Arbetsrapport

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IT related research in the 2002 S&T budget

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Lena Moritz

Enhetschef

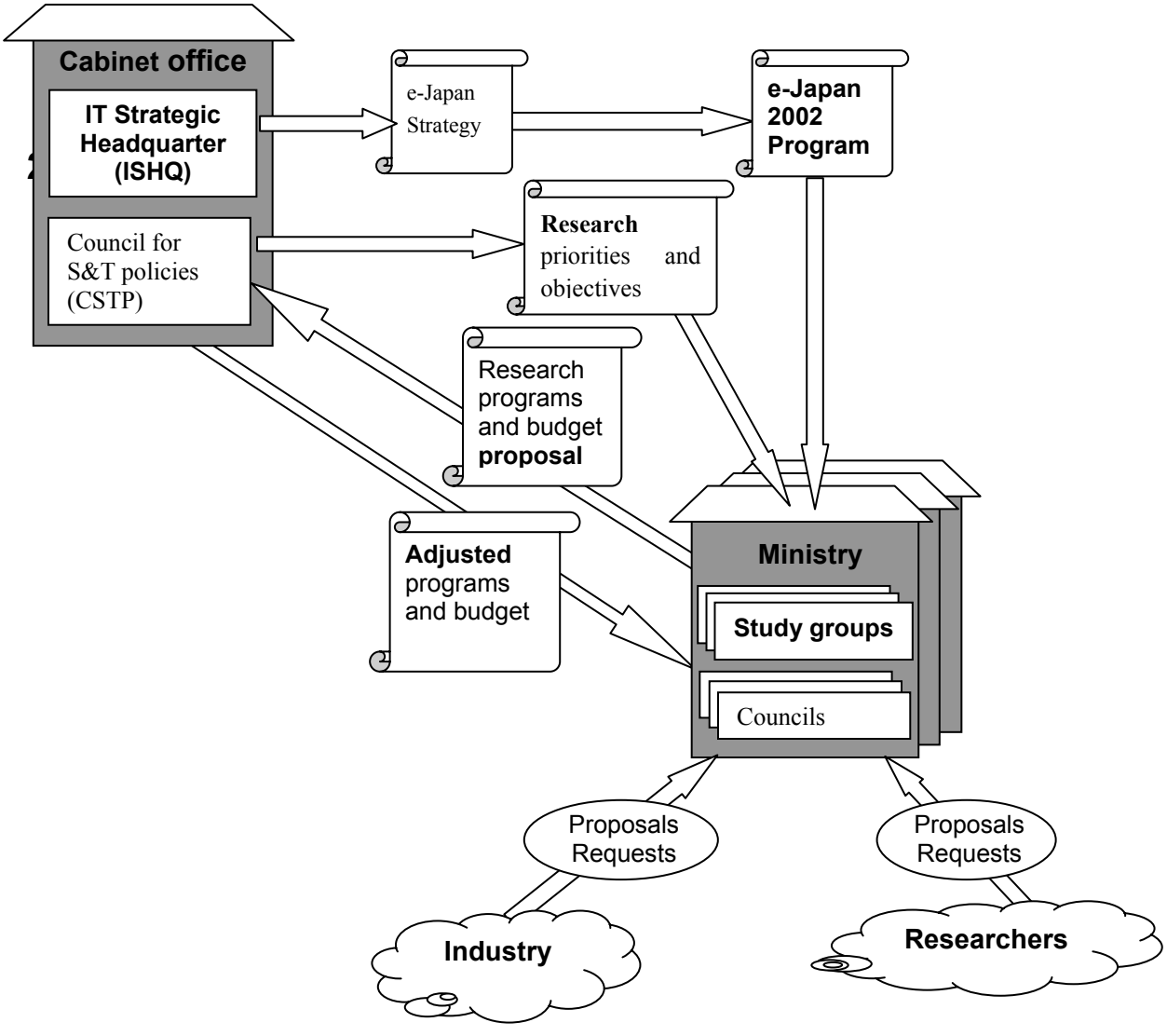
Content

Background

In the current recession the Japanese government is promoting IT use as a means to effect a structural reform and thereby a genuine economic recovery and sustained growth. Based on this understanding, the government-appointed IT Strategic Headquarters (ISHQ) year 2001 set forth an "**e-Japan Strategy**" and an action plan to make Japan the world's most advanced IT nation within five years. The fiscal **e-Japan 2002 program** was drawn up in alignment with that strategy, and is summarized below.

The Council for Science and Technology Policies (CSTP) are also part of the Cabinet Office, and includes representatives both from the industry and the ministries. IT is one of the eight fields that CSTP looks at, the others including for example environment, life sciences, nanotechnology and energy. During the fall 2001, the council released the **priorities and objectives** they recommended that Japan should set for the government funded research and development done in the country during the coming years.

These priorities and the e-Japan program formed the guidelines on which the ministries based their proposed **research programs and budgets** to be included in the 2002 S&T budget. Both the guiding priorities and the thereupon following research program and budget proposals are summarized in this document



Reflections

"Would you tell me, please, which way I ought to go from here?"
"That depends a great deal on where you want to get to", said the Cat.
"I don't much care where…" said Alice.
"Then it doesn't matter which way you go", said the Cat.
"… so long as I get *somewhere*" Alice added as explanation.
"Oh, you're sure to do that" said the Cat, "if you only walk long enough."
From Alice in Wonderland, by Lewis Carroll

Without any ambition to analyze the scientific contents of the programs, something which is best done by experts in each field, I take the liberty to comment on a few striking features in the overall contents and selection process behind it.

2.1 The absence of soft research areas

Among the proposed research areas the overwhelming majority are focusing on hard-ware related technology. The few areas relating to software, such as human interfaces or media interaction, are also them technology oriented. Most of the projects are seeds-oriented, and relatively close to industrial applications. There are no programs focusing on soft issues such as the impact on the society of the informatization, how democracy and privacy can be protected, or usage and acceptance by the intended consumers.

When asking the SCTP about this, they refer to the ISHQ. However, also within the ISHQ's program, the focus is on making IT faster, better and more ubiquitous, with no one asking how all this ever-present bandwidth, communication and information is to be used or in what ways it should achieve the goal of making the citizens' lives "safe, sane and comfortable".

2.2 The objectives are all technical

Reading the national research objectives set up by CSTP, again one is struck by the technology focus. The goals are measured in Mbps, downtime minutes per year and simultaneous user capacity. All of them represent challenging technical ambitions but with little social implications in themselves. Both the starting points and the end targets are firmly based in technology.

Of course there are many different ways to select priority areas and objectives for re-search. When the National Institute for Health in the US prioritized their research areas, they based it on the yearly absence days each disease caused from American work-places.

A Swedish researcher at the Victoria Institute, Sara Ilstedt Hjelm, was given the mission to develop new IT products for the future home. Her team looked at which 10 causes for sick-leave that where increasing in Sweden, and drew the conclusion that they were all related to either mental overload (i e negative stress), or physical inactivity, or both. They therefore decided to develop home based products with 3 goals: to facilitate sleep and relaxation, to encourage movement, and to assist communication.

Professor Ryo Hirasawa, researching in the area of policies at Tokyo University, has proposed that social needs be included when national research goals are set. His idea was to identify major items in the lifelong expenditures of a household, and to find R&D targets to improve their efficiency. In Japan the heaviest financial burden is housing expenditure due to the short life span of Japanese houses (in average 27 years).

He therefore proposed as a comprehensive project the development of long-life housing. The second highest expenditure is education, which he proposed could be addressed with IT contents.

His proposal was however not applied. The priorities were instead set by the whole S&T area being divided into 8 fields, with ten tasks being selected for each field and the importance of each evaluated by about ten experts. Their ratings were summed, normalized by the number of responses and summed up again within each field to get the order of priority. Since this simplistic approach gave raise to internal criticism, another survey was made among a larger number of experts to differentiate the fields.

2.3 The lack of overall strategy and input from" outsiders"

The proposals for research programs in Japan are submitted by the ministries to the Cabinet Office, and they in turn have received proposals and requests for budget from researchers at different institutions. The Cabinet Office then evaluates the proposed programs on a gather-and-adjust principle. Although the Cabinet Office produces the national guidelines and priorities which are distributed to, and hopefully taken into account by, the ministries, they have no comprehensive policy but merely select among the proposed projects. The position and structure of the Cabinet Office do not allow strategic policy making, neither does it have people or sections with the expertise needed. The research projects are therefore mainly conceived and proposed by the same people who are to realize them, who are naturally experts in their specific fields rather than generalists with a wider scope and overview. This approach also does little to encourage projects with multidisciplinary character.

3 e-Japan 2002 Program

In the current recession the Japanese government is promoting IT use as a means to effect a structural reform and thereby a genuine economic recovery and sustained growth. Based on this understanding, the government-appointed IT Strategic Headquarters (ISHQ) year 2001 set forth an "e-Japan Strategy" and an action plan to make Japan the world's most advanced IT nation within five years. The fiscal 2002 program was drawn up in alignment with that strategy, and is summarized below.

For a summary of the e-Japan strategy, please see the following web site:
http://www.kantei.go.jp/foreign/it/network/0122full_e.html

For a summary of the year 2001 e-Japan priority policy program, please see the following site:
http://www.kantei.go.jp/foreign/it/network/priority-all/index.html

3.1 Promotion of High-Speed and Ultra-High-Speed Internet Infrastructure

3.1.1 Objectives

In light of the rapid growth in the number of Internet users, falling communications charges, and increasing access to high-speed Internet connection services, it is necessary to promote the further formation of even higher-speed and lower-cost networks. In order to achieve this, expansion of high-speed Internet infrastructure in disadvantaged areas as well as basic research and development will be promoted.

The continued promotion of fair competition and regulatory reform will be supported to encourage the development of networks by the private sector. Also links will be formed with the Council for Regulatory Reform to investigate at the IT Strategic Headquarters models for future competition policies including regulatory reform in the IT field. Based on these results, the necessary systems will be developed.

3.1.2 Measures

The expansion of high-speed Internet access continues, with the cable television Internet and DSL subscribers in urban areas increasing to approximately 850,000 at the end of FY2000 (an increase of approximately fourfold from the previous year), and a variety of other services including optical and wireless access are also undergoing full-scale launches. In addition, the expansion of ADSL services to almost all areas of the country is planned for FY2002. Elimination of the digital divide in disadvantaged areas and the development of backbone networks compatible with higher-speed subscriber networks are also crucial issues. In order to achieve these goals, the promotion of fair competition, the expansion of high-speed and ultra-high-speed Internet infrastructure, the formation of nationwide networks of accommodation space including information boxes installed under national highways, and the development of necessary technologies for core Internet functions such as IX will be pursued.

(1) Expansion of High-Speed and Ultra-High-Speed Internet Infrastructure

a. In order to promote the expansion of high-speed and ultra-high-speed Internet infrastructure, the development of networks by private sector business will be supported as will the development of wide-area public networks by local governments to foster the

installation of high-speed Internet in disadvantaged areas. (Ministry of Public Management, Home Affairs, Posts and Telecommunications (MPHPT), Ministry of Agriculture, Forestry and Fisheries (MAFF))

b. In order to facilitate the development of inter-regional and intra-regional backbone optical fiber networks, the preparation and opening of accommodation space will be promoted, in conjunction with the construction of optical fiber networks for the administration of public facilities such as highways, rivers, and ports, including a nationwide network of information boxes installed under national highways. (Ministry of Land, Infrastructure and Transport (MLIT))

c. In order to promote the creation of networks by the private sector, measures to foster fair competition will be implemented, and the structure of the Fair Trade Commission reinforced to facilitate the rapid and accurate resolution of cases violating the Antimonopoly Act. (MPHPT, Fair Trade Commission (FTC))

d. In order to respond to the explosive growth in data traffic accompanying the expansion of high-speed and ultra-high-speed Internet Infrastructure, technologies necessary for core Internet functions such as IX will be established. (MPHPT)

e. The introduction of IT into apartments constructed by the Housing Corporation will be promoted. Besides, in order to facilitate high-speed Internet access in apartment complexes, IT standards for housing will be adopted as a support measure for the introduction of IT to housing. (MLIT)

(2) Research and Development

a. In order to promote a transition to IPv6-equipped Internet, research and development will be conducted on technologies that will effectively promote the diffusion of IPv6, including those that can enhance and utilize IPv6 functions and those that will expand the scope of devices other than PCs that can access the Internet. (MPHPT)

b. In order to promote the expansion of seamless high-speed mobile communication services, research and development on technologies necessary for mobile communications services that act in tandem with Intelligent Transport Systems (ITS) and Geographic Information Systems (GIS) will be supported. In addition, research and development on technologies necessary for the realization of fourth-generation mobile communications systems will be promoted and proposals made for the establishment of global standards. (MPHPT, Ministry of Economy, Trade and Industry (METI))

3.2 Digitization of School Education and Reinforcement of Human Resource Development

3.2.1 Objectives

Japan will seek to become a superpower in terms of IT human resources by FY2005 and will promote an IT Human Resource Development Scheme in order to intensively implement the measures necessary for this. Specifically, further development and improvement of connectivity environments will be conducted according to the status of Internet access in schools and the degree of progress in increasing access speeds and lowering the costs of network infrastructure in order to promote the digitization of education. In addition, a wide variety of educational content will be enhanced and applied for the further use of IT in school lessons. Also, the information literacy of the general public

will be raised and the training of creative personnel with specialized knowledge and skills promoted.

3.2.2 Measures

During FY2001, action is being undertaken to provide all public elementary, lower- and upper-secondary schools, etc. with Internet access. By FY2005, virtually all public schools will have 24-hour connection to high-speed Internet access with the aim of enabling children to enhance their capability, so Japan can become a human resources superpower. During FY2002, school lessons utilizing networks will be enriched. To this end, schools will be provided high-speed Internet access and a wide variety of educational content that utilizes networks will be developed and their widespread use promoted.

(1) Digitization of School Education

a. In light of the status of the overall development of high-speed and ultra-high-speed Internet access, a transition to ADSL and optical fiber Internet access by schools will be promoted. (Ministry of Education, Culture, Sports, Science and Technology (MEXT), MPHPT)

b. The utilization of visual content in the possession of public bodies, the creation of digital archives of education resources, and the aggressive development of content distributed through networks will be promoted to enhance and distribute a wide variety of educational content. Also, an educational content portal site will be enriched to allow for searching and downloading of such content. Thus, the distribution of educational content will be promoted systematically as a means to fully utilize IT at actual education sites.

c. The IT instructional skills of teachers will be improved to promote the further utilization of IT in school education. (MEXT)

(2) Provision of IT Learning Opportunities

a. Based on the results of the Basic IT Skill Training Program, action will be taken to improve the information literacy of the general public including the development of IT environments at public facilities. Action will also be taken to improve the information literacy of seniors and the disabled. (MPHPT, MEXT, MAFF)

b. From the perspective of employment creation, job-related IT skills will be developed at various levels among unemployed persons effectively and efficiently. (Ministry of Health, Labour and Welfare (MHLW))

(3) Development of Creative Human Resources with Specialized Knowledge and Skills

a. In order to develop IT human resources with specialized skills and creativity in accordance with the needs of industry, new IT-related departments in universities and graduate schools will be created and existing departments reorganized. The number limit of students will be increased to raise the number of highly-skilled IT human resources. Also, IT-related programs at specialized training colleges will be improved and further development of educational environments promoted. (MEXT)

b. In order to develop highly-skilled IT human resources of both public and private sectors necessary in a broadband era, research and development projects by private sector engineers and local government employees will be encouraged. (MPHPT)

c. In order to facilitate the development and use of highly-skilled IT engineers, standards concerning IT-related job skills will be established and diffused. (METI)

d. The widespread application of e-learning (remote education) will be promoted by providing educational content according to skill standards common to Asian countries from the perspective of the effective development and use of IT human resources across various Asian countries. (METI)

e. In order to develop excellent digital content creators, necessary action will be undertaken for improving the content production environment and distribution structures, and for facilitating the distribution of digital content via the Internet, taking into consideration the enhancement of international competitiveness in digital content. (MPHPT, METI)

f. As globalization progresses, environments in which foreigners can study Japanese easily will be developed both in Japan and overseas to encourage the widespread application of the Japanese language and the dissemination of Japanese culture. (MEXT)

3.3 Enhancement of Network Content

3.3.1 Objectives

For Japan to become the world's most advanced IT society, the volume of high-quality digital content provided via the Internet and transmitted globally must be increased greatly. The production of digital content itself will likely be handled largely by the private sector, but the national government must act to create an environment in which this can take place. Specifically, highly skilled content creators will be trained and measures implemented that promote the production and distribution of high-quality digital content, including the protection of intellectual property rights. Also, the development of an environment that encourages introduction of IT by small and medium-sized enterprises will be accelerated including various measures to support start-ups.

3.3.2 Measures

The scale of the electronic commerce market is increasing rapidly, with the business to business (B to B) market reaching approximately 22 trillion yen (about 2.5 times greater than in CY1998) and the business to consumer (B to C) market reaching approximately 820 billion yen (about 2.5 times greater than in the previous year) in CY2000. In FY2002, while continued efforts will be made to develop a necessary environment for the growth of e-commerce market, specific focus will be placed on promoting the production and distribution of high-quality digital content, including the protection of intellectual property rights to encourage the rapid growth of digital content distributed via the Internet.

(1) Reviews of Regulations (Ministry of Justice (MOJ), and the relevant office and ministries)

The Commercial Code will be amended to allow for the introduction of systems for storage of corporate documents in electronic forms and electronic notification using the Internet, and necessary reviews of regulations that impede electronic commerce will be conducted.

(2) Appropriate Protection and Use of Intellectual Property Rights (MEXT, METI)
In order to promote the appropriate protection and use of intellectual property rights on the Internet, necessary legal structures including systems related to copyrights and patents will be created to ensure the smooth distribution of digital content including computer software, images, and music.

(3) Facilitation of Digital Content Distribution (MPHPT, METI)
Action necessary for the development of environments to establish commercial rules of broadcast content and technology for the prevention of unlawful copying will be taken to facilitate the distribution of broadband content.

(4) Consumer Protection (Cabinet Office, METI, FTC, and the relevant office and ministries)
Consumer protection will be promoted in the electronic commerce field including the creation of systems for the rapid resolution of consumer complaints and the protection of personal information through the provision of related information.

(5) Digital Signatures and Authentication Systems (MPHPT, MOJ, METI)

In order to ensure the efficient implementation of digital signatures and authentication systems, necessary action will be taken including international mutual recognition of authorizing authentication operations, research and investigations with regard to the evaluation of technologies concerning the security and reliability of authentication operations, and activities to publicize such operations among the general public.

(6) Extension and Encouragement of Alternative Dispute Resolution (MOJ, and the relevant office and ministries)

In order to develop the foundations to expand and encourage the use of Alternative Dispute Resolution (ADR), the investigations on a legislation for arbitration will be hastened, taking into consideration international developments such as those of United Nations Communication on International Trade Law (UNCITRAL), and investigations will be made in view of adopting Basic Law on ADR (tentative) to create a basic framework for ADR.

(7) Development of Common IT Foundations for Small- and Medium-Sized Enterprises (SMEs) (METI, MAFF)

In order to promote the introduction of IT to SMEs, a suitable environment will be developed and support measures provided in a comprehensive and systematic manner, including the promotion of human resource development and business tie-ups as well as an enhancement of information provision through implementation of an "e-SME Agency." In addition, the development of an electronic commerce environment will be encouraged in agriculture, forestry and fisheries business areas that are lagging behind other industries.

(8) Coordination with International Rules (MPHPT, MOJ, METI, and the relevant office and ministries)

Active discussions will be conducted on a range of topics including infringement of intellectual property rights, consumer protection, information security, international court jurisdiction, and conflicts of laws in various forums such as World Intellectual Property Organization (WIPO), Organization for Economic Co-operation and

Development (OECD), UNCITRAL, the Hague Conference on Private International Law, and the World Trade Organization (WTO), taking into consideration Japan's legal systems, in order to effect coordination with international legal systems.

3.4 Promotion of Electronic Government and Electronic Local Government

3.4.1 Objectives

It is necessary to promote the development of foundations in FY2002 to realize both electronic government (e-government) and promote the creation of electronic local government by FY2003. In order to do this, the foundations necessary for submitting electronic applications and notifications including public individual certification services by local governments will be developed and necessary support will be provided by the national government so that local governments can undertake such developments, keeping pace with the national government. Also, all possible measures will be taken to ensure security, which is the foundation of all IT services.

3.4.2 Measures

During FY2002, all the ministries will engage in the development of a common system infrastructure to electronically handle applications and notifications, and will also promote electronic delivery of administrative information and electronic government procurement, so that electronic information can be handled administratively in the same way as information on paper by FY2003.

(1) Electronic Delivery of Administrative Information (MPHPT, and all the ministries)
Based on the Action Plan Concerning the Promotion of Electronic Information Delivery to be formulated by each office and ministry according to the Framework for Electronic Delivery of the Administrative Information (Guideline), systematic and priority action will be taken for the electronic delivery of administrative information such as basic information concerning administrative organizations and structures, information regarding budget and settlement of account, and information that will contribute to effective social use.

(2) Electronic filing (application, notification and other procedures) (MPHPT, Ministry of Finance (MOF), and all the ministries)

The following items will be promoted based on a new action plan.

a. Creation of authentication systems and General-Purpose Acceptance System

b. Creation of systems necessary for electronic payment of fees

c. Creation of individual systems necessary for handling separate procedures

d. Creation of inspection support databases, internal memo and decision-making systems, and document management systems that will contribute to efficient internal administration and the enhancement of the functions of such systems.

(3) Construction of Public Authentication Infrastructure for Individuals (MPHPT)
A public authentication system for individuals by local governments using data from basic resident registers is scheduled to start operations in FY2003. In preparation, trial

operations will be conducted, legal and other necessary foundations will be prepared, and systems will be constructed.

(4) Electronic Government Procurement

a. Based on investigations into specifications for electronic bidding and bid opening with respect to government procurement except public works, a system will be developed and put into trial operations. (MPHPT, and all the ministries)

b. An electronic procurement system for public works will be operated with respect to a part of projects under the direct control of the office and ministries, that exceed a certain scale, and a system compatible with various bidding formats will be developed. (MLIT, and the relevant office and ministries)

(5) Paperless (Electronic) Administration (MPHPT, and all the ministries)
Each office and ministry will jointly shift certain tasks to paperless (electronic) administration. While the functions of existing systems will be upgraded as necessary, LANs of national ministries and those of their regional bureaus and branch offices will be connected, and networks linking the national government and local governments will be installed.

(6) Support to Local Governments (MPHPT, and the relevant office and ministries)
In coordination with the introduction of electronic administration in the national government, Priority Policy Program will be steadily implemented by the national government to provide support to the undertakings of local governments.

(7) Development of Wide-Area Systems by Local Governments (MPHPT)

The construction of wide-area systems by multiple local governments will be supported. To carry this out, the construction of jointly operated systems by such means as ASP will be promoted through trial operations.

(8) Electronic Voting in Local Elections (MPHPT)

In order to make voting more convenient for voters and to facilitate ballot counting, action will be taken to make possible trial operations of electronic voting in local elections.

(9) Formulation and Widespread Use of Evaluation Indicators concerning System Development (METI, and the relevant office and ministries)
Based on the result of the adoption of Process Evaluation Indicators' Model for Development and Procurement of Software, action will be conducted to promote the widespread adoption of that model in both the public and private sectors including preparation of a training environment for evaluators.

(10) Introduction of IT in the Public Sector (relevant office and ministries)
Priority Policy Program will be steadily implemented by promoting research and development, by digitizing such fields as science and technology, academic research, the arts and culture, health care and social welfare, the environment, disaster prevention, and public transportation, and by aggressively introducing advanced telecommunications infrastructure and applications into various fields, including the promotion of ITS and GIS.

(11) Effective Promotion of Measures (all the ministries)

The following action will be taken to encourage effective promotion of measures: (1) use of existing systems; (2) development of an effective system that corresponds to diversification of communications services and progress of technology; (3) sharing of design and development results; (4) elimination of duplicative measures; and (5) coordination of measures.

3.5 Ensuring the Security and Reliability over Advanced Information and Telecommunications Networks

3.5.1 Measures

Ensuring information security is a necessary prerequisite for the advancement of the IT revolution. In CY2000, the number of computer virus notifications was 11,000 (approximately three times the number in the previous year), and the number of reported unauthorized access incidents was 143 (approximately 2.6 times the previous year's figure). In FY2002, particular emphasis will be placed on constructing security systems in electronic government, constructing response systems to cyber terrorism, and raising security levels in the private sector.

(1) Construction of a Highly Reliable e-government

a. In order to ensure information security in the e-government, investigations will be launched on the construction of a system for information security, which, in an integrated manner, supports each ministry and agency as well as local governments, evaluates and examines security conditions of each ministry and agency, and responds to emergency situations. (Cabinet Secretariat)

b. In order to evaluate and review security policies on a continuous basis, effective measures will be investigated including the use of ethical hacking. (Cabinet Secretariat)

c. The information security measures of local governments will be supported through such means as the creation of emergency response systems and the implementation of local financial measures. (MPHPT)

(2) Reinforcement of Countermeasures against Cyber-Terrorism (Cabinet Secretariat, National Police Agency (NPA), Defense Agency (JDA), Financial Services Agency (FSA), MPHPT, METI, and MLIT)

Cyber Terrorism Response Database (tentative name) will be constructed and its functions reinforced to collect, transmit, and accumulate information concerning cyber terrorism as well as share such information between the private and public sectors. In addition, training of personnel with advanced skills, development of systems, and international cooperation will be promoted to respond to emergency situations.

(3) Raising Awareness concerning Information Security

Basic education concerning information security will be introduced to the compulsory education level, structures that promote cooperation among private sector initiatives will be developed, and support will be provided for a human resource development program that takes into consideration the needs in various areas. (MPHPT, MEXT, MHLW, METI)

(4) Support for Information Security Measures in the Private Sector

a. Functions whereby ministries and organizations involved in information security provide and accept information and provide guidance and advice to the private sector will be reinforced, consulting services at prefectural police offices for the private sector will be improved, and high-tech anti-crime measures will be strengthened. (NPA, MPHPT, METI)

b. Activities will be conducted to raise public awareness concerning information security, and support will be provided to private companies to promote the introduction of advanced information security facilities and purchase information security related services. (MPHPT, METI)

(5) Development of Key Technologies Concerning Information Security (NPA, JDA, MPHPT, MEXT, METI)

Basic technologies including encryption technology and information security evaluation technology will be developed and shared with other ministries and the private sector to the extent there is no influence to national security issues.

3.6 Reinforcement of International Activities

3.6.1 Objectives

It is important for Japan to play a central role in the IT revolution in Asia. We will disseminate large volumes of digital content, and act as an Asian Internet hub, while engaging in international cooperation concerning IT-related rules and regulations, including those on intellectual property rights and consumer protection. Furthermore, we will contribute to the expansion of the global IT revolution mainly in Asia by promoting the spread of IPv6 and the development of human resources.

4 Priorities for IT related research

During the fall 2001, the Council for Science and Technology (CSTP) released the priorities and objectives they recommended that Japan should set for the government funded research and development done in the country during the coming years. IT is one of the 8 areas looked at, and the recommendations for that area are summarized below.

4.1 Priority areas

4.1.1 Nationwide backbone network

Focus will be put on developing the infrastructure, software, computing power and contents necessary to cover the country with a safe and reliable high speed backbone network that enables all businesses and homes to at any time and from any place connect to fixed and mobile internet.

4.1.2 Next generation breakthrough technology

In this area is included applied IT fields like human interfaces, nano-technology, intelligent transport systems, bio-informatics, robotics, etc.

4.1.3 Promotion of R&D infrastructure and education

This involves creating a world leading research and development environment, including making available research databases, high speed networks connecting labs, supercomputers and simulation tools, etc.

4.2 Research objectives

4.2.1 Nationwide backbone network (within 5 years)

1. Mobile internet system using Ipv6 allowing:
    a. x0 Mbps wireless access during high load, x00 Mbps during low load
    b. 10 Tbps access for optical equipment
2. High-functionality, low-price devices
    a. 1 GHz mobile terminals with one week battery time
    b. SoC technology producing single chip with video, audio functionality, allowing higher speeds, lower power consumption devices
3. Usability, reliability
    a. A database structure allowing simultaneous access by 100 000 persons, and with less than one minute yearly downtime.
    b. Software allowing safe, easy and authorized access

Next generation breakthrough technology

1. Next generation IT (within 10 years):
    a. User interface that can understand and predict the user's intentions depending on context
    b. Quantum based encryption key for short distances (x0 km)
2. Interdisciplinary areas (within 5 years)
    a. Intelligent transport system connected to internet
    b. Space related IT: Gigabit high speed internet communication via satellite
    c. Bio-informatics: Study on small and middle size proteins, gene identification
3. R&D infrastructure
    a. Intelligent transport system using internet
    b. Network of supercomputers and databases to be used by labs and universities

4.3 Realization

4.3.1 Roles and promotion systems

MPHPT is stressing that a larger degree of cooperation between universities, business and the governmental bodies is necessary in order to avoid overlapping efforts and investments. However, in order to achieve world-class results, a certain degree of competition is still needed.

MPHPT envisions that the first priority area, the realization of a nationwide high speed network, will need the cooperative efforts of the industry, the universities and the governmental bodies. The second area, development of next generation breakthrough applied technology, should be led by the universities and the government in a joint effort. The realization of a world class infrastructure for R&D should mainly be headed by the government.

When it comes to the supply of competence and skills within the IT area, MPHPT mentions that the transfer of researchers between different institutions, and also into the industry as spin-off ventures, should be facilitated and supported. The international participation and exchange should also be broadened.

5 Overall Science and Technology research funds

The fiscal 2002 science and technology budget is a shining exception in the otherwise gloomy budget, where the government is proposing significant increases. It seems that the Prime Minister's view that S&T is a major pillar in his reform drive has taken root, and the different ministries hope to support the universities in fostering knowledge, and leverage S&T to create new industries, and thereby job opportunities.

The government has budgeted 1.18 trillion yen (8.9 billion USD) for the promotion of S&T in 2002, a 5.8% increase compared to the current fiscal year. This increase is shared by every ministry. **The ministry of Education, Culture, Sports, Science and Technology,** for example, plan to spend 28% more on life sciences next year (71.1 billion yen in total), 16.6% more on nano-technology (in total 24.9 billion yen), 4.2 % more on IT (in total 89 billion yen) and 0.8% more on environmental science (in total 57.6 billion yen).

In addition to these four focus areas, the ministry has received approval for new research areas, such as 11.8 billion yen for a human genome analysis project and 3.8 billion yen for a project of comprehensive support for nano-technology.

The funding of scholarly research has also increased, to 170.3 billion yen, with another 174.3 billion yen approved for open, competitive research grants.

Another telling feature is the 44.5% increase in spending on facilities, for renovating and rebuilding university facilities, reaching a total of 146.4 billion yen the coming fiscal year and 1.6 trillion yen over the coming five years.

Other ministries have also boosted their S&T budgets. **The ministry of Economy, Trade and Industry**'s technology related budget is up approximately 4.8%, to 588 billion yen, even though its total budget will shrink. Of these, 97.1 billion will be spent on the four areas of life sciences, IT, environment and nanotechnology, 21.4 billion will be spent to support private sector research to create new markets, and 21.9 billion will go to a system of cooperative research between public, private and academic institutions to promote regional S&T advancement.

Meanwhile the **Health, Labour and Welfare ministry** increased its S&T related budget by 3.4% to 40.7 billion yen. It has decided to cut back on to its affiliated research institutes and special corporations while increasing instead the support to public welfare related research projects.

6 IT related research programs and budget for FY 2002

The Council for Science and Technology policies (CSTP) receives proposals for research programs and budgets from the different ministries. The council checks the proposals for redundancies and overall compliance with released policies, and suggests changes, before they are submitted for inclusion in the national budget. The adjusted IT related programs suggested are summarized below.

Within parenthesis after each program name is given the responsible ministry, the suggested budget to be allocated, and the approved budget for 2001 in parenthesis.

Overall objective: Realization of high speed, high reliability IT-system, enabling the ubiquitous network society, through development of mobile, opto and device technology by industry, universities and government.

6.1 Nationwide backbone network

- Generic Network Technologies (1) (MPHPT: 8,900 (6,700))The fourth generation mobile communication, Ultra-high speed Photonic Network, Tera bit class super network, Giga bit network, P2P type advanced information distribution technologies for the public sectors, IPv6 enabled information home appliances, Digital broadcasting enabled advanced broadcasting system
- Quantum information processing and telecommunication technologies (MPHPT: 260 (150))
- Advanced R&D in IT field (1) (MPHPT: part of 2,700 (0))
- Photonic network base technologies, Media hand-over technologies IT Program (1) (MEXT: 1,900 (0))
- (Opto/Electronics devices, etc., Next generation memory device, Next generation mobile Internet system)
- Femto-second technologies, Next generation ferroelectric memory (METI: 1,600 (1,800))
- IT infrastructure advancement program (1) (METI: 4,200 (0))
- (Super-conductive device (*), Photonic network technologies, Organic device (*), High frequency device (*), Magnetic memory device)
- Next generation semiconductor device process (METI: 2,100 (0)) (Low temperature plasma equipment (Part of anti global warming energy measure program in the environmental field), Extreme ultra violet lithography technologies)
- MIRAI, System on chip, SI, LSI for ultra low power consumption information terminal, Advanced device process equipment (METI: 7,300 (6,400))
- Correlated electron technologies (METI: part of 67,600 (300))

- IT Program (2) (MEXT: 440 (0)) (Ultra small large-capacity hard disc)
- Nano meter controlled optical discs. (METI: 890 (1,000))
- IT infrastructure advancement program (2) (METI: 680 (0)) (Optical storage technologies, Network computing)
- Unexplored software/next generation software (Public offer), Information security measures, Security issue for Electric Government (METI: 4,000 (3,300))
- Information security measure (DA 1,850 (0))
- Network security base technologies, Next generation wireless access (MPHPT: 2,700 (2,700))
- Advanced R&D in IT field (2) (MPHPT: part of 2,700 (0)) (Terminal technologies for the disabled people, Wireless security platform technologies, Adaptive individual contents delivery technologies)
- Human-machine communication technologies (MPHPT: part of 16,700 (1,900))
- Information collection agent technologies, Information barrier-free type communication/broadcasting system, Image related technologies for advanced telemedicine, etc.) (MPHPT: 600 (700)
- Media interaction, Intelligent interface (METI: part of 67,600 (100))
- Development/dissemination of IT for the aged/disabled people (METI: 500 (750))
- Next generation high functional imaging technologies, Broadcasting contents production technologies for the blind people (MPHPT: 620 (710))
- Digital contents archive storage question (National Diet Library: 40 (0))

6.2 Research and development infrastructure

6.2.1 Supercomputer network infrastructure, Virtual research environment

- e-science (MEXT: 1,000 (0)) Supercomputer network, Development of "real" experimental environment)
- Promotion of Super SINET plan, Development and utilization of ITBL (Virtual research environment) (MEXT: 8,500 (8,100))

6.2.2 Development of computational science and engineering software

- IT Program (3) (MEXT: 1,500 (0)) (Development of strategic base software)
- Advanced computation science and technologies, Computational science and engineering utilized specific R&D, Next generation integrated calculation (MEXT: 5,100 (6,200))

6.2.3 Science and technology data base

- Science and Technology information (part) (MEXT: 8,100 (7,700))
- Promotion of digital information dispatch/distribution (MEXT: 1,600 (1,700))

6.3 Interdisciplinary areas

6.3.1 Fusion with social infrastructure

- Next generation maritime transport IT system (MLIT: 310 (220))
- Generic network technologies (2) (MPHPT: 1,500 (1,600)) (Information and telecommunication technologies for realizing ITS)
- Research on ITS (MLIT: 8,200 (8,200))
- Information and telecommunication technologies for GIS (MPHPT: 700 (900))

6.3.2 Fusion with Space development (telecommunication)

- Ultra high speed Internet satellite (MEXT: 5,500 (7,500))
- Research and Development of Stratospheric Platform (MPHPT: 1,000 (1,300))
- Global multimedia mobile satellite communication (MPHPT: 460 (650))

6.4 Should lead to: Progress of overall science and technology

- The national objective of the research is:
- Improving knowledge and global competitiveness by informatization
- Preparing for the ubiquitous network society
- Ensuring the citizens a safe, sound, and comfortable life by strengthening the countries competitiveness on the global markets
- Developing high speed and high reliability information communication systems through the cooperation of industry, academia, and government, by focusing on mobile, optical, and device technologies. In these Japan should play a world leading role.

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