В феврале текущего года в Новосибирске прошло заседание Совета по науке и образованию, на котором были предметно обсуждены дальнейшие шаги по укреплению научного потенциала России. В своем выступлении Президент России В. Путин отметил: “В мире происходят кардинальные технологические перемены. По своему масштабу они сопоставимы с эпохами промышленных революций и научных открытий, которые радикально меняли уклад жизни людей на нашей планете, …очевидно, что сейчас лидером станет тот, кто будет обладать собственными технологиями, знаниями, компетенциями; …на это должны быть нацелены проекты научных институтов, программы НИОКРов, министерств, ведомств; …надо предложить такие инструменты, которые позволят не только привлекать выдающихся ученых в качестве руководителей лабораторий, но и формировать в России мощные международные исследовательские коллективы”. Редакция журнала предложила высказать свое мнение по данной теме Б. Павлову, который долгие годы ведет научно-практическую работу по организации разработки и продвижению инновационных инвестиционных проектов, в том числе, и в сфере наноиндустрии.

Сформулированные В. Путиным на заседании Совета по науке и образованию масштабные цели и задачи по укреплению научного потенциала России и его последующей коммерциализации, отвечают вызовам времени и требуют повышения эффективности существующих и создания новых инструментов организации инновационной проектной деятельности на всех
The large-scale goals and tasks for strengthening the scientific potential of Russia and its subsequent commercialization formulated by V. Putin at a meeting of the Council for Science and Education meet the challenges of the time and require increasing the efficiency of existing and creating new tools for organizing innovative project activities at all levels of management of the Russian high-tech economy.

This approach is fully met by the System of Management Full Lifecycle Innovational Project (SMFLIP), developed by us and tested on specific projects of a number of enterprises and organizations, which is implemented within the digital economy, includes training and covers all the main stages of development and implementation of high-tech innovative projects:

• generating ideas based on the achievements of fundamental science and modern technologies to meet existing and foreseeable needs;
• selection and analysis of ideas received for consideration together with all participants of the innovation process;
• development of the concept of innovation and examination of it;
• development of marketing strategy, market research and selection of a promising market segment for innovations;
• preparation of a feasibility study of the innovation project in accordance with the technical part of the innovation proposal;
• determination of the volume of costs of all types of resources, the number of employees, the
timing of work performance and the economic efficiency of the innovation project;
• development of design and project documentation;
• support for project transfer at the stages of attracting investments and pilot operation, industrial operation, modernization and utilization;
• organization of financing at all stages of the full life cycle of the innovation project;
• interaction with public authorities at all levels to improve legislation in order to improve the management of innovation economy.

SMFLIP system allows to effectively manage complex innovative projects that require the integration of scientific and production activities of a large number of enterprises and organizations.

In order to organize the promotion of strategic innovation projects in the field of nanotechnology, the Nanotechnological Society of Russia (NTSR) proposed the concept of creating consortia as the most tested instrument of the current legislation of the Russian Federation, based on the use of the SMFLIP system.

In order to ensure effective interaction of the consortium members, implemented under the auspices of the NTSR, we have created the Transfer of World Technologies (TWT) management company, which manages the full life cycle of innovation projects (SMFLIP). This approach to the creation and commercialization of innovations allows consortium members to efficiently combine their human, technological, financial and other resources to implement specific innovative projects and does not require much preparatory organizational work and pre-financing.
So, for the purpose of effective project management of innovations in agribusiness, with the participation of NTSR a Agronanoindustry consortium was created. The scientific novelty of the agronomic technologies being developed within the consortium is that the processes under consideration occur in the nanometer range of spatial dimensions.

Unlike traditional technologies, agronomic technologies are characterized by an "individual" approach, in which external control reaches individual atoms and molecules, which makes it possible to create from them as "defect-free" materials with fundamentally new physical-chemical and biological properties, as well as new classes of biosystems with typical nanometer dimensions. The effect is achieved due to more active penetration of trace elements into the plant due to the nanoscale particle size and their neutral (from the point of view of electrochemistry) status.

An example of the products manufactured by the enterprises of the Agronanoindustry consortium is Agrobalzam, a complex organic certified eco-product (GOST 54249-2010, TU0391-001-00493623-2014), obtained using nanotechnology from natural material (caustobiolite) and produced in concentrated form. This product is environmentally friendly and does not harm the environment and humans, which is confirmed by the ecological certificate.

The technological system for the production of this product uses the know-how on the basis of the rotor apparatus of the hydrostatic action, which, due to the improved design of the subsonic nozzles, provides the summation of the hydro-impact,
turbulent and cavitation effects, and also increases the extraction of humic compounds from organic materials.

In addition, the enhanced mechanical action when summing up the hydrostatic, turbulent and cavitation effects, significantly reduces the ash content of the resulting product and, as a consequence, increases the yield of humic substances. As our studies have shown, humic compounds extracted with the help of this apparatus have a higher physical-chemical and biological activity, which allows us to reduce the consumption rates for the treatment of contaminated areas. The use of the rotary apparatus of the hydrostatic action for the production of humic substances ensures an increase in the yield of finished products, and, what is especially important, increases its quality.

The Agrobalzam accelerates the growth and development of plants, increases their resistance to various diseases and unfavorable climatic factors, increases the content of starch, gluten, fats and sugars in products, reduces chemical stress from pesticide and herbicide treatments, and also the migration of heavy metals from soil to plants, restores fertility of the soil, including after the use of mineral fertilizers, which favorably affects the quantitative and qualitative indicators of the agricultural yield.

If necessary, additional components, for example, nano-silicon, can be included in the Agrobalzam.

In addition, the use of Agrobalzam is effective for detoxifying oil spills by biological methods, ensuring the improvement of the ecological condition of cultivated
agricultural areas, increasing weather and climate stability and productivity of green plantations and plants.

Practical use of Agrobalzam complex ecoproduct in various regions of Russia has shown its high efficiency.

The implementation of innovative projects in the field of nanoindustry, as well as other high-tech projects in various sectors of the Russian economy, is inextricably linked with the deepening of international cooperation. In his speech at the session of the Council for Science and Education in Novosibirsk, the President of the RAS A.Sergeyev noted that the world scientific and technological progress is increasingly formed by international scientific organizations.

The most effective form of organization of international cooperation are consortia that provide a synergistic effect for the implementation of innovative investment projects through the integration of intellectual activities of scientists from different countries.

Members of consortium retain their economic and legal independence, with the exception of that part of their activities that is related to the achievement of the objectives of joint projects. The management company (or lead partner) of the consortium on a contractual basis represents the interests of the consortium for the implementation of a particular project, but operates within the powers received from other members of the consortium. Therefore, perfection of the Russian and international legislation providing regulation of creation and functioning of the international scientific organizations is extremely actual.

I will cite as an example a number of promising innovative
projects promoted by the teams of Russian scientists in the field of the nanoindustry with the participation of the NTSR, whose effective implementation can only be carried out within the framework of international cooperation. This is the strategic innovation project on creation of a nanotechnology research and production cluster for flexible electronics and photonics on an organic basis, which is now being promoted within the framework of close interaction of Russian companies with foreign partners. The results of the development of technological solutions for the design and fabrication of experimental samples of thin-film organic photosensors conducted within the framework of state order by our leading scientific and design organizations allow us to talk about the advisability of continuing special R&D of dual purpose in order to improve the technology of thin-film organic photomatrix, their design, photoelectric and operational features, required special properties. Together with foreign partners, the following areas of work have been formed: • synthesis of new polyme-thine dyes and their metal complexes, obtaining homogeneous J-aggregated dispersions based on them for the visible and near IR spectral region, which will increase the thermal, photo- and radiation resistance of photomatrixes; • improving the technology of applying dispersions to the substrate surface and developing a method for structuring the photosensitive layer to increase the dark resistance of the working photolayer and the signal-to-noise ratio; • development of a method for obtaining a substrate with a matrix of TFT-transistors for...
assembling switched and active photomatrix with the purpose of increasing their photosensitivity;
• development of a technology for producing a pixel of an active photomatrix and a substrate for it, which will allow obtaining photomatrixes with a higher signal-to-noise ratio;
• study of various power supply schemes and pixel interrogation scheme for variants of passive, switched and active photomatrixes, which will allow optimizing the operation mode of products;
• optimization of the composition and structure of the photosensitive layer, the technology of manufacturing individual materials and components, as well as assembly of photomatrixes of various types.
Scientific bases and experimental technologies of manufacturing the following devices based on organic nano-photonic materials are developed:
• organic photomatrix (dual purpose);
• flexible thin-layer elements of solar batteries;
• RFID-tags obtained by printing;
• organic LEDs and glowing panels;
• ultrathin batteries;
• friend-foe identification system for the identification of targets (man, military equipment, light aircraft, etc.).

The organization of financing of joint works on this project on the basis of signed agreements with foreign partners, including the Korea Institute of Machinery and Materials (KIMM) and the Polymate - International Nanotechnology Research Center (Israel), will allow developing scientific bases for industrial technologies for manufacturing devices based on organic photonics and electronics (solar cells, LED matrices, night vision devices, etc.).
The most important strategic innovation projects are the creation of modern, highly efficient systems for waste treatment and water purification. Developments of Russian companies and their foreign partners allow us today to bring to the market highly efficient equipment for processing all types of waste and purification of water produced on the basis of modern nanotechnology and nanomaterials. The use of this equipment will be carried out in conjunction with smart technologies (software products, management and information security systems), which will create highly competitive cognitive systems that meet all the environmental requirements of Russian and international legislation. Detailed information about these projects is given in the NANOINDUSTRY journal (No. 1, 2017, p. 76), so I will note only their main technological solutions.

After the processing of waste using high-temperature melting gasification, there are practically no products that need to be recycled, that is, gas, dust and smoke are not released into the environment. Products at the output: gas, heat, stone, metal.

Solutions for wastewater and water treatment are based on the universal technology of electrochemical activation. This technology represents the possibility of using the processes of synthesis of electrochemically activated solutions for water purification, as well as technical systems with the same type of electrochemical reactors for use in various fields. Electrochemical systems with capacity from several liters per hour to several thousand cubic meters per day are developed and manufactured, which can be used for high-quality
purification and disinfection of drinking water, sewage, etc.

In general, the proposed domestic technologies and equipment make it possible to create highly efficient integrated systems for the environmental recycling of waste and water purification, which meet the modern requirements of the global market.

In conclusion of the short review of strategic innovative projects in the field of nanotechnology, offered for further promotion, I would like to talk about the project to create a compact on-board laser interference detector for the study of spatial and temporal variations of the gravitational field. Work on this project was initiated by the decisions of the Commission of the Council of Ministers of the USSR on the MIC and the Cabinet of Ministers of the Republic of Tatarstan.

As a result of experimental and theoretical work on the project "Lunar test" on the basis of the State Institute of Applied Optics (Kazan), for the first time in Russia Einstein's equivalence principle (regarding the universality of the law of gravitational "red" bias for clocks of different physical nature) at the level of 0.9%, which almost twice exceeded the previous world achievement.

At present, the scientific team has developed the concept of a strategic innovation project "Creation of a compact multi-functional super sensitive high-precision laser-interferometric complex," which makes it possible to measure the gravitational-induced shift in the frequency of generation of optical laser radiation. A distinctive feature of the proposed compact laser-interferometric complex is its multi-functionality, which makes it...
possible to carry out both fundamental research in different fields of gravitational physics, and to use the developed methods for specific technological solutions and their conversion in the interests of other industries. These include: the study of spatial and temporal variations of the gravitational field, detection of gravitational waves, testing of the foundations of general relativity and alternative theories of gravity, and the creation of new-generation gravimetric instruments for tasks that previously were impossible or extremely difficult to solve.

In addition, this complex can be used to control the position of objects when positioning nanostructures and nanoelements in the process of their assembly and manufacturing, as well as to diagnose nanostructural changes in new materials, use in new generation technological complexes and conduct research in the field of materials and nanotechnology physics.

In conclusion, I want to note that the common goal for all innovative projects should be the commercialization of their intellectual property. The modern economic model of technologically and financially developed countries and their legal and regulatory framework provide tools that allow intellectual property objects (IPOs) to play a crucial role as a mechanism for creating added value (the share of intellectual property is up to 10–15% of the price of products sold); as a means of capitalizing the assets of enterprises and organizations (through intangible assets – up to 30–50%) and as an investment resource (loans and bank guarantees are granted on the security of intellectual property, and also it can be a source...
In accordance with the decision of the VIII International Forum "Innovative Development through the Intellectual Property Market" (2016), an interdepartmental working group on the development of the national standard "Intellectual Property: Intellectual Property Management in a Credit Organization" is working under the auspices of the RSRIP. The implementation of this standard will provide the following benefits:

- create a unified loan system for security of rights to IPOs, where the rules of all subjects of these legal relations will be clearly specified;
- reduce the risks when lending to banks and other credit institutions due to a competent inventory of the results of scientific and technical activities;
- ensure legal protection and proper accounting of intellectual property objects upon their establishment, by virtue of their state registration or by virtue of the establishment of a special legal regime of confidentiality with respect to them;
- ensure that only the rights to IPOs are used as collateral without additional security measures in the form of real and (or) financial assets.

In conclusion, I offer cooperation on the promotion of high-tech innovative projects in the field of nanotechnology on the basis of a digital management system for the full life cycle of an innovative project (SMFLIP) and invite to a joint "brainstorm" on developing proposals for the formation of modern legislation regulating scientific and project activities in the innovative sphere of Russia.