

# Private Sector Interaction in the Decision Making Processes of Public Research Policies

## Country Profile: Japan<sup>1</sup>

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### 1. Political, institutional and economic framework and important actors

National Japanese R&D spending amounts to EURO 119,748 bn (3.15% GDP). The Public Sector accounts for 18.2%, the Private Sector for 73.9% and other sources for 7% of GERD.<sup>2</sup> The Private Sector is the most important performer of research (74.4% of GERD), significantly above EU and OECD averages, while Higher Education Institutions (HEI)<sup>3</sup> (13.9%) and government institutions (9.5%) are less important performers compared to EU and OECD average.<sup>4</sup> Private Sector enterprises tend to have a strong international orientation and a high degree of internationalisation.

The Japanese Science and Innovation System is commonly recognised as a leading Science and Innovation System which tends to emphasise incremental innovation rather than breakthrough innovation. Japan is characterised by highly developed Public and Private Sector research structures, strong international technological cooperation and substantial technological co-operations on a regional level which are substantially supported through policy measures. Important changes in the policy and institutional framework are underway. For example, stronger emphasis will be put on radical innovation and on the share of funds for basic research vs. spending on development activities. Further policy measures are foreseen to enhance the exploitation of intellectual property, technology transfer and industry-science relationships.

Another specific characteristic of the Japanese Innovation System is a wide-spread conservative behaviour of a large share of traditionally grown companies which is limiting the momentum created by entrepreneurial climate and radical renewal. Research and innovation policy is in most cases regional and/or department/agency-specific policy. National research and technology policy is frequently complemented by regional policies in Japan.

Figure 1 depicts the multitude of actors which interact in this system on several levels.

#### a. Political and governmental authorities

The *Cabinet Office* represents all ministries. It is actively engaged in the instigation and design of research and technology policy. The Cabinet Office has mainly a coordinating role, compiling different ministries' and agencies' research policy strategies. *The Council of Science and Technology Policy (CSTP)* is the central advisory body to the Cabinet Office. CSTP is responsible for research and technology policy formulation and budget allocation for implementing these policies. Recently, the promotion of Private Sector research and scientific research has been assigned to CSTP as one of its main tasks.

In the Japanese government, the *Ministry of Education, Culture, Sports, Science and Technology (MEXT)* and the *Ministry of Economy, Trade and Industry (METI)* are the most important ministries with respect to research and technology policy. Other ministries play minor roles in research and technology policy; still some of them finance comparatively smaller units of highly specialised research bodies.

The *Ministry of Education, Culture, Sports, Science and Technology (MEXT)* is the major Japanese ministry responsible for research and development policies in Japan. The *Science and Technology Policy Bureau (STPB)* is a MEXT function, responsible for the planning and design of basic research and technology policies.

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<sup>1</sup> Observations in this country profile are the results of desk research exclusively. In accordance with the Terms of Reference of this study, no interviews were performed or other primary information sources were consulted.

<sup>2</sup> Source: OECD MSTI database; EUROSTAT 2006

<sup>3</sup> note: performance of HEI in the Japan are composed of public and private HEIs

<sup>4</sup> BERD accounting for 2.32% of GDP; Source: OECD MSTI database; 2002 data

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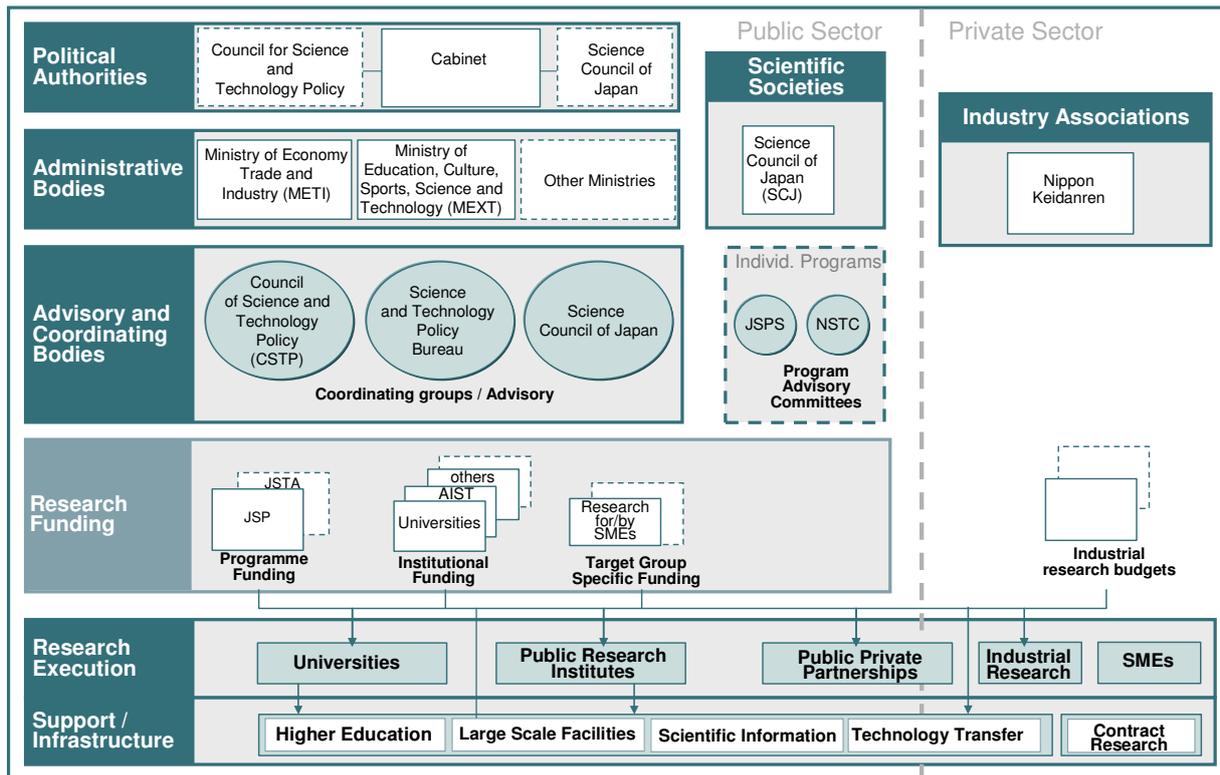


Figure 1: Relevant decision structures of the Japanese National Innovation System

The *Research Promotion Bureau* is responsible for promoting scientific research through creation and supervision of PROs as well as improving the coordination between industry, academia and government. For this purpose, the Research Promotion Bureau regularly seeks consultations with Private Sector bodies. The *Research and Development Bureau* is another MEXT function responsible for large-scale research projects

The *Ministry of Economy, Trade and Industry (METI)* is responsible mainly for the promotion of industrial R&D activities through formulation and implementation of policies. Such policies support SME innovation activities, the promotion of regional innovation clusters and R&D tax deduction schemes. METI research and technology policy measures account for 7% of Japanese public research and technology spending.<sup>5</sup>

Sector specific research policies are designed by the respective ministry.<sup>6</sup>

### b. Intermediate bodies

The *Science Council of Japan (SCJ)* is an independent agency advising the prime minister in matters of research and science in government and industry. SCJ represents Japanese scientists aiming at the promotion of knowledge exchange between researchers. Members are elected from numerous scientists from both the Public and the Private Sector nationwide. SCJ is a major actor in the redesign and reshaping of the Japanese Research System as initiated by CSTP in 2003.

The *Japan Society for the Promotion of Science (JSPS)* is an independent institution, administering Japan's research and scientific policy measures and academic programs. JSPS focuses on the requirements of research performing institutions and adjusts respective research programs accordingly. JSPS mainly supports universities and PROs with its activities. Private Sector participation is negligible.

The *Japan Science and Technology Agency (JSTA)* promotes science and technology. Its responsibilities include the promotion of the commercialisation of basic research results.

<sup>5</sup> source: METI 2005

<sup>6</sup> such as agriculture, environment, construction, transport

JSTA focuses on new technological seeds and the dissemination of scientific and technological information to all relevant stakeholders.

The *National Institute of Science and Technology Policy (NISTEP)* is an institute affiliated to MEXT. NISTEP's mission is the implementation of public research and technology policy. NISTEP aims at involving different stakeholders in its work, namely corporate research planners, policy researchers and administration representatives. One of NISTEP's focus areas are activities related to research strategy formulation and especially innovation management for Private and Public Sector institutions.

### **c. Research performing institutions**

Government-financed research institutions play a less significant role in the Japanese Innovation System, performing 9.5% of total GERD.<sup>7</sup> Besides federal PROs, several regionally funded PROs exist. These PROs are mainly active in basic and applied research. HEI perform 13.9% of GERD.<sup>8</sup> *The National Institute of Advanced Industrial Science and Technology (AIST)* is Japan's largest PRO.<sup>9</sup> AIST strongly emphasises integrated research projects, e.g. research projects starting with basic research and finally leading to prototype development in multiple science and technology fields. AIST research projects are often conducted in collaboration with industrial partners. Furthermore, the AIST advisory board consists of 10 members from the Public Sector and 5 members from the Private Sector.

Recent political discussion focuses on improving the diffusion of state-of-the-art technology, strengthening industry-science collaborations and developing technology transfer and related education measures.

### **d. Private Sector**

The Private Sector performs 74.4% of GERD. Private Sector expenditure on R&D amounts to US\$ 79.543.9 bn of which 97.9% are domestic funds (e.g. research financed by the Private Sector). The remaining 2.1 % are mainly government funding.<sup>10</sup>

The major focus of Private Sector R&D has been on product development. In recent years however, a trend to enhance also applied and even basic research activities can be observed.

*Nippon Keidanren* is the Japanese Business Federation representing industrial associations, and regional economic organisations. Keidanren proactively communicates with stakeholders, namely political leaders, administrators, labour unions, and citizens. Keidanren regularly prepares position papers, organises roundtable meetings with government officials and conducts surveys among its members.

## **2. National research policy decisions and Private Sector involvement**

### **Instigation and Design stage**

The Private Sector is regularly involved in the instigation of research policies and programmes through hearings and consultations, initiated by the Public Sector. Industry associations, namely Keidanren, regularly prepare position statements and white papers and organise roundtable forums or participate in such events. In addition, the Private Sector directly influences policy making through informal consultations with CSTP and STPB.

At these early stages, the Private Sector is always involved through the industry organisation. Involvement of Keidanren as well as of individual member companies refers to all aspects of the Science and Innovation System, e.g. research policy as well as higher education strategy and framework related conditions. Currently, there is no standardised procedure for Private Sector involvement in policy instigation and design.

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<sup>7</sup> source: OECD 2005

<sup>8</sup> source: OECD 2005; note: Figures for HEI include both private HEI and public HEI

<sup>9</sup> around 3,200 employees

<sup>10</sup> source: OECD 2005; Foreign funding accounts for 0.5% of BERD.

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Forecasting activities are beginning to be used at national level. These activities involve all relevant stakeholders. The Private Sector is asked for perceptions and requirements in the context of such exercises. Results of these activities are used in the instigation and design of policy measures by the government authorities.

The major motivation for involving the Private Sector at this stage is seen in the creation of awareness and acceptance within the Private Sector and in his contributions to the design of research policies conducive towards seamless innovation processes, specifically towards the design of technology and innovation management education and the reshape of PRO profiles.

Private Sector involvement in the instigation and design stages is perceived as conducive to and essential for the performance of the Japanese economy and its National Science and Innovation System. In the long run, the Private Sector involvement especially in the instigation and design stages is expected to increase substantially.

Limitations of Private Sector involvement are seen in the rather uncertain estimations of mid- to long-term technology trends and demands.

### **Implementation and Assessment/revision stage**

The Private Sector is also involved in policy making at all stages and levels of policy implementation and assessment. Such involvement refers to the development of national research and innovation policies by formal consultations. In addition, the increasing competition between research institutions and the establishment of joint research institutions creates direct interfaces between these institutions and Private Sector enterprises where they interact intensively. This gives the Private Sector considerable mid-term influence on the research strategies of such institutions.

In the framework of publicly funded joint research projects between the Public and the Private Sector actors, clear project plans and - most important - agreements regarding ownership of resulting intellectual property are a necessary precondition for funding from Public Sector agencies. In addition, the legal framework provides clear regulations for the allocation of intellectual property rights, especially in joint research consortia.

Another form of involvement takes place in the evaluation of research programmes, which is usually undertaken by Private Sector actors. Private Sector representatives hold also positions in a multitude of advisory and steering committees. The industry organisation Keidanren prepares position papers and recommendations, based on the assessment and evaluation activities and communicates its perceptions and recommendations proactively to policy makers and a wider audience.

The Private Sector involvement at these stages is of rather formal nature with important contributions at the beginning. Involvement is sought by both the Public and the Private Sector and likely to remain at the same level.

### **Observations: Possible barriers and current initiatives**

The Japanese Science and Innovation System is confronted with the challenge to maintain its leading position in a fierce global innovation competition. The traditionally product and process innovation-oriented research system and the dominance of large companies in the Japanese economy represent particular challenges. Current initiatives aim at increasing the share of basic research activities in both public and industrial research. Improving the framework conditions conducive to industry-science linkages is another current major concern. There is also an ongoing debate about enhanced measures to promote new start-up firms, especially technology-based spin-offs based on universities' inventions and from large established firms.

Another challenge is created by the increasingly intense innovation competition from global competitors, especially from the catching-up Asian countries like Korea, Taiwan and China. The Japanese Science and Innovation System lacks smooth interfaces between the Private and the Public research institutions. Therefore, institutional changes in the science sector,

namely in terms of PRO and national university reforms, are envisaged or already in progress. Such reforms are also considered to improve research collaborations of the Private Sector with academia and PROs. Since the role of SMEs and start-ups for the Japanese Innovation System has been recognized as being vital for the Japanese economy, national and also regional networks are given more attention currently. Other policy measures to facilitate network-related activities target the areas of IPR, labour mobility and venture capital.

In course of the economic crises, many Private Sector enterprises undertook a major reorganisation and restructuring of their research departments. In conjunction with such reorientations, R&D in new scientific and technological fields and joint research with universities and other Public Sector organisations are given a higher priority. In the future, collaboration and cooperation with other institutions are expected to become more important.<sup>11</sup>

Another challenge is to meet the mid-term demand for graduates in engineering and natural sciences. The Japanese Science and Innovation System is in danger to face a shortage of qualified S&T human resources mid-term. This would also have a long term impact on the Private Sector's R&D investment in Japan and its competitiveness and innovation performance. Therefore the Private Sector expresses its strong interest in policies addressing this issue.

Recent initiatives address in particular the framework conditions for research and innovation. The focus is on streamlining and improving the coordination of the research policy making process, e.g. the coordination of different ministries and regional research and innovation initiatives. Also PRO and public university management systems are developed further to assure efficiency and effectiveness of such institutions and of their interaction with the Private Sector.

### **3. Other important policy decisions with Private Sector involvement**

Research and technology policy takes place in Japan to a significant extent at the regional level. Therefore, increasing attention is given to the creation of technology and science parks as well as to support for entrepreneurs.

On the national level, policy measures to stimulate and support the creation of regional innovation systems were developed.<sup>12</sup> The implementation of such regional innovation systems is left to regional and local actors. They are established in close cooperation between local government bodies and other relevant regional stakeholders, namely the Private Sector and representatives of the public research infrastructure. Such local initiatives build on existing public research and development activities, technology diffusion institutions and supporting venture capital institutions. On local level workshops, hearings and other related mechanisms to involve the Private Sector and other relevant regional stakeholders are used extensively for the development of regional innovation systems.

On the national level, the government plays the key role in scientific and technological operations and the allocation of scientific and technological resources. Most technological development institutes have taken the path of operating according to market mechanisms, gearing research strategies and resources more to the needs of external partners.

Measures conducive to entrepreneurship strongly emphasise the provision of external support to entrepreneurs, e.g. with personnel, equipment funds, development funds and sales funds. In addition to such direct measures, improved framework conditions which target the wider research and innovation environment through appropriate legislation, the establishment of preferential tax measures and the human resource area are put in place.

The Private Sector is also involved in the development of the intellectual property system. After extensive consultations with the Private Sector, appropriate new measures were introduced, for example for a shortening of patent disputes and settlement processes. A specialist

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<sup>11</sup> source: MEXT: *The Survey on Research Activities of Private Businesses* (FY2001)

<sup>12</sup> e.g. financial and human resources support to initiate networks.

processing framework has been established for this purpose. Reviews and evaluations of such measures are scheduled for the near future and further efforts are planned to accelerate research and related processes for the application and commercialisation of its results.

Other policy initiatives aim at further improving the education system as an essential part of the Japanese Innovation System.

#### 4. Types of Private Sector involvement and degree of use

The Private Sector involvement varies, depending on the stages of research policy decision processes as well as the thematic context. Categories of Private Sector involvement instruments mainly used are as follows:

- *General dialogue*, initiated by either party, is often used. Such dialogues occur in the preparation of specific decisions during the instigation and to some extent the design phase, for example in cluster area definition and concerning innovation system framework conditions, e.g. IP regulatory framework and education system related matters.
- *Informal involvement* without direct participation in the policy decision making, initiated by policy makers, is an integrated part of the design, implementation and review phases of research policy making. Here the Private Sector involvement is of an advisory nature.
- On the initiative of the Public Sector, the Private Sector is more *formally involved* in the instigation and design of indirect research policy measures, e.g. the design of tax schemes and policy measures targeting the industry-science-interface.
- *Joint activities* between the Public and the Private Sector on the operative level are essential in the creation and operation of clusters and technology/science parks. Strong emphasis is also given to public-private-partnerships (including ppp's in the area of large scale, research intensive infrastructure) and in specific regional and local programs.
- *Staff interaction* between the Public and the Private Sector currently is of minor importance but expected to grow in the near future.
- *Proactive involvement* sought and initiated by the Private Sector usually refers to instigation and design of mid- to long term measures related to national innovation framework conditions.

Different types and degrees of involvement are explained in more detail in table 1 on page 8. Overall, the Private Sector is involved at early stages of research policy making with varying intensity.

#### 5. Selected useful examples of transferable approaches and experiences

Several useful practices with a potential to be transferred to other Science and Innovation Systems have been mentioned already in the previous chapters. Additional good practices are outlined for example in detail in the literature quoted (see Appendix 2). The following example represents a typical approach used in Japan with the potential to be used also in other countries.

##### 5.1 Initiatives to enhance industry intellectual property management capabilities

On the initiative of METI, several leading Japanese high technology companies conducted a substantial intellectual property (IP) management benchmarking recently.<sup>13</sup> The results of that initiative were used by the Private Sector, namely companies involved and industry associations, for learning and developing IP management internally. Key learning's are also distributed actively by industry associations among member companies. Such distribution includes onsite trainings as well as training documentations.

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<sup>13</sup> Participant names are kept confidential for privacy reasons.

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Besides immediate value creation for the Private Sector, the Public Sector, specifically METI, derives major implications from recognised Private Sector requirements for the design of future policy measures. The insights from these Private Sector inputs are used by Public Sector policy makers in their efforts to design IP-related policies, framework conditions and for related international activities aiming at adjusting international standards and the creation of global systems conducive to the information and knowledge economy.

**Appendix 1: Overview of identified instruments for Private Sector involvement and their use in Japan**

*NOTE: Based on desk research only. Due to lacking in-depth information no examples quoted.*

| Instrument                    |   | Intensity of use | Initiated by   | Used for   | Used in     |        |            |        | Examples and remarks |
|-------------------------------|---|------------------|----------------|--|-------------|--------|------------|--------|----------------------|
|                               |   |                  |                |  | Instigation | Design | Implement. | Review |                      |
| General dialogue              | Insight studies, roadmapping, foresight                           | Regular          | Public Sector  | Awareness & identification of emerging technologies & trends                 |             | ✓      |            |        |                      |
|                               | Conferences   | Regular          | Public Sector  | Discussion platform  | ✓           | ✓      | ✓          |        |                      |
|                               | Brainstorming / task forces                                       | Occasional       | Public Sector  | Identification of priorities and possible policy actions                     |             | ✓      |            |        |                      |
| Informal decision involvement | Evaluation studies  | Regular          | Public Sector  | Programme review, identification of policy needs                             |             |        |            | ✓      |                      |
|                               | Advisory groups   | Regular          | Public Sector  | Participation in design, evaluation, etc.                                    | ✓           |        |            |        |                      |
|                               | Informal consultations  | Regular          | Public Sector  | Exchange of viewpoints between stakeholders                                  |             | ✓      | ✓          |        |                      |
|                               | Formal consultations  | Regular          | Public Sector  | “Official” opinion   | ✓           | ✓      | ✓          |        |                      |
| Formal decision involvement   | Task force  | Occasional       | Public Sector  | Joint policy development   |             | ✓      |            |        |                      |
|                               | Participation in decision making bodies (observer status)         | Regular          | Both sides     | Decision involvement   |             | ✓      |            |        |                      |
|                               | Participation in decision making bodies with (co-) decision right | Occasional       | Public Sector  | Decision involvement, shared responsibility                                  |             |        |            | ✓      |                      |
|                               | Administrative / supervisory boards                               | Occasional       | Both sides     | Private Sector representatives involved in important institutional decisions |             | ✓      | ✓          | ✓      |                      |
| Joint activities              | Initiation of networks  | Occasional       | Both sides     | Stimulation of joint Public-Private Sector initiatives                       |             | ✓      | ✓          |        |                      |
|                               | Co-financing of projects / programmes                             | Regular          | Private Sector | Sharing of cost / risks  |             |        | ✓          |        |                      |
|                               | Public Private Partnership  | Occasional       | Both sides     | Pooling of resources   |             | ✓      | ✓          |        |                      |
| Staff interaction             | (Temporary) Staff exchange  | Beginning to use | Public Sector  | Enhance mutual understanding and mobility                                    |             | ✓      |            |        |                      |
|                               | Staff mobility  | Beginning to use | Public Sector  | Public Sector expertise in research leadership positions                     |             |        | ✓          | ✓      |                      |
| Unsolicited contributions     | Statements, studies, white papers, etc.                           | Regular          | Private Sector | Express views, recommend changes, influence decisions                        | ✓           | ✓      | ✓          |        |                      |
|                               | Dialogue platforms  | Regular          | Private Sector | Initiate / facilitate dialogue with Public Sector                            | ✓           |        | ✓          |        |                      |
|                               | Research funding  | Regular          | Private Sector | Initiate / support research in desired areas                                 | ✓           | ✓      | ✓          |        |                      |

Table 1: Overview of instruments used for Private Sector involvement

### Appendix 2: Sources and Literature

#### 1. General and country information

European Trend Chart on Innovation, *Annual Innovation Policy Report for Japan, China, Korea, Taiwan, Singapore, India, Malaysia, Thailand, Indonesia. September 2004*

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[http://www.mofa.go.jp/about/hq/central\\_gov/gist.html](http://www.mofa.go.jp/about/hq/central_gov/gist.html)

#### 2. Important actors

|   |  |
|---|--|
| <a href="http://www.mext.go.jp">http://www.mext.go.jp</a>           | MEXT   |
| <a href="http://www.meti.go.jp">http://www.meti.go.jp</a>           | METI   |
| <a href="http://www.jetro.go.jp">http://www.jetro.go.jp</a>         | JETRO  |
| <a href="http://www.keidanren.or.jp">http://www.keidanren.or.jp</a> | Keidanren  |
| <a href="http://www.aist.go.jp">http://www.aist.go.jp</a>           | The National Institute of Advanced Industrial Science and Technology |
| <a href="http://www.jsps.go.jp">http://www.jsps.go.jp</a>           | Japan Society for the Promotion of Science                           |
| <a href="http://www.jst.go.jp">http://www.jst.go.jp</a>             | Japan Science and Technology Agency                                  |
| <a href="http://www.riken.go.jp">http://www.riken.go.jp</a>         | The Institute for Physical and Chemical Research                     |
| <a href="http://www.rieti.go.jp">http://www.rieti.go.jp</a>         | RIETI  |
| <a href="http://www.nies.go.jp">http://www.nies.go.jp</a>           | NIES   |
| <a href="http://www.janbo.gr.jp">http://www.janbo.gr.jp</a>         | Japan Association of New Business Incubation Organizations           |
| <a href="http://www.nistep.go.jp">http://www.nistep.go.jp</a>       | National Institute of Science and Technology Policy                  |
| <a href="http://www.cao.go.jp">http://www.cao.go.jp</a>             | Cabinet Office   |
| <a href="http://www.scj.go.jp">http://www.scj.go.jp</a>             | Science Council of Japan   |

### 3. Other

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### 4. Further information and feedback

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