Part II describes the measures taken to promote science, technology and innovation creation in FY 2021 in accordance with the 6th Science, Technology, and Innovation Basic Plan (March 26, 2021 Cabinet Decision).

Chapter 1 Development of Science, Technology and Innovation

Section 1 The Science, Technology, and Innovation Basic Plan

Science, technology and innovation policy in Japan is promoted comprehensively and in a planned manner according to the Science, Technology and Innovation Basic Plan (hereinafter referred to as the Basic Plan). The government renews and implements the 5-year Basic Plan pursuant to the Basic Act on Science, Technology, and Innovation (Act No. 130, 1995).

The government has developed the 1st (FY1996 to FY2000), the 2nd (FY2001-FY2005), the 3rd (FY2006-FY2010), the 4th (FY2011-FY2015) and the 5th (FY2016-FY2020) Basic Plans and promoted science and technology policy according to the plans. (The 1st to 5th plans were called the Science and Technology Basic Plan.)

The 6th Science, Technology and Innovation Basic Plan (for the period from FY2021 to FY2025) ("the 6th Basic Plan") that started in FY2021 is the first plan after the Basic Act on Science and Technology was renamed the "Basic Act on Science, Technology, and Innovation" with its full-scale revision in June 2020. Study for formulation of the 6th Basic Plan was conducted by the Expert Panel on Basic Policy for two years. The panel was set up when the Prime Minister solicited advice from the Council for Science, Technology and Innovation (CSTI) regarding the 6th Basic Plan by issuing the Consultation Request #21, Regarding the Basic Plan in April 2019. On March 26, 2021, the 6th Basic Plan was decided by the Cabinet.

As major changes in society during the period of the 5th basic plan, the 6th Basic Plan listed: reorganization of the world order caused by intensified competition between nations with focus on state-of-the-art technologies (AI, quantum, etc.); surfacing of the technology leak issue and strengthening of countermeasures; the manifestation of climate change and other global problems, and; exposure of the limitations of the information society (Society 4.0). The new plan pointed out that these changes are accelerated by the expansion of COVID-19. Next, it examined the past science, technology and innovation policies and described Japan's failure to make full use of the information communication technologies on which Society 5.0 is premised; the lowering of international position of Japan's papers; the severe environment surrounding young researchers, and; the inclusion of promotion of "humanities and social sciences" and "innovation creation" by the revision of the Basic Act on Science and

Technology.

In this context, the 6th Basic Plan put the Society 5.0 presented by the 5th Basic Plan into a concrete shape, and expressed it as a "society that is sustainable and resilient against threats and unpredictable and uncertain situations, that ensures the safety and security of the people, and that enables each and every one of them to realize well-being." The plan presented the following specific initiatives for its realization.

① Change to a sustainable and resilient society that ensures the safety and security of the people

The government aims for a society where each and every member can realize well-being by redesigning our society to solve global challenges first in the world and ensuring the safety and security of all inhabitants.

For this purpose, the government will change our society to one where cyberspace (virtual space) and physical space (real space) generate a dynamic virtuous cycle so that anyone can use data and AI anytime, anywhere and securely. Then, Japan will lead the net zero greenhouse gas emissions of the world and build a more resilient society by reducing risks, including natural disasters and COVID-19.

In addition, Japan will construct new industrial infrastructure to turn out startups and facilitate value creation through cooperation of diverse entities, while at the same time deploying Smart City (cities/areas pioneering Society 5.0) all over Japan and in the world.

In order to support these initiatives and address new social challenges, the government will use the convergence of knowledge to promote R&D and social implementation including the next SIP[1] and Moonshot Research and Development programs to address social challenges and develop S&T diplomacy to support social changes.

② Strengthening Research Capacity to Open Up New Frontiers of Knowledge and Generate the Source of Value Creation

Diverse research activities based on the intrinsic motivation of the researchers and accumulation of in-depth "knowledge" in the natural sciences and the humanities and social sciences will not only have intellectual/cultural value but also will lead to innovations contributing to new technologies and solution of social challenges. The first measure for strengthening the research capacity that cultivates such knowledge is reinforcing the support for doctoral course students and young researchers. Next, while promoting basic/academic research including humanities and social sciences and convergence of knowledge, the government will bolster promotion of challenging research where dedicated researchers create ingenious results through knowledge exchange with diverse entities.

This will be followed by construction of new research systems including open science and data-driven research.

Universities are nodes of knowledge and the biggest and state-of-the-art foundations of knowledge. University reform will be advanced to

1 Cross-ministerial Strategic Innovation Promotion Program

diversify universities by extending their respective strengths and boost diverse self-expression of individuals. In order to promote further growth of research universities ranked high in the world, in particular, the government will advance measures including establishment of a 10-trillion yen University Endowment Fund.

③ Education and human resource development to realize the well-being of each and every person and tackling of challenges

In order to redesign society and create values in Society 5.0, the government aims to realize education/human resource development systems that will foster an increase in the number of people who have the ability and the will to pursue individual happiness and tackle challenges through trial and error. Specifically, learning based on curiosity is supported and the power to search is strengthened through promotion of STEAM[1] education at the stages of primary and secondary education, promotion of DX in education including initiatives based on the GIGA[2] School Vision, participation/utilization of external human resources and other resources in learning, for example. The government will also develop an environment that encourages continued learning by providing diverse curriculums at universities, etc., fostering environment/culture that promotes recurrent education and other measures.

In order to promote these science, technology and innovation policies, the government secured about 30 trillion yen for total government investment in R&D during the 6th Basic Plan, and set a goal of about 120 trillion yen for total public and private R&D investments.

Furthermore, to ensure steady implementation of the initiatives presented in the 6th Basic Plan, the government will strengthen the functions to use convergence of knowledge, develop policies toward the future, strengthen policy-making functions and ensure their effectiveness by using the evidence system (e-CSTI[3]), implement policy evaluation linked to annual integrated strategy and the basic plan, and ensure effectiveness of the headquarter functions.

1 Science, Technology, Engineering, Art(s) and Mathematics
2 Global and Innovation Gateway for All
3 Evidence data platform constructed by Council for Science, Technology and Innovation

Section 2 Council for Science, Technology and Innovation

CSTI in the Cabinet Office is positioned as "Important Council" toward vigorously promote Japan's science, technology and innovation policies under the leadership of the Prime Minister. CSTI which consists of the Prime Minister as the chairperson, related Cabinet members, executive members and others has the mission of overseeing the nation's science, technology and innovation efforts and offering comprehensive and fundamental policy plans and general coordination (Table 2-1-1).

CSTI has established seven Expert Panels that deliberate on technical aspects of key issues (Expert Panel on Basic Policy, Expert panel on STI Strategy, Expert Panel on Important Issues, Expert Panel on Bioethics, Expert Panel on Evaluation, Expert Panel on the World Level Research Universities, and Expert Panel on Innovation Ecosystem).

■Table 2-1-1／List of CSTI members

Cabinet members	KISHIDA fumio	Prime Minister
	MATSUNO hirokazu	Chief Cabinet Secretary
	KOBAYASHI Takayuki	Minister of State for Science and Technology Policy
	KANEKO Yasushi	Minister of Internal Affairs and Communications
	SUZUKI Shunichi	Minister of Finance
	SUEMATSU Shinsuke	Minister of Education, Culture, Sports, Science and Technology
	HAGIUDA Koichi	Minister of Economy, Trade and Industry
Executive Members	UEYAMA Takahiro (full-time)	Former Vice President, National Graduate Institute for Policy Studies
	KAJIWARA Yumiko (part-time)	Corporate Executive Officer, Fujitsu Ltd.
	SATO Yasuhiro (part-time)	Chairman, Member of the Board of Directors, Mizuho Financial Group Vice Chair, Keidanren
	SHINOHARA Hiromichi (part-time)	Chairman of the Board, NIPPON TELEGRAPH AND TELEPHONE CORPORATION; Vice Chair, KEIDANREN and the Chair of the Committee on Digital Economy, KEIDANREN
	SUGA Hiroaki (part-time)	Professor, The Department of Chemistry, Graduate School of Science, The University of Tokyo; Professor, Research Center for Advanced Science and Technology, The University of Tokyo: Council Member, Science Council of Japan; Director, MiraBiologics Inc.
	HATANO Mutsuko (part-time)	Professor, Department of Electrical and Electronic Engineering, School of Engineering, Tokyo Institute of Technology; Senior Aide to the President, Tokyo Institute of Technology; Section Manager, Quantum Beam Science Research Directorate, National Institutes for Quantum Science and Technology; President, The Japan Society of Applied Physics; Member, Science Council of Japan
	FUJII Teruo (part-time)	President of the University of Tokyo
	KAJITA Takaaki (part-time)	President of the Science Council of Japan (The head of an affiliated organization)

Source: Cabinet Office

1 Major Endeavors of CSTI in FY2021

CSTI[1] has been discussing policy, budgets and systems. Such discussions address the following: 1) the establishment of the Integrated Innovation Strategy 2021 (approved on June 18, 2021 by Cabinet Decision), and 2) the operation of SIP and Public/Private R&D Investment Strategic Expansion PrograM (PRISM).

In FY2021, CSTI discussed the topic "Significantly strengthening the sources of innovation - Integrating human resource development, education, and research capacity" on February 1, 2022, and the goal was the realization of a virtuous cycle of "growth" and "distribution" through science, technology and innovation. CSTI also prepared a final report on research universities that are comparable to those of the world and compiled the Package for Comprehensive Promotion of Research Universities with a Regional Core and Distinctive Characteristics, as well as conducted a study on how to fundamentally strengthen the startup ecosystem with the agenda "Formation of an innovation ecosystem that delivers the benefits of science, technology and innovation to the people and regions of Japan."

2 Strategic Prioritization in the Science and Technology-related Budget

CSTI allocates the science and technology-related budget to important fields and measures, oversees all science, technology and innovation measures, and leads the activities of relevant ministries and agencies. It does the above in order for the Basic Plan and the Integrated Innovation Strategy to be implemented.

❶ The policy for the allocation of budgets and other resources related to science and technology

According to the basic plan showing the medium- to long-term policy direction and based on the changes in the situation of the year, CSTI under the Integrated Innovation Strategy suggested areas of policy focus for the year, and proposed that allocations of governmental science and technology-related budgets be focused on important areas and programs and that policy be subjected to PDCA cycles.

❷ Promotion of SIP

SIP is a program for inter-disciplinary research and development that encompasses everything from basic research to the practical application and commercialization of cross-disciplinary R&D, transcending the boundaries between ministries, industry, academia and government, where CSTI functions as the control tower. SIP was implemented under the CSTI policies, using the "Budget for Creating and Promoting Science, Technology and Innovation" (FY2021: 55.5 billion yen) appropriated to Cabinet Office, Government of Japan.

There were 12 tasks considered in the 2nd term of SIP; in the fourth year since the start, progress was observed in addressing each task regarding research outcomes and the development of systems aimed at achieving social implementation of the research outcomes. In addition, concerning the tasks to be addressed in the next phase of SIP scheduled to start from FY2023, the government determined potential tasks (target areas) at the end of December 2021 with back-casting, based on the 6th Basic Plan, towards the realization of a future society (Society 5.0) that Japan aims to achieve. For each potential task, a request for information (RFI) was requested in January and February 2022 to solicit a wide range of ideas on R&D themes from universities, research institutions, companies and venture companies. In March 2022, the RFI results were compiled, and the recruitment requirements for program director (PD) nominees were discussed.

1 Council for Science, Technology and Innovation

<<Reference URL>>

Strategic Innovation Promotion Program (SIP) Determination of potential tasks for the next SIP

https://www8.cao.go.jp/cstp/stmain/20211224sip.html

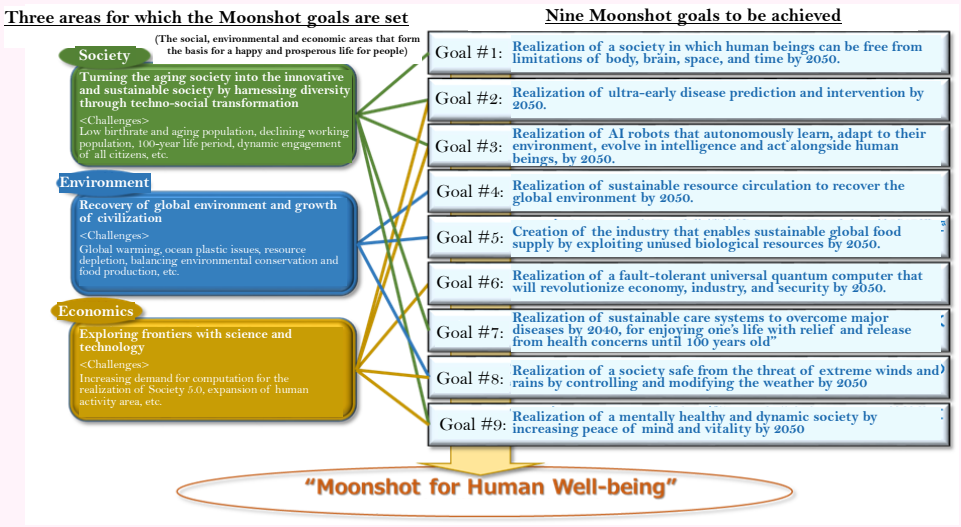
❸ Promotion of the Public/Private R&D Investment Strategic Expansion PrograM (PRISM)

PRISM is a program established in FY2018 in order to steer measures of individual ministries/agencies to areas where they are likely to induce private investments and where efficiency improvement of the government spending is expected through utilization of R&D results. According to the various strategies decided by the CSTI, the funds are being allocated focusing on the AI Technology Area, Technical Area of innovative construction and infrastructure maintenance / innovative disaster prevention and disaster mitigation, Bio Technology Area, and Quantum Technology Area, and additional allocations were made to 32 measures in these four areas in FY2021. Projects of individual ministries and agencies will be accelerated to expand private and public R&D investments according to the various strategies formulated or revised by CSTI.

❹ Promotion of the Moonshot Research and Development Program

Under the Moonshot Research and Development Program, the government sets ambitious goals that fascinate people (Moonshot Goals) to address important social challenges including the super-aging society and global warming, and promote aggressive R&D. The CSTI decided Moonshot goals #1 to #6 in January 2020, and the Headquarters for Healthcare Policy decided Moonshot goal #7 in July 2020. Goals are added in response to changes in the social environment and other factors under this program. CSTI determined new Moonshot Goals 8 and 9 in September 2021, considering the transformation in the economy and society due to the COVID-19 pandemic and the climate change issue, based on the investigative research conducted by young researchers (57th Plenary Session of CSTI). Based on the approach of human-centered society presented at the Visionary Council on the Moonshot Research and Development Program, the program ultimately aims for well-being of each and every person.

■Table 2-1-2／The Moonshot Research and Development Program



In FY2021, the government steadily promoted research and development to realize each of the seven existing goals determined in FY2019 and FY2020 and announced the results at a public symposium and reported on the progress at the Strategy Promotion Council for the Moonshot Research and Development Program comprising of industry, academia, and government.

■Table 2-1-3／Projects of Moonshot Goal 1 to 7

Goal 1
Project Name
Realization of a Human-Avatar Symbiotic Society where Everyone can Experience a Diverse Range of Human Activities
Freedom from Bodily Limitations by Expanding Physical and Perceptional Capabilities
Cybernetic Avatar Technology and Social System Design for Harmonious Co-experience and Collective Ability

Goal 2
Project Name
Comprehensive Mathematical Understanding of the Complex Control System between Organs and Challenge for Ultra-Early Precision Medicine
Challenge toward the Control of Intractable Cancer through Understanding of Molecular, Cellular, and Interorgan Networks
Challenge for Eradication of Diabetes and Comorbidities through Understanding and Manipulating Homeostatic Systems
Towards Overcoming Disorders Linked to Dementia based on a Comprehensive Understanding of Organ Connectivity
Understanding and Control of Virus-Human Interaction Networks

Goal 3
Project Name
Smart Robot that is Close to One Person for a Lifetime
Innovation in Construction of Infrastructure with Cooperative AI and Multi-Robots Adapting to Various Environments
Co-evolution of Human and AI-Robots to Expand Science Frontiers
Adaptable AI-enabled Robots to Create a Vibrant Society

Goal 4
Project Name
(1) Development of technologies to recover greenhouse gases ("GHGs") and convert them into valuable materials
Development of a bioprocess that uses electrical energy to fix atmospheric CO_2
Development of highly efficient direct air capture (DAC) and carbon recycling technologies
Integrated Electrochemical Systems for Scalable CO_2 Conversion to Chemical Feedstocks
C^4S* 6 Research and Development Project * C^4S：Calcium Carbonate Circulation System for Construction
Research and development toward saving energy for direct air capture with available cold energy
Development of Combined Carbon Capture and Conversion (quad-C) Systems for the Utilization of Atmospheric CO_2
Development of Global CO_2 Recycling Technology towards "Beyond-Zero" Emission
Mitigation of greenhouse gas emissions from agricultural lands by optimizing nitrogen and carbon cycles

(2) Development of technologies to recover nitrogen compounds and convert them into harmless or useful materials
Innovative circular technologies for harmful nitrogen compounds
Development of recovery and removal techniques of dilute reactive nitrogen to realize nitrogen circulating society
(3) Development of marine biodegradable plastics which can control the timing and speed of their degradability
Development of Multi-lock Biopolymers Degradable in the Ocean from Non-food Biomasses
Research and development of marine biodegradable plastics with degradation initiation switch function
Development of photo- switching ocean-degradable plastics with edibility

Goal 5
Project Name
(1) Food Production Systems Achieving Both Food Supply Expansion and Global Environment Conservation
Achieving zero food risks by improving crop robustness using cyber-physical systems
Building a platform for sustainable farming by environmental control based on the microbe atlas of the soil
Bio-economical food production system using circular cell culture of algae and animal cells
Realization of zero pest damage agriculture by making full use of advanced physical methods and unused biological functions
Realization of a new livestock production system to reduce methane by 80% through complete control of the bovine rumen microbiome
(2) Food Consumption Systems Realizing Zero Food-loss and Waste
Insect-Based Sustainable Food Production Systems toward Global Food Security and Human Space Exploration Project
Development of innovative food solutions for simultaneous food loss reduction and QoL improvement
Creation of Next-Generation Food Supply Industrial Chains for a Natural Capitalism Society

Goal 6
Project Name
Research and Development of Theory and Software for Fault-tolerant Quantum Computers
Development of Quantum Interfaces for Building Quantum Computer Networks
Fault-tolerant Quantum Computing with Photonically Interconnected Ion Traps
Development of Large-scale Fault-tolerant Universal Optical Quantum Computers
Large-scale Silicon Quantum Computer
Quantum Cyberspace with Networked Quantum Computer
Development of Integration Technologies for Superconducting Quantum Circuits

Goal 7
Project Name
Mitochondrial Medicine
Development of method for complex tissue regeneration via tissue embryonization
Realization of innovative medical systems that extend healthy lifespan to 100 years old by eliminating tissue inflammation-inducing cells
Quantum technology and neuromodulation medicine for new therapeutic strategies to suppress microinflammations
Development of new-generation medical care systems through customizing sleep and hibernation

For the two new goals, the Japan Science and Technology Agency (JST) selected 21 teams from among 129 proposals presented by young researchers, and each team conducted investigative research based on their concept (MILLENNIA program). Based on the results of this research, the following two new goals (Goal 8 and Goal 9) were determined by CSTI.

a. Goal 8 "Realization of a society safe from the threat of extreme winds and rains by controlling and modifying the weather by 2050"

Moonshot Goal 8 aims to significantly reduce damage from extreme winds and rains with highly accurate forecasting and active control of typhoons and extreme rains and realize a safe and secure society free from the threat of disasters caused by typhoons and extreme rains. Eight projects have been identified to achieve this goal.

■Table 2-1-4／Projects of Moonshot Goal 8

Project Name
Control Theory of Weather-Society Coupling Systems for Supporting Social Decision-Making
Typhoon Control Research Aiming for a Safe and Prosperous Society
Heavy Rainfall Control for Living Together with Isolated-Convective Rainstorms and Line-Shaped Rainbands
Quantifying Weather Controllability and Mitigatable Flood Damage Based on Ensemble Weather Forecast
Estimation and Control of Air-Sea Momentum and Heat Fluxes of Typhoons
Development of an Atmospheric Simulation Model for Estimating the Probability of Local Atmospheric Phenomena
Actuator Position Optimization for Large-Degree-of-Freedom Fields
Development of Unmanned Marine Observation Vehicles Essential for Forecasting and Monitoring of Typhoon Artificial Control

b. Goal 9 "Realization of a mentally healthy and dynamic society by increasing peace of mind and vitality by 2050"

Moonshot Goal 9 aims to achieve further social and economic development by making it possible to reduce excessive and persistent anxiety and aggression, which will result in a more stable emotional state. Making people more tolerant of each other will reduce discrimination and aggression (including bullying, domestic violence, and abuse), loneliness, depression and stress, eliminate negative emotions, and help people recover from mental illness.

■Table 2-1-5／Projects of Moonshot Goal 9

Project Name
Integration of Asian humanities and brain informatics to enhance peace and compassion of the mind
Development of "Jizai Hon-yaku-ki (At-will Translator)" connecting various minds based on brain and body functions
Freedom of Mind and Value Co-Creation through Decentralized Data Management
Maximizing well-being and agency on the basis of interpersonal comparison of brain indicators
Realization of a society where people can live a forward-looking life in the face of adversity
Innovation in "Mental Capital" through Awareness Music and creation of new liberal arts
Protecting children's intellectual curiosity and individuality to realize a dynamic society
Understanding the cognitively regulatory basis of food value that controls feeding behaviors
Brain science towards visualization and manipulation of the mind
Breaking the intergenerational chain of child maltreatment through revolutionary diagnostics and positive intervention
Construction of an AIoT-based universal emotional state space and evaluation of well-being/ill-being states
Child care commons: Proposing social infrastructure allowing others to substitute parental roles
Elucidation of the mechanism of serotonin over optimism and pessimism

3 R&D Evaluation of Projects of National Importance

For comprehensive and plan-based promotion of the nation's science and technology policy, CSTI implements evaluation of R&D projects of national importance including large-scale R&D [1] implemented by individual ministries based on Article 26 paragraph (1) (iii) of the Act for Establishment of the Cabinet Office (Act No. 89 of 1999).

In the last fiscal year of the period for a medium- to long-term plan of a national research and development agency, CSTI offers opinions on estimation evaluations and drafts of the next medium- to long-term objectives from the perspective of linking with the Basic Plan and other national strategies based on Article 5 of the Act on Special Measures concerning the Promotion of Research and Development by Designated National Research and Development Agencies (Act No.43 of 2016).

Based on the "Guideline on the Method of Evaluation for Government R&D in MEXT" (decided by the Minister of Education, Culture, Sports, Science and Technology on June 20, 2002, with final revision on April 1, 2017), which was revised following the "National Guideline on the Method of Evaluation for Government R&D" (decided by the Prime Minister on December 21, 2016), the Subdivisions on Research Planning and Evaluation of the Council for Science and Technology (CST) and others evaluates the R&D projects. Moreover on the Subdivisions Research Planning and Evaluation conducts more effective evaluation of research and development through discussions toward conducting R&D program evaluations, thereby aiming to promote excellent research and development effectively and efficiently.

4 Major Deliberations at Expert Panels

❶ Expert Panel on Evaluation

The Expert Panel on Evaluation structure was revised based on the 6th Basic Plan, which states that "the Expert Panel on Evaluation will continuously monitor and evaluate progress using

1 R&D projects with 30 billion yen or more national expenses in total, which the Expert Panel on Evaluation found to require evaluation in light of their importance for the science and technology policy.

indicators."

In FY2021, the newly constituted Expert Panel on Evaluation conducted a survey and study on the scenario of "Reconstruction research that generates diverse and outstanding research" included in the 6th Basic Plan on a trial basis.

From FY2022 onward, the panel plans to study more scenarios covered by the 6th Basic Plan, monitor progress and improve the evaluation system.

In addition, the newly constituted Expert Panel on Evaluation started evaluation with the aim of ensuring that the establishment of evaluation items and the concept of evaluation criteria for "Evaluation of Nationally Important R&D" being implemented by each ministry from before are consistent with the "Basic Plan" and "National Guideline."

❷ Expert Panel on Bioethics

The Expert Panel on Bioethics regarding the policy for handling human fertilized embryos in light of the progress of science and technology set up a task force for review, etc. of "the Basic Idea on Handling of the Status of Human Embryo" and compiled a report on the review, etc. of "the Basic Idea on the Status of Human Embryo – use of genome editing technologies on human fertilized embryo" in February 2022. In the future, when bioethical issues related to science and technology arise, such as the emergence of new technologies for human fertilized embryos, the Expert Panel on Bioethics will deliberate based on the latest scientific findings and evaluate their social relevance.

Section 3 Integrated Innovation Strategy

Japanese Government has been formulating "Integrated Innovation Strategy" for cross-departmental and integrated promotion of related measures toward realization of Society 5.0. This strategy has been reviewing related measures after analyzing the situation surrounding science and technology innovations in Japan and abroad during the year, and identifying the needs for strengthening and new tasks to tackle.

The "Integrated Innovation Strategy 2021" formulated in FY2021, is the first annual strategy positioned as an implementation plan of the 6th Basic Plan. In light of domestic and international changes in science, technology, and innovation, such as struggles for technological supremacy among countries and measures to address climate change issues, the strategy embodies the science, technology, and innovation policies to work on over the next year.

The six goals that form the basis of the policies in the Integrated Innovation Strategy 2021 are as follows.

(1) Transformation into a sustainable and resilient society that ensures the safety and security of the people

(2) Expanding the frontier of knowledge and strengthening research capabilities as a source of value creation

(3) Education and fostering of human resources to realize the well-being of individuals and the challenges they face

(4) Promoting sectoral strategies through public-private partnerships

(5) Revitalizing the flow of funds

(6) Strengthening control tower functions

Expansion of bioeconomy is important for solution of social challenges including control of

COVID-19 and realization of 2050 net zero greenhouse gas emissions a as well as the economic development of the nation. For this reason, the " Bio Strategy Follow-up " (decided by the Integrated Innovation Strategy Promotion Council on June 11, 2021), a polished version of the strategies implemented since 2019, was decided. With the overall goal of realizing the world's most advanced bio-economy society by 2030, the government is promoting necessary measures by back-casting, aiming for a total market size of approximately 92 trillion yen by 2030.

Section 4 Revitalizing the Science, Technology and Innovation Administrative Structure and Flow of Funds

1 Administrative Structure for Science, Technology and Innovation Policies

On the basis of these recommendations and guidelines, relevant administrative agencies are supervising the following: 1) research conducted at national experiment and research institutions, at national R&D agencies and at universities, 2) the promotion of research under various research programs, and 3) improvements in the environment for R&D activities.

MEXT is responsible for the coordination that is necessary for the development of specific R&D programs in diverse fields as well as for science and technology-related of various administrative agencies. MEXT also has initiatives in comprehensively promoting the implementation of R&D programs in important state-of-the-art science and technology fields and the advancement of creative basic research. CST under the jurisdiction of MEXT is engaged in studies and deliberations regarding important matters related to the comprehensive promotion of S&T, in response to consultation with the Minister of MEXT, and provides its opinions to the Minister.

Table 2-1-6 shows major decisions and reports from CST.

■Table 2-1-6／Major decisions and reports from CST (FY2021)

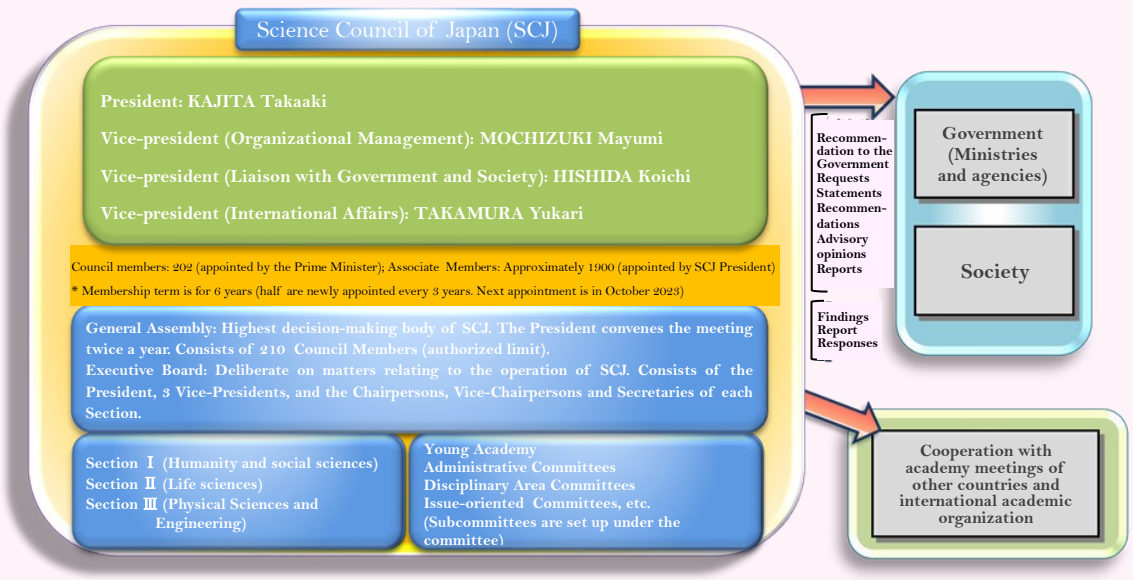
Date of issue	Major Reports
June 30, 2021	[International Strategy Committee] Toward the Strategic International Development of Science and Technology
August 24, 2021	[Subdivision on Science, Special Committee on Humanities and Social Science] Policy for the Promotion of the Humanities and Social Sciences for Creation and Utilization of "Convergence of Knowledge"
August 27, 2021	[Committee on Information Science and Technology, Next Generation Computing Infrastructure Study Subcommittee] Next-Generation Computing Infrastructure Study Subcommittee Mid-term Report
February 16, 2022	[Geodesy Subcommittee] Review Report (Summary) on the Implementation Status of the "The Second Earthquake and Volcano Hazards Observation and Research Program (Earthquake and Volcano Hazard Reduction Research)"
February 18, 2022	[Subdivision on Research Planning and Evaluation, Aviation Science and Technology Committee] Vision for Research and Development in the Field of Aeronautical Science and Technology Final Report
March 23, 2022	[Committee on Information Science and Technology] Proposal on measures to promote Information Science and Technology fields based on The 6th Science, Technology and Innovation Basic Plan
March 30, 2022	[International Strategy Committee] Strategy for the International Development of Science and Technology

Source: MEXT

The Science Council of Japan (SCJ), an organization that represents Japan's scientific community and has 210 Council Members (fixed number) and about 1,900 Associate Members, is under the supervision of the prime minister. The SCJ's duties are to carry out deliberations of important issues regarding science and work for their realization, while coordinating scientific research to improve their efficiency (Figure 2-1-7).

The SCJ has worked on its improvement based on the "Future prospects of the Science Council of Japan" (decided by the expert meeting to think about new prospects of the SCJ in March 2015). Now The SCJ extracts issues through self-inspection of its current state and is examining the origin of the academy so that it can fulfill a better role and implement concrete initiatives for its reform (Toward Better Fulfillment of the Role of the Science Council of Japan, the General Assembly of Science Council of Japan, April 22, 2021.)

■Table 2-1-7／Organizational structure of the Science Council of Japan (SCJ)



Note: As of April 1, 2021
Source: Cabinet Office

The SCJ reviewed its scientific advisory function and membership selection process based on this. It also discussed comprehensive and medium- to long-term issues that need deliberation at its 183rd General Assembly (December 2021). The SCJ published one recommendation ("Toward Research Evaluation for the Advancement of Science: Challenges and Prospects for Desirable Research Evaluation" (November 25, 2021)) to the government and society and also published the SCJ President's Statement "COVID-19 Disease and Vaccination." The SCJ has set up various committees and conducts deliberation for the publication of recommendations, etc., in the future.

The SCJ is also working to strengthen and utilize networks in the Partnership with academic societies (2,018 societies as of the end of fiscal 2021) while at the same time promoting cooperation and communication with parties outside of the community through various symposiums, press conferences and other opportunities.

In addition, the SCJ represents Japan in 44 international academic organizations including the International Science Council (ISC) and promotes international academic exchange program. In FY2021, the SCJ jointly hosted six international conferences with the verbal agreement by the Cabinet and released the G-Science Academies' Joint Statements on three subjects, including climate change, in March 2021, jointly working with the national academies of G7 countries.

The "Policy Discussion on the Future of the Science Council of Japan" was held at the advisory panel of experts in CSTI on the current state of the SCJ and a report compiled in January 2022. The government is proceeding with a comprehensive study of the policies based on this report.

2 Revitalizing the flow of funds to create knowledge and value

1. Science and Technology Budgets

The science and technology-related portion of Japan's initial budget for FY2021 is 4.1194 trillion yen, of which 3.3418 trillion yen is allocated for the

general account budget and 777.6 billion yen is allocated for the special account budget. The science and technology-related portion of Japan's supplementary budget in FY2021 is 3.5622 trillion yen, of which 3.3345 trillion yen is allocated for the general account budget, and 227.7 billion yen is allocated for the special account budget (As of March 2022). Changes in the science and technology budget (initial budget) are shown in Table 2-1-8, and science and technology budgets are broken down by ministry in Table 2-1-9.

■Table 2-1-8／Changes in science and technology budgets

(Unit: 100 million yen)

Item \ FY		FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
	Science and technology promotion expenditures (A)	12,930	13,045	13,175	13,597	13,639	13,638
	As a % of the previous FY	-	100.9	101.0	103.2	100.3	100.0
	Other research-related budget (B)	15,225	15,339	17,340	20,584	22,054	19,780
	As a % of the previous FY	-	100.7	113.0	118.7	107.4	89.7
Science and technology budget included in the general account budget (C) = (A) + (B)		28,155	28,384	30,515	34,182	35,693	33,418
As a % of the previous FY		-	100.8	107.5	112.0	104.5	93.6
Science and technology budget included in the special account budget (D)		7,514	7,497	7,908	8,237	8,094	7,776
As a % of the previous FY		-	99.8	105.5	104.2	98.3	96.1
Science and technology budget (E) = (C) + (D)		35,669	35,881	38,423	42,419	43,787	41,194
As a % of the previous FY		-	100.6	107.1	110.4	103.3	94.1
General account budget of Japan (F)		967,218	974,547	977,128	1,014,571	1,026,580	1,066,097
As a % of the previous FY		100.4	100.8	100.3	103.8	101.2	103.8
General expenditure budget of Japan (G)		578,286	583,591	588,958	619,639	634,972	669,020
As a % of the previous FY		100.8	100.9	100.9	105.2	102.5	105.4

Note: 1) Initial budget amounts are shown.
2) Because figures of FY2016 and after are calculated using a new calculation method based on a unified standard, simple comparison with data in FY2015 is not possible.
3) Because of rounding, the cumulative amounts in some columns may not equal the totals.
Source: Adapted by MEXT based on data provided by the Cabinet Office and MOF

■Table 2-1-9／Science and technology budgets of each ministry/office/agency

(Unit: 100 million yen)

Item / Ministry/Office/Agency	FY2020 (Initial budget)				FY2020 (Initial budget)				FY2021 (Initial budget)				FY2021 (Initial budget)			
	General account	Science and technology promotion expenditures	Special account	Total	General account	Science and technology promotion expenditures	Special account	Total	General account	Science and technology promotion expenditures	Special account	Total	General account	Science and technology promotion expenditures	Special account	Total
National Diet	12	11	-	12	-	-	-	-	12	11	-	12	-	-	-	-
Cabinet Secretariat	653	-	-	653	224	-	-	224	653	-	-	653	222	-	-	222
Cabinet Office	1,249	872	-	1,249	688	554	-	688	1,159	882	-	1,159	2,066	1,746	-	2,066
National Police Agency (NPA)	23	22	-	23	-1	-1	-	-1	23	21	-	23	-1	-1	-	-1
Consumer Affairs Agency	31	-	-	31	11	-	-	11	30	-	-	30	3	-	-	3
Digital Agency	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	3
Reconstruction Agency	-	-	248	248	-	-	-	-	-	-	275	275	-	-	-	-
Ministry of Internal Affairs and Communications (MIC)	1,830	541	-	1,830	772	717	-	772	1,133	598	-	1,133	1,320	677	-	1,320
Ministry of Justice (MOJ)	12	-	-	12	-	-	-	-	12	-	-	12	-	-	-	-
Ministry of Foreign Affairs (MOFA)	132	-	-	132	89	-	-	89	156	-	-	156	2	-	-	2
Ministry of Finance (MOF)	10	10	-	10	-	-	-	-	11	10	-	11	-	-	-	-
Ministry of Education, Culture, Sports and Science (MEXT)	20,135	8,863	1,089	21,224	10,380	9,434	-	10,380	19,510	8,844	1,088	20,598	11,436	10,664	82	11,518
Ministry of Health, Labour and Welfare (MHLW)	2,474	656	169	2,643	3,799	805	62	3,861	1,610	667	178	1,787	2,945	30	-	2,945
Ministry of Agriculture, Forestry and Fisheries (MAFF)	2,048	957	-	2,048	296	74	-	296	1,949	943	-	1,949	495	88	-	495
Ministry of Economy, Trade and Industry (METI)	1,787	1,133	5,102	6,889	25,847	21,416	219	26,066	1,713	1,090	4,932	6,645	14,495	10,101	1,811	16,306
Ministry of Land, Infrastructure, Transport and Tourism (MLIT)	3,598	283	82	3,681	357	180	2	359	3,904	281	110	4,013	322	83	-	322
Ministry of the Environment (MOE)	417	291	1,404	1,821	29	11	481	510	404	289	1,193	1,597	35	33	383	418
Ministry of Defense (MOD)	1,280	-	-	1,280	-	-	-	-	1,139	-	-	1,139	-	-	-	-
Total	35,693	13,639	8,094	43,787	42,493	33,189	764	43,256	33,418	13,638	7,776	41,194	33,345	23,421	2,277	35,622

Note: 1) Supplementary budget amounts are calculated in a manner not based on a unified standard as in the case of the initial budget, but instead based on the judgment of the responsible ministries.
2) Because of rounding, the cumulative amounts in some columns may not equal the totals.
3) From the science and technology-related portion of Japan's supplementary budget in FY2020, the "Green Innovation Fund Program" (2 trillion yen) and "10-trillion yen University Endowment Fund" are used for large-scale and long-term S&T projects. the S&T expenditure of these funds during the 6th phase period will be ascertained.

Source: Adopted by MEXT based on data from the Cabinet Office

2. Tax Incentives to Promote Private R&D Investment

The government of Japan has established an R&D Tax Credit System, as shown in Figure 2-1-10, to promote R&D investment by private companies.

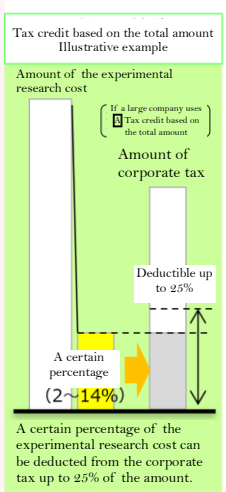
The R&D Tax Credit System was established following the global trend to transform Japan into "The world's most innovation-friendly country." The system allows companies engaged in R&D to deduct an amount equivalent to their experiment and research expenses multiplied by the tax credit rate from their corporate tax payments. This system aims to encourage medium- to long-term innovative R&D that leads to the creation of innovations by the maintenance and expansion of R&D investments by private companies, thereby strengthening growth potential and international

competitiveness of Japan.

■Table 2-1-10／R&D taxation system

□ Outline of the R&D tax system

If there is an amount of experimental research expenses to be included in deductive expenses for the purpose of calculation of the amount of income, the amount obtained by multiplying the amount of the experimental research expense by the tax exemption rate may be deducted from the corporation tax of the fiscal year.



Main part (Permanent measures)

[A: based on the total amount]
[Maximum amount of tax credit: 25%]
Proportional Tax Credits for total R&D costs

Tax credit rate:
- For large companies: 2 to 14% according to changes in R&D costs
  * Tax credit rate: the part exceeding 10% is provisional measure (for two years)
- For SMEs (Tax system to strengthen the technical base of SMEs)
  : 12-17% according to the changes in R&D costs
  * Tax credit rate exceeding 12% is provisional measure (for two years)

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[B: for open innovation]
[Maximum amount of tax credit: 10%]
Tax credit for the total costs of joint/commissioned research with a university, national research institution, private company, etc. (Special R&D costs)

Tax credit rate:
- with university, special research institution, etc.
  ⇒ **30%**
- with research and development venture
  ⇒ **25% (*)**
- with other partners (private business, etc.)
  ⇒ **20% (*)**

[Period of application: up to the end of fiscal year 2021 for time-limited measures (including time-limited adding)]

Tax credit based on the total amount:

(1) The upper limit of the tax credit for venture companies (within 10 years after establishment and with loss carried forward to the next period) is increased by 15% (permanent measure)

(2) When the ratio of test and research expenses to the average sales (average of sales of the business year and past 3 business years) exceeds 10%, the upper limit of tax credit is increased by up to 10% and tax credit rate is also increased up to 14% (up to 17% for SME) (time-limited measure)

(3) Regarding the tax system for strengthening SMEs' technology infrastructure, when the increase of test and research expenses exceeds 9.4%, an extra 10% is applied. However, either (2) or (3) should be selected (time-limited measure))

(4) If sales have decreased by 2% or more compared to pre-COVID times (fiscal years ending before February 1, 2020) but the R&D expenses have still increased, the deduction limit is increased by 5%. However, it will be a choice between (1) and (4). (Time-limited measure)

(*) Research commissioned to R&D ventures and large companies is applicable only to basic/applied research and R&D aimed at use of intellectual property and not applicable to mere outsourcing.

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