Institute for Statistical Studies and Economics of Knowledge

2023 BRICS Science, Technology and Innovation Policy and Foresight Exercises Symposium

STI policy development in Russia

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Innovation has become a key driver of socio-economic development worldwide

Many large developing countries has shown rapid changes in their innovation development in the last 10 years

Changes in countries' Global Innovation Index positions

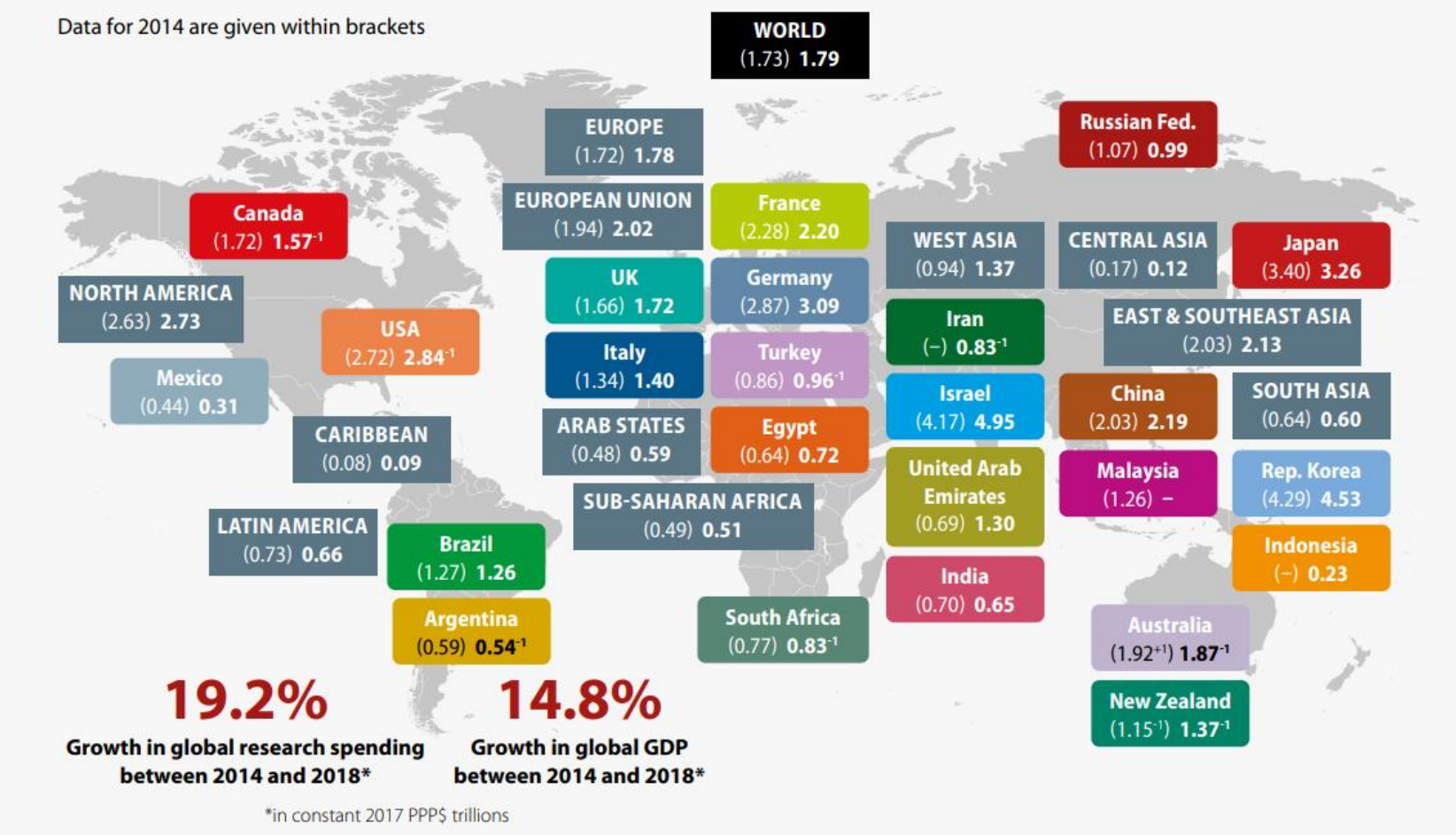
	2013		2018		2023
China	35	→	17	→	12
Turkey	68	→	50	→	39
India	66	→	57	→	40
Vietnam	76	→	45	→	46
Brazil	64	→	64	→	49
Philippines	90	→	73	→	56
Indonesia	85	→	85	→	61
Iran	113	→	65	→	62
Pakistan	137	→	109	→	88

Source: WIPO, Global Innovation Index.

Global research spending has risen

In 2014-2018, **global research spending rose by 19.2%**, outpacing the growth of the global economy (+14.8%).
This translated into a rise in research intensity from 1.73% to 1.79% of GDP.
Almost half (44%) of this rise was driven by China alone

Investment in R&D as a share of GDP, by region and selected country, 2014 and 2018 (%)



Source: UNESCO Science Report 2021

Large R&D programmes have been established, and investments in new technologies are increasing

Large R&D programmes:

USA: «CHIPS and Science Act» (2022- 2032) – 280 billion US dollars

EU: «Horizon Europe» (2021-2027) – 95.5 billion euros

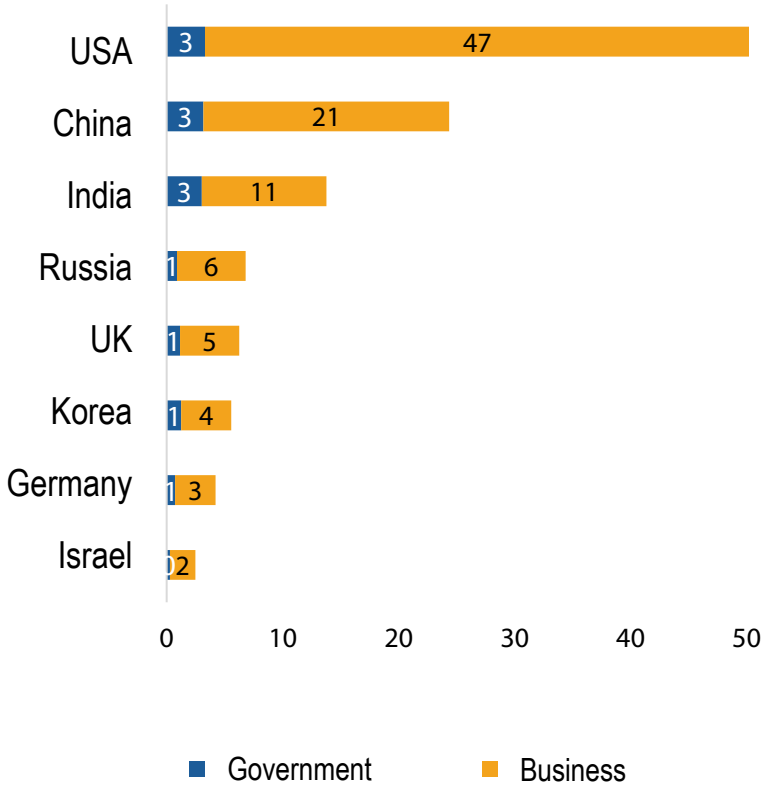
Korea: «Three Technology Super Gap R&D Strategy» (2023 - 2027) – 160 trillion won

France: «Healthcare Innovation 2030» – 20 bioproducts for cancer recovery up to 2030 – 7.5 billion euros

R&D investments of the largest companies: 2022, billion US dollars:

Alphabet – 39.5
Apple – 26.2
Microsoft – 24.5
Huawei – 23.9
Samsung – 19.9
Intel – 17.5
Cisco – 6.7
Tencent – 9.1
Alibaba – 8.7
IBM – 6.5
TSMC – 5.4
AMD – 5.0

Actual and planned investments in the development of AI technologies: 2021-2024, billion US dollars PPP



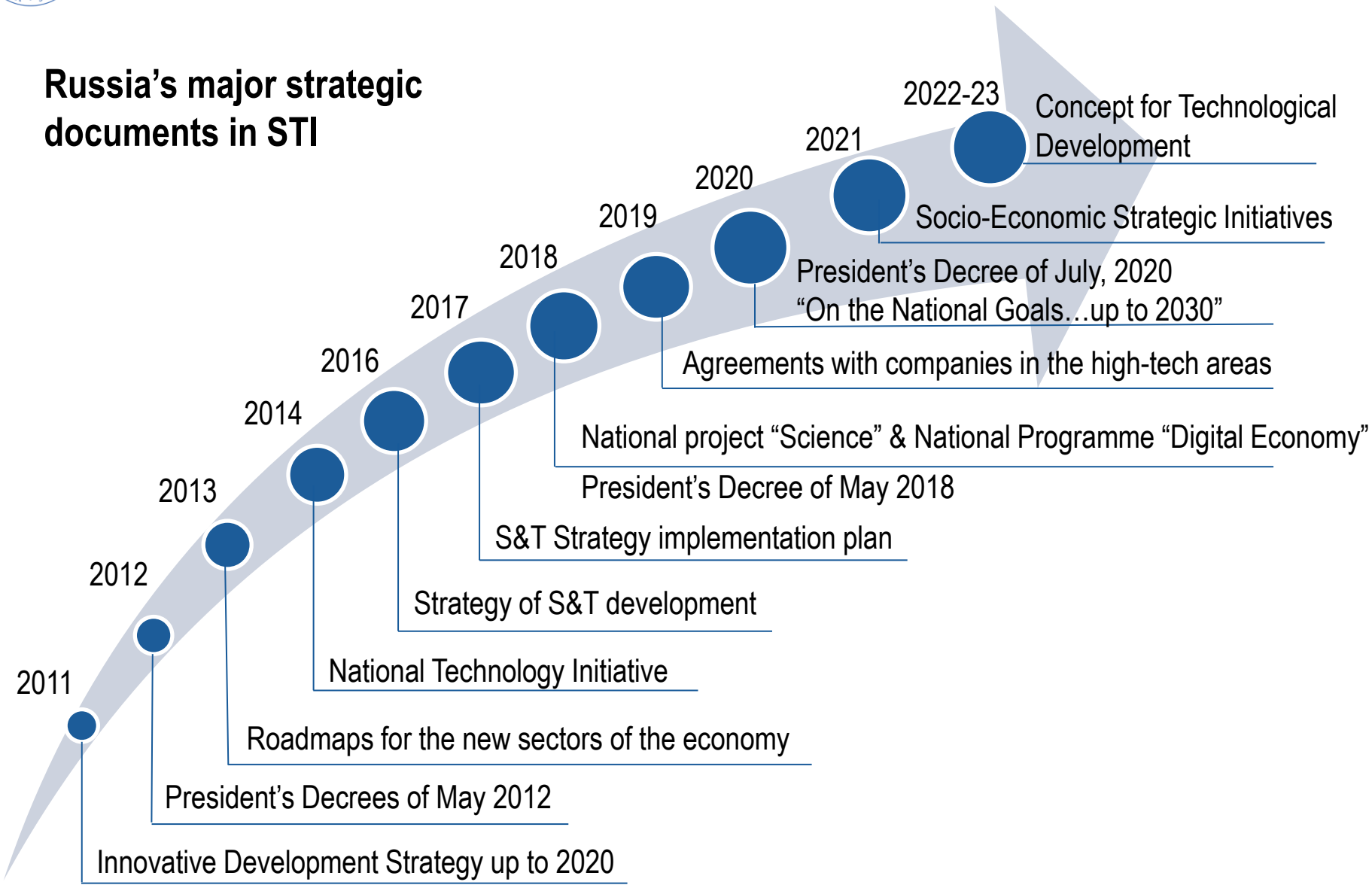
The policies of leading countries are focused on sustainable development and increasing competitiveness through advanced technologies, as well as on achieving tech sovereignty

Note: The font and circle sizes show the dynamism of the term – the average growth rate of its significance over the analyzed period. Significance is calculated as the number of times a term is used in a document corpus, normalized by the size of the document corpus and multiplied by the vector centrality indicator (the average value of the term's thematic proximity with all other terms included in the analysis).

 Based on the analysis of 300 strategic S&T policy documents of 36 countries issued in the 1st half of 2023 (using the iFORA big data mining system)

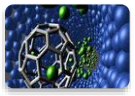
Russia has also been developing an innovation economy

Russia's major strategic documents in STI



Priority Areas and Critical Technologies (2011)

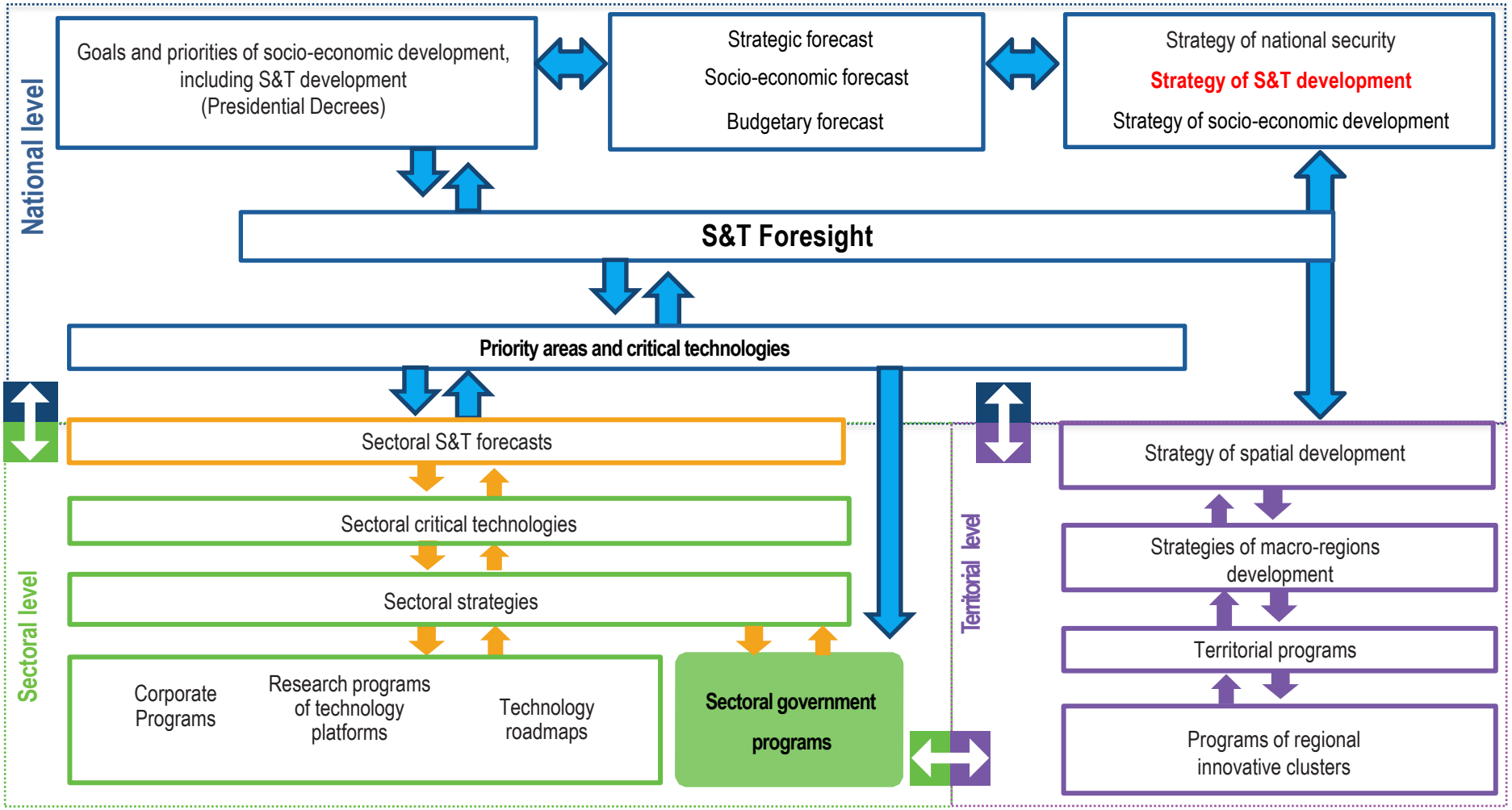
Is to be updated in 2024

Priority areas	Critical technologies
Nanoindustry 	Computer modelling of nanomaterials, nanodevices, nanotechnologies
	Nano-, bio-, information, cognitive technologies
	Nanomaterials and nanodevices diagnostics
	Nanodevices and microsystems
	Technologies for manufacturing and processing construction nanomaterials
	Technologies for manufacturing and processing functional nanomaterials
Information and telecommunication 	Technologies providing broadband access to multimedia services
	Information, management and navigation systems
	Technologies and software for distributed and high-performance computer systems
	Technologies for creating component base and energy-efficient lighting devices
Life sciences 	Bio-catalytic, bio-synthetic and bio-sensor technologies
	Biomedical and veterinary technologies
	Genome, proteome and post-genome technologies
	Cellular technologies
	Bioengineering technologies
	Technologies to reduce damage from socially significant illnesses
Rational use of nature 	Technologies for monitoring and forecasting the state of environment, prevention and liquidation of environmental pollution
	Technologies for exploring, developing and mining natural resources' sites
	Technologies for the prevention and managing the consequences of natural and technological emergencies
Transport and aerospace 	High-speed transportation vehicles and intelligent systems for operating and managing new types of vehicles
	New-generation rocket and space systems and transportation vehicles
Energy efficiency and energy saving 	Basic power electrical engineering technologies
	Nuclear power engineering, nuclear fuel cycle, safe handling of nuclear waste and depleted nuclear fuel
	New and sustainable energy sources including hydrogen power engineering
	Energy saving systems for energy transfer, distribution and use
	Energy-efficient power generation and transformation technologies based on organic fuel

* Presidential Decree of 7 July 2011 N 899 'On the approval of priority areas of science and technology development of the Russian Federation and the list of critical technologies of the Russian Federation'

S&T Foresight 2030 (adopted in 2014)

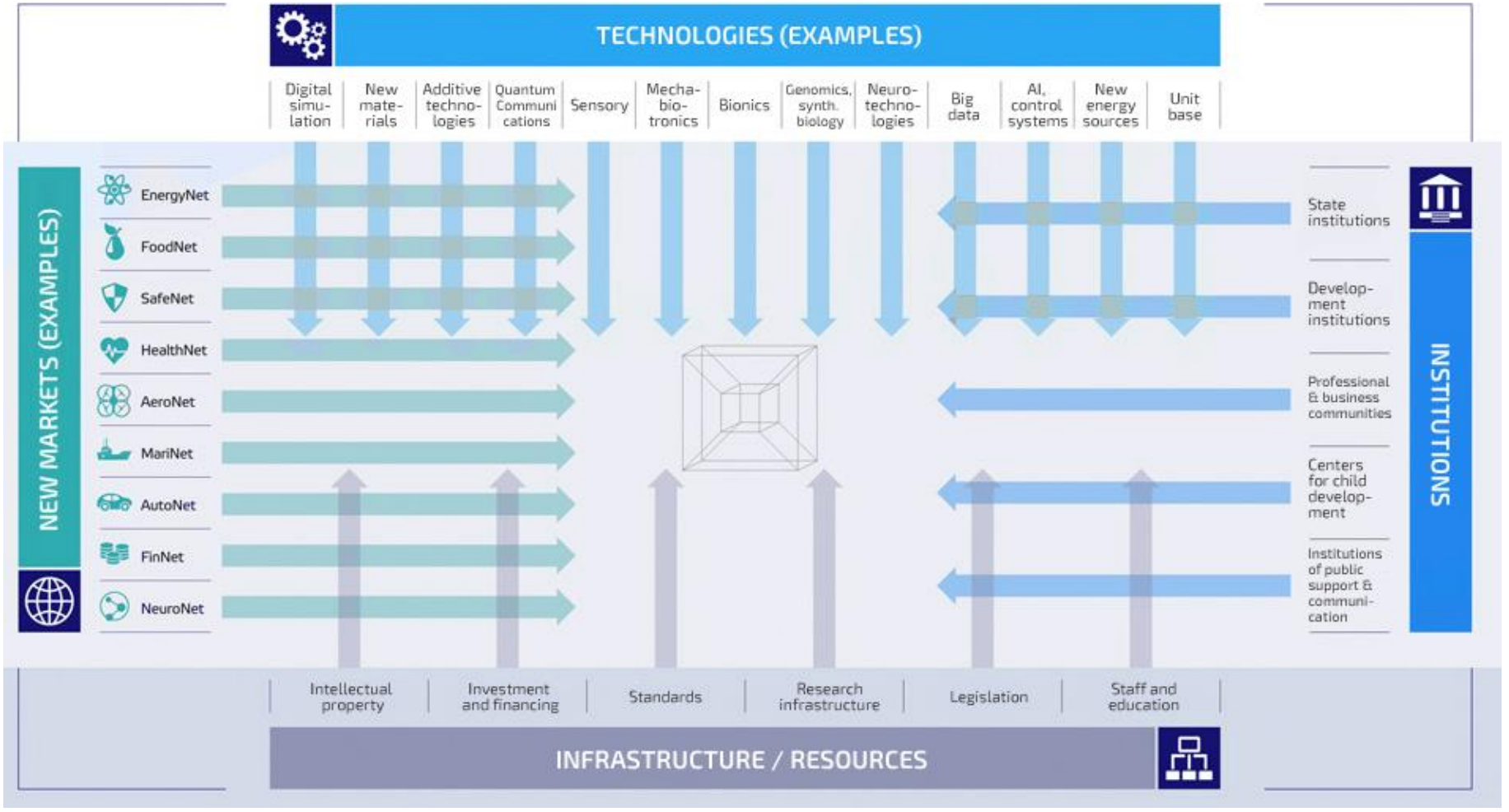
Russian S&T Foresight is a major strategic planning document aimed at identifying the most promising areas of S&T development in Russia towards 2030



Source: HSE ISSEK, 2023

National Technology Initiative (2014)

- Since 2014 – The program for creation of fundamentally new markets and conditions for global technological leadership of Russia by 2035
- Budget for 2020 – around 10,6 billion rubles from the federal budget

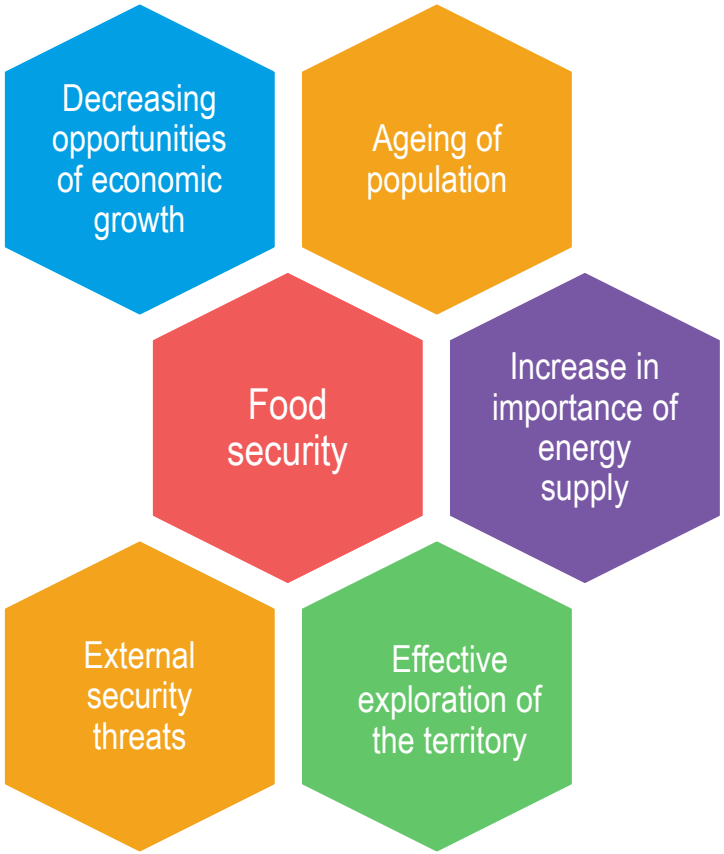


Sources: Agency for Strategic Initiatives, https://asi.ru/eng/nti/; Federal Treasury data

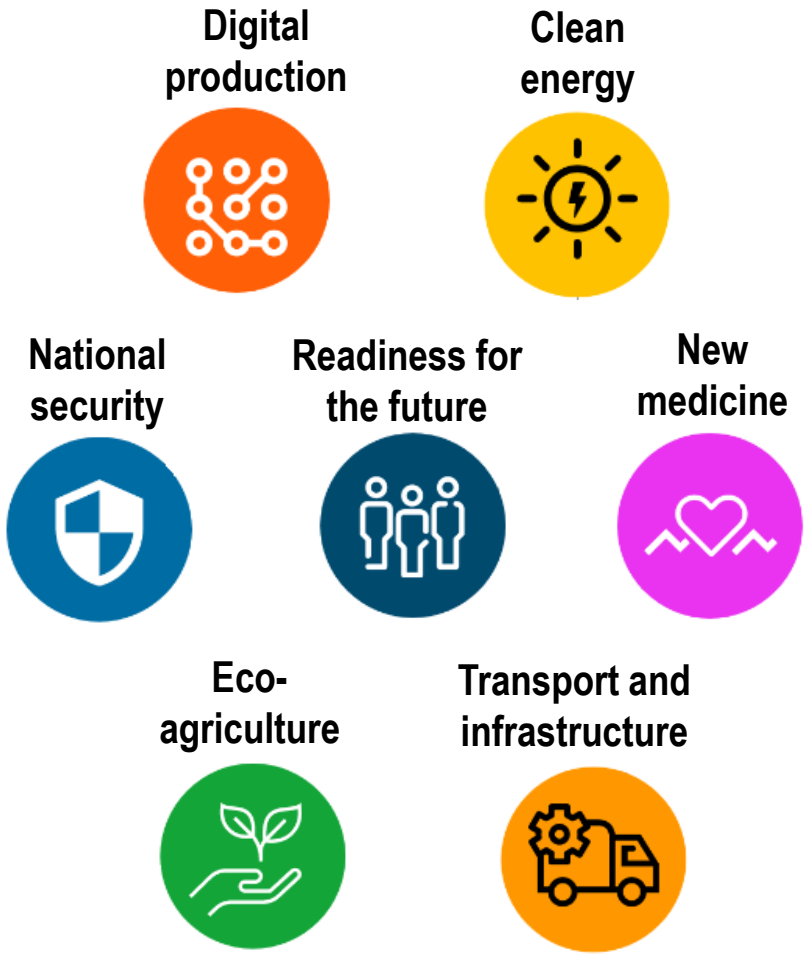
Strategy for S&T development (2016): challenges and priorities

(adopted by the President of Russia 1 December, 2016)

Grand challenges for Russia



S&T priorities



Concept for Technological Development (2023) as an answer to foreign sanctions

Central strategic document at the moment aimed at achieving technology sovereignty

- National control over the development of critical and emerging technologies
- Innovation oriented economic growth and strengthening technologies role in the development of the economy and society
- Technology based sustainable functioning and development of production systems

- **Setting technology priorities**
- **Implementing industrial mega-projects (microelectronics, machine tool industry/robotics, drone industry)**
- **Developing products based on new technologies (AI, quantum, etc.)**
- **Supporting technology companies**
- **Developing STI cooperation with friendly countries**

BRICS countries innovation systems strength and weaknesses

Country	Strengths	Weaknesses
Brazil 	• High-tech imports • Expenditure on education • Domestic market scale • Trademarks by origin	• Graduates in science and engineering • Labor productivity growth • Policies for doing business • Loans from microfinance institutions
China 	• GERD financed by business • Patents and utility models by origin • Global corporate R&D investors • QS university ranking • Labor productivity growth	• Regulatory quality • Tertiary inbound mobility • Cost of redundancy dismissal • Environmental performance • GERD financed by abroad
India 	• Intangible asset intensity • VC received • Domestic industry diversification • Domestic market scale	• Knowledge-intensive employment • Pupil–teacher ratio, secondary • Environmental performance • ICT access
Russia 	• Domestic market scale • Graduates in science and engineering • QS university ranking • Knowledge-intensive employment	• Operational stability for businesses • Rule of law • Venture capital • Environmental performance
South Africa 	• Market capitalization • Domestic credit to private sector • Software spending • Global brand values	• Graduates in science and engineering • Pupil–teacher ratio, secondary • Policies for doing business • Energy use

Source: https://www.globalinnovationindex.org

Concluding remarks

- Innovation-based growth has become an imperative worldwide
- More and more countries increase their investments in R&D and new technologies
- Russia is consequently developing policies aimed at stimulating innovative development and reaching technology sovereignty
- BRICS nations should further develop their cooperation in order to strengthen each other's economies

Thank you!

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