

Chapter 5 Development and Promotion of Policy in Collaboration with Society

Section 1 Deepening Relations between Society and Science, Technology and Innovation

While recent progress in Science and Technology (S&T) has raised the public expectations, the Great East Japan Earthquake (GEJE) and the accident at the Tokyo Electric Fukushima Daiichi Nuclear Power Station have revealed insufficient risk management and increased anxiety and distrust of the general public with regard to S&T. On planning and conducting science, technology and innovation (STI) policies, it is important that the government, in collaboration with researchers, engineers, and research institutions, gain the understanding, trust and support of citizens. The government should carefully consider the expectations and anxieties of society and explain the possibilities, risks and costs of S&T to the general public. Thus, the government is making efforts to promote S&T communication activities, including risk communication and public participation in the policy process in order to strengthen the relationship between society and STI.

When promoting measures based on the 4th Basic Plan of the Council for the Science and Technology (CST) Basic Plan Promotion Committee, Ministry of Education, Culture, Sports, Science and Technology (MEXT) reviewed issues to be considered from the viewpoint of “deepening the relationship between society and STI” and summarized the “Discussions Summary on Promotion of STI Policies that Respond to Social Demands” in November, 2012.

1 Promotion of Science, Technology and Innovation Policies from the Public Viewpoint

(1) Further involvement of the public in policy planning and promotion

When planning and promoting economically and socially valuable STI policies, the government must thoroughly understand the issues and the social needs that are to be addressed, and to appropriately reflect them in policy. It is also important for the government to disseminate these policies to all levels of the general public and to make efforts to strengthen accountability. Accordingly, the government promotes the implementation of public comment procedures and wide involvement of the public in policy planning and promotion.

In drafting the S&T budget for FY2014, Action Plans for S&T Priority Measures are being formulated with input from experts from the business world and other sections of society to ensure that the expertise of the parties concerned is incorporated in the Action Plans.

(2) Response to ethical, legal and social issues

As S&T progresses, becoming more complex and diversified, the relationship between S&T and the general public has deepened ethically, legally and social—ly. Due to misconduct, such as fabrication, falsification, or plagiarism (FFP) of data in research activities and other aspects of advanced science, technology and bioethics, the government promotes the following measures:

1) Raising the ethical standard of researchers and engineers

Based on the “Guidelines for Countermeasures against Misconduct in Research Activities by the Competitive Research Fund (September 2005 Agreement in the Liaison Committee of Ministries and Agencies Concerned with Competitive Funding)”, which stipulates measures are to be taken when misconduct such as fabrication or plagiarism in research is revealed, MEXT, Ministry of Economy, Trade and Industry (METI), and other concerned ministries have requested that all organizations concerned take appropriate measures, and these agencies have also simultaneously established a reception desk to process all accusations of misconduct. In view of the cases of scientific misconduct, the guidelines are being revised at an appropriate time.

Recurrent research misconduct has become a significant social issue recently. In December 2013, the Science Council of Japan (SCJ) published the *Measures for Preventing Research Misconduct and Ex-post Measures: For Enhanced Scientific Integrity*. MEXT has been reviewing their own Guidelines on Measures to Prevent Research Misconduct (determined by Special Committee on Research Misconduct under the Council for Science and Technology, August 2006), and has also been supporting the development of education programs on research ethics (Part I, Chapter 1, Section 3, 2).

2) Efforts in relation to bioethics and safety in the life sciences

To adequately deal with problems related to bioethics that could potentially occur as a result of the rapid growth that has occurred in the life sciences recent years, the CSTP is implementing surveys and studies on important issues, MEXT and Ministry of Health, Labour and Welfare (MHLW) will also review any necessary acts, regulations, and guidelines (Part I, Chapter 2, Section 3, 2).

(3) Fostering and securing human resources connecting society with science, technology and innovation policies

Human resources who act as liaisons between society and STI play an important role in the government’s efforts to implement effective STI policies. The government promotes fostering and securing human resources who play these roles and promotes increasing the number of opportunities for their activities.

1) Science and technology communicators

To promote S&T to the general public, it is necessary to foster and secure “S&T communicators” to bridge the gap between the general public, policy makers and researchers, as well as to encourage communication between them.

The National Museum of Emerging Science and Innovation, run by the Japan Science and Technology Agency (JST), is working to foster and produce S&T communicators, who work both inside and outside the museum through S&T communication activities, such as conducting dialogues with visitors, as well as planning and producing exhibitions and events (Part II, Chapter 5, Section 1, 2).

The National Museum of Nature and Science is also training S&T communicators (Part II, Chapter 5, Section 1, 2).

2) Research management human resources (research administrators)

Universities and research institutions in Japan have insufficient human resources who capable of conducting research management, who can also understand the contents of R&D at their specified level. This imposes an excessive burden on researchers because of the additional works they must do in addition to their research activities. To improve this situation, MEXT supports fostering and securing personnel who can conduct research management (University Research Administrator) at universities, with the aim of establishing an environment that both activates and enhances research activities as well as R&D management at universities.

(4) Undertakings to address detailed social issues

The Research Institute of Science and Technology for Society (RISTEX) of JST promotes R&D into social technology using a problem solving style in order to apply solutions to on-site problems. This is done in cooperation with researchers at universities and public research institutions along with stakeholders who have various backgrounds and who are familiar with the situations and issues at each working site, such as local residents, NPOs and the local government. The R&D of social technology in three areas and two programs have been specified. The three areas are as follows: 1) creation of safe and secure cities and local communities linked by community; 2) design of a new-aged society created with community, and 3) anti global-warming and environmental-friendly society rooted in community. The two programs are the Problem-Solving-Based Service Science Research and Development Program and the Science Research and Development Program for Science and Technology Innovation Policies. Efforts for utilizing and implementing the results of R&D conducted by using public R&D funds are supported by the Implementation-support Program of RISTEX.

Column 2-4

Development of a disaster victim directory system that supports prompt relief of disaster victims

One of the projects conducted under the Implementation-support Programs of RISTEX is Implementation of a Relief Support System Utilizing Disaster Victim Directories Which are Useful in Case a Major Earthquake Occurs Directly Beneath the Tokyo Metropolitan Area (conducted by Keiko Tamura, professor at Niigata University, and Haruo Hayashi, professor at Kyoto University.) The RISTEX Implementation-support Program supports projects that translate the results of R&D conducted for solving social issues into practical applications to benefit the public.

IDs or other certifications are necessary for victims of earthquakes and other disasters to receive benefits, to move to temporary housing, and to get other support from local governments. However, it sometimes takes more than a month before necessary certificates are issued. Prof. Tamura worked with Prof. Hayashi and others in developing a support system for local governments to facilitate prompt issuance of certificates. The system was utilized in the City of Kashiwazaki, Niigata Prefecture, when the Niigataken Chuetsu-oki Earthquake occurred in 2007.

In Prof. Tamura's project, based on the assumption that up to 25 million people will be affected by a large earthquake occurring directly beneath the Tokyo Metropolitan Area, the system was advanced and used for demonstration tests in Toshima Ward and Chofu City in Tokyo. In the comprehensive disaster drill conducted by the Tokyo Metropolitan Government in 2012, the Disaster Prevention Division of Bureau of General Affairs, Bureau of Taxation, Bureau of Urban Development, and Tokyo Fire Department cooperated to implement the system. Citizens played the role of disaster victims, and employees of 12 wards and 9 cities used the system to follow a series of procedures from assessment/certification of damage to buildings, issuance of victim's certificates, and consultation regarding support to relief.

After the GEJE, the system was used in Iwate Prefecture. The system was also utilized in the City of Uji, Kyoto Prefecture, in FY2012 when the city was hit hard by a typhoon and heavy rain. It was also used in the Cities of Kyoto and Fukuchiyama, Kyoto Prefecture, and the Town of Oshima, Tokyo, in FY2013, in supporting relief of disaster victims. The system helped ensure prompt issuance of victim's certificates and prevent failure and delay in the payment of benefits to victims, thus contributed to early relief of victims.



Certificates were issued in the comprehensive disaster drill conducted by the Tokyo Metropolitan Government on September 1, 2012.

Courtesy of RISTEX of JST

2 Promotion of Science, Technology and Innovation Communication Activities

In order to create a society in which the general public is familiar with and has a strong interest in S&T, it is necessary for the government to provide various opportunities for the general public to touch, experience, and learn S&T by promoting interactive communication between researchers, engineers and the citizens.

(i) Science and technology week

MEXT, in cooperation with other relevant organizations, including experimental research institutions and local authorities, held the 54th “Science and Technology Week” from April 15 to 21, 2013. Various events, including opening research facilities to the general public, performing experiments in classrooms and on lectures, took place at organizations across the country. At the same time, a “Science Café,” where researchers and citizens could talk casually over a cup of coffee was held at the “Joho-Hiroba (Information Plaza) of MEXT.”

(ii) Enhancement of activities conducted by science museums

JST supports experimental classes, events and the establishment of networks by science museums, universities, local authorities and volunteer groups, to promote S&T communication activities nationwide. The National Museum of Emerging Science and Innovation, in addition to exhibitions and their explanations and organizing events, promotes an interactive exchange between researchers and the general public through lectures and the creation of exhibitions to introduce advanced S&T in an easy-to-understand manner. It also encourages collaboration among science museums and schools across the country as the basis of Japan's S&T communication activities.

The National Museum of Nature and Science holds exhibitions that provide opportunities to share the joys of nature and science across generations, allowing them to think together. It also provides age-appropriate learning supports by utilizing intellectual, material and human resources, including research results and sample materials accumulated by the national center of natural history and S&T history. The Museum fosters human resources who connect people with S&T, through programs such as

the “Science Communicators Practical Training Program.” The Museum also encourages scientific experimental study programs developed for schools across the country through events such as the “Museum Open House for Teachers” and through programs to improve the science literacy of everyone.

(iii) Efforts by research agencies

The Japan Aerospace Exploration Agency (JAXA) provides various educational activities such as “Cosmic Collage” with the aim of getting the young people who will lead the next generation more interested in S&T as a whole and space science. In particular,

RIKEN offers various programs to citizens, and also conducts outreach activities. For example, RIKEN produces animated films to explain the latest research results and scientific phenomena aimed at high school students. These films are available free online.

MAFF provides producers and consumers with information and opportunities to exchange opinions on the R&D of advanced technology in the fields of agriculture, forestry and fisheries. These R&D-type independent administrative institutions open their facilities to the public and provide lectures throughout the year, helping to raise awareness by facilitating interactive communication with the public about their research activities and by exhibiting research results.

The National Institute of Advanced Industrial Science and Technology (AIST) operates the Science Square Tsukuba/Waterfront and the Geological Museum as permanent exhibition facilities. In 2013, its research facilities were opened to the public in nine locations nationwide. More than 15,000 people visited the research facilities. In addition, with the aim of establishing interactive communication with the public, AIST actively promotes S&T communication programs focusing on dialogue. This is done through events such as Science Cafés, experimental classrooms, lectures and the “AIST Open Laboratory.”

Universities and public research institutions make efforts to widely disseminate information on research results to the general public.

Science Agora, a big event on scientific topics that was held jointly by the Cabinet Office and JST in November 2013, had programs for young people. Specifically, the details of Comprehensive Strategy on Science, Technology and Innovation (hereinafter: Comprehensive STI Strategy) were explained, female/young researchers gave lectures, and a panel discussion was held.

The Council for Science and Technology Policy (CSTP) summarized a policy for the “Promotion of the 'Dialog on Science and Technology with Citizens' (A Basic Course of Action)” in June 2010. With this policy, CSTP encourages researchers who receive public research funds to allocate 30 million yen or more per year, per research project, to actively engage in dialogue with the public regarding the contents and the results of their research activities.

(Efforts of the Science Council of Japan and academic societies)

Science Council of Japan has been holding scientific forums as part of its efforts to share scientific research results with citizens. In FY2013, 13 forums were held on various topics that included “An approach to fostering next-generation leaders in S&T: Linking education, science and technology to creation of value”, “Mitigation of damage due to tectonic movement; science and education”, and “Toward reconstruction and revitalization of fishing industries, the associated communities in the coastal areas, and natural environment after the GEJE.” Furthermore, a Science Café was also held six times in 2013

co-housed with MEXT.

The academic societies is voluntary associations organized mainly by researchers in universities and other research institutions. They play an important role for research evaluation, information exchange, and communication beyond that of individual research organizations and contribute to the development of academic research through academic research meetings, seminars and symposiums that disseminate the latest results from quality research and academic journals. Through programs such as the “Grant in Aid of Publication of Scientific Research Results,” MEXT subsidizes international conferences held by academic societies that invite researchers from overseas, and holds symposiums to raise awareness of the latest research results, to disseminate those results to children, young people and adults, and to improve international information dissemination.

(Promotion of risk communication)

The S&T Committee for a Safe and Secure Society, Council for Science and Technology (MEXT) started deliberation on the methods for promoting risk communication in March 2013, and published a report on the deliberation results on March 27, 2014.

JST investigated preceding cases of risk communication in order to identify common factors across various sectors and disciplines. At Science Agora 2013, a large-scale event held in November 9 and 10, 2013 for multilateral discussion on the measures for utilizing S&T for a better world, a workshop was held to exchange views about risks.

The Consumer Affairs Agency (CAA), the Food Safety Commission, MHLW, and Ministry of Agriculture, Forestry and Fisheries (MAFF) collaboratively conduct risk communication activities for food safety. As a result of the first case of Bovine sponge form encephalopathy (BSE) found in 2001, the 2003 Basic Food Safety Act (Act No. 48 of 2003) was enacted, making the government responsible for the communication of food safety to the nation. Meetings are held to exchange opinions on a variety of topics, including the prevention of food poisoning, the safety of imported food products, functional foods, food additives and pesticide residues. In particular, since 2011, and in response to the accident at the Tokyo Electric Power Company (TEPCO) Fukushima Daiichi Nuclear Power Station (NPS), active risk communication undertakings have been conducted by opinion exchange meetings with consumer regarding countermeasures against radioactive substances.

Section 2 Promotion of Effective Science, Technology and Innovation policies

The 4th Basic Plan positions STI policies as a part of its “policies for society and the general public,” and promotes the planning of policies based on objective evidence, establishment of the plan-do-check-act cycle (PDCA) cycle, and innovation of the R&D system

1 Strengthening of Planning and Promotion of Policies

(Undertakings for “Reinforcing headquarter functions of CSTP”)

After the start of the Abe administration in December 2012, Prime Minister Abe stated in his policy speech on February 28, 2013: “The government will create “the Most Innovation-friendly Country in the World”. The CSTP will take control of necessary efforts.” On the basis of the direction offered by the

Prime Minister, in the Japan Revitalization Strategy and the Comprehensive STI Strategy (approved by the Cabinet in June 2013), it was determined that specific measures would be taken to drastically strengthen the function of the CSTP as the headquarters for this venture.

To favor this, the government set up the STI Budget Strategy Committee, SIP, and ImPACT (Chapter I, Section 2, 2 (2), (4) & (6)). A draft bill of the Act for Partial Revision to the Cabinet Office Establishment Act was submitted to the 186th ordinary Diet session. The draft bill included the addition of affairs under the jurisdiction of CSTP and the Cabinet Office for enhancing the regulatory capability of the CSTP. The draft bill was enacted on April 23, 2014, and came into effect on May 19 of the same year (Part II, Chapter 1, Section 2).

(Strategic funds for the promotion of S&T)

Strategic funds for the promotion of S&T are used to implement policies by the CSTP based on a comprehensive review of measures taken by ministries and agencies. MEXT performs administrative work in accordance with the policies made by the CSTP. Two surveys were conducted in FY2013 for policy formulation: 1) the Survey Regarding the Follow-up of the 4th Basic Plan and the Comprehensive STI Strategy, and 2) the Survey Regarding the Follow-up of the Super Special Consortia for Supporting the Development of cutting-edge medical care.

(Integrated promotion of social system reforms and R&D)

Ongoing projects that have been implemented using the Strategic Funds for the Promotion of Science and Technology until FY2012 are included in MEXT's programs for integrated promotion of social system reforms and R&D in FY2013. A total of nine programs have been implemented in FY2013.

(Science for RE-designing Science, Technology and Innovation Policy: (SciREX) program)

MEXT, in cooperation with the National Institute of Science and Technology Policy (NISTEP), the RISTEX of JST, and the Center for Research and Development Strategy (CRDS) has implemented the "SciREX" program. This is aimed at facilitating "objective, evidence-based policy making," in which effective policies are made in response to issues, drawing on a multifaceted grasp and analysis of economic, social and other factors (Figure 2-5-1). MEXT promotes the program by convening the SciREX Steering Committee, which oversees all programs, gives advice on basic procedures for carrying out the programs and gives advice on other issues that affect each program.

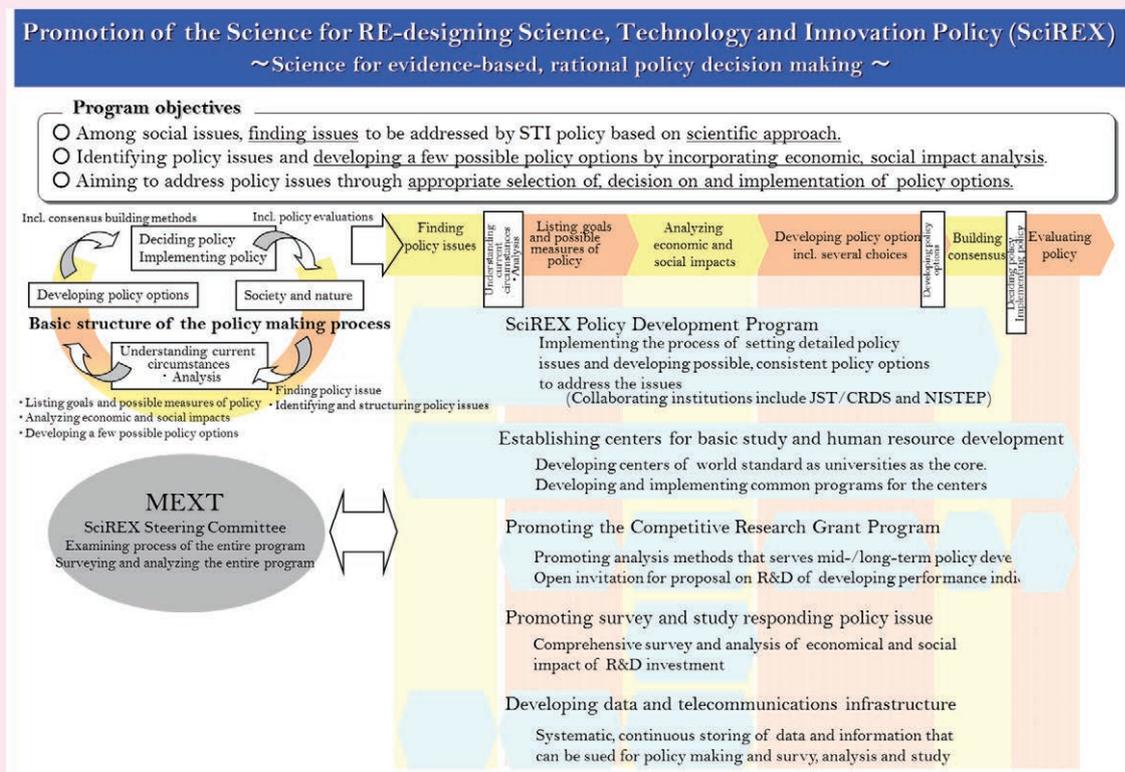
MEXT supports hub institutions (universities) fostering research personnel who can advance the "SciREX" and human resources who can facilitate its social implementation. MEXT has also established a network structure that joins hub institutions in order to enable nationwide, systematic human resource development. In FY2013, the National Graduate Institute for Policy Studies, the University of Tokyo, Hitotsubashi University, Osaka University (Kyoto University), and Kyushu University started to accepting students.

NISTEP conducts investigations and analysis based on government needs, such as the investigation and research of economic and societal ripple effects caused by government R&D investments. In addition, it has been constructing data and informational infrastructure to systematically and continuously manage and accumulate the data used for policy making, investigation, analysis, and research concerning STI.

RISTEX of JST aims to contribute to mid-term the long-term policy-making. It considers various viewpoints in order to understand and analyzes social issues, and to assess the present situation and possibilities of S&T required to deal with those issues. Based on this, RISTEX supports activities to research and to develop measures and indices, as well as activities to develop policies through rational processes and through public projects. In FY2013, RISTEX adopted five R&D projects and two project-planning investigations from 43 submitted entries. This is promoted the R&D of them in addition to 11 other R&D projects that were adopted in FY2011 and FY2012.

Using “Realization of a healthy longevity society based on the prediction and prevention” as an example of policy challenges, policy options were formulated on a trial basis regarding prediction and prevention of diabetes. Trials were also implemented for identifying policy challenges and advancing policymaking processes.

Figure 2-5-1 / Promotion of Science for RE-Designing Science, Technology and Innovation Policy



Source: MEXT

2 Enhancement of Assessment and Allocation Functions in the Research-fund Systems

(1) System reform for the effective and efficient assessment and allocation of research funds

Based on the Basic Policy¹, which states “the competitive fund systems that have a similar purpose or subject of R&D will be consolidated within or across government ministries and agencies,” MEXT promotes efficient R&D by consolidating all systems into five systems, including the Grants-in-Aid for Scientific Research Program (KAKENHI).

¹ The report on Consultation No. 11 “Japan’s Science and Technology Basic Policy Report” requested to CSTP (December 24, 2010).

In order for research funds to be utilized effectively and efficiently, as based on the “2011 Action Plans” (July 2010), efforts to unify, streamline, and rationalize rules for the use of competitive funds are being made in all relevant ministries, agencies and fund-distribution organizations. In FY2013, MEXT made it possible for researchers to combine multiple competitive research funds the purchase of equipment and supplies necessary for research. Additionally, in FY2014, rules were formulated to increase the flexibility for researchers in appropriating research funds to various expense items on the condition that approval of the organization allocating the research funds is not required regarding the items.

(2) Improvement and enhancement of the competitive fund system

The competitive fund system is a core research fund system for the establishment of a competitive research environment and for the consistent development and ongoing commitment to researchers in various and creative R&D activities. Until now, efforts have been made to secure budgets and to improve and enhance the system (Budget in FY2013: 408.5 billion yen. (Table 2-5-2)).

For indirect costs in the competitive fund system, in an attempt to promote competitiveness among research institutions, a fixed percentage of the research grant is allocated to institutions that employ researchers who have won competitive funding. The government has been striving toward securing 30% of the direct costs in FY2013.

Regarding R&D management work, including issuing invitations to the public and the application of competitive funds, the “cross-ministerial R&D management system” (hereinafter: e-Rad) is used to expedite the process for researchers and to avoid illogical overlaps and to avoid excessive concentration of fund allocations. The current system allows users to display information entered into a public database with e-Rad, and to modify it to create a summary document of each researcher’s career and achievements, which improves the efficiency of users’ applications and the management of their work in regard to requesting research funds.

In order to ensure the fair, transparent, and high-quality examination and evaluation of research proposals, the government ensures diversity in the age, gender and affiliation of examiners. It also aims to eliminate stakeholders, to develop an examiner-evaluation system, to specify methods and criteria for examination and adoption, and to disclose examination results.

For example, the examination of KAKENHI applications is conducted via a process of peer review by more than 6,000 examiners. JSPS selects examiners, being aware to avoid overly relying on certain research organizations and by considering the aggressive promotion of both young researchers and female researchers. This is done by using the database of examiner candidates, which contained 75,000 registered names as of FY2013. The disclosure of examination results and associated information has been improved over years. In addition to numerical information, such as a rough ranking of all unsuccessful research subjects and the average score of each evaluation element, there are detailed items in each evaluation element that examiners have judged as being inadequate that are disclosed through the Electronic Application System for Grants-in-Aid for Scientific Research in order to give the applicants a more detailed evaluation of the results. In the “Analytical Report for 2010 Expert Survey on Japanese S&T Systems and S&T Activities by Field” (May 2013, National Institute of Science and Technology Policy), the examination of KAKENHI has been evaluated as being “fair and highly transparent for applicants.”

Concerning measures to prevent the inappropriate use of competitive funds and other public research

funds, the CSTP provided common “measures to prevent the inappropriate use of research funds” (August 31, 2006). MEXT created implementation standards as listed in its, “Guidelines for Management and Audit of Public Research Funds at Research Institutions (implementation standards)” (February 15, 2007) (hereinafter: “Guidelines”), which called for research institutions to establish necessary systems to implement appropriate management and to audit public research funds. Also, MEXT has been holding seminars to promote understanding of the Guidelines.

For the purpose of enhancing research institutions’ independent systems for managing and auditing research funds, MEXT conducts surveys on the compliance of research institutions to the specified guidelines and also continues follow-up surveys. MEXT provides guidance to the research institutions that keep failing to comply with the guidelines, etc.

The abuse of research funds has become a significant social issue, so MEXT has been working on prevention. Guidelines were revised in February 2014. Based on the interim report published in September 2013 on the Task Force for Preventing Scientific Misconduct and Abuse of Research Funds, the revised guidelines clarified the responsibilities of research institutions regarding the management of research funds, and incorporated measures for preventing misconduct.

Table 2-5-2 / List of Competitive Funds

Ministry /Agency	Sponsor	Program	Responsibilities of Each Program	FY 2012 Budget (Unit: million yen)	FY 2013 Budget (Unit: million yen)
CAO	Food Safety Commission	Research Program for Risk Assessment Study on Food Safety	To implement relevant studies and research for setting forth guidelines and standards on risk assessments through a "research-area setting type (provisional)." To manage a competitive funds system in which proposals are publicly invited after research areas are set. To promote science-based risk assessments for food safety.	210	189
CAO Subtotal				211	189
MIC	MIC	Strategic Information and Communications R&D Promotion Programme (SCOPE)	To publicly invite proposals for unique and novel research subjects in the field of information and communications technologies from various fields, and to offer contract research to institutions after competitive selection by an external evaluation committee so that the aforementioned parties can implement the research of advanced technology independently.	2,340	2,351 (*1)
	MIC	Strategic International Collaborative R&D Promotion Program	To promote international collaborative R&D as conducted by Japanese research institutions and overseas research institutions. The purposes were for accelerating international standardization, for accelerating the practical use of achievements in R&D, for contributing to the further creation of innovation, for the strengthening of the international competitiveness of Japan, and for improving the safety and reliability of people's daily lives, as well as that of the society and of the economy.	100	379
	MIC	R&D of Technologies for Resolving Digital Divide	To enhance communications and broadcasting services for the elderly and for the disabled by offering policy support for the R&D of appropriate technologies.	77	65
	MIC	Promotion Program for Reducing Global Environmental Load through ICT Innovation	Support is provided to develop applications for advanced communications that capitalize on the features of new-generation networks in which paths and bandwidths are flexibly controlled and used.	-	316
	National Institute of Information and Communications Technology	Grants to Subsidize Advanced Technology Development for Pioneering New Communications and Broadcasting Areas	To create new businesses in communications and broadcasting by offering policy support for the R&D of creative technologies that promote international R&D collaboration, and for international standardization by international joint-research teams.	74	-
	Fire and Disaster Management Agency	Promotion Program for Fire and Disaster Prevention Technologies	To facilitate R&D that will develop innovative and practical fire and disaster prevention technologies and will open those technologies in order to invite proposals from people engaged in R&D in industry, academia, government, universities, private sectors, research corporations, and Fire-Defense Headquarters. This program was established in 2003.	208	182
MIC Subtotal				2,725	3,293
MEXT	MEXT/ JSPS	Grants-in-Aid for Scientific Research (KAKENHI)	The Grants-in-Aid for Scientific Research aims at rapid advancement of academic research, (including research based on creative ideas, basic research and applied research) across all fields, including the humanities and social sciences as well as the natural sciences. The program supports creative and pioneering research that will support the foundation of an affluent society.	256,610 (Grants allocated to researchers 230,690 (*2))	238,143 (Grants allocated to researchers 231,790 (*2))
	JST	Strategic Basic Research Programs	Based on decisions made in a top-down style, time-limited consortia that cut across institutional boundaries are formed (virtual institute system) to promote strategic, innovation-oriented basic research for creating new technologies, and research that has produced promising result is fast tracked.	54,544	62,548
	JST	Industry-Academia Collaborative R&D Programs	These programs aim to promote practical application of research outputs in academia through industrial-academic collaboration, so that the country strengthens its S&T capacity and industrial competitiveness and create STI.	24,037	29,322
	JST	International Collaborative Research Program	To promote international research partnerships with developing countries to address global challenges in the fields of environment and energy, natural disaster prevention, infectious diseases control, and	3,142	3,437

	MEXT/ JST	R&D Promotion for National Issues	<p>bioresources; to strategically promote international joint research in cutting-edge science and technology fields with other developed countries and regions including Europe and the U.S., and with a growing Asia, with equal partnerships (fifty-fifty cooperative relationships) based on intergovernmental agreements.</p> <p>Competitive funds provided to selected high quality research proposals. To address major challenges facing the country, government determines R&D topics, and selects research proposals based on the expected research results in terms of achieving technical target.</p>	19,136	23,658
MEXT Subtotal				357,469	357,108
MHLW	MHLW	MHLW Grants	To manage creative or pioneering research and other issues with strong social demands, to form a creative research environment and to promote health and labour sciences research, to maintain the scientific promotion of administrative policies regarding health-care, welfare, environmental health, and industrial health and safety, and to enhance their technical level.	38,205	31,218
	National Institute of Biomedical Innovation	Grants for Promoting the Development of Orphan Drug and Orphan Medical Devices	To support research activities and to disseminate the results of R&D on difficult-to-treat diseases and rare diseases (and others in which it is relatively difficult for companies to conduct R&D proactively due to high risk), and to pioneer research using innovative technology and methods.	3,749	3,011
MHLW Subtotal				41,954	34,229
MAFF	MAFF	Research and Development Projects for Application in Promoting New Policy of Agriculture, Forestry and Fisheries	By gathering research capabilities from industry, academia and government and by utilizing the technology seeds from various fields to attain the goal of "raising Japan's food self-sufficiency ratio (50% by 2020)" as proposed in "the Basic Plan for Food, Agriculture and Rural Areas" (Cabinet decision, March 30, 2010), MAFF promotes the development of practical use technologies that will quickly solve the technical problems of production in the agriculture, forestry, fishing and food industries as well as the relevant distribution and processing fields.	3,820	-
	MAFF	Science and technology research promotion program for agriculture, forestry, fisheries and food industry	<p>To create innovations that make agriculture, forestry and fishery and food industry growing industries is a system that secures steady application of basic research from public research institutes to production through participations of private businesses and that serves producers of agriculture, forestry and fishery industries and society.</p> <p>This program aims to focus Japan's research powers and to activate interchange between relevant people by making the most of Japan's high R&D capabilities in the fields of agriculture, forestry and fishery and food industries and gaining participations of research power from the private sector beyond fields. The program also supports university-industry collaboration research that addresses technical issues in the agriculture, forestry and fishery and food industries and strengthens competitiveness in these industries.</p> <p>In this program, public invitations for research topic proposals are held at each stage of R&D. Seamless support is provided for each stage: R&D at the basic level or "seeds creation stage," R&D for application of basic research called the "development fusion stage," and R&D for commercial application or "practical technology development stage."</p>	-	4,576
	National Agriculture and Food Research Organization	Basic Research Promotion for Creation of Innovation	In order to address various policy themes agriculture, forestry and fisheries, as based on creative ideas and basic research from researchers in diverse fields, MAFF promotes 1) basic research for the development of technology seeds aiming at the creation of new technology innovation and new industry and 2) applied research for the development of developed technical seeds to yield practical technology. Also, MAFF promotes joint R&D contributing to reconstruction from the GEJE as conducted by universities and with technology seeds leading to the creation of business and public research institutions, including experimental stations, and private sectors that are planning to commercialize their research results.	4,039	2,057
MAFF Subtotal				7,858	6,633

METI	METI	Support Program for Experimental Research of Regional Innovation Creation	To support experimental research by research entities that optimally collaborate resources from regional, small and medium-sized enterprises and from industry-academia-government, while revitalization regional economies by creating new businesses and industry using regional resources and technologies.	277	-
	METI	Subsidy for creating innovations by regional SMEs	This is to support verification studies (verification or performance assessment of practical application of technology) conducted collaboratively by small and medium regional enterprises (major force) and universities, colleges of technology and public research institutions	-	296
	NEDO	Program for Advanced Industrial Technology Creation	In order to enhance industrial technology, to provide grants for high quality research by presenting technology fields and technology themes that industry expects universities, inter-university research institutes, national research institutes, colleges of technology, incorporated administrative corporations, public experimental research institutions, foundations, or incorporated associations; (hereinafter: "universities, research institutes, etc.") to address, and publically invite research theme proposals from young researchers at universities, research institutes, etc. (individual or team).	1,650	173
	Japan Oil, Gas and Metals National Corporation	R&D for Promotion of Oil and Natural Gas Development	To conduct basic and applied research, based on proposals selected from public submissions, for unique and innovative technologies in the oil and natural gas exploration and development fields.	80	-
METI Subtotal				2,007	469
MLIT	MLIT	Construction Technology Research and Development Subsidy Program	To supply funds for the R&D of technologies contributing to the sophistication and enhancement of the international competitiveness of construction technologies under MLIT's jurisdiction in order to promote technology innovation in the construction field. There are two types of public invitation: "Public invitation of technology development for solving policy issues (general type, small and medium-sized enterprise type), and "public invitation of technology development for addressing earthquake disaster." MLIT provides grants for technology and for research development of R&D themes appropriate for each type.	300	283
	MLIT	Program for Promoting Technological Development of Transportation	An open annual invitation for the proposal of research topics related to policy issues of MLIT is made among research institutions. Selecting prospective topics among those proposed and commissioned to conduct the research as the R&D projects.	-	175
	Japan Railway Construction, Transport and Technology Agency	Program for Promoting Fundamental Transport Technology Research	To implement technologies contributing to traffic safety, preservation of the environment and development of advanced traffic services in the transport field by publicly inviting unique and innovative research projects based on the free-thinking of researchers. This program was discontinued in FY 2012.	210	-
MLIT Subtotal				510	458
MOE	MOE	Environmental Research and Technology Development Fund	To promote gathering of scientific knowledge and technological development requisite for promoting environmental policy, to establish a sustainable society; for example, by preventing global warming, by forming a recycling society, by coexisting with the natural environment and by managing environmental risk.	6,670	6,160
	MOE	Program for Development and Experimental Research of Technology to Prevent Global Warming	For the development and experimental research of technology to reduce emissions of energy-derived CO ₂ , which must be, and can be, realized at an early stage; to invite proposals from private corporations, public research institutes, and universities; to support proposed programs selected by a evaluation committee consisting of external experts.	6,000	-
MOE Subtotal				12,670	6,160
Total				425,479	408,539

Note: 1. The numerical totals may not match due to rounding off.

2. Apart from this list, using the "Leading-edge Research Promotion Fund" established in 2009, the "Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST)" (100 billion yen), and the "Funding Program for Next Generation World-Leading Researchers (NEXT)" (50 billion yen) have been implemented (Project was completed in FY2013).

*1: R&D program for promotion of radio wave efficiency has been included since FY2013.

*2: The budget does not represent grants of the aid fiscal year because research expenditures used for the next fiscal year or later are included in the budget (foundation part) due to the introduction of "foundation" in part of the categories in FY 2011. Therefore, both budgets and grants are specified.

Source: MEXT

3 Enhancement of R&D Implementation Systems

In order to attract intellectual capacity to Japan to strengthening innovative, creative capability, R&D systems need to be strategically reformed. The 185th extraordinary session of the Diet enacted the Revised Act on Enhancement of Research and Development Capacity and Efficient Promotion, etc. of Research and Development, etc. by Advancement of Research and Development System Reform (hereinafter: Revised Act on Enhancement of Research and Development Capacity) on December 5, 2013. The legislation was introduced by Diet members with the idea of continuous reform of the R&D system by strengthening R&D capabilities and promoting R&D efficiently. The Act calls for creation of a new R&D corporation system, establishing a research administrator system, exempting researchers from the Labor Contract Act, contributing R&D corporation and making provisions for resource allocations to R&D on the safety of Japan and its nation.

(1) Reform of the R&D corporation

The R&D Corporation is an incorporated administrative agency performing R&D activities that are difficult for private sectors or universities, such as long-term or high-risk R&D. IT refers to 37 corporations in the Research and Development Enhancement Act. An additional resolution of the Upper and Lower Houses, when this act was formed, agreed that the most appropriate modalities of the R&D Corporation would be considered. The 4th Basic Plan also states, "In reference to the Basic Policy on Review of Administrative Systems and Projects of Incorporated Administrative Agencies" (Decided by the Cabinet on December 7, 2010), "the government will establish a new system concerning national R&D institutions to achieve reform in organizational governance and management and to strengthen the R&D Corporation's function, while considering the characteristics of R&D" (long-term nature, uncertainty, unpredictability, and expertise). On June 7, 2013, the Comprehensive STI Strategy was approved by the Cabinet. This strategy includes creation of the world's highest level R&D Corporation System. In order to study the establishment of a new R&D Corporation system, an expert panel was convened under the Minister of State for Science and Technology Policy and Minister of MEXT. The expert panel issued a report, the *New R&D Corporation System for Growth Strategy* on November 19, 2013.

Along with the Revised Act on Enhancement of Research and Development Capacity, cabinet decision on the Basic Policy on Reform of Independent Administrative Agencies was made on December 24, 2013. Under the Act on General Rules of Incorporated Administrative Agency (Act No. 103 of 2009), R&D Corporations were categorized differently from other public corporations. In accordance with the policy of "efficient and effective" operation of public corporations, the key objective set is the maximization of R&D results. To realize the key objective, necessary systems are to be organized and designated creative research corporations that are expected to produce world top class research achievements as "Special National R&D Corporations (tentative name)" among public R&D Corporations. Although adopting the Act on General Rules of Incorporated Administrative Agency, in view of national strategy, it was decided to enact a new act enabling special measures, such as the major involvement of the minister in charge of CSTP.

On March 12, 2014, CSTP announced that RIKEN and AIST would be candidates for the Special National R&D Corporations. A consideration in selection of these special corporations would be that they are represent Japan and should have a large influence in the world, as well as be a comprehensive research institute based on the key concept of the special corporation system. Also, the criteria for selecting the

special corporation and the selected corporation would be altered as necessary in the future in view of changing social and economic circumstances, trends of STI, research results and activities of corporations and other acts. These reforms will be introduced from April 2015 after revising the relevant acts and taking other necessary measures.

(2) Development of a system for effectively promoting research activities

In order for universities and public research institutions to promote research activities effectively and efficiently, in addition to recruiting researchers, it is necessary to develop a system enabling active employment for various personnel specialized in the management of overall research activities, in the management and operation of intellectual properties and in the maintenance and management of facilities and equipment. However, individual research institutions cannot secure of these specialized personnel and most researchers do not have enough time beyond their own research for managerial work. In response, the government will strengthen efforts to improve these conditions.

Considering this situation, MEXT supports fostering and securing human resources capable of conducting research management at universities and other institutions (URAs) (Part II, Chapter 5, Section 1, 1 (3)).

In order to create internationally competitive industries, the Japan Patent Office, through the National Center for Industrial Property Information and Training, has dispatched intellectual property management experts, called “intellectual property producers (IPPs),” to universities and R&D consortiums, where public funds are injected with expectations of innovative output.

In order to assist in the design of research plans to be implemented in collaboration with universities, incorporated administrative agencies and public research institutions, MAFF offers support for the deployment of coordinators throughout the country who are specialized in agriculture, forestry and fisheries and in the food industry. This support includes the introduction of viewpoints on the management of technology (MOT), including the strategic uses of intellectual property.

4 Establishment of the PDCA Cycle in Science, Technology and Innovation Policy

(1) Ensuring the effectiveness of the PDCA cycle

In order to promote STI policies effectively and efficiently, it is necessary to set clear performance targets, such as policies, measures and implementation systems. It is also necessary to conduct timely follow-ups to ensure progress, and to consider the results when reviewing policies and resource allocation. Finally, it is necessary to plan new policies by establishing a PDCA (Plan-Do-Check-Action) cycle. For this reason, the government has been promoting efforts for ensuring the effectiveness of the PDCA cycle.

Specifically, the government set the National Guideline on the Method of Evaluation for Governmental R&D ((National Guidelines) instituted by the Prime Minister in FY2012 (Part 2, Chapter 2, Section 4 (2)).

(2) Improvement and enhancement of R&D evaluation systems

To effectively and efficiently promote an internationally high-level of R&D that contributes to both society and the economy, as well as to the development of new science fields, it is important to make further improvement to the R&D evaluation system.

All ministries and agencies conduct R&D evaluation, based on their own detailed guidelines which specify evaluation methodologies that have been formulated in accordance with the National Guidelines.

In addition to the revision of the *National Guidelines*, MEXT revised the *Guidelines for Evaluation of R&D* in the MEXT Proposal (hereinafter: MEXT R&D Evaluation Guidelines) in April 2014. The revision positions five items as considered special issues: 1) “Creating science and technology based innovation; and promoting a system to solve problems”, 2) “Promoting high-risk research, inter-, multi- and trans-disciplinary research”, 3) “Promoting nurture and support for junior researchers who will lead the coming generation”, 4) “Preventing evaluation from becoming a mere formality, alleviating the growing burden of evaluation” and 5) “R&D program evaluation”.

Based on the National Guidelines and the MEXT R&D Evaluation Guidelines, MEXT has been conducting evaluations in accordance with the objectives, policies and scales of each research project. This is based on a wide range of R&D covering everything, from scientific research stemming from researcher’s free thinking and personal motivation in conducting R&D to large projects that realize a specific policy objective. In order to prioritize, the appropriateness of budget requests is judged by conducting an assessment by means of an external evaluation. An interim evaluation is then conducted to confirm the necessity of making changes to the plan, and an ex-post evaluation is conducted for application to the next deployment. Since much basic research leads to unexpected developments over time, care is taken to avoid evaluations that expect rapid output based on uniform and short-term points of view.

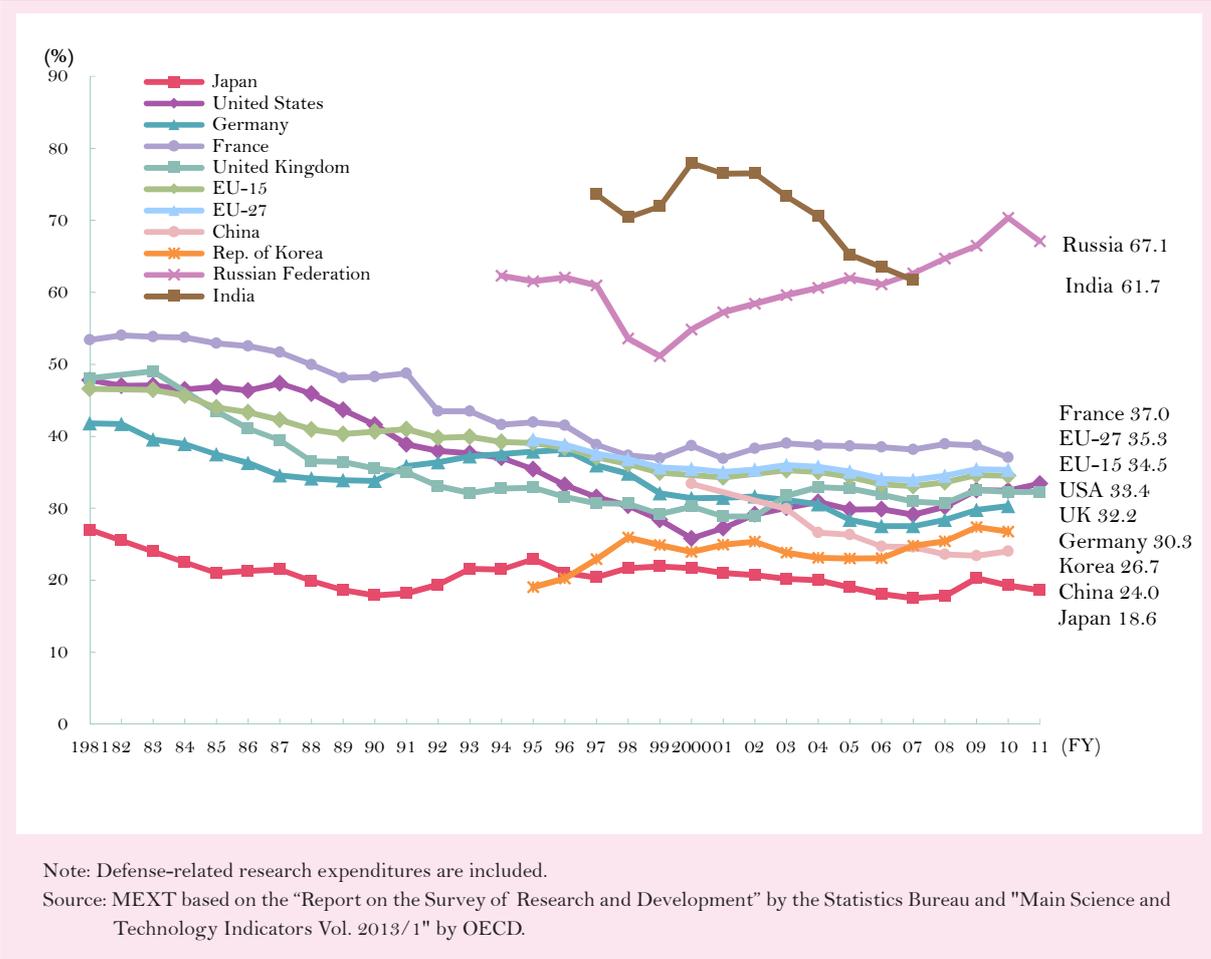
METI conducts preliminary evaluations, interim evaluations, post evaluations, and follow-up evaluations of R&D projects. Since 2008, in order to review projects with similar objectives and to clarify the mutual relationship of each project, METI, while considering the direction of the field as a whole, has implemented a “policy evaluation for technology.” Under this policy the interim and post evaluation of related projects once conducted separately over different fiscal years, are conducted together. However, in response to the revision of the National Guidelines in December 2012, the “Evaluation of R&D Programs” will be introduced.

Incorporated administrative agencies, national universities and corporations conduct evaluations of their performance in accordance with the “Act on General Rules for an Incorporated Administrative Agency” and the “National University Corporation Act” (Act No. 112 of 2003), respectively. Ministries and agencies conduct policy evaluations in accordance with the “Government Policy Evaluations Act” (Act No.86 of 2001).

Section 3 **Expansion of Research and Development Investment**

The government set the expanded target of R&D investment to 4% or more of GDP in all government and private sectors by FY 2020. The 4th Basic Plan states, “comprehensively, considering that the percentage of the Japanese government’s burden of research costs is lower than that of foreign countries, considering that the government’s investments are expected to produce the synergetic effect of promoting private-sector investment, which is currently hampered by a weak economy, and considering that many foreign countries are increasing S&T investment by setting targets, an expansion of investment is required”(Figure 2-5-3).

Figure 2-5-3 / Trends in Government-financed R&D Expenditures in Selected Countries



Although the financial situation in Japan is expected to become critical, the government should secure the expenditures necessary for promoting the measures outlined in the 4th Basic Plan to ensure consistency with the Fiscal Management Strategy, including the fiscal consolidation targets and the Medium-term Fiscal Framework decided by the Cabinet in June 2010.

Likewise, in order to induce R&D investment in the private sector, which account for more than 70% of all R&D investment in Japan, the government, while respecting the principle of voluntary efforts being taken by private companies, should conduct rational reviews of regulations and systems, including the utilization of a tax system that facilitates R&D activities to stimulate motivation.

(Government R&D investment)

Government R&D investment in FY2013 was 4.4927 trillion yen; comprised of 4.0431 trillion yen for the central government, including both the initial budget and the supplementary budget, and 449.6 billion yen for local authorities. (Refer to Part II, Chapter 1, Section 4-2 for details of R&D investment by the central government.)

(Preferential treatment for promoting R&D investment by the private sector)

To promote R&D in the private sector, various tax measures are provided as shown in Table 2-5-4.

Table 2-5-4 / R&D Taxation System

Item	Purpose	Description	Applicable law	Remarks
R&D taxation system	Promotion of R&D investment by the private sector, etc.	<p>Tax Credit for R&D expenditures.</p> <p>I. Proportional Tax Credits for total R&D expenditures* The R&D credit is a percentage (8 to 10%) of total R&D expenditures. (The maximum amount is 20% of corporate tax liability)</p> <p>II. Special Tax Credit on special R&D expenditures* For joint-experimentation research and experimentation research commissioned by universities, public experiment and research institutes, the National Experiment and Research Institute, and other organizations, in addition to Item I above, a tax equivalent to 12% of the total R&D expenditures regarding such experiments and research is exempted (but limited to an amount equivalent to 20% of the corporate tax, including the special tax exemption in Item I above.). In accordance with FY 2013 tax reform, R&D expenditures relating to joint research conducted by corporations based on a certain contract, etc., was added to the special R&D expenditures.</p>	Special Taxation Measures Act, Article 10, Article 10-2 (income tax) 42-4, 42-4-2, Article 68-9, 68-9-2 (corporate tax), Local Tax Act, Supplementary Provision, Article 8, Item 1.	Enacted in FY 2003 (Hereinafter, for private business owners, the tax credit system will remain the same.)
		<p>III. Tax system to strengthen the technical base of SMEs (Applied instead of I or II)</p> <p>(1) The tax credit amount is a value equivalent to 12% of the test and research expenditures at SMEs (but limited to a value equivalent to 20% of corporate tax) (*).</p> <p>(2) The tax credit amount in (1) above is excluded from the tax base for corporate inhabitants' tax (Local tax).</p> <p>(Remarks) 1. The tax credit amount, in relation to the above I through III is a value equivalent to 30% of corporate tax for only FY 2013 through FY 2014 2. In relation to the amount exceeding the tax credit mentioned in I through III, it can be deferred one year for deduction.</p>		Enacted in FY 1985
		<p>IV. Proportional Tax Credits for increased R&D expenditures</p> <p>Either of the following 1) or 2) will be selected and be applicable (limited to an amount equivalent to 10% of the corporate tax, apart from I through III)</p> <p>1) When the amount of experimental and research expenditures exceed the average of the experiment and research expenditures for the current term, and for three years before the current term and exceeds the largest amount out of experiment and research expenditures for two years before the current term, then a tax equivalent up to 5% of the amount exceeding the average is exempted.</p> <p>2) When the amount of experimental and research expenditures exceed 10% of the sales amount for the current term and for three years before the current term, the tax is exempted in a predefined proportion to the excessive amount.</p> <p>(Remarks) 1. Since FY2014, the measures in 1) will be amended to increase the tax exception rate to a 30% maximum with an increase in the R&D expenditures. It will be extended for three years to FY2016 together with the measures in 2).</p>		Enacted in FY 2008

Source: MEXT