Promotion of University-Industry Linkages in Japan

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NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY POLICY

ASIALICS Tokyo
September 20, 2013

Today's Topics

1. Key S&T Indicators Relating to University-Industry Cooperation

2. Administrative Structure and Development of University-Industry Cooperation Policy

3. Overview of Relevant Public Policies and Programs

4. Highlights of NISTEP's Related Studies

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1. Key S&T Indicators and Figures Relating to University-Industry Cooperation

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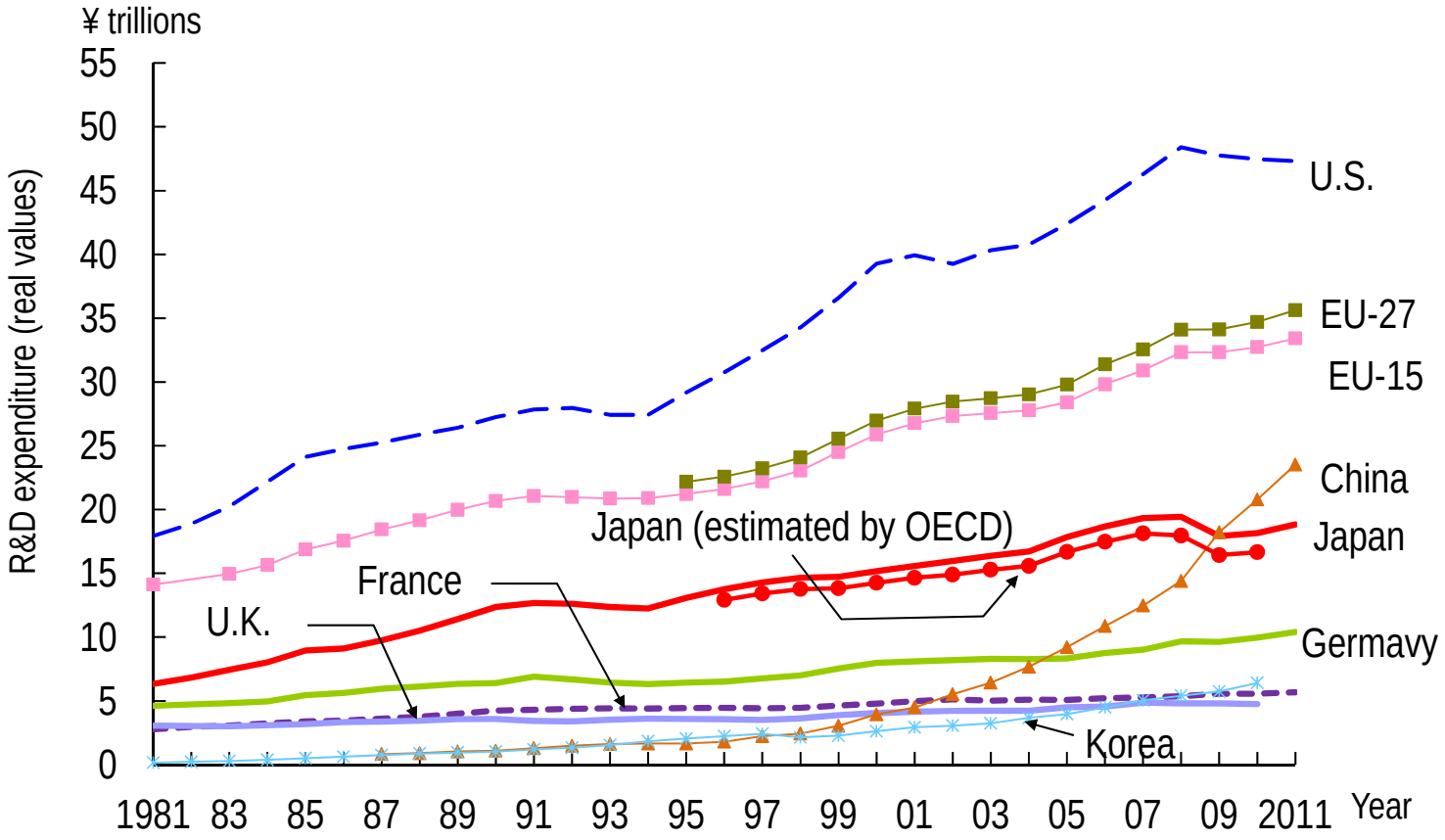
Trend in total R&D expenditure in selected countries
Real values
(2000 base: OECD purchasing power parity equivalent)



Sources: National Institute of Science and Technology Policy, Japanese Science & Technology Indicators 2013, Research Material-225, August 2013

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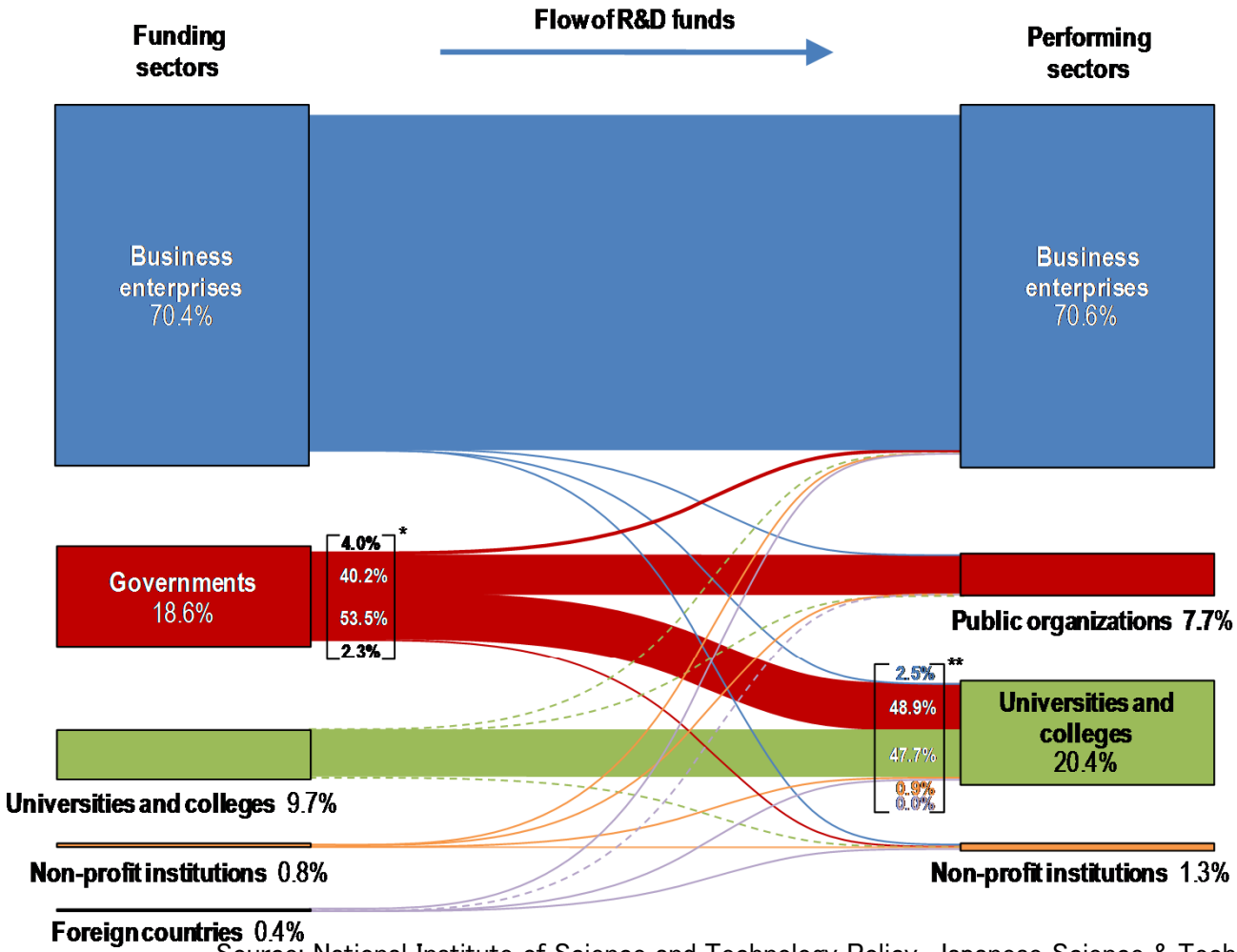
Flow of R&D funds from funding sectors to performing sectors in selected countries
Japan（2011）



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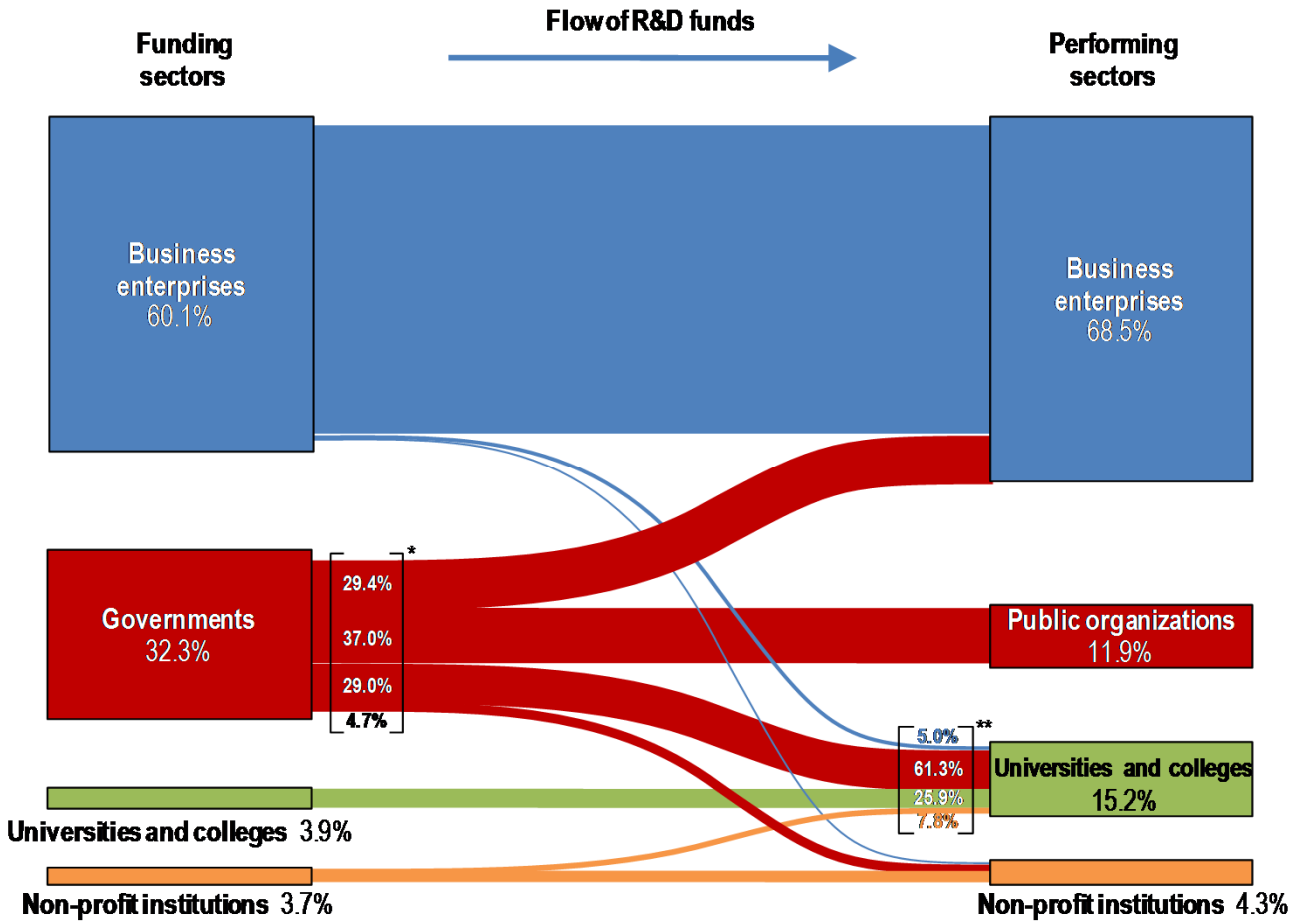
Flow of R&D funds from funding sectors to performing sectors in selected countries
U.S.(2011)



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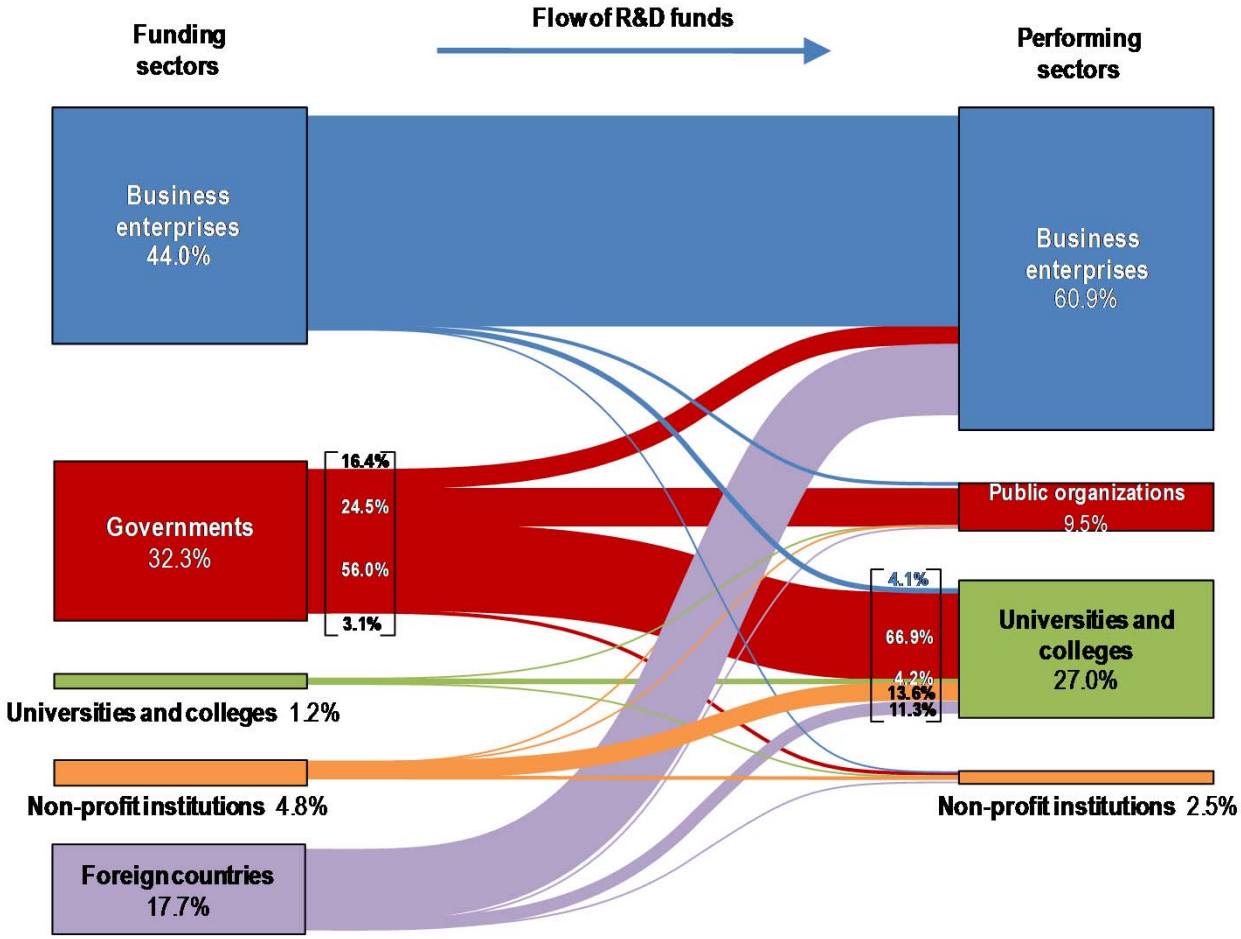
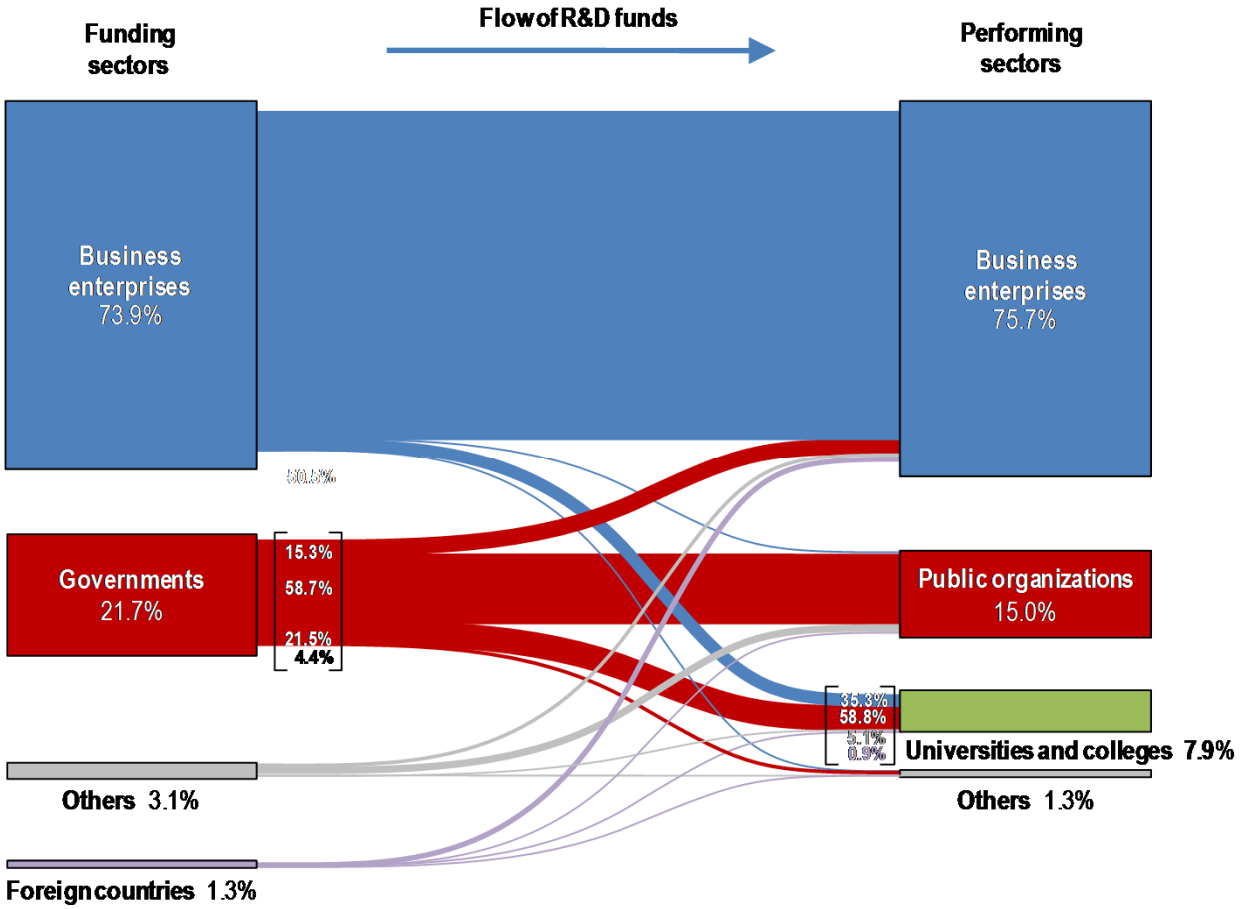
Flow of R&D funds from funding sectors to performing sectors in selected countries
U.K.（2010）



Source: National Institute of Science and Technology Policy, Japanese Science & Technology Indicators 2013, Research Material-225, August 2013

Flow of R&D funds from funding sectors to performing sectors in selected countries
China(2011)



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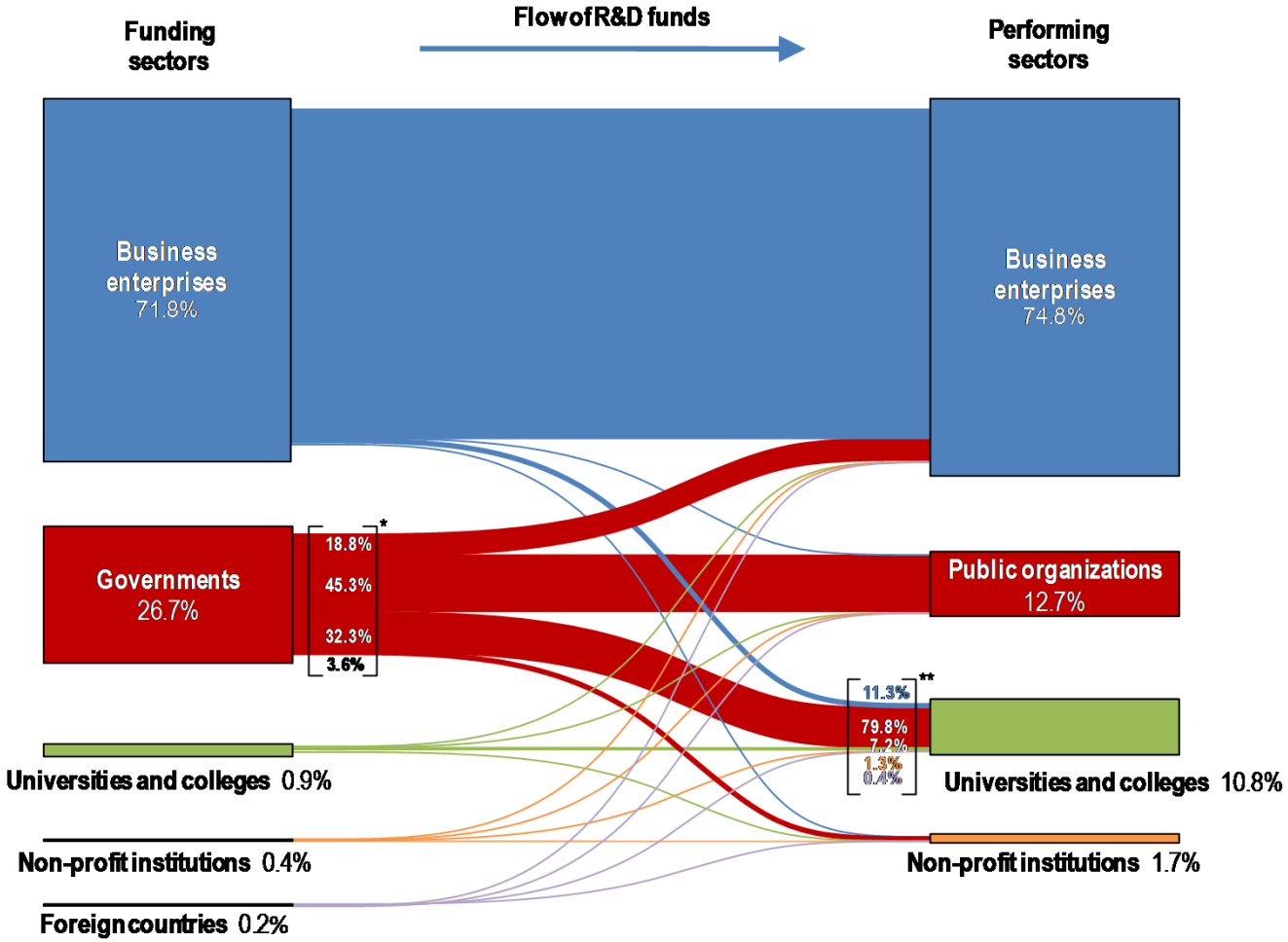
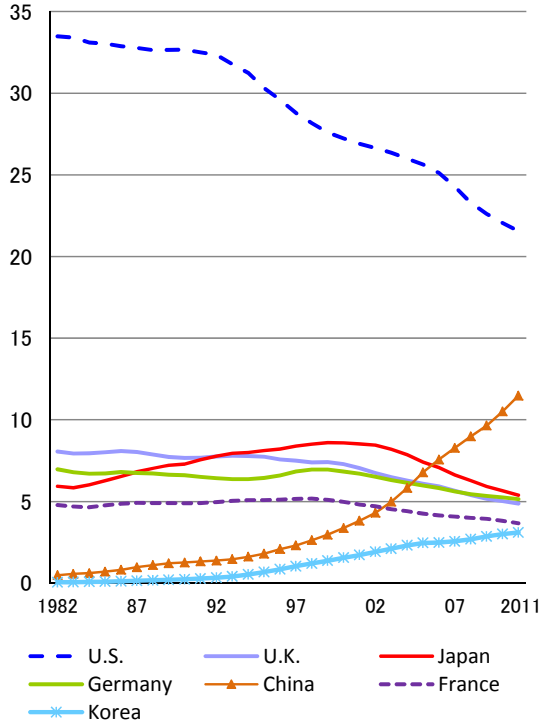
Flow of R&D funds from funding sectors to performing sectors in selected countries
Korea（2010）



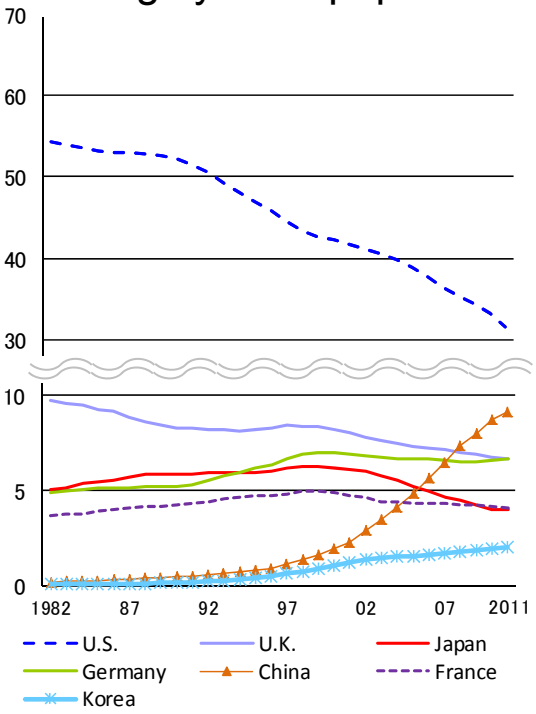
Source: National Institute of Science and Technology Policy, Japanese Science & Technology Indicators 2013, Research Material-225, August 2013

The change in the share of the numbers of papers in main countries

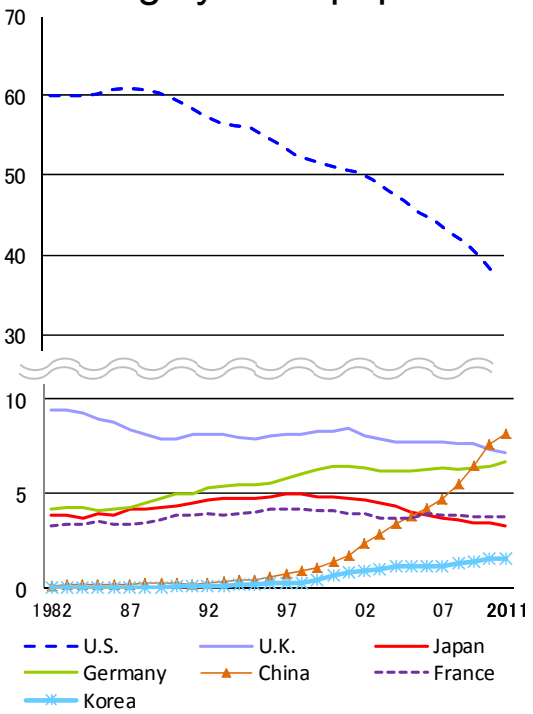
The Share of the number of All papers



The Share of the number of Top10% highly cited papers



The Share of the number of Top1% highly cited papers



Data: 3-years moving average of share tabulated from Thomson Reuters "Web of Science(SCIE, CPCI-S)" by fractional counting.

Source: National Institute of Science and Technology Policy, Japanese Science & Technology Indicators 2013, Research Material-225, August 2013

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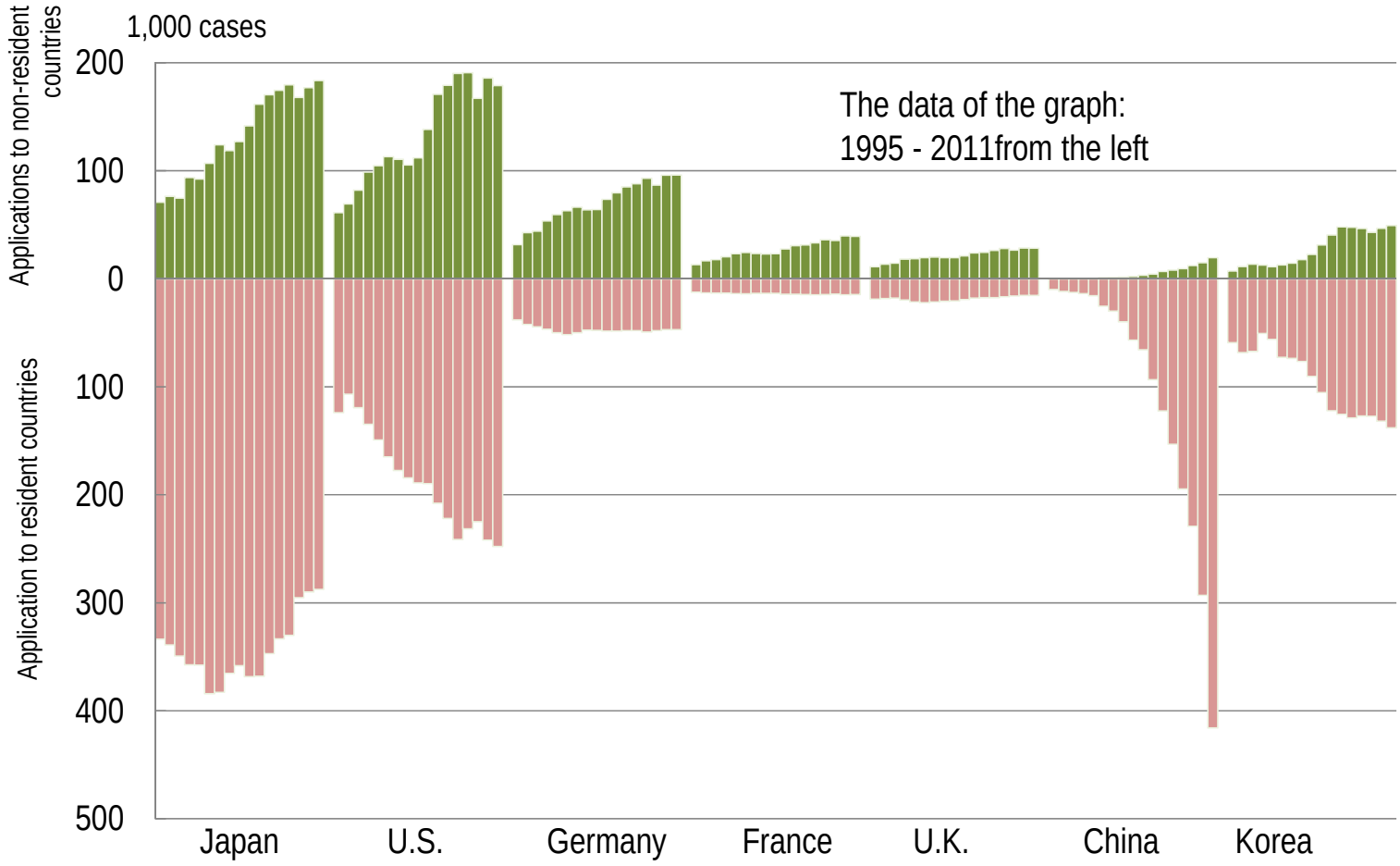
Analysis of Paper Publication by sector in Japan

1. Falling number of papers by private companies.
2. Growing number of papers by public research institutions (IAI).
3. Slight decrease in domestic share of national universities.
4. Slight increase in domestic share of private universities.

Number of papers published by sectors in Japan (fractional counting method)

All fields	No. of papers		
	2002-2004 (average)	2008-2010 (average)	Rate of change
National universities	29,096	30,648	5%
Public universities	2,789	2,756	-1%
Private universities	8,821	10,356	17%
Independent Administrative Institutions	4,572	5,466	20%
Private companies	4,298	3,767	-12%
Japan total	56,693	61,170	8%

The numbers of patent applications from main countries (1995–2011)



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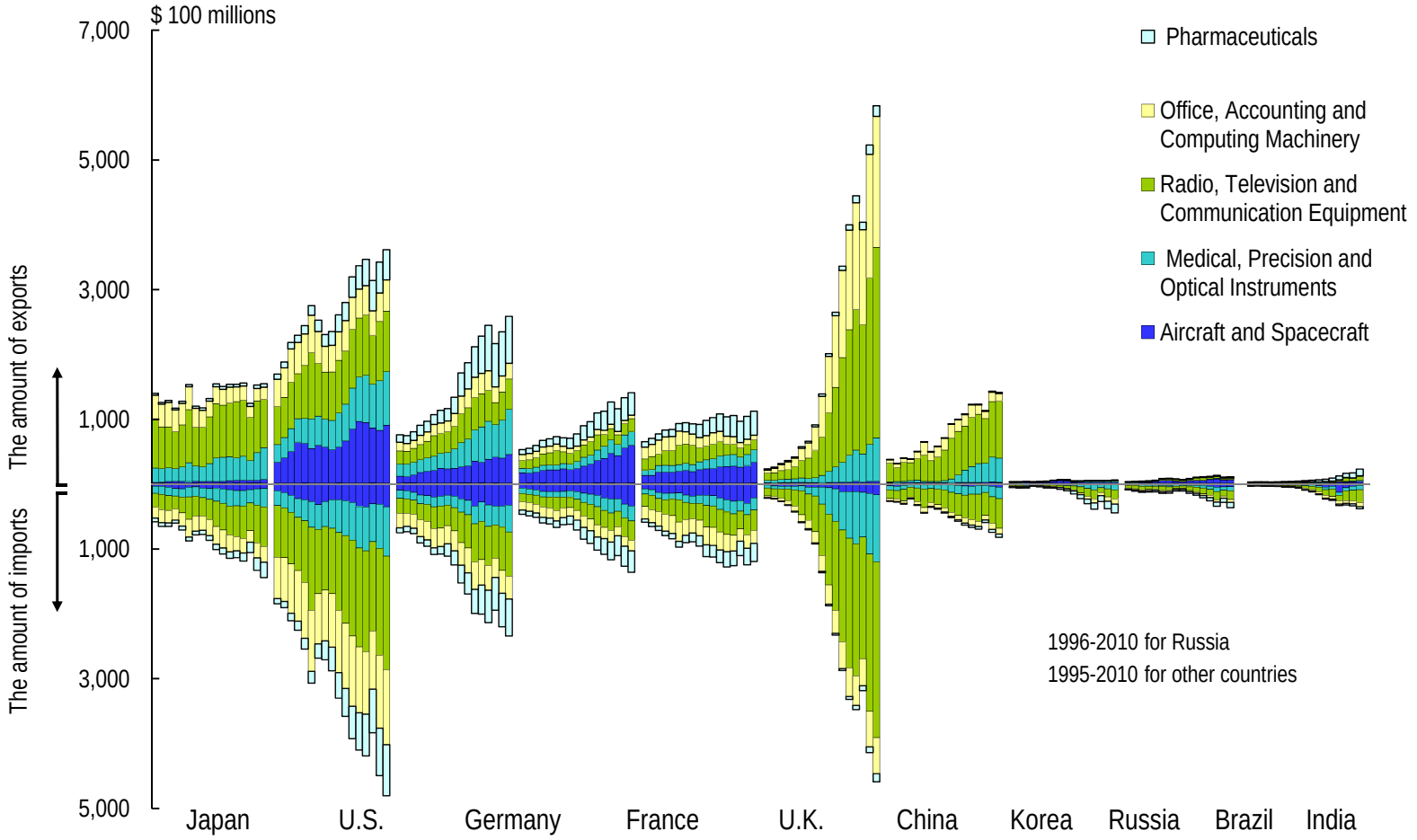
Change in the trade amount of high technology industry in main countries



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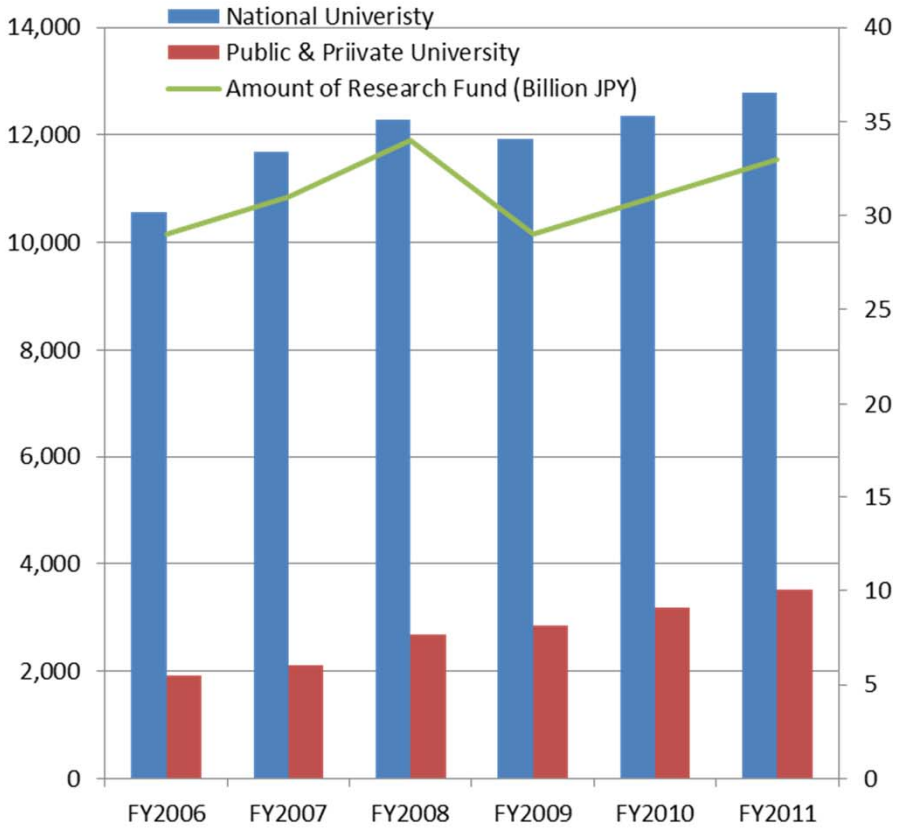
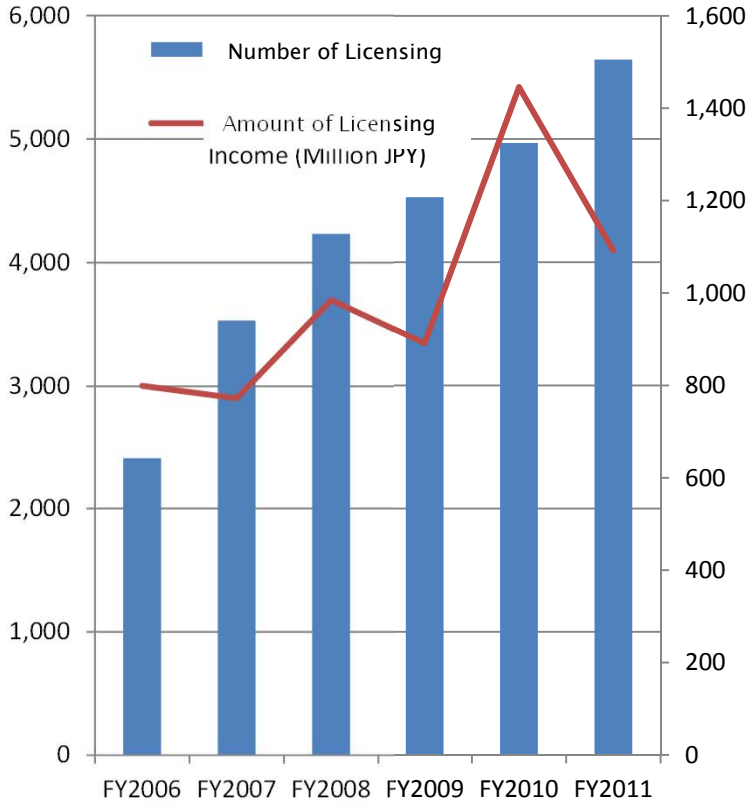
Trends in University-Industry Collaboration (Cont'd)

Collaborative Research between University and Industry



Licensing of University Patents



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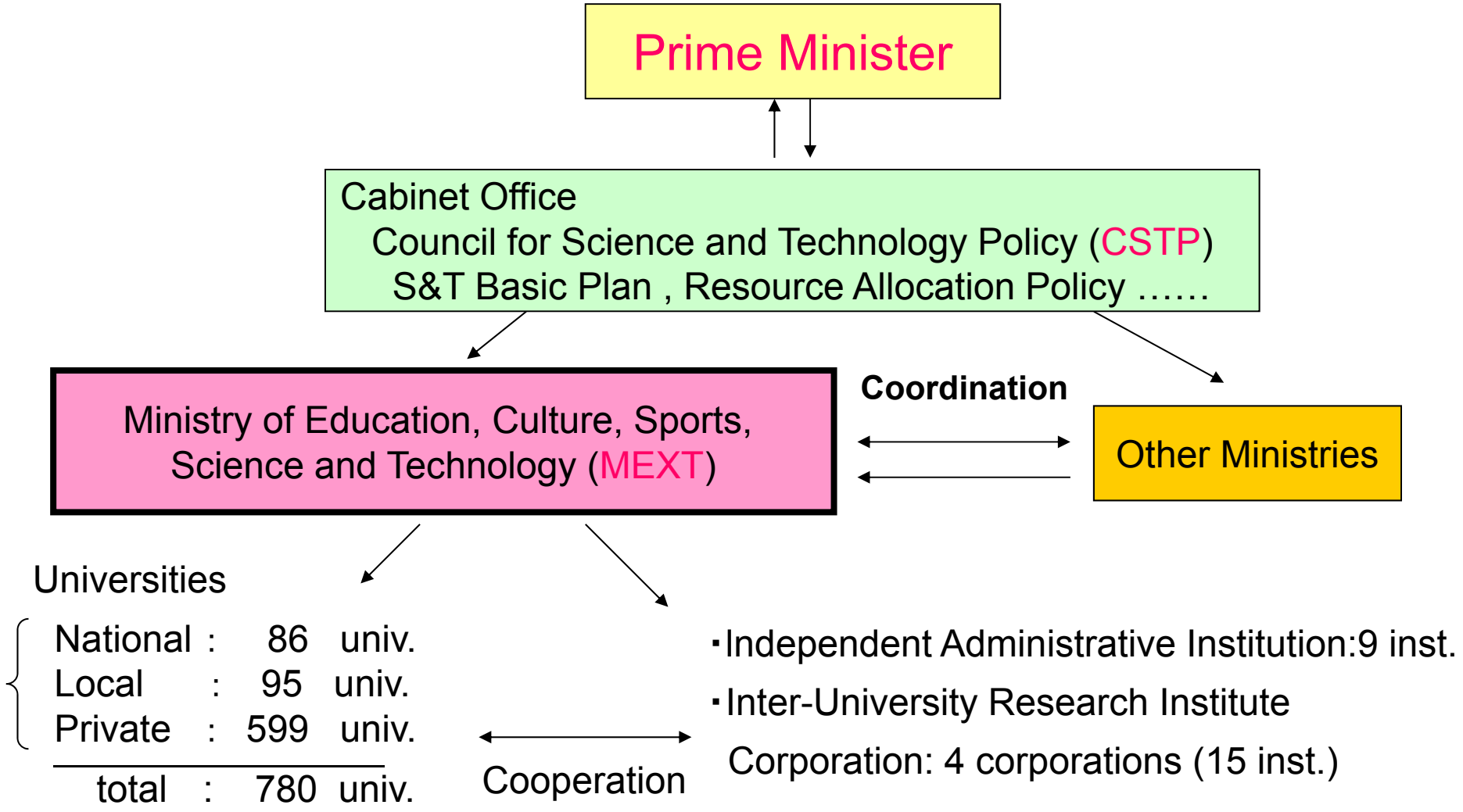
2. Administrative Structure and Development of University-Industry Cooperation Policy

Administrative Structure for S&T Policy



（※Source: FY2011 School Basic Survey）

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Administrative Structure for S&T Policy

Science and Technology Basic Law (enacted in 1995)

The 1st Science and Technology Basic Plan (FY1996～2000)

●Increase in governmental R&D expenditure

The total budget for governmental R&D expenditure exceeded 17trillion yen.
(result: 1 7.6 trillion yen)

●Construction of new R&D system

・Increase in competitive research funds
・Support plan for 10,000 post-doctoral fellows (including Ph.D students)
・Promotion of industry-academia-government collaboration
・Implementation of evaluation system

The 2nd Science and Technology Basic Plan (FY2001～2005)
The 3rd Science and Technology Basic Plan (FY2006～2010)

●Three basic ideas
・Creation of Wisdom
・Vitality from wisdom
・Sophisticated society by wisdom

●Key policies
・strategic priority setting in S&T
－promotion of basic researches
－Prioritization of R&D on national/social subjects
・S&T system reforms
－Doubling of competitive research funds
－Enhancement of industry-academia-government collaboration
・Total budget of 2nd basic policy24trillion yen
(result:21.1trillion yen)
・ Total budget of 3rd basic policy 25trillion yen
(result: 21.7trillion yen)

The 4th Science and Technology Basic Plan (FY2011～2015)

●Basic Concept
・Integrated development of "STI policies"
・Further focus on the "role of human resources and the organizations"
・Realization of Policy Created together with Society

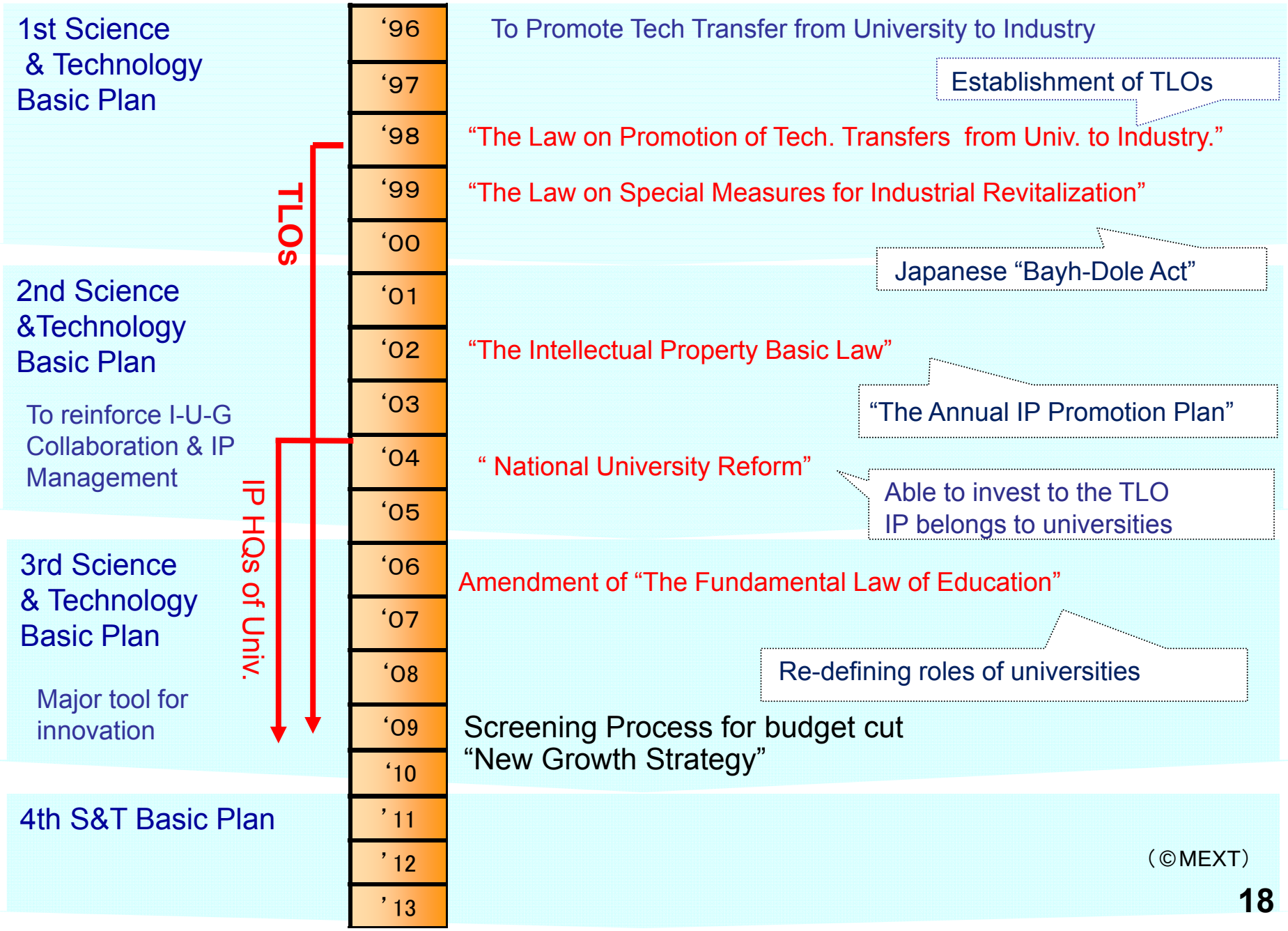
・**Realization of Sustainable Growth and Societal Development into the Future**
・**Recovery and rehabilitation from the recent earthquake**
・**Green and Life Innovation**
・**Enhancing Basic Research and Human Resource Development**
・**Establishing the PDCA Cycle and Action Plan for improving science policy**

Total amount of the government R&D investment

→25trillion yen

Prepared by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) based on materials prepared by the Cabinet Office

Chronological table of University-Industry Collaboration



(©MEXT)

3. Overview of Relevant Public Policies & Programs

Overview of Promoting Policies for Industry Collaboration & Regional Innovation

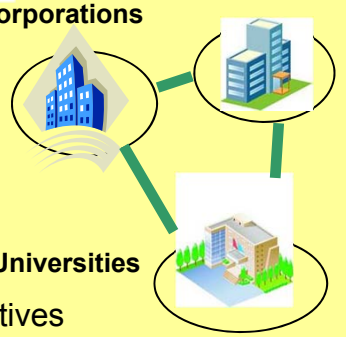
MEXT Policy **JST Policy**

JST stands for Japan science and Technology Agency
which is one of the independent administrative institutions in Japan.

【 Project for Developing Innovation Systems 】

Regional Innovation Strategy Support Program

Effectively support a high-quality locally led scheme to encourage regional innovation.
In particular, new support for research conducted by multiple regions.



①Support to Forming Regional Cluster under Local Initiatives

③【 Infrastructure of industry-university cooperation 】

・University Research Administrator (URA)

⑤【 Support for patent applications 】

・JST support center for technology transfer
・JST support for overseas patent applications

Outputs / Outcomes of basic research

【Creating an environment conducive to beefing up support for commercialization】

②Project for Creating New Industries from Universities

Set up a system to encourage innovation by creating a team at universities and similar institutions to work on commercialization beginning at the invention phase and by promoting unified R&D and business development.

Support for collaborative research (ideas-push)

・**④ A-STEP** Adaptable and Seamless Technology Transfer Program through Target-Driven R&D

Support for top-down collaborative projects

1.Large-scale and long-term R&D projects with consortiums

2.Development of systems and technology for advanced measurement and analysis

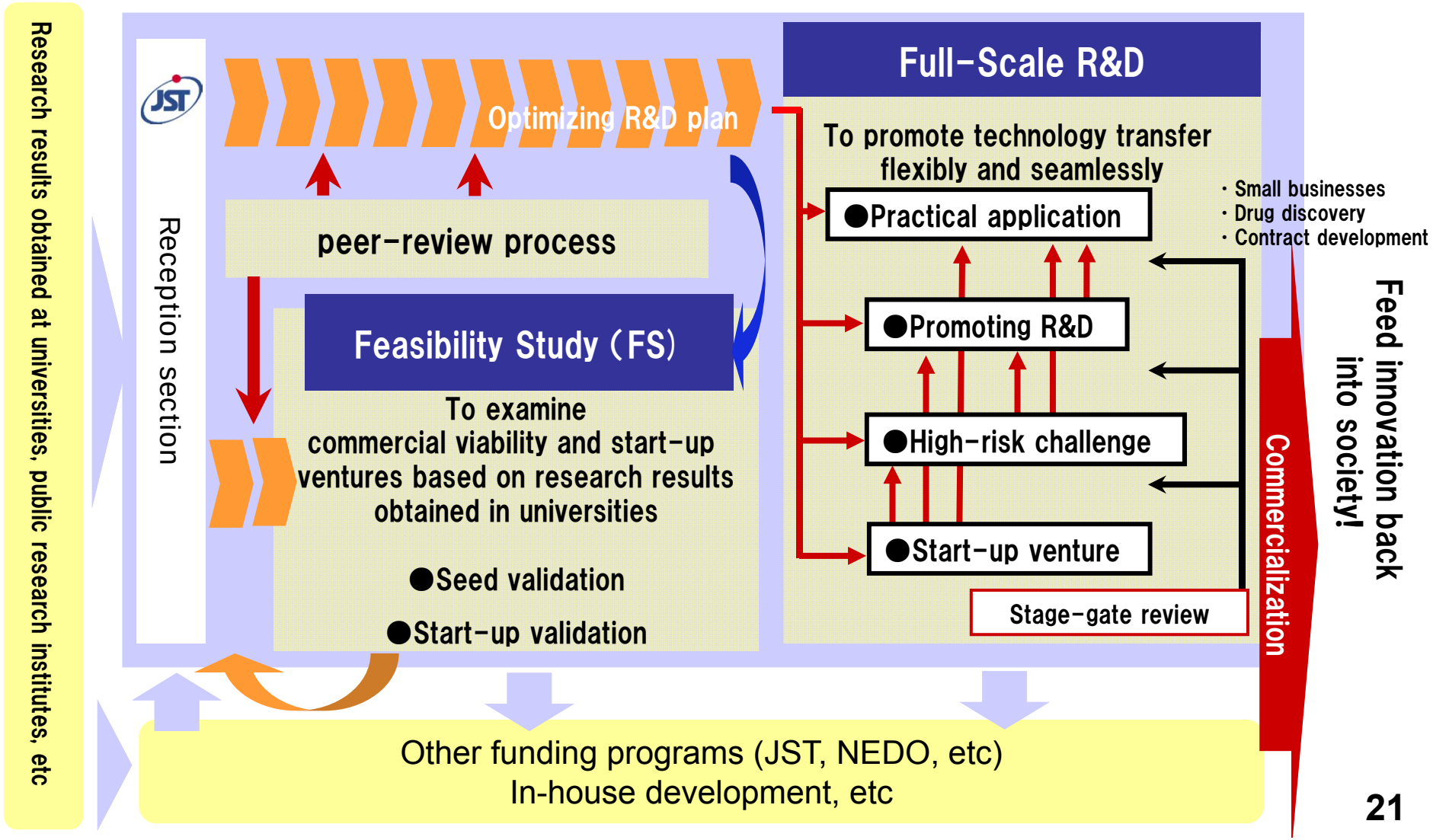
3. Cooperative basic research projects to solve problems in industry

Funding Program for Technology Transfer ~A-STEP~

FY2013 Budget: 14.5 billion yen

Adaptable and Seamless Technology Transfer Program through Target-Driven R&D (A-STEP)

- Covering all fields of R&D for technology transfer including medical sciences.
- Application is submitted jointly by university researchers and company partners.



Pioneering Results brought by A-STEP and Previous Projects

Development period 1987～1990

The innovation was created from a long-term pure and basic research in the industrial world.

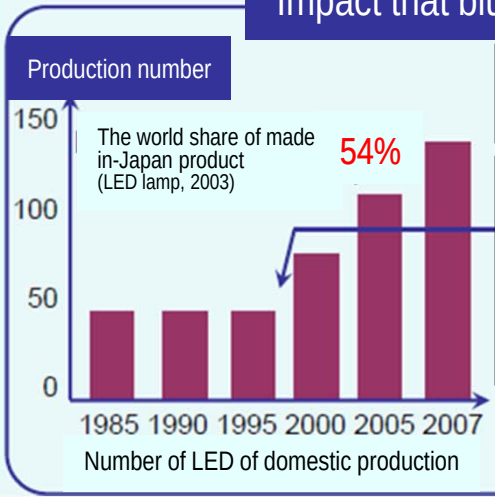
Isamu Akasaki （Nagoya univ）

It succeeds in blue LED development of the world first by using gallium nitride (GaN).

TOYODA GOSEI CO., LTD.

The expression of full-color became possible by putting blue LED it to practical use.

Impact that blue LED and white LED bring



1960's Discovery of basic principle of LED (United States)
1970's was put to practical use.

1990's that is the invention of Japan puts it to practical use.
Three primary colors of light become complete, and all the colors become feasible.
is achieved by combining the luminescent material with "Blue".

Production increases rapidly, and the usage has expanded greatly.

New market value of about 350 billion yen arose by blue LED a result of development.

Effect by LED production
80.7 billion yen

LED sales of Toyoda Gosei
53.2 billion yen

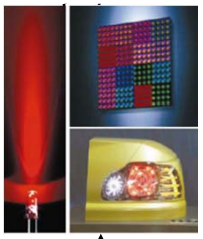
Effect by product sales
210.9 billion yen

Effect of job creation
32,000 Employment

http://www.jst.go.jp/itaku/result/effect.html

Pioneering Results brought by A-STEP and Previous Projects

1972
High luminosity Red LED
➔ Display



1977
Amorphous metals
➔ Magnetic components in electronic devices

1986
GaN-based blue LED
➔ Display devices

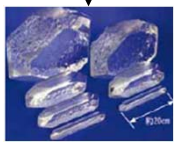
1997
Polymers with phospholipid polar group
➔ Cosmetics, contact lenses, biocompatible materials

2000
^{18}O-labeled water for PET diagnosis
➔ Early detection and treatment of cancer

2003
Retinoic acid nanoparticles
➔ Cosmetics

2004
Large high-precision scanner system
➔ For cultural assets etc.

Since1958

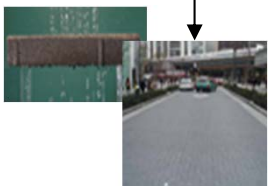


1959
Synthetic crystal
➔ Radios, TVs, Watches, mobile phones, PCs

1980
Interferon preparation (IFN_β)
➔ Medicine for Brain tumors, malignant melanomas, viral

1990
Oxide superconductor
➔ Superconductive cables/motors

1991, 1998
Optically active alcohols
✪ Practical application of research by R. Noyori (Nobel Prize in Chemistry 2001)



2000
Mitigating method for heat island phenomenon
➔ Water-retentive pavement

2005, 2006
Production engineering of valuable antibodies
➔ Surgical influenza face masks, air cleaner

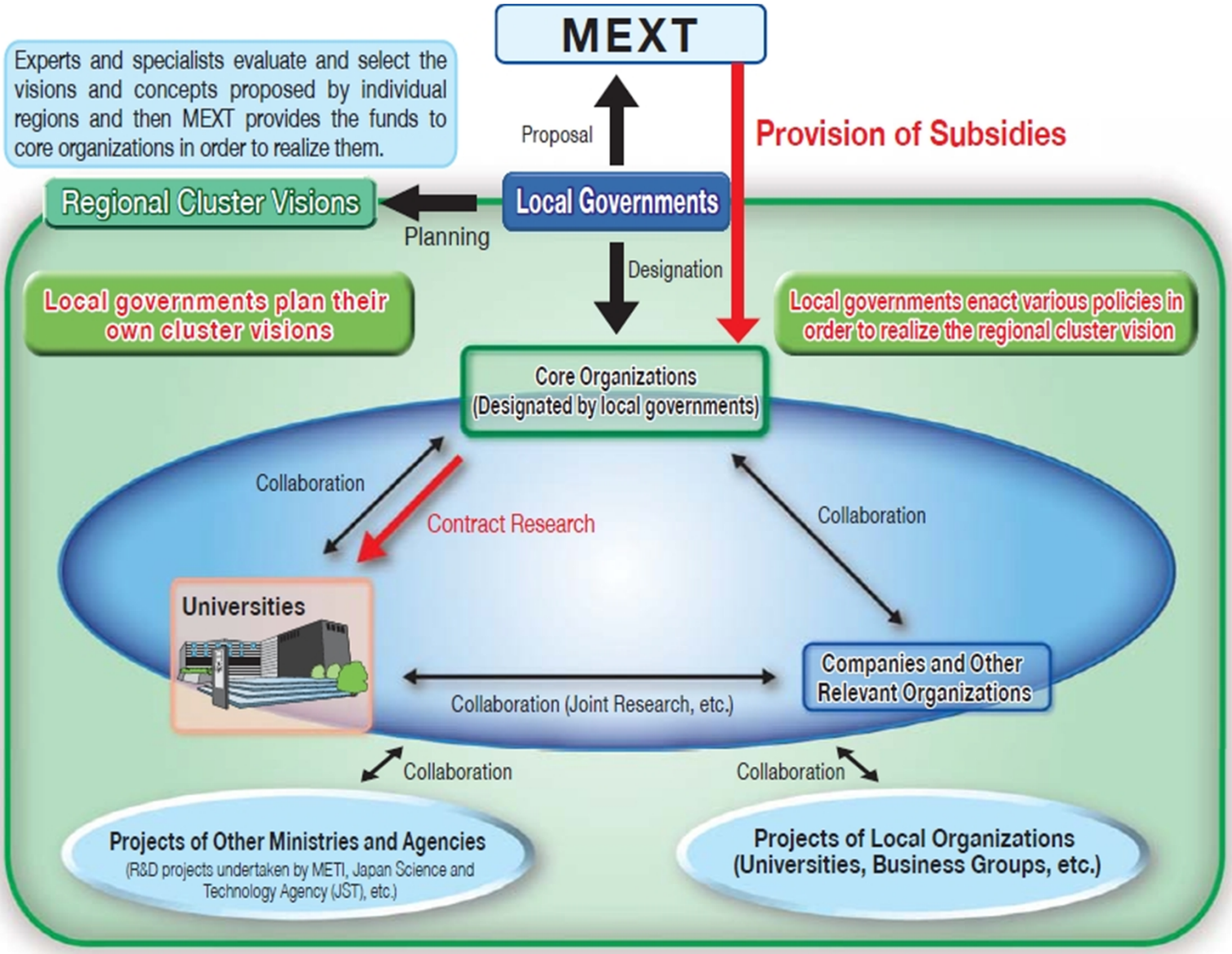
JST-launched start-ups : 248 (as of Nov. 09; cumulative)

- 12% of all academic start-ups ever established.
- Gross sales: ¥11 B, Employees: 1,800
- Benefit for the overall economy: ¥20 B

Licensing income: ¥19 B (as of Jan. 2010, cumulative)

- Benefit for the overall economy: ¥627 B (approx. estimation)

Structure of the Regional Innovation Cluster Program



Support to Forming Regional Cluster under Local Initiatives (2012)

Knowledge Cluster Initiative

MEXT strongly supports the formation of world-class clusters, while encouraging regional independence, in cooperation with relevant ministries such as METI

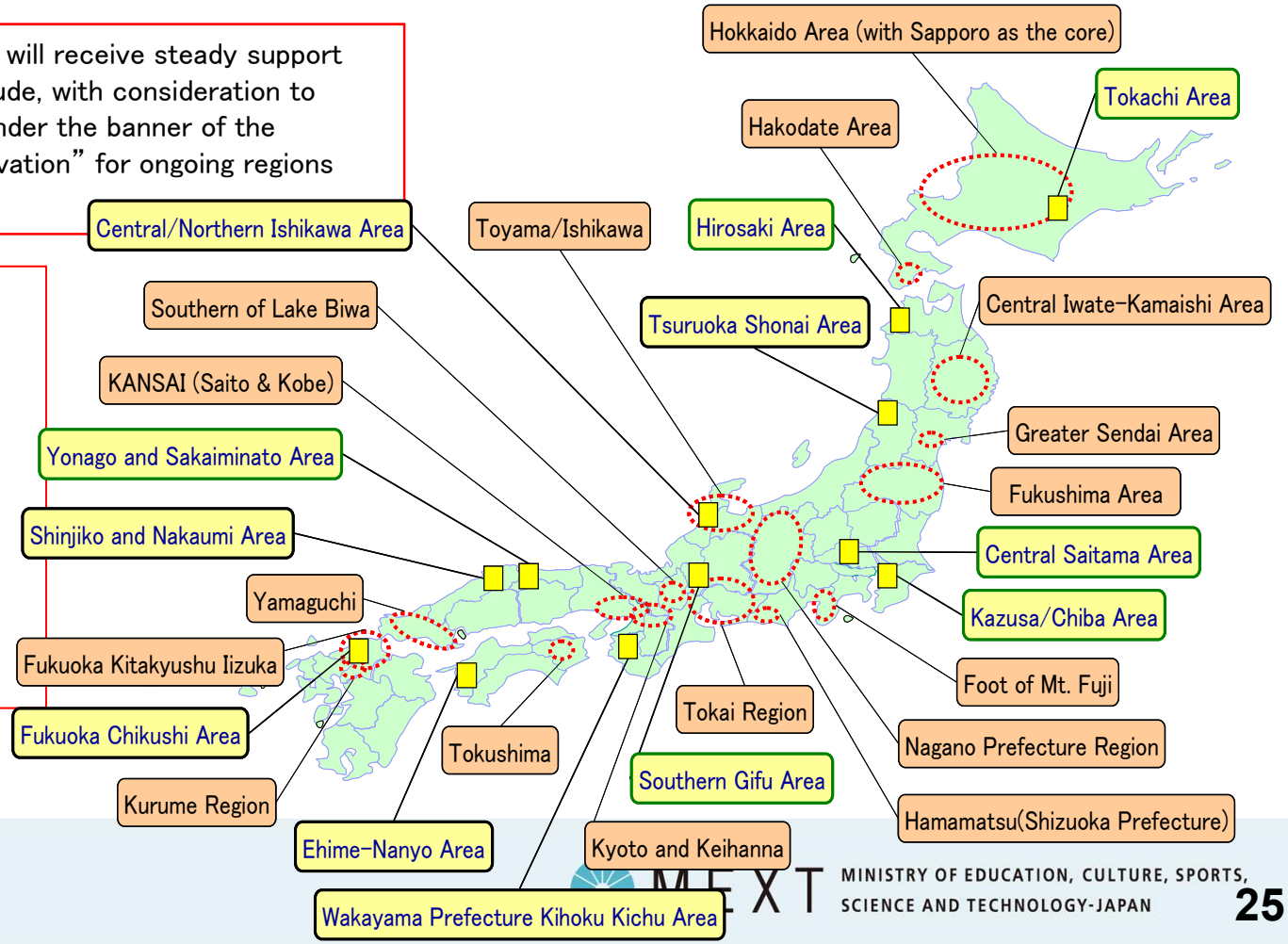
City Area Program

MEXT supports the creation of new businesses and R&D businesses that utilize unique regional resources through industry-academia-government collaborations

Knowledge Cluster Initiative and City Area Program Map

On Ongoing Regions

Regions with ongoing cluster projects will receive steady support until 2013 when ongoing issues conclude, with consideration to project continuity and consistency, under the banner of the "Program for Fostering Regional Innovation" for ongoing regions



Typical Results (FY 2002 to 2010)

- ✓Patents Domestic 3,829
  International 692
- ✓Practical Use (commercialization, Incorporation, etc.) 3,434
- ✓Articles Domestic 4,655
  International 9,435
- ✓Sales of related products
  Approximately 82.2 billion JPY
  (7.53 billion EUR)

Major Achievements

Fukuoka Kitakyushu Iizuka Global Type : 2nd Stage (FY2007 ~ 2011)

Companies attracted to the region by the efforts to establish a world-class R&D hub of advanced system LSI

(Background)

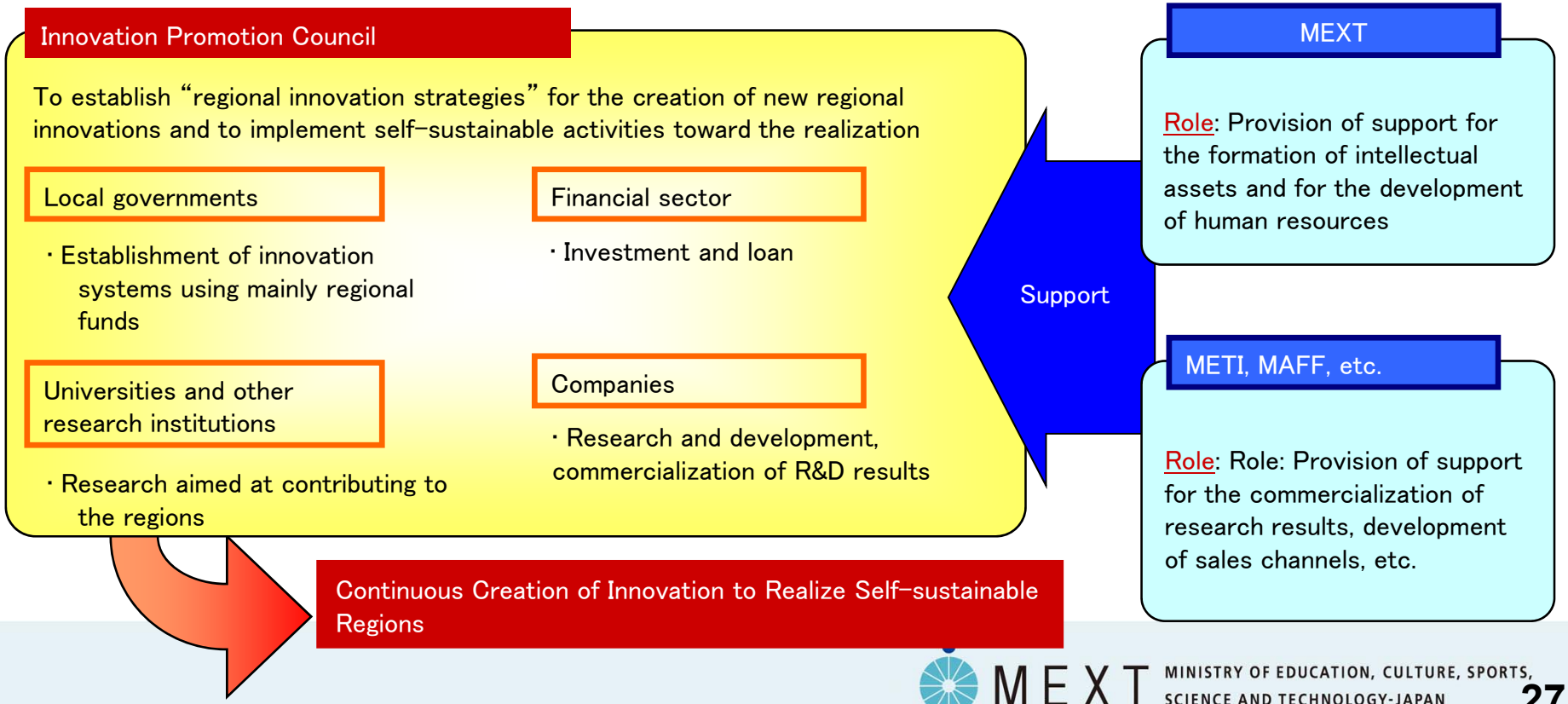
- Aiming at activating the "Silicon Sea Belt region", where more than 70% of semiconductors produced in the world are consumed.
- Collaboration with research organizations in the Silicon Sea Belt region in order to promote joint research toward the commercialization of research results.

(Project)

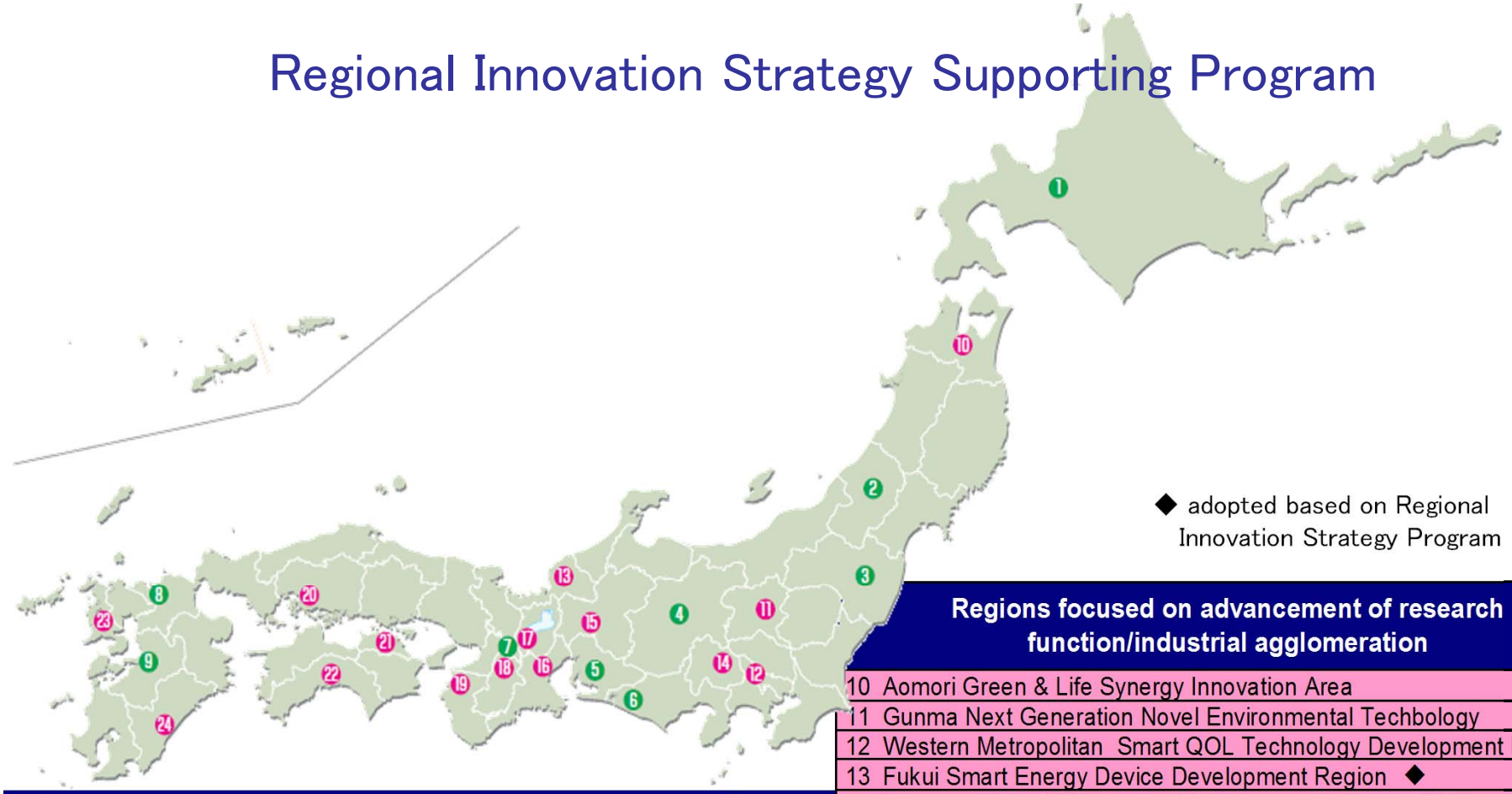
- Expanding the network with other research centers in the Asian region and spurring business exchange activities through interregional exchange events such as international conferences and technical exchange meetings.
- The number of system-LSI-related companies in the region increased by more than ten times during the period from Fiscal 2000 to Fiscal 2011, to 225 companies

New Inter-Ministry Initiative for Regional Cluster Policy

- Regional Innovation Strategies Support Program
  - In Fiscal 2011, MEXT, Ministry of Economy,Trade and Industry (METI) and Ministry of Agriculture, Forestry and Fisheries (MAFF) jointly designated regions with excellent visions toward the creation of regional innovations as "Regional Innovation Strategy Promoting Regions".
  - Among these regions, those with especially outstanding strategies will receive seamless support from these ministries to help the regions realize their regional innovation strategies comprehensively and efficiently.



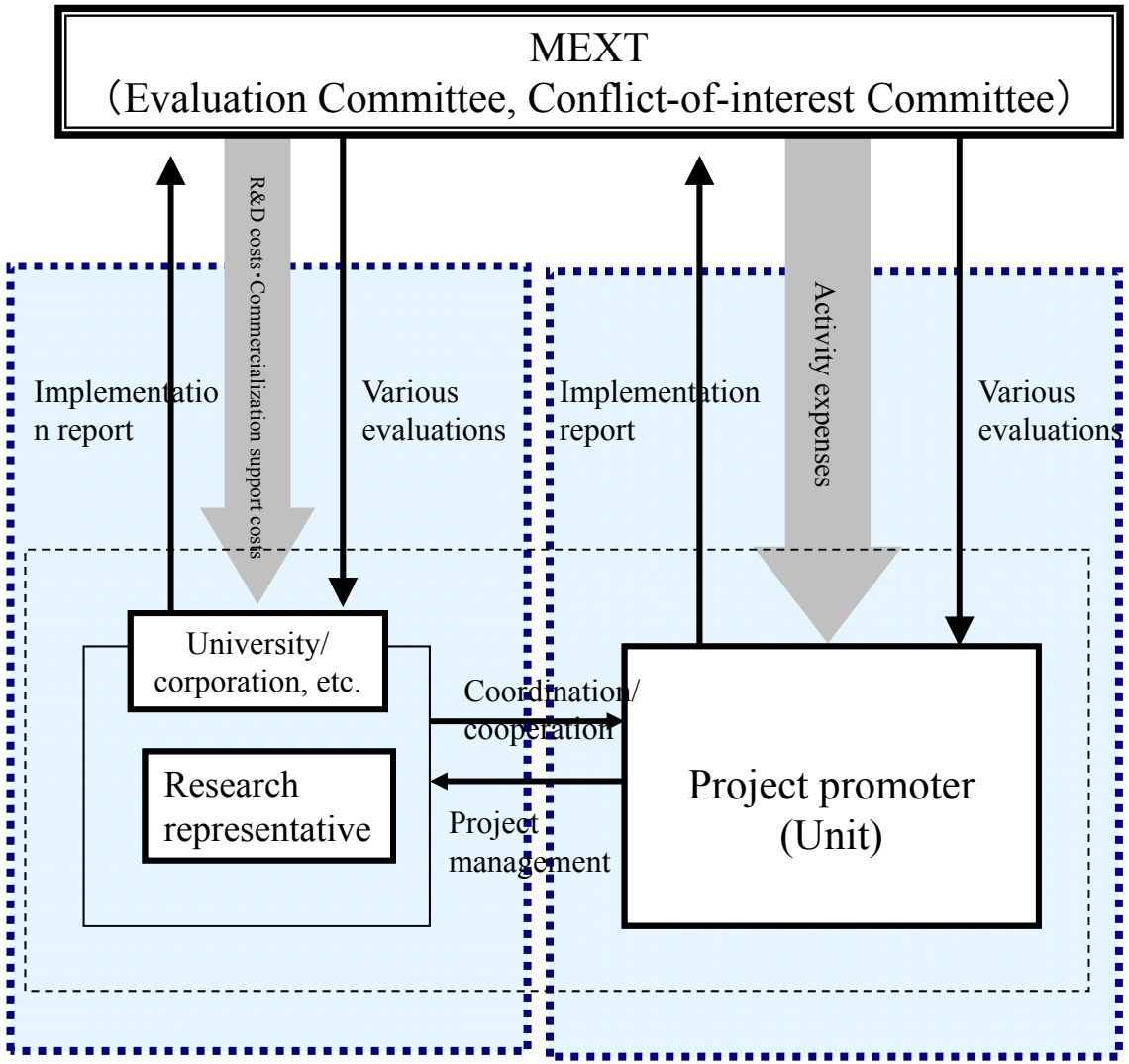
Regional Innovation Strategy Supporting Program



◆ adopted based on Regional Innovation Strategy Program

Regions focused on reinforcement of international competitiveness	Regions focused on advancement of research function/industrial agglomeration
1 Hokkaido University Research & Business Park	10 Aomori Green & Life Synergy Innovation Area
2 Yamagata Organic Electronics Innovation Strategy Promotion Region ◆	11 Gunma Next Generation Novel Environmental Techbology
3 Fukushima Next Generation Medical Industry Cluster	12 Western Metropolitan Smart QOL Technology Development Region
4 Nagano Super Module Supply Hub ◆	13 Fukui Smart Energy Device Development Region ◆
5 Aichi Nanotechnology Innovation Strategy Promotion Region ◆	14 Yamanashi Next Generation Environmental and Health Care Industry Development Area
6 Hamamatsu/Higashi-Mikawa Life Photonics Innovation	15 Gifu Technology Innovation Promotion Area ◆
7 Keihanna Science City Health Care Development Region ◆	16 Mie Energy Innovation Region ◆
8 Fukuoka Next Generation Social System Development Promotion Hub	17 Circum-Lake Biwa Environmental Industry Development Area ◆
9 Kumamoto Organic Electronics Cooperation Area ◆	18 Nara Functional Plants Application Region
	19 Wakayama Health Care Indsutry Innovation Promotion Region
	20 Hiroshima Medical Engineering Innovation Promotion Region ◆
	21 Kagawa Medical Industry Development Region ◆
	22 Kochi Green Innovation Promotion Region
	23 Nagasaki Heath, Medical and Welfare System Development Region
	24 Miyazaki Food Bio Innovation Area

Framework of the Program for creating STart-ups from Advanced Research and Technology (START)



(2) Project support type **(1) Project promoter support type**

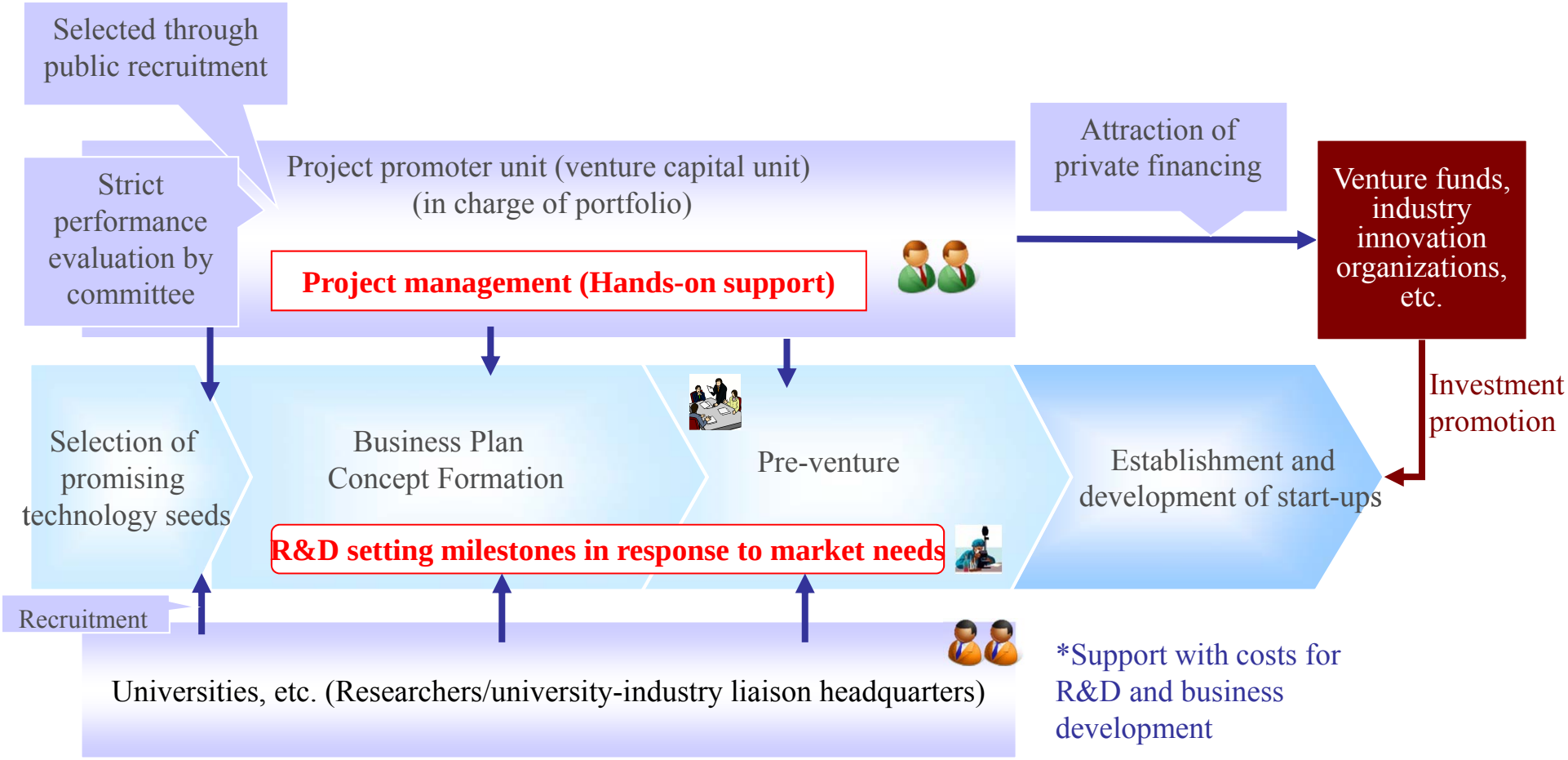
(1) Project promoter support type

Provides hands-on support from the seed/early stages and assists activities related to the discovery of seeds by organizations that support commercialization through the creation of start-ups, due diligence, and the integrated management of project development and R&D.

(2) Project support type

Subsidizes R&D costs and commercialization support costs under the management of the project promoter for innovative technology seeds R&D conducted by research organizations such as universities /incorporated administrative agencies.

Program for Creating STart-ups from Advanced Research and Technology (START)



*Experience, accumulation of knowledge, human resource training, and reutilization of human resources through the creation of successful examples (sustainability)

*1 Technology seeds: elemental technology
*2 Portfolio: technology seed groups

Support for Technology Transfer (JST)

FY2013 budget: 2.8 billion yen

Support for technology transfer and intellectual property activities in universities by supporting international patent application and offering occasions for Industry-University matching.

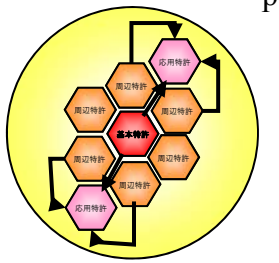
Universities

Achievements at Univ. by Grant-in-Aid for Scientific Research

Support for patent application

○Assist international patent application at Univ.

○Assist developing patent portfolio



Promotion of technology transfer

Secure coordination among relevant organizations to promote technology back into society

○Consultation desk
○Occasions for matching
- Innovation Japan
- New Technology Presentation Meetings

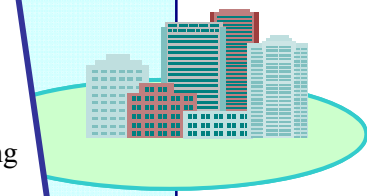
Development of experts

Development of human resources with excellent eyes for technology transfer

○Offer training meeting

JST

Industry



Accelerating Utilization of University IP

○ support to ncrease the value of patents held by Universities and Public Research Institutions
○ collaboration with investment institutions
○ Establish "Research Patent Commons" enabling patents to be used gratuitously limited to research,also, offer related information

Center of Innovation (COI) Stream
(S&T based Radical Innovation and Entrepreneurship Program)

MEXT 文部科学省

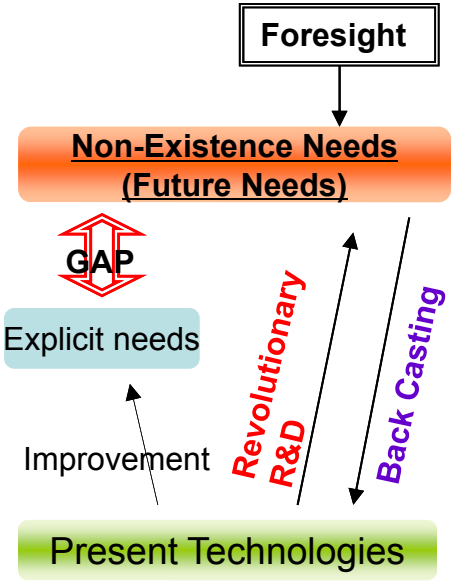
Mission: Create radical innovations under the growth strategy of JAPAN to win the global competition.

Concerns

●**Mismatching** between researches and change of industrial structure	●**Insufficient** Academia-Industry Collaboration ●**Gaps** between Research results and radical /destructive innovations	●**Needs** to create unique technologies continuously, which can not be followed by others, to raise the level of Japan's industrial competitiveness

Budget Plan for FY2013 : $100M (12centers to be established)

Solutions



Establishment of Radical Agenda

Based on the "**Science and Technology Intelligence**",

-- Specify needs of society or markets of ten years later
-- Scenario development and research subjects setting that respond to the needs

Fusion of Different Research Fields to Create Emerging Areas

Establishment of research system by fusion of wide variety of fields

--Promoting R&D in emerging areas in collaboration with industries
--Open to youth/ international talents

Matrix of Academia-Industry Collaboration

	Existing Seeds	Unexploited Technologies
Explicit Needs	Tech Transfer	Joint Research
Implicit Future Needs	**Revolutionary R&D at COIs**	

Research Management by Higher Expertise

●Management team for promoting **seamless R&D** from basic research to commercialization
●Introducing viewpoint of both "**seeds push**" and "**needs pull**"

International Collaboration : Joint activity of Foresight/ Conceptual Design of COIs/ Exchange of Researchers

4. Highlights of NISTEP's Related Studies

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Related Studies I - Highlights of "Survey on Research Activities of Private Corporations (2012)": (1) Purpose & Method

- Purpose
  - To understand R&D activities of corporations, and to collect basic data for planning and promotion of policy for science, technology and innovation.
- Investigation items (R&D activities of corporations in FY2011)
  - Trend of R&D expenses and staffs
  - Activities on intellectual property
  - Innovation process (i.e. introduction of new products or services)
  - Cooperation with other organization
  - Influence of the Great East Japan Earthquake
- Target group
  - The survey questionnaire was sent to 3,287 corporations that have capital stock of at least 100 million yen and that conduct R&D activities.
  - Response rate: 44.3% (1,434 corporations responded.)
- Method
  - The survey was conducted from Nov. to Dec. 2012 by questionnaire survey.
  - Financial matters (ex. amount of sales) questioned on the conditions of FY2011, and human resource matters questioned on the conditions at the end of March in 2011

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(2) Trend of R&D investment : Changes in external R&D expenditures (comparison by panel data)

- The median of external R&D expenditures has increased
  - by 54.9% (100 million yen to <1 billion yen);
  - by 51.5% (1 billion yen to <10 billion yen);
  - by 51.0% (10 billion yen or more).

Changes in R&D expenditures per corporations of main business unit, by capital classification

(10,000 yen)

	FY2011			FY2010		
Capital classification	N	Mean	Median	N	Mean	Median
100 million yen to < 1 billion yen	144	12246.9	488.0	144	15881.9	315.0
1 billion yen to < 10 billion yen	167	19804.6	500.0	167	16963.8	330.0
10 billion yen or more	135	193633.2	8635.0	135	179340.4	5720.0
Total	446	69980.7	1000.0	446	65764.4	640.0

Note: The corporations that answered external R&D expenditures both in the FY 2010 and FY2011 were calculated.

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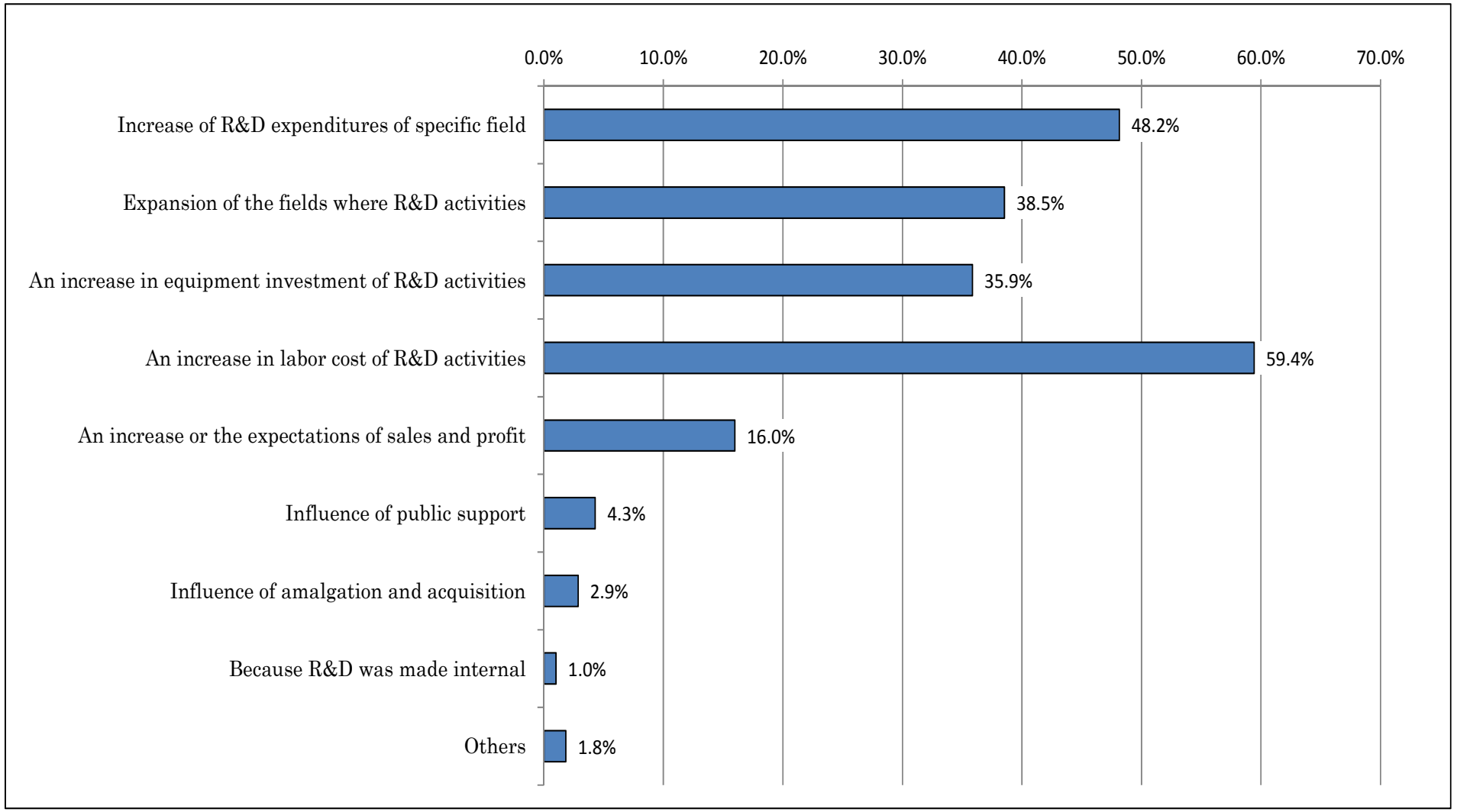
(2) Trend of R&D investment : Factor affecting the increase of internal R&D expenditures



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(3) Employment of researchers:
Ratio of corporations hiring researchers

- More than half of the sample did not employ researcher. (The ratio in the survey was 53.8% last year, and it has decreased a little.)
- The hired ratio of researcher with master's degree was the highest. The corporation of about 90% did not employ the researcher with doctoral degree. The employment of postdoctoral fellows was extremely small.

Ratio of Corporations hiring researchers

	N (a)	Number of corporations that hired (b)	Percentage of corporations that hired (b/a)
Total number of researchers (including new graduates and those with mid-career employment)	974	448	46.0%
with bachelor's degree	974	237	24.3%
with master's degree	974	351	36.0%
with doctorate degree	974	101	10.4%
(Postdoctoral fellows at the time of the adoption)	974	11	1.1%
Female researchers	974	219	22.5%

Note: Only the corporations that answerd the total number of researchers and all the five breakdown items were calculated.

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(4) Activities on intellectual property: Ratio of the number of patents by the period before executing

- Before or within less than a decade after receiving a patent, the ratio of the number of patents executed in-house is lower in the case of jointly-owned patents with the university, than the ratio in all patents.
- The ratio of the number of patents executed in more than a decade after receiving it is higher in the case of jointly-owned patents with the university than the ratio in all patents.

⇒It reflects that patents jointly owned with university have a characteristic of a basic technology far from the preeminence of the market.

The ratio of the number of patents, by the period until executing it by itself

	N	Execution before patenting		Ratio less than 3 months after patenting		Ratio between 3 months to<1 year after patenting		Ratio between 1 year to<5 years after patenting		Ratio between 5 years to<10 years after patenting		Ratio more than a decade after patenting	
		Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Ratio of the number of patents by the period until executing(note 1)	880	65.7%	90.0%	6.7%	0.0%	8.0%	0.0%	11.5%	0.0%	4.6%	0.0%	2.4%	0.0%
Ratio of the number of patents jointly owned with the university by the period until executing(note 2)	406	39.8%	0.0%	2.0%	0.0%	4.2%	0.0%	8.3%	0.0%	4.1%	0.0%	6.5%	0.0%

Note 1: Only the corporations that answered all breakdowns and they have at least one national patent were calculated.

Note 2: Only the corporations that answered all breakdowns and they have at least one patent jointly owed with the university were calculated.

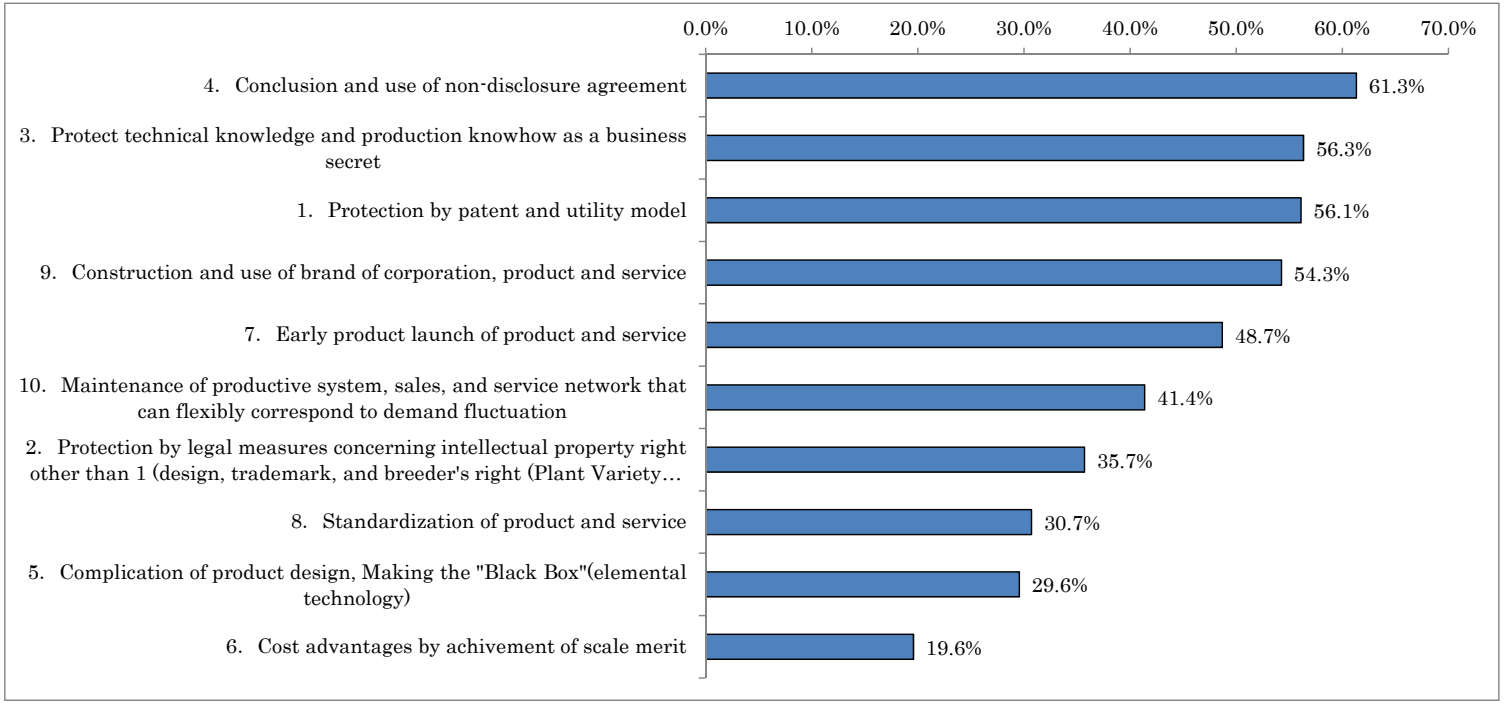
(5) Attaining innovation in the major product or service field : Means to secure profits

- The corporations value the strategy to monopolize the technical intelligence obtained by their R&D as a mean to secure the profits of a new product or service, mainly by:

➢ Securing exclusive right by patenting

➢ Protecting technical intelligence as secrecy

Proportion of firms' ideas to achieve competitiveness



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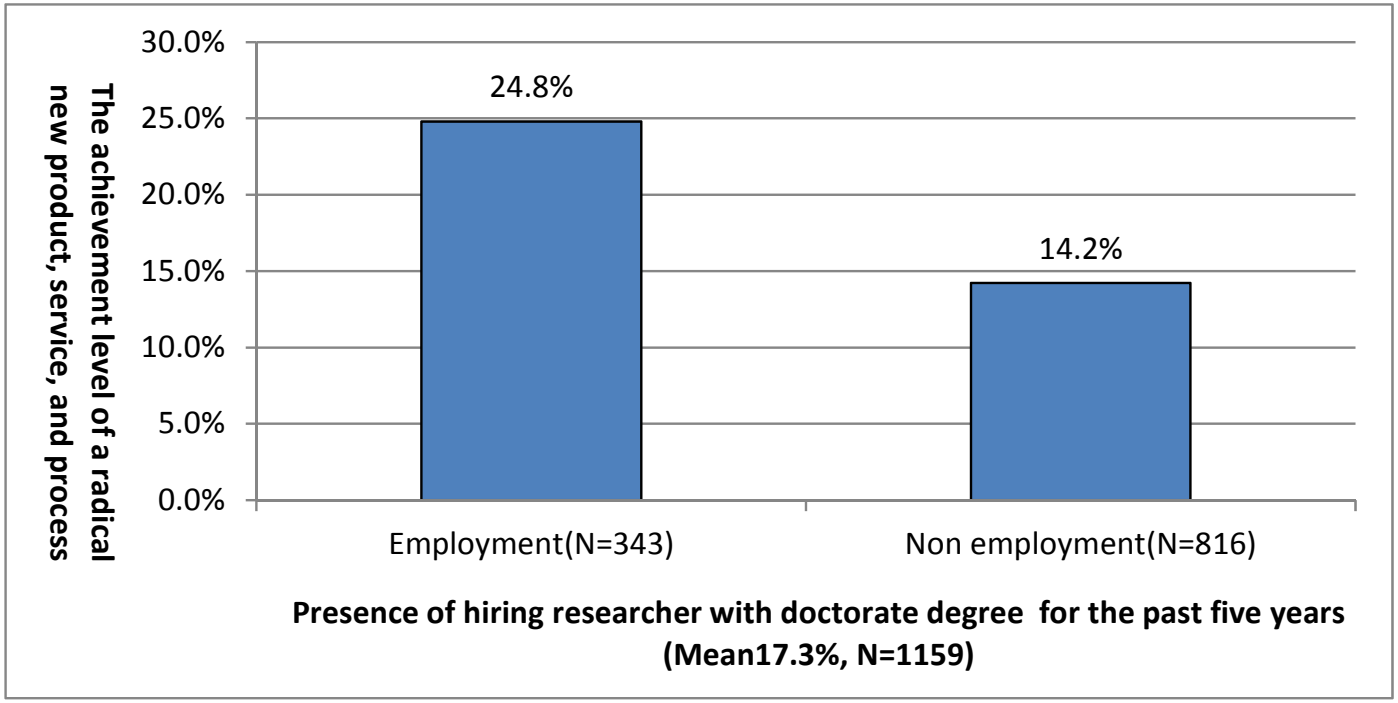
Relationship between the employment of researcher with doctorate degree and radical innovation of a new product, service, and process

- In the corporations that employed the researcher with doctoral degree, the achievement level of radical innovation of product, service and process was 24.8%. The achievement level is higher than that of the corporations which did not employ researchers with doctoral degree.

⇒ It is suggested that there is a correlation between the employment of a highly-professional researcher and the achievement of radical innovation of product, service and process.



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(6) Cooperation with other organizations:
Types of partners for cooperation

1st: University : 63.6% (note：It includes university, National technical college, and the Inter-university research institute.）
2nd: A customer company : 42.0%
3rd: Suppliers of equipment, materials, or parts : 34.9%

Organizations	N	Ratio
1. A customer company	356	42.0%
2. Suppliers such as equipment, materials, and parts	296	34.9%
3. Competitive enterprise	78	9.2%
4. Participating company of R&D consortium	149	17.6%
5. Another company that belongs to the same industry group	147	17.4%
6. R&D service mediation entrepreneur	15	1.8%
7. External consultant and private laboratory	132	15.6%
8. Entrepreneur and venture company	42	5.0%
9. University	539	63.6%
10. Public research organization	290	34.2%
11. Others	43	5.1%

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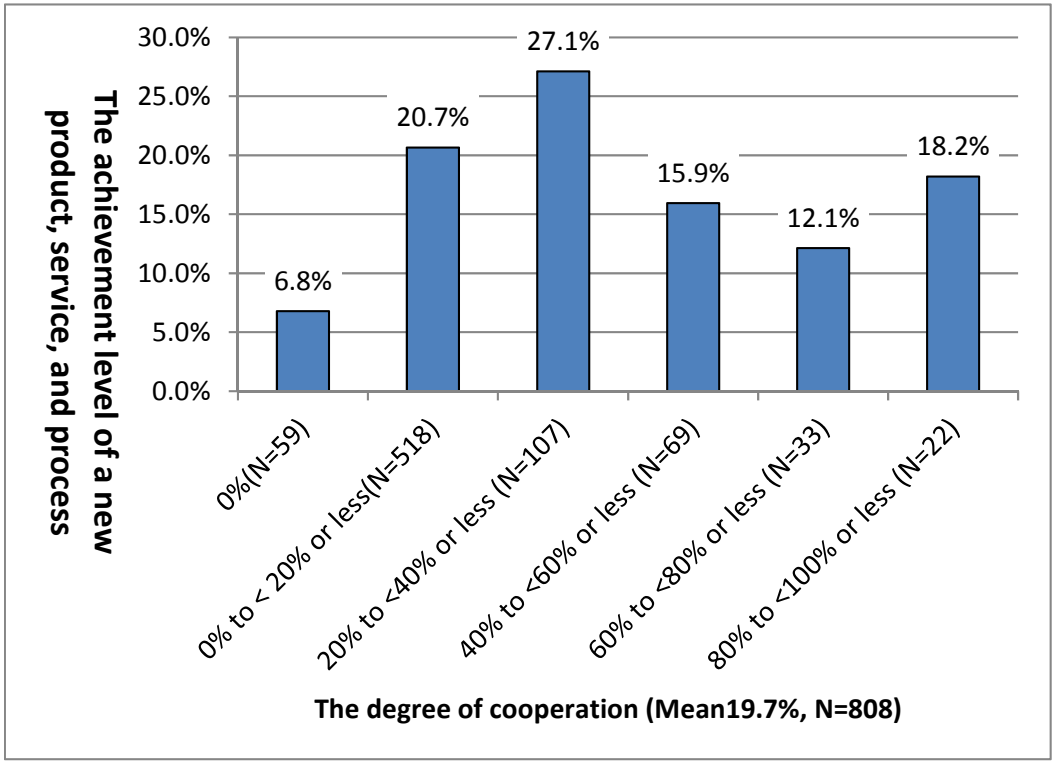
(6) Cooperation with other organizations: Relationship between cooperation level and innovation of a new product, service and process

- In the case of cooperation with other organization, the achievement level of the innovation is higher than in the case without cooperation.
- The achievement level of innovation is lower when without cooperation, because external knowledge is not introduced.
- On the other hand, it is suggested that the R&D ability does not necessarily increase and the achievement level of innovation becomes lower when the degree of dependence to external organization is too high.

Relationship between cooperation level and innovation of a new product, service, and process



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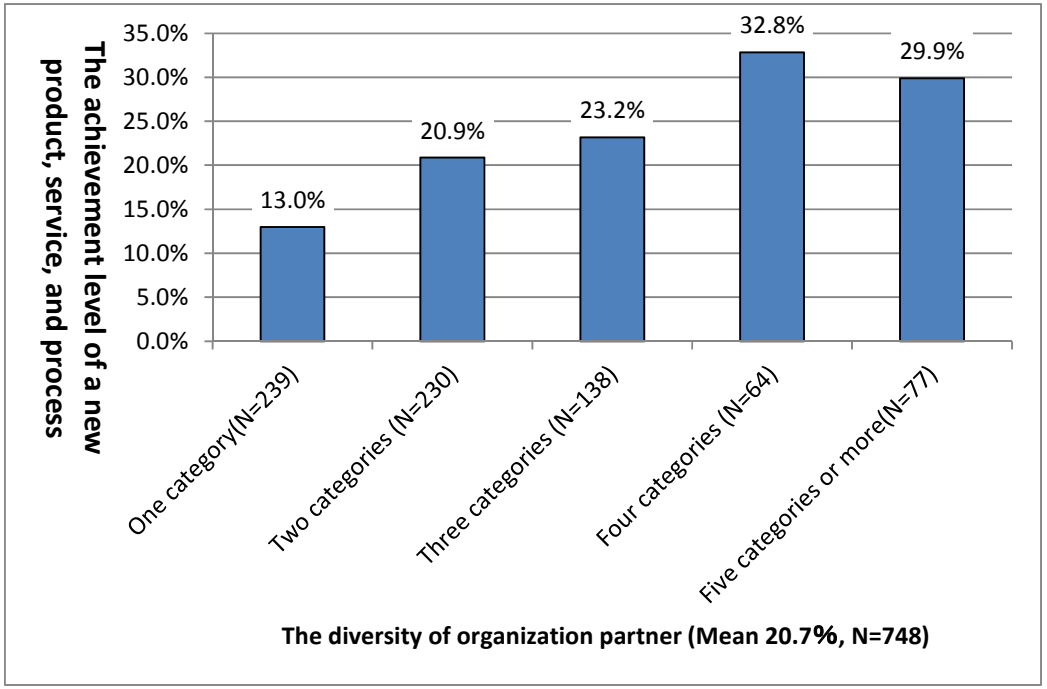
(6) Cooperation with other organizations: Relationship between partner diversity and innovation of a new product, service and process

- When the number of types of organization partner is 4, the achievement level of the innovation reaches the highest.
- When the number of types is 4 or less, the achievement level of the innovation tends to rise by increasing of diversity.
- It is suggested that cooperation with diverse external organizations promote the achievement of a new product, service and process.

Relationship between diversity of organization partner and innovation of a new product, service and process



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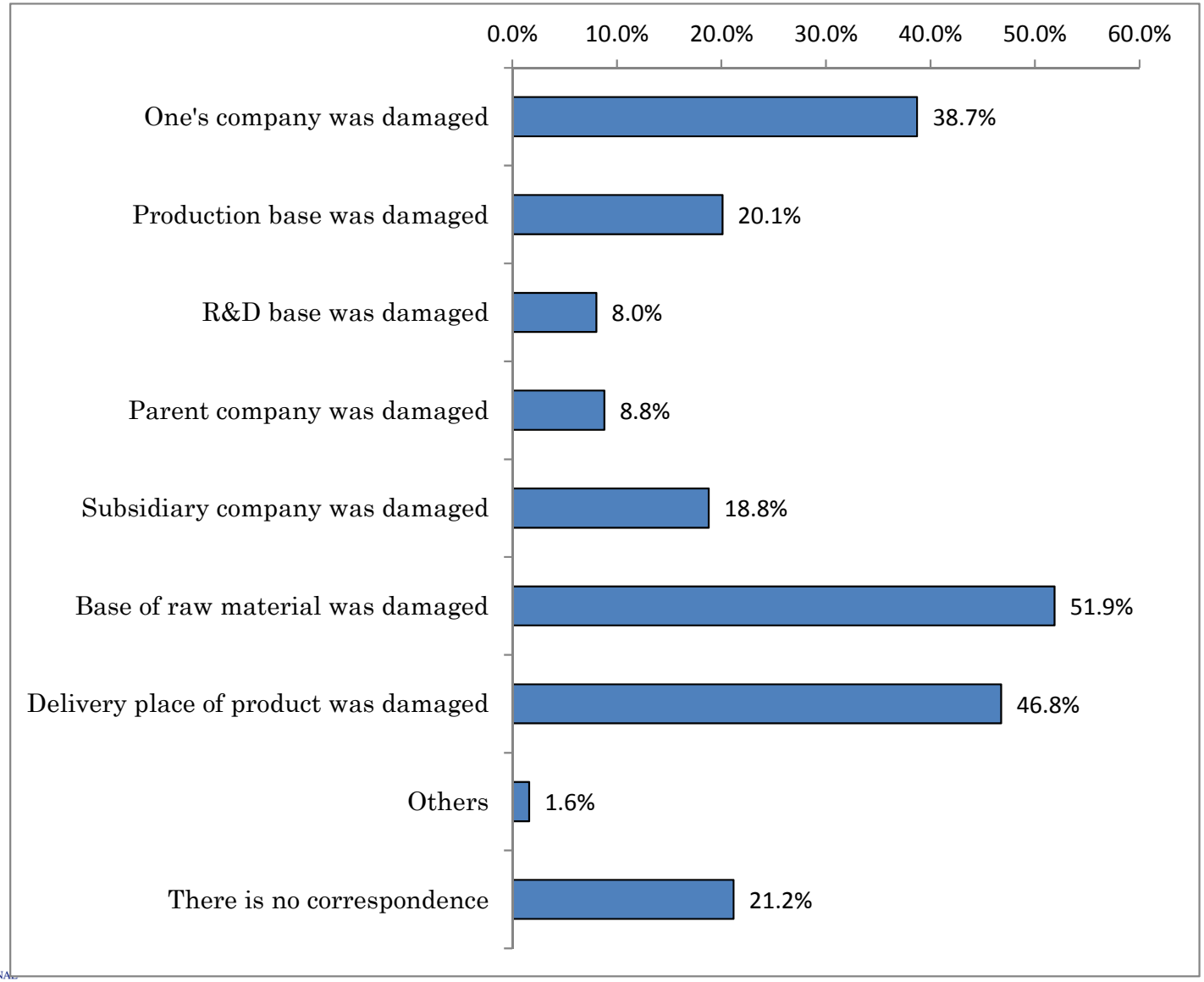
(7) Impact of the Great East Japan Earthquake : Damage caused by the earthquake and subsequent Atomic Power Plant accident



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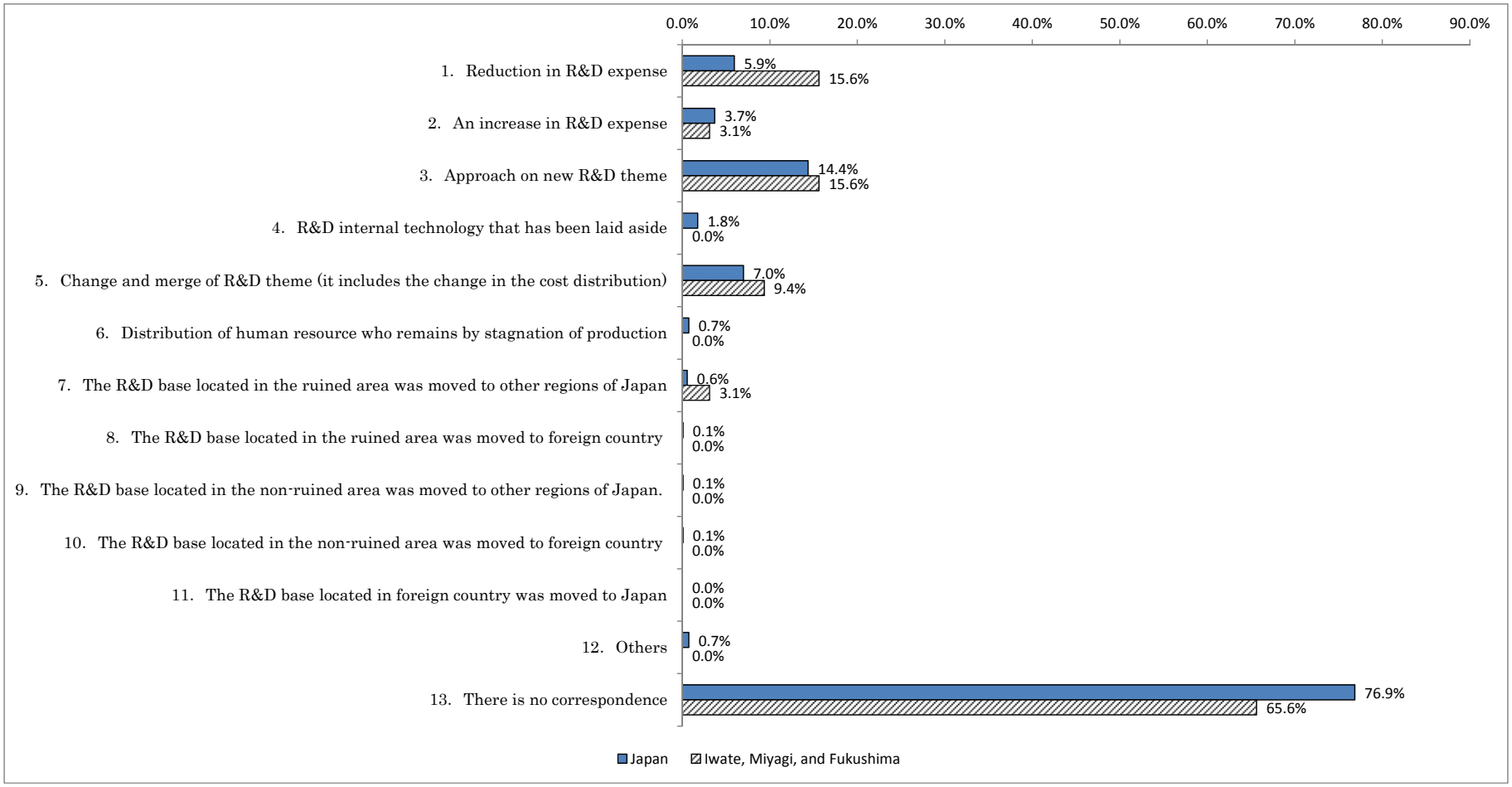
(7) Impact of the Great East Japan Earthquake : R&D activities triggered by the impact of the earthquake

The efforts related to R&D activities triggered by the earthquake



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2011 East Japan Earthquake

Damage caused by Tsunami

Casualties
- Dead 15,868
- Missing 2,847
- Injured 6,100

Damage caused by Ground Liquefaction

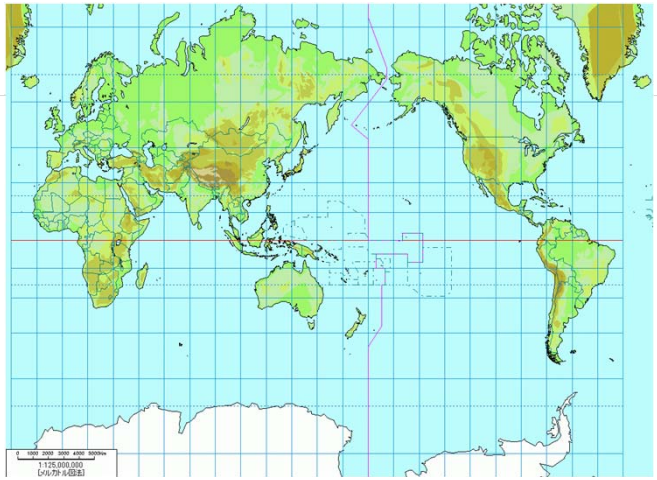
Fukushima Nuclear
Power Plant Accident

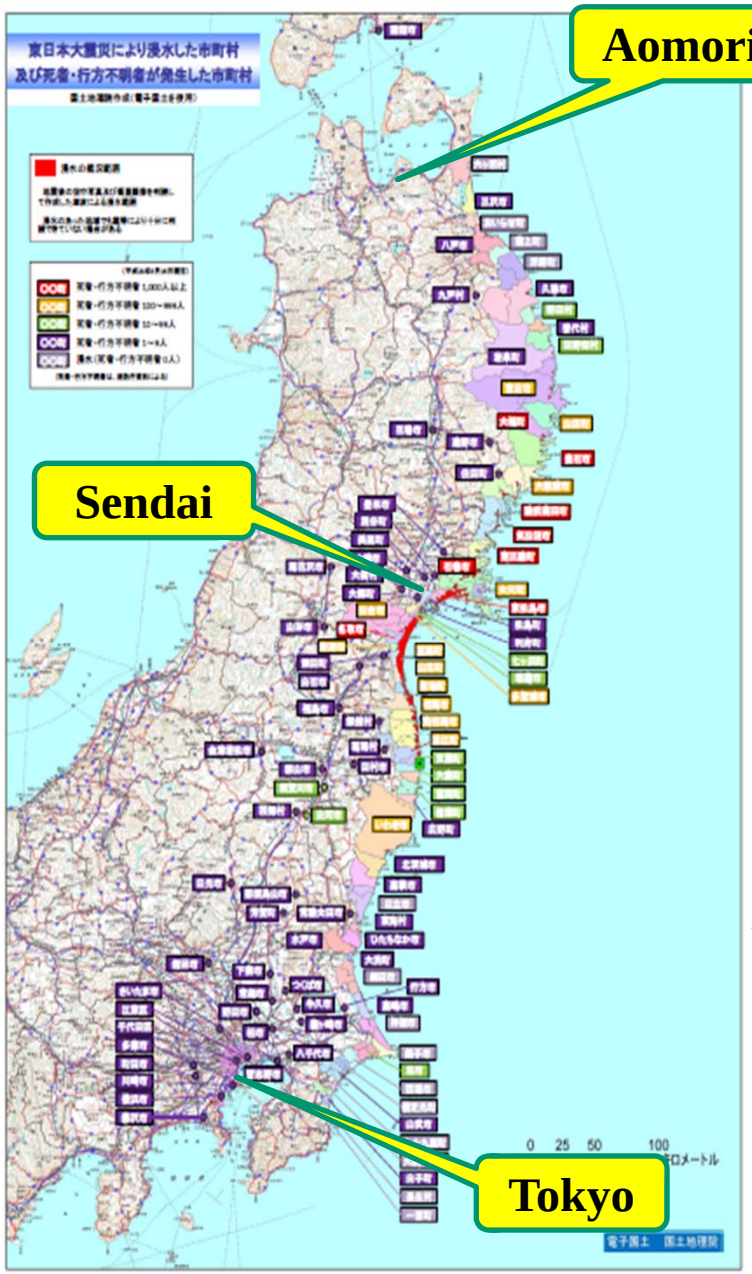
Damage caused by Ground Shaking

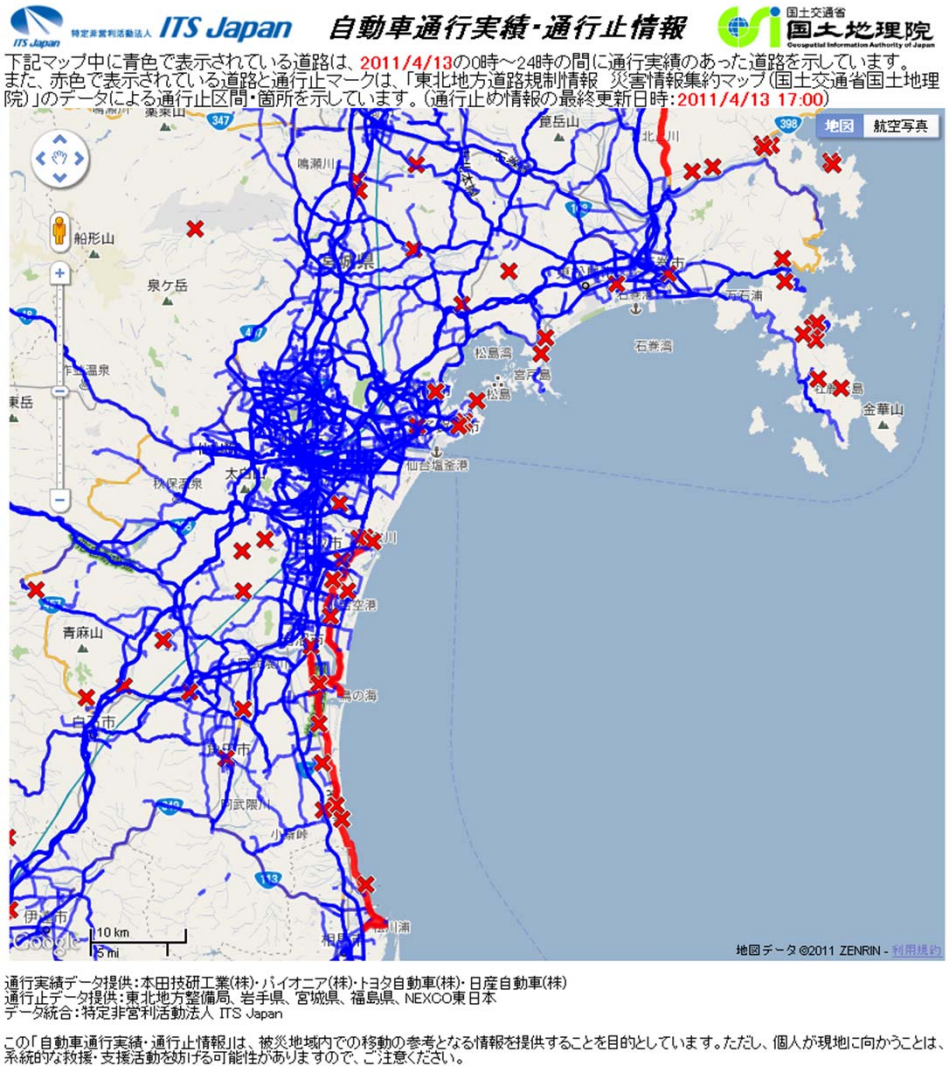
Metropolitan Tokyo Turmoil

Review of the Impact of the Great East Japan Earthquake

- Date : March 11, 2011 (Fri.) 14:46
- Epicenter : Off the coast of Sanriku, depth 24 km
- Earthquake size : Magnitude 9.0
- Tsunami : Over 40 m (run-up height)
- Area flooded : 561 km2 (approximate)
- Deaths : 15,866 (as of July 4, 2012)
- Power outage : About 8.71 million homes (entire Tohoku region & part of Kanto)
- Water outage : about 2.3 million homes (entire Tohoku region & part of Kanto)
- Fukushima nuclear power plant accident
  Massive emission of radioactive material







Intelligent Transport Systems (ITS) Car navigation Electronic toll collection system

⇒

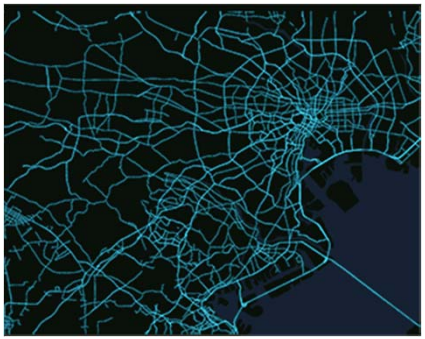
Data collection and mapping Traffic routes available Across the east Japan

- **ITS Japan provided "Car traffic information map" displaying available routes and their actual car traffic overlaid onto digital map on the internet, aiming at assisting the transport of disaster victims and rescue / rehabilitation workers.**
- **This comprehensive map was being created through utilizing integrated traffic information of ITS, based upon probe information collected anonymously and statistically by Honda, Pioneer, Toyota and Nissan.**
- **It was their first effort ever to deal with respective information unilaterally and to provide them daily to general public.**

Individuals contribute to data generation

Conventional Traffic Information System

Fixed sensor data



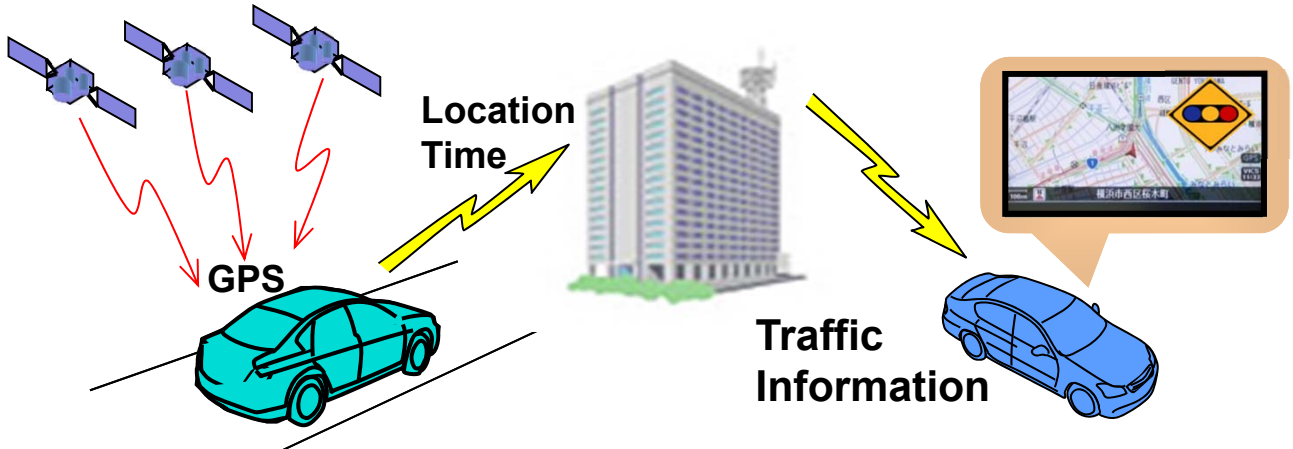
Central Tokyo

Traffic Control Center

Mobile Device based System

Probe Data

Central Tokyo



Source: Dr. Watanabe, Chairman of ITS Japan, Presented at 19th ITS World Congress Vienna, Austria

Connected people helped each other

Crisis Response website opened in two hours by Google Japan

Service	Contents
Person Finder	All data entered by individuals become publicly available, and viewable and usable by anyone.
Shelter Resident Lists	Emailed photos are uploaded to a photo album and scanned to be made searchable in Person Finder.
YouTube Message	Video messages from the evacuees are shared at the YouTube site.
Shelter Information	Shelter locations, water and food distribution, and local resources portal map are shared.
Probe Car Data Map	Routes actually used on the previous day are shown on the map.

Source: Nippon Keizai Shimbun, April 3, 2011

Awareness-Raising Activities on Tsunami Disaster Saved 2,926 Pupils of Elementary & Secondary Schools

Mission-Oriented Research Program (FY2001-05)
Implementation-Support Program (FY2007-11)

➢Establishing a Foothold for Nationwide Expansion of Tsunami Education Using a Comprehensive Tsunami Disaster Scenario Simulator

Led by Prof. Toshitaka KATADA, Disaster Research Center, Gunma Univ.

Outline of implemented R&D Outputs

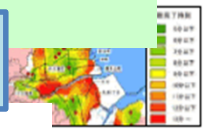
An education tool "Comprehensive Tsunami Disaster Scenario Simulator" was developed, which can simulate a damage caused by Tsunami, with condition-settings such as crisis-awareness level of local residents triggered by earthquake motion, whether evacuation is recommended or not, daily awareness level of residents on disaster crisis, experience of past Tsunami disaster, in addition to simulating physical reach and height of Tsunami based upon epicenter and magnitude of triggering earthquake.

Developing Comprehensive Tsunami Scenario Simulator for Targeted Area

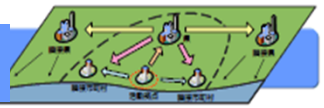
Collaborating with targeted area using Tsunami Simulator

Raising Residents' Awareness on Disaster
- Lecture Program
- Workshops

Upgrading Tsunami Crisis Management Plan
- Identifying issues
- Assisting disaster management planning



Disseminating Awareness-Raising Activities Nationwide



(Final Goal) Upgrading Disaster-Management Level against Tsunami Nationwide

Children in Kamaishi, evacuating from designated facility to a safer hill by their own judgment on 11 March, 2011

実践成果 by Implementation

Continued efforts were made using the simulator, for raising local residents' disaster-awareness level and education in elementary and secondary schools, to create a robust community against Tsunami disaster. Consequently, in the wake of Great East Japan Earthquake in Kamaishi-City, senior-grade students have taken a leadership in evacuation, assisting junior-grade pupils and elderly persons, and made a further evacuation from a designated facility to a safer hill by their own judgment, not being trapped by initial prediction, thanks to their high awareness level. That has resulted in saving 2,926 students (99.8% of the total elementary and secondary schools) in Kamaishi (widely known as 'Kamaishi-Miracle').

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Promptly Issuing Certificates of Disaster Victim

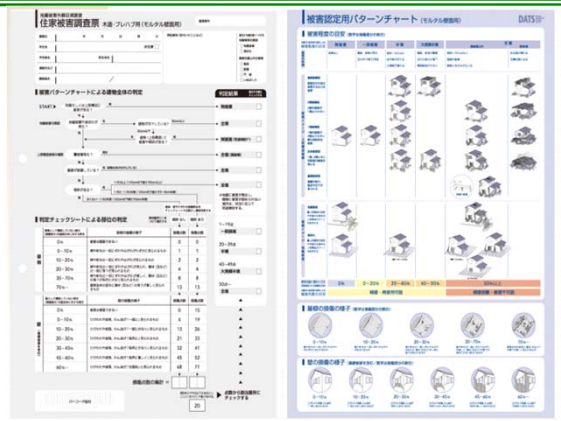
- **Development of Problem-Solving Capacity for Crisis Management using GIS**
  [FY2007-09] (R&D Focus Area: Information Technology & Society)
- **Development of Life Recovery Support System for a Possible Tokyo Metropolitan Earthquake [FY2010-13] (Implementation Support Program)**
  - Led by: Prof. Haruo HAYASHI, Disaster Prevention Research Institute, Kyoto University
- **Implementation of the Building Damage Evaluation and Household Recovery Support Systems for Local Governmental Post-Disaster Operations [FY2009-12]**
  - Led by: Prof. Satoshi TANAKA, Fuji Tokoha University

Outline of Implemented R&D Outputs

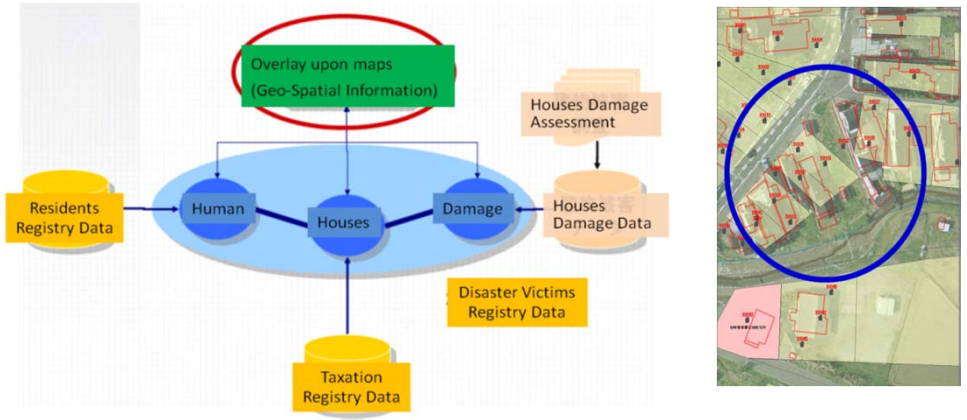
After a large-scale disaster happened, in order to help survivors to rebuild their daily lives it is necessary for local governments to accurately grasp damage level of individual houses, and to issue a Disaster Victim Certificates. They offered a one-stop information system including comprehensive management of support services, which can process promptly and precisely a bulk of disaster damage information by fully utilizing paper-based form, in addition to the existing system with normal computer processing.

Outcomes by Implementation

After Niigata Chuetsu-oki Earthquake in 2007, it took only about 1 month from determining the damage level of houses to issuing Disaster Victim Certificates. After Great East Japan Earthquake, outputs from this project were also implemented in Iwate Pref. and other districts as well. They were also adopted in Disaster Management Plan of Tokyo Metropolitan Government, and on-site training is being conducted in disaster-affected area.



Anyone can act as an official surveyor by clear criteria and adoption of paper-based form.



Loosely integrating Residents Registry, Taxation Registry and Houses Damage Survey Data, for promptly issuing Disaster Victim Certificates

Related Studies II -

Comparative Analysis of Industry-Academia Collaboration among Three Regions in Japan

Background and aim of research

- Unveil with whom and how local companies build up relationship in a region
- Categorize local companies in term of situation of university-industry-government collaboration.
- extract the characteristics of regional triple helix

[Definition of University-industry-government collaboration]

- Technical Consultation
- Joint R&D
- Use of research equipment
- Human resource development

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Framework of Research

- Research object
  - Focusing on manufacturing industry
  - 3 prefectures extracted (Yamagata, Gunma, Nagano)

  → Key elements / factors:

  1. Local area (with less population density)
  2. Agglomeration of Processing and Assembly industry
  3. Available local resources（established single national university, similar scale and level)
- Methodology
  - Postal questionnaire survey
- Research duration
  - October 22th ～ November 12th 2012

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Profile of extracted 3 Regions

	Yamagata	Gunma	Nagano
Location from Tokyo	350km North	100km North	200km North-west
industry	Electronics and machinery industry	Automobile and electronics industry	Electro-device & precision machinery industry
resource	Yamagata Univ.	Gunma Univ.	Shinshu Univ.

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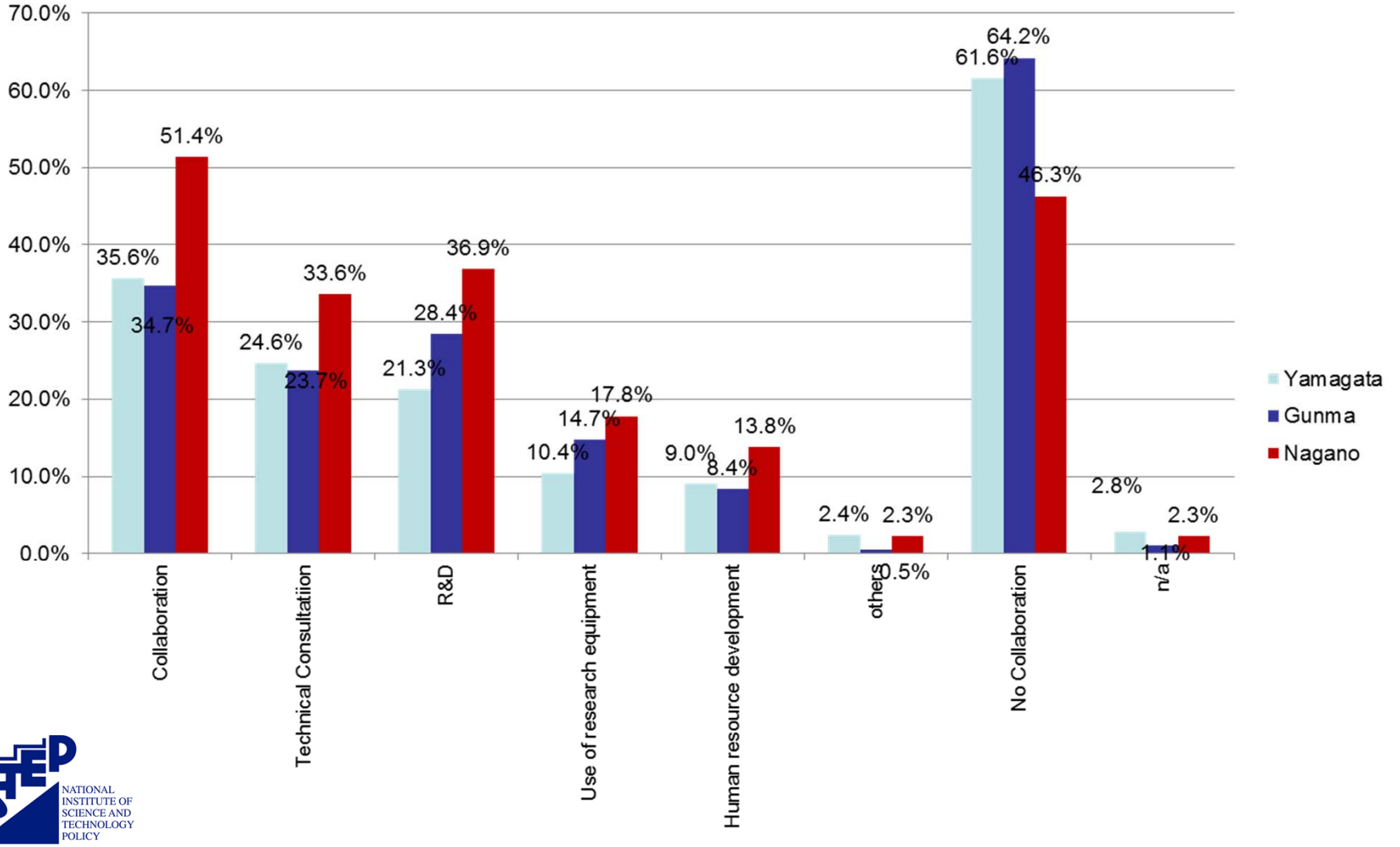
Relationship with Academia



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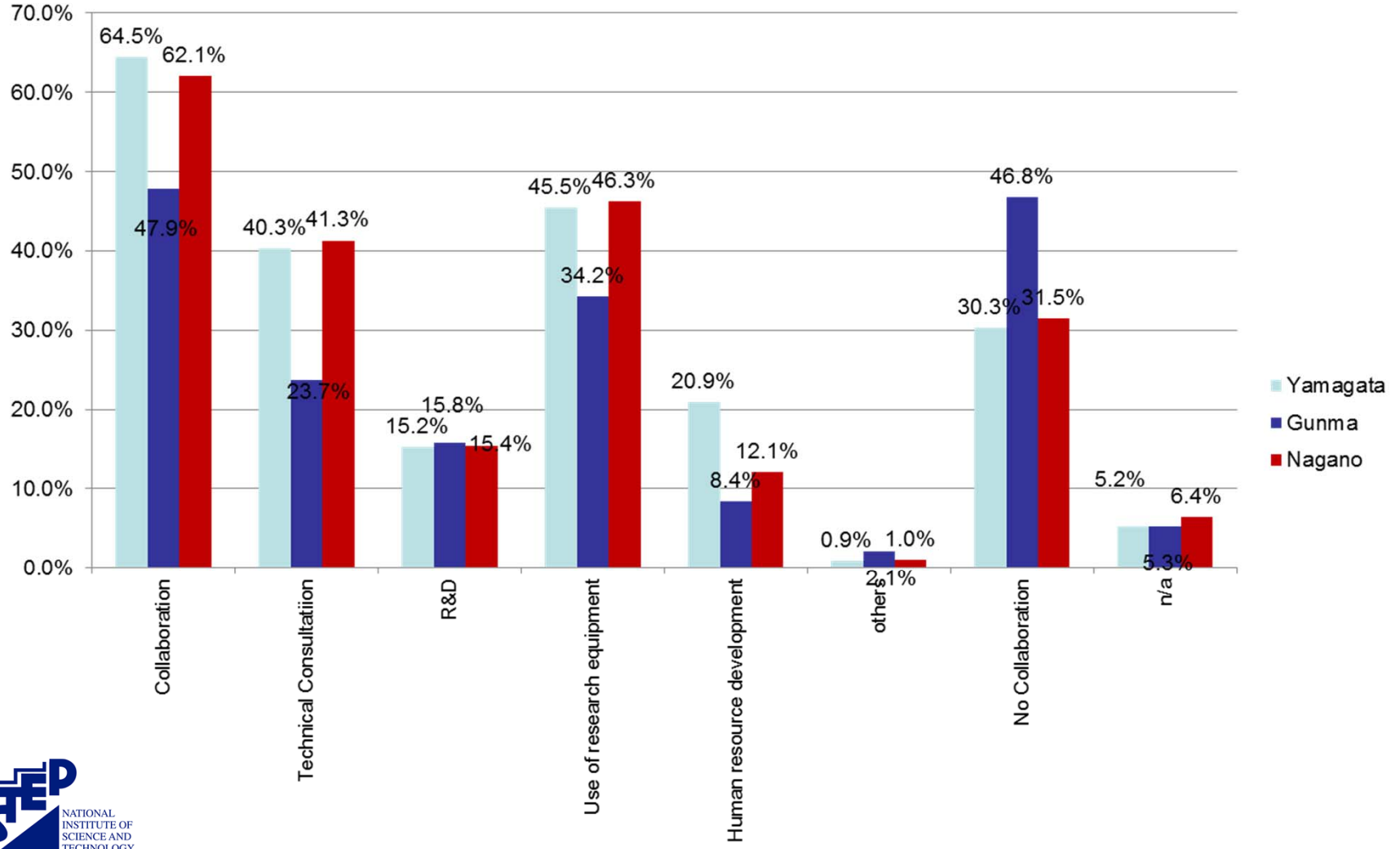
Relationship with Public Research Institutes



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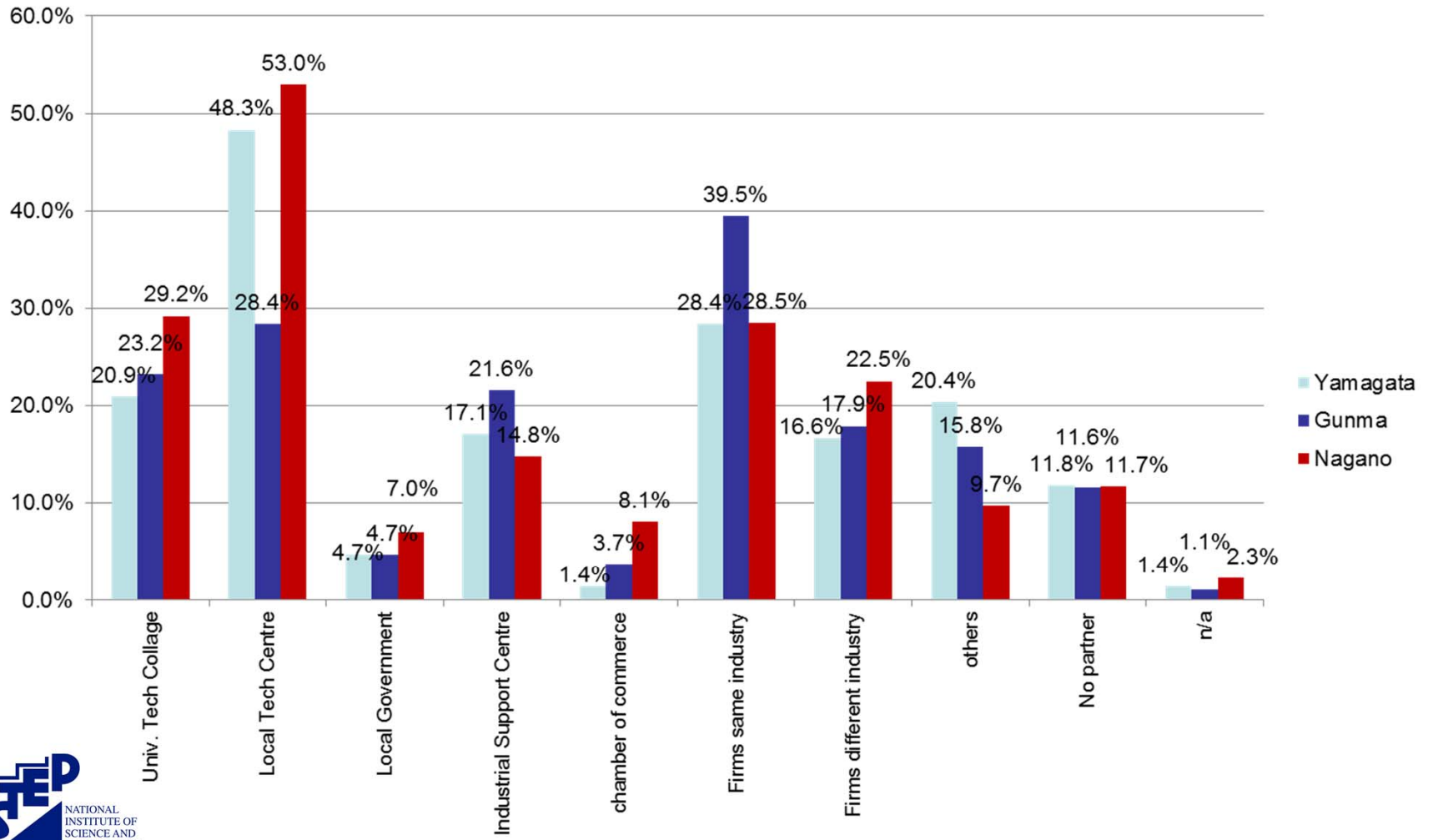
Consultations on Technical Issues



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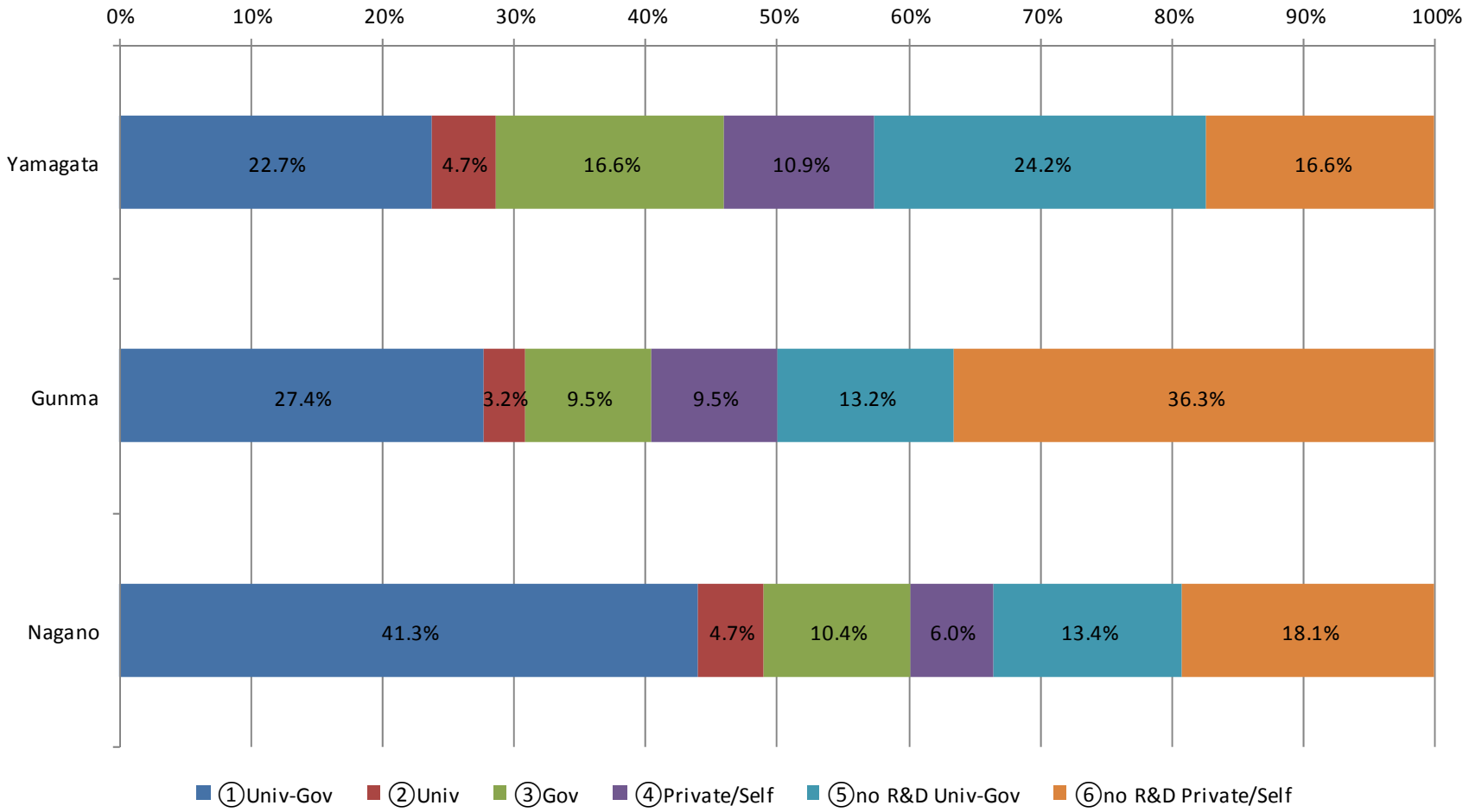
Type of Regional 'Triple Helix' in 3 regions



		University-Industry-Government Relationship		
		University	Government	Private or Self
R&D Experience	Done	①		④
		②	③	
	Not Done	⑤		⑥

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