Table 2-3-28 Balance of payments for Japan's high-tech trade, by industry (2001)

Export and import amounts / Industry	Exports (billion yen)	Imports (billion yen)	Trade balance
All manufacturing	46,772	31,533	1.48
All high-tech products	14,386	9,544	1.51
Electronics	7,277	3,657	1.99
Office Machinery & Computer Industry	3,462	2,848	1.22
Medical, precision, and optical equipment	2,878	1,799	1.60
Pharmaceuticals	445	750	0.59
Aerospace	323	490	0.66

Source: OECD. "Main Science and Technology Indicators," "STAN Database"

2.4 Efforts to Develop New Science and Technology Indicators

The indicators discussed in Chapters 2.1 to 2.3, such as R&D expenditures, numbers of researchers, numbers of scientific papers, numbers of patent applications and grants, and value of technology trade, are important as basic data for use in planning Japan's science and technology policies. While various surveys and investigations have helped to provide the above data, under the increasing complexity and globalization, etc., of scientific and technological activities in recent years, the current indicators and survey methods are being reviewed, and new indicators are being developed to grasp the shape of the national scientific and technological activities more accurately. In this section, we introduce the efforts being taken by the OECD and those being taken in Japan.

2.4.1 Efforts by the OECD

The OECD established the Working Party of National Experts on Science and Technology Indicators (NESTI) as a subsidiary organization within the Council for Science and Technology Policy (CSTP). The NESTI is working to improve methods for collecting internationally comparable R&D data and on the development of new indicators.

At its June 2003 meeting, NESTI revised the Oslo Manual, an international standard for the collection and interpretation of data on innovation activities. The preparation of the revision proposal—work in which Japan is participating—is currently underway.

Additionally, NESTI is reviewing Field of Science (FOS) classifications used in R&D statistics and is also moving forward with a study aimed at the development of indicators regarding Human Resources in Science and Technology (HRST).

2.4.2 Efforts in Japan

2.4.2.1 Ministry of Internal Affairs and Communications

The Ministry of Internal Affairs and Communications has been conducting surveys of business enterprises, non-profit institutions, public organizations, and universities concerning science and technology indicators for R&D expenditure, the numbers of researchers, the amount of technology transfer, etc., in Japan. This survey was originally started in 1953 as the Basic Statistical Survey of Research Institution, with the name changing in 1960 to the current Survey of Research & Development. Since that time, the coverage of the survey has been expanded and new variables added several times, to reach its present focus. To reflect the increasingly important roles of software and services in industry, and to improve the quality of international comparisons, the survey was subjected to an exhaustive review by the Statistics Council in FY2001, after which a new survey was launched in FY2002 with new survey categories and survey coverage.

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

In November 2002, the MEXT conducted the "Survey of Full-time Equivalency Data at Universities," targeting teachers and doctoral students at all types of universities across Japan in order to gain an understanding of the Full-Time Equivalency (FTE) of researchers at "universities" in the "Survey of Research and Development."

The total results for valid replies showed that the full-time equivalencies of teachers and doctoral students at universities are annual averages of 46.5% and 70.9%, respectively.

Table 2-4-1 Full-Time Equivalency (FTE) for university faculty and doctoral students (2002)

	Persons	FTE factor	FTE
Faculty members	171,094	0.465	79,604
Doctoral students	64,019	0.709	45,419

Note: Data on the number of people comes from the "FY2002 Report on the Survey of Research and Development."

Since 1991, the National Institute of Science and Technology Policy (NISTEP) has revised the science and technology indicators every three to four years and drawn up reports for the purpose of obtaining a comprehensive, objective grasp of scientific and technological activities. The fifth edition of the "Science and Technology Indicators Report (FY2004)" was released in April 2004. The 2004 edition improves the science and technology indicators in the following ways:

1. Introduces indicators that demonstrate the progress of a knowledge-based society
2. Introduces indicators that demonstrate transformations in knowledge production methods for science and technology
3. Introduces data on industry-academia collaboration
4. Enhances indicators relating to dissertations and patents
5. Improves the reliability and applicability of comprehensive science and technology indicators

In addition to the revisions made every three to four years to the science and technology indicators, the data has been updated and published annually since FY2001.

Part 3
Measures Adopted for Promotion of Science and Technology

Part 3 discusses the measures adopted in FY2003 for the promotion of science and technology, in line with the Second Science and Technology Basic Plan.

3.1 Development of Science and Technology Policies

The Science and Technology Basic Law was promulgated and put into effect on November 15, 1995. Based on a recognition of the important role that science and technology should play in the development of Japan's economy and society, in the improvement of the welfare of the nation, and in the sustainable development of human society, the objective of this law is to achieve higher standards of science and technology through the promotion of such measures as the implementation of the Science and Technology Basic Plan, etc., for the comprehensive and systematic promotion of science and technology.

Japan is currently faced with such issues as a rapid population shift toward more elderly people and fewer children, as well as intensive economic competition with other countries, and will in the future be required to overcome such problems as a hollowing out of industry, a lack of vitality in society, and deteriorating living standards. In addition, Japan should, as a member of international society, actively address, and contribute to resolution of, the global-scale issues that confront mankind, including global environmental issues, population and food problems, and energy and natural resource problems.

For this reason, it is important that Japan challenge itself to move forward into as-yet-uncharted frontiers of science and technology in order to achieve a high standard of science and technology. In promoting policies related to science and technology, the establishment of a Plan-Do-See process by the ministries and by the Council for Science and Technology Policy is important. The Science and Technology Basic Law lays down the basic framework for future science and technology policy in Japan, which aims to be an advanced science- and technology-oriented nation, and presents to the international public the basic stance of strongly advancing the promotion of science and technology.

Article 9 of the Law stipulates that the government must draw up a basic plan for science and technology, for the purpose of the comprehensive and systematic promotion of measures for the promotion of science and technology.

3.1.1 The Science and Technology Basic Plan

With the launching of the most recent Council for Science and Technology Policy (CSTP) in January 2001, the Prime Minister posed an inquiry regarding the general strategy for science and technology, which calls for the adoption of a five-year science and technology basic plan to be launched in FY2001. Based on the recommendation for a "Basic Plan for Science and Technology" made by the previous Council for Science and Technology on December 26, 2000, the CSTP examined and discussed the general strategy in view of the comprehensive integration of the natural sciences with the social sciences and the humanities, and in strategic consideration of advance investments in science and technology for the future, and then issued a recommendation in March 2001.

In response to the comprehensive strategy, the Cabinet officially launched the Second Science and Technology Basic Plan (hereinafter referred to as the "Basic Plan") on March 30, 2001.

The Basic Plan was adopted in consideration of the form science and technology should take in the 21st century, and for the comprehensive promotion of the government's science and technology policies, while also emphasizing the building of a new relationship between science and technology, and

society.In this plan, the basic direction of Japan's science and technology policy is to have a clear vision with three characteristics as the basis for being an advanced science- and technology- oriented nation, as "a nation contributing to the world by the creation and utilization of scientific knowledge," "a nation with international competitiveness and the ability for sustainable development," and "a nation securing safety and quality of life." Toward the realization of this vision, the plan emphasizes the need for high-quality basic research, and calls for prioritized and efficient investment in research and development activities covering topics of interest to the state and society in each sector, including the life sciences, information and communications technology, the environment, and nanotechnology and materials. Moreover, in order to enhance the level of Japan's scientific and technological activities, and to better promote the restoration of the results of these activities to society, the plan focuses on expansion of investment, reform of the science and technology systems that cover research and development activities, human resources development, and the interface between science and technology, and society, and on strengthening independent international cooperation activities and information dissemination capabilities, as well as internationalization of the domestic research environment, in order to promote the internationalization of scientific and technological activities. The plan calls for continued efforts to promote science and technology with an updated understanding of future trends in the major countries of Europe and North America, and for this purpose asserts that a total of about 24 trillion yen[1] for governmental research and development investment will be required in the five years from FY2001 to FY2005 (Figure 3-1-1).

1 Budget figures are based on the presumption that government research and development investment will be 1% of GDP during the period of the Basic Plan, with a nominal GDP growth rate of 3.5%.

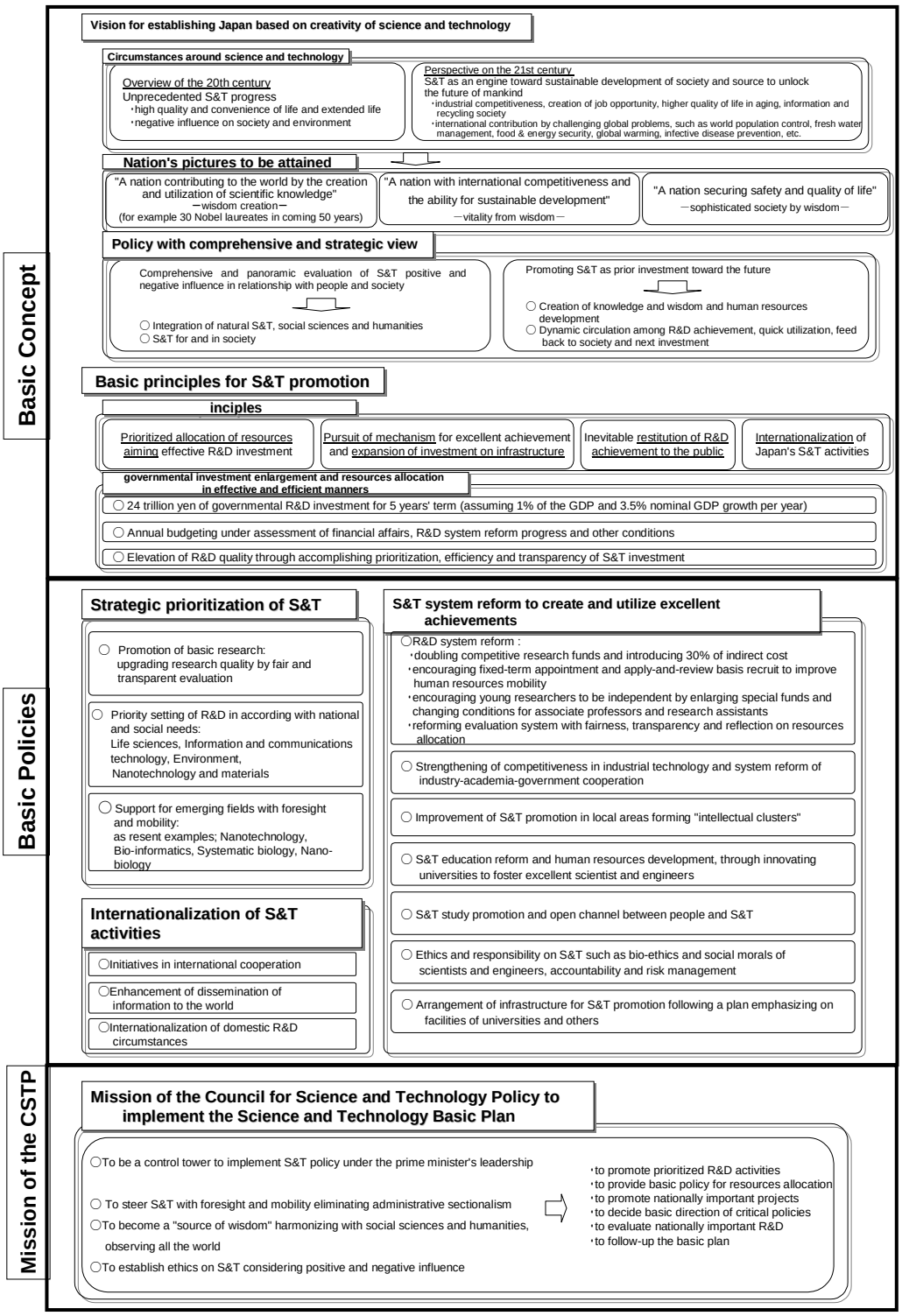


Figure 3-1-1 Points of Second Science and Technology Basic Plan

Meanwhile, sound government finances will be a pressing issue if Japan is to build up a 21st century society and economy that have vitality.

In view of the above, while taking into consideration future social and economic trends, the necessity for the promotion of science and technology, and a fiscal situation that is even more severe than it was during the period of the First Basic Plan, Japan should be striving for expansion of the funds necessary for promotion of the policies presented in the Basic Plan, based on prioritized and efficient allocation of funds, and in accordance with trends in the effects of rationalization and financial resource assurance achieved in research system reforms under the Basic Plan.

3.1.2 The Council for Science and Technology Policy

3.1.2.1 Establishment of the Council for Science and Technology Policy, and It's Tasks

The Council for Science and Technology Policy (CSTP) was established under the Cabinet Office in January 2001, in accordance with the Law for Establishment of the Cabinet Office (2001 Law No.89) as "a council for discussion of important policies," and to serve as a "place of wisdom" in support of the Prime Minister and Cabinet. It was established for the objective of drawing up planning proposals for comprehensive, fundamental science and technology policy and for performing comprehensive adjustments by taking a broad overview of Japan's science and technology from a viewpoint one step above any of the individual ministers (Figure 3-1-2). The Prime Minister functions as the head of the council, with the other members consisting of the Chief Cabinet Secretary, the Minister of State for Science and Technology Policy, other relevant cabinet ministers, heads of relevant government administrative institutions, and eminent members of society (Table 3-1-3). Its tasks include: (1) performing investigations and discussions of basic policies in response to inquiries from the Prime Minister for the purpose of comprehensive and planned promotion of science and technology; (2) performing investigations and discussions of important issues in response to inquiries from the Prime Minister or other relevant ministers regarding guidelines on budgetary/personnel resources allocation in science and technology for the promotion of science and technology, and other important matters concerning the promotion of science and technology; (3) evaluating large-scale research and development of science and technology and other research and development important to the state; and (4) expressing opinions concerning the matters listed in (1) and (2) above to the Prime Minister and others whenever necessary, even when not in receipt of inquiries.

In addition, to swiftly facilitate deepening its expert knowledge of important issues, the CSTP has established: (1) the Expert Panel on the Promotion Strategy for Prioritized Areas; (2) the Expert Panel on Evaluations; (3) the Expert Panel on S&T System Reform; (4) the Expert Panel on Bioethics; (5) the Expert Panel on Space Development and Utilization; (6) the Expert Panel on Management of Intellectual Properties; and (7) the Expert Panel on Human Resources.

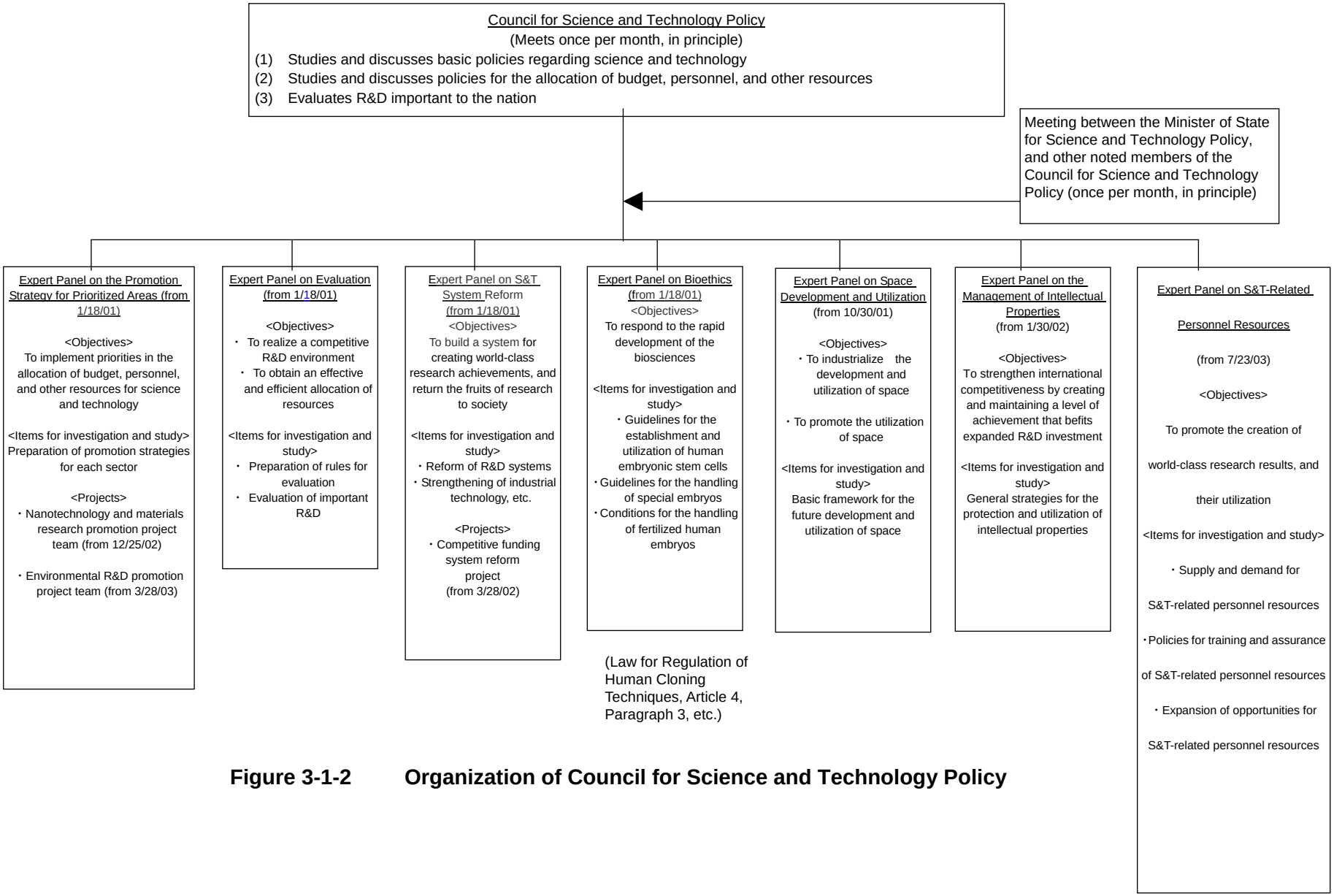


Figure 3-1-2 Organization of Council for Science and Technology Policy

Table 3-1-3 Chairman and members of the Council for Science and Technology Policy (as of the end of March 2002)

●Chairman: Junichiro Koizumi, Prime Minister

●Members

・Six cabinet ministers: Yasuo Fukuda, Chief Cabinet Secretary; Toshimitsu Motegi, Minister of State for Science and Technology Policy; Taro Aso, **Minister of Internal Affairs and Communications;** Sadakazu Tanigaki, Minister of Finance; Takeo Kawamura, Minister of Education, Culture, Sports, Science, and Technology; and Shoichi Nakagawa, Minister of Economy, Trade, and Industry

・Seven noted members of society: Hiroyuki Abe, professor emeritus, Tohoku University; Masanobu Oyama, advisor (part-time) to Toshiba Corporation; Taizo Yakushiji, visiting professor, Keio University; Tadamitsu Kishimoto, visiting professor, Osaka University; Reiko Kuroda, professor, University of Tokyo; Kazuko Matsumoto, professor, School of Science and Engineering, Waseda University; and Hiroyuki Yoshino, director and advisor, Honda Motor Co., Ltd.

・One head of a government institution**: Kiyoshi Kurokawa** : President of the Science Council of Japan

3.1.2.2 Activities of the Council for Science and Technology

Since its establishment in January 2001, the Council for Science and Technology Policy has generally met once a month with the participation of the Prime Minister as council chairman (a total of 35 sessions as of March 2004). The major items discussed and ratified during FY2001 are as presented below.

3.1.2.2.1 Guidelines on Budgetary/Personnel Resources Allocation in Science and Technology

As shown in the Basic Plan, the CSTP relies on the Basic Plan and the promotion strategies for each sector, etc., examines the science and technology measures set forth for the next fiscal year, and presents opinions to the Prime Minister regarding those measures that it believes merit particular priority, and then clarifies its ideas regarding the next fiscal year's important measures and allocation of resources, and presents those ideas to the relevant ministers. Furthermore, to ensure that the resource allocations settled upon in the CSTP are carried out, the council coordinates when necessary with the finance authorities during the budget formulation process.

3.1.2.2.1.1 FY2004 Guidelines on Budgetary/Personnel Resources Allocation in Science and Technology (June 19, 2003)

Policies related to science and technology were strongly promoted in FY2004, with equal emphasis on policies for investment from the medium to long-term view, and policies for immediate economic revitalization. Priorities were placed on policies that aligned with such basic policies as: (1) build up national power by strengthening research foundations; (2) revitalize the economy by preserving and strengthening international competitiveness; and (3) build up a safe, secure, and comfortable society capable of addressing such societal trends as increasingly fewer children and more elderly people. Moreover, in the promotion of these policies, it was recognized that human resources are

needed to serve as scientists, technologists, and technology management specialists, and special priority was placed on fostering and preserving those human resources.

3.1.2.2.1.2 Prioritization in the Budget Formulation Process

Preparing for the FY2004 budget formulation process, in order to help secure a science and technology-related budget that ensures priority allocation of research and development resources for truly important measures, the CSTP—primarily the Minister of State for Science and Technology Policy and the eminent members of the Council—prioritized (in 4 levels: S, A, B, and C) the principal items within the measures for which relevant ministries and agencies made budget requests, and then, based on a general understanding of operations at incorporated administrative agencies, summarized opinions regarding the main projects to assist in project operations at the agencies (announced on October 17, 2003). The prioritization results were as follows:

S: 32 items (16%) — Particularly important research topics that require aggressive implementation

A: 91 items (46%) — Important research topics that require steady implementation

B: 59 items (30%) — Items for which problems must be solved and that need effective and efficient implementation

C: 16 items (8%) — Items requiring review of research details, plans, and promotion systems

In addition, working to enhance the science and technology budget, the CSTP summarized in "Toward Formation of the FY2004 Science and Technology-Related Budget (Opinion)" the areas that should receive special attention in the process of budget formulation and implementation of measures. The Council submitted its opinion to the Prime Minister and the relevant ministers (November 25, 2003). In view of the importance of science and technology, the science- and technology-related budget grew by 0.8% over the previous year (in particular, expenses for the promotion of science and technology rose by 4.4%), in contrast to the general expenditure average, which registered a year-on-year increase of only 0.1%.

3.1.2.2.1.3 R & D projects for Economic Stimulus (The Mirai Creation Project)

Japan's economy continues to be in a precarious position, and in an effort to break out of this situation to ensure and strengthen the nation's international competitiveness, R & D projects for economic stimulus (the Mirai Creation Project) were promoted in the FY2002 supplemental budget, and in the FY2003 government budget. This project, which uses research and development for items that are both "expected to result in practical applications within a relatively short period" and "expected to contribute to the construction of next generation industrial infrastructures, although requiring a relatively long period until the realization of practical applications" to promote structural reform in Japan, was funded at 74.1 billion yen in the FY2003 government budget (and at another 58.6 billion yen in the FY2002 supplemental budget).

3.1.2.2.2 Major Efforts of the Council for Science and Technology Policy in FY2003

3.1.2.2.2.1 Examination of Promotion Measures in Priority Areas

Based on the priority setting laid down in the Basic Plan, in FY2001 the CSTP prepared the "Promotion Strategy for Prioritized Areas" for eight major area, which are the life sciences, information and communications technology, the environmental sciences, nanotechnology and materials, energy, manufacturing technology, infrastructure and the frontier-outer space and the oceans (Figure 3-1-4). Based on the promotion strategies for these areas, CSTP addressed the major items in FY2003 as follows (see section 3.2.2):

Figure 3-1-4 Strategies for the promotion of each of the four priority sectors (September 21, 2001)

Four Priority Sectors: the sectors that receive particular priority and preferential allocation of R&D resources. Each section below features the current situation and issues, thoughts on prioritizing and areas of priority, five-year R&D objectives, and promotion measures for one of these sectors.

Life Sciences Sector

1. Current Situation, and Issues

The 21st century is being called the "Century of Life." While Japan had a late start in analysis of the genome, the country is using its leading-edge R&D performance in SNPs, proteins, etc., to catch up in post-genome research and industrial applications.

2. Thoughts on Prioritizing, and Areas of Priority

Strive to extend the "healthy life expectancy" in an aged society with fewer children, and seek to overcome the infectious diseases, allergies and stress-related illnesses that are now coming to the fore as social problems. Furthermore, achieve a prosperous lifestyle by utilizing diverse bio-resources and bio-functions, and strengthening industrial competitiveness.

(1) Develop technologies to "protect the people's health"
- Technologies for the prevention and treatment of diseases that utilize genome-related technologies to achieve active, long lives
- Elucidation of physiological defense mechanisms and technologies for prevention and medical treatment in relation to infectious diseases and environmental factors
- Promotion of basic research and technologies for the treatment and prevention of mental health and brain diseases

(2) Develop technologies for "competitiveness" and "sustainable development"
- Materials production and environmental response technologies that utilize bio-functions
- Food sciences and technologies that contribute to the improvement of food supply capabilities and to the peoples' diet

(3) Emerging and interdisciplinary areas and the development of advanced analyzing technologies. Build systems and structures that accelerate the return of the fruits of research to society.

3. Five-Year R&D Objectives

(1) Realize healthy, secure lives by:
- Developing countermeasures for "lifestyle related diseases," and ailments that lead to "dementia" and "bed-ridden status": Analyze tens of million of SNPs each year/Perform structural and functional analysis of large-scale, highly purified proteins/Identify approximately 10 genes related to each ailment/Shorten drug development times/Realize effective treatment using medicines tailor-made to the constitution of individual patients, etc.
- Developing countermeasures for infectious diseases and environmental factors such as toxic substances: Elucidate the mechanism for the incidence of hepatitis C infections, etc./Use vaccines, etc., to prevent infections and control incidence, etc.
- Developing countermeasures for mental and nervous system diseases: Promote brain science/ Set out to develop new diagnostic and treatment methods for Alzheimer's and other nervous system diseases/Develop non-invasive diagnostic technologies for the measurement of brain functions

(2) Advance technologies for the production of useful substances and technologies for separating environmental pollutants, utilizing genome-related technologies and microorganisms and other plants and animals/Develop crops resistant to environmental stresses to improve food supply capabilities

(3) Promote research into interdisciplinary sectors such as bio-informatics and nanobiology/Promote clinical research/Arrive at consensus in bioethics/Promote social acceptance of genetically modified organism/ Promote accumulation of intellectual properties, etc.

4. Promotion Measures

(1) Build up comprehensive systems of promotion for the evaluation of, and guidance on, measures proposed by various ministries that serve to strengthen national efforts

(2) Develop effective collaboration among industry, academia and government, the development of systems and structures that return the fruits of research to society, etc.

(3) Develop education and research centers for developing human resources for such interdisciplinary sectors as bio-informatics, advanced analysis, and medical treatment device development, in which engineering, physical sciences, medical science, agriculture, etc., are utilized and integrated

Information and Communications Sector

1. Current Situation and Issues

While the gap between Japan and the United States in information and communications technology continues to widen, R&D investment growth in the private sector is stalling, and collaboration among industry, academia, and the government remains insufficient. Since Japan's economy relies heavily on the information and communications industry, strengthening international competitiveness is an urgent task.

2. Thoughts on Prioritizing and Areas of Priority

Prioritize from the viewpoints of strengthening international competitiveness in the core technologies in which Japan has an advantage, such as mobile, optical and device technologies, the achievement of safe, secure and comfortable lives, strengthening the foundation for next-generation information and communications technologies and R&D infrastructure.

○ Building a "high-speed, highly reliable information systems" suitable for a society with a ubiquitous information-network, and the creation of a global market
- Technologies that realize an ultra-high-speed mobile internet system, in which vast amounts of information can be exchanged and utilized with high quality through wireless and optical networks anywhere and anytime, whether at home, in the office or on the move
- Technologies for devices with advanced-function and low-power-consumption
- Technologies for improved convenience, security, and reliability, for software and content, for the flexible and safe utilization of distributed computing power, etc.

○ Next-generation information and communications technologies, including next-generation human interfaces, quantum information and communication, and advanced traffic information systems (ITS, etc.), and so on

○ R&D infrastructures including science and technology databases, supercomputer networks, computational sciences, etc.

○ Human resource development in software, the Internet, interdisciplinary sectors, etc.

3. Five-Year R&D Objectives

(1) Information and communications system with high-speed and highly reliability.
- Realize wireless access in the class of tens of megabits per second, fully optical networks at 10 terabits per second, ultra-large scale connections (nodes) with IPv6, and high-quality real-time transmissions, and mobile terminals with 1-gigahertz-class high-speed and advanced functionality that do not require recharging for a week at a time, etc.
- Realize databases that can be accessed by approximately 100,000 people at the same time, advanced coding and authentification technologies, the establishment of development methods for the improvement of software reliability and productivity, digital authorization control systems, etc.

(2) Next-generation information and communications technologies: Realize technologies that can understand user intention by considering surrounding conditions, quantum code key distribution over relatively short distances, advanced ITS using next-generation Internets, gigabit-class high-speed space communications, etc.

(3) R&D infrastructure: Realize electronic science and technology information and search systems, and joint supercomputer networks linking national research institutions and universities, etc.

4. Promotion Measures

(1) Promotion of R&D applications: Strengthen collaboration among industry, academia, and government, etc., to promote R&D activities specifically intended for practical use, promote international standardization, and promote technology development in test beds for real environments

(2) R&D systems: Promote greater movement of researchers between institutions, support and develop venture companies, utilize excellent universities and research institutions as R&D bases, develop high-level instructors in the information and communications field, and expand the scale of human resource development capabilities

(3) Investigation of effects on society: Research the effects of information and communications development on society, coordinate with IT strategy headquarters, form strategic international collaborations to encourage international standardization and technology transfers, etc.

(Figure 3-1-4)

Environmental Area

1. Current Situation, and Issues

With environmental problems becoming both broader in geographical scope and more complex, research is requested to coordinate individual projects and develop planned and integrated programs. Other issues also requiring attention from a comprehensive viewpoint are research on human-environment interactions, and forecasting and preventive research (scenario-driven environmental research).

2. Thoughts on Prioritizing, and Areas of Priority

Engage in research that contributes to the solution of urgent and serious environmental problems, and to the building of sustainable societies. Perform research promoted by scenario-driven initiatives in which natural sciences, humanities and social sciences are merged under inter-ministerial collaboration.
[Important issues]
- ○ Research into global warming
- ○ Research into waste-free and resource recycling technologies
- ○ Research into eco-harmonious river basin and urban area regeneration
- ○ Research into chemical substance risk management
- ○ Research into global water cycle
- ○ Development of intellectual infrastructure such as standard materials and environmental biological resources
- ○ Advanced research

3. Five-Year R&D Objectives

(1) Research into global warming: Seek possibilities for controlling the emission of greenhouse gases into the atmosphere so as not to endanger mankind and ecosystems, and examine obtaining and systemizing scientific knowledge, developing and advancing remedy technologies and creating scenarios for the control of global warming.
(2) Research into waste-free and resource recycling technologies: Develop technologies and systems that contribute to the reduction of waste volumes, improvement of recycling and reutilization rates, and reduction of environmental risks from toxic wastes.
(3) Research into eco-harmonious river basin and urban area regeneration: Propose measures for the resolution of such environmental problems as high environmental loads in urban areas and the retreat or deterioration of natural environments, and systematically develop riparian district and urban renewal technologies and systems in order to contribute to the preparation of specific plans for coexistence with nature in major urban areas
(4) Research into chemical substance risk management: While determining the chemical substances that are expected to need risk management, urgently build up the technological infrastructure, knowledge systems, and intellectual infrastructure for comprehensive management of chemical substances, to ensure "safety and security"
(5) Research into global water cycle: Provide the scientific knowledge and technological infrastructure required for assessing the effects on human society of water resource supply and demand and changes in the water cycle, and for establishing water management methods that lead to sustainable development
(6) Intellectual infrastructure for the environmental area: Broaden and upgrade the intellectual infrastructure for environmental research
(7) Promotion of advanced research: Develop innovative knowledge for the resolution of environmental problems, and build new paradigms

4. Promotion Measures

(1) Improvement of R&D quality: ①Establish promotion and evaluation systems for initiatives, ②Foster international cooperation, ③ Disseminate R&D results, reflected in environmental policies, and basic efforts on societal understanding, ④Define roles and foster cooperation among industry, academia, and government, ⑤Cooperate with initiatives by local governments and NGOs, etc.
(2) Necessary resources: ①Enhance and expand competitive funding, ②Assure and develop human resources, strengthen international research networks, improve systems for accepting foreign researchers, and support and actively utilize environment-related university institutions, ③Cooperate with other sectors: actively utilize new methods and technologies in other sectors in order to engender reform of environment research paradigms, ④Develop important large-scale facilities and equipments specific to environmental research

Nanotechnology and Materials Area

1. Current Situation, and Issues

Nanotechnology offers great possibilities for technological innovation in a wide range of industries. Nations everywhere are actively engaged in strategic efforts. In materials technology, competitiveness arises from high value-added functional materials.

2. Thoughts on Prioritizing, and Areas of Priority

Assign priorities from the perspectives of "strengthening industrial competitiveness and forming the basis for sustainable economic growth," "responses to environmental and energy problems, and to an aged society with few children," and "assurance of safe and secure lives for the people, and retention of strategic technologies." Clarify the timetable for technological development, and steadily implement basic measurement, evaluation, and processing technologies, as well as materials technologies, etc.
- ○ Nano-devices and materials for next-generation information and communication systems
- ○ Materials for environmental preservation and advanced energy utilization
- ○ Ultra-small medical systems and materials, and nano-biology utilizing and controlling biological mechanisms
- ○ Basic technologies such as measurement, evaluation, processing, numerical analysis and simulations, and areas spreading from them
- ○ Substance and materials technologies that can generate innovative properties and functions

3. Five-Year R&D Objectives

- ○ Nano-devices and materials for next-generation information and communication systems
  - – Ensure international competitiveness in high-speed and high IC density device technologies
  - – Use the competitive development of various devices based on new principles, to select and focus next-generation, cutting-edge core technologies
- ○ Materials for environmental preservation and advanced energy utilization
  - – Realize materials for the reduction of CO2 emission volumes required to meet the COP3 objectives, and encourage the use of these materials into society
  - – Realize technologies for the reduction and elimination of risks arising from chemical substances, and incorporate them into society and national life
- ○ Ultra-small medical systems and materials, and nano-biology utilizing and controlling biological mechanisms
  - – Establish the groundwork for bio-functional materials, pinpoint therapies, and other technologies to extend healthy life expectancy
  - – Elucidate the basic principles to construct the systems that utilize the motive principles, etc., of bio-molecules
- ○ Basic technologies for measurement, evaluation, processing, numerical analysis and simulations, and areas spreading from them
  - – Realize highly precise measurement and processing technologies, improved by at least one order of magnitude compared to the levels required by the above three objectives
  - – Utilize simulations in the development of new materials and new devices
- ○ Substance and materials technologies that can generate innovative properties and functions
  - – Develop new materials through R&D activities that go beyond the boundaries of traditional materials classification
  - – Build up research and production methods that lead to the rapid resolution of social issues

4. Promotion Measures

- ○ Encourage competition at daily R&D activities, and prepare environments suitable for that purpose
  (Emphasis on competitive funding, promotion that goes beyond the boundaries of government ministries/agencies or systems, and the strategic acquisition of intellectual property)
- ○ Promote cooperation between different areas and researchers
  (Support for cooperative efforts among different areas building up networks among researchers and among institutions, etc.)
- ○ Build a system for the industrialization of R&D results, and promote collaboration among industry, academia, and the government
  (Acceleration of technology transfers, improvement of incentives such as support measures, and promotion of human resources mobility)
- ○ Ensure and develop human resources
  (Personnel capable of working in interdisciplinary areas, research assistants, and personnel capable of research evaluation and management).

(Figure 3-1-4)

Four Other Fundamental Areas: areas that are fundamental to the existence of the nation, and that are emphasized as areas in which it is essential for Japan to be involved:

Energy Area

1. Areas of Priority and Five-Year Objectives..

(1) R&D that brings about a reform of the total energy system, including supply, transportation, conversion, and consumption
Vigorous and efficient efforts to fulfill 3E goals
(2) R&D essential for upgrading the energy infrastructure
Energy infrastructure-related R&D; upgrades in efficiency and environmental soundness
(3) R&D for safe and secure energy
R&D that reassures people by ensuring safety in all aspects of energy
(4) R&D that comprehensively evaluates and analyzes energy both socially and economically
R&D that comprehensively analyzes and evaluates social, economic, and environmental facets, and deepens social understanding; R&D with the aim of creating industries
* Five-year objectives have been established for the above items.

2. Promotion Measures..

1. Important items for improving the quality and efficiency of R&D:

(1) Creation of results that are transferable to developing countries, and active use of international cooperation through participation in international joint research
(2) R&D efforts and evaluation under the conditions of the level of social understanding of R&D results and the diffusion of them
(3) To recognize each role for, and collaboration among, industry, academia and the government in order to promote the efficient development of system technologies
(4) Efficient promotion through inter-ministerial coordination of cross-ministerial themes
(5) Consistent efforts for short-, mid-, and long-term R&D themes

2. Points of concern relating to necessary R&D resources:

Securing and fostering personnel; enhancement of education on energy utilization and safety

Infrastructure Area

1. Areas of Priority and Five-Year Objectives

○ Building of Safety
Mechanisms for the generation of abnormal natural phenomena; immediate response systems for disasters (disaster prevention IT, emergency rescue systems, etc.); measures to reduce massive disaster damage to densely populated urban areas; systems for the protection of core functions and cultural assets; ultra-advanced disaster prevention support systems; intelligent transport systems (ITS); measures for land, sea, and air traffic safety; countermeasures against deteriorating social infrastructure; and safety measures in response to toxic or dangerous substances, or to criminal activity
○ Regeneration of the beauty of Japan, and the establishment of a basis for high-quality lives
Rebuilding beautiful living spaces in co-existence with nature; wide-area local topics; restoration of drainage area water cycles and general water management; transportation systems consonant with modern traffic and physical distribution; barrier-free systems and universal designs; and information infrastructure technologies and systems for society
■ A policy of proactive R&D cooperation for social infrastructure building in developing countries is indispensable.
* Five-year objectives have been established for the above items.

2. Promotion Measures..

○ Enhancement of policy studies on the development of infrastructure
○ Promotion of collaboration between the science and technology community and the humanities and social science community
○ Enhancement of R&D in cross-governmental areas
○ Stimulation of exchanges among industry, academia, and government researchers (including academic societies)
○ Establishment of international scheme of science and technology for infrastructure, particularly in the east Asia region
○ Promotion of R&D to support developing countries for infrastructure buildup

Manufacturing Technology Area

1. Areas of Priority and Five-Year Objectives..

○ Strengthening competitiveness through manufacturing technology innovations
Dramatic progress in productivity through high utilization of IT; changes to manufacturing processes through breakthroughs in technology; upgrading of quality control, safety, and maintenance technologies
○ Pioneering new areas of manufacturing technology
High value added commercialization technology (nanotechnology applications, etc.); technologies for cultivating new demand
○ Manufacturing technology to minimize the environmental burden
Manufacturing systems adapted to the formation of an environmentally-based society; minimization of harmful substances; prevention of global warming
* Five-year objectives have been established for the above items.

2. Promotion Measures..

(1) Develop human resources; improve environments that encourage creativity
(2) Accumulate fundamental knowledge, technology, and know-how
(3) Intellectual property rights-related strategies
(1) Incentives for the acquisition of intellectual property rights; (2) Support measures for launching businesses based on patents; (3) A society and system that pay due recognition to inventors
(4) Review the status of collaboration among industry, academia, and government
(1) Collaborate and clarify the sharing of responsibilities among industry, academia, and the government from the initial stages of research; (2) Promote personnel mobility; (3) Promote matching funds at times of collaboration among industry, academia, and the government; (4) Clarification of the relations of rights in conflict of interest issues
(5) Promote the development and standardization of the intellectual infrastructure
(6) Promote practical applications such as through the formation of venture businesses
(1) Support measures for the market entry of venture business in the field of new manufacturing technologies; (2) Smooth the transfer of university research results into the manufacturing world through active utilization of TLOs; (3) Actively utilize subvention systems for practical applications

Frontier Area

1. Areas of Priority and Five-Year Objectives..

○ Ensuring security Information-gathering technology using satellites (including transport capability); advanced positioning and surveying technology
○ Technology innovations enabling global market entry
Low-cost, reliable transportation technology; next-generation satellite technology; technology for the utilization of marine resources
○ International contributions to human intellectual creation, and securing international status
International projects that give people, and particularly the next generation, dreams, hope, and pride; construction of a worldwide network for global environmental information
* Five-year objectives have been established for the above items.

2. Promotion Measures..

○ Restructure the space development and utilization scheme so that it can be promoted by the nation as a whole
○ Establishment of public-private burden sharing and cooperation systems needed for nurturing space-related activities into a key industry
○ Promotion of marine utilization through collaboration with other sectors
○ Return to society of the fruits of research activities on global environmental change
○ Strategic promotion of basic research and training/securing human resources
○ Continual and seamless acquisition, processing, and accumulation of information, and the establishment of a system to transmit it to the world
○ Establishment of R&D methods and systems incorporating the latest advanced information technology
○ Clarification of international relationships in each cooperative project in order to promote smooth interaction
○ Nurturing interpreters who can explain things to the public in an easy to understand manner, and the stimulation of public relations activities
○ Significant progress in the efficiency of R&D, especially in big projects

(1) Promotion of the Life Sciences Area

In response to the April 2003 announcement proclaiming the successful end to the human genome sequencing project, the CSTP conducted surveys and studies about where Japan's future research should be directed, toward "the development of preventive and therapeutic technologies utilizing genome-related technologies for the realization of an active long-lived society." In addition, in the course of promoting "the elucidation of biological defense mechanisms in response to environmental factors that threaten people's health, and the development of preventive and clinical technologies," the CSTP conducted surveys and studies about Severe Acute Respiratory Syndrome (SARS), Bovine Spongiform Encephalopathy (BSE), avian influenza, and other infectious diseases shared by humans and animals.

(2) Promotion of the Information and Communications Sector

"Report on the Promotion of Research and Development on Information and Communications Technology" (opinions presented on May 27, 2003)

The information and communications technology research and development promotion project team, established within the CSTP's Expert Panel on the Promotion Strategy for Prioritized Areas, intensively investigated and examined measures for promoting the science and technology that form the foundation for the utilization of information and communications to improve the lives of the public and strengthen industrial competitiveness, and presented opinions to the relevant ministers. The contents of this report were reflected in the IT Strategy Headquarters "e-Japan Strategy II" summary report of July 2003

(3) Promotion of the Environmental Area

"Report on the Promotion of Research and Development of Technology for Greenhouse Gas Reduction Measures" (opinions presented on April 21, 2003)

The Project Team for Technology to Prevent Global Warming, established under the Expert Panel on the Promotion Strategy for Prioritized Areas, intensively investigated and examined research strategies related to technology for greenhouse gas reduction measures that were specified in the "Guidelines for Measures to Prevent Global Warming" (decision made by the Global Warming Prevention Headquarters on March 19, 2002), and presented opinions to the relevant ministers.

"Interim Report on the Basics of Efforts regarding Future Earth Observation" (opinions presented on March 24, 2004)

Toward clarification of Japan's basic conceptual approach as a nation to earth observation in the interest of efficiently and effectively furthering earth observation, the Environmental Research and Development Promotion Project Team established under the Expert Panel on the Promotion Strategy for Prioritized Areas compiled an interim report, based on intensive investigations and examinations made by its working group on earth observation, and presented its opinions to the relevant ministers.

(4) Promotion of the Nanotechnology and Materials Area

"Report on the Promotion of Industrial Development in the Nanotechnology and Materials Field" (opinions presented on July 23, 2003)

The nanotechnology and materials research and development promotion project team, established within the CSTP's Expert Panel on the Promotion Strategy for Prioritized Areas, intensively investigated and examined concrete measures related to the preparation of environments suitable for nanotechnology and materials research, development, and industrialization, prepared a summation of inter-ministerial projects, and presented opinions to the relevant ministers. The team then proceeded with follow-up investigations.

3.1.2.2.2.2 Evaluations

(1) "Ex Ante Evaluation of Large-scale Research and Development" (opinions presented on November 25, 2003)

The CSTP conducted evaluations of ex ante evaluations of five large-scale research and development projects (genome network research, an Antarctic region monitoring project, the Aruma Program, an advanced measurement and analysis technology and equipment development project, and R&D based on the comprehensive strategy for the third decade of

the fight against cancer) that were scheduled to be newly implemented in FY2003.

(2) "Evaluations of Competitive Research Funding Systems" (opinions presented on July 23, 2003)

The CSTP conducted evaluations of seven typical competitive research funding systems, with a particular focus on results.

(3) "Audits on Ongoing Important Research and Development" (September 11, 2003)

The Minister of State for Science and Technology Policy and committee members with experience examined the state of midterm evaluations being presented to the various ministries and agencies regarding continuing research and development items funded at more than 1 billion yen in the FY2003 government budget, and extracted and surveyed the most important items.

3.1.2.2.2.3 Reform of Science and Technology Systems

(1) Reform of the Competitive Funding System

The Basic Plan calls for a doubling of competitive funding. To facilitate the expansion of such funding, and to maximize its effectiveness, a competitive funding program reform project team established within the CSTP's Expert Panel on Science and Technology System Reform investigated policies for the promotion of drastic system reforms, prepared a summation of specific measures to be taken, including the establishment of a fair and transparent evaluation system and other specific measures, and presented opinions to the relevant ministers. In December 2003, the First Competitive Research Funding Program Directors' Conference was held at the initiative of the CSTP (see Section 3.3.1.1.1)

(2) Promotion of Collaboration among Industry, Academia, and Government, and the Creation and Fostering of R&D-Type Venture Businesses

"Report on the Creation and Promotion of R&D-Oriented Ventures" (opinions presented on May 27, 2003)

The R&D-type venture business project team, established within the CSTP's Expert Panel on Science and Technology System Reform, investigated and examined specific proposals for the effective promotion of the commercialization and application of research and development results at corporations, universities, and other public research institutions, and presented its opinions to the relevant ministers. (See Section 3.3.2)

(3) Management of Intellectual Properties

"Report on the Management of Intellectual Properties" (opinions presented on June 19, 2003)

The CSTP investigates comprehensive strategies for the protection and utilization of intellectual properties in order to strengthen industrial competitiveness through expanded investment in research and development conducted throughout Japan. The Council then presents its opinions to the relevant ministers. Some of these opinions were reflected in the "Strategic Program for the Creation, Protection and Exploitation of Intellectual Property" prepared in July 2003 by the Intellectual Property Strategy Headquarters. The CSTP is now cooperating with the Intellectual Property Strategy Headquarters to examine methods for the utilization of intellectual property at universities, etc. (See Section 3.3.6.4)

(4) Fostering and Ensuring S&T Related Personnel Resources

If Japan is to take the lead in the world as a frontrunner in science and technology, the nation will need superior human resources in scientific and technological fields. For this purpose, in July 2003, the CSTP established the Expert Panel on S&T Related Personnel, which is currently engaged in investigations and examinations in regards to fostering and ensuring the availability of the scientists, technologists, and specialists who are needed for promoting world-class research results and their utilization.

3.1.2.2.4 Response to Bioethics

"Basic Conceptual Approach Relating to the Treatment of Human Embryos (interim report)" (December 26, 2003)

Based on Article 2 of the Supplementary Provisions of the "Law Concerning Regulation Relating to Human Cloning Technologies and Other Similar Technologies," the Expert Panel on Bioethics (EPB) started a discussion on the treatment of human embryos, and issued an interim report. Moreover, based on the results of public comments regarding the interim report (from December 26, 2003 to February 29, 2004), and of symposiums on the subject (held in February 2004 in Tokyo and Kobe), the EPB is now moving ahead with the preparation of a final report (see Section 3.2.2.1.2).

3.1.2.2.2.5 Promotion of Space Development and Utilization

As a follow-up to the "Space Development and Utilization Policy" report made by the Expert Panel on Space Development and Utilization in June 2002, the CSTP laid down guidelines in October 2003 for an updated, revised report (see Section 3.2.2.8.1).

3.1.2.2.2.6 Special Coordination Fund for Promoting Science and Technology

The Special Coordination Funds for Promoting Science and Technology (Chosei-hi) is a competitive research fund for promoting the systematic reform of science and technology by taking the initiative among the administrative agencies, based on policies laid down by the CSTP.

In FY2003, the Special Coordination Funds for Promoting Science and Technology supported three topics as meriting emergency R&D efforts, including emergency investigation and research on "diagnostic and testing methods for Severe Acute Respiratory Syndrome (SARS)" (May 12, 2003), "on the 2003 Tokachi Offshore Earthquake" (October 17, 2003), and "on countermeasures against the highly-pathogenic avian influenza virus" (January 29, 2004 and supplemented on February 24, 2004).

3.1.2.2.2.7 Follow-Up to the Science and Technology Basic Plan

In regards to the "See" part of the Plan-Do-See process for scientific and technological policy, the following is a summary of the present state of the implementation of Basic Plan policies.

3.1.3 Administrative Structure of Science and Technology, and the Budget

3.1.3.1 Administrative Structure of Science and Technology

Taking of measures for Japan's science and technology is based on the Science and Technology Basic Law and on the Science and Technology Basic Plan, and is also promoted through programs of the administrative organs based on the various recommendations and advice offered by the former Council for Science and Technology, and now by the CSTP. Research is carried out at national research institutions, public corporations, independent administrative institutions, universities, and university joint research institutions, varied research programs are used to promote research, and the preparation of research and development environments is being pushed forward (Figure 3-1-5).

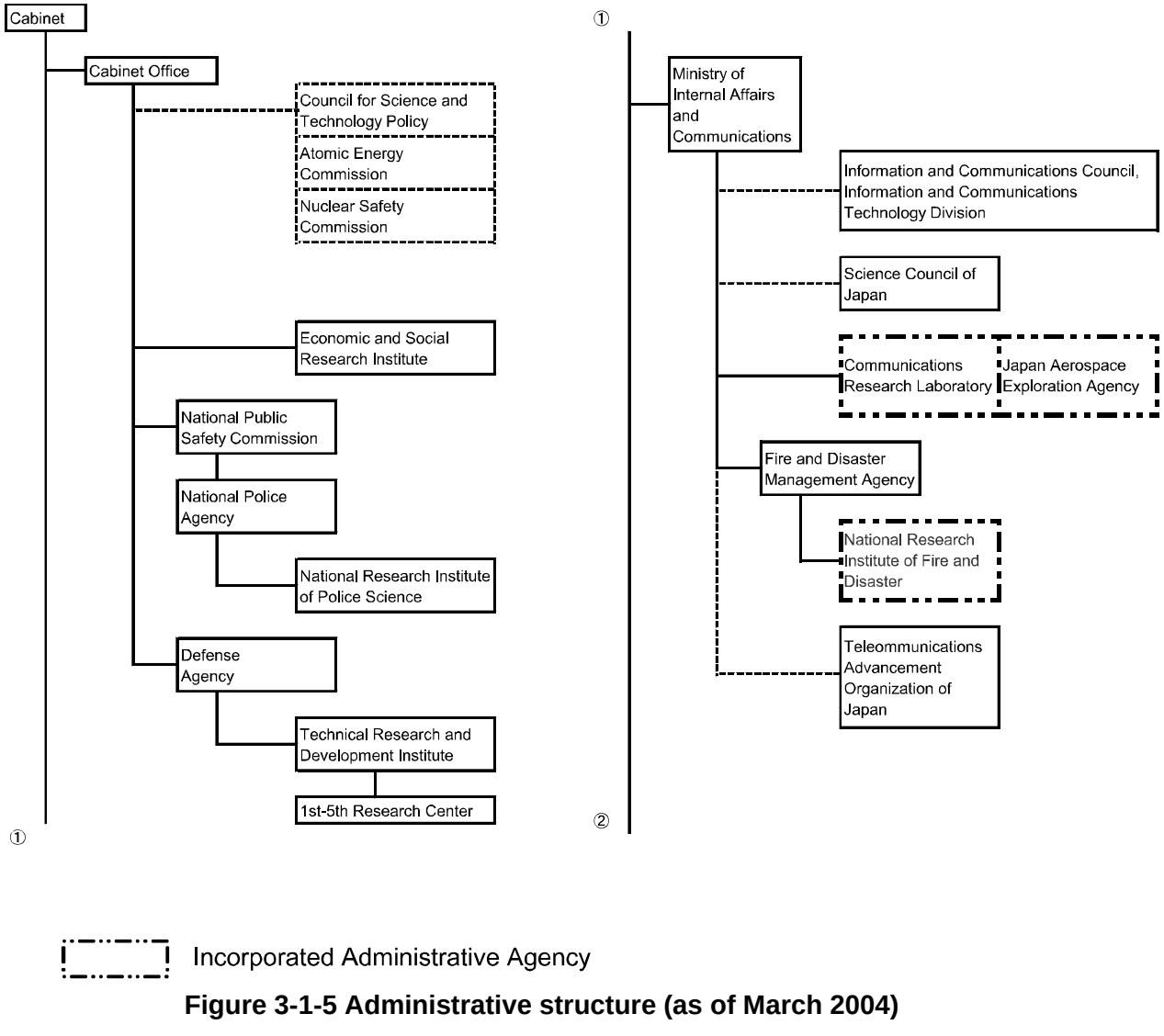
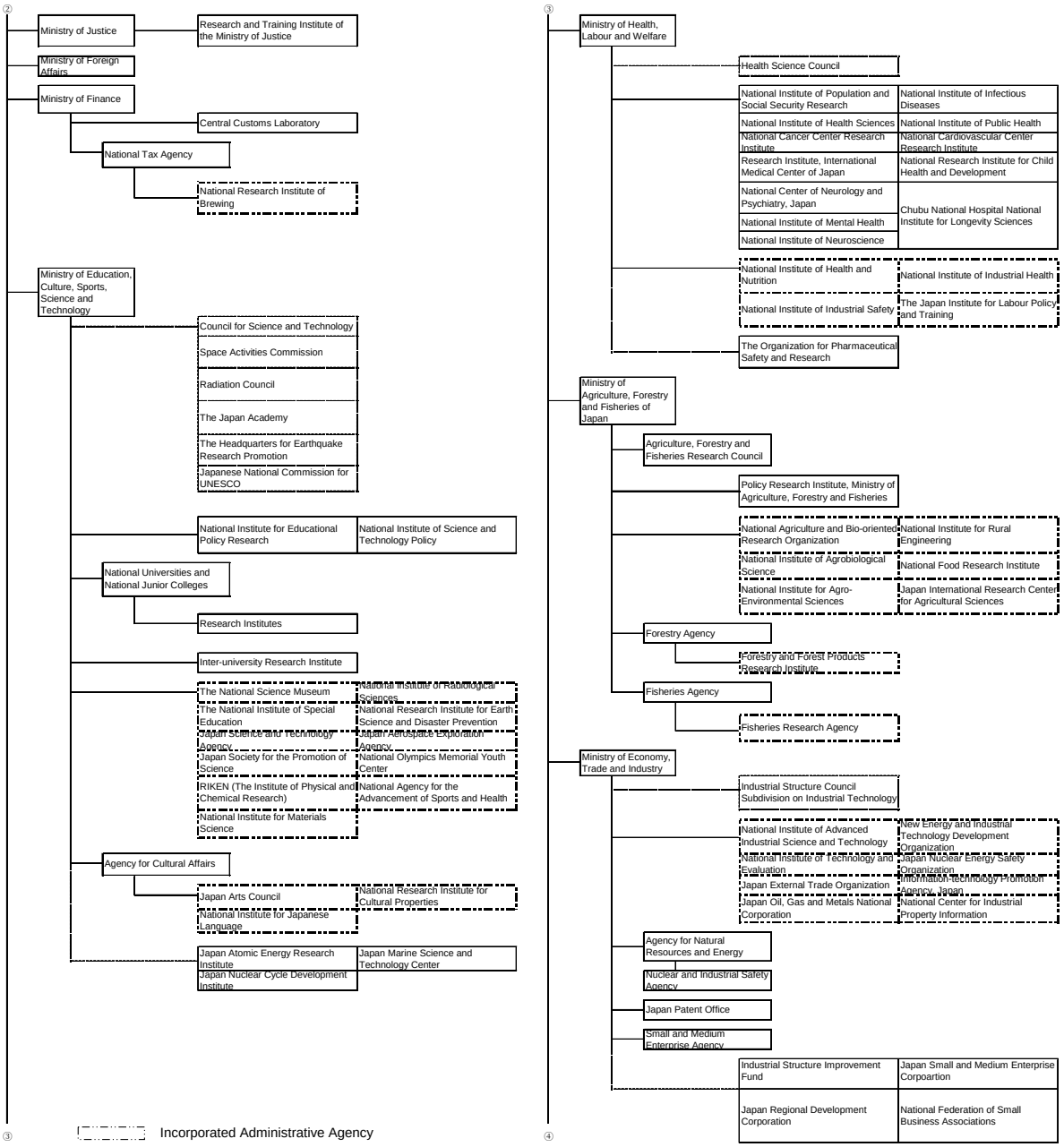
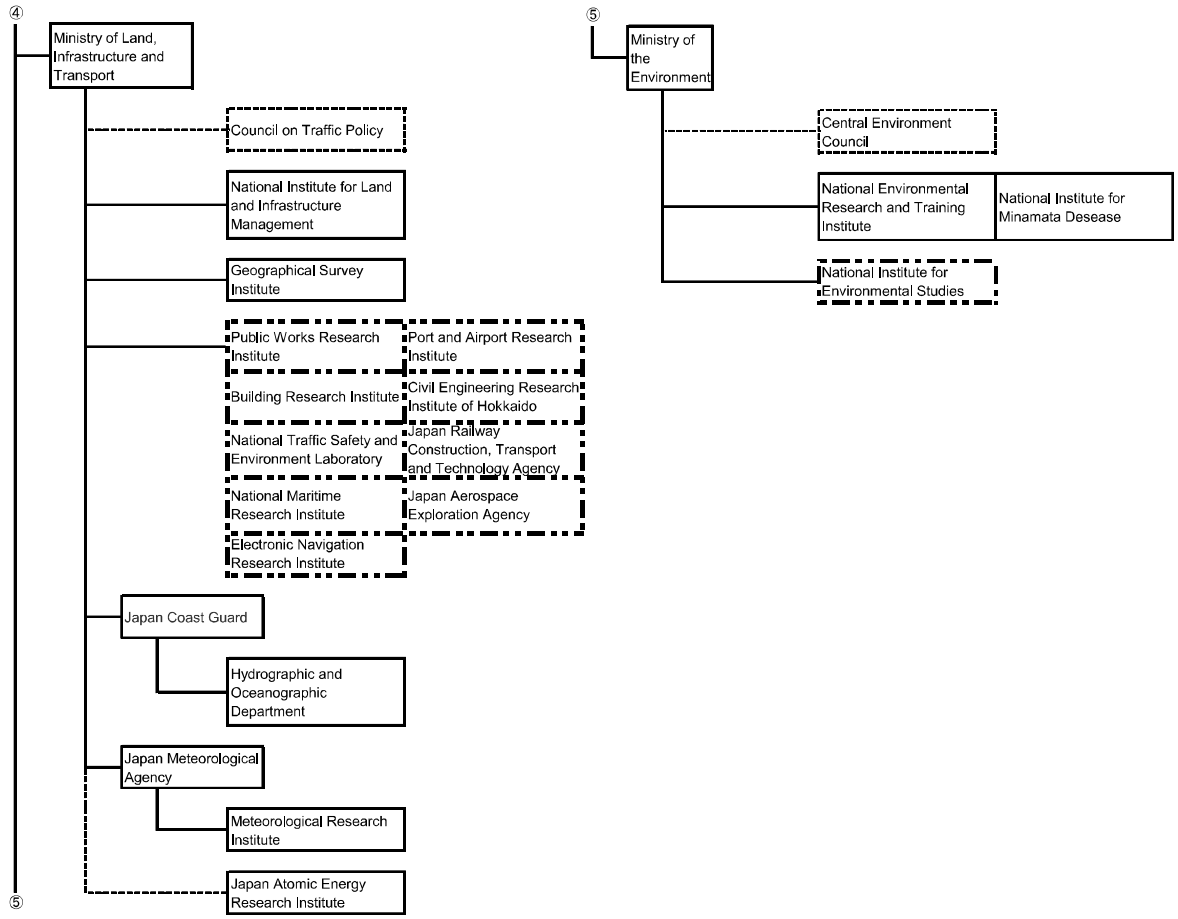


Figure 3-1-5 Administrative structure (as of March 2004)


②
Ministry of Justice
Research and Training Institute of the Ministry of Justice
Ministry of Foreign Affairs
Ministry of Finance
Central Customs Laboratory
National Tax Agency
National Research Institute of Brewing
Ministry of Education, Culture, Sports, Science and Technology
Council for Science and Technology
Space Activities Commission
Radiation Council
The Japan Academy
The Headquarters for Earthquake Research Promotion
Japanese National Commission for UNESCO
National Institute for Educational Policy Research
National Institute of Science and Technology Policy
National Universities and National Junior Colleges
Research Institutes
Inter-university Research Institute
The National Science Museum
National Institute of Radiological Sciences
The National Institute of Special Education
National Research Institute for Earth Science and Disaster Prevention
Japan Science and Technology Agency
Japan Aerospace Exploration Agency
Japan Society for the Promotion of Science
National Olympics Memorial Youth Center
RIKEN (The Institute of Physical and Chemical Research)
National Agency for the Advancement of Sports and Health
National Institute for Materials Science
Agency for Cultural Affairs
Japan Arts Council
National Research Institute for Cultural Properties
National Institute for Japanese Language
Japan Atomic Energy Research Institute
Japan Marine Science and Technology Center
Japan Nuclear Cycle Development Institute
③
Ministry of Health, Labour and Welfare
Health Science Council
National Institute of Population and Social Security Research
National Institute of Infectious Diseases
National Institute of Health Sciences
National Institute of Public Health
National Cancer Center Research Institute
National Cardiovascular Center Research Institute
Research Institute, International Medical Center of Japan
National Research Institute for Child Health and Development
National Center of Neurology and Psychiatry, Japan
National Institute of Mental Health
Chubu National Hospital National Institute for Longevity Sciences
National Institute of Neuroscience
National Institute of Health and Nutrition
National Institute of Industrial Health
National Institute of Industrial Safety
The Japan Institute for Labour Policy and Training
The Organization for Pharmaceutical Safety and Research
Ministry of Agriculture, Forestry and Fisheries of Japan
Agriculture, Forestry and Fisheries Research Council
Policy Research Institute, Ministry of Agriculture, Forestry and Fisheries
National Agriculture and Bio-oriented Research Organization
National Institute for Rural Engineering
National Institute of Agrobiological Science
National Food Research Institute
National Institute for Agro-Environmental Sciences
Japan International Research Center for Agricultural Sciences
Forestry Agency
Forestry and Forest Products Research Institute
Fisheries Agency
Fisheries Research Agency
Ministry of Economy, Trade and Industry
Industrial Structure Council Subdivision on Industrial Technology
National Institute of Advanced Industrial Science and Technology
New Energy and Industrial Technology Development Organization
National Institute of Technology and Evaluation
Japan Nuclear Energy Safety Organization
Japan External Trade Organization
Information-Technology Promotion Agency, Japan
Japan Oil, Gas and Metals National Corporation
National Center for Industrial Property Information
Agency for Natural Resources and Energy
Nuclear and Industrial Safety Agency
Japan Patent Office
Small and Medium Enterprise Agency
Industrial Structure Improvement Fund
Japan Small and Medium Enterprise Corpoartion
Japan Regional Development Corporation
National Federation of Small Business Associations
④
Incorporated Administrative Agency



Notes: 1. The Communications Research Laboratory and the Telecommunications Satellite Corporation of Japan merged in April 2004 to form the National Institute of Communications and Technology as an incorporated administrative agency.

2. The Japan Marine Science and Technology Center was transformed into an incorporated administrative agency in April 2004 as the Japan Agency for Marine-Earth Science Technology.
3. The Japan Atomic Energy Research Institute and the Japan Nuclear Cycle Development Institute are planned to be merged into a new incorporated administrative agency by the end of FY2005.
4. The Adverse Drug Suffering Relief and Research Promotion Fund was transformed into an incorporated administrative agency in April 2004 as the Pharmaceuticals and Medical Devices Agency.
5. The Industrial Structure Improvement Fund, the Japan Regional Development Corporation, and the Japan Small and Medium Enterprise Corporation merged in July 2004, to form the Organization for Small & Medium Enterprises and Regional Innovation as an incorporated administrative agency.

The CSTP conducts surveys regarding basic policies for the comprehensive and planned promotion of science and technology, as well as on the allocation of the science and technology budget, personnel and other resources needed for the promotion of science and technology (hereafter called "resource allocation policies"), and also performs evaluations of major scientific and technological R&D and other R&D important to the state.

The CSTP also prepares comprehensive strategies and resource allocation policies for science and technology on behalf of the government overall, while the Ministry of Education, Culture, Sports, Science and Technology acts in line with those strategies to prepare specific research and development plans for individual sectors, coordinates policies for estimating costs planned by test and research institutions, etc., and administers allocations of the Special Coordination Fund for Promoting Science and Technology (SCF), in order to coordinate the management of science and technology with relevant administrative institutions. The Ministry comprehensively promotes the implementation of research and development in advanced and important science and technology fields, and the administration of science and technology that advances and strengthens creative and basic research.

In recent years, cooperation between ministries and agencies has been strengthened with the establishment of roundtable groups and inter-ministerial liaison committees concerning various research sectors and related measures, including programs for the promotion of brain sciences research, and for basic research conducted by public corporations through public canvassing methods. Depending on the character of the respective fields or policies, these programs are promoting lateral, long-term thinking between ministries and agencies and the adoption of priority guidelines on how to promote research and development, and also promoting cooperation through the promotion of information exchanges concerning the progress of research, etc., and researcher exchanges.

The Science Council conducts surveys and discussions on important issues regarding the comprehensive promotion of science and technology in response to inquiries posed by the Minister of Education, Culture, Sports, Science and Technology, and presents opinions on these issues to the minister. In June and July of FY2003, the Council prepared summaries entitled "Concerning Technology Department Reviews in Technologist Exams (recommendation)," "Concerning Promotion of a New Monitoring Research Program (Second) for Quake Detection (proposal)," and "Promotion of the Seventh Volcanic Eruption Detection Program (recommendation)," respectively. The Science Council's recommendations are shown in Table 3-1-6.

Table 3-1-6 Recommendations of the Council for Science and Technology (FY2003)

1. Recommendation
   Technology Department Reviews in Technologist Exams (recommendation) (June 2, 2003)
2. Proposal
   Promotion of a New Monitoring Research Program (Second) for Quake Detection (proposal) (July 24, 2003)
   B31 (proposal) (July 24, 2003)
3. Principal Reports

Date (m/d/y)	Principal Reports
	Subdivision on R&D Planning and Evaluation
5/28/03	Policies for the Promotion of Research and Development into Aviation Science and Technology
5/28/03	Review of Policies for the Promotion of Research and Development into Global Environmental Science and Technology
2003/9/12	Overview of the Preliminary Evaluation Results for Priority Topics, Etc., in Budget Requests for FY2004
	Subdivision on Science
4/24/03	Incorporation of Inter-University Research Institutions
4/24/03	How Research Institutes and Facilities Will Function in the New National University Incorporation System
5/27/03	Evaluation of Grants-in Aid for the Scientific Research Program (report by Research Funds Section)
6/30/03	Policies for the Promotion of Future Cancer Research in Grants-in Aid for Scientific Research (Report by the Grants-in Aid for Scientific Research Program Inspection Section)
6/30/03	Policies for the Promotion of Future Genome Research in Grants-in Aid for Scientific Research (Report by the Grants-in Aid for Scientific Research Program Inspection Section)
6/30/03	Policies for the Promotion of Future Brain Research in Grants-in Aid for Scientific Research (Report by the Grants-in Aid for Scientific Research Program Inspection Section)
2003/10/2	How Big Science Should be Handled
2003/12/2	Interim Evaluation Report for the High Intensity Proton Accelerator Project (Report by the Research Planning and Evaluation Subdivision of the Special Committee on Fundamental Issues, and the Working Group for the High Intensity Proton Acceleration Project of the Committee for R&D Evaluation in the Atomic Power
	Subdivision on Geodesic Science
2003/6/2	Promotion of a New Monitoring Research Program (Second) for Quake Detection (Interim report)
2003/6/2	Promotion of the Seventh Volcanic Eruption Detection Program (Interim report)
	Technology and Research Foundations Section
2003/4/28	Building Links between Industry, Academia, and the Government in the New Era (Summary of discussions of the Committee for the Promotion of Links Between Industry, Academia, and the Government)
	Committee on Human Resources
2003/6/30	Fostering and Assuring Research Personnel Resources to Improve International Competitiveness (Second Declaration)

3.1.3.2 Budget for Science and Technology

The Basic Plan intends to seek the expansion of funding required for the promotion of the measures raised in the Basic Plan based on prioritized and efficient allocation of funding, taking into account future socioeconomic trends, as well as the need for the promotion of science and technology.

In FY2003, in particular, Japan's budget for science and technology totaled 3.5974 trillion yen. Of this total, the general account budget was 1.8852 trillion yen, while the special account budget, which covers expenses for national universities, etc., was 1.7122 trillion yen. In the general account budget, the amount singled out for the promotion of science and technology was 1.2298 trillion yen (Table 3-1-7).

Trends in the budget for science and technology by ministry or agency are shown in Table 3-1-8.

Table 3-1-7 Trends in the science and technology budget

Item \ Fiscal		1999	2000	2001	2002	2003
Science and Technology Promotion Fund	(A)	9,531	10,244	11,124	11,832	12,298
Percentage increase over the previous year	%	107.0	107.5	108.6	106.4	103.9
Other research appropriations	(B)	6,416	7,004	7,252	6,697	6,554
Percentage increase over the previous year	%	105.3	109.2	103.5	92.3	97.9
Science and technology appropriations from the General Account Budget	(C)=(A)+(B)	15,948	17,248	18,376	18,529	18,852
Percentage increase over the previous year	%	106.3	108.2	106.5	100.8	101.7
Science and technology appropriations from Special Accounts	(D)	15,620	15,612	16,309	16,915	17,122
Percentage increase over the previous year	%	102.0	99.9	104.5	103.7	101.2
Science and Technology Budget	(E)=(C)+(D)	31,567	32,860	34,685	35,444	35,974
Percentage increase over the previous year	%	104.1	104.1	105.6	102.2	101.5
General Account Budget	(F)	818,601	849,871	826,524	812,300	817,891
Percentage increase over the previous year	%	105.4	103.8	97.3	98.3	100.7
General Budget Expenditure	(G)	468,878	480,914	486,589	475,472	475,922
Percentage increase over the previous year	%	105.3	102.6	101.2	97.7	100.1

Notes: 1. Amounts shown for Other research appropriations (B) and Science and technology appropriations from Special Accounts (D) are MEXT's estimates.

2. All amounts represent initial budgets or appropriations for the respective fiscal year.

3. Since amounts have been rounded, the sum of the amounts and percentages for each column and the totals and percentages shown above do not necessarily agree.

4. Based on policies of the Second Science and Technology Basic Plan, the subjects of calculation were revised starting in FY2001.

Since the administration of science and technology in Japan is not concentrated in a single ministry, but rather is spread among a large number of ministries and agencies, there is a need for the coordination of science and technology measures between the relevant ministries and agencies that can eliminate unnecessary duplication and promote stronger cooperation, so as to ensure consistency among ministries as a whole, and to efficiently and effectively promote science and technology.

For this purpose, the CSTP acts under the leadership of the Prime Minister as a policy promotion supervisory body to ensure that important measures either stipulated in comprehensive government strategies or laid out in the Science and Technology Basic Plan in accordance with these strategies are properly and firmly realized throughout Japan. In addition, the Ministry of Education, Culture, Sports, Science and Technology contacts the relevant ministries and agencies each fiscal year, before requests for the ceiling of science and technology related expenditures are made, to hear the reasoning behind their budget requests. The ministry then coordinates with the ministries and agencies to eliminate any duplication and to promote inter-ministerial cooperation, as part of government-wide efforts.

3.2 Priority Strategies for Science and Technology

3.2.1 Promotion of Basic Research

Basic research builds on the free thinking of researchers to discover new natural laws and principles, to build original theories, and to predict and discover unknown phenomena, thereby contributing to the expansion of humankind's intellectual assets and bringing about breakthroughs in research results of the highest standards in the world, and in innovative new technologies that support the economy. While the results of basic research do not always lead immediately to practical applications, they rather accumulate as the common property of all humankind, and should therefore be widely, steadily, and continuously promoted.

In promoting basic research, attention must be given to the fact that such research depends more on the capabilities of individuals than on those of groups. It is therefore necessary to support researchers so that they are able to carry out highly creative research based on their liberal and open ideas. There is also a need to promote cross-sectoral research whereby researchers from different areas of expertise step outside their respective areas for exchanges and, in the process, come up with new ideas. To this end, while keeping in mind global research trends and conditions in Japan, research is being actively promoted in areas that require organized and international promotion, and in areas that require large-scale facilities and equipment for expansion of the frontiers of knowledge. In addition, universities and Inter-University Research Institutes, which play a core role in the academic research that contributes to the development of culture and the building of civilization, are comprehensively developing both research activities and education activities as integral parts of their entire systems.

3.2.2 Prioritization of Research and Development in Response to Issues Important to the State and Society

Aggressive and strategic investment in priority sectors and promotion of research and development are essential for ensuring sustained economic development through vitalization of the economy and industry, and for assuring people of safe, secure lives. Under its prioritization policy, the government has selected four sectors requiring particular priority, including the life sciences, information and communications, the environment, and nanotechnology and materials.

3.2.2.1 Life Sciences

3.2.2.1.1 Promotion of Life Scinces

The life sciences aim at elucidating the complex and elaborate mechanisms of biological phenomena produced by living things, and their results contribute greatly to the improvement of people's lives and to development of the national economy, through dramatic advances in medicine, resolutions of food supply and environmental problems, and other areas.

3.2.2.1.1.1 Basic Policies for the Promotion of Life Sciences Research

In Japan, the life sciences are being promoted more aggressively than in past years. The "Basic Plan" has positioned the life sciences as one of its four priority sectors, and called for prioritized, strategic efforts in this sector.

As the Promotion Strategy for each Sector, the priority areas among the technologies to be developed for protecting the people's health have been selected as follows: (1) technologies that utilize genome-related technologies for the prevention and treatment of disease, in order to achieve a vital and long-lived society; (2) elucidation of life-protecting mechanisms in relation to infectious diseases, and environmental factors and technologies for the prevention and treatment of disease; and (3) promotion of basic technologies for mental health and for the brain, and technologies for the prevention and treatment of disease. In the area of the "development of technologies for competitiveness and sustainable growth," it listed: (4) technologies for materials production and environmental treatment that