

# NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY POLICY

---

**Ministry of Education, Culture, Sports, Science and Technology**



## Mission of NISTEP

The National Institute of Science and Technology Policy (NISTEP) is a national research institution that was established in accordance with the National Government Organization Law under the direct jurisdiction of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) to be engaged in the Japanese government's science and technology policy-planning process. It is expected to ascertain government needs to collaborate and cooperate with government agencies, including participation in the decision-making process.

Accordingly, NISTEP takes on the following three missions:

**To forecast future policy issues and investigate them through autonomous research**

**To carry out research in response to requests from government agencies**

**As a core institution in the field of science and technology research, to provide data that forms the basis of research and play a key cooperative and contributing role in activities with other institutions and researchers, in order to contribute to the expansion and accumulation of knowledge.**

## Major Research Activities

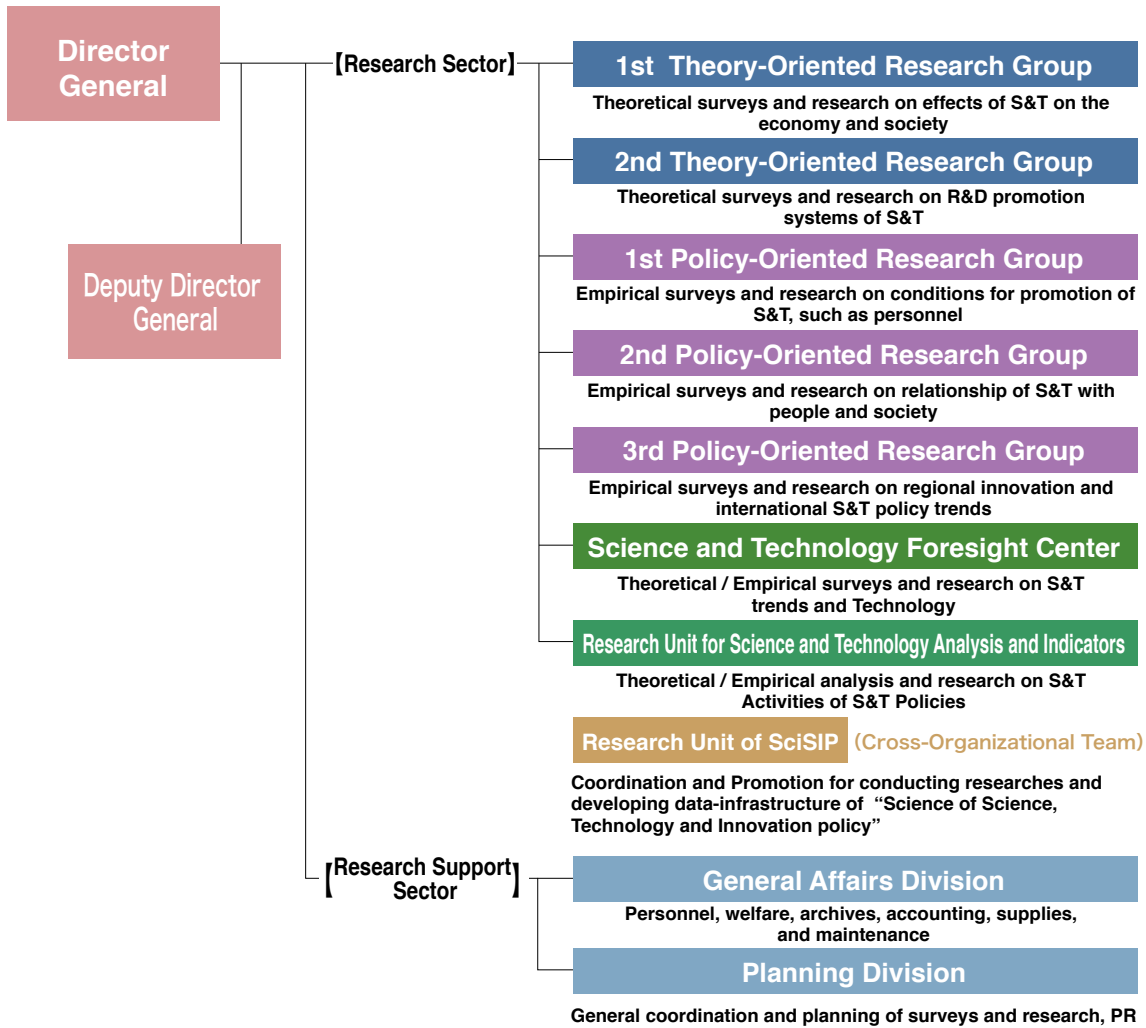
NISTEP carries out research primarily in the seven areas noted below, in order to promote science, technology and innovation policy, collaborating with domestic and foreign universities and public research institutions.

Research results are released through a variety of channels, including the "NISTEP REPORT", "Research Material", "Science and Technology Trends", as well as at seminars and international conferences organized by NISTEP, and more.

- ◆ **Science of Science, Technology and Innovation Policy**
- ◆ **R&D and Innovation**
- ◆ **Science and Technology System**
- ◆ **Human Resources in Science and Technology**
- ◆ **Science and Technology Indicators, and Scientometrics**
- ◆ **Science and Technology Foresight, and Science and Technology Trends**
- ◆ **The Relationship of Science and Technology with Society**

※See P. 3 onward for details on each areas.

# Organization and Personnel



## History

- Jul 1988** National Institute of Science and Technology Policy established (restructured from the National Institute of Resources).
- Jan 2001** Ministry of Education, Culture, Sports, Science and Technology (MEXT) formed due to administrative reform. NISTEP became an affiliated research institute under MEXT. The Science and Technology Foresight Center was founded as a part of NISTEP.
- Jan 2004** Relocated to the Ministry of Education, Culture, Science, and Technology Building (Marunouchi, Chiyoda-ku).
- Apr 2006** Research Unit for Science and Technology Analysis and Indicators was established.
- Jan 2008** Relocated to the Central Government Building No. 7 East Wing(Kasumigaseki, Chiyoda-ku). Satellite office established at the National Graduate Institute for Policy Studies (GRIPS).

## Science of Science, Technology and Innovation Policy

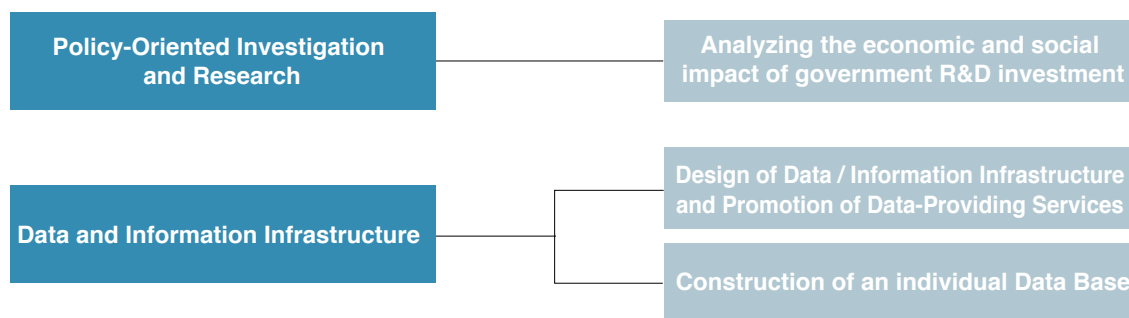
There is growing public expectation from S&T as a means of addressing the various changes in the economy and society and resolving today's most pressing social issues. This kind of policy formation requires a highly rational and highly transparent process based on objective evidence. NISTEP is committed to conduct several researches as well as developing data infrastructure with a view to contributing to science, technology and innovation (STI) policy.

The United States, European nations, and other countries are currently promoting research to scientifically analyze the mechanisms of STI and taking actions to build data-infrastructure that will be based on their policymaking. For its part, Japan currently advocates "Science of science, technology and innovation policy" as a new field that will provide a foundation for a transition from conventional S&T policy to STI policy that encompasses other related policies.

Japan's Fourth Science and Technology Basic Plan (FY2011 to 2015) states the following: "The Japanese government promotes 'Science of Science, Technology and Innovation policy' to formulate the objective evidence-based policy, and to reflect the outcomes of evaluation and examination of policies into the next policy-formation. In this regard, the government seeks the participation of researchers in social sciences as well as ones in natural sciences, and through these efforts, the government fosters human resources who engage in formation of policies".

Based on this background, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) launched the "Science for RE-designing Science, Technology and Innovation Policy (SciREX)" program in fiscal 2011 to realize "evidence-based policy formulation" that will create effective policies for addressing pertinent issues based on analysis and full understanding of economic and social circumstances from multifaceted perspectives.

NISTEP takes charge of promoting 1) Policy-oriented investigation and research that facilitates analysis of the economic and social impact of government R&D investment, and 2) the development of data-infrastructure useful for research or analysis in the area of science, technology, and innovation policy formulation.



# R&D and innovation

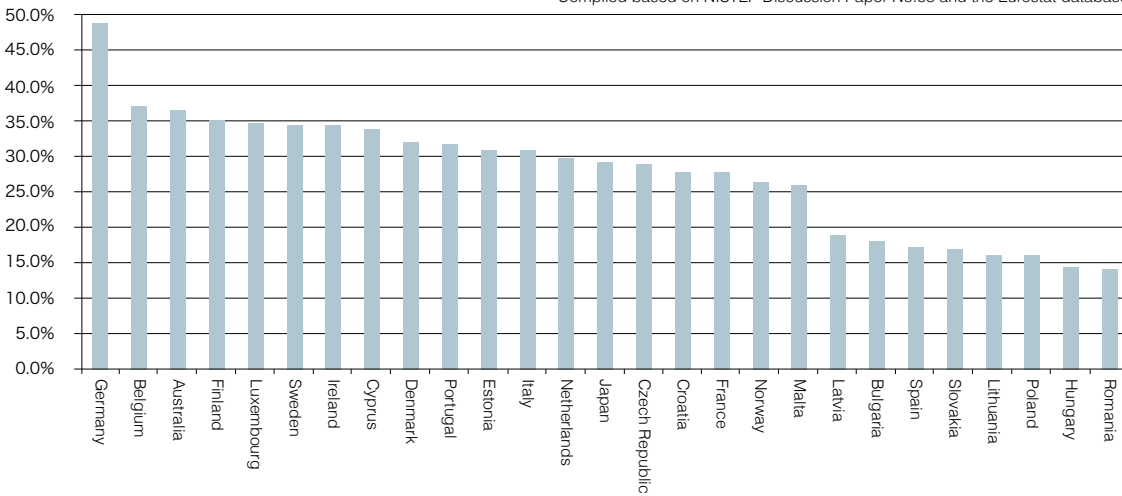
In order to ensure future growth and development in Japan, innovation is critically important. NISTEP is working on clarifying the process of realization of innovation by tracking how knowledge—created through tangible and intangible asset investment including R&D—leads to innovation. This research covers activities not only at universities and public research institutions but also at private companies.

## Innovation and intangible assets

Improving productivity through innovation is considered key to Japan's future sustained growth. To achieve the innovation, Japan as a developed country needs to invest in intangible assets. Using an economic approach, NISTEP seeks to clarify the process leading to greater productivity through innovation—created by investment in intangible assets. Specifically, NISTEP conducts the National Innovation Survey of official statistics. This survey is designed to collect data on innovation activities in firms. NISTEP also builds a database on intangible assets, innovation, and productivity, using data in Japan and other countries, including official statistics, and conducts empirical analyses with the databases. In addition, in order to facilitate our research projects, we collaborate with domestic and foreign institutions including the Organization for Economic Cooperation and Development (OECD), the Research Institute of Economy, Trade, and Industry (RIETI), Hitotsubashi University, and more.

Rate of product innovator in the manufacturing sector (by country)

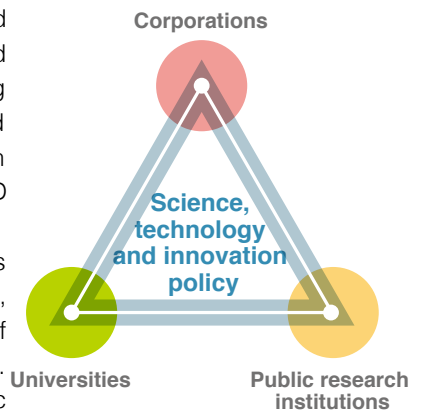
Compiled based on NISTEP Discussion Paper No.68 and the Eurostat database



## R&D management

The process of innovation is developed through collaboration between companies and the government, universities, and public research institutions. In order to formulate and implement science, technology and innovation policy with a view to creating innovation, it is important to accurately assess trends in R&D activities and management amongst not only government, universities, and public research institutions, but also private companies, which spend approximately 70% of total R&D expenditure in Japan.

In order to accurately assess research trends of private companies, NISTEP conducts "Survey on Research Activities of Private Corporations" of official statistics. In addition, NISTEP conducts research on internationalization/industry-academia collaboration of research activities at private companies, as well as intellectual asset management. NISTEP also conducts surveys on research management of university and public research institution.



## Science and Technology System

Realizing Science, technology, and Innovation requires the building of appropriate systems and mechanisms. NISTEP strives to contribute to the formulation of policies and measures concerning S&T systems by surveying and analyzing relevant circumstances in Japan and abroad. Such surveys and analyses cover innovation activities at the regional level and industry-academia-government collaborations as well as other various systems and initiatives.

### Industry-academia-government collaboration and academic startups

Many government measures have been implemented to promote industry-academia-government collaboration, for example by developing internal systems and organizations of universities and public research institutions. In the next stage, it is important to develop sustainable systems to create innovation. Given this, NISTEP conducts surveys and research for the purpose of illuminating the current status of industry-academia-government collaboration as well as challenges for the future.

At the same time, academic startups represent one means of utilizing the achievements of research that is conducted by universities and other public research institutions. Moreover, such ventures are regarded as important actors in the creation of innovation. Thus, NISTEP conducts surveys and research to clarify conditions surrounding academic startups and issues relevant to the formulation of future promotion strategies.



### Innovation-related activities at the regional level

It is considered that excellence in science and technology activities and innovation-related activities at the regional level is the basis of advancement, diversification and competitiveness of S&T at the national level. For this reason, NISTEP conducts surveys and research on systems and measures concerning S&T promotion at the regional level, as well as on success-inducing factors and promotion policies for regional innovation systems. It also implements case studies on MEXT's Knowledge Cluster Initiative and City Area Program, which are connected to regional innovation policy, as well as achievements by individual regions.

### R&D systems and S&T systems

NISTEP conducts surveys and research to identify the ideal R&D systems and S&T systems needed to realize STI in Japan based on comparisons with other countries. It also implements research on the desirable institutions and systems by analyzing changes in experts' attitudes concerning them through questionnaires that are issued in identical form to the same respondents each year.

## Human Resources in Science and Technology

Along with the increased sophistication and complexity of S&T, which forms the very basis of daily life and the foundations for our society, the work of science and technology personnel is becoming increasingly important. In order for Japan to continuously produce results in the field of S&T—and to foster new innovation—universities, public research institutions, and companies of various sectors need to put more resources into training personnel capable of leading Japan and the world. It is therefore critical to create an environment where individuals can develop this capacity.

At the same time, in order to train S&T personnel capable of working on future initiatives, we need not only to survey systems and career paths, but also to accurately assess issues and problems related to job site conditions and career development, and to assist individuals in resolution of such issues. In light of these circumstances, NISTEP works to analyze issues faced by personnel working in the field of science and technological innovation.

### ◆ Research on training S&T personnel

Japanese universities and graduate schools employ distinctive systems to train personnel through high-quality education and research, and to make education more systematic.

At NISTEP, one of our objectives is to assess the level and circumstances of personnel and to shed light on current and future issues. This is accomplished by examining education, research, and personnel training in Japanese graduate schools, mainly at the doctoral level, and by comparing systems at universities around the world with Japanese university systems.

### ◆ Research on S&T personnel career paths

Japanese doctoral and post-doctoral researchers tend to work in universities and public research institutions upon building their careers, but recently more of these individuals are working for private companies and other organizations. This trend indicates greater diversification of career path choices.

Focusing mainly on the doctoral and post-doctoral level, NISTEP assesses and analyzes post-doctoral career choices, as well as the diverse array of environments that researchers work in, and the mobility between these environments.



### ◆ Research on diversity and mobility of S&T personnel

In order to ensure that S&T personnel in Japan can carry out superior research, it is important to boost mobility of researchers between institutions so that they can compete with each other to develop.

In addition, diversification of personnel, such as employing female researchers and foreign researchers, is expected to contribute to superior results.

NISTEP tries to obtain quantifiable data on mobility, movement, and diversity of S&T personnel, and analyze this data.



## Science and Technology Indicators, and Scientometrics

Quantitative S&T data and their analyses are an indispensable foundation for formulating S&T policy, and they play an important role in S&T policy research. Quantitative data represent a key tool in grasping S&T activities that tend to be complex and reach across multiple fields, as well as in analyzing the effects and influences that policies have.

Given that S&T activity is the process of producing knowledge, preparing quantitative data for this intangible process is not easy. In addition to this, close linkage to S&T activity with various other activities makes the measurement of S&T activity and differentiating it from other activities technically difficult. NISTEP understands the difficulties here, and that is why it is developing S&T indicators and conducting research in scientometrics in order to deepen application and analysis of quantitative S&T data.

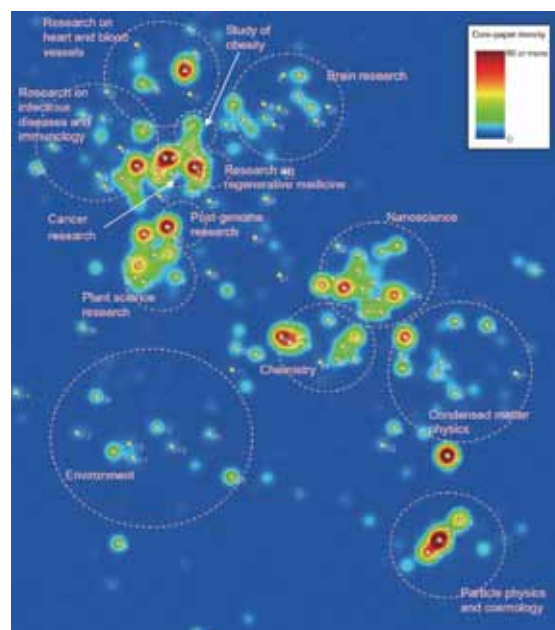
### Science and Technology Indicators

“Science and technology indicators” are basic resources for systematically ascertaining S&T activities in Japan and the world based on objective, quantitative data. Science and technology indicators are prepared by many countries of the world. In Japan, the first indicators were published by NISTEP in 1991. Initially, NISTEP reviewed the structures of indicator system every three years. However, since 2009, it has been emphasizing the timeliness of data by focusing on basic indicators that are updated each year. It assembles basic data that include R&D expenditure, number of researchers, and number of published research papers in Japan and major countries together with detailed explanations about meta-data of the statistics. Moreover, NISTEP not only announces “science and technology indicators” but also conducts relevant surveys and research.



### Scientometrics

With the aim of gaining a comprehensive and quantitative understanding of views on sciences and technology trends, we analyze research and development trends and the science and technology level of each country using a database comprising scientific papers (e.g., time series analysis of scientific strengths and weaknesses in each country, and an institution level analysis that reveals their characteristics). In addition, we make a “Science Map” every other year in order to identify hot research areas in science and analyze their characteristics.



Science Map

#### How to Read the Science Map

The yellow dots signify the centers of hot research areas, and the numbers written beside the dots indicate the ID numbers of the areas. The gradation corresponds to the frequency of citation.

This map shows the close relationship between clinical research and basic life science, and also explains that nano-science is positioned in between chemistry and physics.

Source: NISTEP REPORT No. 139 Science Map 2008



# Science and Technology Foresight, and Science and Technology Trends

Policy discussion for promoting STI requires perspectives on how our society and cutting-edge S&T are going to go in the future. We seek to see the tomorrow that scientific and technological achievements can bring through foresight activities including methodological development. NISTEP also keeps up on S&T trends that are emerging throughout the world with cooperation from external experts, which are published regularly.

## Science and Technology Foresight Reports

Large-scale S&T foresight has been implemented roughly every five years since 1971 in Japan. As of the fifth survey (1992), NISTEP has taken over as the implementing body.

NISTEP's S&T foresight is characterized by long-term horizon of 30 years and broad discussion, taking the perspective not only of scientists and technological experts but also of the demand side and experts in humanities and social science. NISTEP combine various methods including Delphi questionnaire, scenario and workshops to paint a picture of the desirable society and then identify S&T that can contribute to its realization. We also develop new methods that the future will likely require.

We have enhanced our international network of foresight activities through participating in international projects and organizing training courses for young researchers from emerging economies. We are leading in this regard.



A scene from the 2025 lifestyle

## S&T trends

NISTEP conducts investigative analysis of 1) orientation of R&D in each area, 2) R&D issues for the future, and 3) current conditions and issues in S&T systems, with cooperation from external experts including members of the "S&T Experts Network". The results are published in journal "S&T Trends".

NISTEP also carries out detailed analyses regarding comparison of research trends in the world and Japan, problems in human resources development, universities' intellectual property creation, international mobility among research personnel, etc. Through these analyses, NISTEP seeks to illuminate problems and encourage debate toward their resolution.



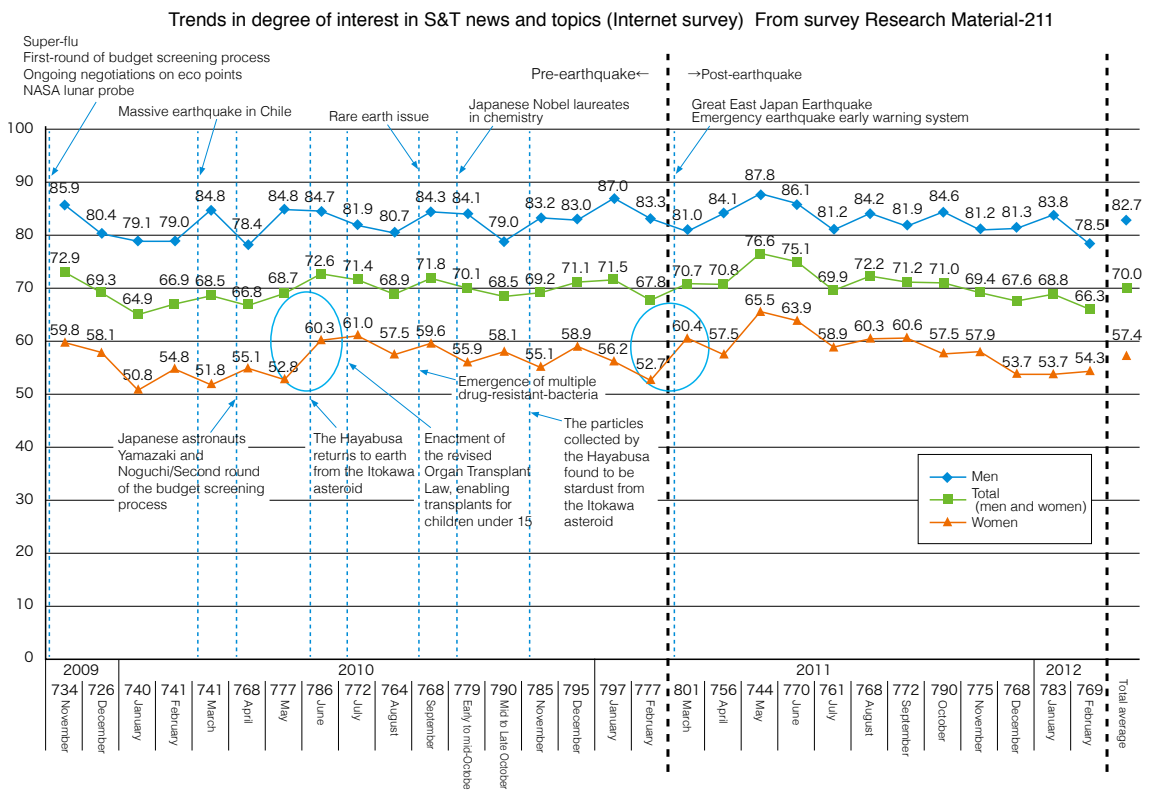
# The Relationship of Science and Technology with Society

In today's world, S&T has become an integral part of our society, and our economy would simply not run without it. Furthermore, in today's world of increasingly conspicuous energy and environmental issues, we as individuals need to start thinking of social issues as his or her own issues, and to consider them more in our day-to-day lives. According to Japan's Fourth Science and Technology Basic Plan, the government needs to accurately assess social needs and expectations on how to address the issues in policy making and promotion, with a view to creating economic and social value through science, technology and Innovation policy. Further, such plans must be appropriately incorporated into policy.

To facilitate this process, NISTEP regularly monitors the Japanese public attitudes on S&T as part of survey on reinforcing the relationship between S&T and society. At the same time, NISTEP conducts research on measures to "give back" some of the positive results of S&T to society.

## ◆ Surveys and research on public attitudes on S&T issues

Japan is seeking to deepen the relationship of between Society and Science, technology and innovation, which means it is critical that the Japanese public has a strong interest in and deeper understanding of S&T. Since 1960, the Cabinet Office (including the former General Administrative Agency of the Cabinet) has conducted a survey on awareness of S&T amongst the people, called "Public Opinion Survey on Science and Technology," every few years. NISTEP also implements a public opinion survey (interview style) as well as Internet surveys (since 2007) on the subject. Recent surveys indicate changes in public awareness of S&T following the Great East Japan Earthquake.



## ◆ Surveys and research on boosting science and technology communications

To assess the impact of enhanced S&T communications on public attitude and awareness levels, NISTEP conducts surveys and analyzes by collecting information on individual case studies.

## Publishing information on research results

NISTEP also provides information to the public as follows. Science and Technology Policy Study Review Seminars on S&T policy and reports on research results (Visit the NISTEP Website to sign up for your newsletter).

### ◆NISTEP Newsletter

The NISTEP Newsletter (in Japanese) began in February of 2011 for the purpose of communicating our activities.

### ◆Science and Technology Trends—Quarterly Review

NISTEP publishes a report featuring topics and extensive analysis of the latest trends, called “Science and Technology Trends”. We also send out an e-magazine providing summaries of the latest reports issues and related links.

In addition, we publish an electronic newsletter in English called “Science and Technology Trends-Quarterly Review”.

## NISTEP Award (The Researchers with Nice Step)

Since 2005, NISTEP has been selecting people who have made significant contributions to S&T as “NISTEP Award (The Researchers with Nice Step)”.

NISTEP holds symposia that are led by awarded persons. The symposia provide them with a venue for presenting cutting-edge research achievements and initiatives that promote science and technology.



NISTEP 2012 researchers visit the Ministry of Education, Culture, Sports, Science and Technology

## Collaboration and cooperation with other institutions

NISTEP holds agreements with policy research institutions and universities in Japan and overseas to conduct joint research, send and accept researchers, and invite leading researchers for symposiums.

In addition, NISTEP holds human resource development trainings, inviting young government officers from emerging economies in charge of S&T policy for enhancing international collaboration in the future.



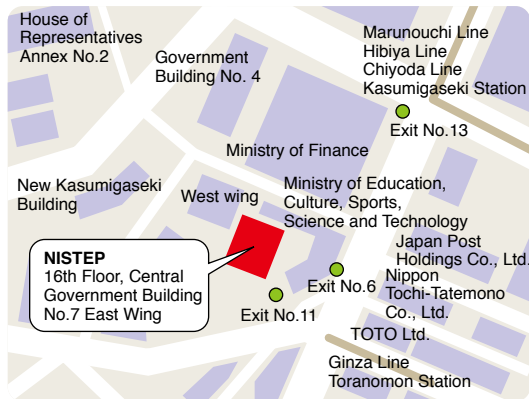
Young researchers invited from overseas study

### **[List of collaborative institutes and universities]**

- National Graduate Institute for Policy Studies (GRIPS)
- Hitotsubashi University Institute of Innovation Research
- Hitotsubashi University Institute of Economic Research
- Graduate School of Information Science and Technology, The University of Tokyo
- Japan Science and Technology Agency (JST)
- The Research Institute of Economy, Trade and Industry (RIETI)
- The Project Research Institutes of the Comprehensive Research Organization, Waseda University

## NATIONAL INSTITUTE OF SCIENCE AND TECHNOLOGY POLICY

16th Floor, Central Government Building No.7 East Wing  
 Kasumigaseki 3-2-2, Chiyoda-ku, Tokyo 100-0013, Japan  
 Tel : +81-(0)3-3581-2391  
 Fax: +81-(0)3-3503-3996

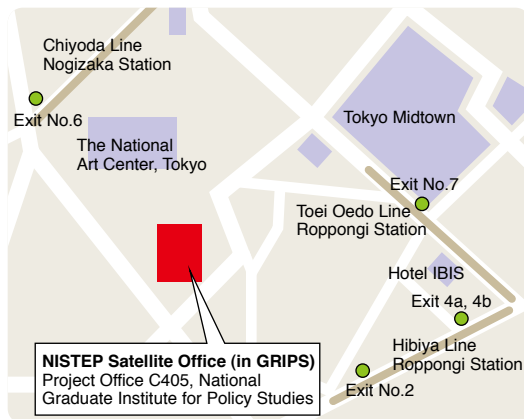


Tokyo Metro Ginza Line: Get off at Toranomon Station, Exit No.6,11 (2-minute walk)

Tokyo Metro Chiyoda Line/Hibiya Line/Marunouchi Line: Get off at Kasumigaseki Station, Exit A13 (5-minute walk)

## Satellite Office (in GRIPS)

Project Office C405, National Graduate Institute for Policy Studies  
 7-22-1 Roppongi, Minato-ku, Tokyo 106-8677, Japan  
 Tel: +81-(0)3-5775-2651



Tokyo Metro Chiyoda Line: Get off at Nogizaka Station, Exit A6 (6-minute walk)

Toei Oedo Line: Get off at Roppongi Station, Exit No.7, 4a, 4b (5-minute walk)

Tokyo Metro Hibiya Line: Get off at Roppongi Station, Exit A2 (10-minute walk)

**WEB** <http://www.nistep.go.jp/>