

Integrated Innovation Strategy 2023 (Summary)

tentative translation

- Science, technology, and innovation are the pillars of our country's growth strategy. These are the driving force to **originate engines of growth from social issues** and to achieve **sustainable economic growth**. At the same time, they are **the national lifeline** in terms of ensuring **safety and security** from infectious diseases. Expectations for science, technology and innovation enter a **new phase** against the background of growing impact of the prolonged situation in Ukraine
- As the **international environment** surrounding Japan is becoming **severe**, it is even more important for the public and private sectors to cooperate and collaborate in **strategically addressing key national issues**, with science, technology and innovation as the cornerstones
- As the **third annual strategy** under the STI Sixth Basic Plan, it is necessary to **strongly promote effective policies**, strengthen initiatives based on progress, and **respond flexibly to changing circumstances**

Recognition of the current situation

Administration's agenda

[Changes in the Situation at Home and Abroad]

- ✓ Prolonged Russian aggression against Ukraine (increased severity of the international environment, including energy and food, increased importance of supply chains, etc.)
- ✓ Accelerate building of new international partnerships under post-COVID-19
- ✓ Rapid acceleration of advanced technologies (such as generative AI and fusion energy (nuclear fusion))
- ✓ Intensifying international competition (increased investment and competition for acquisition of human resources)

[Expectations and Demand for Science, Technology and Innovation Policy]

- ✓ Growing importance as measures that underpin comprehensive national power (expanding presence and contribution in the international community and improving the security environment)
- ✓ Collaboration with the like-minded countries and formation of brain circulation in light of the severe situation surrounding international society
- ✓ Make full use of new funding to overcome the relative decline in Japan's research capabilities and the collective wisdom of industry, academia, and government in responding to changing circumstances

- ✓ Realization of **New Form of Capitalism**
Strengthen economic security, including priority investment areas such as "people," "science, technology, and innovation," and "startups," as well as energy and food
- ✓ Formulation of the new National Security Strategy of Japan
Positioning that "the appropriate use of technological capabilities plays a crucial role in improving Japan's national security environment" against the background of the rapid acceleration of advanced technology and its multi-use nature
- ✓ In accordance with the agenda, realization of a virtuous cycle of "social transformation through Convergence Knowledge (So-Go-Chi)" and "investment for knowledge and people" and Society 5.0

In order to realize the society (Society 5.0) that Japan is pursuing, for which the way is paved by **advanced science and technology** including advanced **generative AI and quantum** technology, it is essential to **further substantiate the process of realization** and form **new alliances that can respond flexibly to changes in circumstances**, so that the power of Japan's industry, academia, and government can be mobilized.

Three cornerstones of Science, Technology and Innovation Policies

Expanding our presence and contribution to the **international community** with **advanced science and technology** as the cornerstone by **enhancing the knowledge base** built by university reform, **startups** that lead innovation, and **human resources** that are the driving force of value creation, as well as by mobilizing wisdom and knowledge

Strategic promotion of **Advanced Science and Technology**

- **Strengthen the efforts to address generative AI-driven issues, draw up a strategic realization process by strengthening quantum technology and fusion energy strategies and launching a think tank**, and accelerate strengthening of economic security and social implementation by promoting the **Key and Advanced Technology R&D through Cross Community Collaboration Program(K Program), Strategic Innovation Promotion Program (SIP) phase 3, and the Moonshot R&D Program**
 - **Respond to key national issues in cooperation with the public and private sectors**, and a full fledged effort to regain the presence
 - **Contribution of multi-use advanced technology** in the context of the National Security Strategy of Japan
- (1) Promoting national strategies for key technologies and responding to key national issues**
 - Respond to risks related to AI while promoting optimal use of and strengthening development capabilities of AI; promote strategic R&D and social implementation based on the new quantum technology and fusion energy strategy; enhance agriculture and food innovation; and enhance the analytical functions of e-CSTI
 - Combine the capabilities of the public and private sectors to address key national issues such as digitalization of society, green initiatives, semiconductors, biotechnology, materials, health and medicine, space, ocean, and Beyond 5G
 - (2) Expanding the contribution of advanced science and technology to ensure safety and security**
 - Strong support through the K Program and preparatory work for the establishment of a think tank
 - Increase and improve the use of results from R&D of advanced technologies in the security field
 - Promote appropriate countermeasures against technology leakage
 - (3) Strengthening R&D and social implementation to accelerate solutions to social issues**
 - Launch SIP phase 3, integrated operation of BRIDGE (crossing the bridge to Society 5.0), enhance the Moonshot R&D Program, strengthen international standardization strategy, and utilize Convergence Knowledge (So-Go-Chi)

Foster the technologies that support the future of our country and guide their application in society, keeping in mind the superiority and indispensability of the technologies

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

- Utilize both the **University Endowment Fund** and the **promotion of research universities with a regional core and distinctive characteristics** to strengthen their functions, **promote fundamental and academic research**, and build a diverse knowledge base
 - **Strengthen the development and education of young, female, and other diverse human resources** who lead creative research, regardless of field, and **expand career paths for their activities**
 - Using the **G7** as an opportunity to strengthen cooperation with **partner countries**, encourage **international brain circulation**, and strengthen responses to **academic journal** issues
- (1) Strengthen research infrastructure and reform universities by promoting the University Endowment Fund/regional core universities, etc.**
 - Accreditation of Universities for International Research Excellence toward the commencement of subsidies from the University Endowment Fund
 - Launch of expanded projects based on the revision of the package for comprehensive promotion of research universities with a regional core and distinctive characteristics
 - Realization of the Global Startup Campus Initiative
 - (2) Enhance the development and education of creative and diverse human resources and promote their activities**
 - Provide support for young people, including doctoral students, and expand career paths in which they can excel
 - Promote efforts to improve the research environment, including securing research time
 - Support for strengthening inquiry-based and STEAM education, closing the gender gap in science and math, enhancing recurrent education, and reorganizing university and Colleges of technology (KOSEN) into growing fields
 - (3) Collaboration with like-minded countries and partner countries that share the same values**
 - Promote strategic science and technology diplomacy on the occasion of the G7 meeting
 - Promote open science, including strengthening response to market dominance of academic in scholarly publishing; develop Research DX platforms; cooperate in ensuring research security and integrity; and contribute to the Hiroshima AI Process
 - Accelerate international brain circulation, strengthen strategic international joint research, collaborate with ASEAN

Form international brain circulation to create a source of science, technology, innovation, and value creation

Creation of **Innovation Ecosystem**

- As a **promoter of innovation**, provide **thorough support** for **startups**, including in **deep tech**, which is Japan's strength, based on the "Startup Development Five-year Plan"
 - **Strengthen the formation of an ecosystem** where startups are born and grow one after another through the **Global Startup Campus Initiative** and the promotion of **hub cities**
Mobilize all policy tools to promote the formation of a growth-oriented funding cycle and increase public and private investment in R&D
- (1) Thorough support for startups (promotion of Startup Development Five-year Plan)**
 - Strong support through the Small/Startup Business Innovation Research (SBIR) system, including support for demonstrations in advanced technology fields
 - Utilize government procurement for startup development
 - Develop entrepreneurs including through entrepreneurship education
 - (2) Strengthening of cooperation with cities, regions, universities, and startups**
 - Full-scale launch of the Global Startup Campus Initiative and acceleration of global expansion of startups mainly from Startup Cities
 - (3) Formation of a growth-oriented capital cycle and expansion of R&D investment**
 - (4) Accelerating the Vision for a Digital Garden City Nation**
 - Promote the widespread use of smart city services and develop a roadmap for them
 - Promote Industry-Academia-Government Collaboration and open innovation with the universities at the core

Bring the benefits of science, technology, and innovation to the public and society by placing a priority on startups

Strengthen the functions of the National Institute for Research and Development Agency/Funding Agency to support the three cornerstones of science, technology, and innovation policies, as well as new collaborations to bring together and promote the mobility of outstanding human resources from universities, companies, and the National Institute and to enhance the research environment

Strategic promotion of **Advanced Science and Technology**

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

- ◆ **Creating new value through the** fusion of cyberspace and physical space
 - Developing Base Registries and assuring trust, based on the "Priority Policy Program for Realizing Digital Society" mainly by Digital Agency
 - Revision of the Semiconductor and Digital Industry Strategy and acceleration of initiatives, and promotion of R&D and international standards setting of Beyond 5G
- ◆ **Promoting social change and disruptive innovation to overcome global issues**
 - Promote the development of innovative technologies for energy efficiency, renewable energy, nuclear energy, fusion energy, etc. for net-zero and utilization of diverse energy sources based on the Basic Policy for the Realization of GX (green transformation), etc., in order to simultaneously achieve decarbonization, steady energy supply, and economic growth through realization of GX
 - Promote the transition to a nature-positive economy based on the new National Biodiversity Strategy and Action Plan of Japan 2023-2030, 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 preparations for think-tank functions, promotion of the K Program and measures against technology leakage.
 - Strengthen the use of results from R&D of advanced technologies in the security field, based on the National Security Strategy
 - Steady implementation of measures related to public-private technical cooperation and non-disclosure of selected patent applications, etc. under the Economic Security Promotion Act
- ◆ **Promotion of R&D and social implementation to solve various social problems and utilization of the Convergence Knowledge (So-Go-Chi)**
 - Strengthening and promoting dissemination and utilization of the concept and examples of the Convergence Knowledge (So-Go-Chi)
 - Start of integrated operation of SIP phase 3 and BRIDGE, and enhancement of the Moonshot R&D Program for up to 10 years of R&D
 - Using the G7 as an opportunity, implement strategic science and technology diplomacy, including open science and the Hiroshima AI Process; cooperation with emerging and developing countries, including ASEAN; strengthening international standards strategies; enhancing international joint research; and ensuring research integrity autonomously
 - Promote production, practical application, and dissemination of radioisotopes for medical use

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

[Strategic fundamental technologies to be addressed]

Promotion of world-leading R&D, formation of hubs, and human resource development, including the response to the risks of AI while promoting optimal use and development capabilities of AI, strengthening social implementation of advanced technologies and economic security based on the new quantum technology and fusion energy strategy, and the realization of innovative bio-manufacturing and material DX platforms

[Strategic applied fields to be addressed]

Promotion of exit-oriented initiatives through Industry-Academia-Government Collaborations in such fields as health and medicine, space, ocean, food, agriculture, forestry, and fisheries

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

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

- ◆ **Promoting university reform** and expanding functions for **strategic management**
 - Accreditation for Universities for International Research Excellence to realize research universities that rank with the world
 - From FY2024 onward, Universities for International Research Excellence will begin receiving grants from the profits of a 10-trillion-yen University Endowment Fund
 - Smooth implementation of support based on the revised "Package for Comprehensive Promotion of Research Universities with a Regional Core and Distinctive Characteristics" and encouragement of strategic management to develop strengths and characteristics, including the establishment of funds and Industry-Academia-Government collaboration centers
- ◆ **Rebuilding the environment to produce diverse and outstanding research**
 - Expand career paths for doctoral students in various fields, including implementation of long-term paid internships and promotion of activities in national public service, and improve compensation for doctoral students
 - Promotion of funding for Grants-in-Aid for Scientific Research (KAKENHI) as well as Fusion Oriented REsearch for disruptive Science and Technology (FOREST), improvement of the environment for employing researchers starting with securing positions for young researchers primarily through the reformation of human resource and payroll management, improvement of the research environment for researchers such as securing research time, and promotion of active participation of female researchers
 - Strategic science and technology diplomacy on the occasion of the G7, strengthening of international joint research and formation of hubs for international brain circulation, cooperation with emerging and developing countries including ASEAN
- ◆ **Construction of new research systems (promotion of open science and data-driven research, etc.)**
 - Promotion of immediate open access to scholarly publications and scientific data
 - Promotion of management and utilization of research data
 - Development and operation of infrastructures for Research DX (digital transformation) such as research data management system, preprint server and supercomputers
 - Promotion of shared use of research facilities and equipments

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
- Support the strengthening of inquiry-based, STEAM, and entrepreneurship education, promoting empirical research on guidance and support for children with unique talents, and promoting reorganization of academic faculties in universities and Colleges of technology (KOSEN) in growth fields
- Present the role models for closing the gender gap in studying science and mathematics and factor analysis through surveys
- Enhancement of support for those who are willing to learn by utilizing the "Investment in Human Capital" Policy Package, which amount to 1 trillion yen over 5 years from 2022 based on the Comprehensive Economic Measures to Overcome Rising Prices and Realize Economic Revival, and strengthening of recurrent education at companies, universities, etc.

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
 - Large-scale startup creation centered on the deep tech sector based on the Startup Development Five-year Plan
 - Based on the radical expansion of the SBIR system with the addition of Phase 3, which will support technology demonstrations, etc. starting in FY2023, commence strong support for early social implementation of advanced technologies owned by startups
 - Promote the use of government procurement for startup development
 - Creation of an environment for unlisted markets, drastically strengthen entrepreneurship education from the primary and secondary education level, based on the policy package on education and human resource development for the realization of Society 5.0, and provide opportunities to receive support for starting their own businesses for all university students and others who wish to do so
 - Promote the utilization of 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
 - Strengthen Japan's incubation function by promoting the Global Startup Campus Initiative and formation of an ecosystem including accelerating the global expansion of startups mainly from Startup Cities
- ◆ **Urban and regional development as the foundation for succeeding in the next generation (Development of Smart Cities)**
 - 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.
 - Formulate a medium- to long-term roadmap for implementation by the public and private sectors in the region, and promote efforts to create promotion hubs and human resource development, etc.
 - Promote industry-university collaboration and open innovation with universities playing the core role, based on the Comprehensive Promotion Package for Regional Core and Distinctive Research Universities

Circulation of funds and revitalization for knowledge and value creation

- Leading the international R&D competition under the R&D 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

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

- Advancement of evidence systems (e-CSTI), analysis of topics such as 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