CHAPTER 2

The National Technological Initiative of Russia Project Implementation as a Basis for the Development of Perspective Technological Markets and Industries in Russia

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Introduction

The vector of development of contemporary Russia, especially amid the post-COVID situation, is mainly directed toward the extension of the domestic production of innovative products and services. This is demonstrated by forming strategies of international development (Belozorova & Sultanova, 2019), which are targeted at the creation of high-quality

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projects in the high-tech and research sectors (Schislyaeva & Shamrai, 2018), the use of domestic standards and recommendations together with the international experience of designing innovative infrastructures, and, certainly, approaching foreign markets and reaching economic leadership on the global arena (Nevskaya, 2020).

The major challenge was to create a platform capable of making the right use of available tools and building up a new innovative structure headed by the innovation-supplying companies (Grigoryan et al., 2020; Palkina, 2020; Semin et al., 2020). Overcoming technological barriers to creating new products is a principal challenge both for Russian and foreign high-tech companies, which is a key to competitiveness at the perspective markets, especially in the post-COVID situation (Maksimova & Morozov, 2020).

The National Technological Initiative (NTI) is an association of representatives of businesses and expert communities aimed at the development of prospective technological markets and industries in Russia, which may eventually become the backbone of the global economy (National Technological Initiative, 2021). NTI is viewed as a long-term interagency program of public–private partnership to promote the development of new prospective markets on the basis of high-tech solutions and the establishment of the conditions for global technological leadership, which will be shaping the development of the global and Russian economy by 2035 (Government of Russia, 2021).

The activity to develop the markets is arranged as roadmaps or strategic planning documents, which contain a set of actions interrelated and interconnected as regards the tasks, due dates, performers, and resources. The roadmaps are implemented by way of launching specific NTI projects.

NTI unites technological entrepreneurs, representatives of universities and research centers, large business associations of Russia, development institutions, expert and professional communities, and executive power agencies (Lyapina & Stroeva, 2017).

To address the issues of financial and non-financial support, creating the tools to increase the number of participants, technological teams, and start-up companies involved, and identifying the prospective growth areas, the ANCO (Autonomous Non-Commercial Organization) Platforma NTI was established by the decision of the Government of the Russian Federation (Makarov et al, 2020; Official Website of RVC).

NTI focuses on new global markets, which shall come into shape in 15–20 years. Most of the markets will have a network nature (they will

inherit the currently existing Internet approaches or will make use of the Net infrastructure) (Lobatyuk et al., 2017). The new markets will be oriented at customer; the distance between the producer and the consumer shall become minimal.

Results

NTI development takes several stages. At the initial stage—which was already completed—the following actions were performed: primary, the selection of Nets, their institutionalization, establishing the principal organization structures for planning and implementation, preparing roadmaps, planning the further government financing for the projects implementation, and creating the legal and regulatory framework to regulate the emerging markets, products, and services related to the NTI markets (Shinkevich & Barsegyan, 2018; Sibirskaya & Oveshnikova, 2018).

In 2020, due to the current economic situation (Spitsyn et al., 2020; Vetrov, 2020) it was decided to modernize the existing program and transfer to NTI 2.0, which would include the larger quantity of markets and tasks that emerged during the COVID-19 pandemic. In May 2020, Foresight NTI 2.0 took place, which was dedicated to analysis and forecasting of the markets of newly emerging and already existing NTIs, as well as planning further actions and measures.

The review of prospective markets of NTI 2.0, revealing its key segments and hypotheses, is provided in Table 2.1.

During the post-COVID situation, Foresight NTI 2.0 gained successful development; within the frames of Foresight NTI 2.0, it is possible to connect to the prospective markets of a digital community NTI 20.35 online. Foresight NTI 2.0 is a new vision of ideas of the National Technological Initiative and participants of NTI ecosystem. It is a unique project for creating an image of the future: For the first time, a large-scale NTI ecosystem event shall take place online according to the Rapid Foresight methodology. Foresight NTI 2.0 will make it possible to analyze the trends, forecast the demand, deal with threats and barriers, understand what changes should be made in the laws alongside what kinds of specialists should be trained by the higher educational institutions, and finally identify how to create and develop companies earning money at the new markets.

According to NTI strategy, by 2035 the share of private investments in the long-term research programs will be no less than 50%. Foreign

Table 2.1 Analysis of perspective NTI markets

Seq. No.	*Market name*	*Market hypothesis*	*Market key segments*
1	AeroNet	Aerial logistics and surveillance, which are implemented by a new generation of unmanned aerospace systems united into a single relevant information field	Unmanned aircraft systems; aerospace systems; small spacecraft; remote systems for sensing, monitoring, and 3D-modeling of territories and objects, as well as the required infrastructure
2	TechNet	Open ecosystem of advanced production technologies, materials, equipment, and services (factories of the future) facilitating the NTI markets development	Digital alter egos, cyber-physical systems. Product data management. Digital manufacturing and operations
3	NeuroNet	The market of human-machine communication means based on advanced neurotechnology solutions adding to the productivity of human–machine systems and the efficiency of psychical and mental processes	Neuroassistants, neuroeducation, and neuropharmacology. ExoRehabilitation. Artificial intelligence for telecommunication companies. Neuronal replacement. Neurotechnology in economics
4	HealthNet	Personalized medical services and drugs increasing lifespans, as well as new efficient means of prevention and treatment of different diseases	Preventive medicine; sports and health; medical genetics; information technology in medicine; healthy longevity; and biomedicine
5	FoodNet	The market of disruptive technology and services from microbe to the plate	Smart agriculture. Accelerated selection; new cultivated crops and sources of raw materials; accessible and affordable organics; super-local farms; personalized nutrition. Changing a logistic chain from the manufacturer to the consumer

(continued)

Table 2.1 (continued)

Seq. No.	*Market name*	*Market hypothesis*	*Market key segments*
6	WearNet	Ecosystem of businesses, including the creative industry (fashion), light industry, retail and technology, manufacturing and distributing a fashion product of the future, which is a hybrid product. New technologies and digitalization act as a way to overcome disconnection and as a driver of "hybrid revolution"	Distributed computer-aided manufacturing systems with a unified system of ordering and logistics. Robot-assisted factories targeted at small-scale production and single piece production. Services and tools for supporting individual clothes design
7	EduNet	Network-centric educational ecosystem ensuring the country's competitiveness at the global market	Creation, personalization, packaging, and technological delivery of the educational content and training programs for all ages, including shifting the focus to development of personal competencies
8	GameNet	Development and application of gaming methods and practices in business, culture, education, science, health care, public management (Osipov, 2021), and communities to improve the overall quality of human life	Cross-media gaming universes with new types of network monetization. Cyber-physical games with a new level of immersiveness. Gamification and digitalization of sport games
9	EcoNet	Projects aimed at environmental preservation and the creation of infrastructure reducing the negative impact of climate change	Deep analysis and climate control technology, creation of experimental and super-local climatic zones restoring biodiversity waste as a resource

(continued)

investments to the Russian technological solutions shall account for no less than 10% of the total country budget on research and development (Dol, 2021; Skuratova, 2019).

Also, by 2035 the total expenses on science and technology shall reach 4% of GDP (Prudiy & Kulikov, 2020; Samoilenko, 2020). Incomes of

Table 2.1 (continued)

Seq. No.	*Market name*	*Market hypothesis*	*Market key segments*
10	HomeNet	Network associations of tenants, houses, and condominiums. Digital bus for a home, house, and condominium. Digital platforms for management, design, construction, and operation of residential premises and communal facilities. Dwellings outside the comfortable climatic zones (space, Arctic, water, mountains, etc.)	The market shall develop the projects aimed at creating a comfortable environment for people to live and work, which also includes severe and unexplored natural and climatic zones
11	SportNet	The market of cross-sports technologies and cyber-physical systems for homeostasis of humans and society	eSports are electronic devices for professional and amateur sportsmen; sponsorship of sporting events; media channels broadcasting sporting events and sports matches; sports betting
12	AutoNet	The market of new robotic aviation creating new technologies, values, quality of life, and work for the people and the enterprises	Transport and information telematic systems, smart city mobility, transportation, and logistics services
13	MariNet	Smart sea traffic management system and world ocean exploration technologies	Digital navigation and communications, innovative shipbuilding, ocean resources, development technologies
14	EnergyNet	Distributed power generation, from personal power to smart grid, smart city. Internet of Energy, an ecosystem of power energy producers and consumers, which seamlessly integrate into the general infrastructure and exchange power energy	Reliable and flexible distributed networks Smart distributed power generation Personal power plants and consumer services

(continued)

Table 2.1 (continued)

Seq. No.	*Market name*	*Market hypothesis*	*Market key segments*
15	SafeNet	Safe and protected computer technologies, data transfer solutions, safety of information, and cyber-physical systems	Devices used to ensure safety; applied systems for addressing the safety issues; safety of networks and safety of management platforms and applications

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the Russian companies and universities from intellectual property management will make up 1% of the global market turnover, while Russia shall enter the top-5 countries in the rating according to the number of professionals in R&D (Yakovets, 2019).

To ensure the sustainable growth of newly established NTI markets, the top-priority cross-cutting technologies have been outlined, which should be used in NTI projects to conquer a certain share of the global market in any specific industry. Among them are big data, AI, blockchain systems, quantum technology, new and portable energy sources, new manufacturing technology, sensorics and robotic components, wireless communication technology, management technology for biological object properties, neurotechnology, virtual reality, and augmented reality.

The establishment of scientific and research background in Russia for such groups of technology will make it possible to create globally competitive high-tech products and services (Mil'kina & Lits, 2020; Novak, 2020; Popova, 2020; Schislyaeva & Shamrai, 2018). At the same time, the focus of research activity of the Russian universities and research institutions on the NTI technological areas will make it possible for them to gain high demand from the high-tech industries of the national economy within the next 20 years (Aimukhammedova, 2020; Andreeva & Dmitrieva, 2020; Fedotova et al., 2020; Ivaschenko et al., 2017; Spitsyn, 2019).

One of the tools for developing cross-cutting technologies is the network of NTI Competency Centers, which is a network of engineering education consortia on the basis of the Russian universities and scientific organizations. The centers carry out research and educational activities in partnership with the largest technology companies for the purpose of training the leaders in development of new technologies and performing

technology transfer (Kononkova, 2020; Kulikov, 2020; Povalko, 2019; Shinkevich & Shinkevich, 2018; Sibirskaya, 2017; Tsogoeva & Galaova, 2020).

Discussions

Therefore, within the frames of NTI as an umbrella program for developing the potential of technological entrepreneurship: (1) priority disruptive technologies were selected, which have the highest influence on development of the NTI markets, and (2) the institutions of financial support for the projects from the state budget funds in the form of grants and subsidies were created, which should facilitate for the initial search of investments for entrepreneurs to bring their ideas to life (Osipov, 2016).

One should also note the interim results of implementing the national goals 2020 as the basis for the development of prospective technological markets and industries of Russia. The crisis caused by a new coronavirus infection so far did not affect the demographic processes. However, new economic problems (risks of unemployment, declining income) may aggravate the current birth rate situation.

Taking into account the positive dynamics of the previous years, the life expectancy in 2020 should have reached 73.9 years. However, the declining socioeconomic situation caused by the spread of COVID-19 had a negative effect on the life span of the Russian population in 2020 (Erokhin, 2020; Ryazanov, 2020).

In Q1 2020, the real disposable household incomes showed a decline, but this was not yet caused by introduction of lockdown measures. A serious decline of incomes was observed in Q2 2020.

The restrictive measures adopted by the Government of the Russian Federation to fight the new coronavirus infection resulted in the sharp decline of economic activity, which, in its turn, had a negative impact on the level of employment and salary/wages of the employees (Duma, 2020). In this situation, achieving national strategic goals for the growth of real incomes and the alleviation of poverty becomes problematic. According to the national objectives, it is planned to alleviate poverty twofold by 2024. In 2019, before the consequences of the coronavirus transmission began to reveal themselves, the planned value of poverty alleviation had not been reached. At present, the risks of failure to meet the target values become even higher.

According to the Federal State Statistic Service of the Russian Federation, in May 2020 unemployment in Russia reached the maximum level for the past eight years, which requires the revision of existing measures against poverty and an increase of funding in this area (Dun et al., 2020; Osipov, 2019; Osipov et al., 2021).

In 2019, the target value for the improvement of living conditions was reached. Along with that, due to the unfavorable epidemiological situation caused by the coronavirus infection and, as a result, a possible increase in the length of construction and a drop in the consumer purchasing power, reaching the target value in 2020 is rather difficult. Also, there is a risk observed of not meeting the target in case of failure to provide the funding as was planned for 2020.

Temporary lockdown limitations on economic operations in the current year lead to a decline in entrepreneurial, investment, and consumer activity, the volume of goods produced, and the services provided. All this leads to a risk of failing to meet the target value as regards the national objective of technological development acceleration.

At the same time, the Federal Scientific and Research Program of Genetic Technology Development was approved for 2019–2027. The program envisages the establishment and development of educational organizations, laboratories, and centers engaged in research in the area of genetic technologies, their technological support, scientific research, and developments involving genetic technologies, including the development of bio-based products, diagnostic systems, and immunobiological substances for health care, and agricultural and industrial biotechnologies (Konina, 2021a, 2021b; Konina et al., 2021). It is also planned to develop in vitro and in vivo models of human diseases with the help of genetic technologies, as well as the financing of bioresource centers.

Despite the aggravation of external and internal conditions of economic functioning, the GDP growth rate in Q1 2020 turned out to be high enough.

The inflation rate in May slowed down, mainly due to moderate demand and the dynamics of currency exchange rates. The main groups of goods and services in May made an approximately equal contribution to the monthly inflation rate value, although the highest growth of prices was observed for services.

The indicator concerning the establishment of high-performance export-oriented sectors in the principal economic areas—first and foremost, the processing industry and agro-industrial complex (Roud &

Vlasova, 2018), which are developed on the basis of advanced technologies and possess a highly-skilled staff—showed insignificant growth as compared with 2018, which is not sufficient to reach the target value by 2024.

Conclusion

The onset of the unprecedented socioeconomic crisis caused by the coronavirus pandemic posed new challenges on the way of achieving the national objectives of the national projects development and implementation. However, both in the period of pandemic and in the post-COVID period, the demand on the Nets is high like never before. For instance, one of the advantages of unmanned delivery is the absence of contact between people during cargo handling, which is one of the most important factors of fighting the infection spreading. The strongest demand will be observed in such areas as genetics, biotechnology, neurotechnology, quantum technology, and digital security.

Therefore, by creating an unprecedented platform, Russia applied a mass-scale approach to addressing the current economic issues, which is different from the experience of other countries. Within the frames of NTI, Russia focuses on those markets where it is possible to create the industries of a new technological paradigm, which are important for ensuring national security and high living standards for the population.

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