

Section 4 Systemic Reforms for the Promotion of Science and Technology Innovations

1 Reinforcement of Systems to Strategically Promote Science and Technology Innovations

(1) Establishment of “Science and Technology Innovation Strategy Council”

The Basic Plan states that the government is to set up the “Science and Technology Innovation Strategy Council [tentative] (hereinafter referred to as “Strategy Council”),” as a platform for dealing with policies ranging from considering to promoting critical issues of S&T.

This is because it was found out that individual results in sectorial R&D in and prior to the 3rd Basic Plan had not necessarily led to solutions to social issues, and the government now aims to build a system to promote more effective and issue-oriented R&D, in cooperation with relevant parties in a wide variety of business areas including industrial sectors that will play a central role in commercializing R&D.

According to the Basic Plan, the Strategy Council is to be placed on each critical issue such as recovery and reconstruction from the GEJE, green innovation and life innovation. And the Council will consider strategies that Japan needs to pursue from a broad standpoint and promote efforts on the targeted issues.

(2) Strengthening of the Industry-Academia-Government Network of Knowledge

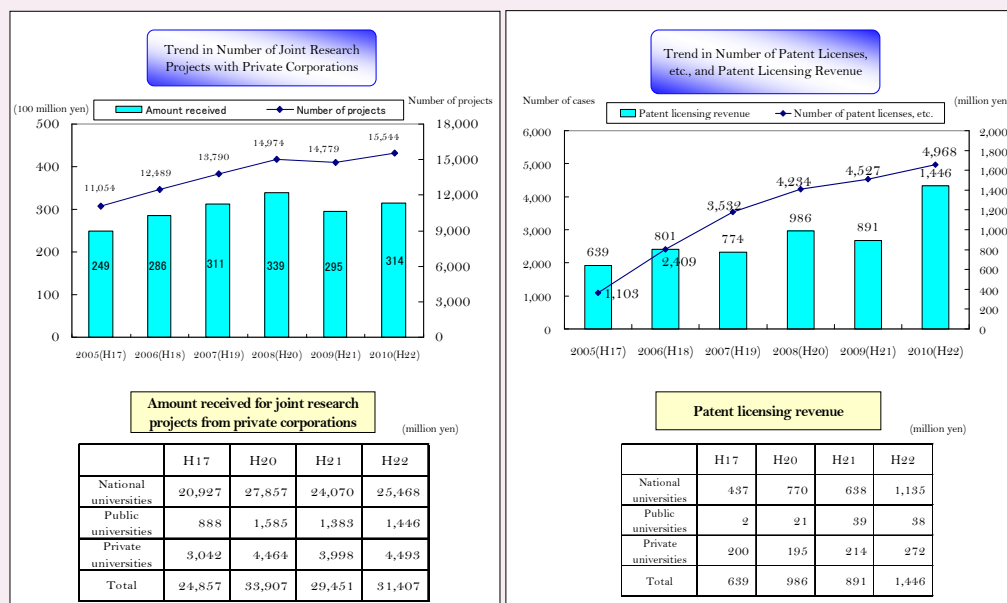
It is clear that creating innovations will benefit the economic growth of Japan. It is thus necessary to strengthen the network of knowledge among industry, academia and government, in order to turn the remarkable research results achieved by universities and public research organizations to innovations. Here below are descriptions of the current status of industry-academia-government collaboration activities and the government’s efforts to reinforce industry-academia-government collaboration.

1) Current Status of Domestic and International Industry-Academia-Government Collaboration Activities

(i) Implementation Status of Industry-Academia-Government Collaboration Activities at Universities

In general, industry-academia-government collaboration activities at universities have steadily been producing high results since national universities were converted into independent administrative entities in April 2004. In 2010, there were 15,544 cases (up 5.2% from the previous year) of joint research between universities and private corporations, and amount received for joint research from private corporations was 31.4 billion yen (up 6.6% from the previous year). Furthermore, the total number of joint research performed in 2010 was 1.4 times higher than that of 2005, and the number of patent licenses, etc. also increased to 4,968, approximately 4.5% higher than that of 2005 (Figure 2-2-11).

Figure 2-2-11/ Trends in the Performance of Joint Research, etc., at Universities



- ※ Subject: National, public and private universities
 - ※ The term “Universities” indicates junior colleges, technical colleges and inter-university research institutes.
 - ※ The number of patent licenses, etc. denotes the number of patents which have been licensed or transferred (patent at the stage of “to be received” included).
 - ※ “Total” amount and “total of intermediate total of national, public and private universities” amount may not match because any amount less than a million yen is rounded off.
 - ※ After reviewing the counting method, there were changes found in some parts of “the number of patent licenses, etc.” Therefore, all the numbers including ones prior to the previous year have been revised.
- Source: “Implementation Status of Industry-Academia-Government Collaborations at Universities (2010),” Ministry of Education, Culture, Sports, Science and Technology (as of November 30, 2011)

(ii) Activity Status of Technology Licensing Organization (TLO)

Technology Licensing Organization (TLO) is an organization that licenses business companies with patents or other rights, based on research results at universities, gains profits from these companies for licensing, and gives a part of the profits back to universities and researchers (inventors) as a research fund.

As of April 1, 2011, there are 42 TLOs that have officially been recognized by MEXT and METI under the “Act on the Promotion of Technology Transfer from Universities to Private Industry (Act No.52 of 1998),” and the number of patent licensing was 2,733 in 2010.

2) Efforts to Expand Industry-Academia-Government Collaboration

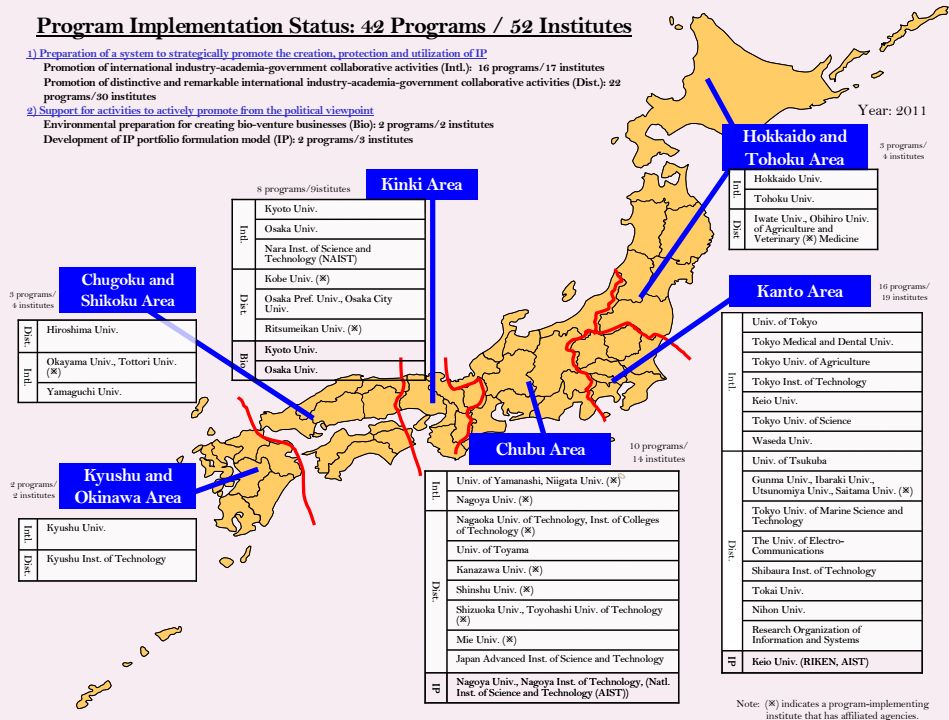
(i) Arrangement of Industry-Academia-Government Collaboration Structure

In order to effectively reflect research results generated from universities to society, MEXT has implemented the “Program for Promoting Self-Sustaining Management of Industry-Academia-Government Collaboration in Universities” to prepare a suitable environment for universities to carry out continuous activities with industry, academia and government, through assistance in, for instance, making activities more distinctive with the use of international and inter-university collaborations, arranging industry-academia-government collaboration coordinators, etc. (Figure 2-2-12, Figure 2-2-13).

Figure 2-2-12/ Supported Institutes under the Program for Promoting Self-Sustaining Management of Industry-Academia-Government Collaboration in Universities [Function Support Type] (2011)

Program Implementation Status: 42 Programs / 52 Institutes

- 1) Preparation of a system to strategically promote the creation, protection and utilization of IP
 - Promotion of international industry-academia-government collaborative activities (Intl.): 16 programs/17 institutes
 - Promotion of distinctive and remarkable international industry-academia-government collaborative activities (Dist.): 22 programs/30 institutes
- 2) Support for activities to actively promote from the political viewpoint
 - Environmental preparation for creating bio-venture businesses (Bio): 2 programs/2 institutes
 - Development of IP portfolio formulation model (IP): 2 programs/3 institutes



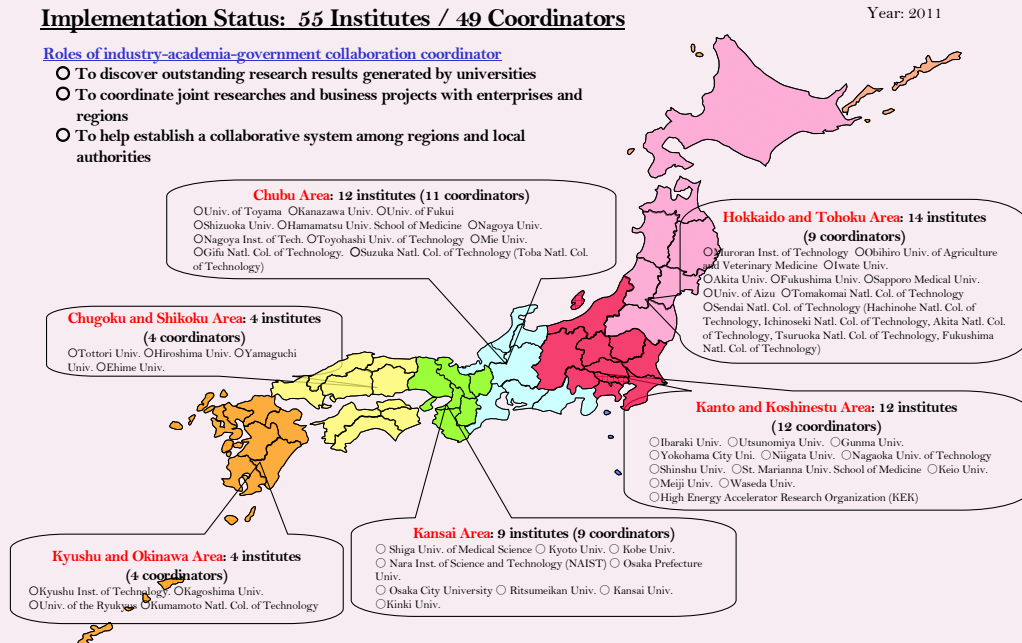
Source: Created by MEXT

Figure 2-2-13/ Supported Institutes under the Program for Promoting Self-Sustaining Management of Industry-Academia-Government Collaboration in Universities [Coordinator Support Type] (2011)

Implementation Status: 55 Institutes / 49 Coordinators

Roles of industry-academia-government collaboration coordinator

- To discover outstanding research results generated by universities
- To coordinate joint researches and business projects with enterprises and regions
- To help establish a collaborative system among regions and local authorities



Source: Created by MEXT

These efforts have thus far enhanced progress the arrangement of basic structure in many ways, and vitalized industry-academia-government collaborative activities (Table 2-2-14). For instance, they prompted universities to unify industry-academia-government collaboration divisions and intellectual property (IP) management divisions, establish a pan-academic and cross-sectional structure with vice president or other executives at the top, and formulate basic rules such as intellectual property policy.

Table 2-2-14/ Developmental Status of Intellectual Property (IP) Management and Utilization System (Establishment of university's IP management centers, etc.), 2010

	Already developed (institution)	Scheduled to be developed (institution)	NOT Scheduled to be developed (institution)	Number of Universities Responded (institution)
Total	230 (216)	154 (171)	495 (510)	879 (897)
National universities	75 (74)	4 (3)	12 (14)	91 (91)
Private universities	123 (113)	132 (151)	435 (444)	690 (708)
Public universities	32 (29)	18 (17)	48 (52)	98 (98)

Note: Figure in parentheses indicates institutional performance of 2009.

Source: Created by MEXT

In order to construct a scheme for IP management at universities and strengthen IP management functions for the promotion of industry-academia-government cooperation, the Japan Patent Office (JPO) dispatches, through the National Center for Industrial Property Information and Training, "University Network IP Advisors" specializing in IP management at universities to the wide-area network composed of multiple universities.

MIC currently promotes industry-academia-government collaborating R&D as well as demonstration tests, using New Generation Network Testbed (JGN-X) built and operated by National Institute of Information and Communications Technology (NICT) (refer to Part 2, Chapter 3, Section 1, 2(2)).

MAFF deploys coordinators specializing in such fields as agriculture, forestry, fishery and food industry across the country, and carries out various activities including collecting research seeds, assisting to draw up research plans, according to the "Regional Support Coalition of Industry-Academia Collaborative Activities."

(ii) Reinforcement of Industry-Academia-Government Collaborative R&D

In order to overcome "Death Valley" situation where funds for R&D to put basic research results into practical use fall short and to accelerate the practical application of research results achieved by universities, MEXT has promoted the "Project of "Bridge over Tomorrow" that stimulates the flow of private funds into R&D. Meanwhile, JST entered into a collaboration agreement with financial institutions including Japan Finance Corporation and DBJ Capital, Co., Ltd. in 2011, to further enhance financial ties.

To facilitate the practical application of research achievements generated by universities, JST also promotes; "Adaptable and Seamless Technology Transfer Program through Target-driven R&D (A-STEP)" to provide universities and public research institutes with constant assistance throughout the period from the discovery of promising technology seeds to the commercialization of the seeds, "Strategic Promotion of Innovative R&D (S-Innovation)" to conduct R&D under a particular theme set according to

remarkable research achievements and help create technologies that serve as a foundation for creation of new industries, and “Collaborative Research Based on Industrial Demand” to support basic research of universities valuable for solving technological problems which industry sectors face.

METI assists approved TLOs to launch a technology transfer operation. The Ministry also assists wide-area TLOs to enhance cooperation and unification among organizations, and to develop the practical and commercial applications of research results of universities. For practical application of research achievements generated by R&D incorporated administrative agencies in the field of industry, MAFF supports activities of TLOs recognized by the Minister of MAFF through the “Technology Results Transfer Promotion Program for the Practical Application of Research Results of Incorporated Administrative Agencies for Experimental Research.”

According to the “Intellectual Property Promotion Plan 2011 (Introduced by IP Strategy Headquarters, June 3, 2011),” MEXT and METI discuss how the university IP management centers as well as TLOs should be performing their business for the future, and conduct trial surveys using indicators that make an adequate evaluation of the effectiveness and efficiency of industry-academia-government cooperative activities.

3) Promotion to Construct Networks between Industry, Academia and Government

It is essential to nurture a common ground of understanding between industry and academia for building up industry-academia-government networks. To facilitate matching activities between private corporations and universities, the government of Japan has been holding lecture meetings and seminars as a forum for dialog with the participation of relevant persons throughout the country. In the meantime, universities are also promoting publication and information sharing of research achievements. For instance, they provide opportunities to report research outcomes, release journals such as annual reports, publish research papers in academic journals or at academic conferences, and disclose patent applications. Below are some examples of such primary efforts made by the government.

(Industry-Academia-Government Collaboration Promotion Conference 2011 (September 21-22, 2011))

Aiming at further promotion of industry-academia-government collaboration, “Industry-Academia-Government Collaboration Promotion Conference 2011” was held under the auspices of the Cabinet Office and other agencies including 8 government ministries, 2 institutes and 11 independent administrative agencies, and a number of projects were awarded for their significant contributions to industry-academia-government collaboration (Table 2-2-15).

Table 2-2-15/ Persons of Merit in Industry-Academia-Government Collaboration Awards

Award	Project	Winner's Name and Affiliations
Prime Minister's Prize	Semiconductor bonding technology that enables more compact and larger capacity electronic devices (Development of die-bonding film)	<u>Sadakazu Inada</u> : Head Researcher, Fundamental Technology Development Center, Tsukuba Research Laboratory, Hitachi Chemical Co., Ltd. <u>Takashi Inoue</u> : Associate Professor, Department of Polymer Engineering, Graduate School of Science and Engineering, Yamagata University Professor Emeritus, Tokyo Institute of Technology
Minister's Award, Ministry of State for Science and Technology Policy	Development of "Measurement and Control Techniques, and Wide Frequency Ultra Short Pulse Fiber Laser"	<u>Masaru Hori</u> : Professor, Department of Electrical Engineering and Computer Science, Graduate School of Engineering, Nagoya University Director, Plasma Nanotechnology Research Center <u>Toshio Goto</u> : Professor Emeritus, Department of Electrical Engineering and Computer Science, Graduate School of Engineering, Nagoya University Vice President, Professor, Chubu University <u>Norihiko Nishizawa</u> : Associate Professor, Department of Electrical Engineering and Computer Science, Graduate School of Engineering, Nagoya University Director, NU system corp.
Minister's Award, Ministry of Internal Affairs and Communications (MIC)	Development of Terahertz Focal Plane Arrays and Handy Cameras	<u>Naoki Oda</u> : Executive Expert, Guidance and Electro-Optics Division, NEC Corporation <u>Iwao Hosako</u> : Associate Director General of Advanced ICT Research Institute, National Institute of Information and Communications Technology <u>Susumu Komiyama</u> : Professor, Department of Basic Science, Graduate School of Arts and Science, University of Tokyo
	R&D of High Water Pressure Powered Saw	<u>Sakura Rubber Company Limited</u> , <u>Water Jet (WJ) Division, Sugino Machine Limited</u> , <u>Fire Technology and Safety Laboratory, Tokyo Fire Department</u> <u>Department of Mechanical Engineering, Tokyo Metropolitan University</u>
Minister's Award, Ministry of Education, Culture, Sports, Science and Technology (MEXT)	Development of "artificial intelligence engine that understands human emotions and ideas"	<u>Junichi Aoe</u> : Professor, Institute of technology and science, Tokushima University <u>Shinkaku Kashiji</u> : CEO, Institute of Language Understanding
	Establishment of "Support System for Seamless Medical Care using ICT"	<u>Akitoshi Yoshida</u> : President, Asahikawa Medical University <u>Masayoshi Son</u> : Chairman and CEO, SOFTBANK BB Corp.
	Development of "Edible SaFE Pesticide"	<u>Yutaka Arimoto</u> : Invited Senior Scientist, RIKEN (Institute of Physical and Chemical Research) <u>Tetsuya Imai</u> : Director of Naruto Research Institute, Otsuka AgriTechno Co., Ltd. <u>Takayuki Kashima</u> : Researcher, Insecticide Group, Central Research Institute of Bioscience Research Laboratory. Ishihara Sangyo Kaisha Ltd.

Minister's Award, Ministry of Health, Labour and Welfare (MHLW)	Development of Hydroponic cultivation system of Licorice	<p><u>Kayo Yoshimatsu</u>: Head of Breeding and Physiology Lab, Research Center for Medicinal Plant Resources, National Institute of Biomedical Innovation</p> <p><u>Toshiya Saito</u>: GL, Production and Research Facility Group 3, Engineering Division, Kajima Corporation (Current Assistant Manager, Civil Engineering Technology Division, Civil Engineering Management Division)</p> <p><u>Eiji Goto</u>: Professor, Laboratory of Environment Control Engineering, Environmental Science for Bioproduction, Graduate School of Horticulture, Chiba University</p>
	Development of VaSera; Vascular Screening System	<p><u>Kohji Shirai</u>: Professor, Sakura Medical Center, Toho University</p> <p><u>Masanobu Takata</u>: Director, Toyama Teishin Hospital</p> <p><u>Kotaro Fukuda</u>: Chairman and CEO, Fukuda Denshi Co., Ltd.</p>
Minister's Award, Ministry of Agriculture, Forestry and Fisheries (MAFF)	Development of thick structural plywood "Nedanon"	<p><u>Thick Structural Plywood Research Group, Forestry and Forest Products Research Institute</u></p> <p><u>Tokyo Plywood Manufactures Association and Tohoku Plywood Manufactures Association</u></p> <p><u>Institute of Wood Technology, Akita Prefectural University</u></p>
	Creation of a new industry using Proteoglycan extracted from unused marine resources	<p><u>Aomori Prefectural Industry Technology Research Center (local independent administrative agency)</u></p> <p><u>Hirosaki University</u></p>
Minister's Award, Ministry of Economy, Trade and Industry (METI)	Commercialization of clay-based-film products in cooperation of industry-academia-government consortium; development of materials using local resources for the solution of environmental problems	<p><u>Takeo Ebina</u>: Team Leader, Material Processing Team, Research Center of Compact Chemical Process, National Institute of Advanced Industrial Science and Technology (AIST)</p> <p><u>Katsuro Tsukamoto</u>: CEO, Japan Matex Co., Ltd.</p> <p><u>Keiichi Kurosaka</u>: Development Manager, Kunimine Industries, Co., Ltd.</p>
	"Engineered Plastic Bonding Technology that Contributes to More Lightweight Automobiles"	<p><u>Takashi Aoki</u>: Manager, Functional Composite Materials Division, Materials Technology Department, DENSO Corporation.</p> <p><u>Atsushi Takahara</u>: Leading Professor and Deputy Director, Institute for Materials Chemistry Engineering, Kyushu University</p>
	Development of Optical Filter Stimulating Color Vision Deficiency for Color Universal Design	<p><u>Shigeki Nakauchi</u>: Professor, Department of Computer Science and Engineering, Toyohashi University of Technology</p> <p><u>Keizo Shigemori</u>: Professor, School of Information, Kochi University of Technology</p> <p><u>Hirohisa Kato</u>: General Manager of R&D Department, Itoh Optical Industrial Co., Ltd.</p>

Minister's Award, Ministry of Land, Infrastructure, Transport and Tourism (MLIT)	Establishment of countermeasures against liquefaction using compaction grouting methods	<p><u>Hiroyuki Yamazaki</u>: Head of Soil Dynamics Division, Port and Airport Research Institute (PARI)</p> <p><u>Keiichi Akimoto</u>: Chairman, Compaction Grouting Society (CPG Method) of Japan</p> <p><u>Kouki Zen</u>: Professor, Graduate School of Engineering, Kyushu University (Representative President, National Disaster Information Center of Western Japan)</p>
	Construction technique for deep-water immersed tunnel, Tunnel immersion work of Bosphorus rail tube crossing project	<p><u>Fumio Koyama</u>: General Manager, Taisei Corporation (former Immersed Tunnel Project Manager)</p> <p><u>Osamu Kiyomiya</u>: Professor, Faculty of Science and Engineering</p> <p><u>Susumu Yasuda</u>: Professor, Department of Civil and Environmental Engineering, Tokyo Denki University</p>
Minister's Award, Ministry of the Environment (MOE)	R&D of non-contact rapid charging inductive power supply system for electric-driven vehicles	<p><u>Yasuhiro Daisho</u>: Professor, Graduate School of Environment and Energy Engineering, Waseda University</p> <p><u>Shunsuke Takahashi</u>: Chief Engineer, EV Business Administration Department, Showa Aircraft Industry Co., Ltd. Japan</p>
Chairman's Award, Japan Economic Federation	Practical application of non-volatile memory (FeRAM)	<p><u>Hiroshi Ishihara</u>: Professor Emeritus, Tokyo Institute of Technology</p> <p><u>Yoshihiro Arimoto</u>: Expert, IP Division, Process and Technology Department, Fujitsu Laboratories Ltd.</p> <p><u>Takashi Eshita</u>: Manager, Process Technology Management Department, FRAM Process Technology Department, Fujitsu Laboratories Ltd.</p>
President's Award, Science Council of Japan (SCJ)	Optimization of "Platform Technology for the Drug Discovery of Novel Peptide Drug Leads; RaPID (Random Peptide Integrated Discovery) System"	<p><u>PeptiDream Inc.</u></p> <p><u>Hiroaki Suga</u>: Professor, Department of Chemistry, Graduate School of Science, University of Tokyo</p>

(Innovation Japan 2011 – University Fair (September 21-22, 2011))

In cooperation with JST and New Energy and Industrial Technology Development Organization (NEDO), MEXT and METI together aim to proactively return the profit gained from the results of most advanced technology research carried out by universities and public research organizations to society. For this purpose, these four parties held "Innovation Japan 2011 – University Fair¹," Japan's largest industrial sectors and universities matching event where concerned parties from universities, public research institutions, private corporations, etc., gather. Likewise, JST has been holding "New Technology Presentation Meetings" in partnership with universities, in order to provide active support for activities that bring back research results such as patents, achieved by universities and public research organizations

¹ "Innovation Japan-University Fair" has been Held simultaneously with the Industry-Academia-Government Collaboration Promotion Conference since 2011.

to society (Technology Transfer).

(Agribusiness Creation Fair (November 30-December 2, 2011))

Through the exhibition of technology seeds created by private corporations, universities, public R&D institutes, and independent administrative agencies that conduct research in the fields of agriculture, forestry, fisheries and food, MAFF holds, in coordination with relevant ministries and agencies, an annual “Agribusiness Creation Fair” to stimulate collaborative activities with institutions that possess technology seeds. In 2011, the fair attracted approximately 26,000 participants and exhibits by 179 institutions nationwide. At the fair, MAFF made comprehensive efforts to match participants and visitors by placing on-site coordinators who mediate industry-academia collaboration, carrying out site-tours guided by coordinators. Furthermore, through holding a localized version of “Agribusiness Creation Fair” at 5 places nationwide, the Ministry also endeavored to promote reinforcement of local industry-academia networks.

(3) Creating a “Platform” for Industry-Academia-Government Collaborations

To further facilitate innovations through technology quickly and efficiently, it is necessary to create a platform among the industrial, academic and governmental sectors able to work in collaboration.

1) Establishment of Open Innovation Centers

(i) Development of Joint R&D Facilities for Industry-Academia Collaborations

METI has started to develop “Advanced Innovation Centers (joint R&D facilities)” for the universities working on advanced R&D for practical application as well as the corporations aiming to achieve innovations through utilization of these technologies generated by universities. The center’s objective is to facilitate these concerned institutes to engage in a coherent process from research to applied development, product testing, etc., while building up mutually-supporting structure. So far, the development of 19 centers has been completed as joint R&D centers for low carbon society, health and medical care.

In addition, METI has set up a fund pertaining to the “Technology Bridge Development Program (joint R&D facilities)” in the fiscal 2010 1st supplementary budget to further develop such centers with the perspective of revitalizing local communities, and is currently developing 11 more centers.

(ii) Enhancing Functions of Tsukuba Science City and Kansai Science City

The “National Spatial Strategy (National Plan)” (decision by Cabinet Council, July 4, 2008) states that “universities and R&D institutes are valuable intellectual/human resources for the country as the cluster of these institutes can be found in Tsukuba Science City and Kansai Science City, and hence they are to be utilized for the purpose of Japan’s overall progress.” In light of this policy, below-described efforts have been implemented in Tsukuba Science City and Kansai Science City.

a) Tsukuba Science City

Tsukuba Science City was built for creating a center for high-level experimental research and education as well as for relieving the excess concentration in the Tokyo area. The city has 32 national experimental research and educational organizations in addition to a number of private research facilities, and advances various projects such as the promotion of research exchange and the improvement of international

research exchange functions among these institutions.

Due to the concentration of research facilities and human resources related to advanced nanotechnology in the city, Tsukuba Science City launched the concept of “Tsukuba Innovation Arena (TIA),” a center for industry-academia-government concentrated collaborations, in June 2009. Setting Tsukuba University, National Institute for Materials Science (NIMS), Advanced Industrial Science and Technology (AIST) and Keidanren (Japan Business Federation) as TIA’s core institutes (4 core institutes), the city aims to formulate a global center for nanotechnology innovation with support of MEXT and METI.

Through the new projects utilizing the characteristics of core research domains and infrastructures of each institute, development of center and enhancement of center’s applications, etc., Tsukuba Science City began its full-scale process for its formulation.

In February 2011, the “Medium Term Plan for TIA,” which crystallizes the specific visions that TIA hopes to achieve within the next 5 years and indicates its clear action points, was determined at the “TIA Executive Council” consisting of the heads of 4 core institutes and other concerned parties. In addition, for encouraging private corporations to participate in TIA, the establishment of “TIA Alliance Forum,” which is composed of such members as 4 core institutes, Nanotechnology Business Creation Initiative and TIA R&D project operators, was also agreed on, and the forum was officially inaugurated later in May 2011.

In April 2011, with the participation of 4 core institutes, Tokyo University of Science and Shibaura Institute of Technology, the “TIA Networking School Consortium” was founded for fostering next-generation global leaders in nanotechnology who can create new industries for future Japan. Furthermore, the “TIA Open Symposium” was held in November 2011, and relevant issues including the efforts of TIA open innovation, latest research achievements and framework for center’s applications were introduced.

Along with these activities, TIA also endeavors to expand its collaboration network with private corporations and universities through efforts such as providing user facilities with samples of project results using evaluation feedback system, and comprehensively advances industrialization of nanotechnology and cultivation of human resources as a R&D center open to industry, academia and government.

Under the “Research and Innovation Promotion Headquarters” set up for strengthening open innovation functions in 2010, AIST promotes the discovery of technological seeds and R&D projects. In doing so, AIST conducts industry-academia-government collaboration related works in an integrated manner, based on the diverse needs from society and industrial sectors pertaining to industrial technology. In particular, AIST, as previously described, has been working on the formulation of TIA as an open innovation promotion center, participated in 16 technology research associations, and completed 18 large externally-funded projects. So far, AIST also has strengthened cooperative ties with private sectors by holding “AIST Open Lab” to announce its own research achievements to relevant parties such as corporate executives, researchers and engineers.

b) Kansai Science City

With the aim of contributing to the progress of domestic and global culture, science and research, as well as the development of Japan’s national economy, Kansai Science City currently pushes for the construction of a central city to meet its aims. As of the end of 2011, over 110 facilities have been

constructed in the city, and a variety of research and other activities are being carried out.

2) Creating a Dialog Forum for Industrial and Academic Sectors --- “Industry-Academia Collaboration Platform”

Setting up the “Industry-Academia Collaboration Platform,” a dialog forum for the industrial and academic sectors, for universities to conduct basic research contributing to solutions of technical themes that the industrial sectors face, and to speed up problem-solving processes, JST has implemented the “Collaborative Research Based on Industrial Demand”.

3) Creation of Innovation Centers for Advanced Interdisciplinary Research Areas

MEXT has launched the Program of “Creation of Innovation Centers for Advanced Interdisciplinary Research Areas.” The program aims to support the institutes that constitute innovation bases pursuing industry-academia collaborative R&D for future applications from its basic stage in advanced interdisciplinary areas. These scientific areas are believed to be particularly important for the creation of new innovations, and MEXT is currently providing support for 12 R&D subjects under the program.

2 Establishment of New System for Science and Technology Innovations

(1) Environmental Improvement for the Enhancement of Commercialization Assistance

In order to create new industries, generate jobs and stimulate the economy, it is essential to vitalize business-launching activities utilizing achievements of advanced S&T.

Due to various efforts made by the industrial, academic and governmental sectors on university ventures, there were approximately 2,000 university-launched venture companies established by the end of 2008. However, the number of newly-launched ventures has lately been declining from 252/year in its peak year of 2004 and 2005 to 90/year in 2008. To this end, measures to improve an environment to strengthen support for launching venture companies, etc., have been implemented by enhancing seamless support ranging from the early stage of venture’s R&D to its commercialization.

1) Support for University Ventures

JST provides R&D support for creating university ventures under the “Adaptable Seamless Technology Transfer Program through Target-driven R&D (A-STEP).” Because of these efforts, there have been 117 venture companies newly established by the end of January 2012.

2) Support for R&D-type Ventures

For a newly-launched venture company using RIKEN’s research achievements as its core business, RIKEN has adopted a system promoting swift dissemination and practical application of the research results by providing such privileges as preferential treatment in patent licensing.

Creating training systems for venture businesses under the “Basic Research Promotion for Creation of Innovation,” the National Agriculture and Food Research Organization (NARO) supports R&D conducted by R&D-type ventures playing a crucial role in creating new businesses and industries.

With private corporations making use of a wide variety of resources in rural areas, NARO also develops

R&D focusing on market needs and cost in the practical application stage under the “Support Programs for Applied Research by Private Business” to promote the sixth industrialization of rural areas.

3) Support through Small and Medium-Size Business Innovation Research (SBIR) System

Small and Medium-Sized Business Innovation Research (SBIR) System is a system which relevant ministries and agencies provide small and medium sized enterprises with consistent support on their R&D and its commercialization for assisting business activities using their own new technologies. Through this system, the ministries seek to increase opportunities for small and medium sized enterprises to get subsidies, entrustment expense fees, etc., for R&D of new technologies that lead to their future business activities. In addition, the ministries are also taking other support measures to cut down the related expenses including patent fees and promote financial policies such as low-interest loan by Japan Finance Corporation. In 2011, 7 concerned ministries (MIC, MEXT, MHLW, MAFF, METI, MLIT and MOE) designated 110 small and medium sized enterprises to receive special subsidies and set the expenditure target to 45.1 billion yen in total.

(2) Utilization of Regulations and Systems for Fostering Innovations

R&D activities are the source that leads to sustainable progress of Japan’s economy and society, and to strengthening of international competitiveness through the creation of new knowledge, innovation-based new industries and markets, etc. Although the regulations and systems surrounding R&D activities are originally designed to serve such purposes as ensuring their smooth development and improving the safety, they often hinder the innovative growth of R&D because of their excessive strictness. The government of Japan is therefore currently working on creating a special zone system, which implements preferential measures for existing regulations, measures providing tax, fiscal and financial support in an integrated manner. Through this new system, innovative growth is expected to accelerate.

(Efforts to Create Comprehensive Special Zone System)

On December 22, 2011, the government designated the first comprehensive special zones. 7 regions were selected for “International Strategic Zones” to formulate an industry-/function-concentrated base as driving force of Japan’s economic progress, and 26 regions were selected for “Local Revitalization Special Zones” to enhance regional communities based on revitalization efforts making maximum use of regional local resources.

Among the areas selected for international strategic zone, “Tsukuba,” Japan’s largest international R&D center with a number of state-of-art research facilities, had some major issues to resolve. For instance, the past research results did not quite match with the immediate creation of new businesses and industries, and there were only a few opportunities for multiple research organizations to work together with shared goals for creating new businesses and industries since the formulation of TIA. In order to resolve these issues and promote life innovations and green innovations, Tsukuba, utilizing this comprehensive special zone system, will seek to realize the promotion of the shared-use of the world’s most advanced research facilities based on relaxation of regulations including the Act of Normalization of Grants, and the facilitation of wide-range inter-organization personnel exchange, etc.

(3) Establishment of Regional Innovation System

For advancing efforts toward the solution of various regional problems and revitalizing local areas with the power of S&T, it is essential for each region to make active use of its diversity, distinctiveness and originality. Therefore, concerned ministries aim to construct a system that a region can autonomously develop S&T innovation activities with use of its advantages and features, in order to develop vigorous regions, restore and recover from the GEJE, and thus advance and diversify Japan's S&T, and enhance its industrial competitiveness through the creation of regional S&T innovations. To this end, the ministries actively provide regions with coordinated assistance.

Since 2011, MEXT, METI and MAFF have jointly selected regions with independent and prominent visions toward the creation of regional innovations. These visions were formulated by the coordination and cooperation among local public organizations, research institutes including universities, industrial sectors and financial institutions. The ministries designated the selected regions as “Regional Innovation Strategy Promoting Regions,” and established a system to support the selected regions, using ministries' every measure available, for consistently developing S&T innovations from research step to commercialization.

In 2011, “9 Regions Focused on Strengthening International Competitiveness” that have universities with globally superior technology seeds, concentration of corporations, and powerful potential to attract human resources/materials/capitals, and “14 Regions Focused on Advancement of Research Function/Industrial Concentration” that are expected to develop innovations using regional distinctiveness and possess potential to acquire overseas market in the future, 23 regions in total, were jointly selected by MEXT, METI and MAFF for “Regional Innovation Strategy Promoting Regions.”

1) MEXT

Out of these regional innovation strategy promoting regions, MEXT has selected 13 regions found to significantly contribute to the realization of STI strategy in the region. The Ministry currently provides these regions with soft-focused and human-focused support such as accumulating IP, cultivating human resources, etc. (Figure 2-2-16).

MEXT also works on the program of “Creating Local Active Human Resources Fostering Institutions” financed by strategic funds for S&T promotion, to assist efforts for creating bases that produce outstanding human resources who make regional contribution in collaboration with local public organizations and private business operators. As of 2011, MEXT proceeds with efforts for local revitalization using S&T in 53 bases.

Under the “Adaptable Seamless Technology Transfer Program through Target-driven R&D (A-STEP),” JST offers comprehensive support to generation of regional innovations by conducting R&D consistent from the discovery of technology seeds to the corporatization with meticulous assistance of S&T coordinators.

2) MIC

Based on the promotion of local industries through ICT (i.e. Information and Communications Technology) R&D, which is one of the primary themes in the “Strategic Information and Communications Research and Development Promotion Programme,” MIC pursues joint research with universities and corporations that carry out ICT-related R&D for creating region-based new industries, promoting local businesses, and revitalizing local communities, etc.

3) MAFF

MAFF has launched the implementation of the “Research and Development Projects for Application in Promoting New Policy of Agriculture, Forestry and Fisheries.” In these projects, MAFF selects a research subject that leads to the resolution of technical problems for local revitalization, production site, etc., using regionally-oriented free ideas, and promotes R&D on the subject led by industry-academia-government collaborations among prefectural R&D institutes and local universities. Furthermore, the Ministry boosts regional R&D in the fields of agriculture, forestry, fishery and food by staffing industry-academia-government collaboration coordinators specializing in these fields across the country.

4) METI

To develop new demands and turn them into the actual development of products that can help create new local industries and businesses, METI has formed research teams composed of optimally-combined industry-academic-government R&D resources, and implemented R&D projects on practical application enabling technology for the development of new products.

With the goal of promoting commercialization of outstanding technology that answers the needs of the disaster-affected areas and thus making contributions to restoration and development of these areas, METI has also provided subsidies to the cost spent on the joint demonstrations or performance evaluations of practical application enabling technology carried out by R&D institutes under the management of enterprises, universities and local public agencies located in the areas that suffered serious damage by the GEJE.

In addition, for “Establishing New Industry-Academic-Government Collaborative Framework in the Tohoku Area,” the Ministry aims to accelerate innovations and create industrial clusters in the fields of materials, which universities and manufacturers in Tohoku area specialize. To this end, METI provides assistance for the establishment of a base for material-related R&D and industrialization by

industry-academia-government collaborations.

AIST characterizes its own regional centers deployed in 8 locations throughout Japan as research bases that lead the highest level research in the world while reflecting local features and needs, and collaborative bases that transfer research results to local industries. Using these centers as regional open innovation hubs for small and medium enterprises on technical support, joint research activities and human resources development, AIST promotes the revitalization of local industries.

(4) Promotion of IP Strategy and International Standardization Strategy

With the arrival of “Global Network Era,” the mobility of information, capital, goods, technology and human resources has increased. For strengthening the international competitiveness in such times, Japan must further stimulate activities for international standardization, promote strategic use of certification, achieve a strategic and comprehensive IP management system necessary for worldwide IP marketing, build and operate IP infrastructures, and cultivate and secure human resources in IP field.

In light of such background, the IP Strategy Headquarters has compiled the IP Promotion Plan 2011 that includes priority strategies such as “Stage-up Strategy for International Standardization” and “Competitive Strategy for IP Innovation,” and promotes measures taken by the government as a whole.

In particular, Japan faithfully implements and studies “International Standardization Strategy (2nd Action Plan)” to strategically utilize international standardization in 7 specific fields (advanced medical technology, water, next generation vehicles, railways, energy management, digital contents and robots), and makes efforts to promote international preliminary examinations in English as well as international examiner conferences, expand Patent Prosecution Highway (PPH) throughout Asia, and develop a plan for “IP Human Resource Development,” etc.

1) Efforts toward the Formulation and Implementation of International Standardization Strategy

For the promotion of innovations through the dissemination of R&D achievements and enhancement of industrial competitiveness, METI, based on the relevant programs including New Growth Strategy and IP Promotion Plan, pushes forward with strategic international standardization activities. As the Ministry proposed Japan’s advanced technologies to be internationally standardized in 2011, METI has also actively been involved in the creation of standards at such places as International Organization for Standardization (ISO) or International Electrotechnical Commission (IEC). According to the national projects such as the “Project to Promote Strategic International Standardization,” Japan also engages in development in environmental energy fields including smart grid-related technologies, and conducts continuous, intensive verification testing and supplementary R&D specifically on globally-superior products/technologies. Through such efforts, Japan pushes hard for international standardization. Furthermore, AIST and National Institute of Standards and Technology (NIST) under the U.S. Department of Commerce, the world-leading Japanese and American research institutes, together develop R&D partnership for the international standardization in the fields of nanotechnology, energy and environment, biotechnology, and other areas.

On the domestic ground, METI steadily makes fundamental efforts for standardization on creating Japan Industrial Standards (JIS), which contribute to the improvement of social environment that provides people with safety and security and gives consideration to the elderly and persons with disabilities.

As for cultivation of human resources for standardization, METI continues to dispatch instructors to standardization-related courses at universities. In addition, aiming to cultivate personnel able to demonstrate their initiative at international institutions for standardization and actively promote Japan's international standardization activities, METI offers industrial standardization awards.

Meanwhile, MIC promotes standardization activities at International Telecommunication Union (ITU) and forums, focusing on the prioritized technology fields such as smart grid, digital signage¹ and next generation browsing software.

As the water business was viewed as one of the specific strategic fields for international standardization in the IP Promotion Plan, MLIT promotes strategic policies for international standardization in order to create an international market in which Japanese enterprises aiming for the global development in the field of water supply and sewerage systems can demonstrate its high-level competitiveness. The Ministry is currently taking active part in formulating ISO international standards in the project committee on wastewater reuse for irrigation (ISO/PC253), asset management (ISO/TC224 and ISO/PC251) and crisis management (ISO/TC224 WG6). Furthermore, MLIT also advances the consideration on the international standards of wastewater reuse in urban areas, with a view to the future establishment of ISO standards at the North East Asia Standards Cooperation Forum for the promotion of standardization activities among Japan, China, and Korea.

2) Review of IP System, and Improvement of System for IP Activities

In response to changes in the global innovation environment, relevant agencies create and implement international standardization strategies. In the meantime, the agencies make below-described efforts in order to review Japan's IP system and advance the improvement of IP activity-related systems.

(i) JPO

a) Formulation and Publication of International Standardization Strategies

As economic globalization and innovation become increasingly open, JPO formulated and publicized the "Global IP Initiative" in July 2011, to progressively improve international IP infrastructures for Japanese corporations to be able to smoothly conduct business anywhere in the world, and currently proceeds with the initiative toward the realization of such infrastructures. For this purpose, JPO has implemented the "Patent Prosecution Highway (PPH)," the system that enables an accelerated examination overseas based on an application that is first determined patentable, between 22 countries and regions (as of April 2012). JPO also strives to prepare an environment, which enables to investigate foreign patent documents, especially Chinese and Korean documents that are rapidly increasing, including the use of machine translation.

b) Implementation of Accelerated Examination System

The accelerated examination system, which allows an examination on a patent application at early stage, has been implemented under certain conditions to meet various applicants' needs related to timing of the

¹ Digital signage is a system that transmits information using electric displays in the locations such as outdoors, store front, public space and transportation facilities

acquisition of the right. Additionally, since August 2011, the “Accelerated Examination and Accelerated Appeal Examination to Support Recovery from Earthquake Disasters,” which conducts early examination on patent applications submitted by disaster victims and offices in disaster-hit areas, has been implemented to support the reconstruction, while these disaster-affected corporations utilize IP. Moreover, for the important applications that require quicker process for patent acquisition than the accelerated examination, JPO practices the super accelerated examination system.

c) Revision of Patent Act (patenting for inventions published on the media such as television or radio)

Inventions which have been disclosed by inventors, etc. at academic conferences held abroad or to the media such as television or radio before filing a patent application, could not be patented. Due to the revision of Patent Act (Article 30), however, these inventions have now become patentable on or after April 1, 2012.

d) Information Provision regarding Patent Licensable and Research Tools

For the promotion of smooth use of IP, the National Center for Industrial Property, Information and Training provides database-compiled information pertaining to licensable patent and research tools.

e) Implementation and Publication of Technological Trend Research

To use patent information for making R&D strategies, the collaboration between IP policies and R&D are required even at the stage of R&D policy planning. JPO, therefore, conducts and publicizes the result of technological trend researches which comprehensively analyze “patent application trends,” based on “R&D trends” and “market trends” specifically in green innovations and life innovations.

f) Cultivation and Recruitment of Human Resources

To disseminate knowledge about IP, the National Center for Industrial Property, Information and Training assists high schools and technical colleges engaged in practical cultivation of human resources focusing on IP.

(ii) JST

JST promotes the coherent efforts at all levels ranging from discovering remarkable research results, supporting its patent acquisition and to developing it toward corporatization. In particular, JST gives strategic support for the acquisition of foreign patent based on research results generated by universities, covers the costs for testing and research carried out by researchers hoping for strengthening of patent and additional acquisition of data, etc., with the idea of practical application of the patent, provides free information regarding the patents developed by universities via internet (J-STORE), and offers a patent-restriction-free research environment by opening up access to the patents in the research stage held by universities (Science and Technology Commons). Through these efforts under the “Promotion of the Use of IP,” JST comprehensively supports IP utilizations.