

Integrated Innovation Strategy 2022 (Summary)

tentative translation

- Science, technology and innovation are the nation's lifeblood from the viewpoints of **growing the economy, solving social issues, and ensuring safety and security**. The international competition based on science, technology, and innovation is getting even more fierce.
- In the unpredictable and chaotic times that we face now, the public and private sectors must work together with a vision for the future to **address issues of national importance** through science, technology, and innovation.
- This 2022 strategy, as the second annual strategy under the Sixth STI Basic Plan, **reviews and implements policies to be more agile**, which leads to **establishing an effective and efficient model for promoting the policies**.

Recognition of the current situation

Administration's agenda

[Changes in the Situation at Home and Abroad]

- ✓ On the back of rapidly changing times, climate change and other social issues are increasingly complex, and emerging technologies are advancing rapidly.
- ✓ Manifestation of threats such as infectious diseases, natural disasters, and cyber terrorism.
- ✓ Increasing severity of the security environment surrounding Japan.

[Demand for Science, Technology and Innovation Policy]

- ✓ Expanding the range of policies to enhance Japan's presence in the international community and realize the comprehensive security underpinning the power of Japan.
- ✓ Toward a breakthrough for the relative decline in Japan's research and innovation capabilities, make full use of the new funding model, and enhance the promotion of the Sixth STI Basic Plan.

- ✓ Realization of New Form of Capitalism (Transforming social issues into growth engines)
Realization of a nation based on science and technology, thorough support for startups, promotion of the Vision for a Digital Garden City Nation, ensuring economic security, and drastic reinforcement of investment in human resources.
- ✓ Realization of Society 5.0 in accordance with the Agenda and embodiment of a virtuous cycle of growth and distribution through "a virtuous cycle of 'social transformation through Convergence Knowledge (So-Go-Chi)' and 'investment in knowledge and people'".

Giving a more concrete shape to the policy direction and vision for realization is indispensable so that public and private sectors can share "**Scenario to Goals**", which is the strategic process toward the realization of Society 5.0, and mobilize the capacities.

Three pillars of Science, Technology and Innovation Policies

Realization of social transformation led by startups, with intellectual assets unlocked by university reform and STEAM education and technology seeds generated by advanced research and development responding to the need of economic security, etc. as two wings of the game changer.

Enhancement of Knowledge bases (research capabilities) and Human Resource Development

- By strengthening the functions of universities, **promote fundamental and academic research activities for establishing multi-faceted and multi-dimensional knowledge bases** across the country.
- **Return intellectual assets** created by universities and other academic institutes **to society**: Develop human resources who can lead creative research projects regardless of fields of study, and promote education by meeting social needs and responding to the positive attitude of continuous learning.
- ① **Promotion of next-generation research bases led by the University Fund and university reform**
 - Public invitation to participate in universities for international research excellence with possible subsidies from the University Endowment Fund
 - Improving the treatment of doctoral students, expanding their career paths, improving the research environment for young researchers, etc.
 - Promotion of the participation of female researchers and enhancement of international joint research projects and international brain circulation
 - Nationwide management and utilization of research data, development and shared use of research infrastructure
- ② **Promotion of regional core and distinctive research universities**
 - Revision of the comprehensive promotion package and support for strategic management to develop the strengths and characteristics of these universities
- ③ **Promotion of inquiry-based/STEAM education and recurrent education**
 - Support for children with unique talents, closing the gender gap in students majoring in science and mathematics
 - Enhancement of support and improvement of the environment for recurrent education at companies, universities, etc.

Continuous creation of knowledge as a source of science, technology, innovation and value creation

Creation of Innovation Ecosystem

- As a promotor of innovation, **place a priority on startups to create new businesses** and revitalize the economy and society.
- **Strengthen the fundamental ecosystem where Deep Tech** and other digital startups are popping up and growing. Make full use of policy tools to **attract private funds**, and expand public and private investment in research and development.
- ① **Thorough support for startups and promotion of fund circulation involving private funds**
 - Strengthening growth capital by promoting VC investment from institutional investors and improving the investment environment
 - Fostering private VC funds, and strengthening support for commercialization in cooperation with domestic and overseas VC funds
 - Support for entrepreneurs through the creation of private markets and entrepreneurship education
 - Strengthening the functions of cities and universities, such as by promoting the international startup campus concept
 - Strengthening the Small Business Innovation Research (SBIR) system and utilizing government procurement opportunities
 - Expansion of research and development investment by activating the circulation of funds
- ② **Accelerating the Vision for a Digital Garden City Nation**
 - Create and develop good practices in regional smart cities and formulate road maps
 - Develop regional human resources and provide solutions through cooperation in establishing bases in various fields

Returning the Benefits of Science, Technology and Innovation to the People, Society and Local Communities

Strategic promotion of Advanced Science and Technology

- Through the formulation of a **New Strategy for AI and Quantum** technologies and the advancement of **think-tank functions**, identify the technologies that advance our country and accelerate initiatives leading to social implementation by promoting the **program to foster critical and emerging technologies for economic security** and the **Next Cross-ministerial Strategic Innovation Promotion Program (SIP)**
- The public and private sectors join hands in responding to critical challenges, such as **digital, green, and semiconductor** technologies, to embark on a **full-fledged effort to regain the presence** in the fields where Japan should take the lead in the world
- ① **Promoting national strategies for key technologies and responding to critical national issues**
 - Promotion of R&D and other measures, including the enhancement of social implementation in the National Strategy*
 - Digitization of society based on data strategy, making use of Digital Twin for disaster prevention measures, and technological development for achievement of net-zero GHG emissions and utilization of various energy sources
- ② **Promotion of measures for safety and security**
 - Promotion of think-tank functions and the program to foster critical and emerging technologies for economic security
- ③ **Promotion of R&D for solving social issues and advancing social implementation and utilization of Convergence Knowledge**
 - Dissemination of Convergence Knowledge, social implementation of the 2nd period of SIP and preparation of the next SIP, promotion of the Moonshot R&D Program
 - Strengthen the international standardization strategy, promote science and technology diplomacy and international joint research projects, and ensure research integrity

While considering the autonomy of the economic structure and the superiority and indispensability of technology, foster the technologies that advance our country

The three pillars are integrated together and mutually cooperate to promote policies effectively and efficiently

Brush up on the policy process to address complex social issues that cannot be solved by sector, promote **cross-ministerial/sectoral efforts and complementary collaboration of various measures** to create new value.

Cooperation among sectoral strategies using new programs

Regarding the program to foster critical and emerging technologies for economic security and the next SIP, strengthen the viewpoints of economic security and social implementation, make them work as a means of connecting sectoral strategies such as AI and quantum technologies from a birds-eye perspective, and improve the linkage among the strategies.

More strategic promotion of research and development directly linked to Scenario to Goals

Cooperation among key measures and sectoral strategies

- Advancing organic linkages among key measures and sectoral strategies
- Establish a mechanism to follow up sectoral strategies for timely policy implementation

Increase the reliability of Scenario to Goals to address critical national challenges

Integrated implementation of policies (Review planned at a later date)

Enhancement of **Knowledge** bases (research capabilities) and **Human Resource Development**

Developing frontiers of **knowledge** and strengthening **research capabilities** as sources of value creation

- ◆ **Rebuilding the environment to produce **diverse and outstanding research****
 - Improve the treatment of students in doctoral programs and expand career paths that enable them to play an active role in various fields, such as reviewing the treatment of human resources with doctoral degrees among national public employees.
 - Promotion of Fusion Oriented REsearch for disruptive Science and Technology (FOREST), improvement of the research environment for researchers, including securing positions for young researchers through the reformation of human resource and payroll management, and promotion of active participation of female researchers.
 - Promotion of international joint research projects and formation of hubs for international brain circulation, based on the results of the review on international trends in science and technology.
- ◆ **Construction of new research systems (promotion of **open science** and **data-driven research**, etc.)**
 - Promotion of management and utilization of research data using the Research Data Infrastructure System.
 - Development and operation of infrastructure such as supercomputers that support Research DX (digital transformation).
 - Promotion of shared use of research facilities and equipment.
- ◆ **Promoting **university reform** and expanding functions for **strategic management****
 - To foster research universities with international competitiveness, establish universities for international research excellence, and start the open call for participants during FY2022.
 - Comprehensive support for universities for international research excellence, including subsidies from the 10-trillion-yen University Endowment Fund from FY2024.
 - Revision of the Comprehensive Promotion Package for Regional Core and Distinctive Research Universities, formation of co-creation bases through Industry-Academia-Government Collaboration, and support for strategic management for expanding the strengths and characteristics of universities.

Education and human resource development to realize **diverse happiness (well-being) and challenges for each individual**

- Implementation and follow-up of measures based on the roadmap for the Policy Package on Education and Human Resource Development toward the realization of Society 5.0.
- Strengthening STEAM and entrepreneurship education and promoting empirical research on guidance and support for children with unique talents.
- Present the role models for closing the gender gap in studying science and mathematics and factor analysis through surveys.
- Fulfillment of the support system for those who are willing to learn with a package of measures to budget about 400 billion yen for allocations over a three-year period, and enhancement of recurrent education at companies and universities.

Creation of **Innovation Ecosystem**

Transformation into a **sustainable and resilient society** that ensures the safety and security of the people

- ◆ **Formation of an **innovation ecosystem** that is the foundation for creating **new industries that co-create value****
 - Strengthen growth capital by promoting VC (venture capital) investment from institutional investors and improving the investment environment, and by encouraging investment from individual investors such as angel investors.
 - Fostering private VC funds through public institutions' and public-private investment funds' engagement and strengthening support for commercialization in cooperation with domestic and overseas VCs.
 - Development of an environment for establishing unlisted markets, promotion of entrepreneurship education from the primary and secondary education levels, and support for entrepreneurs through Grand Challenges and other initiatives.
 - Strengthening the functions of cities and universities, such as supporting hub cities for startup ecosystems and promoting the international startup campus initiative.
 - Regarding the SBIR system, drastically expanding the eligibilities and scales of businesses subject to "designated subsidies, etc." under the System, and promoting the use of government procurement opportunities to foster startups.
- ◆ **Urban and regional development (development of **Smart Cities**) as the foundation for succeeding in the next generation**
 - Creation and development of good practices from various efforts utilizing local resources in Smart Cities toward the realization of the Vision for a Digital Garden City Nation, along with the Super City initiative, etc.
 - Formulation of the mid-to-long term roadmap for implementation by the public and private sectors in the region, the utilization of standards, review on research and development, etc.
 - Creating a platform for the development and activities of regional management personnel and establishing a system and ecosystem for solving regional issues through cooperation in forming regional hubs in various fields, with universities and startups playing the core role.

Circulation of funds and revitalization for **knowledge and value creation**

- Leading the international R&D competition under the research and development investment target of 30 trillion yen for the government and 120 trillion yen for the public and private sectors during the Sixth STI Basic Plan period.
- Induction of private investment by expanding science and technology budgets, promoting innovation in government enterprises, utilizing R&D Promotion Tax System and promoting public procurement.

Strategic promotion of **Advanced Science and Technology**

- ◆ **Creating new value through the **fusion of cyberspace and physical space****
 - Based on National data strategy led by the Digital Agency, organize the issues of the base registry and deliver the results by 2025.
 - Building a data linkage platform, promoting R&D and international standardization for Beyond 5G.
- ◆ **Promoting **social change and discontinuous innovation** to **overcome global issues****
 - Eyeing the Clean Energy Strategy to be formulated in the future, enhance innovative technology development (utilizing Funds, etc.) for achieving net-zero GHG emissions and using diverse energy sources in such fields as energy conservation, renewable energy, nuclear power, and fusion energy based on the Green Growth Strategy and other governmental strategies and plans.
 - Accelerate the transformation into the decarbonized society, circular economy, and decentralized society by reviewing the National Biodiversity Strategy, etc.
- ◆ **Building a **resilient, safe, and secure society****
 - Through building Digital Twin and developing simulation technology, respond to threats of natural disasters and aging infrastructure.
 - Ensuring comprehensive security through think-tank functions, promotion of the program to foster critical and emerging technologies for economic security and measures against technology leakage.
 - Steady implementation of measures for public-private technical cooperation and non-publication of patent applications under the Economic Security Promotion Act.
- ◆ **Promotion of **research and development and social implementation to solve various social problems and utilization of the Convergence Knowledge****
 - Strengthening and promoting dissemination and utilization of the concept and examples of the Convergence Knowledge (So-Go-Chi).
 - Social implementation of 2nd period of SIP, feasibility study of the next SIP, and enhancement of Moonshot R&D program through the new goals, stage gates, and international collaboration.
 - Strengthening the international standardization strategy, strategic promotion of science and technology diplomacy and international joint research projects, and autonomous securing and follow-up of research integrity.
 - Promotion of the manufacture, practical application, and dissemination of radioisotope for medical use.

Promotion of **sectoral strategies** through **public-private partnerships**

- [Fundamental technologies]** Social implementation based on new AI and quantum technology strategies, strengthening economic security, expanding the bio community and markets focused on biomanufacturing, and realizing the Material DX platform. Promotion of world-leading research and development, the establishment of R&D bases, human resource development, etc.
- [Application fields]** Promotion of exit-oriented initiatives through Industry-Academia-Government Collaborations in such fields as health and medicine, space, ocean, food, agriculture, forestry, and fisheries.

Strengthening the control tower function of the Council for Science, Technology and Innovation

- Advancement of evidence systems (e-CSTI), analysis of critical science and technology areas, the superiority of our country, and the allocation of funds.
- Assessing the progress of the Sixth STI Basic Plan and promoting collaboration among headquarters meetings participated by stakeholders and related ministries and agencies.