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Contents

HSE Institute for Statistical Studies and Economics of Knowledge (ISSEK) continues to monitor the state science, technology, and innovation policy. The fifth issue presents the initiatives to fight the coronavirus pandemic and facilitate economic recovery currently being implemented in Russia and the leading countries of the world, and relevant OECD recommendations.

Russia

Government approves anti-crisis plan

The National Action Plan has been approved In Russia, aimed at promoting employment and people's income, economic growth, and long-term structural changes in the economy (RF Government decision No. P13-60855 of October 2, 2020). The budget for 2020-2021 is 6.4 trillion roubles, 4 trillion of which has already been spent this year in April-May to counter the pandemic.

One of the Plan's key objectives is to accelerate technological development, in particular through digitalisation, *e.g.* restructuring development institutions, supporting technology companies, adopting the "state as a digital platform" model, etc. The funding allocated for these purposes in the current year will amount to 106 billion roubles, followed by 209 billion more next year. 14.1 and 18.5 billion roubles are allocated to support high-tech companies and promote development and accelerated implementation of digital technologies in 2020-2021, respectively; 2 and 4.3 billion roubles — for digitalisation of healthcare, 16.8 and 18.5 billion — for digitalisation of education; and 15 and 144 billion, respectively — to promote development of electronic engineering.

The Plan provides for establishing S&T innovation centres ("technology valleys"): 1 in 2020, and 3 in 2021; promoting development and implementation of artificial intelligence technologies; and developing standardised organisational and legal mechanisms to coordinate R&D and S&T activities, at all readiness levels.

Science and technology will help develop the Russian Arctic

On October 26, 2020, the President of Russia has signed the Decree No. 645 approving the Strategy for Developing the Russian Federation's Arctic Zone and Ensuring National Security until 2035. The government was instructed to develop an implementation plan within the next 3 months.

The Arctic zone is strategically important for Russia, as it produces more than 80% of gas and 17% of oil; there are more than 85.1 trillion cubic metres of gas and 17.3 billion tons of oil reserves there. The Northern Sea Route is a globally important transport corridor.

The development of the Arctic zone will depend on the country's S&T potential. The key objectives include development and implementation of critical technologies, conducting field research expeditions, developing a comprehensive plan for international research, upgrading research fleet, establishing research and educational centres, and providing monitoring, evaluation, and foresight of S&T development.

The Strategy shall be mainly implemented through the national programme of '"Social and Economic Development of the Russian Federation's Arctic Zone", with a budget of 0.4 billion roubles for 2020, and 4.4, 6.7, and 6.5 billion roubles for 2021-2023, respectively.

Future biological threats will be monitored

The President signed the Decree No. 620 of October 12, 2020 "On the RF Security Council's Interdepartmental Commission for Establishing National Protection System against New Infections".

The new interdepartmental body is vested, among others, with the following responsibilities:

- assessing internal and external threats of infectious disease dissemination and antimicrobial resistance, Russia's population protection level against new infections; and the measures taken to ensure the effectiveness and safety of vaccines, other medicines, and treatment techniques;
- monitoring emergence and dissemination of new infectious diseases, and the collective immunity of the Russian population based on genetic information and research results;

- organising integrated research to develop technological solutions for prevention, diagnosis, and treatment of infectious diseases and creation of new antiviral and antimicrobial drugs, diagnostic systems, and drug delivery vehicles.

R&D expenditures in the new budget cycle

The State Duma approved the bill "On the federal budget for 2021 and for the planning period of 2022 and 2023" in the first reading. Expenditures on civil S&T in 2021 will be cut by 4.6% (to 486.2 billion roubles), but in 2022 and 2023 they will be increased by 1% and 4% compared to 2020 (to 514.6 and 531.9 billion roubles, respectively).
The appropriations for basic research will be increased by 7%, 18%, and 31%, respectively, to 210.5, 233, and 258.7 billion roubles compared to the current year (197.1 billion roubles).
Project implementation costs will be increased as follows:

- for the "Science" national project by 20%, 67%, and 114%, respectively, to 54.9, 76.3 and 97.8 billion roubles (45.7 billion in 2020);
- for the "Digital Economy" by 32%, 86%, and 68%, respectively, to 150.2, 211.1 and 190.7 billion roubles (113.4 billion in 2020).
  Almost half of all expenditures on civil S&T (249 billion roubles) will be allocated through the "Scientific and Technological Development of the Russian Federation" government programme (4.5% increase in 2021).

Review of research and educational centres' applications for support is ongoing

The Russian Ministry of Science and Higher Education continues to accept grant applications from world-class research and educational centres (NOC). This initiative is aimed at promoting the integration of R&D organisations and universities, and strengthening their cooperation with enterprises of the real sector of the economy.

NOCs are established by executive authorities of Russian regions, that, jointly with universities or R&D organisations, develop a programme for the centre's activities. The programme is implemented on the region's territory, and must include targeted actions to conduct world-class research and development, create and commercialise competitive technologies and products, and train personnel to achieve the country's major S&T objectives.

Based on the results of the 2020 competition, at least 5 centres will be chosen to receive support. In 2021, the total of 1.3 billion roubles was earmarked in the federal budget for the implementation of the NOC project, in accordance with the "Development of Scientific and Industry-Science Cooperation" federal project within the "Science" national project.

Scientists awarded for S&T achievements

The Russian Government awarded 2020 science and technology prizes (RF Government instructions of October 22, 2020 No. 2736-r and No. 2736-r). 14 teams of authors comprising 133 people in total will receive 2 million roubles each for the development of a nuclear reactor unit, increasing the reliability of smart grids, production of special types of pipes, development of unique organo-silicon liquids, digital technologies for the light industry, diagnostics and treatment of immunoassociated diseases and chronic pancreatitis, etc.

5 teams of young scientists comprising a total of 25 people will receive 1 million roubles each for the development of advanced manufacturing technologies, solutions for functional diagnostics of oil pipelines, implementation of digital technologies in the textile industry, and improving the reliability of maritime hydraulic engineering structures in the Arctic.

Subsidising quantum processor prototypes

The RF Government has prepared a draft regulation on the approval of the rules for allocating federal budget subsidies on the development of quantum processor prototypes. Subsidies will be provided to legal entities officially responsible for implementing the "Quantum Computing' roadmap" that is part of the "Digital Technologies" federal project under the "Digital Economy of the Russian Federation" National Programme. The Rosatom was appointed as the fund manager.

The subsidies may be used to procure goods and services from co-contractors, perform R&D, and create an ecosystem facilitating the development of quantum computing, including HR development, new educational programmes, and start-up support.

3.7 billion roubles will be allocated for these purposes in 2020, and a total of 13.2 billion roubles in 2020-2024.

The government will start funding innovation projects in advance

A decision was adopted to advance subsidies for implementation of innovation projects in priority industries (RF Government Regulation of October 7, 2020 No. 1613). The regulation promotes a partial subsidising of the required R&D costs which was previously available only upon completion of works. The funds may be used to pay salaries, purchase equipment, rent premises, register intellectual property, etc. However, the end result of the project must be the mass production of an innovative product.

The list of technologies to be supported and the maximum amount of the subsidy will be determined by an interdepartmental commission; the recipients will be selected on a tender basis. About 28.7 billion roubles in total will be allocated to subsidise industrial R&D in 2020-2022.

Digitalisation of public administration continues

Federal executive authorities and state extra-budgetary funds were instructed to develop and approve 3-year digital transformation programmes (RF Government Regulation of October 10, 2020 No. 1646). The programmes will be subjected to approval by the Russian Ministry of Digital Development and the Presidium of the Government Commission on Digital Development. The heads of public administration bodies will be held personally responsible for achieving the results targeted in the programmes. Ongoing monitoring will facilitate timely decision-making in case there's a risk of failing to meet the digitalisation goals.

First ever regional administration centres

As of December 1, 2020, regional administration centres (RAC) will be launched in Russia. They are digital platforms that aggregate people's queries from official websites and social networks to speed up problem solving. With 23.1 billion roubles being allocated, the system is due to be implemented by 2024 as part of the "Digital Economy" national programme. The RACs will be operated by the Dialogue Regions Autonomous Non-Profit Organisation, with Rostelecom acting as the technology partner. The funds will be used to procure technical support, for set up and maintenance of the digital platforms, establishing a RAC network at the municipal level, and to train RAC staff and regional civil servants during the next five years.

The state will finance the development of domestic 5G network equipment

Subsidies for the development of 5G equipment will be included in the budget of the "Digital Technologies" under the "Digital Economy" National Programme. 21.4 billion roubles is earmarked for these purposes until 2024, and the total of, if we include extra-budgetary funding of the 5G development roadmap (not yet approved), 42.9 billion roubles. The funds will be used not only to develop domestic equipment but, also, to promote it abroad. In particular, Russian cryptographic encryption algorithms will be submitted to the 3GPP international communications consortium for approval.

Two more antiviral COVID-19 drugs registered

In October, the Russian Ministry of Health registered two antiviral Remdesivir drugs (domestic and foreign) for the new coronavirus infection. Initially, the drug was designed to treat hepatitis C and diseases caused by respiratory syncytial virus. In a number of countries its derivatives have already been approved to alleviate the condition of COVID-19 patients.

Rostech is developing advanced medical equipment

At the BIOTECHMED forum (October 15-16, 2020) a wide range of the Rostech State Corporation's cutting-edge medical products and designs was presented, to combat COVID-2019 and other infections.

Many Rostech companies are engaged in manufacturing medical equipment and pharmaceuticals to counter COVID-2019, including the Shvabe holding, the Concern Radio-Electronic Technologies, the National Immunobiological Company, the Roskhimzashchita Corporation, etc. They make resuscitation equipment, defibrillators, air disinfectants, non-contact thermometers, personal protective equipment, plastic test tubes, etc.

Prospective developments at the stage of prototype testing or pilot application include new types of infrared scanners; Detector-BIO device for quick detection of bacteria, toxins, and various viruses (including COVID-19) indoors; compact air recirculators (suitable for use in cars); overalls with antiviral protection from biological threats and viruses; lung ventilators (9 thousand have already been delivered to medical centres throughout the country, and 3 thousand more will be delivered by the end of the year).

New spacecraft material developed

The Space and Aviation Materials Research Institute (Pereslavl-Zalessky, Yaroslavl Region) created a polymer material (aristide) for the aerospace industry. The composite material is 10 times lighter than aircraft aluminium, and can withstand over 1,300 °C while remaining fire-resistant. It retains heat; in terms of thermal conductivity, a 3 mm layer is equivalent to a 1 metre of brick wall. These properties have been acquired due to a cyanate ester resin. The R&D was supported by grants provided by the Skolkovo Foundation and the Innovation Promotion Fund. The polymer was tested on scientific space satellites.

Global agenda

OECD: building trust in artificial intelligence for healthcare

The OECD presented analytical report "Trustworthy AI in Health". The study discusses the prospects and risks associated with using artificial intelligence (AI). A wide range of opportunities for using these technologies in healthcare is noted, from drug development to optimising administrative healthcare services. AI application will improve the quality of medical services and reduce the costs.

The OECD offers 5 policy recommendations to foster a more efficient use of AI in healthcare, emphasising the need to solve real problems rather than follow "hype" trends. The recommendations are in line with the G20 AI Principles, and include the following:

- fostering a digital AI ecosystem through health data governance for safe, fair, legal, and ethical data sharing;
- operationalising the values-based G20 AI Principles;
- creating a favourable regulatory environment to promote trustworthy AI;
- developing AI competencies, building human potential, preparing the workforce for changes in the labour market;
- promoting investments in AI-related R&D.

BRICS countries' cooperation in the field of photonics

On October 13-15, during the online meeting of the BRICS Working Group on Photonics, representatives of Russia, Brazil, China, India, and South Africa discussed the prospects for joint research in integrated optics, radio photonics, high-speed optical communication systems, nanophotonics, and metamaterials, and application of photonics in biomedical technology, agriculture, and food production. On the Russian side, the Working Group is coordinated by the Skolkovo Institute of Science and Technology (Skoltech) supported by the Russian Ministry of Science and Higher Education.

One of the meeting's topics was the BRICS Virtual Photonics Institute. Russia initiated its establishment on the basis of the Skoltech Photonics and Quantum Materials Centre to coordinate jointly conducted basic and applied research and development of educational programmes. The Working Group members discussed the priorities for further work, and the scope for involving industrial partners in the BRICS countries' research projects under the BRICS STI Framework Programme.

Building a career in the European Research Area

On October 14, the Research Policy Group discussed the future of research careers in the European Research Area. The agenda included topics such as improving the European research career development system by promoting intersectoral mobility and "brain circulation" against the backdrop of the COVID-19 proliferation. In 2021, human resources will be taken as a priority issue for the EU, under the Portuguese Presidency of the Council of the EU.

The EU Chemicals Strategy for Sustainability

The European Commission adopted the EU Chemicals Strategy for Sustainability. This document is the first step towards achieving the zero pollution and creating the toxic-free environment declared in the European Green Deal action plan. The strategy aims to promote innovation in the field of safe and sustainable chemicals, protect people's health and the environment. It is planned to ban the use of hazardous chemicals in manufacturing consumer goods such as toys, baby care items, cosmetics, detergents, materials in contact with food, textiles, etc.

UK: regulatory and digital sandboxes in finance

The UK Financial Conduct Authority (FCA) announced the launch of a new (seventh) application round of Regulatory and Digital Sandbox pilot. The project objective is to support financial services innovation aimed at solving the problems caused by the COVID-19 pandemic. Digital development should focus on 3 areas: detection and prevention of fraud, supporting financial sustainability of vulnerable consumer groups, and improving access to financial resources for small and medium-sized enterprises. The digital sandbox pilot project launched by the FCA aims to support early-stage innovations not yet ready to be tested by real consumers.

Regulatory sandboxes allow companies to reduce time-to-market for new solutions by testing innovations in near real-life conditions. Digital sandboxes provide firms with access to databases, API marketplaces, IDE, and collaboration platforms.

Germany: stepping up digitalisation of the hospital system

The German Ministry of Health has allocated 3 billion euros to finance the hospital system modernisation programme, accelerate digitalisation, and improve IT security. 70% of the projects to upgrade the healthcare system will be funded by the Future Hospitals Fund out of the Healthcare Fund's reserves. 1.3 billion euros more is expected to be provided by German regional authorities and the hospital system operators. The approved hospital digitalisation projects include patient portals, electronic document management and administration solutions, IT security and telemedicine projects, application of robotics, and development of high-tech medicine.

Luxembourg: efficient European space exploration hub

The Luxembourg Space Agency and the Luxembourg Institute of Science and Technology have joined forces to establish the European Space Resources Innovation Centre in the country (ESRIC), a new programme within the government initiative launched in 2016 to create a favourable space research and exploration ecosystem. The open research structure will bring together numerous European players, public and private ones alike, to support research and development, economic activities, knowledge management, and industry-science cooperation to make use of space resources.

Netherlands: involving museums in research

The Netherlands Organisation for Scientific Research jointly with the Ministry of Education, Science, and Culture announced the launch of the third round of the "Museum Grants" programme. Its goal is to support the development of museums as full-fledged research centres by encouraging research activities of museum workers. Employees with a master's degree or its equivalent can apply for a grant

in the amount of 10 to 25 thousand euros (0.9 – 2.3 million roubles) to conduct research which involves direct use of the museum collections, or museum activities, in general. In addition to the applicant employee, the museum director and curator (an experienced researcher or a professor at one of the country's universities) must participate in the grant application. The author of the best open-access publication based on the funded project's results will receive an additional special prize. A total of 1.3 million euros (almost 120 million roubles) has been allocated for the implementation of the current programme round.

Cooperation with the OECD

Implementing the OECD Recommendation on Responsible Innovation in Neurotechnology

On 23-24 September, the Working Group on Bio-, Nano- and Convergent Technologies (BNCT) met to discuss the implementation of the OECD Recommendation on Responsible Innovation in Neurotechnology.

Neurotechnology has a huge potential for application in medicine (to improve mental health, for rehabilitation purposes, etc.). However, insufficiently developed legal, political, and ethical issues remain a major problem. To minimise negative effects in this area, the OECD Council jointly with the OECD Committee for Scientific and Technological Policy prepared the abovementioned Recommendation. It's the first international "soft law" tool in this field (it does not entail legal obligations for the OECD member and partner countries), which can serve as a model to promote new technologies.

The purpose of the event was to support the parties interested in the implementation of the document. The following issues were discussed in this context:

- using the Recommendation and other soft law tools to address ethical, legal, and social problems associated with the development of neurotechnology;
- strengthening multilateral and interdisciplinary dialogue;
- developing indicators and assessment techniques to monitor the implementation and use of the Recommendation.

Some countries (France, Korea, Switzerland, Japan, the US) have already made progress in implementing the Recommendation, and established monitoring teams.

OECD Global Science Forum events

On 21-23 October, a webinar and the 43rd meeting of the OECD Global Science Forum took place, with the participation of experts from various countries including Russia. The webinar titled "Mobilising Science to Meet COVID-19 Challenges" continued a series of events held to produce the next edition of the OECD Science, Technology and Innovation Policy Outlook 2020.

At the heart of the discussion were the challenges related to the need to quickly set priorities in support and mobilisation of resources, accelerate research and development without compensating for their quality, facilitate access to research data and facilities, and coordinate international efforts in the field of science.

At the Global Science Forum experts analysed the progress with implementing projects aimed at reducing risks when choosing a research career, policies to support high-risk research, and review of R&D policy initiatives implemented by various countries to counter COVID-19.

Commentary

The COVID-19 pandemic, and its consequences, are prompting us to rethink the role of science, technology, and innovation in the economy and society. Both in the nearest future and long-term perspective, their development and support have become the leading countries' political priorities.

Along with the "rapid response" measures to combat the crisis, new strategic documents aimed at sustainable socio-economic development through accelerated introduction of digital technologies are being drafted. Providing long-term support for science and technology is also on the agenda. The OECD is very active here, offering practical recommendations for national governments including promoting international cooperation, funding costly high-risk research in breakthrough areas, promoting investment in science and technology from non-public sources, and providing open access to research data and infrastructure.

International experience shows that in times of crisis, support for science, technology, and innovation does not generally tend to decrease. In leading countries not only the government and development institutions, but also businesses become active in this field. In the nearest future one of the Russia's major challenges will be promoting companies' entrepreneurial and innovation activities and increasing the investment appeal of the science and technology sphere to facilitate recovery and long-term structural changes in the economy.

Sources: official websites of the RF President, RF Government, Ministry of Science and Higher Education, Ministry of Economic Development, Ministry of Digital Development, Rostech, Rossiyskaya Gazeta and Kommersant newspapers, OECD, European Commission, BRICS, and foreign countries.

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