structure of a number of entirely successful and effective universities.

However, despite active discussions regarding an effective level for this threshold, there are currently no plans to revise the threshold downwards. Some universities 'ignored' this opportunity due to a lack of taxable income or failure to meet the deadline for submitting the required documents (12.7% and 11.8% respectively of respondents not using this exemption).

Plans to use this incentive after 2011 can be used to assess universities' potential demand for it and its potential impact. Almost one third of respondents were going to use this opportunity (32.4%) and almost the same share of universities were not going to as they considered that the share of R&D and educational activities in their income did not reach the required 90%. However, 10.4% of respondents would use the income tax exemption if the share of R&D and educational activities in income was reduced to roughly 70-75%.

The fact that this rule has not yet been changed suggests that demand for income tax exemption among universities generally will continue to be low, meaning that the impact of this incentive on Russian universities will be insignificant. We believe that this regulation should be revised and the experience of its implementation should be taken into account when discussing new proposals for tax support schemes for universities.

Universities' demand for available tax incentives varies significantly (Table 2).

Table 2. Universities' demand for tax incentives for R&D and innovation and factors affecting demand (percent of respondents)

Tax incentives	Percent of respondents
Had grants from the Russian Foundation for Basic Research (RFBR) and/or the Russian Foundation for Humanities (RFH)	63.9
Had no problems with tax registration for RFBR and/or RFH grants*	95.8
Used the accelerated amortisation of R&D fixed assets	7.4
Did not use the accelerated amortisation of R&D fixed assets due to lack of or inability to separate these from other assets**	78.3
Used the income tax allowance for R&D carried out using own funds	45.8
Used regional income tax allowance	6.0
Used VAT exemption for transactions with intellectual property	23.1
Did not carry out operations with intellectual property ***	93.5
Used VAT exemption in relation to R&D carried out under commercial contracts****	70.6
Used property tax allowance	25.0

* As a percentage of respondents that had the grants.
** As a percentage of respondents that did not use the accelerated amortisation on such assets.
*** As a percentage of respondents that did not use the VAT exemption for transactions with intellectual property.
**** As a percentage of respondents that did use the VAT exemption allowed for R&D.

As the survey shows, almost two thirds of universities (63.9%) received RFBR and RFH grants and virtually all of them (95.8%) used appropriate income tax allowance and VAT exemption without any problems (especially without disputes with the tax authorities). This in turn suggests that these tax incentives are more important for universities than others. The accelerated amortisation of R&D fixed assets was only used by 7.4% of respondents. This can by no means be explained by the lack of R&D fixed assets, but rather by the fundamental complexity or impossibility of separating the assets specifically for R&D from the university's other fixed assets. However, the low overall demand for this allowance among universities points to the fact that its impact was on the whole insignificant.

The income tax allowance for R&D carried out by universities at their own expense (including R&D ordered by other organisations)[17] was used by less than a half of the surveyed universities (45.8%). Other respondents carried out R&D only at the expense of customers or used the exemption from income tax (29.4% and 17.4% respectively of respondents which did not use the income tax allowance for R&D).

Half of the respondents (50.8%) did not use the possibility of increasing (times 1.5) eligible R&D expenditure[18] since their R&D was carried out only at the expense of customers. 15.7% of respondents' R&D did not meet the conditions specified by the Tax Code of the Russian Federation and 26.1% of universities used the exemption from income tax. Finally, only 2.3% of the surveyed universities used this income tax allowance, which cannot be considered significant.

Almost a quarter of respondents (23.1%) took advantage of VAT exemption for transactions with intellectual property[19]. The majority of other respondents (93.5%) did not use (or could not use) this exemption since they were not engaged in such transactions. Since the existence of intellectual property and income from use of intellectual property rights serves as one of the indicators of a university's competitiveness, it can be stated that this incentive was in

[17] Article 262 of the Russian Tax Code gives an exhaustive list of R&D expenditure items (eligible R&D expenditures) which can be taken into account when calculating the taxable income.

[18] In accordance with Article 262 of the Russian Tax Code, expenditure on R&D carried out using an organization's own funds can be taken into account when calculating the taxable income with a coefficient of 1.5 if the R&D is included in the corresponding list approved by the Russian Government.

[19] In accordance with Article 149, clause 2, sub-clause 26 of the Russian Tax Code, the sale on Russian territory of exclusive rights to inventions, utility models, industrial designs, software, databases, integrated circuit layouts, know-how, and the issuance of a license to use the mentioned results are exempt from VAT.

demand mainly by successful universities, which somewhat restricts its impact on universities nationwide.

Impact of R&I policies on universities

The diversity of goals, objectives and conditions surrounding the observed policy measures makes it almost impossible to compare their effects. Moreover, the outcomes of certain programmes could be interrelated. For example, some effects of innovative education programmes mentioned by successful applicants came to light during the implementation of NRU development programmes (Table 3).

Table 3. Some effects of innovative education programmes and NRU development programmes (percentage of respondents that won the competitions)

Effects	Innovative education programmes	NRU development programmes
Growth in the qualifications of professors and researchers	51.7	13.5
Introduction of new education programmes or courses	46.6	29.7
Acquisition of new scientific equipment	56.9	54.1

More than half of the respondents who were successful in these two programmes (56.9% and 54.1% respectively) stated that it allowed them to acquire new scientific equipment which in many respects contributed to growth in R&D expenditure and research outcomes. The 'contribution' of innovative education programmes to growth in the qualifications of professors and researchers and the emergence of new education programmes or courses was higher than in NRU development programmes. This can be fully explained by the orientation of the first - predominantly towards educational activities, and of the second – towards developing universities' R&D.

A large number of NRU development programme winners (54.1%) indicated that it allowed them to set up new research, educational or innovation divisions. Almost two thirds of respondents who received grants to attract leading scientists identified effects such as bringing younger personnel into work with them, increasing research outcomes and strengthening cooperation with leading scientific and educational centres in Russia and abroad (Figure 5).

Figure 5. Some effects of receiving grants to attract leading scientists (percent of respondents having received such grants)

Analysis of the effects of direct competitive R&I support for universities, as revealed in the survey results, shows that contrary to expectations, the support did not have an impact on all respondents. What is more, these effects were extremely heterogeneous and covered no more than two thirds of those receiving the support.

The effects of non-competitive R&I policy measures also vary depending on their contents. For instance, by 2013, those respondents that had set up small businesses to use their intellectual property identified positive effects from their activities such as the involvement of students and postgraduates in them, growth in personnel qualifications, better recording and registration practices for intangible assets, etc. (Figure 6).

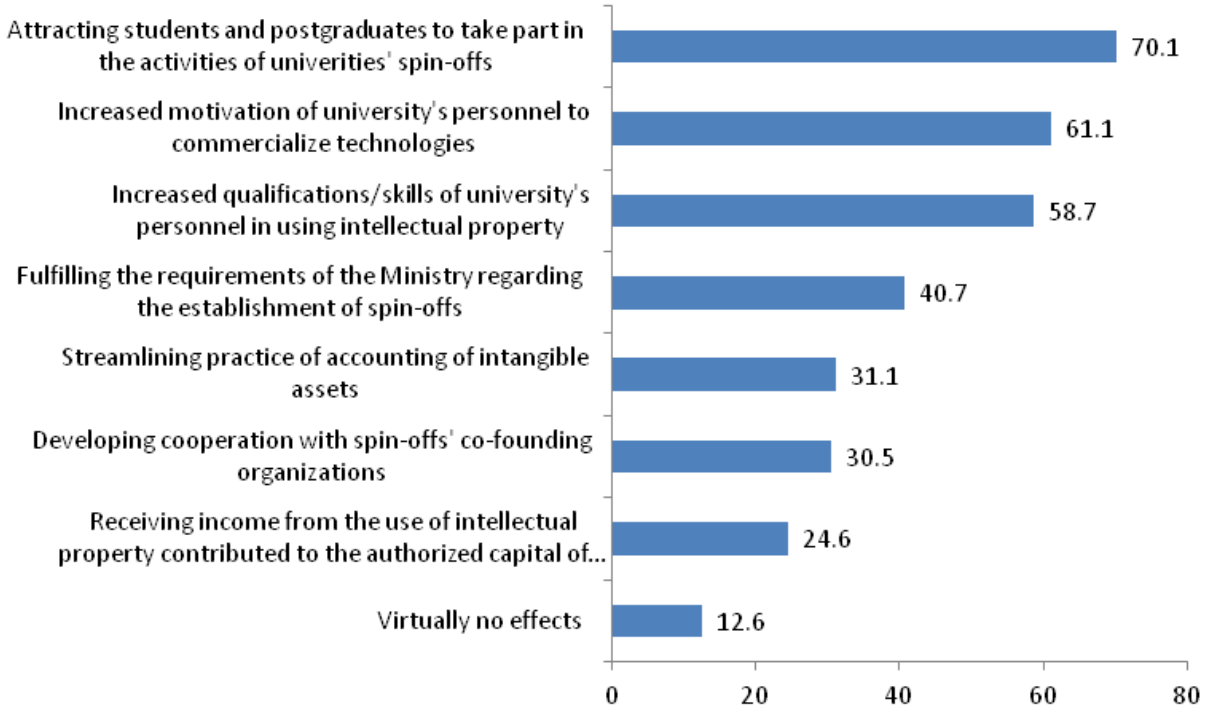

Figure 6. Some effects of spin-offs set up by universities (percent of respondents having set up such spin-offs)

It is worth noting at this point that 'fulfilling requirements of their ministries' was also mentioned as one of the effects by a significant proportion of the surveyed universities (40.7%). In essence, this means that one of the factors affecting demand for this policy was administrative pressure from the ministries, which in our view restricts the measure's potential impact on universities' development.

The survey results show that it was predominantly intellectual property that was contributed by universities to their spin-offs (70% of respondents that had set up spin-offs). And more than one third of them (38.9%) had already produced at least one innovative product. At the same time, a significant number of these small businesses were not actually concerned with making use of universities' intellectual property, but rather providing various (scientific and technical) services (44.3% of respondents that had set up businesses). Roughly one third of the respondents reported the very small authorised capital of their spin-offs and other barriers that did not allow them to count on additional private investment into these businesses. Thus, the effects of this state policy appear mixed. If nothing else, it is clear that the goal of setting up and

operating such businesses has not been achieved and their impact on the development of universities' R&I activities is less than expected.

Taking into account the low overall demand among respondents for the tax benefits for R&D and innovation included in the survey, their impact on the R&I activities of universities was generally negligible. The only exception was the ability to take grants from foundations providing support for scientific, technological and innovation activities into account for tax purposes: virtually all respondents receiving such grants used these benefits. The coverage of the surveyed universities in terms of other tax support measures for R&D and innovation was significantly lower: less than a quarter of respondents took advantage of each of the instruments (only 7.4% of respondents took advantage of the accelerated amortisation option for R&D fixed assets, for example).

However, analysis of the combinations of tax benefits used by respondents revealed four models of tax behaviour (Gokhberg, Kitova, Roud, 2014). The first model covers universities whose demand for tax support for R&D and innovation is focused on income tax and VAT allowances (44% of respondents). The second model (32.1% of respondents) reflects universities taking advantage of their right to exempt R&D expenditure and/or transactions from VAT. The behaviour of universities covered by the third model (11% of respondents) differs from the others in terms of the relatively active use of the zero per cent profit tax rate and property tax benefits. Finally, the fourth model (roughly 3% of respondents), predominantly exhibited by NRUs, characterises the relatively high demand for virtually all of the tax support instruments included in the survey. Admittedly, despite the differences revealed in the tax behaviour of the respondents, no statistically significant impact of tax benefits on the R&I activities of universities (including on the number of R&D personnel, R&D expenditure, income from intellectual property use) was observed. That is, we can assume that there is no direct correlation between a university's use of tax benefits for R&D and innovation, on the one hand, and the extent and performance of such activities, on the other (at least over the period under consideration). This in turn means that the tax support for R&D and innovation in Russia in 2006-2012 had virtually no impact on the development of R&I activities at Russian universities during this period.

Discussion and conclusions

Russian R&I policy in 2006-2012 is characterised by significant growth in direct targeted support for universities' R&I activities, and an expanded range of instruments used.

The efforts made to advance R&D in universities have led to a slight shift in the sectoral structure of Russian science. Although research institutes still dominate, their share in the number of R&D institutions reduced from 59.3% to 47.7% in 2005-2013, while higher education institutions increased from 11.4% to 18.6% (HSE, 2015). Clearer still is the 'expansion' of the higher education sector, which showed a fivefold increase in its R&D expenditures during this period (compared with a roughly threefold increase for Russian science as a whole) and 35% growth in R&D personnel (compared with a 11% reduction in Russian R&D personnel). As a result, higher education's share in GERD increased in this period from 5.8% to 9% and in R&D personnel from 5.3% to 8.1%.[20]

The impact of this policy was apparent in the publication activity of universities in 2005-2014. The number of university publications in scientific journals indexed on Web of Science and Scopus increased by 40% and 71% respectively[21]. However, this growth is caused not only by high rates of university publications, but also by the involvement of co-authors from other research institutions. Thus, the total number of publications by Russian authors in these journals increased by only 11% and 13%.

To assess R&I policies' impact, a special survey of universities was carried out, aimed at revealing their demand for specific policies and the effects they had. The survey results have allowed the formulation of certain conclusions and recommendations regarding efficacy, areas for improvement and the effects of state support for R&I activities at Russian universities in 2006-2012, as well as opportunities to assess the impact of Russian R&I policy. In particular, the potential impact of direct competitive support for university R&I activities could be 'measured' not only by the number of those receiving support, but also when considering the number of those deciding to take part in the competitions.

[20] Admittedly, this has not yet come close to the sectoral structure for science in developed countries. In the majority of them, the contribution of the higher education sector to GERD is significantly higher. For example, 15% in the USA, 18% in Germany, 20% in Finland, 26.9% in the UK, and 38.1% in Canada (HSE, 2015).

[21] HSE calculations based on Web of Science and Scopus data as of 18 January, 2015 for three types of scientific publication: articles, conference papers and reviews.

The willingness of the surveyed universities to take part in the competitions slightly decreased: while the potential support of innovative education programmes was ignored by roughly half of the respondents, 58.2% had likewise ignored achieving NRU status (and support for the corresponding development programme). In our opinion, the observed reduction in the number of participants and winners is perhaps due to the limited impact of this support on universities in general.

The reasons for universities' passivity in competing for additional government funding also serve as an indirect measure of the state policies' efficacy. In particular, the survey revealed that in a number of cases universities did not know about a particular R&I policy instrument (for example, over one third of respondents not taking part in a competition of innovative education programmes simply were not aware of it) or did not have sufficient information. This shows not only the inadequate information support for R&I policy, but also the low overall quality of management at Russian universities which, ultimately, also restricts the potential impact of R&I policy on universities. Although in recent years the situation regarding awareness of new R&I policy initiatives (including those directly geared towards higher education institutions) has gradually improved, the abovementioned problems still might affect Russian R&I policy.

The previously identified 'defeatist mindset' of a number of surveyed universities, which did not take part in competitions due to the low likelihood of their success, could point to both the objectivity of their self-assessments and a sceptical attitude towards the quality of these competitions (in particular, the transparency and objectivity of expert assessments of applications). In the context of Russia's transition to competitive mechanisms for direct state support for R&I in recent years, questions surrounding their transparency and objectivity deserve particular attention. The quality of competitive procedures largely determines the achievement of the set goals and the impact of R&I policy on universities and other organisations. This hypothesis is confirmed by universities explaining their loss in the competitions being due to the lack of objectivity and transparency in the assessment procedures and the lack of effective lobbyists.

The effects of the state support vary both among measures and among individual recipients. That is, the impact of direct competitive support for universities' R&I is not distributed evenly across all recipients, but only across a portion of them, which in turn is accompanied by increased isolation from other universities (both those 'ignoring' or not

participating in the competitions and those not feeling the proper effects of such support) and the widening 'gap' between the best universities and others. As Russian R&I policy resources and efforts continue to be focused on priority support of the best (universities, research institutes, laboratories, research groups, individual researchers, etc.), the urgent need to develop and implement balanced decisions for those who do not fall into this category has intensified.

Thus, judging by the results of the survey, the impact of R&I policy measures on universities extended only to some universities, differed in terms of the aims of the measures and turned out to be less than expected. Aside from the conclusion that the impact of Russian R&I policy on universities in 2006-2012 was generally insufficient, it is also worth recognising the possibility of underestimation due to the lag between the introduction of measures and their effects. The latter could have occurred or could have manifested outside the boundaries of the period under consideration or even after the study had been carried out in 2013-2014. Finally, a serious constraint to the potential impact of these measures can also be external factors, such as budgetary and tax regulations, low overall demand for university research from business, etc.

The survey carried out has allowed the assessment of not only the impact of R&I policy, but also its match with the needs of universities and with quality and implementation problems, which can be used both to refine existing policy measures and to develop new ones.

At first glance, looking at the demand for R&I policy measures and their effects appears somewhat simple. However, taking into account the lack of information for both ex-post and ex-ante assessments, such surveys of policy beneficiaries are among the most accessible. Furthermore, it is highly important for Russia (and other countries as well) to build a detailed database for assessing the impact of R&I policies, integrating relevant statistical data and information from dedicated ministries and agencies in order to expand IA practices and use the results effectively in their decision-making.

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