Part II

Measures Implemented to Promote Science and Technology

Part II describes the measures taken to promote science and technology in FY 2018 in accordance with the 5th Science and Technology Basic Plan (January 22, 2016 Cabinet Decision).

Chapter 1 Development of Science and Technology

Section 1 The Science and Technology Basic Plan

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

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

Towards formulating the next Basic Plan, which was to start in FY 2016, the Prime Minister solicited advice from the Council for Science, Technology and Innovation (CSTI) by issuing the Consultation Request #5, Regarding the Basic Plan. CSTI established the Expert Panel on Basic Policy and conducted studies and examinations for one year. In December 2015, CSTI responded to the Consultation #5. On January 22, 2016, a Cabinet Decision was made to implement the 5th Basic Plan.

The 5th Basic Plan presents recognition of the current situation of Japan and the world: This is a "period of great change" when the socioeconomic structure changes day by day due to the development of Information and Communication Technology (ICT) and other technologies. The importance of promoting science, technology and innovation (STI) has been growing due to increases in the number of domestic and international issues, and in the complexity of those issues. The basic plans of the previous 20 years have had achievements and issues. The achievements include steady improvements in the R&D environment, and notable award-winning R&D such as iPS cell technologies and blue LEDs. Issues include the weakening of "basic strengths" in science and technology and the stagnation of government investment in science and technology.

In this context the 5th Basic Plan envisions goals Japan should: 1) achieve sustainable growth and self-sustaining regional development; 2) ensure safety and security for the nation and citizens and a high quality, prosperous way of life; 3) address global challenges and contribute to global development; and 4) promote sustainable creation of intellectual assets. To realize these visions, with focus on the ability to forecast the future (foresight and strategical strength) and the ability to adequately adapt to any changes (diversification and flexibility), the Plan sets the following 4 policy pillars:

i) Acting to create new value for the development of future industry and social transformation

Society 5.0[1] is to be strongly promoted to make a large change and to lead the era of revolution through a series of undertakings that realize a "super smart society" in which new values and services are created one after another ahead of the world and through the strengthening of R&D that achieves independent innovation.

1 Society 5.0 refers to a new economic society following a hunter-gatherer society, agrarian society, industrial society and, information society. This will be a human-centered society characterized by the sophisticated integration of cyberspace with physical space ("the real world") and successful combination of economic development and solution of social problems to enable a comfortable, vigorous and high-quality life.

ii) Addressing economic and social challenges

To take appropriate pre-emptive action addressing the various issues that have emerged domestically and globally, the national government will select important policy issues and promote STI towards addressing national and global issues before they become problems.

iii) Reinforcing the "fundamentals" for science, technology, and innovation

Basic capabilities in STI will be dramatically strengthened to address possible future changes flexibly and adequately, through the fostering of young human resources, the promotion of their active role-taking, and the reform and strengthening of universities.

iv) Building a systemic virtuous cycle of human resource, knowledge, and funding for innovation

Making the most of domestic and international human resources, knowledge and funds, we will foster and take advantage of "new value." To this end, we will develop an innovation creation system by circulating human resources, knowledge and funds beyond any barriers by fostering strong, deep collaboration among private businesses, universities and public research institutions and by strengthening startups establishments.

The plan states that strategic international development combined with science and technology diplomacy is indispensable for Japan to promote the four pillars. It is also announced that Japan will constantly be working to improve the quality of its policies by determining key indicators and numerical targets to determine the progress and outcomes of the 5th Basic Plan through their achievement levels.

The 5th Basic Plan sets a target of at least 4% for public- and private-sector R&D investment as a share of GDP and a target of 1% for governmental R&D investment as a share of GDP. The latter is thought to be achievable with the Plan to Advance Economic and Fiscal Revitalization included in the Basic Policy on Economic and Fiscal Management and Reform 2015 approved by the Cabinet in June 2015. Assuming that the nominal GDP growth rate during the 5th Plan averages 3.3%, the investment in governmental R&D during that plan will total 26 trillion yen. The governmental R&D investment target has not been achieved since the 2nd Basic Plan, but the science and technology-related budget has increased every year. The budget in the 2019 government budget draft was over 4.2 trillion yen, the largest since the enactment of The Science and Technology Basic Law in 1995 as a result of the expansion of the existing R&D projects, including 8.6 billion yen increase of Grant-in-Aid for Scientific Research from the previous year.

Section 2 Council for Science, Technology and Innovation

CSTI in the Cabinet Office is positioned as a council that advances key policies toward vigorously promoting Japan's science and technology policies under the leadership of the Prime Minister. CSTI consists of the Prime Minister as the chairperson, related Cabinet members, expert members and others, all of whom have the mission of overseeing the nation's science and technology efforts and offering comprehensive and fundamental policy plans and general coordination (Table 2-1-1).

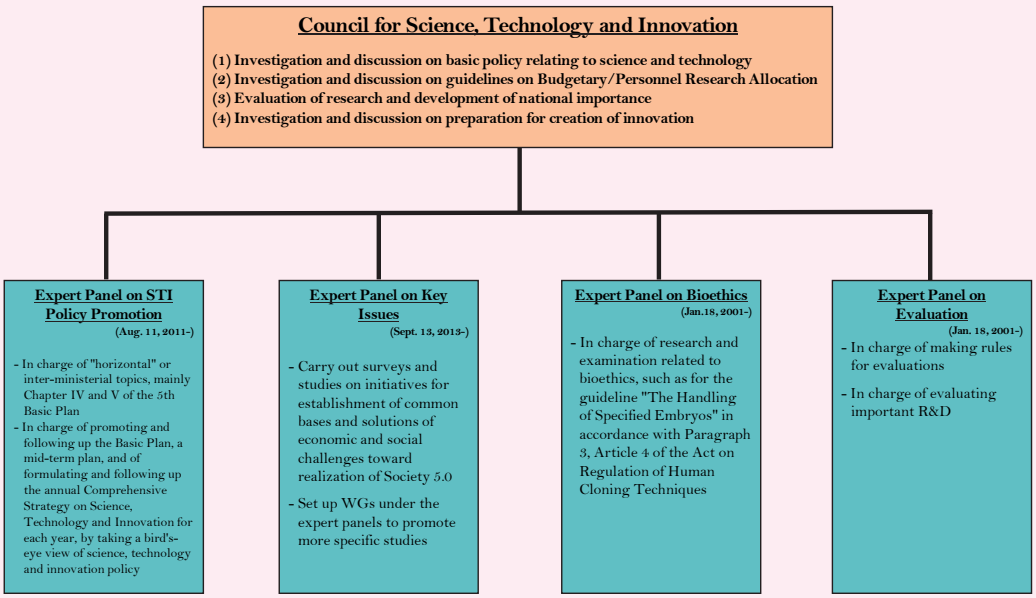
CSTI has established the expert panels that deliberate on technical aspects of key issues (Figure 2-1-2).

■Table 2-1-1/List of CSTI members

Cabinet members	ABE Shinzo	Prime Minister
	SUGA Yoshihide	Chief Cabinet Secretary
	HIRAI Takuya	Minister of State for Science and Technology Policy
	ISHIDA Masatoshi	Minister of Internal Affairs and Communications
	ASO Taro	Minister of Finance
	SHIBAYAMA Masahiko	Minister of Education, Culture, Sports, Science and Technology
	SEKO Hiroshige	Minister of Economy, Trade and Industry
Experts	UEYAMA Takahiro (full-time)	Former Professor and Vice-President, The National Graduate Institute for Policy Studies (GRIPS)
	KAJIWARA Yumiko (part-time)	Corporate Executive Officer, Fujitsu Limited
	KOTANI Motoko (part-time)	Director, Advanced Institute for Materials Research (AIMR); Prof., Graduate School of Science, Tohoku University
	KOBAYASHI Yoshimitsu (part-time)	Chairperson of the Director of the Board, Mitsubishi Chemical Holdings Corporation; Chairman of Keizai Doyukai
	SHINOHARA Hiromichi (part-time)	Chairman of the Board, NIPPON TELEGRAPH AND TELEPHONE CORPORATION; Vice Chair, KEIDANREN and the Chair of the Committee on Information and Telecommunication Policy, KEIDANREN
	HASHIMOTO Kazuhito (part-time)	President, National Institute for Materials Science (NIMS)
	MATSUO Seiichi (part-time)	President, Nagoya University
	YAMAGIWA Juichi (part-time)	President of the Science Council of Japan (The head of affiliated institutions)

Source: Cabinet Office

■Figure 2-1-2/Organizational chart of CSTI



Source: Cabinet Office

1 Major Endeavors of CSTI in FY2018

CSTI has been discussing policy, budgets and systems. Such discussions address the following: 1) the establishment of the Integrated Innovation Strategy (approved on June 14, 2018 by Cabinet Decision), and 2) the operation of the Cross-ministerial Strategic Innovation Promotion Program (SIP), Public/Private R&D Investment Strategic Expansion PrograM (PRISM) and the Impulsing Paradigm Change through Disruptive Technologies Program (ImPACT).

In FY2018, the Meeting to Promote Comprehensive Innovation Strategy was set up in the Cabinet based on the Integrated Innovation Strategy. The aim is to ensure substantial coordination across CSTI, which is a headquarter meeting deeply involved in innovation, Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Strategic Headquarters), the Intellectual Property Strategy Headquarters, the Headquarters for Healthcare Policy, the Strategic Headquarters for Space Policy, the Headquarters for Ocean Policy and the Meeting for the Advancement of Utilizing Geospatial Information, as well as promotion of the strategy.

The Integrated Innovation Strategy sets ambitious targets and visions, which include "study of the Moonshot-type Research and Development System" to gather knowledge of researchers worldwide. "The basic approach for the Moonshot-type Research and Development System" was decided at CSTI on December 20, 2018.

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.

(1) 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.

(2) Promotion of the Strategic Innovation Promotion Program (SIP)

Through interdisciplinary and inter-ministerial management where CSTI functions as the control tower, the SIP encompasses everything from basic research to the practical application and commercialization of research results under industry-academia-government collaborations. The 23 program directors (PDs) play central roles in relevant programs to powerfully promote science, technology and innovation that will be economic growth engine and dramatically change society. According to the CSTI policies, the Cabinet Office budget for Creating and Promoting Science, Technology and Innovation (FY2018: 55.5 billion yen) was intensively allocated to the implementation of the SIP. Health and medicine were promoted under the Headquarters for Healthcare Policy.

Under the SIP the following 11 programs have been selected to contribute to the solution of social problems, enhancement of industry competitiveness and economic reform. The programs entered their last year in FY2018 (Table 2-1-3).

■Table 2-1-3/Strategic Innovation Promotion Program (SIP)

Innovative Combustion Technology	Realize innovative combustion technology to improve Maximum Thermal Efficiency of internal combustion engines for passenger vehicles to 50% in lasting industry-academia cooperation.
Next-Generation Power Electronics	Significantly improve the performance of the current power electronics to contribute to energy conservation and expansion of the introduction of renewable energy and thereby create a big market.
Structural Materials for Innovation	Accelerate development of revolutionary light-weight materials having excellent heat/environment resistance and their application to airplanes and other real machines so that Japanese component/materials industries can maintain and strengthen their competitiveness.
Energy Carriers	Utilize the hydrogen derived from renewable energy, etc. to create a clean, economically efficient and highly secure society
Next-Generation Technology for Ocean Resources Exploration	Establish technologies for highly efficient survey of ocean resources including sea-floor hydrothermal deposits and cobalt-rich manganese crusts ahead of the world to create an ocean resource surveying industry.
Automated Driving System	Realize an advanced automated driving system, including its development to being the next-generation urban transportation. Reduce accidents and congestion while improving convenience.
Infrastructure Maintenance, Renovation and Management	Raise the level of maintenance at low cost through preventive maintenance. Create a continuing maintenance market while promoting overseas development.
Enhancement of Societal Resiliency against Natural Disasters	Construct a mechanism to share disaster information in public and private efforts in preparation against natural disasters in order to improve our prevention/prediction capabilities and strengthen our response capability.
Cyber-Security for Critical Infrastructures	Conduct R&D of behavior monitoring and analysis technology and defense technology including authenticity determination for control/communication equipment to strengthen the international competitiveness of critical infrastructure operators.
Technologies for Creating Next-Generation Agriculture, Forestry and Fisheries	Develop innovative production systems, new breeding, plant protection and new functions integrally with the agricultural reform to contribute to income increase for new farmers, agriculture and villages.
Innovative Design/Manufacturing Technologies	Establish a new manufacturing style to break through temporal and spatial restrictions, which will enable high value-added product design and production and thereby strengthen the competitiveness of industrial areas.

In the second period of SIP funded by the FY2017 supplementary budget, the productivity revolution that is the intention of the budget as well as the following 12 tasks are promoted, adhering to the current SIP concept in principle toward realization of Society 5.0 (Table 2-1-4) (see Chapter 7 Section 4.4).

■Table 2-1-4/Second period of Strategic Innovation Promotion Program (SIP)

Fundamental cyberspace technologies "Fundamental cyberspace technologies using big data and AI"	Establish and commercialize the world's most advanced human interaction technologies (sense/cognitive technology development, etc.) by merging language and non-language information in real space, data exchange platforms and AI coordination.
Fundamental digital data processing technologies in physical space	Develop and commercialize the world's most advanced fundamental technologies that enable high-performance sensing, highly efficient data processing and close coordination with the cyber side.
Cyber and physical security matching an IoT society	Develop what will be the world's cutting-edge "cyber and physical security measure base" that can be used for protection of the entire supply chain including SMEs, while at the same time strengthening cooperation with the US and European and other countries to ensure international standardization and social implementation.
Automatic driving (practical application of systems and services)	Establish the world's most advanced core technologies (e.g. technologies on collection and distribution of road traffic information including signal and probe information) that are cooperation areas of auto manufacturers, construct a basis for realization of Level 3 automatic driving on open roads and commercialize the technologies.
Materials revolution through an integrated materials development system	Toward substantial reduction of material development cost and time, realize and commercialize the world's most advanced inverse problem materials integration (prediction of optimum materials, processes and structures based on the desired performance) and thereby contribute to the development of super high-performance materials and establish a reliability evaluation technology.
Society 5.0 realization technology using photon/quantum	Develop and commercialize the world's most advanced processing technologies using light quantum technology (e.g. laser machining), optoelectronic information processing and communication (quantum cryptography).
Core technologies for Smart Bio-industry and Agriculture	Develop and commercialize innovative bio materials through advanced use of bio-functions such as genome editing using big data, high-function products, smart food system and smart agriculture.
Energy system for realization of a decarbonized society	Develop and commercialize the world's most advanced core technologies for realization of a decarbonized society (e.g. carbon cycle, energy creation/conservation, energy network, high-efficiency wireless transmission technologies).
Enhancement of national resilience (disaster prevention/mitigation)	Construct and commercialize an evacuation guidance system, disaster information sharing/support system for local governments and residents by using satellites, AI and big data.
Advanced diagnosis and treatment system at AI hospitals	Utilize data handled in the processes from production to distribution, sales and consumption in a streamlined manner, build and commercialize optimized production and distribution systems.
Smart material distribution service	Utilize data handled in the processes from production to distribution, sales and consumption in a streamlined manner, build and commercialize optimized production and distribution systems.
Innovative deep sea resource survey technology	Toward utilization of rich ocean mineral resources within the exclusive economic zone of Japan, lead the world in establishing, demonstrating and commercializing technologies to survey ocean resources deeper than 2000m below sea level.

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

PRISM was established in FY2018 in order to guide measures of individual ministries/agencies to areas where they are likely to induce private investments and the three areas[1] where efficiency improvement of the government spending is expected through utilization of R&D results. In FY2018 according to the

1 i) Cyber space platform technologies, ii) Physical space platform technologies, and iii) Construction and infrastructure maintenance technologies/Natural disaster prevention and reduction technologies

Integrated Innovation Strategy decided by the cabinet in June, budget was allocated with focus on initiatives to establish a coordination platform for agriculture, drug discovery, infrastructure and other data, and to develop advanced IT human resources through R&D.

(4) Promotion of the Impulsing Paradigm Change through Disruptive Technologies (ImPACT) Program

The ImPACT Program for high-risk, high-impact, innovative R&D is being promoted to create STI that will bring significant changes to industry and society if it is realized. 16 program managers (PM) who have been given major authority and responsibility for planning, promoting and managing R&D implemented R&D programs based on their respective R&D plans.

(5) Establishment of the Moonshot-type Research and Development System

As the ImPACT Program reached a milestone, the Moonshot-type Research and Development System was established for the whole government to make continuing and stable promotion efforts of aggressive R&D based on unconventional and bold thinking with the aim of creating disruptive innovations from Japan.

■Table 2-1-5/Key projects for promotion of science and technology policies (FY2018)

Ministry	Implemented by	Project
Cabinet Office	CSTI	Public/Private R&D Investment Strategic Expansion PrograM (PRISM)

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. 29 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).

(1) Interim Evaluation of Large-Scale R&D (approved and notified on November 22, 2018)

CSTI conducted an interim evaluation of the large-scale R&D project "Flagship 2020 Project development of the supercomputer to succeed the K computer" that started in FY2014, on the assumption that the project will enter a production stage in FY2019. The evaluation result was notified to the Minister of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), who holds jurisdiction over the project.

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.

(2) Checking the result of the stage gate evaluation of a large-scale R&D project (decided on August 28, 2018 and notified on September 25, 2018)

A large-scale R&D project "Innovative Structural Materials Research and Development" has been implemented in four stage gates since FY2013. In response to the 2nd stage gate evaluation conducted by the Ministry of Economy, Trade and Industry (METI) in FY2017, the validity of the evaluation was checked and the result was notified to the Director General of METI Industrial Technology Environmental Agency.

4 Major Deliberations at Expert Panels

(1) Expert Panel on Key Issues

The Panel carried out investigations, examinations, etc. of the initiatives to build common bases and solve economic and social problems toward realization of Society 5.0 included in the Fifth Basic Plan and the Comprehensive Strategy on Science, Technology, and Innovation.

(2) Expert Panel on Evaluation

The Expert Panel on Evaluation conducted one interim evaluation of large R&D development projects in FY 2018 and compiled the result. The Panel also conducted one stage gate evaluation and compiled the result. In addition, it compiled items for studies and examinations in order to improve R&D evaluation and decided to start studies and examinations of their outline in FY2019.

(3) Expert Panel on Bioethics

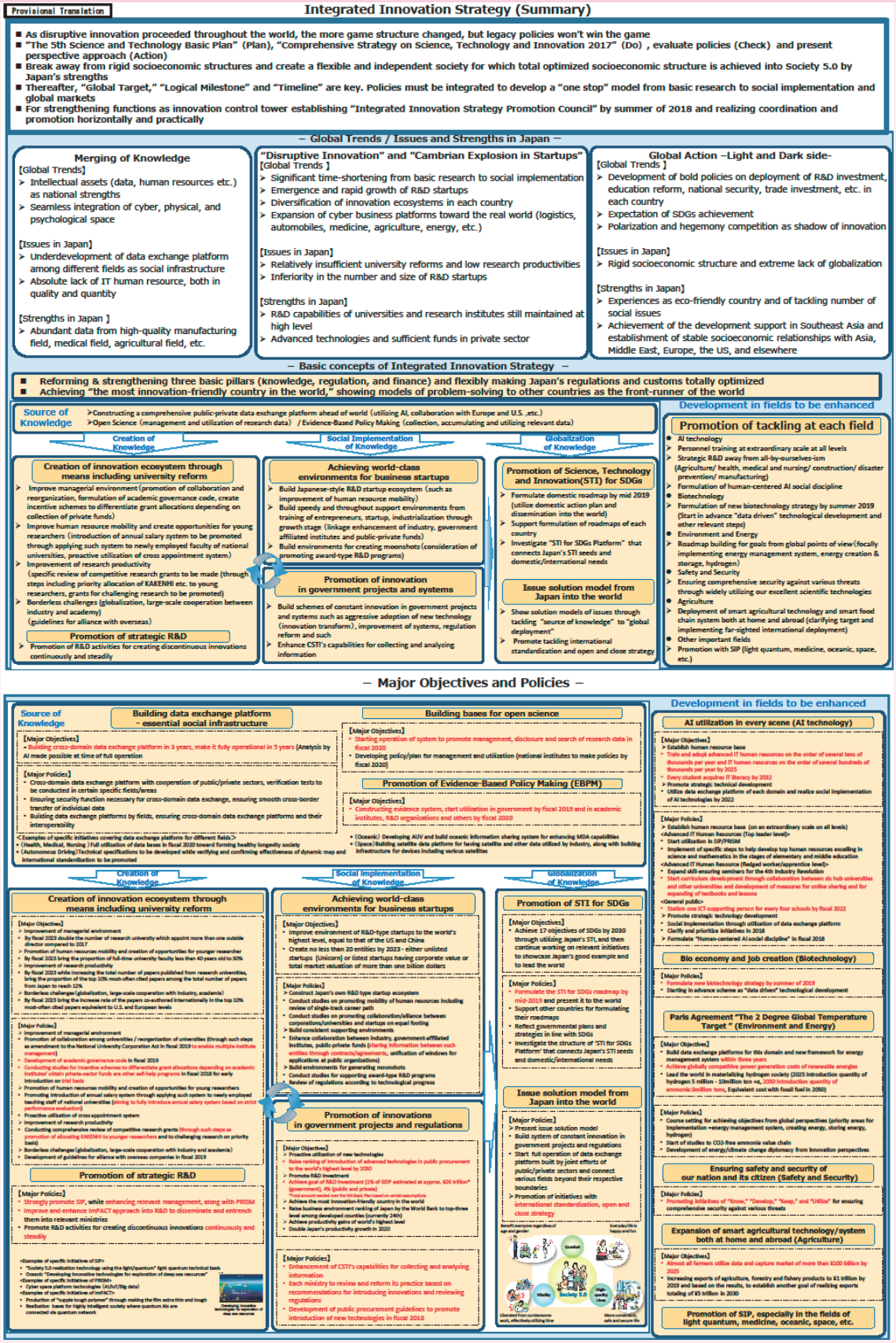
In order to deepen discussion on research that uses genome editing technology for human fertilized embryo, the Expert Panel on Bioethics set up a task force for review, etc. of "the Basic Idea on the Status of Human Embryo" and compiled a report on the review, etc. of "the Basic Idea on the Status of Human Embryo – 1: use of genome editing technologies for research on assisted reproductive technology". The Panel will continue to deepen discussions on such research.

Section 3 Integrated Innovation Strategy

CSTI formulated "Integrated Innovation Strategy" for cross-departmental and integrated promotion of related measures toward realization of Society 5.0 (Figure 2-1-6).

The strategy presents "global goals", "logical road map" and a fixed "timeline" to promote consistent initiatives from basic research to social implementation and globalization. Specifically, the strategy includes: construction of a data exchange platform that will form the foundation of Society 5.0;, university reform for generation of science and technology innovations; construction of a Japanese venture ecosystem that promotes young researchers who create science and technology innovations and puts generated seeds into practical use through venture activities; promotion of social implementation of "knowledge" by public and private sectors including government programs for social implementation of initiatives of a public nature, and; projects in individual key frontier fields such as AI and bio technology. The aim of the strategy is the fastest realization of Society 5.0 in order to become "the world's most innovation-friendly country" by addressing the challenges above.

Figure 2-1-6/Integrated Innovation Strategy 2018 (Summary)



Source: Cabinet Office

Colum 2-1 The first Science 20 in Japan

The Science Council of Japan held the first Science 20 in Japan on March 6, 2019, preceding the G20 Summit in Japan.

Science 20 is a meeting of academies of science of the G20 countries, the aim of which is to jointly provide scientific recommendations to the G20 Summit. Science 20 Japan 2019 that is the 3rd S20 following S20 Germany in 2017 and S20 Argentine in 2018 was held by the Science Council of Japan as the chair academy.

The theme of the S20 Japan 2019 is "Threats to Marine Ecosystems and Conservation of the Marine Environment –with Special Attention to Climate Change and Marine Plastic Waste". Following keynote speeches and panel discussions under the theme, the representatives of the national academies of science of the G20 countries gathered to discuss and adopt a joint statement. The joint statement identified urgent ocean environment problems that science should address, which include ocean warming caused by climate change, acidification and deoxygenation and accumulation of plastic waste in the ocean, and offered recommendations toward their solution.

Six points of the recommendations are: 1) use of expert, evidence-based advice on ocean resource development; 2) reduction of stressors on coastal and marine ecosystems such as pollution; 3) establishment of more recycling and energy efficient practices; 4) capacity building for research infrastructures; 5) establishment of an improved data storage and management system that ensures open access by scientists globally; and 6) sharing of information gained through research activities carried out under extensive and multinational collaboration. After adoption of the joint statement on March 6, President YAMAGIWA Junichi of the Science Council of Japan handed the statement to Prime Minister ABE Shinzo on the day, and to Minister of the Environment HARADA Yoshiaki on March 8.

Handing the joint statement to Prime Minister ABE Shinzo
Source: Secretariat of the Science Council of Japan at the Cabinet Office

Handing the joint statement to Minister of the Environment, HARADA Yoshiaki

Section 4 Administrative Structure and Budget for Science, Technology and Innovation Policies

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 advanced science and technology fields and the advancement of creative basic research. The Council for Science and Technology (CST), under the jurisdiction of MEXT, is engaged in investigations and deliberations regarding important matters related to the comprehensive promotion of S&T, following the advice of the minister of MEXT, and also offers its views to the minister.

Table 2-1-7 shows major decisions and reports from CST.

The Science Council of Japan (SCJ), an organization that represents Japan's scientific community and has 210 members and about 2,000 associate members, is under the supervision of the prime minister. SCJ's duties are to carry out deliberations of important matters regarding science and work for their realization, while coordinating scientific research to improve their efficiency (Figure 2-1-8).

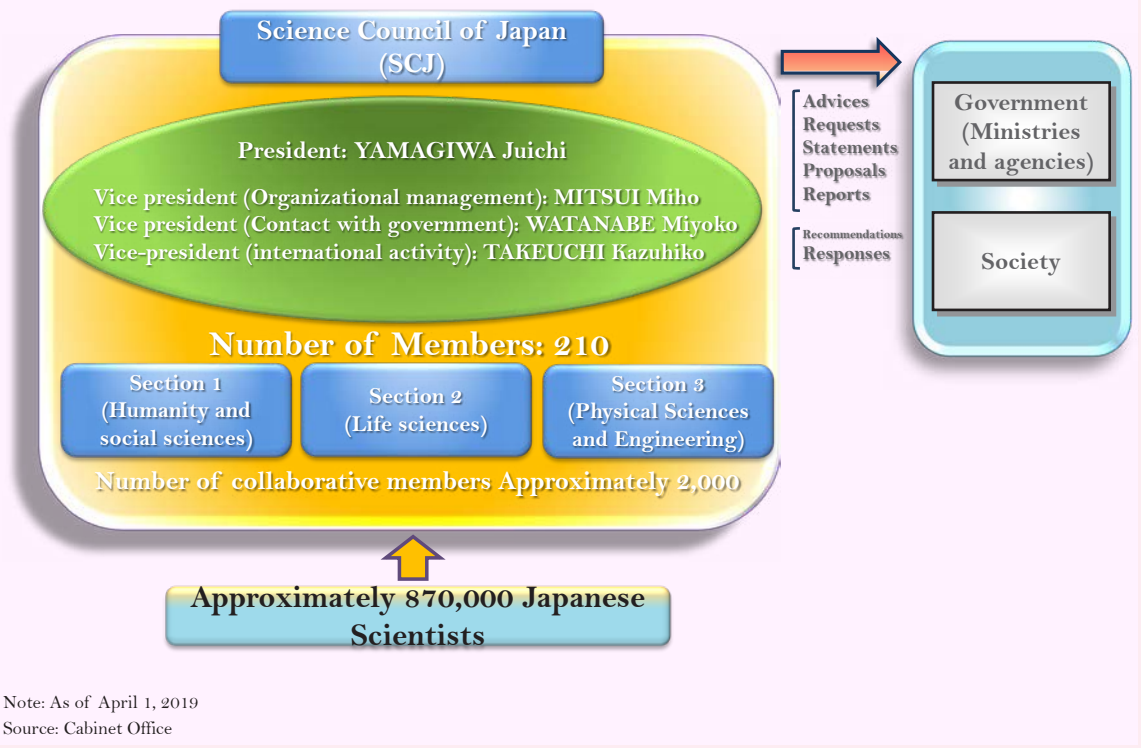
Based on the "Future prospects of the Science Council of Japan" (decided by the expert meeting to think about new prospects of the SCJ in March 2015) the SCJ is working on (1) enhancement of its proposals to the government and society; (2) strengthening and utilization of the networks in science community; (3) strengthening of coordination and communication with actors outside of the community; and (4) enhancement of its function as an academy in the world.

■Table 2-1-7/Major decisions and reports from Council for Science and Technology (FY2018)

Date of issue	Major Reports
	General Meeting
Jan. 30, 2019	Promotion of the 2nd Earthquake and Volcano Observation Research Plan to contribute to disaster mitigation (proposition)
	Subdivision on Resources Research
Dec. 18, 2018	Standard tables of food composition in Japan 2015 (Seventh Revised Edition) Supplementary edition 2018 Amino Acids, Standard Tables of Food Composition in Japan 2015 Supplementary edition 2018 Fatty Acids, Standard Tables of Food Composition in Japan (Seventh Revised Edition) Supplementary edition 2018 Available Carbohydrates, Polyols and Organic Acids, Standard Tables of Food Composition in Japan (Seventh Revised Edition) Supplementary edition 2018
	Subdivision on Science
Dec. 14, 2018	[Research Environmental Base Section] Model of inter-university research institutes during the period of the 4th medium-term objectives (summary of discussions)
	[Working group on modalities of human and social science promotion] Toward promotion of human and social sciences (summary of discussions)
	Subdivision on Ocean Development
Jan 22, 2019	Revision of R&D plan pertaining to ocean science and technology
	Professional engineer subdivision
Jan 8, 2019	Summary of issues regarding Professional Engineer system reform
	Subcommittee on Industrial Collaboration and Regional Support
Feb 13, 2019	[Regional STI Promotion Committee] New promotion measures for regional science, technology and innovation – science, technology and innovation as initiator critical for regional revitalization – final report
	Bioethics and Biosafety Commission
Apr. 6, 2018	Handling of research of animal-human chimeric embryos
Jul 20, 2018	Revision of "Guidelines for the handling of specified embryos"
Dec 4, 2018	Revision of the "Guidelines on the Establishment of Human Embryonic Stem Cells" and the "Guidelines on the Derivation and Distribution of Human Embryonic Stem Cells" Establishment of the "Ethical Guidelines for Research using Genetic Information Altering Technology, etc. on Human Fertilized Embryo"
	Committee on Human Resources
Jul 31, 2018	[Joint session of the CST Committee on Human Resources and the Central Council for Education' University Division Subdivision on Graduate Schools] Summary of issues regarding development and securing of researchers to strengthen Japan's research capacity

Source: MEXT

■Figure 2-1-8/Organizational structure of the Science Council of Japan (SCJ)



Note: As of April 1, 2019
Source: Cabinet Office

In terms of proposals to the government and society, the SCJ announced 7 proposals, 3 reports and 1 response in fiscal 2018 (there were no advices, requests, statements or recommendations) (Table 2-1-9). In addition, SCJ published the "Statement of the Executive Board of Science Council of Japan on Birth of 'Genome-edited Babies'" and the "Statement of the Executive Board of Science Council of Japan calling for Fairness in Entrance Examinations and Education in Medical Schools – From the Perspective of Gender Equality". SCJ set up various committees and conducts deliberations for future publication of recommendations, etc.

The SCJ is also working to strengthen and utilize networks in the scientists' community including cooperative academic societies (2,042 societies as of the end of fiscal 2018) 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 societies including the International Science Council (ISC) and promotes international academic exchange program. In FY2018 SCJ jointly hosted eight international conferences with verbal agreement of the Cabinet, submitted the G-Science Academies' Joint Statements compiled jointly with academies of the G7 member countries to the Prime Minister ABE Shinzo in May 2018 and held the 18th Science Council of Asia (SCA) meeting in the Japan in December. In March 2019 the SCJ held Science 20 (see Column 2-1).

■Table 2-1-9/Major proposals by the Science Council of Japan (SCJ) (FY2018)

Matters related to this white paper	Proposals	Date of issue	Gist
Addressing economic and social challenges	Problems with the introduction of summer time: an alarm from health science (proposal)	November 7, 2018	Pointed out problems with summer time: (1) summer time is destructive to biological rhythms and has a long-time impact on health, and (2) summer time does not contribute to protection against hot weather in society or at home.
Reinforcing the "fundamentals" for science, technology, and innovation	Approaches to supply of neutrons necessary for research and industries and research reactors (proposal)	August 16, 2018	Regarding research reactors in Japan, we have major concerns about extinction of irradiation reactors due to JMTR decommissioning and aging of beam reactors such as JRR-3 and KUR. To address this issue SCJ proposed (1) early construction of irradiation reactors; (2) improvement of the beam reactor JRR-3, and (3) sharing the cost of research reactors and human resource development.
	Response to the IAU Resolution that recommends renaming of the Hubble's Law (proposal)	December 26, 2018	The resolution "to recommend renaming the Hubble law as the Hubble–Lemaître law" proposed at the International Astronomical Union" was accepted by votes of members in October 2018. This proposal was made because it was found necessary to present guidelines to avoid confusion in society, especially in school education due to change of the recommended name "Hubble's law" that is broadly known also to the general public.
Reformation and function enhancement of universities	Universities that will become center of knowledge-intensive society – social change to be accomplished by 2025 (proposal)	November 28, 2018	Realization of a sustainable society is difficult without promptly addressing the aging problem that is also called 2025 problem. Roles that universities can play for this purpose include Formation of centers of "knowledge-intensive society." The SCJ reviewed universities in this regard and presented reform directions consisting of four points: (1) provision of new research funds to universities, (2) utilization of information resources of universities, (3) active participation of talents developed by universities, and (4) synthesis of research fields of universities.

Source: Cabinet Office

2 Science and Technology Budgets

The science and technology-related portion of Japan's initial budget for FY2018 is 3.8401 trillion yen, of which 3.0494 trillion yen is allocated for the general account budget and 790.8 billion yen is allocated for the special account budget. The funds for promoting science and technology, which represent the principal science and technology-related expenditures in the general account, are 1.3175 trillion yen. The science and technology-related portion of Japan's supplementary budget in FY2018 was 441.9 billion yen, of which 415.6 billion yen was allocated for the general account budget (including 234.5 billion yen in funds for promoting science and technology), and 26.2 billion yen was allocated for the special account budget (As of January 2019). The science and technology budget had been registered based on the judgment of the responsible ministries but the budgets since fiscal 2016 were recalculated based on a unified standard

using the content of administrative project review sheets. Changes in the science and technology budget (initial budget) are shown in Table 2-1-10, and science and technology budgets are broken down by ministry in Table 2-1-11.

■Table 2-1-10/Changes in science and technology budgets

(Unit: 100 million yen)

Item \ FY	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
Science and technology promotion expenditures (A)	13,007	13,372	12,857	12,930	13,045	13,175
As a % of the previous FY	99.0	102.8	96.2	-	100.9	101.0
Other research-related budget (B)	16,571	17,102	16,610	15,225	15,338	17,319
As a % of the previous FY	99.1	103.2	97.1	-	100.7	112.9
Science and technology budget included in the general account budget (C) = (A) + (B)	29,578	30,474	29,467	28,155	28,383	30,494
As a % of the previous FY	99.0	103.0	96.7	-	100.8	107.4
Science and technology budget included in the special account budget (D)	6,520	6,039	5,309	7,514	7,497	7,908
As a % of the previous FY	92.3	92.6	87.9	-	99.8	105.5
Science and technology budget (E) = (C) + (D)	36,098	36,513	34,776	35,669	35,880	38,401
As a % of the previous FY	97.8	101.1	95.2	-	100.6	107.0
General account budget of Japan (F)	926,115	958,823	963,420	967,218	974,547	977,128
As a % of the previous FY	102.5	103.5	100.5	100.4	100.8	100.3
General expenditure budget of Japan (G)	539,774	564,697	573,555	578,286	583,591	588,958
As a % of the previous FY	104.2	104.6	101.6	100.8	100.9	100.9

Note: 1) Initial budget amounts are shown.
2) Because figures of FY2016 and after are results of the recalculation based on a unified standard, simple comparison with data in or before 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 2-1-11/Science and technology budgets of each ministry/office/agency

(Unit: 100 million yen)

Item / Ministry/Office/Agency	FY2017 (Initial budget)				FY2017 (Supplementary budget)				FY2018 (Initial budget)				FY2018 (Supplementary 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	11	11	-	11	-	-	-	-	11	11	-	11	-	-	-	-
Cabinet Secretariat	624	-	-	624	135	-	-	135	625	-	-	625	167	-	-	167
Reconstruction Agency	-	-	289	289	-	-	-	-	-	-	359	359	-	-	-	-
Cabinet Office	868	689	-	868	715	625	-	715	1,034	781	-	1,034	447	295	-	447
National Police Agency (NPA)	23	23	-	23	-	-	-	-	22	21	-	22	-	-	-	-
Consumer Affairs Agency	33	-	-	33	-	-	-	-	33	-	-	33	9	-	-	9
MIC	918	451	-	918	93	61	-	93	991	482	-	991	51	8	-	51
Ministry of Justice (MOJ)	12	-	-	12	-	-	-	-	12	-	-	12	0	-	-	0
Ministry of Foreign Affairs (MOFA)	153	-	-	153	4	-	-	4	148	-	-	148	8	-	-	8
Ministry of Finance (MOF)	13	9	-	13	5	5	-	5	13	10	-	13	-	-	-	-
Ministry of Education, Culture, Sports and Science (MEXT)	19,463	8,674	1,095	20,558	590	444	-	590	19,814	8,694	1,088	20,902	1,796	1,547	-	1,796
Ministry of Health, Labour and Welfare (MHLW)	1,386	673	137	1,523	35	27	-	35	1,559	637	138	1,698	71	6	-	71
Ministry of Agriculture, Forestry and Fisheries (MAFF)	1,245	984	-	1,245	129	70	-	129	1,658	949	-	1,658	174	65	-	174
Ministry of Economy, Trade and Industry (METI)	1,320	1,010	4,943	6,263	1,862	253	121	1,983	1,407	1,054	5,151	6,558	1,274	369	50	1,324
Ministry of Land, Infrastructure, Transport and Tourism (MLIT)	729	265	36	765	28	20	-	28	1,749	270	76	1,825	158	55	-	158
Ministry of the Environment (MOE)	364	255	997	1,361	10	9	8	17	374	266	1,096	1,470	-	-	212	212
Ministry of Defense (MOD)	1,222	-	-	1,222	-	-	-	-	1,042	-	-	1,042	-	-	-	-
Total	28,383	13,045	7,497	35,880	3,606	1,513	129	3,735	30,494	13,175	7,908	38,401	4,156	2,345	262	4,419

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.

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