

THE PLAN FOR INFORMATION SOCIETY

— a National Goal Toward Year 2000 —

COMPUTERIZATION COMMITTEE

Final Report

May 1972

JAPAN COMPUTER USAGE DEVELOPMENT INSTITUTE

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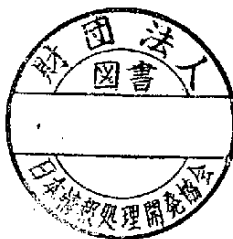
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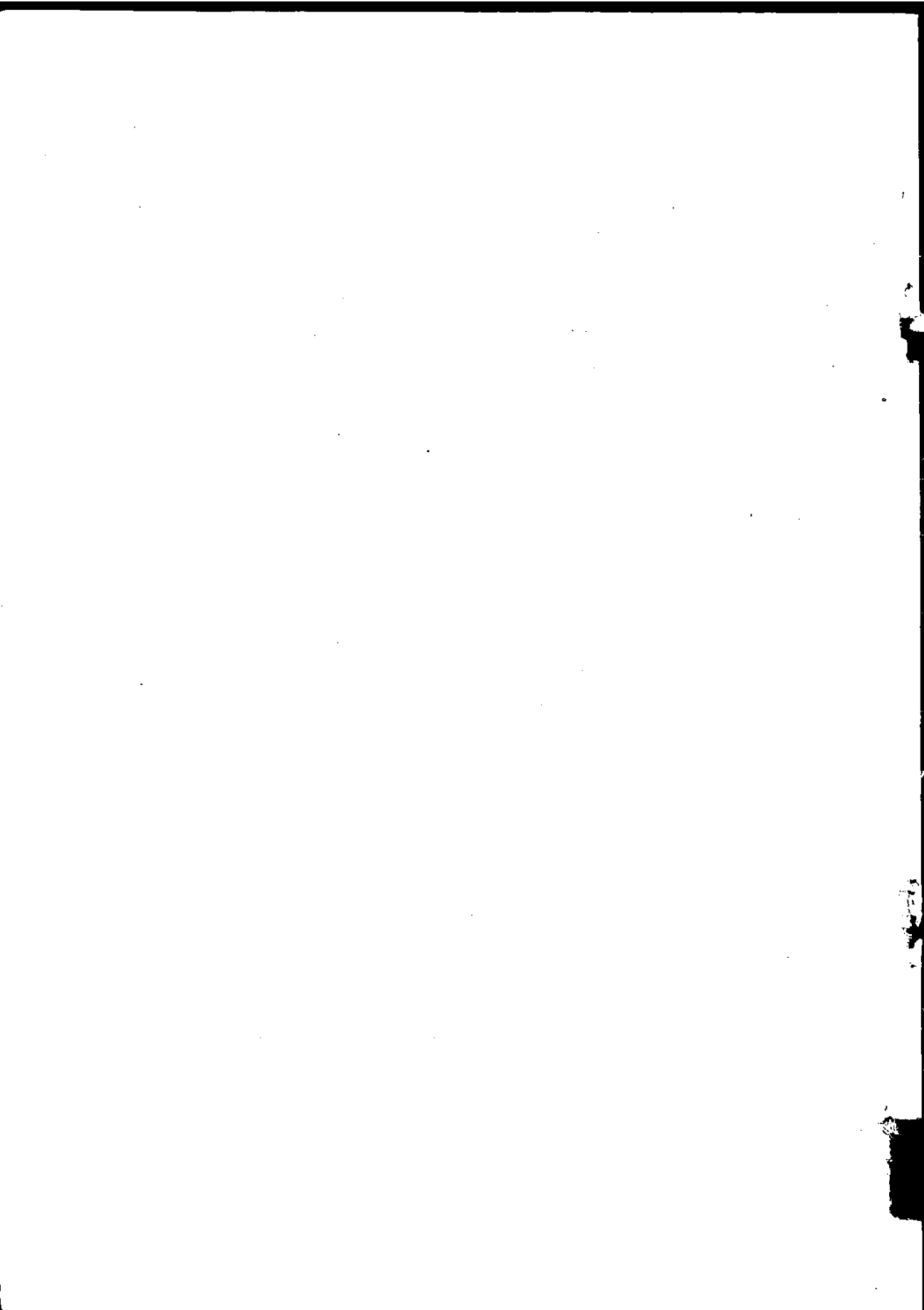
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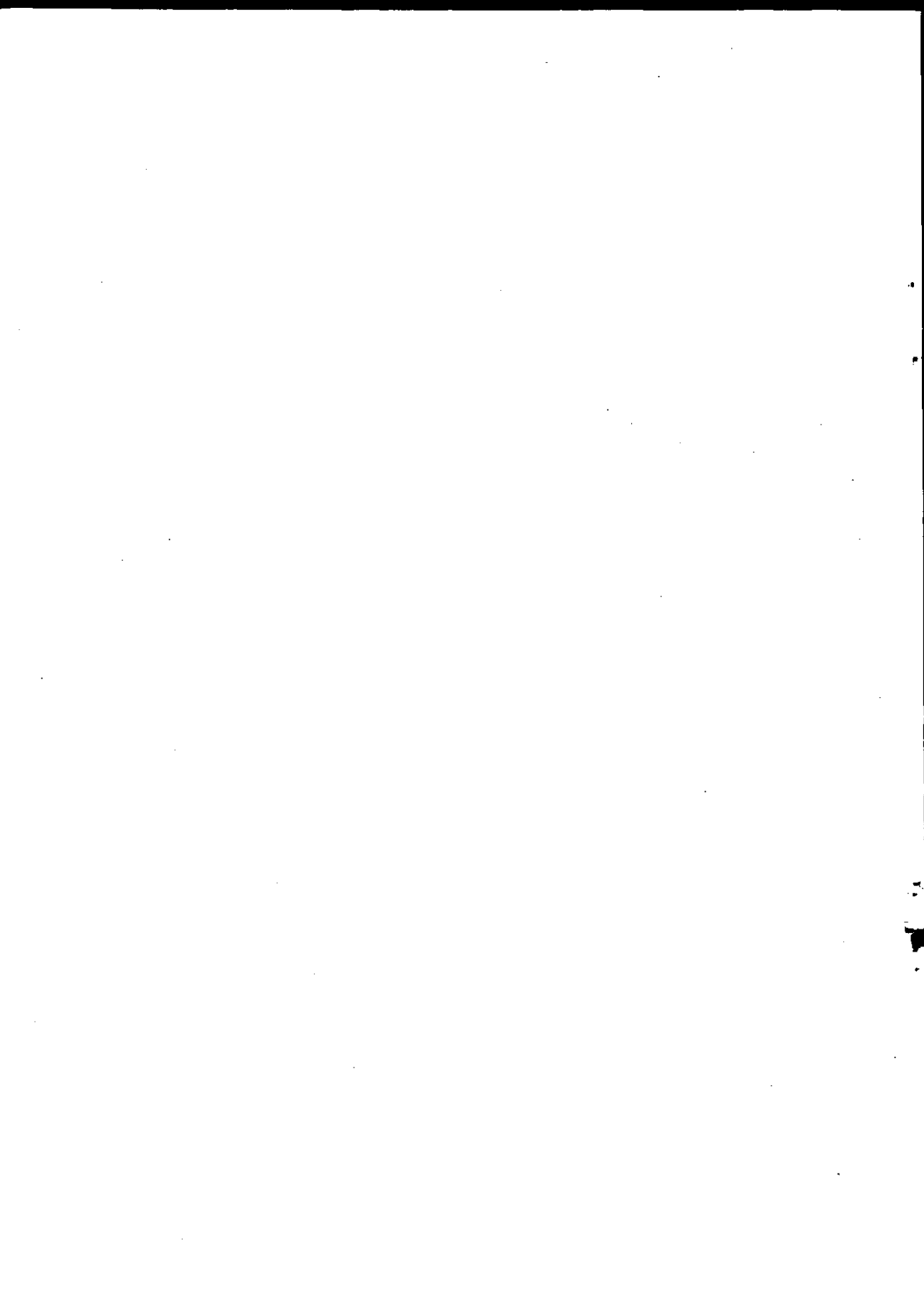


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PRELUDE

This plan has been formulated as a fruit of a year's work since April 1971, by the Computerization Committee, established in the Japan Computer Usage Development Institute. (Committee Chairman: Mr. Kazue Kitagawa, Chairman of Sumitomo Electric Industries, Committee Chief Investigator, Mr. Yoneji Masuda, Director of Japan Computer Usage Development Institute)

It presents a picture of Japan's planned information society which is scheduled to be established by 1985, and the means of attaining this national goal and its schedule. Future plans, such as this plan, tend to involve very many uncertainties and difficulties that stand in the way of materializing the plans.

However, if this plan presents some suggestions as to the realization of Japan's information society and plays its role as a corner stone of such a society, it can be said to have accomplished its mission.

Chapter I BASIC CONCEPT

1. Establishment of a Pictorial Representation of a Information Society as a New National Target

During almost a century, since the Imperial Restoration, Japan endeavored to build a modernized industrial society, and has almost reached this goal. However, Japan is now confronting multitudes of social and economic problems that include pollution problems, excessively dense population problems in urban areas, economic depression arising from industrial and economic structures, increases in aged population, etc.

In the advanced countries, de-industrialization is now under way, and the world is generally and steadily shifting from the industrialized society to the information society. Therefore, this committee proposes establishment of a new national target, "Realization of the Information Society".

The ultimate goal of the information society is the re-realization of "a society that brings about a general flourishing state of human intellectual creativity". Intellectual creativity may be defined as a process of exploring into future possibilities by fully employing information and knowledge with the aim of materializing such possibilities.

If the goal of the industrialized society is represented by volume consumption of durable consumer goods or realization of heavy mass consumption centering around motorization, information society may be termed as "a society with highly intellectual creativity where people may draw future designs on an invisible canvas and pursue and realize individual life worth living".

2. Formulation of an Intermediate and Long Range Plan for Developing an Information Society

It will most probably be in the twenty-first century when Japan may realize such a highly intellectually creative society.

Therefore, on the way to attain this goal, an intermediate target "establishment of computer mind" will have to be established. In order to attain this intermediate target by 1985, a basic plan, "an information society development plan" shall be formulated.

This basic plan shall be supported by two fundamental conditions.

The first condition is that efforts be concentrated on the relaxation and prevention of various disastrous matters that may arise during the '70s. Among other problems, heavy shortage of intellectual personnel, widening information gaps, pollution and traffic problems, and excessively populated urban problems be urgently solved.

The second condition is that a gradual and effective transformation of the industrial society into an information society be committed. For this purpose, the government shall furnish necessary funds for carrying out the information society development plan under the government's guidance.

The information society development plan shall be divided into an intermediate impact plan and a long term basic plan.

The intermediate impact plan shall include:

- (a) A five year plan ending in 1976, investing ¥1000 billion (\$3,250 million).
- (b) The central project shall be such that will give an impact effect on the realization of information society in the future.
- (c) In order to develop this commitment, the "Information Society Development National Council" shall be established.

The long-term basic plan shall be as follows:

- (a) A long-term plan to cover until 1985, investing national funds totaling ¥20,000,000 million (\$64,935 million).
- (b) The plan should be intended to prepare the background to enable establishment of computer mind, and to prepare measures that will compensate for the drawbacks arising from computerization.
- (c) In order to carry out these plans, the basic principles for the information society development shall be established.

3. Creation and Fostering of the Third Sector.

The financial resources for carrying out the information society development plan shall be mostly the government's treasury investments which will be utilized under the government's political guidance. For implementation of the plan, creative talents and management capabilities of those enterprises in the private sector must be fully employed. In practice, this shall be done by the conventional joint efforts of the public sector and the private sector. Further, a third sector must be created and efforts should be exerted to develop this sector.

The third sector in this case represents a new form of entity organized by the government and the private sector, financed by the government and operated by the private sector, with the aim of promoting public interests but not pursuing profits. In the future information society, this type of third sector is expected to develop to play an important role.

In this plan, industrially classified data bank, hospital supply public corporation, think tank center, new town development corporation, etc. are already being presented as the most likely candidates for the third sector. This committee is anticipating formation of such entities.

4. Incorporating Various Systems as Suggested by the Nation.

A revolutionary data processing centering on computers will be the motive power of transforming the industrialized society into an information society. At the same time, the government's leadership will play a big role in the fundamental changes in various social and economic systems and practices, and in the value system.

As a safeguard against a controlled society, vigorous cooperation of the general public must be obtained. In order to do so, various systems should be incorporated into the information society development plan, such as the national congress for the development of information society, a reviewer system, citizens' policy participation system, etc.

The national congress for the development of the information society which comes under immediate control of the prime minister is a computerization policy council whose members are representatives of every stratum of the society such as businessmen, labor union members and consumers.

The reviewer system is composed of knowledgeable and learned persons and techno-economists. These people will check and evaluate the government's various computerization policies, and will endeavor to work as a communication medium standing between the government and the citizens.

The citizen's policy participation system is a system devised to reflect the citizens' intent on the central and regional governments' policies through use of policy models.

5. Use of TPBS

At the time of formulating and implementing a "plan" such as the information society development plan, a dynamic commitment that will cope with the changes in situation is required through full employment of TPBS.

TPBS is an abbreviation for Target Setting, Policy Model Building and Scheduling system. It is technically a kind of scenario writing using policy modules.

- (a) It sets a desired and attainable target.
- (b) This target is reduced to a subtarget and a sub-goal.
- (c) Set a dead line to each of these various targets.
- (d) Gradually establish necessary policy measures and methods required to attain the targets.
- (e) Policy module shall be employed for simulation.
- (f) Finally establish a desired and feasible project plan.

Characteristics of TPBS are that:

- (a) TPBS is a model incorporating time series and composite policy.
- (b) The government's policy, social system, citizens' behavioral consciousness and other qualitative elements may be incorporated into TPBS as policy functions.
- (c) Feed back is possible based on the evaluation while the plan is under way.

Chapter II THE NECESSITY AND BACKGROUND OF THE PLAN FOR INFORMATION SOCIETY

1. The Necessity of Change from Industrialization to Informationalization

The Computerization Committee stands on a historical viewpoint that it is necessary to promote the change from industrialization which is the extension of the old concepts to new informationalization by the plan for information society because the world resources are limited. The report of world dynamic model written by the study group under the guidance of Professor Forrester of MIT sponsored by Rome Club warned that it will be in the face of ruin in the next one hundred years because the scarce of foods, drain of resources, pollution of environment, congestion of population in the urban area which will be accelerated by the increase of population and economic growth. Professor Robert Junk, the futurest, said that human being will face a crisis if we will continue the material civilization, and the promotion of computerization will be one of the solution to prevent this crisis. It is our urgent need to change from industrialization to informationalization regardless the level of industrialization or the wealth of accumulated resources.

Japan faces social and economic problems which resulted the lack of resources, pollution, over density or rarefied population and international tension because Japan has grown very rapidly. Therefore Japan is forced to decrease the speed of industrialization because of resources, pollution, location, environment and international coordination. That is the reason why the Ministry of International Trade and Industry emphasized the promotion of knowledge industry in 1970's as one of the major policies in Japan. Considering these background, the Computerization Committee's main goals in the plan for information society are as follows:

- to promote the knowledge industry in Japan
- to solve social problems such as medical, transportation, pollution and distribution problems
- to hasten the change from industrialization to informationalization smoothly

2. The Reason Why Guideline Policy Will Be the Best

The next logical question is "how to change from industrial society to information society in what means and methods?" There are three alternatives, i.e. the principle of laissezfaire, the extension of the current policy for the promotion of information processing industry and guideline policy with targets and long-range plan.

It will be difficult to realize a balanced and desirable information society by the principle of laissezfaire or the extension of the current policy. The information society will be only partially realized and unbalanced if one of two types will be taken. The information pollution will be spread just like industrial pollution which has been resulted by the development of the industrialization. The guideline policy will be required to realize a desirable and balanced information society preventing the information pollution. The plan for information society which are formulated by the Computerization Committee is an example of the guideline policy.

3. Main Characteristics of the Plan

Most development projects or plans which are already released in various countries were more concerned about housing or highway construction and leisure or recreation. But this plan for information society will be more concerned about information and social problems. The characteristics of the plan may be summarized as follows:

- (a) It is consisted by two plans, i.e. medium term impact plan and long-range basic plan. The combination of these two plans will be better than one and only plan to realize the information society.
- (b) The target is focused on information rather than on the extension of industrialization. And we believe that this new target is an unique approach to design the future.
- (c) The plan is software-oriented rather than hardware-oriented while the most other plans are intended to expand facilities and other materials. This plan is to reorganize the systems in various fields of our society, and to improve the quality of society instead of expanding the quantity of materials in our society.

- (d) The plan is an integrated plan which includes many sub plans in various areas in the society. Most other plans covered limited areas and the goal was single. But this plan is a multi phased projects which combines many sub plans.
- (e) The investment amount which will be required to attain the objectives of this plan is reasonable if compared with the scale and the importance of this plan. The medium-term impact plan will require 1,000 billion yen (3,247 million dollars), and the long-range basic plan will require 20,000 billion yen (65 billion dollars). These investments are reasonable if compared with other Japanese large scale plans and projects. The Computerization Committee believes that the plan for information society is a reasonable and timely plan.

Figure 1

Projects and Plans in Japan during the Past One Year

<u>Principal of Plan and Project</u>	<u>Theme</u>	<u>Period</u>	<u>Investment Amount</u>
Ministry of International Trade & Industry	Construction of CATV experimentation town	1972-1975	32 million dollars
Ministry of International Trade & Industry	Research and development of pattern information processing system	1971-1978	114
Ministry of International Trade & Industry	Ryukyu Ocean exposition	1972-1974	325
Ministry of Education	Training of information processing	1972-1980	494
Ministry of Transportation	Construction of new Osaka international airport	1972-1984	1,623
Ministry of Transportation	Construction of new express (between Okayama and Hakata)	1970-1974	3,019
Computerization Committee	Information society medium range impact plan	1972-1978	3,247
Ministry of Transportation	Construction of new three lines (Tohoku, Joetsu and Narita)	1971-1974	5,195
Ministry of Transportation	Construction of new four lines (Tohoku, Hokkaido, Hokuriku and Kyushu)	1974-1979	6,494-9,740
Ministry of Construction	Five years plan of drain system	1971-1975	8,441
Japan Telegraph and Telephone Public Corp.	Seven years plan of the expansion of telephone and telegraph	1971-1977	27,597
Japan Telegraph and Telephone Public Corp.	New five years plan of the extension of telephone and telegraph	1978-1982	38,312
Computerization Committee	Information society long range plan	1972-1985	64,935
Economic Planning Agency	New nationwide land development plan	1969-1985	97,403-162,338
Ministry of Transportation	New transportation system	1972-1985	324,675
Ministry of Construction	Basic policies of administration	1970-1985	811,688

Chapter III PREREQUISITES

Four prerequisite conditions are required in the formulation of the information society development plan.

1. The Social Information Building Period in the Computerization

The committee's perception is based on the historical and basic recognition that the contemporary industrialized society is shifting towards an information society centering on the development of computerization. Thus, the committee defines the 1970's to be a period transforming into a social information period in a sequence of development periods.

A specialization tendency can be observed in the computerization of advanced industrialized countries because of the differences in the nation's character, value system, climate, political system and social economic structure (Ref: "Problems on Japan's Computerization from International Viewpoint" compiled by the Europe's computerization survey team). However, the general tendency is that the computerization period (management information computerization period), centering on the government and private corporation, is developing into a social welfare or social development oriented computerization period (social information building period).

Japan's current situation is characterized by a structural depression triggered by the "dollar shock". Depression is also evident in the computer related industry. However, the committee views that the current phenomenon is not a mere economic depression but is one of the inflection points in the computerization development period.

That is, like other advanced countries, Japan is also entering the social information building period from the management information computerization period. However, because various conditions are yet to be organized Japan is now confronting an inflection point in the form of a temporary business stagnancy.

However, from the latter half of the '70s, Japan is expected to enter a full-fledged social information building period initiated by the government's vigorous propelling of computerization policy and computerization investment. The reasoning behind this expectation is that:

- (a) Japan's social needs for social information building in her excessively densely populated society is very high as compared with western countries.
- (b) Japan is completely equipped with nationwide information network of telephone, newspaper, and T.V.
- (c) Nationwide scale of social information policy can be enforced with relative facility under Japan's more or less centralized administration.
- (d) Japan's economic growth is now being led by public investments in place of private investments.
- (e) The nation and its culture are homogeneous.
- (f) The computer industry, the software industry and the information oriented industries have grown to be independent industries.

2. GNP's Sustained Growth Centering on the Intelligence Intensive Industry.

That GNP will continue its sustained growth is one of the important prerequisite conditions to realize the planned information society.

The primary reason for this is that a huge investment in anticipation of future profit is necessary since an information society cannot be developed on a commercial basis.

The project that forms the central core of this information society development plan is social information computerization centering on health-care and education. However, these activities can hardly be done on a commercial basis. At the same time, it requires a huge investment in anticipation of future profits.

Therefore, investments for developing an information society will necessarily have to be made through national funds. However, in order to make this plan possible, the size of GNP must become at least several times larger than the contemporary GNP.

Thus, more than a 10% sustained growth of GNP is desired.

Figure 2

Computerization Development Periods

	<u>1st period</u> <u>1945 - 1970</u>	<u>2nd period</u> <u>1955 - 1980</u>	<u>3rd period</u> <u>1970 - 1990</u>	<u>4th period</u> <u>1980 - 2000</u>
	(Big Science, Base)	(Management, Base)	(Society, Base)	(Private Person, Base)
Objective	Defense, Space Development	GNP	GNW (Welfare)	GNS (Satisfaction)
Value System	National Prestige	Economic Growth	Social Welfare	Self- Realization
Subject	Country	Enterprise	People	Private Person
Object	Nature	Organization	Society	Human Being
Basic Science	Natural Science	Management Science	Social Science	Behavioral Science
Information Patter	Attaining the Goal	Pursuing Efficiency	Solving Problems	Intellectual Creation

Source: "Problems on Japan's Computerization from International Viewpoint" compiled by the computerization committee's survey team report on Europe's computerization.

According to this committee's long-term information society development plan, a cumulative total of approximately 20,000,000 million yen (64,935 million dollars) of treasury investments is called for a 14 year period, from 1972 to 1985.

This possibility may be endorsed by the following assumption. That is, supposing that Japan's future GNP grows at an annual rate of 11% and reaches an estimated 400,000 billion yen (1,299 billion dollars) by 1985, assuming that the government's treasury investments, centering on public undertaking, account for 16% of GNP, the cumulative total invested will aggregate 377,000 billion yen (1,224 billion dollars), and if 10% of this cumulative total is to be spent in the information society development investments, the amount intended to be spent for developing an information society will be about 38,000 billion yen (123 billion dollars). And, supposing that 50% of this amount is allocated to this committee's information society development plan, the amount allotted will be just appropriate, i.e. 20,000 billion yen (65 billion dollars).

Another reason for taking the sustained growth of GNP as a prerequisite is that the cost of information is too high to be used both socially and privately without limit.

Because IBM represents 70% of the global computer market, it is the price leader in the computer market. Furthermore, because of the quick technological progress, conventional hardware models will soon become obsolete. The market size is small and mass production is difficult and not practical.

In the future, in order that intellectual creativity should become generalized, installation of home terminals in each home would be essential. However, the current rate for information service by TSS of the Telegraph & Telephone Corporation is about 170,000 yen (552 dollars) per month. This amount is impossible for the wage earners, whose monthly net salary averages about 115,000 yen (373 dollars).

However, if, by 1985, the monthly disposable income increases to 350,000 yen (1,113 dollars), or three times as much, and the information service rate comes down to 50,000 yen (162 dollars), or reduced to one third, the proportion of the information service charge in a home budget will be about 15%. This economic condition will enable individual homes to use home terminals.

Figure 3

The Correlation between GNP and
The Information Society Development Investment

(Unit: billion dollars)

	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>
GNP (Nominal)	338	419	738	1,301
Treasury Investment	20	42	89	186
Proportion Invested in Computerization	1.6%	5%	10%	15%
Amount Invested in Computerization	0.3	2	9	28
Cumulative Total Invested	0.3	6	34	128
Ratio of the Plan for Information Society		50.3%		50.6%
Cumulative Investment of the Plan for Information Society		32 (1976)		649

Source: Estimated by the computerization
committee based on the assumed
GNP growth rate of 11%.

3. Establishment of the Government's Integrated Computerization Policy

What is critically important in carrying out this committee's information society development plan is the establishment of the government's integrated computerization policy.

According to this committee's analysis, the following conditions are requisite for carrying out the information society development plan:

- (a) Government's policy.
- (b) Cooperation of the organizations having interests in the computerization.
- (c) Funds.
- (d) Technology.
- (e) Reduction of information cost.

The above items are listed in the order of their importance. It has been indicated that technology and funds are not crucial bottlenecks. However, the government's lagging policy, relatively high information costs, and the resistance of the organizations having interests in the computerization are found to be standing in the way of carrying out this plan. Among other factors, the government's lagging policy formulation is a serious drawback in the propelling of Japan's computerization.

According to this committee's policy simulation, a one-year delay in the decision making of computerization policy will bring about delay in the development of an information society. The correlation degree has been calculated to be 0.7.

Therefore, the following two points are requested in the future administration.

The first point is to consider the information society development investment an important item in the future public investments.

Japan's economy is gasping under structural depression, and in order to solve this problem it has been stressed that investments should be led by the government rather than the private sector.

The treasury investments have three alternatives.

- (a) Construction investments centering on dwellings and roads.
- (b) Recreation investments directed to leisure.
- (c) Computerization to increase information and knowledge.

Thus far, the government has placed the greatest emphasis on construction investments. Less emphasis has been placed on recreation investments and the least emphasis on computerization.

Even if the treasury funds lead the nation's economy, the government's basic posture will never realize the information society envisaged to be the nation's new objective.

Therefore, the government should immediately and drastically increase the weight of computerization investment to at least 30% of the treasury investments.

The second point is the establishment of the integrated social information development policy.

So far, the government's computerization policy has been mainly directed to fostering the information industry.

It is a fact that the government's policy has enabled the Japanese computer industry to become an independent industry and has contributed to the successful development of the software industry. However, the future computerization policy must be switched from industrial policy to social policy. As mentioned earlier, it is observed that the world's general trend for the later '70s will be a transformation period from the management information development period to the social information development period. Therefore, when carrying out the social information development plan, the establishment of an integrated policy with a long-term perspective is desirable. If this is neglected unfavorable situation will result:

- (a) Computerization will go sprawling.
- (b) Effect of computerization investment will be reduced.
- (c) Unfavorable effects of computerization will increase.

4. Improvement of Human Intellectual Creativity Standards

Finally, there is a general improvement problem of human intellectual creativity standards. This is one of the most difficult prerequisite conditions. It may be a hypothesis rather than a prerequisite condition.

At the time of realization of industrialized society through the industrial revolution, creation of demand for the industrial products depended only on purchasability. There was no problem on the humanity side. So long as the goods produced were needed, they satisfied the human desire to possess them.

However, use of information will find its value only along with the improvement of human intellectual creativity. In this field, theoretical thinking, self-control, and development of new ability are required.

The information society centering around computers is different from the society characterized by projected images that are passive, sentimental, and sensible such as mainly represented by TVs. It is necessary to stress that the information society is an intellectual creativity society and is subjective, theoretical, and objective pursuing.

Therefore, this committee's information society development plan incorporates various educational projects mainly for self-learning purposes. How people in the future will upgrade their intellectual creativity standards through these projects and will have computer mind in their way of thinking to cope with the development of an information society is the key to open the door to the success in the realization of an information society.

Thus, "the development and settlement of computer mind in the people's mind" has been established as an intermediate target of this committee's plan.

Figure 4

Cycle of Man-computer System

Man

Computer

Development of information system

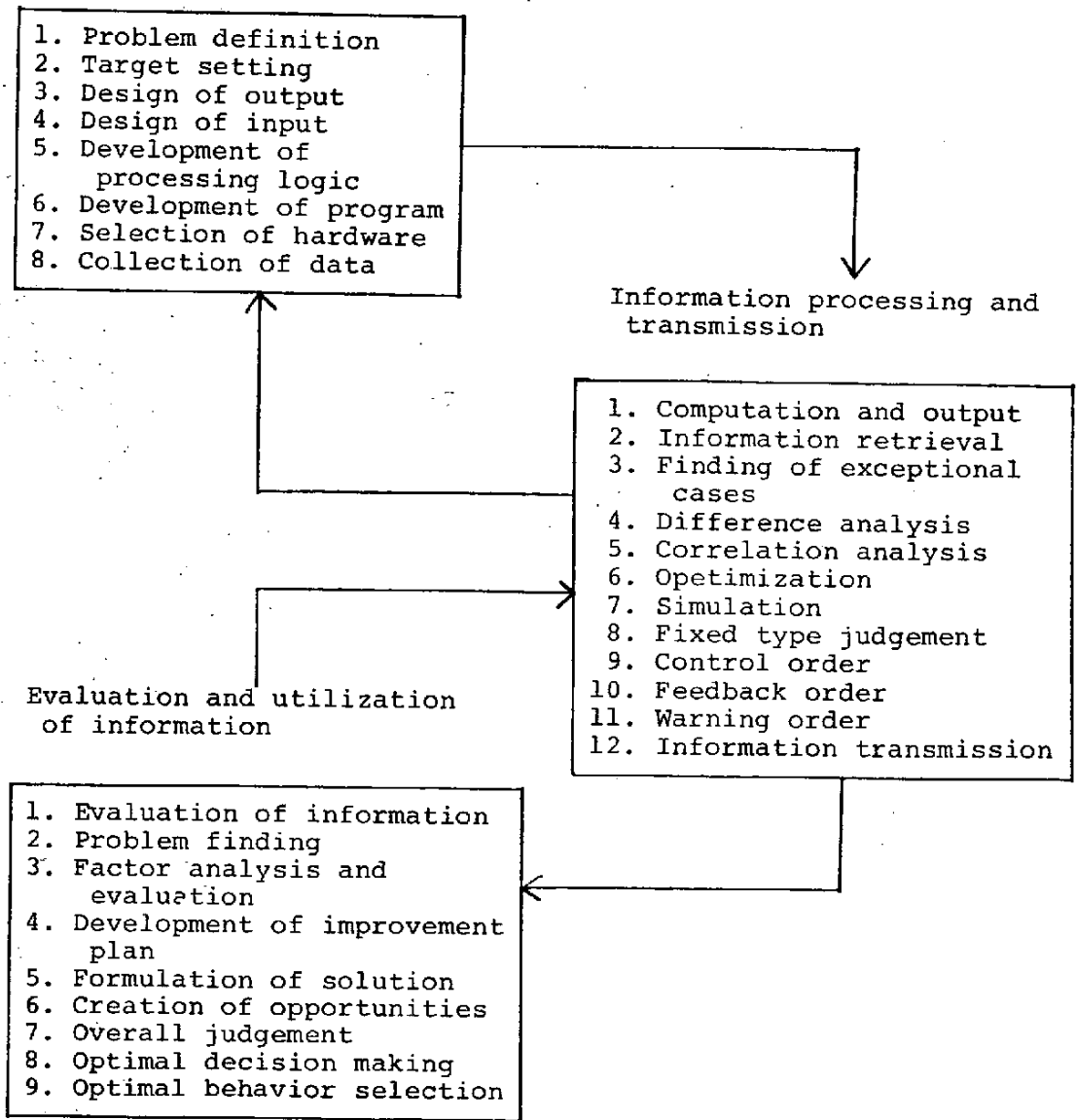
1. Problem definition
2. Target setting
3. Design of output
4. Design of input
5. Development of processing logic
6. Development of program
7. Selection of hardware
8. Collection of data

Information processing and transmission

1. Computation and output
2. Information retrieval
3. Finding of exceptional cases
4. Difference analysis
5. Correlation analysis
6. Optimization
7. Simulation
8. Fixed type judgement
9. Control order
10. Feedback order
11. Warning order
12. Information transmission

Evaluation and utilization of information

1. Evaluation of information
2. Problem finding
3. Factor analysis and evaluation
4. Development of improvement plan
5. Formulation of solution
6. Creation of opportunities
7. Overall judgement
8. Optimal decision making
9. Optimal behavior selection



Chapter IV CONTENTS OF THE INFORMATION SOCIETY DEVELOPMENT PLAN

The information society development plan has been developed for presentation as a model plan for the realization of Japan's information society. It gives a picture of an information society that is desirable and can be realized by 1985. It also includes an integrated plan involving various projects for the construction of the blue printed information society.

The information society development plan is divided into "intermediate impact plan" and "long-term basic plan". The former is a five-year intermediate plan consisting mainly of various projects that may initiate the development of an information society in the future. The latter is intended to reorganize various social and economic conditions that will form a framework of the future information society.

1. Intermediate Impact Plan

(1) Outline of the Plan.

The primary objective of the intermediate impact plan consists of selecting projects that will initiate realization of the future information society and carrying out these projects within a short period.

The period for the plan will be five years ranging from 1972 to 1977 investing a cumulative total of 1,000 billion yen (3,247 million dollars).

The schedule for the initial year will include survey, research, and preparation. The remaining four years will be spent in implementing the plan.

The funds required for this plan will be issued from the treasury accounts. The "Information Society Development Law" should be enacted as a temporary legislation which will endorse the plan. In order to obtain national consensus and cooperation, "The National Congress for the Development of Information Society" will be established. At the time of implementation of the plan, efforts shall be concentrated on the third sector and, in principle, because of the nature of the project, it's management shall be mainly conducted by private enterprises except for what must be directly handled by the government.

(2) Selection of Projects

The projects that will form the core of this plan shall be selected according to the following criteria.

- (a) The project shall be a breakthrough to introduce the future information society.
- (b) Further, it shall become a basis for a full-fledged development in the future.
- (c) It shall have high social needs and cannot be carried out by private business.
- (d) It shall be a model sample of the future information society and may be considered experimental.
- (e) It shall be a composite project, a combination of various targets in the long-term basic plan.

In accordance with these criteria, nine projects have been selected. They are:

- (a) Administration data bank.
- (b) Computepolis plan.
- (c) Medical systems that cover broad areas and remote localities.
- (d) Computer oriented education experiment school district.
- (e) Pollution prevention systems covering broad areas.
- (f) Think tank center.
- (g) Introduction of MIS into small and medium-sized enterprises.
- (h) Labor force redevelopment center.
- (i) Computer peace corp.

Figure 5

Required Investment of the
Information Society Impact Plan

(Unit: million dollars)

<u>Project Name</u>	<u>Amount</u>
Administration data bank	299
Computopolis plan	1,169
CVS	633
CATV	471
Automated supermarket	10
Regional health care	26
Regional airconditioning	29
Broad area remote medical systems	227
Automated hospital	110
First aid medical system	15
Remote medical sytem	18
Regional health care	23
Medical engineering institute	61
Computer oriented education in our experimental school	266
Education engineering research center	114
Rationalization of school office work	13
Individual education guidance system	45
Computer oriented education	94
Pollution prevention system in a broad region	584
Regional pollution prevention center	178
Pollution prevention research center	130
Pollution prevention facilities	276
Think tank center	386
Think tank	266
Citizen participation system	10
Education center	110
MIS of small and medium-sized enterprises	127
Central information center	16
Regional information center	111
Labor redevelopment center	179
Computer peace corp.	10
<u>Total</u>	<u>3,247</u>

(3) Outline of Each Project

(A) Administration Data Bank

Required funds: 92 billion yen (299 million dollars)

This project is aimed at controlling through distribution and concentration the administrative data compiled by the government offices, and at offering services through batch disposal or on line process and disposal of these data as required by the government offices.

This will contribute to the formulation of administrative policy and will become the major information supply source to the universities and general enterprises.

The systems will be divided into:

- (a) Information retrieval of administrative data.
- (b) Policy module and policy model program.

The basic composition of the systems will be:

- (a) The nation's major statistical data collected over the past decade, and kept in the form of microfiche.
- (b) The administrative data to be used with high frequency will be kept in the form of magnetic tape and stored in automatic storage facilities.
- (c) Many policy module units required for formulating a policy will be prepared. These will be employed to prepare a program for formulating a policy.

Remarks: Example of policy module:

"Calculation of number of primary schools in each prefecture in 1980."

In this case, estimated number of population of primary school age, the standard number of classes and teachers and other numerical data are combined into one unit.

(B) Computepolis Plan

Required funds: 360 billion yen (1,169 million dollars)

Computepolis is a "computerized city" expected to be developed in the future information society.

In this project, experiments on a model of the future information society to be built as a new town similar to the currently developed Tama new town will be conducted. What forms the core of urban computerization will consist of such systems as:

- (a) CATV
- (b) CVS
- (c) Automated supermarket
- (d) Regional health control, and
- (e) Regional cooking and heating system

CATV will not be a mere multi-channel TV broadcasts by cable. It will also involve inquiries from individual homes, constituting two way information service, such as:

- (a) Local news
- (b) Shopping and leisure consultation
- (c) Emergency Communication, such as fire
- (d) Medical and infant nursing consultation, and
- (e) Education

CVS is a transportation network in a newtown. Automatically driven passenger cars on rails will carry two persons each.

Automated supermarket will have no service personnel. It supplies fresh food and is equipped with automatic refrigeration warehouse, sample selling system, combined with magnetic card. This supermarket will have direct contacts with the producers.

Local health control is a medical information system comprising disease prevention and health control. This will be done by preparing individual medical data files for all the inhabitants of the newtown through semi-annual health check.

(C) Regional Remote Control Medical System

Required funds: 70 billion yen (227 million dollars)

A model experimental area may be designated and over-all medical project in accordance with the long term basic plan will be incorporated therein.

Centering on local health control systems in a completely automated hospital, the system will incorporate remote control health care and first aid medical systems. The model area shall have a population of about 100,000. An ideal automated hospital with a total system involving hospital office work, diagnosis, medical treatment and clinical study.

A medical engineering laboratory will also be built. Modern ME equipment technology and case history files will be combined and studied in this laboratory.

This model hospital will have contacts with isolated islands and isolated regions and will develop a standard model of a remote health care system through communication, physical tests and case history files. At the same time, traffic accidents occurred in the vicinity will be handled as first aid medical system.

(D) Computer-oriented Education in an Experimental School District

Required funds: 82 billion yen (266 million dollars)

An experimental school district will be established to conduct computer-oriented education in kindergarten, primary school, junior and senior high schools centering around a university such as the education university.

Details of the projects shall be in accordance with the long term basic plan. These projects are:

(a) Rationalization of school office work

(b) Individual education guidance system

- (c) Computer oriented education
- (d) Educational science research center

A combination of these projects will contribute to,

- (a) Solving problems on future computer oriented education.
- (b) Measuring educational effect of intelligence network.
- (c) Planning a standard education system.
- (d) Developing a new individual education system.

In experimenting this educational experiment, emphasis should be placed on the objective and scientific data collation and analysis regarding the differences in the results of two education systems. One is the computer-oriented, private-instruction, problem-solving type of education system; and the other, the contemporary, group, uniform education system.

Introduction of computers into education will create school teachers' resistance, and this possibility is a crucial point.

(E) Pollution Prevention System in a Broad Region

Required funds: 180 billion (584 million dollars)

This is a development of an integrated pollution prevention system to be applied on polluted areas such as Mizushima area.

This system will include direct and indirect measuring, warning, and control system, having a pollution information center in each polluted area, with a communication network connecting the information center and the sources of pollution.

The pollution to be considered will be not only the emissions of effluent and gas from factories but also atmospheric pollution, ocean, and river pollution, as well as disposal of garbage. The polluting sources are to include factories, buildings, automobiles, and all other facilities.

A pollution prevention research center will be established adjacent to this center. The prevention research center will develop pollution measuring equipment, pollution prevention technology, and waste disposal and processing technology.

Furthermore, in order to obtain cooperation of the general public, a pollution prevention citizens' conference will be established.

(F) Think Tank Center

Required funds: 119 billion yen (386 million dollars)

In central Tokyo, a high rise building of the size of Kasumigaseki Building should be built. This building shall accommodate all the nation's Think Tanks whether they are government established or privately established. This building will be equipped with facilities that can be used in common by the Think Tanks (such as computers, various models, programs, library, discussion rooms, experiment facilities, etc.). This center and the government's data bank, scientific technology information center, and other data banks are joined with an on-line system.

It is important that these facilities be made open to those think tanks which may be temporarily formed to carry out individual projects so that these think tanks may be fostered.

A special education center that corresponds to a graduate school shall also be established in this center to give education to corporate managers, specialists, and engineers. A long term education course between one and two years shall be established so that the attendants may receive education which is equivalent to a master's or doctor's course. A professor of high caliber from a U.S. university business school will be invited as a lecturer.

Another facility will be a citizen's participation center. A model experiment of people's political consensus reflection system may be conducted so that the citizens may be able to participate in group discussions and allowed to employ policy model simulation on social and economic problems.

(G) Introduction of MIS in Compiling Reports on
Income Tax Return

Required funds: 39 billion yen (127 million dollars)

Modernization of small and medium-sized enterprises will be expedited through introduction of EDP of the blue form tax return report. The number of establishments in Tokyo subjected to the submission of the blue form is about 120,000.

For this purpose, a small and medium-sized enterprise information center will be established so that about 10,000 enterprises may be selected and their business consultation a monthly presentation of corporate management data may be done.

These enterprises will be equipped with terminal equipment connected with the center and input and output of data by remote batch will be made possible.

Various data and files for the consultation of small and medium-sized enterprises shall be prepared in the center and specialists shall be employed for guidance.

Seminar facilities will also be provided for the managers and accountants of the small and medium-sized companies.

The aim of this project is to get the modernization of management of small and medium-sized enterprises under way through introduction of EDP of the blue form income tax return report. These are emphasized in view of the fact that the modernization of small and medium-sized enterprises has not been carried out effectively in the past.

(H) Labor Redevelopment Center

Required funds: 55 billion yen (179 million dollars)

This center will be established in order to retrain the middle aged and older people. It will have a capacity of training about 1,000 people throughout the year.

The training will not be a mere instruction course of technical matters for the purpose of re-employment. It will be discovery and development of potentiality and latent faculties of each individual through checking career files

and character test. At the same time, through counseling and guidance, each individual will be guided to plan and to develop faculties by himself so that he may be newly employed. The major objective of education and training is to guide each individual to resume social activities on his own initiative and not to introduce the aged persons to new jobs.

Therefore, the system will be devised so that the information, which will make development of new employment opportunities possible, will be furnished from a broad information network.

Lodging facilities will be adequately furnished in this labor center so that mutual communication will enable the participants to start for a new social life.

(I) Computer Peace Corp.

Required funds: 3 billion yen (10 million dollars)

A computer peace corp will be established as a powerful boost which will reinforce economic aid to developing countries. A team, consisting of systems analysts, programmers, engineers and managers in the electronic computer field, will be organized.

The minimum period of each project will be two years. Ten projects that will contribute to the development of developing countries will be given priority at the time of selection every year.

It will not be limited to the development of social development model or mere consultation. In this connection, additional assistance for necessary technologies and facilities will be given.

Future aid to development countries will necessarily involve medical, educational, and social welfare aid besides industrialization and resource development aid to those countries. Furthermore, a new aid policy will be formulated by including a modernization plan in the industrialization and computerization plans.

In carrying out aid in the medical and educational field, emphasis should be placed on the major role played by the remote control medical system applicable to isolated islands and regions and the technologies of computer-oriented education connected with communication circuits

incorporated in the information society development plan. If such a computer peace corp could be established, it will certainly become a great incentive for the Japanese young systems engineers and programmers.

2. Long Term Basic Plan

(1) Outline of the Plan

As the ultimate goal of Japan's information society, this plan aims at realizing a society in which human intellectual creativity will bear fruit.

Before reaching this goal, there is an intermediate stage. In order to prepare social economic environment and the principal condition so that an information society may be introduced, an intermediate target of "establishment of computer mind" must be accomplished by 1985. And in order to attain this target, composite targets that will form a framework should be selected. The composite targets shall comprise subtargets and subgoals and plans to attain these subtargets and subgoals shall be formulated.

The period for this intermediate stage shall be from 1972 to 1985 and the budget required will be a cumulative total of 20,000 billion yen (65 billion dollars)

This amount shall be financed through the treasury funds. Fostering and employment of the third sector will be the same as the intermediate impact plan.

(2) Selection of Project

The criteria for the selection of projects (targets) according to this plan are as follows:

- (a) The characteristics of the project shall be such that a key factor for the establishment of computer mind as an intermediate target shall be developed.
- (b) The project shall be such that it will help establishing information-oriented society and economic environment.
- (c) One that will contribute to the establishment of information-oriented behavior.

- (d) One that will help eliminating possible drawbacks resulting from computerization in the future.
- (e) One that will help solving pollution, traffic congestion and other economic problems that are considered to become critical issues during the '70s.
- (f) One that may be difficult to carry on commercial basis by private companies in the social field and in developing computerization.
- (g) One that must be developed over an extended time horizon and is essential for the realization of future information society.

In accordance with the above mentioned selection criteria, the following major targets and projects will be selected.

- (a) Formation of the Nation-Wide Information Network.
- (b) Rationalization of Administration.
- (c) Upgrading MIS.
- (d) Computer-Oriented Education.
- (e) Modernization of Health-Care.
- (f) Pollution Prevention System.
- (g) Modernization of Distribution Channel.
- (h) Computerization of Traffic System.
- (i) Diffusion of Home Terminals.
- (j) International Cooperation in Computerization.
- (k) Measures to Eliminate Demerit of Computerization.

In attaining each target, intermediate targets and subtargets will be established. These subtargets or intermediate targets will be set;

- (a) To develop small-sized model projects into larger-sized models.
- (b) To begin with the area where resistance by those who have interests in the activities is least.
- (c) To let education - the education to develop intellectual creativity by the use of computers - lead the activities.

(3) Outline of Each Project

(A) Formation of the Nation-Wide Information Network

Formation of the nation-wide information network (data-communication network) will create the foundation on which to develop future information society.

The current telephone lines will be employed temporarily but, in the future, a new data communication network must be separately built to cope with the following development:

- (a) Transmission of facsimile and pictures.
- (b) Volume EDP by TSS.
- (c) Improved efficiency and reliability.

This new data communication network covering a broad area and employing coaxial cable and microwave should be built. Use of both the newly installed network and telephone circuits is considered to be the most suitable communication method.

Therefore, a broad area exchange network having a capacity of one million data communication circuits will be realized by 1985.

Construction of the circuits will begin in big cities such as Tokyo and Osaka and in isolated islands and regions, and will be gradually extended to other regions.

In utilizing the data communication network, it is necessary to make the principle of fair competition between Telegraph and Telephone Corporation and general enterprises explicit. It is desirable that the information service

offered by Telegraph and Telephone Corporation be limited to information of nation-wide scale and (2) related to public interests only.

Further, regarding communication line service charges, a rate separate from telephone line charges shall be established.

Since volume demand is expected from such public areas as education and medicine, a special account be established so that a low rate may be applicable.

(B) Rationalization of Administration

The target of administration rationalization is the establishment of administrative data bank. This plan comprises two phases. The first phase is to establish the automatic storage of tape-base and the microfiche data bank. The data compiled on microfiche will consist of those administrative statistical data which may be used in common with high frequencies by all the ministries. The data will be those records filed over the past ten years. Important data will be made accessible to as far as the data on individual persons. In connection with this project, the low-cost-high-capacity memory and the data-based-management software will be developed. During the second phase of this project, the data bank will be developed into an administrative information center to be completed by 1985.

In addition to the aforementioned basic data, many policy modules will be prepared. These will be used to develop various policy models for the formulation of policies. The administrative data bank will be open to general enterprises and universities.

Another subtarget will be the establishment of a policy science education center. This center will enable the government agencies' middle class officers to acquire good knowledge and technology of high policy science employing computers. This educational program will also offer opportunities to these government officers to study abroad at government expenses.

The regional governments will also plan a similar project according to which they will establish regional administration data bank and policy science regional education center.

Further, in order to let the citizens' requests be included in the regional administration, a model of a citizens feedback system be realized by 1985.

(C) Upgrading MIS

Since the operational management information system (operation) has been completed, the MIS should now evolve into a managerial MIS by 1980 (management), into a strategy MIS by 1985 (top executive) and into an international MIS (multi-national enterprise) by 1990. More than 70% of the enterprises involved shall have their MIS upgraded in the above evolution sequence. The development of MIS itself will be left to the effort of each enterprise. The government will give an all-out assistance to expedite development of this system.

In order to carry out this project, a MIS education center will be established by 1976 through the government's long-term loans.

Corporate managers, the staff, and engineers will receive training at this center. There will be a long training course and a short training course. In this project, a conversation mode language automatic programming software will be developed.

At 100 places between Tokyo and Osaka, data banks classified by industrial category will be built for 50 industrial segments. Statistical data and other data required by the enterprises of each industrial category will be stored in these banks. Softwares (including forecast models, structural models, policy models, etc.) will also be developed and will be freely used by these enterprises.

Further, before 1985, international transmission centers will be built at ten places. These centers will receive, store, and transmit relevant data and documents in respect to international trade, cargo transportation, air transportation, meteorological and pollution information. These centers will also be authorized to check, control, and refer to the documents related to international laws and rules.

Among other centers, international trade data transmission center is expected to be established by 1976 since its establishment is an urgent matter at this moment when Japan is confronting the jumbo jet age which is characterized by high speed and volume transportation of cargo.

(D) Computer-Oriented Education

Computer-oriented education has the aim of establishing computer mind. This approach is not direct but is most effective.

This project may be divided into two phases. Phase I will be the 1972-1980 period and phase II, the 1981-1985 period. The first phase is to include activities such as rationalization of school office work and tutoring guidance that are needed by the teachers and are readily acceptable. At the same time, an education science seminar center should be established to bring up a new type of teachers for information society.

A full-fledged computer-oriented education will be deployed in the second phase.

Rationalization of school office work includes introduction of EDP which will be fully extended over making time tables, examination ratings, health check, IQ test, school class management evaluation, etc. at the primary and junior high school level. This will be accomplished by 1980.

When this is done, the teachers will be relieved from the burden of office work and data processing.

According to the tutoring system, individual pupils' memory, understanding, application, and general interpretation of each lesson will be structurally analyzed. Through a collective evaluation of the whole class, the relative position of each individual, and also special aptitude of each will be discovered so that their weak points may be rectified individually by means of drills.

The education science research institute will be a part of the education science seminar center. In this institute, education is given by fully employing new CAI equipment and techniques. The best rated teachers will be given education and will be made instructors for the research institute.

In this computer-oriented education, the results of experiments in a model experimental district will be gradually incorporated into experiments in other school districts and by 1985, each of the nation's kindergartens, primary schools, junior and senior high schools totaling 51,000 schools will have one classroom equipped with terminals to be used by each individual pupil or student.

In carrying out a computer-oriented education, emphasis will be placed on:

- (a) Development of infant's potential faculty.
- (b) Fostering problem solution capability and intellectual creativity.
- (c) Education of new ethics centering around self-control and plural democracy.

(E) Modernization of Health-Care

Modernization of health-care and computer-oriented education are the mainstay of social computerization. Very similar to education, medical field is very conservative, and introduction of new systems into this field is considered difficult.

Therefore, the first aid medical system, and the remote control medical system, which have high social needs and can be realized with relative facility, must be given priority in this project.

Thereafter, automation should be introduced into general hospitals, and a broad area health control system should be materialized.

The first aid medical information systems for the traffic accidents and other catastrophes will be introduced before 1980 into cities with 500,000 or more populations. For this purpose, an ambulance, with the emergency diagnosing equipment, and the emergency traffic control system, to be installed along the roads, facilitating passage of the ambulance, must be developed.

The data on the traffic accident occurrences and the patients' medical record will be filled and analyzed so that these data will contribute to the prevention of accidents and improvement of first aid medical treatment.

Under the remote control medical system, all the isolated islands and 570 isolated regions will be connected by on-line system with general hospitals located in urban areas. The development of the system involves:

- (a) Verbal consultation through TV or telephone.

- (b) A combined system of high performance integrated diagnosing equipment and individual medical files.

Automation of general hospitals will include automation and mechanization of hospital office work (reservation system accounting; pharmacy control; hospital bed control; etc.) and increased efficiency of diagnosing and medical treatment.

A model general hospital will be constructed by 1977. The first aid and the remote control medical systems will be installed in this hospital. Based on this experience, a standardized automated general hospital will be planned and will be built at five places in each prefecture. In order to carry out this plan a hospital supply public corporation will be built as the third sector.

Under the broad region health control system 1,500 health control centers will be built by 1985, one center in each area of 500,000 population. People in each area will receive health-check twice a year. Based on this health-check data, the nation's individual health file will be made.

In its initial phase, a health note will be issued to each person by 1977 recording his blood type and allergic diathesis. Model health control centers classified by such types as large city, medium-sized city, and rural area will be developed.

(F) Pollution Prevention System

By 1980, a pollution prevention system will be introduced into major polluted areas. Also, by 1980, an integrated pollution preclusion system in large cities should be established. By 1985, the national pollution information centers should be established.

In accordance with the regional pollution, preclusion system, a direct warning, forecasting and controlling system employing various measuring instruments shall be installed in polluting sources (such as factories). Along with these activities, 100 billion yen (325 million dollars) of development funds will be invested so that technologies and equipment to preclude and prevent pollution, convert wastes into harmless substances, or to convert wastes into useful substances by processing may be developed.

The integrated pollution preclusion system for large cities will be a system which will effectively eradicate general polluting sources in large cities, such as Tokyo and Osaka, and its vicinities including atmospheric pollution, river water pollution, pollution by wastes and their disposal, and disturbances by noises.

In order to carry out this system, integrated policies and measures must be implemented, including traffic control, solution of chemical pollution, redevelopment of urban area, and various other measures, and people's mass movement and cooperative systems.

Thus, the minimum pollution level must be attained by 1980 at the latest.

The major operational objective of the national pollution information centers is an overall short-term and long-term pollution prevention and pre-arrangements covering the nation-wide oceanic and atmospheric pollution. Some of the important activities of the center will also involve discovery of pollutions unknown so far, and possibility of occurrences of new types of pollutions, forecasting, survey, and research of such possibilities. For this purpose, these centers will be equipped with various types of experimenting equipment and technologies, and large-sized computers. Simulations using ecology models will be put into practical uses. Based on the results of these activities, the centers will strengthen international cooperation.

(G) Modernization of Distribution Channels

In order to stabilize supply and price of daily consumer goods centering on fresh foods, large supermarkets shall be systematized and will be connected directly with the producers' areas through cold-chains.

One large supermarket will be built for every 5,000 households. By 1985, 1,000 supermarkets will be built in cities with one million or more population.

The basic plan of the system is a total system comprising,

- (a) Refrigerated and automated warehouse.
- (b) Sample selling.
- (c) Magnetic cards that combine these into a total system.

Osaka and its vicinity will be selected as model area, where 20 large-sized supermarkets will be built by 1980. Similar large-sized supermarkets will be built subsequently in other major cities before 1985. Funds required to build these supermarkets will be financed by the government in the form of long-term loans. Fresh food retailers will be encouraged to form a cooperative body.

(H) Computerization of Traffic System

Computerization of traffic system consists of CVS (computer-controlled vehicle system, or non-manned vehicle traffic system) and broad area traffic information system.

CVS is employed mainly in new towns and the central part of large cities. It is a computer-controlled new urban traffic system (non-manned and highly efficient). Its prototype has been already developed. This system will be actually employed in new towns such as Tama New Town before 1976. Based on this experience, this system will be gradually introduced into the central parts of urban areas, and by 1985, it will be built in major cities, such as Tokyo and Osaka.

The broad area traffic information system will consist of the following:

- (a) Dynamic control focused on a given area
(A method of controlling traffic flows in proportion to the density of traffic congestion through controls of signals and direction indicators.).
- (b) Traffic information system by mesh (a system by which a driven will be able to obtain by car radio traffic information of those areas for which the car is heading. For this purpose, road maps will be detailed.).

This system will be introduced in the congested areas of large cities with more than a million population before 1976. The same system will be applied to the highways across the country and the major cities with more than half a million population.

(I) Diffusion of Home Terminals

Diffusion of home terminals is one of the critical targets to bring the information society up to its maturity phase. The initial phase of this project will be up to 1980. Businessmen, managers, specialists and engineers, and small and medium-sized enterprise businessmen will use the terminals at home for their business. Housewives and children will be the marginal users. In the second phase of the project, housewives and children will gradually start buying the terminals in the same way as they are buying TV sets at present. Thus, by 1985, 1% of the nation's households will own home terminals, totaling 250,000 sets.

In 1980, home terminal ownership will be as follows:

Businessmen and corporate managers	10,000
Specialists and engineers	35,000
Small enterprise businessmen	15,000
Total:	60,000

The TSS information cost, then, is estimated to be 100,000 yen monthly.

Calculation of the 250,000 home terminals to be diffused by 1985 is based on the following assumption:

- (a) Wage earners' (a family of four) nominal monthly income to be 350,000 yen (1,136 dollars).
- (b) Price of a home terminal to be 300,000 yen (974 dollars).
- (c) TSS charges to be about 50,000 yen (162 dollars) monthly.
- (d) Diverse information services including shopping, upbringing, education, home budget, etc.
- (e) Nation's behavior and thinking presumed to have been shifted from motorization to computerization.

(J) International Cooperation in Computerization

Economic aid through computerization can be a new form of aid to developing countries in addition to such economic aids as industrialization and cultural assistances.

Under this project 0.1% of Japan's GNP will be allocated to economic aid through computerization. The major activities will be:

- (a) Sending computer peace corp.
- (b) International education network.
- (c) International medical-care network.

The computer peace corp is expected to carry out projects aimed at regional development, industrial planning, obliterating illiteracy, stamping out endemic disease, and improving social welfare.

In carrying out these activities, systems analysis and other methods will be employed in order to develop concrete social systems. These will be endorsed with necessary technologies, equipment, personnel, and funds. Cumulative total funds to be allotted between 1980 and 1985 will be 100 billion yen (325 million dollars).

In carrying out activities of international education network, a remote control education system by employing a new CAI system (Computer Assisted Instruction) and data communication adopted in the computer oriented education will be converted into an international version suited to a given country. Development of such an international version of education system will be made in conjunction with the country receiving the aid and other related countries.

In the same manner, technologies and experiences for the remote control medical system for the isolated islands and regions will be applied to the international medical-care network.

International contribution for the educational and medical network in 1985 is estimated to amount to 100 billion yen (325 million dollars) annually.

(K) Measures to Eliminate Demerit of Computerization

Development of the information society development plan is expected to bring with it various disadvantages inherent to various types of information. Therefore, measures must be prepared to prevent and eliminate such drawbacks.

These measures may be intended for accomplishing the following two objectives:

- (a) Protection of privacy;
elimination of information monopoly;
prevention of computer crime.
- (b) Retraining of the unemployed resulting
from labor-saving technology and out-
moded technologies.

A dual regulatory measure must be adopted for eliminating these disadvantages resulting from computerization.

- (a) The privacy protection law and other laws
must be legislated.
- (b) The nation's reviewer system and surveil-
lance organization must be established.

In order to retrain the unemployed to make them fit in the information society, a large-sized labor retraining center, having a capacity of accommodating 1,000 men will be built by 1976 with a total budget of 50 billion yen (162 million dollars).

Its operation will not be a mere training and education of the attendants. The center will give counselling and guidance that will enable the trainees to identify new opportunities in the information society.

Chapter V MERIT AND DEMERIT

Once the information society development plan has been materialized, there will be multitudes of merits. However, because this plan is intended to initiate information revolution, it is expected to accompany various demerits as well. Therefore, these merits and demerits should be assessed beforehand in an effort to maximize merit and minimize demerit arising from carrying out this plan.

Merits and demerits of each project must be scrutinized first, and then, an overall assessment of the whole plan regarding social and economic merits and demerits must be made.

1. Merits and Demerits of Each Project

The information society development plan comprises many important projects. Each project has its own merits and demerits arising from the characteristics of each individual project.

An overall assessment of merits and demerits including the cost phase is shown in Table 3. The projects have also been patternized in this table.

The project evaluated A in this Table shows:

- (a) Huge amount of funds is required (cost).
- (b) Merits are, however, very great extending over a long period and have big influences.
- (c) And, demerits are relatively small.

"Nationwide Information Network", "Computer Oriented Education", and "Modernization of Health-care" belong to A group. That is to say, the "Nationwide Information Network" will include:

- (a) Establishment of the nationwide data communication network.
- (b) Multiplex transmission of high quality information such as facsimile and video.

The "Computer Oriented Education" will involve:

- (a) Education to develop individual faculty.
- (b) Abolition of school year.
- (c) Establishment of computer mind.

The "Modernization of Health-care" will have the following big social merits:

- (a) There will be no administrative district that has no doctor.
- (b) Casualty death rate will decrease.
- (c) The nation will have less chance of contracting diseases, and average lifetime will become longer.

These A class projects will also have demerits, such as:

- (a) Huge amount of investments.
- (b) Social position and prestige of teachers and doctors will be lowered.

However, these disadvantages are relatively smaller than the merits. Therefore, these A class projects have the characteristics of the mainstay for the development of future information society, and, consequently, should be carried on step by step as scheduled.

The B class projects have the following characteristics:

- (a) The cost is not very large.
- (b) Merits are great.
- (c) However, demerits are also great.

These B class projects are:

- (a) "Rationalization of Administration."
- (b) "Upgrading MIS."
- (c) "Modernization of Distribution Channels."

Figure 6

Costs, Merits, Demerits

<u>Project</u>	<u>Cost</u>	<u>Merits</u>	<u>Demerits</u>	<u>Overall Assessment</u>			
				<u>Cost</u>	<u>Merit</u>	<u>Demerit</u>	<u>Rating</u>
1. Nationwide Information Network		1. This will establish the nationwide data communication network which will form the basis of the future information society. 2. High quality information such as facsimile and video may be transmitted at high speed, multiplex communication also becomes possible.	1. Huge investment amount. 2. Excessive supply of information	○	○	•	A
2. Rationalization of Administration		1. Decision-making can be rationally carried out in the administrative field such as adequate appropriation of budget. 2. Government Agencies may be simplified or liquidated. 3. Feedback of the nation's will in politics. 4. Abundant supply of data for corporate strategy.	1. Information will be concentrated on the government. Increased danger of controlled society. 2. Corporate secret and privacy may be violated.	○	○	○	B
3. Upgrading MIS		1. Improvement of corporate system and modernization of corporate management. 2. Strengthening of corporate international competitiveness.	1. Development of labor saving technology. Specialized technology and engineering become obsolete. 2. Multi-national companies will expand international investments and increase management capacity. This will create international tension.	○	○	○	B

Figure 6

(Continued)

<u>Project</u>	<u>Cost</u>	<u>Merits</u>	<u>Demerits</u>	<u>Overall Assessment</u>			
				<u>Cost</u>	<u>Merit</u>	<u>Demerit</u>	<u>Rating</u>
4. Computer-Oriented Education		1. Education ingeneral will center on each individual's faculty.	1. Teachers' social position and prestige will be threatened.				
		2. Teachers will be relieved from miscellaneous duties.	2. Humanistic contacts between teachers and students will become less frequent.	⊙	⊙	.	A
		3. School years and tests will be abolished.	3. Culture of sentiment and ethics will be neglected.				
		4. Computer-consciousness will be established.					
5. Modernization of Health-care		1. Every administrative district will have a doctor.	1. The government must sustain high financial burden.				
		2. Traffic casualty death rate will decrease with high rate of recovery.	2. Longer life.	⊙	⊙	.	A
		3. Shortage of doctors and nurses will be relaxed owing to decreased miscellaneous duties.					
		4. The disease occurence ratio will decrease improved longevity.					
6. Pollution Prevention System		1. Pollutions will be prevented. Diseases resulting from pollutions will be decreased.	1. Corporate social expenditure will become costly.				
		2. Harmony with natural environment will be promoted.	2. Economic growth will be restrained resulting in economic slow down.	⊙	⊙	.	C
7. Modernization of Distribution Channel		1. Supply volume and price of fresh food will be stabilized.	1. Close down of small and medium-sized enterprises will become a controversial issue.				
		2. Modernization of distribution channels will be expedited.	2. Possibility of applying administered price will threaten the consumers.	⊙	⊙	⊙	B

Figure 6

(Continued)

<u>Project</u>	<u>Cost</u>	<u>Merits</u>	<u>Demerits</u>	<u>Overall Assessment</u>			
				<u>Cost</u>	<u>Merit</u>	<u>Demerit</u>	<u>Rating</u>
8. Computerize Traffic System		<ol style="list-style-type: none"> 1. Urban traffic congestion will be relaxed. 2. Atmospheric pollution and traffic accidents will decrease. 	<ol style="list-style-type: none"> 1. Adversely influence the automobile industry. 2. Transportation of both cargo and passengers will be limited. 	⊙	⊙	.	C
9. Diffusion of Home Terminals		<ol style="list-style-type: none"> 1. There will be an increasing tendency of doing work at home. 2. Housewives will be relieved from housekeeping labor. 3. Individual intellectual creativity will be promoted. 	<ol style="list-style-type: none"> 1. Housewives will have excessive leisure hours and will become lazy. 2. Commercial information will give increased adverse effects. 	⊙	⊙	.	D
10. International Cooperation in the Exchange of Information		<ol style="list-style-type: none"> 1. Industrialization and improved social welfare will be introduced into developing countries. 2. Global consciousness rather than nationalistic consciousness will be promoted. 	<ol style="list-style-type: none"> 1. Population in the developing countries will explosively increase. 2. International uniformity will be promoted. 	⊙	⊙	.	D

The "Rationalization of Administration" has the following merits:

- (a) Adequate budget appropriation.
- (b) Simplification or liquidation of government agencies.
- (c) Feedback of the nation's will to the politics.

This project also has critical demerits which may even introduce a controlled society.

- (a) Information may be centralized by the government.
- (b) Encroachment on privacy.

The "Upgrading MIS" has many merits, such as:

- (a) Modernization of management.
- (b) Increases in corporate international competitiveness.
- (c) Expediting computerization of industries.

But, there are many demerits as well, such as:

- (a) As the conventional technologies become outdated and labor saving technologies are introduced, there will be increased unemployment problems and job shifts.
- (b) Automation brings about alienation.
- (c) Possible enlargement of international control by enterprises as they grow to mammoth-size may result.

The "Modernization of Distribution Channel" will have epoch-making merits, such as:

- (a) Stabilization of supply and price of fresh food.
- (b) Simplification of distribution channels.
- (c) Decrease in distribution cost.

Its demerits may be:

- (a) Fear of introduction of administered price.
- (b) Close down of small foodstuff retail stores may create serious social problems.

Therefore, in effecting the B class projects, adequate preparations should be made and various counter measures should be devised beforehand to check these possible demerits. In some cases necessary consideration should be made to slow down the tempo of carrying out these projects. The C class projects have the following characteristics features:

- (a) They have high social needs.
- (b) They require urgency.
- (c) They are directly and immediately effective.
- (d) They are relatively costly.

There are two C class projects:

- (a) Pollution Prevention System.
- (b) Computerization of Traffic System.

At present, these two projects are most urgently needed in developing an information society.

Further, as these are implemented pollution will be prevented or precluded and traffic congestion may be eradicated. These are the direct and immediate effects of these projects. However, these are intended to control pollution and traffics which are some of the symptoms of the dislocation resulting from high pace of economic growth, and eradication of pollution and traffic congestion require a more vigorous measure that will fundamentally solve these problems.

Under the circumstances, these two projects must precede others and must be carried out urgently. However, in carrying out these projects, basic technological research and policy must also be carried out in parallel with the projects. Pollution substances must be made harmless and useful substances must be converted. Broad region traffic system must be developed while large cities must be redeveloped and their sizes must be reduced by transferring part of the city functions to rural areas.

The D class projects have the following characteristics:

- (a) Big merits.
- (b) Small demerits.
- (c) Demand is still latent.

"Diffusion of Home Terminals" and "International Cooperation in Information Exchange" belong to D class.

Diffusion of home terminals is essential

- (a) For the improvement of individual intellectual creativity.
- (b) As basic condition to create a highly developed information society.

The latent demand will become apparent as each one of the above mentioned projects are materialized and their effects have been realized.

Internationalization of information has the following merits.

- (a) Industrialization and cultural improvements of developing countries.
- (b) Narrowing the gap between the northern and southern hemispheres.
- (c) Promotion of global-consciousness.

These matters become realistic only after Japan's social computerization has attained a certain level.

Therefore, efforts must be concentrated on these two projects in the latter half of the planned period, or after 1980.

2. Merits and Demerits Viewed from the Social and Economic Standpoint

The following paragraphs depict the social and economic merits and demerits resulting from the Information Society Development Plan as a whole.

A. Social and Economic Merits

(1) Establishment of the Foundation for the Information Industry

The primary merit that the Information Society Development Plan will introduce is establishment of the foundation for the information industry.

If this plan has been carried out:

- (a) The government will invest a cumulative total of 20,000 billion yen (65 billion dollars).
- (b) A wide-band of data communication network, one million circuits across the nation, will be built and organized.
- (c) The computer industry and the software industry will then have a steady demand of at least slightly less than 2,000 billion yen (6,494 million dollars).
- (d) New technologies and new equipment, such as, big capacity memory and home terminals will be developed.
- (e) New potential market for social welfare such as health-care and education will be created.

The current information industry comprises the computer industry, having a size of an estimated 250 billion yen (812 million dollars), and the software industry with an estimated size of 10 billion yen (32 million dollars). Thus, the government's spending in computerization amounting to 20,000 billion yen (64,940 million dollars) will make the information industry grow by almost sixty times. This shows how great the impact of this plan on the information industry is.

(2) Rapid Improvement in Social Welfare

The second merit is a rapid improvement in social welfare. During the '70s social problems, such as pollution, traffic, and price problems, will become increasingly serious. Along with the increases in income, social needs for health-care will gain momentum. These various problems

will possibly be effectively eradicated as the Information Society Development Plan progresses.

- (a) As this plan progresses the health-care problems in isolated islands and regions numbering 580 places throughout Japan will be solved.
- (b) 750 health control centers will be built in Japan.
- (c) The first aid medical system will be established in major cities. As a result, the nation's disease incidence rate and death rate are expected to decrease by at least 30%.

With regard to pollution prevention:

- (a) The degree of pollution in the nation's major polluting areas will drop to below the standard level.
- (b) The degree of pollution in the atmosphere, and rivers, and the amount of waste, and noise disturbances will be reduced to at least one third of the current level.
- (c) Discovery of new possible pollution and prevention of pollution can be carried out through activities by the national pollution information centers.

This will reduce the diseases arising from pollution and the number of patients who contracted disease from pollution will decrease to one tenth of the current level.

In traffic systems:

- (a) CVS and other new traffic systems will become popular in new towns and in the central part of large cities.
- (b) The traffic volume in large cities will decrease by 30%.
- (c) Photo-Chemical smog and auto exhaust gas pollution will be eradicated.

In the consumers' daily life, large supermarkets will handle 40% of retail business.

- (a) This will reduce distribution costs by 50%.
- (b) Prices of fresh food will be stabilized.
- (c) Price rises of consumer goods will not exceed 5%.

(3) Renovation in Social and Economic Systems

The third merit will be a complete renovation of old social and economic systems.

Through implementation of this plan, evolution of rigid political, medical, and educational systems into a more dynamic and pluralistic systems that will fit the future information society will become possible.

On the political and administrative side:

- (a) The government agencies may be abolished through establishment of the administrative data bank and through ideal appropriation of budget.
- (b) The nation's will feedback system will realize the nation's participation in politics.

On the economy side:

- (a) Data bank for each industry; Hospital supply corporation; Think Tank center; and other third sector may be created.
- (b) Under the government's information society development policy, the industry structure will be converted into an intelligence intensive type of industry.

On the education side, personal learning guidance system and computer-oriented education system will become popular:

- (a) Uniform education to groups has been the method employed more than a century. This will be switched to a system in which individual faculty will be developed.

- (b) School years and tests will be abolished.

On the medical side:

- (a) Automated hospital and broad area health control system will destroy the old system of discrimination within profession.
- (b) Establishment of a democratic medical system for the people will be established.

Thus, fundamental innovations will take place in the political, economic and social fields.

Among other fields, medical and educational fields being the most conservative fields, the implementation of the Information Society Development Plan is the only way to make innovation possible.

(4) Blossoming of Intellectual Creativity

The fourth but in a sense the most important merit is the general blossoming of intellectual creativity. In the future information society, a mode of thinking which will fit the society will become necessary. This is the establishment of computer mind based on the improved intellectual creativity.

Thus a sequence of projects has been incorporated in this plan so that computer mind may be established.

The first project is the establishment of various centers such as policy science education center, MIS education center, etc.

In ten years, a total of 225,000 men will learn special software know-how. Its breakdown is as follows:

- (a) 100,000 government officials.
- (b) 40,000 corporate middle class officers.
- (c) 75,000 teachers.
- (d) 10,000 citizens.

The second project is the computer-oriented education to be given to the pupils and students of the nation's kindergartens, primary schools, junior and senior high schools, totaling 51,000 schools.

The result:

- (a) 15 million pupils (students) will receive problem-solving type of computer-oriented education every year.
- (b) In 20 years, computer mind will be established in respect to about 30% of the total populations.

The third project will be the diffusion of home terminals:

- (a) One percent of the nation's total households, or 250,000 households, by 1985.
- (b) Ten percent of the nation's total households, or 2,500,000 households by 1990 will have home terminals.
- (c) Even housewives and children will have computer mind.

Thus, it will take several decades of accumulation before intellectual creativity may be blossomed.

If this plan has been implemented as planned, it is expected that the intellectual creativity based on plural value system of each individual will blossom all at once.

B. Social and Economic Demerits

(1) Fear of Creating a Controlled Society

The first social and economic demerit is the fear of creating a controlled society. The information revolution centering on computers is a sword with two edges. In a sense, this possibility is greater than atomic energy. Because its merit is great, there is fear that its demerit may possibly become great as well.

Among these demerits, the greatest fear is the possible development of a controlled society.

It will be:

- (a) Encroachment on privacy.
- (b) Centralization and monopoly of information.

- (c) Alienation through labor saving and automation.

What is related to encroachment on privacy will be:

- (a) Administrative data bank.
- (b) Individuals' medical-care files.
- (c) Individuals' education files.
- (d) Individuals' credit files.
- (e) Other various data files on individual basis.

Among other data files, many pieces of information on personal and corporate privacies will be centralized at the administrative data bank.

Therefore, in order to protect the nation's privacies, a sequence of measures will become necessary, such as:

- (a) Prohibition of use of individuals' files by administrative agency for other than the intended purposes.
- (b) Prohibition of perusal and correction of individuals' files.
- (c) Prohibition of publicly stating individuals' information at the public agency.

Similarly, if the data bank is monopolized by an influential party, there is a danger of creating a controlled society.

Thus, various measures will become necessary : Such as,

- (a) Decentralization of information.
- (b) Public disclosure of information.
- (c) Surveillance of the use of information.

In order to eliminate the fear of unemployment and alienation through labor saving and automation at the enterprise level, the following measures are necessary:

- (a) A system whereby a previous arrangement be made between the employers and employees.
- (b) Redevelopment of labor.
- (c) Mobility of labor should be encouraged.
- (d) Development of new social opportunities.

Emphasis should be place on the following:

- (a) Previous arrangements to prepare demerits measures.
- (b) Dynamic adjustment of the pace and scale of implementing the plan.
- (c) Establishment of a conference to conduct a strong surveillance.

(2) Broadend Gap between the Intellectual Elite and the General Public

The second demerit will be a broadened gap between the intellectual elite and the general public.

In the future information society, there will appear a new class of people who are different from what existed in the industrialized society.

On one hand, there will be intellectual elite mainly composed of government officials, corporate officers, and techno-economists who lead the information society using computerized information and high technologies. On the other hand, there will be a big mass who enjoy leisure hours and amusements. And, the gap between these two groups will become wider.

In order to eliminate such gaps various measures must be devised, such as:

- (a) Comprehensive and thorough computer-oriented education.
- (b) Creation of new social opportunities.
- (c) Development of a new type of self-governing community.

- (d) Promotion of the formation of joint or cooperative ventures by small groups, such as venture business.

(3) Loss of Humanity Ethics

The third demerit will be the loss of humanity and ethics.

The social-revolution-like significance which will be brought about by computers will be an amplification of human intellectual creativity.

Therefore, on one hand, human intellectual creativity will be greatly promoted by a series of projects included in the information society development plan. On the other hand, human sentiment and ethics may go out of balance. Therefore, counter-measures should also be prepared to eliminate such demerits.

For this purpose, emphasis should be placed on the following along with computer-oriented education.

- (a) Education should be geared to promote human sentiment.
- (b) Ethics should be introduced into education based on new ethics standards. Among other things, self-control under one's own initiative, and active service to contribute to the society are most important as formation of such ethics.

Eradication of pollutions will be possible only by proper behavior of each individual. And, at the same time, self-control is the most important ethics standards in social life.

In the future, ethics should not be a very modest type, such as "simply not disturbing others." It should be such that each individual will vigorously contribute to the society through intellectual creation. And, this should be raised to the level where every citizen will feel that it is his duty.

Chapter VI FEASIBILITY

The plan for information is not merely a vision. This is a plan to be realized in the future. We, therefore, analyzed very carefully the coming society by two approaches. The first approach was the feedback of vision which is called "desirable plan". The other approach was the dissolution of the gap between the extension of the current situation and the probable future. Finally we formulated a probable plan which mediate between the desirable plan and the extension of the current situation.

1. The Feedback of the Vision Type Plan

(1) Comparison of the Desirable Plan and the Probable Plan

The procedures of the first approach which is called the feedback of the vision-type plan consist of the following three steps:

- establish a desirable vision-type plan which is called the desirable plan
- then review this plan considering the limitations
- finally feedback and formulate a desirable and feasible plan which is called the probable plan

The Computerization Committee formulated a vision-type plan which emphasized desirable features of the new society. The outline of this desirable plan is as follows:

- establish computer mind among Japanese people as the medium target
- set up nine sub targets such as the formation of a nation-wide information networks
- these targets to be realized by year 1980
- the amount of the required funds will reach 39,000 billion yen (127 billion dollars).

Figure 7

Feedback from Desirable Plan
to Probable Plan

(Unit: million dollars)

<u>Project</u>	<u>Desirable Plan</u>	<u>Probable Plan</u>	<u>Decrease or increase Amount</u>
Nationwide information networks	3,503	3,503	0
Rationalization of government administration	2,896	2,182	-714
Upgrade of MIS	5,604	5,636	+32
Computer oriented education	84,633	35,938	-48,695
Modernization of medical care	12,487	7,792	-4,695
Pollution prevention system	3,529	1,581	-1,948
Rationalization of distribution system	5,273	2,636	-2,637
Transportation system	4,640	2,552	-2,088
Diffusion of home terminal	1,062	1,062	0
International cooperation of the promotion of information society	5,032	3,328	-1,704
Demerit prevention policies	172	172	0

Figure 8

Scoring of the Feasibility of Desirable Plan

<u>Project</u>	<u>Scoring Item</u>						<u>Total</u>	<u>Grade</u>
	<u>Technology</u>	<u>Funds</u>	<u>People</u>	<u>System and Procedures</u>	<u>Demand</u>	<u>Policy</u>		
Nationwide information networks	2	3	3	2	4	3	17	Pro.
Rationalization of government administration								
Administration data bank	3	2	3	3	3	3	17	Pro.
Administration information center	3	1	4	5	2	3	18	D1
Policy science education center	2	1	3	1	3	2	12	P1
Local government data bank	2	3	4	5	3	3	20	D1
Policy science local education center	2	2	3	1	4	3	15	P1
People's will reflection system	3	2	3	5	3	5	21	D2
Upgrade of MIS								
MIS training center	2	1	3	2	3	2	13	P1
Industry data bank	3	3	3	3	2	3	17	Pro.
International data transmission center	2	2	2	4	3	3	16	Pro.
Computer oriented education								
Rationalization of school office work	1	2	3	3	1	4	14	P1
Industrial learning instruction system	3	3	4	5	3	4	22	D2
Education engineering training center	3	1	3	2	3	3	15	P1
Computer oriented education	4	4	5	5	3	4	25	D2

Figure 8

(Continued)

<u>Project</u>	<u>Scoring Item</u>						<u>Total</u>	<u>Grade</u>
	<u>Technology</u>	<u>Funds</u>	<u>People</u>	<u>System and Procedures</u>	<u>Demand</u>	<u>Policy</u>		
Modernization of medical care								
First-aid medical system	1	2	1	2	1	3	10	P1
Remote medical system	3	2	4	3	1	4	17	D1
Automation of general hospitals	4	4	5	5	2	4	24	D2
Broad area health care system	3	4	3	4	2	4	20	D2
Pollution prevention system								
Regional pollution prevention center	3	2	3	4	1	3	16	Pro.
Big city pollution prevention center	4	3	3	5	1	3	19	D1
National pollution information center	4	3	3	2	2	3	17	Pro.
Modernization of distribution system								
Model area large supermarket	2	2	2	2	2	2	12	P1
Supermarkets in main cities	2	3	3	5	2	3	18	D1
Transportation system								
New town CVS	2	3	2	2	1	3	13	P1
Big city CVS	2	5	2	4	3	4	20	D2
Broad area transportation information system	3	3	2	3	2	3	16	Pro.
Diffusion of home terminal								
Utilization of home terminal	3	2	3	4	4	3	19	D1
Expansion of time sharing system in homes	4	4	3	3	5	4	23	D2

Figure 8

(Continued)

<u>Project</u>	<u>Scoring</u>						<u>Total</u>	<u>Grade</u>	
	<u>Technology</u>	<u>Funds</u>	<u>People</u>	<u>System and Procedures</u>	<u>Demand</u>	<u>Policy</u>			
International cooperation of the promotion of the information society									
Computer peace corp.	3	3	4	3	3	4	20	D1	
International education network	5	4	4	4	3	4	24	D2	
International medical network	4	4	5	4	2	4	24	D2	
Demerit prevention policy									
Information pollution prevention policy	3	1	3	3	3	4	17	Pro.	-
Laobr redevelopment center	3	3	3	3	2	4	18	Pro.	62

Figure 9

Scoring of the Feasibility of the Plan for Information Society

<u>Criteria</u>	<u>Score</u>					<u>Sub-total 4 and 5</u>	<u>ratio of sub-total in total score</u>
	<u>1 point</u>	<u>2 points</u>	<u>3 points</u>	<u>4 points</u>	<u>5 points</u>		
Technology							
Development of new technology, hardware and software	2	10	14	6	1	7	21%
Funds							
Determined by the relationship between possible supply amount and the needs of each projects	5	10	11	5	2	7	21
People							
Professional engineer, system engineer and programmer etc.	1	5	18	6	3	9	28
System and procedures							
Conservatism and resistance from old social system and procedures	2	7	9	7	8	15	46
Demand							
Potential demand, demand and relationship between purchasing power and price	6	10	13	3	1	4	12
Policy							
Promotion policy of the information society in the central and local	0	3	16	13	1	14	42
Total	16	45	81	41	15	56	29

- (Note) 1 point: possible by the present level and situation
 2 points: possible by the extension of the present situation
 3 points: possible by improvement
 4 points: possible by the combination of improvement and innovation
 5 points: long efforts and innovations will be required

Then we reviewed this desirable plan considering the limitations of the resources. The results of the review were summarized as the feedback probable plan. The difference between the desirable plan and the probable plan were as follows:

- the target year was extended from 1980 to 1985
- the scales of some projects such as computer oriented education were decreased because of the limited resources
- the required fund was estimated 20,000 billion yen (965 billion dollars) instead of 39,000 billion yen (127 billion dollars)

(2) The Evaluation of the Desirable Plan Considering Limitations

The Computerization Committed estimated and investigated the following six limitations to review the desirable plan. In other words, we formulated a new probable plan based on the desirable plan considering the feasibility. We graded each project from the standpoint of the feasibility by the five ranks scoring for the difficulty of the implementation of the project.

The higher scores of the degree of the difficulty of the implementation represent the more difficulty to implement project. The symbols to represent the grades are as follows:

D2 : ideal

D1 : target which can be achieved by
best efforts

PRO : feasible

P1 : possible by the extension of
current situation

P2 : possible by the principle of
laissezfaire

The main conclusion of the Computerization Committee are as follows:

- (a) Most D1 and D2 sub projects are concentrated on the following projects:
- the rationalization of government administration
 - computer oriented education
 - modernization of medical care
 - expansion of home terminal
 - international cooperation of the promotion of the information society
- (b) 45% of total sub projects were D2 and D1 sub projects (the sub total of D1 and D2 projects was 16).
- (c) The total of score 4 and 5 was 29%. The total of "policy" and "system and Procedures" was 51% of elements.

The above-mentioned results of review indicate that there will be some difficulties to implement the desirable plan because of the characteristics of the desirable plan which emphasize desirability. We, therefore, amended the desirable plan by the feedback of the following three approaches:

- (a) The extension of target year (5 years)

The first large feedback was 5 years extension of target year from 1980 to 1985. There were two reasons why we extended the target year. The first reason of the extension was the difficulty to achieve the objectives of the plan by 1980 if we considered the results of scores for each project in terms of time required.

The second reason was technological difficulties. There are five year difference between our desirable plan and technology forecasting which has been done by Science and Technology Agency in terms of the probable achievement year. The purpose of the projection by Science and Technology Agency was to foresee the possibilities of the technological development, and not to foresee the diffusion of technology in the society. We concluded to extend the target year of the plan for

Figure 10

The Comparison of Achievement Year between the plan for Information Society
and Technology Forecasting by the Science and Technology Agency

<u>Information society project</u>	<u>Achievement Year</u>	<u>Technology forecasting by Science and Technology Agency</u>	<u>Achievement Year</u>	<u>Gap</u>
Broad area transportation information system	1980	Highway information transmission system	1981	1 year
		Traffic control system in big cities	1983	3
Big city pollution prevention center	1980	Scrap and dust processing technology in cities	1989	9
		Provision for cleanliness of drain and plant draining	1987	7
Computer oriented education	1980	Creativity development technology in school	1984	4
		Training system in elementary and secondary school	1983	3
Remote medical diagnosis system	1980	Remote medical diagnosis system	1985	5
Automation of general hospital	1980	Computerized equipments for clinical examination, monitoring and auto- matic question system	1982	2
Regional health care system	1980	Centralization of karte written by the general hospital and doctors	1987	7
Highly capable diagnosis inspection instrument	1980	Health screening system	1986	6
First-aid medical system	1980	Nationwide network of first-aid system and transportation system	1986	6
Computerization of large supermarket	1980	Nationwide cold foods chain system of fresh foods	1981	1
Demerit prevention policy for information pollution	1980	Privacy and secret protection system for individual and group	1987	7

information society. We supposed that the plan will be realized if we extend the target year from 1980 to 1985.

(b) Adjustment of scales and grades

The second feedback was to decrease the scales and grade down. There are some sub projects which are difficult to achieve after the extension of the target year. We expanded the scales of a few sub projects.

The scales of the following sub projects in the desirable plan were decreased.

- the number of terminals in elementary, secondary and high schools to realize the computer oriented education was decreased to 65%.
- the number of automated hospital in a prefecture was changed from 5 to 3 hospitals.
- the number of supermarkets changed from 2,000 to 1,000 stores.
- Osaka is excluded from the expected installation area of CVS.

The scales of the following sub projects were increased because of the importance.

- policy science training center
- MIS training center
- education facilities such as education engineering training center

(c) The adjustment of amount

The third feedback was the adjustment of the total amount to be invested. We changed the total amount from 39,600 billion yen (129 billion dollars) in the desirable plan to 20,000 billion yen (65 billion dollars).

We decreased the total investment amount because we decreased the scale of sub projects and we considered the possible amount from the government sources in the future. We estimated that 20,000 billion yen (65 billion dollars) will be supplied from the Japanese government for the promotion of the information society if we considered the growth of GNP and the amount of fixed capital investment in the future. Our conclusion was that the accumulated amount of the fixed capital investment between 1970 and 1985 will reach 376,900 billion yen (1,224 billion dollars). And we also assumed that the 10% of 376,900 billion yen will be invested for the computerization, and about half of 37,690 billion yen (122 billion dollars) will be spent for the plan for the information society.

We believe that the investment amount, 20,000 billion yen (65 billion dollars), will be reasonable if we study the current policy of the promotion of information processing industries and the institutional limitations and other factors.

2. The Dissolution of Gap between the Extension of the Current Situation and the Probable Plan

(1) Three Alternative Models

The second approach which is called "the dissolution of gap between the extension of the current situation and the probable plan" is the reverse of the first approach. The procedures of the second approach are as follows:

- (a) formulate a plan which extends the current situation. This plan is called "possible plan".
- (b) then find the gap between possible plan and probable plan.
- (c) finally formulate a new plan to dissolve the gap of the two plans.

The Computerization Committee assumed three models to analyze the features of the coming society.

- policy guideline model

- extension of the current situation model
- the principle of laissezfaire model

The first model, policy guideline model, is same as the probable plan. The second and third model are developed by the committee. The attached tables show the characteristics and the structure of the information society according to three different models.

(2) The Differences among Three Models

The first model is policy guideline model. The characteristics of the first model may be summarized as follows:

- government will take leadership to promote the computerization
- integrated plan will be promoted centering the computerization to solve social problems
- the tempo of the computerization will be speedy
- the computerization in various fields will be developed in a well balanced form
- the scale of computerization will be expanded to nationwide and international level

The second model is the extension of the current situation, and the characteristics of the model may be summarized as follows:

- the computerization will be promoted with the coordination between government and enterprises under the guidance of government
- the development of the computerization will be promoted separately centering the computerization of industries and enterprises
- the computerization in various fields will be unbalanced
- the tempo of the computerization will be rather slow
- the scale of computerization will be mostly regional and industrial level

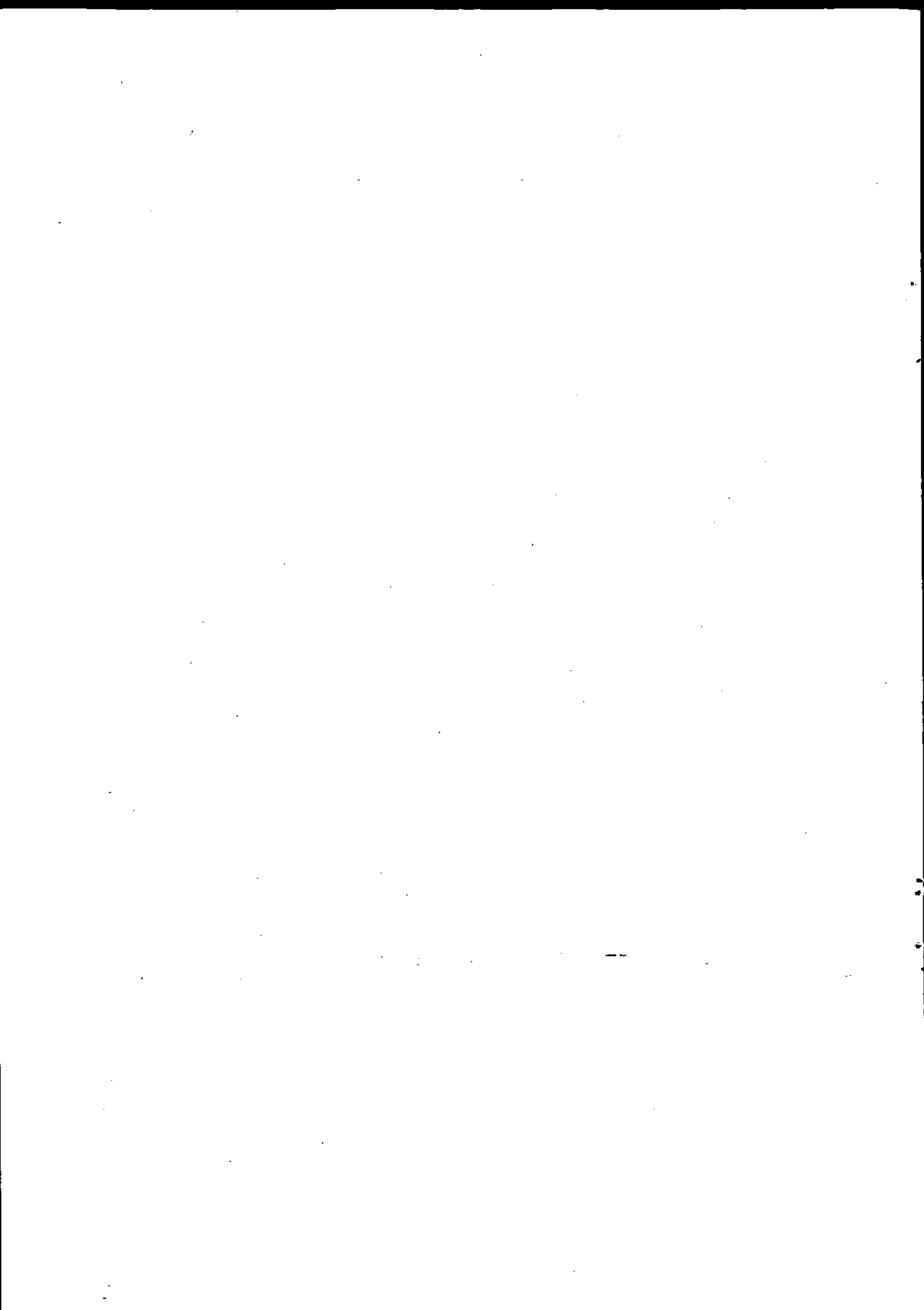


Figure 11

(Continued)

Pattern	Type		
	<u>Policy guideline type</u>	<u>Extension of the current situation type</u>	<u>Laissezfair type</u>
FORECASTING OF IMFOR- MATION SOCIETY IN 1985			
1. Economic development	Stable	Decreased growth	Unstable
2. GNP growth rate (annual)	above 10%	about 10%	below 7%
3. Core of the industrial struc- ture	Knowledge industry	Public related industries	Service and leissure industries
4. Leading sector of information pro- cessing industry	Welfare such as medical care and education	Social environment such as pollution and trans- portation	Automation and commercial infor- mation services
5. Core of the society	Computer utility	Industry data banks	Industrial CATV
6. Nature of the society	Highly satisfaction society	Welfare society	Emotional society
7. Social merits	Development of intellectual creativity	Improvement of social welfare	Increase of leissure
8. Social demerits	Bureaucracy and controlled society	Privacy Centralization and mono- poly of information	Employment gap among the social classes Increase of criminal cases

Figure 11

(Continued)

Pattern	Type		
	Policy guideline type	Extension of the current situation type	Laissezfair type
GAP AMONG THREE ALTERNATIVE SOCIETIES			
1. Achievement year	1985	1990	2000
2. Achievement degree of the plan in 1985	80-100%	50-70%	10-15%
3. Required government investment (accumulated amount)	20,000 billion yen (65 billion dollars)	10,000 billion yen (32 billion dollars)	5,000 billion yen (16 billion dollars)
4. Main projects	Nationwide information networks Medical care Education International cooperation	Transportation Pollution Automation of supermarkets	Upgrade of MIS Commercial information services
5. Demerit prevention policy	Prepare before the happening of demerits	Implement gradually	Act possibly

the third model is the principle of laissezfaire type model which will not fit for the Japanese society. The characteristics of this model may be summarized as follows:

- the principle of free competition will be workable because private enterprises will become the principle of the computerization
- the direction of the computerization will be concentrated in commercial base projects and MIS
- disordered computerization will cause information flood
- the dissolution of social problems will be difficult
- the scale of computerization will be limited

(3) A Projection of the Information Society in 1985

The differences of these three models will affect the characteristics, scale and structure of the information society. Now we wish to present you three different patterns of the information society in 1985.

Let us talk about the economy.

Policy guideline model

- stable economy
- 10% sustained growth rate

The extension of current situation model

- decrease of economic growth
- 8-10% growth rate

The principle of laissezfaire model

- unstable economy
- 7% growth rate

Above-mentioned differences of the economy are the result of the different types of models. If we take policy guideline model, then the transfer from industrial society to information society will be realized efficiently and the new demands will be created. But if we take the extension of the current situation model or the principle of laissezfaire model, then pollution, congestion in urban areas and

conflict of international economy will occur in the process of transfer to information society because the industrialization will continue.

Now let us talk about the characteristics of the information society. If we take policy guideline model, the characteristics of the information society will be as follows:

- (a) the industrial structure will change from heavy and chemical industry oriented to knowledge industry oriented structure
- (b) computer utility will be a symbol of the computerization
- (c) the computerization in welfare related areas such as medical care and education will be advanced
- (d) intellectual creativity of each person will be improved
- (e) a high satisfaction society will be realized.

If we take the extension of the current situation model, then the characteristics of the information will be as follows

- (a) public investment will concentrate on housing and highway construction
- (b) government administration data bank and industry data bank will be the core of computerization
- (c) the computerization will be mainly advanced to improve the social environment such as pollution and transportation
- (d) the welfare will be improved
- (e) a welfare society which satisfy civil minimum will be realized

If we take the principle of laissezfaire model, the characteristics of the information society will be as follows:

- (a) leisure industry and fashion industry will be the leading industry in Japan

- (b) the center of the computerization will be automation and commercial information services
- (c) the symbol of the computerization will be CATV
- (d) leisure hours and leisure will be increased
- (e) an emotional society will be realized

(4) Gap of the Realization of the Plan

How big is the gap among these alternative information society? The target years will be 1985 in policy guideline model, 1990 in the extension of the current situation model and 2000 in the principle of laissezfaire model. The gap between the first and second plan will be five years and between the first and third plan will be ten years. If we assume the achievement rate of the first model will be 80-100%, then we can say that the second plan will be 50-70% and the third plan will be 10-15%.

The first reason is the limitation of funds. If we take policy guideline model which means that the government will take leadership to promote the information society and we estimated that 20,000 billion yen (65 billion dollars) will be supplied by the government. In case of the extension of the current situation model, we expect 10,000 billion yen (32 billion dollars) of the national investment. In case of the principle of laissezfaire model we only expect that 5,000 billion yen (16 billion dollars) will be provided from the public source.

The second reason is the scale and the nature of the projects. In case of policy guideline model, the big projects will be established such as medical care, education and broad area data transmission networks. In case of the extension of the current situation model the social projects such as transportation, pollution and distribution will be the major projects. In case of the laissezfaire model, limited scale projects such as the grade up of MIS and commercial information services will be the major projects. The projects of second and third case will be smaller than these of the first case.

(5) Policy Variables to Dissolute the Gap

Next question is "how to dissolve the gap among these alternative plans. From the standpoint of the mathematical model, we can dissolve the gap by the adjustment of policy variables.

There are six groups of policy variables.

- (a) technology
- (b) funds
- (c) necessary personnel
- (d) system and habits
- (e) demand
- (f) policy

It is very clear that "policy" is the most important policy variable among six variables.

The next important policy variable is "system and habits".

Our conclusion is that key factors to dissolve the gap in the process of the realization of information society will be change of passive government policy and dissolution of old fashioned social system and habits such as medical care and education and the resistance of the interested parties. The limitation of technology, funds and people will not be so important if compared with the above-mentioned factors. Cheap and large memory units, highly capable diagnosis instrument and technology of pollution prevention are under development. The required national funds for the realization of the information society will be supplied if we assume that the sustained economic growth rate will be 10% and the nature of economy will be the government guided economy. The labor forces for the realization of the information society will be supplied if the wages will be raised in the future because of the shortage of labor forces and perspectives of system engineer and programmer will be brighter than before although temporary shortage may occur in the process of transfer of the society. We can see the potential demands for pollution, transportation, distribution and medical care in the future. There will be some problems to create demands for MIS and home terminal, but these demands will be created by the computer oriented education.

In short, the dissolution of gap among alternative plans will be "how to change conservative government policy" and "what means and what procedures to be taken". And it is important "how to change the conservative system such as medical care and education smoothly and efficiently".

Especially the change of government policy will be the most important factor to promote the information society because of big weight and its influential power for the other policy variables.

We can say whether the realization of the information society will be postponed depends on the change of the government policy.

Chapter VII TRIGGER FACTORS AND URGENT PROBLEMS TO BE SOLVED

Two urgent problems are to be solved to hasten the realization of the plan for information society. The first problem may be solved by the trigger factor projects. The trigger factor project is a pilot project which will affect many other factors and promote the realization of the information society. We have selected the following three subjects as trigger factor projects:

- (a) Remote medical care system
- (b) Computerization of schools and universities business
- (c) Administration data banks for the central and local government

The Computerization Committee selected these three subjects as trigger factor projects because of the following reasons:

- (a) the social needs which require urgent solution are high
- (b) the resistance for the change in the process of this plan may be smaller than other areas in terms of the change of procedures, habits and way of thinking
- (c) the technical barrier are not so big

For example, the doctors will not resist the remote medical care system which is to solve doctorless area problem. And the development of the remote medical care system will benefit the development of the series of the other medical care system such as broad area health care. The computerization of schools will give additional times for teachers, and also decrease the psychological resistance for computer. This change in schools will hasten the installation of individual education system by CAI. The development of data banks will accelerate not only the rationalization of the government administration but hasten other projects such as external information for strategic MIS and industry data bank.

Another problem is "how to start the projects which will get over barriers?" The projects to be started are as follows:

- (a) establishment of computer-oriented education in elementary and secondary schools
- (b) establishment of information assessment board which is a national institution for adjustment of advantages and disadvantages among government organizations
- (c) formulation of guidelines for the nationwide data transmission network

Computer-oriented education will be the base for the development of human capabilities to meet new information society in the future. Computer-oriented education will be a steady approach to achieve the information society although it seems a roundabout way of achieving the new society. The computer-oriented education will be very important project from the long-range point of view although we will have to study and experiment computer-oriented education carefully.

Information assessment board will play a very important role to prevent discontinuity of way of thinking or value systems among different generations or people which will be augmented by the flood of information in the future society. The adjustment will be more difficult if the establishment of information assessment board were delayed because the flood of information will become bigger and bigger. The establishment of information assessment board will be very important.

The formation of nationwide data transmission networks will be a technological basis for the information society. If we fail to solve this problem, we will have difficulties just like the wrong decision for narrow gauge railroad 100 years ago because the recovery of wrong decision will take long time. For instance, the judgement which decide any one of two alternatives between CATV network and broad area common carrier cable will affect the nature and the characteristics of the information society.

Therefore the right selection will be absolutely important, and we have to start these three projects as soon as possible.

Figure 12

Required Investment Amount of the Information Society Long Range Basic Plan

(Unit: million dollars)

<u>Project</u>	<u>Main flame</u>	<u>Terminal</u>	<u>Mass file</u>	<u>Software</u>	<u>R&D</u>	<u>Communication live</u>	<u>Facilities</u>	<u>Land building</u>	<u>Operating expense</u>	<u>Maintenance cost</u>	<u>Total</u>
NATIONWIDE INFORMATION NETWORK											3,505
Solitary island or out- of-the-way place and cities											77
1 million population cities											1,383
Among 1 million popu- lation cities											121
Cities											1,249
Among cities											546
Broad area block											129
RATIONALIZATION OF GOVERNMENT ADMINISTRATION											2,181
Administration data bank	49	19		81		1		3	7	28	189
Administration infor- mation center	137	52	6	130	7		19	3	21	49	424
Policy science edu- cation center	19	10		5			2	6	4	3	49
Local administration data bank	468	327	9	65		52	6	78	88	63	1,156
Policy science local education center	29	15		3				10	5	3	65
People's will reflec- tion system (prefectures)	156	5	5	10			31	3	20	11	241
People's will reflec- tion system (nationwide)	16	10	1	16		2		3	3	6	57

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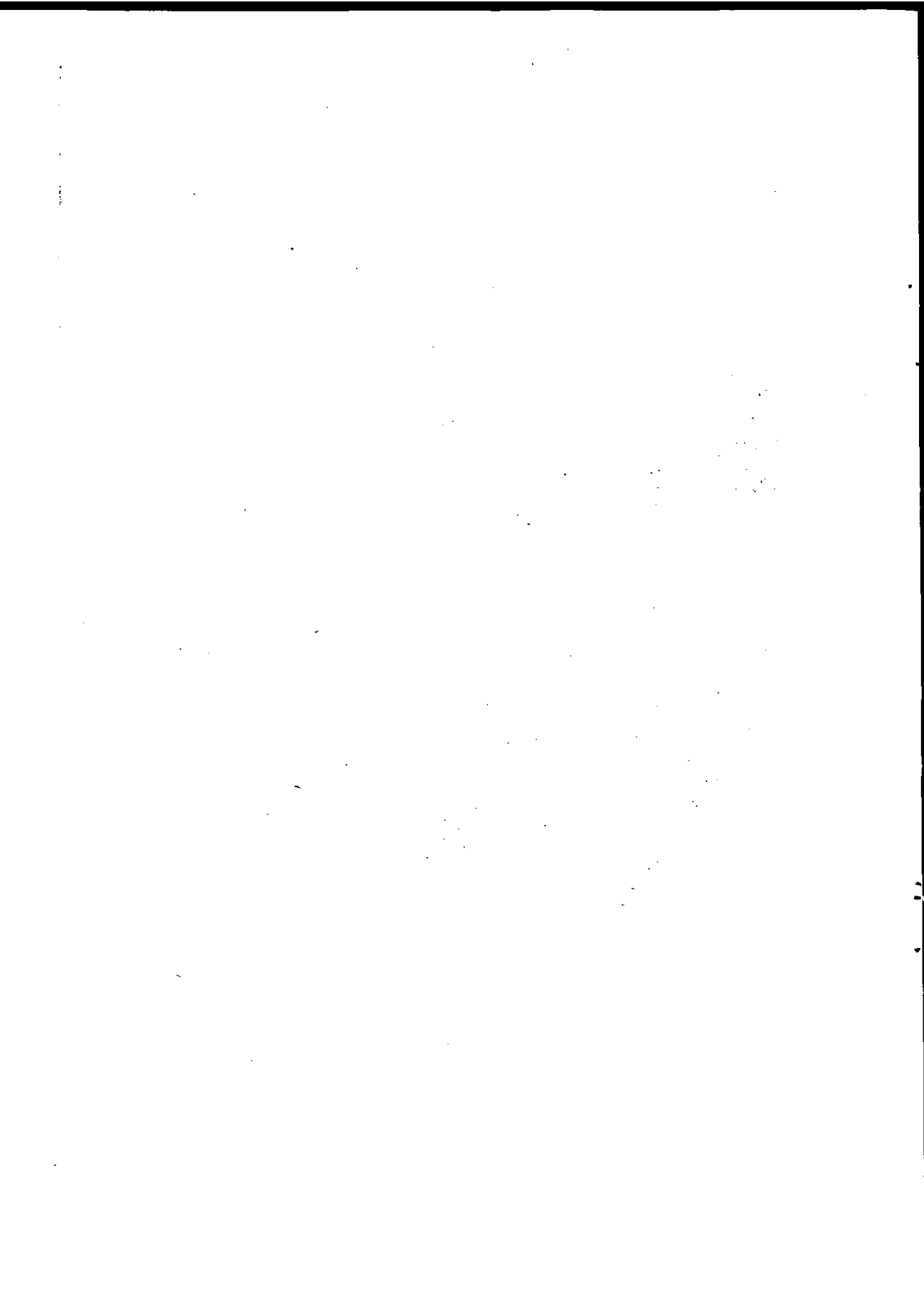
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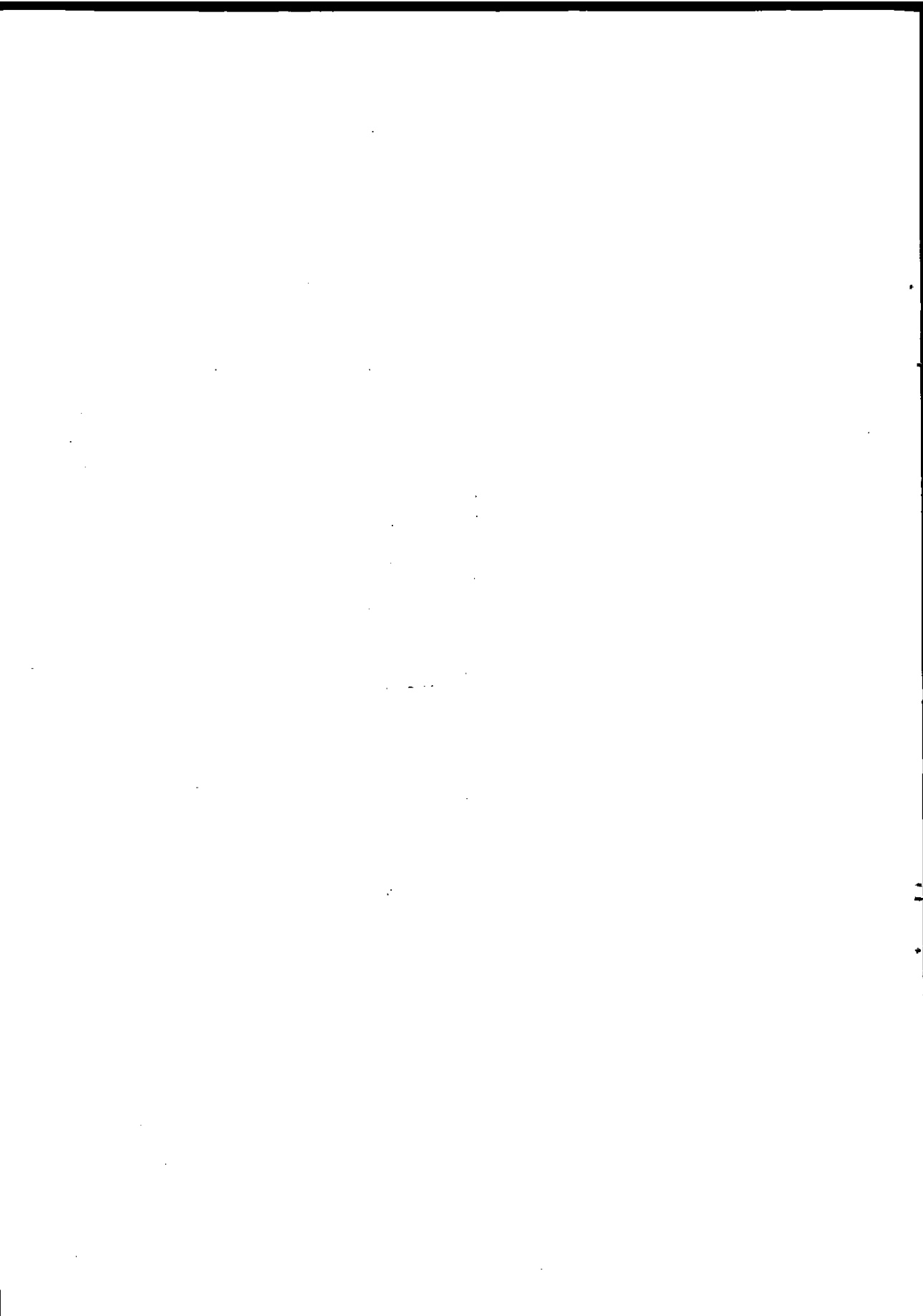


APPENDIX 1. INTERIM REPORT OF THE

COMPUTERIZATION COMMITTEE

A VISION OF INFORMATION SOCIETY

TOWARD 1980



Executive summary

1. The Points of View As Bases for Envisaging the Information Society

There are two points of view which we have established bases for envisaging the information society in 1980.

The first point of view was based on the intended relaxation, dissolution, or prevention, through the introduction of information systems, of probable social and economic difficulties with which Japan will be confronted if matters were to go on as they are.

One of the difficulties which we may confront during the 1970s is the shortage of intellectual manpower. As our standard of living improves still further, and leisure hours rapidly increase, demand for education involving pre-school training will also increase. However, the supply of teachers to cope with this situation is insufficient at present, and supply of teachers will be one of problems that remains to be solved in the future.

In the medical field, the disease occurrence rate increases in proportion to the increase in income; in addition there is the issue of prophylactic medicine for the diseases of the aged. These developments have brought about an increased demand for medical doctors, and the trend towards a serious shortage of doctors will become increasingly critical.

Further, a shortage of systems engineers and professional engineers resulting from rapid progress in electronics technology and software technology, also presents a critical problem. Thus, extreme shortage of intellectual manpower will become a major social problem which will displace the current shortage problem in the young labor force in the 1970.

Another difficulty is the underdeveloped state of social-development-oriented information processing technology. The current explosive increases in the volume of various types of information are said to be a public nuisance.

However, what is actually needed is integrated information for the purposes of social development, but the processing technology for this type of information is underdeveloped. Thus, there is a wide gap between the volume of information and the processing technology.

The future economic society will be highly complex and will be specialized. However, each component of the society so specialized will be mutually dependent, and this trend will proceed in depth. To bring some order into this complex situation, a tremendous volume of information should quickly and appropriately be treated and processed, and a system for this purpose will be required.

The third difficulty includes the increasingly critical issues involving environmental problems, high wholesale and consumer prices, traffic congestion, and other social development problems and their delayed solutions. If economic growth and excessive concentration of population in urban areas were to continue in the future under the current social and economic system, these problems will be further aggravated and the difficulty of solving them will be compounded.

Thus, we, the Computerization Committee, made a vigorous challenge for the solution of these problems through a new concept of information society to displace the current concept centering on industrialization, or any extension of the current policies.

The second point of view was based on the hope of conveying a picture of an integrated information society which will be effectively created from the current industrialized society through various information-oriented policies which were devised to cope with the various issues during the 1970s. Therefore, the Computerization Committee acknowledged that Japan is now standing between the industrialized society and an information society, and on this basis the group drew up an ultimate blue-print of a desirable and feasible information society, as a "society that brings about a general blossoming of the creative power of human intellect".

The Computerization Committee also recognizes that the computerization during the 1970s, which was characterized by a closed-end computer usage by government offices

or business firms, should evolve into open-end use of communication networks, and into development of an information network by making spread use of data communication.

A draft of an information society as an intermediate target for the 1980 was drawn up on the foregoing basis.

2. The Intermediate Target for the 1980s

On the bases of the above mentioned two points of view, the Computerization Committee introduced "The Establishment of 'Computer-mind'" as an overall integrated target. The word "computer-mind" was coined to represent an ideology which will cope with the information society. This implies a vision of a buffer stage as a prerequisite towards realizing an information society for the 1980. The word "computer-mind" was coined to contrast with "industry-mind" and to signify an ideology required to live in the information society. In the coming information society, computers will become indispensable, just as electricity is in daily life as well as in social and economic activities. Computers will become as intimate as air. Intellectual creativity, by fully using information output by the computers, will become the general pattern of human behavior.

Thus, daily habits and practices appropriate in the information society will be developed. This is the establishment of "computer-mind".

Therefore, the intermediate target, a vision of a buffer stage as a passage to realize an information society, for the 1980 is said to have been attained when all the above conditions required for the establishment of "computer-mind" have been sufficiently developed.

3. Establishment of Ten Concrete Targets

In order to sufficiently develop various conditions required for the "establishment of computer-mind" the Computerization Committee has outlined the following:

1. Expansion of installation of home terminals
2. Development of the nation-wide information network
3. Rationalization of government administration
4. Computer-oriented education
5. Modernization of medical care
6. Solution and control of environmental problems
7. Traffic control by AVI (Automatic vehicle identification)
8. Utilization in depth of MIS
9. Systematizing the distribution channel
10. Establishment of "computer-mind"

These fundamental targets are inter-related to one another. However, in the order of time, "Expansion of installation of home terminals" and "development of the nation-wide information-network" are the leading targets. On these bases, a series of social development activities to attain other targets, such as "computer-oriented education", "modernization of medical care", and "solution and control of environmental problems" must be vigorously carried out, and the "establishment of computer mind" depends on the success of attaining these targets.

4. The Time-table for the Coming 10 Years

In order that these targets may be attained by 1980 as planned, formulation of the government's basic policy for the information society should be established by 1972 at the latest; the government's basic plans and policies for the prevention of various ill effects that accompany computerization must be made explicit by 1972; a framework for the nation-wide information network should be developed by 1975; the government's administrative data bank should be completed.

Along with the above activities, such social development projects as the following must be simultaneously started around 1972-1973:

1. Computer-oriented education at the primary and junior high school level;
2. First aid and rural medical care system;
3. Air and water pollution alarm system;
4. Traffic control system by AVI;
5. Fully automated system at supermarkets.

5. Importance of Measures for the Prevention of Adverse Effects Arising from an Information System

In the process of deploying various projects for introducing the information society there is the possibility of a violation of privacy, erroneous processing of information and incorrect information, illegal access to data, accidental breakdown of computers, and various other accidents.

Sufficient preparation should be made to prevent the occurrence of these ill effects.

6. Obstacles in Attaining These Targets

On the road to attaining these targets, there lie the following obstacles, the appropriate solution to

which should indicate the direction for important policies.

1. Government policies and measures to expedite the establishment of the information society are already lagging.
2. There is a severe shortage of systems engineers to develop various information systems.
3. The inculcation of a value system in which information and knowledge are highly valued.

7. Social Effects in the Case of Success

Once these obstacles are overcome and the ten basic targets attained, the creative intellectual power of human beings will blossom at once (such as:

1. Elimination of congestion of urban traffic; prevention and control of air pollution and other pollution.
2. Every village will have a medical doctor.
3. The citizens' requests will be directly reflected to the administration.
4. Individual and selective education; non-grading system;
5. Price stabilization of fresh food;
6. Development of low priced high performance home terminals;
7. High evaluation of time.)

and Japan will be qualified to introduce the information society in 1980.

From the foregoing the "project of evolving into the Information Society toward the 1980" can be said to be a Japanese version of Apollo Project in which the Japanese challenge is to social development instead of space exploration.

Detailed Argument

The following chapters describe the required policies, the limitations and the interim targets, the courses of actions and the time schedules of ten targets.

1. Populalization of Time Sharing System

Populalization of time sharing systems means the extension of utilization of time sharing system such as TSS for people other than government and business uses. The first target of the populalization of TSS will be utilization of TSS by housewives. If housewives use large scale computer through home terminals (terminals installed at home) as their pleases, this will affect the realization of the establishment of computer mind which is an overall integrate target for the vision of information society. Therefore utilization of home terminals by housewives will be one of important basic targets. We assumed that the number of home terminals in Japan 1980 will reach 600 thousand units.

This figure is almost equal to two percent of the number of households (one fiftyth of thirty million households). It is said that there are 180 thousands of time sharing computer terminals in the U.S.A. and this figure will reach 2,430 thousands units in 1980 which include terminals in business, government and houses.

The figure of 600 thousand units which we forecast includes only home terminals. We must also include terminals in business, government, laboratories and others, and if we are to include these the number of terminals will reach 1,500 thousand units. This figure is almost 60 percent of that of U.S.A. and seems appropriate.

Firstly the critical problem to realize the utilization of home terminals by housewives will be "how much do housewives spend information processing expenses out of total household revenue after ten years?" The net income in a month at a wage-earner household in 1970 was 115 thousands yen. If we assume that the net income in 1980

will be multiplied by 2.5, the result will be 250 thousands yen in a month. Further, if we assume that the rate of information processing expenses will be five percent of total income, we get 12,500 yen.

The basic charge of time sharing system in a month at GE which provides top ranking time sharing service is about 70 dollars. If we consider telephone charge, we get 30 thousands yen. And the above-mentioned 12,500 yen is equal to 40 percent of 30,000 yen.

Thus the estimated information processing expense at the Japanese home in 1980 will be considerably smaller than the current charge of TSS in the U.S.A.

The possible answer to decrease the gap will be the extension of the installation of a cheap but highly capable home terminal up to 1978. A model of this kind of home terminal might be a terminal which combine a telephone and a simple typewriter which has dot generator to print out a simple graph.

The second critical point of the utilization of home terminal will be "what will be the purpose of the usage of home terminal for housewives in the future?" The main purpose at this stage will be to get information concerning shopping, menu, leisure, medical services and other information which are necessary for everyday living, and not to solve problems or to find new opportunities in human life. There will be some possibilities that these instant information are provided as free service such as current TV commercials. The average frequency of access of these kind of information by housewives will be several times in a day at the utmost. Childrens will use home terminals to study at home. But purpose of their usage will be to do their home lessons and not to study by themselves using computer terminal.

Our conclusion is that homewives will not purchase home terminal because of the limited usage as instant everyday living information and home lessons. The home terminals will not populalized such as TV sets and refrigerators.

The next question is "who will be the main user of home terminal instead of housewives?". The answer might

be top executives, officers, professionals such as lawyers, architecture designers who will use terminals not only in the office but at home. Top executives of small enterprises, especially in service industries will also use computer terminals for both business and private use. If these situation will be realized, the husbands will be user of terminal at home in the future. If husband will not want to use home terminal as major user, the installation of home terminal at home will not be expanded by 1980. The housewives will be the marginal users of home terminals at this stage.

Therefore it will be required to establish managerial MIS (MIS for middle managers) as an critical precondition to expand the installation of home terminal. The managers will get various informations to control with the aid of computer through man-machine interaction when managerial MIS is realized. If managerial MIS are expanded in the Japanese firms, probably a home terminal will be installed at home. To realize this possibilities, the working habits will be requested to change. The expansion of irregular and flexible working hours, project team system management by objectives will enable people to work at home, use terminals at home and study by themselves using computer.

Professionals such as engineers will use home terminals to solves engineering problems and other complicated problems if the softwares for time sharing system have been developed.

The computerization of the blue return for an income tax will be the most important area to realize the usage of home terminals by executives in the small enterprises. And other important area to promote the usage of home terminals in Japan will be the starting of information processing services by banks and data centers. Once these information processing services are provided by bank or data centers, owners of small firms will accustomed to use home terminal because usually their office and home are in a same house.

Other preconditions such as nation-wide time sharing information networks and government data banks will be required to realize the expansion of home terminals beside

managerial MIS, blue return and data center. To establish managerial MIS will be needed to develop time sharing information networks and government data banks to provide external information for private firms. The development of a conversational mode computer language will be required because the characteristics of managerial MIS is man-machine interactions between middle managers and computers. Currently there is no excellent conversational mode computer language in Japan if compared with BASIC which has been developed by Dartmouth University in the U.S.A., while various computer languages are under development. We have to develop such kind of computer language as soon as possible.

In Japan the development of problem solving type computer and programs lag behind U.S.A., while G.E. already developed a variety of problem solving computer programs. Considering these situations, the basic technology of time sharing system in Japan to promote managerial MIS and installation of home terminals for housewives and children is still less developed.

Therefore, we suppose that the starting of projects which stand long-term point of views considering the before mentioned situations are very important for the planning of time schedule in the coming ten years.

The reason why we put emphasis on the populalization of time sharing system as the first target is that this will affect other major targets and interim targets to realize "the vision of information society in 1980".

2. Development of the Nation-wide Information Network

The development of the nation-wide information network will be one of the basic conditions for the door to the information society. The utilization of computer in 1970 will change from the stage of point as the closed system in the government and business to the stage of the plane as the expansion of time sharing networks. From this point of view, we selected the development of the nation-wide information system as one of the basic targets.

The development of the information networks can be divided into five stages as follows:

- A. Networks which combine urban and local areas
- B. Networks within a city
- C. Networks which combine major large cities
- D. Networks which covers broad area
- E. Nation-wide network

The first goal to be attained will be the expansion of networks include the medical information system which combine urban and local areas. If this network combines urban areas and remote places, it will be necessary to provide funds by the local government to compensate the expenses for the telephone lines. The starting point of this kind of network will be 1973 when medical information network which combine remote places will start.

The second stage of the information network will be the expansion of the networks within a city. And this relates the expansion of time sharing systems in urban areas. Firstly there will be the problem of the telecommunication line charges. If we take an example from pushphone, the charge is seven yen per second. If someone uses pushphone for one hour, it costs 1,200 yen. The charge of the pushphone is nine times of ordinary telephone charge because the latter charge is seven yen for three minutes. The major uses of data transmission through networks will be time sharing use, and the appropriate pricing policies of the telecommunication charges will be

required to meet the new situation in a information society.

The framework of law to utilize freely the network by private firms has been already decided, but we have to promote the expansion of information networks in Japan.

The development of a large scale computer for time sharing will be another important problem. The Japan Telephone and Telegraph Public Corporation is now developing a system called DIPS. And this system will be installed by 1975 in Tokyo and Osaka. But we shall have to develop commercial computers which can compete IBM model 370 series. The multi channel technology is developing for the transmission line. Thus the central problem of the development of the networks within a city will be the time schedules of the development project, the size of the information network and securing necessary funds. We decided the period of the information networks within a city will be 1973.

The information network will advance from the networks within a city to networks which combines the major large cities. The starting point of the latter networks will be a network which combines Tokyo and Osaka. But to attain this first goal, the adjustment of long distance charge system will probably be required. We shall have to install a switching system between computers in Tokyo and Osaka, and also to develop a reliability technology for telecommunications. We, Japanese, also have to expand the capabilities of data transmission volume. In the next step, the networks among major cities will expand other than Tokyo and Osaka, and will cover the six large cities in Japan by 1975.

The last stage of information networks, nation-wide information network will be completed by 1980. At this stage a new charge system which is the fixed charge by steps by blocks will be started to narrow the existing gaps of long distance telephone charges. The communication satellite technology developed by Japanese will be required if possible by 1980. Now Japan is implementing a plan of communication satellite as one of MITI's, so called big projects. If this plan will keep continue its pace, a network which uses communication satellite will be utilized by 1982 at latest.

The most important factors in the development of the information networks will be the development of the information networks which switch the information among major large 1975. If this time schedule of network among major cities, it will affect other time schedules of basic targets such as the government data banks and the managerial MIS which is scheduled in 1976.

3. Rationalization of Government Administration

Rationalization of government administration can be divided into the following four sub targets:

- A. Rational policy making
- B. Rationalization of government business procedures
- C. Non-sectionalism
- D. Democratization of government administration

These four items are interrelated. The integrated target, the rationalization of government administration can be achieved when these four sub targets are realized.

The first critical variable will be the appointment of the special assistant in charge of information. This new position is similar to the assistant to the president in the U.S.A. The promotion of rationalization of government administration can be done the settlement of this kind of powerful position.

The role of the assistant will be not only the promotion of rationalization of government administration but to assist for the prime minister for the planning and implementation of informationalization policy. He will have his own responsibility and authority with some extents.

The settlement of information cabinet meeting will be a solution as the previous stage for special assistant. But we hope that the appointment of special assistant will be realized by 1972.

Among these four sub targets, the realization of rational policy making and rationalization of government business procedures may be done in the following sequences. The base for rationalization will be integrated government administration information system. And the core of rationalization in the government offices will be the development of government data banks. The development of government data banks can be divided into two stages. The first stage of government data banks will be the establishment of utilization system to switch various government statistics which are generated in the various government offices. The technical problems relating to switching will be required to promote switching. The technical problems are as follows:

- (1) The development of software
- (2) Unification and standardization of code of the various government statistics
- (3) The development of conversion system among different computers

In the second stage, the government data banks will consist of individual information relating to important government statistics. In the first stage the government data banks will insist of the aggregated statistics. But in the second stage the government offices will utilize the integrated data banks for the policy making.

Furthermore the development of policy module will be important for policy making. The policy module is a set of data for the basis of decision making of the specific policy formulation. At third stage the government will easily build policy simulation models by the combination of ready made policy modules. The development of software for the policy simulation models and simulations will also be important. The expansion of nation-wide information system will be needed to use the data bank which include individual data through switching via various government offices.

The time schedule of the rationalization of government business procedures will start from the switching between two government offices before 1972. The target of the development of government data banks which consist of individual data will be achieved by 1975. And at this stage the information networks which switch informations among data in data banks will be completed.

We assume that PPBS will be introduced to government budget in 1976. In this stage the government will allocate its budget according to PPBS. In 1977 the application of PPBS will be expanded to the national projects to evaluate and decide national policies such as medical services, rice price, pollution, consumer price and transportation. PPBS will be applied to decide priorities and optical allocation of budget. In the process of the rationalization the government statistics will be computerized year after year, and the computerization of the government business procedures will expand step by step.

The same kind of policies will be promoted in local government as well as central government.

Currently the part of information networks which combine local government and its offices were already completed. And the data file which contain the statistical figures in the local government also developed in Japan. Therefore the next target will be the completion of information networks which combine the central government and the local government by 1973. We hope to complete the local government data banks by 1975 when central government data banks will be completed.

We hope that the local government will complete local government data banks which contain individual data, unification and standardization of coded as well as the central government by 1974. We further hope that the local government will apply PPBS by 1976 and develop a broad area local government administration information system which integrates various offices in the local governments.

In the process of the introduction of PPBS to the central and local governments based on the data banks, the coordination of the policy making among the offices will closer and closer by 1978. And the relationships among the local government also will be tight because of the broad area administration. The sectionalism among the government offices will decrease year after year. The coordination among the government offices beyond the sectionalism will be realized by 1978.

The fourth sub target the democratization of the government administration, will be realized through the direct reflection system of the will of the people to the government with the assistance of the computers.

We shall have to realize a policy making system which the head of the town and village can know the will of the people directly through the computer terminals by 1976.

The will of the people direct reflection system for policy making will be installed in the city by 1977. The purpose of this system will be to reflect the will of the citizens to the administration of the city. In 1977 a model case will implemented to reflect the will of the people to the central government. We suppose that the citizen sampling simulation which has been developed by the University of Illinois can be helpful for the design

of this system.

The will of the people direct reflection system which utilize computer terminals, data banks and policy models will be a important tool for the democratization of the government administration.

4. Utilization in Depth of MIS

The utilization in depth of Management Information System in the future may be divided into four developmental stages and sub targets.

1. Operational MIS
2. Managerial MIS
3. Strategic MIS
4. International MIS

The first three MIS are the developmental stages from the view point of management positions such as top, middle and lower management. The system which assist middle management. The strategic MIS is to assist top management. Therefore the function of operational MIS is to process daily works and print out fixed format and regular reports. The managerial MIS is to assist management control and print out management control report which compare planned and actual figures such as budge control or sales performance evaluation. The third stage, strategic MIS is to develop a system which can assist strategic decision making because the purpose is to assist top management. The last stage of MIS will be international MIS which will come after the first three MIS. The international MIS is a system which link information networks in international scale.

The developmental stage of MIS will be divided into the above-mentioned four stages of MIS. One is the human problems such as the leadership of top management and training of computer people. The other common characteristics is the development of data banks, software development, hardware development and standardization.

(1) Operational MIS

Operational MIS is a system which process daily works in production, sales and raw materials etc. And we assume that the operational MIS have been already developed and implemented in Japan. The starting point of operational MIS was the leadership of top management. Then the innovation of the training of officers and programmers for computer and organization came after the leadership of top management.

The standardization of code and procedures and software development and data file creation have been followed. The final stage of the operational MIS was the integration of simple fixed sub system such as production, sales and raw materials. We believe that the operational MIS in Japan already realized by before 1970.

(2) Managerial MIS

The second development stage of MIS is managerial MIS. Managerial MIS is a system which print out management control reports and exceptional reports with the aid of time sharing system, or provide informations for decision making to select appropriate actions in daily management control. Two conditions will be required to achieve the purpose of managerial MIS.

The first condition will be the technological development of time sharing system for man-machine conversation by conversational mode program.

The second condition will be the industry data bank. The companies in an industry and industry association will standardize the code to establish industry data banks. There will be another problem relating to human side of computerization though the technological basic conditions will be satisfied by the before-mentioned conditions.

The first requirement for the human side of computerization will be the training of the officers to utilize computer terminals. The second requirement will be the training of the system engineers for the development of the softwares of managerial MIS. The leadership of top management will be very important to fulfill two requirement. If top management take the leadership for the development of managerial MIS, such as the training of officers, data banks, training of system engineers, the officers will use the computer terminals by themselves. A part of the Japanese firms started to use the GE time sharing system and implemented managerial MIS. But in Japan conversational computer language and computer programs for problem solving were still under-developed. The introduction of foreign technology of time sharing system will affect the expansion of managerial MIS in Japan. In conclusion there will be some important problems to expand managerial MIS in large corporations in Japan by 1976.

(3) Strategic MIS

Strategic MIS is a system to assist the strategic decision making with the aid of corporate simulation models which are built from the long range point of view. There are two important technological aspects to realize strategic MIS.

The first aspect will be the construction of external data bank which can provide informations about environmental problems and economic tendencies. The managerial MIS will require some informations about external data such as industries. But strategic MIS will require more broad informations not only industry data but political, social, economic and technological informations. And to create these external data bank the coordination of the government will be one of critical points.

Secondly, we shall have to build complicated forecasting models or policy simulation models in the future. It is said that some American company sent fifty million dollars to build sophisticated simulation models. Considering the current situation in Japan we will need the top management understandings of the importance of strategic simulation models and decision making and the supporting funds for the development of simulation software from the government. The cooperation between system engineers and economists will be required to form a good team-work in the future. Our target to develop the strategic MIS will be fulfilled by 1980.

(4) International MIS

The last stage of MIS will be the international MIS. The international MIS in Japan will be realized by 1985. There will be two type of international MIS. One is the Japanese large corporations will expand its information networks which cover the head office and subsidiary companies in the foreign countries. The other case is that the foreign multi national companies will expand its network to Japan and other countries. It will be necessary that the Japanese companies and other companies in the foreign countries will utilize data banks in the foreign countries. In the most desirable case, the direct access of the data banks from other countries will be important. But in this case the international problems such as law and unification of code will be critical. And we shall have to build international corporate simulation models which will be fairly large and complicated.

Considering these possible situations we think that the following time schedule will be desirable. The change of top management attitude such as the leaderships toward international MIS will start from 1975. In 1977 the training of system engineers who have international scope, experience and knowledge and exchange of people among various countries will be active. In 1978 the development of software and data banks will advance. In 1979 the standardization of international code will be realized. In 1980 the result of international MIS will be bigger and bigger such as standardization, the change of value system, and the implementation of international MIS. But the expansion of international MIS will continue between 1980 and 1985. Finally the international MIS will be completed by 1985.

5. Computer-oriented Education

There are two reasons why we put emphasis computer-oriented education. The first reason is that the computer-oriented education will be most influential factor for establishment of computer mind though education go a long way round. Presumably if we can carry out the computer-oriented education for the next and young people, this will be the shortest way to reach the information society.

The second reason is that the importance of information system for social development in 1970's. And educational information system and medical information system will be very important projects among other information systems in the future.

The first target will be the computer-oriented education with the aid of time sharing system at elementary and secondary schools rather than universities and high schools.

We assumed that the computer-oriented education at elementary and secondary schools in model area in the major cities as a test case will be realized by 1980. The implementation of computer-oriented education at elementary and secondary school in nation-wide scale will have many difficult problems relating to compulsory education. We will be very careful in this case to avoid confusions.

The next question is "how to carry out the computer-oriented education at elementary and secondary schools".

The first step will the utilization of pushphones at model schools in Tokyo for the lessons of mathematics and science. Thirty-fourty pushphones will be installed in a special room at model schools. The computer-oriented education can be started if we can develop additional application programs for school education to the existing computer programs for pushphone. The computer-oriented education at model schools will be realized by 1972 at latest. In 1975 more advanced computer-oriented education will start. Advanced computer-oriented education will need teletype-like terminals and display unit for children. Teacher will use auto analyzer and other computer assisted instruction units. We have to emphasize that computer-oriented education in Japan will put emphasis to self-study

and problem solving capabilities and not the computerization of education itself.

We will have many problems to be solved to promote the computer-oriented education.

Firstly there will be necessary that the ministry of education decide the implementation the computer-oriented education as a national policy.

The next problem will be the adjustment of special charge system of telecommunication for the promotion of computer-oriented education. A school has to pay 18,000 yen for one class hour for one class lesson (30 pupils) because the charge of pushphone is 1200 yen as we mentioned before. This amount is too expensive and almost impossible because of the limitations of compulsory education budget. The support from the special financial budget for telecommunication charges for education might be desirable, or special cheap charge system for education might be necessary.

The other problem relating to computer-oriented education will be the coordination of teachers. And reeducation of teachers will be important. The deep understanding and knowledge about computer, new education methods and the analysis of education effect by computer will be important factors to promote computer-oriented education. The education engineer will be required who can develop new education computer programs.

The first approach to computer-oriented education will be the promotion of computerization of school business. For example physical checkup, hour assignment of lessons and school records can be computerized. The teachers will realize the importance of computer and will coordinate with the computer-oriented education through the experience of the computerization of school business. Reeducation of teachers can be divided into three projects.

The first project will be a general purpose computer education of teachers for the utilization of computer for education. The second project will be reeducation of teachers toward computer-oriented education from the theoretical and practical aspects. The third project will be the education of systems engineers for the development of softwares for computer-oriented education.

There will be an urgent need for the development of the software of self-study. The main purpose of this software will be the change of basic education concept from passive and mass education to positive and individual education. There is a kind of self-study program which is called adaptable teaching method. Adaptable teaching method is a self-study program to meet individual abilities.

The other innovational change will be individual data file. Individual data file is a collection of school record of each student and we can access the school record according to the historical sequence. This data file will enable us to change the education system from mass and fixed education to education according to ability. A study analysis and evaluation system will be developed based upon individual data file. For example this system will analyze the structure of the study about mathematics, science and language using structural matrix. The elements of this matrix will be memory, understanding and judgement, or school record by term or school year. The teachers will have tool to analyze the student's ability from the various point of view such as time series and others. An education effect analysis and evaluation system will be developed in the future. We have now Scalogram, but teachers have to spend many energy and time because it is not computerized yet. Therefore the development of software for education effect analysis and evaluation system which will be just like a computerized Scalogram and or its extensions. The construction of computerized study center for elementary and secondary students will be required as test case by 1980. The data banks for the teachers and students to use as teaching materials and self-study will be needed by 1980.

These computer-oriented education will affect to the establishment of computer mind according to our plan, to open the door for the information society. The education system in the future will change drastically. The major changes will be as follows:

- A. from mass education to individual education
- B. from passive education to self-study education
- C. from fixed school year system to non-school year system

D. from regular test to emphasis of study
evaluation system

This drastic change will cause a new education system to meet the requirements of information society in 21st century instead of compulsory education system which continued for one hundred years in Japan since Meiji Revolution. Of course we will consider and never forget the importance of man to man education system which will not substitute by mechanical automation forever.

6. The Modernization of Medical Care

The final target of the modernization of medical care will be the construction of nation-wide medical care integrated information center. We, the Computerization Committee, decided four sub targets to achieve the final goal.

- (1) Precaution system for the sickness of the aged people
- (2) Automation of hospitals the resolution of three minutes diagnosis vs. three hours waiting
- (3) Remote medical care system resolution of no-doctor area.
- (4) Emergency medical care system emergency medical care system for the traffic accident etc.

(1) Emergency medical care system

The first sub target to be achieved will be the emergency medical care system which can be realized faster than the other three sub targets. The first step for the emergency medical care system will be the development of emergency medical care information system. The purpose of this system is to provide information to decide appropriate hospital for the patient such as "which hospital has bed for patient" or "which hospital is appropriate because of the degree of injury" when the traffic accident happened.

The plan will start from the implementation of this system in the model areas where is the part of large city. The number of the cities in the model areas will be increased year after year. By 1980 the all major cities in Japan will be covered by this system. This system is not so complicated, and the degree of the achievement of this system will depend on the policy making and the amount of investment.

(2) Remote medical care system

The next sub target to be achieved will be the remote medical care system. This is a system which can provide

information for the medical treatment through telephone and wireless when someone are seized with a sudden illness in no-doctor area, ships and homes. There will be two key elements, to promote the remote medical care system. One will be the development of cheap but highly capable medical inspection units. This instrument will be very useful in no-doctor areas to find the symptom of sicknesses.

Another element will be the development of the new methods of diagnosis which can inspect the symptom of sicknesses. For instance, a new method which can inspect most dangerous sicknesses by the chemical test of blood and urine will be helpful if possible. The basic problems of the remote medical care system will be solved if these two elements are achieved. There will be no critical problems in terms of information system development. The education and training of medical engineers who will operate these new instrument will be very important in the future.

The first project, simple remote medical care system, will has to start from 1972 in model areas, and then expand gradually year by year. By 1980 the remote medical care system will complete in block units. And to achieve this final goal, the installation of telephone lines which combine cities and remote places will be very important.

(3) Precaution system for sickness of aged people

The third sub target to be realized will be the precaution system for the sickness of aged people. In Japan this system already operated in a limited scale. But in the future the development of automatic clinical examination system will be important. New system will have to treat many patients and be fully automated.

Another possibility will be the development of man-machine diagnosis system. Doctors will use the information provided by computer to decide his decisions. Doctor will communicate with computer and decide his decision. The development of this kind of system will be important to achieve our goals.

There will be two kinds of system. We can establish precaution medical care center one by one in a district, and then expand the coverage of centers.

Another plan is a mobile precaution center. The mobile precaution will be active because it is easy to move around by car. The required funds of the establishment of these two kinds of new systems will be considerably big at the beginning. But if we will expand these systems more broader areas in Japan, the cost of per center will be sharply decreased in the latter stage. We hope that the information networks which combine these center will be set up by 1980.

The very important by products will be the data banks of case history of illness which cover all over Japan.

The first step of the creation of data bank of case history will be the creation of data bank which contains case history by voluntary basis. Then next step will be the creation of data bank of case history which emphasize the generality of illness. The center of data bank of case history will be constructed in the process of the expansion of precaution system. The efficiency of file will be augmented if each person has the national identification number. The data bank will be very useful for the precaution and finding of illness and aftercare because the sickness of aged people is very complicated.

(4) Automation of hospital

The final sub target to be achieved will be the automation of hospital. The hospital automation can be divided into national hospital and private hospital. The hospital automation can be divided into two types e.g. automatic diagnosis and computerization of hospital business.

The first step of hospital automation will be a model project in a national hospital to promote the computerization of hospital. This first project will promote the computerization of diagnosis, treatment and hospital business concurrently. The man-machine diagnosis and treatment system, urgent medical care system, automatic monitoring system and new charge system based on scoring will be developed. Then the number of automated national hospitals will be expanded gradually and finally will cover all major cities in Japan by 1980. The automation of private hospitals will start when the national hospital automation reach to some degree of success. We think that the national hospital

automation is easier than private hospital automation because of supporting funds for automation. There will be some technological difficulties relating to hospital automation, but these difficulties will not be the biggest obstacles. The Japan Doctors Association problem will not be critical in case of national hospital automation. In summary the required funds for the development of hospital automation will be the biggest bottleneck. Therefore the decision making of the Japanese government and budget for the implementation of national hospital automation will be the most important factors. And this projects will advance if government decision making and budget requirement were fulfilled.

The common problems for medical systems will be the lack of medical engineers and including systems engineers. The training and education of these kind of people will be the urgent needs. The government have to realize the importance of this problem and take actions to set up some educational organizations and other policies in the near future.

7. Prevention and Control of Pollution

The final target of prevention and control of pollution will be the establishment of nation-wide pollution information center.

The establishment of long-term policies to prevent and control pollution by local government and integrated administration of pollution will be very important. The function of environment agency which has been established very recently in Japan is still limited. The unification of the administration of pollution problems is an urgent need. The settlement of criterion figures to control pollution will be required.

The settlement of criterion figure to control pollution, the density of polluted materials and the methods of measurement are different in various local governments except these which have been decided by the central government. It will be bottleneck for pollution control if we do not standardize the criteria and methods of measurement. We hope that the local government will take an action to standardize and unify the criteria and methods of measurement in the near future.

(1) Pollution measurement and warning system

The first step will be the establishment of a simple pollution measurement warning system in a model area (for example in Kawasaki) by 1973. This system will collect data from observation instruments (partially offline). This system will inform and warn to the original data sources or government offices in charge of pollution when the density of pollution exceed the limits. We shall have to develop the automated observation instruments which can be connected with computer by online. The improvement of accuracy, stability and cost down will be the problems in the process of the development of the above-mentioned instruments. It will be necessary not only two dimensional data collection but three dimensional data collection. Radar will be powerful tool because of its capability of three dimensional observation and possibility of the connection with the computer. At this stage the technological aspects such as hardware and software will not be critical. Data bank for this system accumulate the collected data, analyzed data.

The claims and guarantees section will be needed to support pollution measurement and warning system. Citizens will coordinate for this section. The claims and guarantee section will be expanded gradually city, district, block and nation-wide scale. The true purpose of system relating to pollution will be the pollution prevention system and not only warning and control.

In Japan there is a plan to decrease waste gas of car to 10% by 1975. But we hope that the other technology to prevent the pollution will be developed as soon as possible. The development of this kind of technology should be promoted because of its importance though the development will require big investment. The formation of interdisciplinary team including various kinds of professional engineers will be important to promote the development of technology.

(2) Pollution forecasting, warning and control system

The pollution measurement and warning system will be expanded by 1976, and on the other hand this system will grade up to pollution forecasting, warning and control system.

The development of data bank and simulation model will be required to promote the progress of pollution forecasting, warning and control system. The first requirement will be the pollution data bank. The observation data will be collected by a control center through a regional network system and accumulated in the data bank. The data bank will accumulate not only observation data but other regional characteristic data, meteorological statistics and other external data.

The second requirement will be the short range forecasting simulation model. The collection of information such as general pollution data, weather, river pollution, city planning, plant location and airport construction plan will be important to support simulation model.

We expect that the pollution data bank and short range forecasting simulation model will be completed by 1975 and by 1976 respectively.

(3) Nation-wide pollution information center

We propose that the expansion of pollution forecasting, warning and control system to cover major cities in Japan gradually. The final target will be the establishment of nation-wide pollution information center as a total system by 1980. The information concerning the pollution in Japan will be processed and maintained by this information center. The long-term forecasting simulation model will be developed to analyze the policies for the prevention of pollution and the relationships of the cause of pollution generation etc.

In the very late stage of this center, the international activities will be started by the connection between a nation-wide pollution information center and an international pollution information center by 1985.

8. Traffic Control by AVI

AVI is the abbreviation of Automatic Vehicle Identification System. A bit generator is fixed on car. And inspection unit which can identify car numbers are installed on the road. This kind of identification system was already used for freight car. The bit generator for car can be purchased at 5,000 yen if LSI is used to decrease the price. The price of inspection unit on the road may be 500,000 yen, but this price can be decreased by mass production.

AVI implementation committee will start in 1972. And we will need the settlement of a law of electronic number plate.

AVI will be installed in a model area in a limited scale. We will identify the number of cars which go through specific road which car by AVI. This kind of information which will be identified by AVI system will be very useful. The basic data for the planning of road construction and city traffic control will be provided by expansion of AVI system. AVI system will be installed in a part of the major city in Japan by 1975. Car entering control system will be operated after the installation of AVI system in Nagoya or Osaka because the inspection units on the road were installed on the way to the center of the city.

AVI can be utilized for the finding of stolen car and crime if the system covers all of the major cities in Japan by 1980. And also the traffic control system which cover broad area will be implemented by 1980. The traffic information center will be required to achieve the above-mentioned purposes.

AVI system can be applied to dynamic signal control instead of the existing fixed signal control. A new dynamic signal control will be operated to meet the degree of congestion. This new signal control will be cover more broader areas in the future.

We have selected AVI system as one of targets of computerization instead of an integrated traffic control system. We thought that the most of traffic problems in the future will be solved by AVI system if an integrated traffic policy for car is decided in near future. Another reason which we

took up AVI system was that personal file of car will not cause privacy problem. AVI system will be useful when this system combine with car registration records as an information for the administration of traffic problems.

9. Computerization of Distribution Channel

The basic target of the computerization of distribution channel will be the computerization of large supermarkets. We selected the computerization of large supermarkets as one of the targets because 40% of the retail sales in Japan will be sold by supermarkets in 1980. The modernization of distribution channel of consumer goods will be achieved and the consumer price of consumer goods will be stabilized if the computerization of large supermarkets will be completed by 1980.

The promotion policies by the Japanese government will be required to achieve the target.

For example:

- (1) establishment of cold chain
- (2) the settlement of wholesale distribution center
- (3) reorganization of retail merchants

will be promoted by the government policies. Concerning the reorganization of retail merchants, the specialization and coordination of retail merchants and blue return system for retail merchants will be promoted by the government policies. The promotion policies for the reorganization of distribution channel including both retail store and wholesalers will be very important to realize the computerization of supermarkets.

The data bank for the distribution industry will be created to support a wholesale distribution center by 1975. The coordination of distribution industry will be important and organizer of distribution system will be required. Standardization of code numbers and package size will also be important in the near future.

The fresh foods information center which is promoting by the ministry of agriculture will be extended and will be connected with a wholesale distribution center. The combination of these two centers will form an integrated information network of distribution.

The establishment of cold chain is making progress, and it will be changed to a new cold chain which include refrigeration warehouses and refrigeration trains and other facilities.

Another important factor to promote the computerization of supermarkets will be the expansion of credit card system. In the future the existing credit cards will be integrated as a standardized credit card.

The first step of the computerization of supermarkets will be the automated warehouses.

There will be no critical technical problems to facilitate the automated warehouses by supermarkets because information warehouses and automated warehouse were already constructed in Japan in other industries. The next step will be the expansion of the sample selling system. The sample selling system is a system which supermarkets exhibit samples only in the store and all other merchandises are stored in a large warehouse. The customers select the goods to be purchased by samples and goods are transferred from the warehouse to customers. The supermarket will be fully automated if this system is introduced. The expansion of this system in Japan will be realized in near future because some supermarkets have plans to introduce this kind of system.

A large scale new town will be constructed as a test case of computerization of supermarkets in 1975.

After 1975, distribution terminals and distribution data banks will be completed and expanded based upon the experience of the above-mentioned model case. Consumer goods distribution center will be constructed in Osaka at first. In 1978 the computerization of supermarket in Osaka will be completed in 1978, and the computerization of supermarkets will be expanded to cover all over Japan.

10. Establishment of Computer Mind

We selected the establishment of computer mind as the overall target for the vision of information society toward 1980.

Computer mind means that the way of living or way of thinking which fit the information society. In other words, computer mind is a way of thinking which is appropriate to a new society called information society. The establishment of computer mind is a situation which the computer become general knowledge.

The target of computer mind is to make computer general knowledge instead of specialist's knowledge. We can see a blue print of a new society where people use computer in everyday living in business, government, university, school, and home. Our ultimate goal is to present you a vision of a new society where people create ideas and new thoughts with the assistance of computers.

The problem which we are facing now is the lack of information processing capabilities and not the lack of materials or goods. The reason for calling new society information society derives from the importance of information in the future. We can enjoy affluent social life of intelligent creation when people possess computer minds.

We believe that the establishment of computer mind will be the final and integrated targets in preparation for the establishment of computer mind.

The following four points will be very important, and we shall have to keep balance of these points.

- (1) The establishment of information-oriented social environment
- (2) The development of information networks
- (3) The promotion of the policies for the prevention of information pollution
- (4) The establishment of information-oriented behavior

(1) The Establishment of Information-oriented Social Environment

The change of economy, business, society and politics will be required from the existing type to information-oriented type to establish the information-oriented social environment.

A. Informationalization of economy: The information processing and service industry will be key industry in Japan in terms of economic sense. The basis for the information service industry will be established by 1975. And think tank will be born in Japan by 1977. Numerical control and group control system will be expanded in Japan by 1973. A complicated system industry will appeared which design and implement big system such as ocean and urban development by 1980.

B. Informationalization of business: The business in the future will promote the development of MIS to foresee and insight complicated and dynamic change of economic environment while the information industry will grow. The stage of MIS moved from operational MIS to managerial MIS for middle management. We suppose that the strategic MIS for the strategic decision making will develop, and most corporations will implement strategic MIS by 1980. And by 1985 some part of the multi-national companies will start international MIS.

C. Informationalization of society: We will develop social information system which use computers for everyday living. This system can be examined by emergency, easiness, economy and importance. The establishment of pollution preventing system will be most desirable from the stand point of view of emergency. The traffic system will be easy to develop in terms of technology and system. The system which will be used many times will be most economical system. For instance the cashless system will be one of examples. The education and medical information will be most important system in the future. The priority to choose the system will depend on the view point. And it is very difficult to put priority among these systems. We propose that the development of these systems will start concurrently, and the scale and speed of the development will be adjusted if we find some difficulties.

D. Informationalization of government: The direct involvement of citizens to administration and the application of PPBS for budgeting of local government will be the main targets of the computerization of administration. The development of switching system in local government and government data banks will be important factors to achieve the target.

(2) The Establishment of Information Networks

The construction of information networks will be the basic condition to achieve information-oriented social environment.

In Japan banks, trading companies, transportation companies and electric machinery manufacturers completed their own information networks. For instance, local banks money exchange online system was completed. And in 1971 the construction of information network among different companies was approved by law. In 1972 commercial time sharing services will start in Japan. The utilization of time sharing system will be expanded from business and government to people, and the home terminals will be installed at home by 1980. The home terminals will be installed in broader areas in Japan and information networks will cover foreign countries by 1985. At this final stage the multi-national companies will start to develop international MIS.

(3) The Promotion of Policies to Prevent Information Pollution

It is obvious that computer mind will not be popularized if we only analyze the merits of information society. Computer science is an extremity science such as atomic power or biochemistry. It will be necessary to think about the policies to prevent the demerits of information society in advance.

The first step of the demerits prevention policies will be the establishment of policies for the prevention of computer demerits. The following policies will be required in very near future.

- a. Exclusion of information monopoly which will be resulted from the creation of the government data

banks.

- b. Recognition of information value and prevention of leakage of confidential information which will be resulted from the development of information industry.
- c. Protection of privacy which will be caused by traffic control and individual data bank.
- d. Duties to report correctly.

The second step of the demerits prevention policies will be the settlement of reviewer system. This system will play the role of interpreter between specialists knowledge and people's common sense. The reviewer will have two responsibilities.

- a. To explain new discoveries, inventions in the specialized areas to people, and study and present the significance of social impacts.
- b. To interpret the directions and wishes relating to computerization which are arose in people's mind in technical terms, and present the results of analysis to the specialists.

The settlement of these law and new systems will be accomplished by 1975.

The second stage will be a new social system which will rescue the people who can not adopt the information society. The reeducation system will be necessary not only for middle and aged people for people in general. The policies to prevent future shocks such as speed-up of information accumulation and requirements for the speed-up information processing time will be necessary in 1980.

(4) The Establishment of Information-oriented Behavior

The basis for the establishment of computer mind will be fulfilled if these three points are satisfied.

Information-oriented behavior can be said as people who have computer mind.

We hope that the computer mind will be expanded in Japan by 1985. At this stage materialism value system will be lost its significance for people. The attitude of people now existing which behave according to their feelings will disappear. People will find their purpose of life through actualization of themselves by their carefully designed plans. The computer will be very useful tool at this stage.

The first step to use computers as a tool for self-actualization will be to use computers in a man-machine mode. This man-machine conversational mode will be the most useful method to amplify the human intelligent labor.

The usage of computers as a man-machine mode will be helpful for the training of problem finding and problem solving. The possibilities of opportunity finding will be augmented by the increased ability of human being with the back up of computers. We will set our life time objectives and will achieve more easily than old days. People will lead a life worth living. The final vision of information society will be that people will plan and design their future time and realize their wishes and desires. We believe that this kind of information society can be realized in the future and it will be of great worth.

11. Critical Policy Variable to Achieve the Targets

We would like to talk about the critical and common policy variables to achieve the before-mentioned ten targets.

The policy variables are the interim targets and other means which affect the achievement of plans.

Various informationalization government policies will play important role to realize information society.

The major policies to be established will be as follows:

- (1) The settlement of information cabinet member meeting
- (2) Appointment of special assistant to the prime minister in charge of informationalization
- (3) The establishment of information demerits prevention policies relating to information processing and services.
- (4) Amendment of education law
- (5) Amendment of medical law such as doctor law and medical care law
- (6) Pollution prevention law
- (7) Amendment of communication law

The most highest priority will be put on the government integrated policy for the promotion of information society, policies to provide funds or other means to promote informationalization and the amendment of various law or settlement of new laws to realize out vision of information society toward 1980.

The second priority will be the change of the traditional systems and procedures. These traditional systems and procedures will be the biggest obstackles for the change from industrial society to information society. These are as follows:

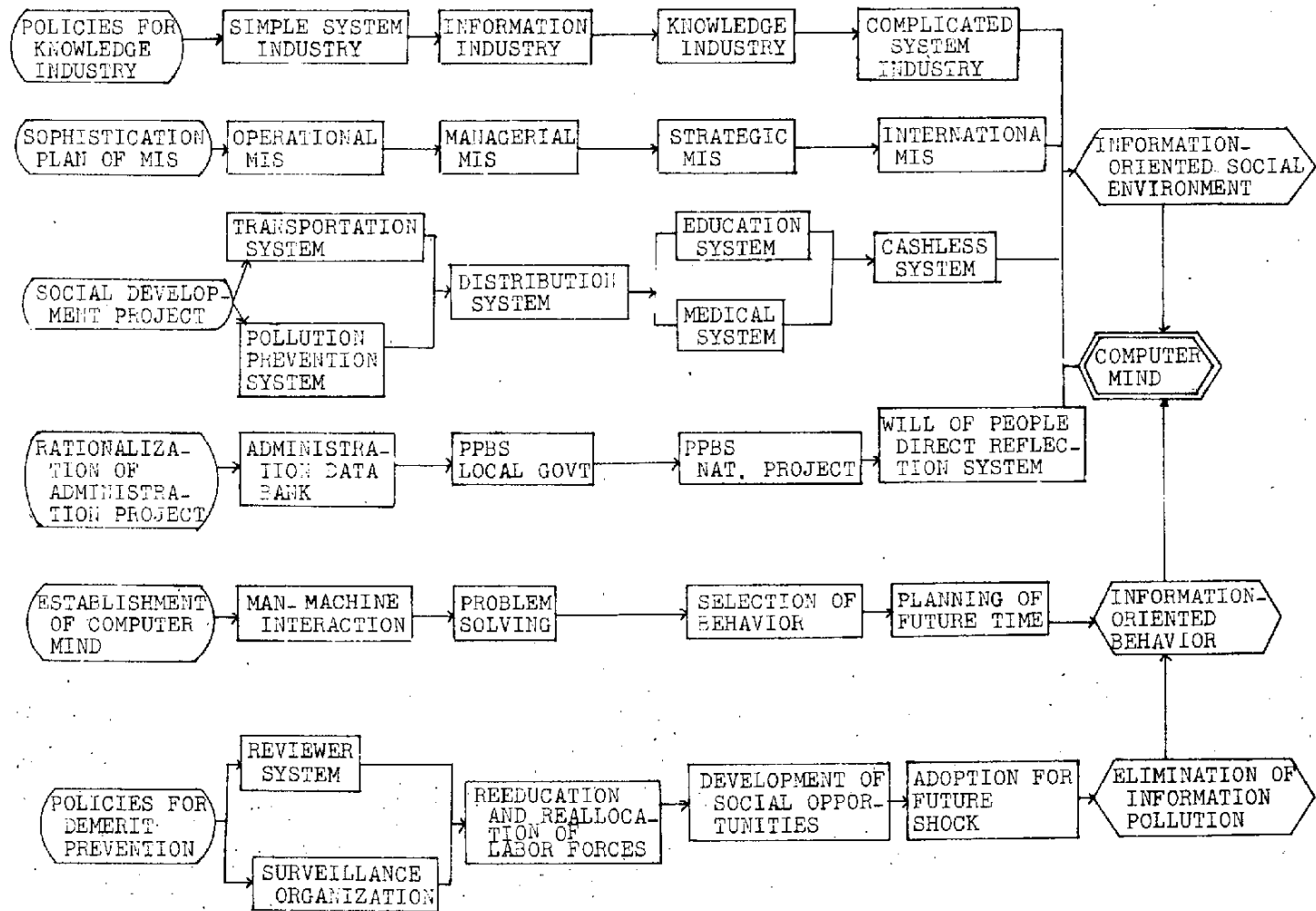
- (1) Elimination of sectionalism
this is a problem "how to eliminate
the demerits of vertical administration
of the government offices"
- (2) More broader administration in the local
government
- (3) Citizen's direct involvement system to decrease
the demerits of parliamentarism
- (4) Problems relating to reviewer system
- (5) Problems relating to the change from mass
and fixed education system to self study and
non-school year system
- (6) Remote medical care system and automated
diagnosis system
- (7) Establishment of new trade customs such
as information value and the protection
of the right of software
- (8) Problems of new markets for fresh foods,
reorganization of retailers and customs
and procedures related cashless society
- (9) Liquidation of labor forces; non-regular
working hour and the strengthening of
qualifications

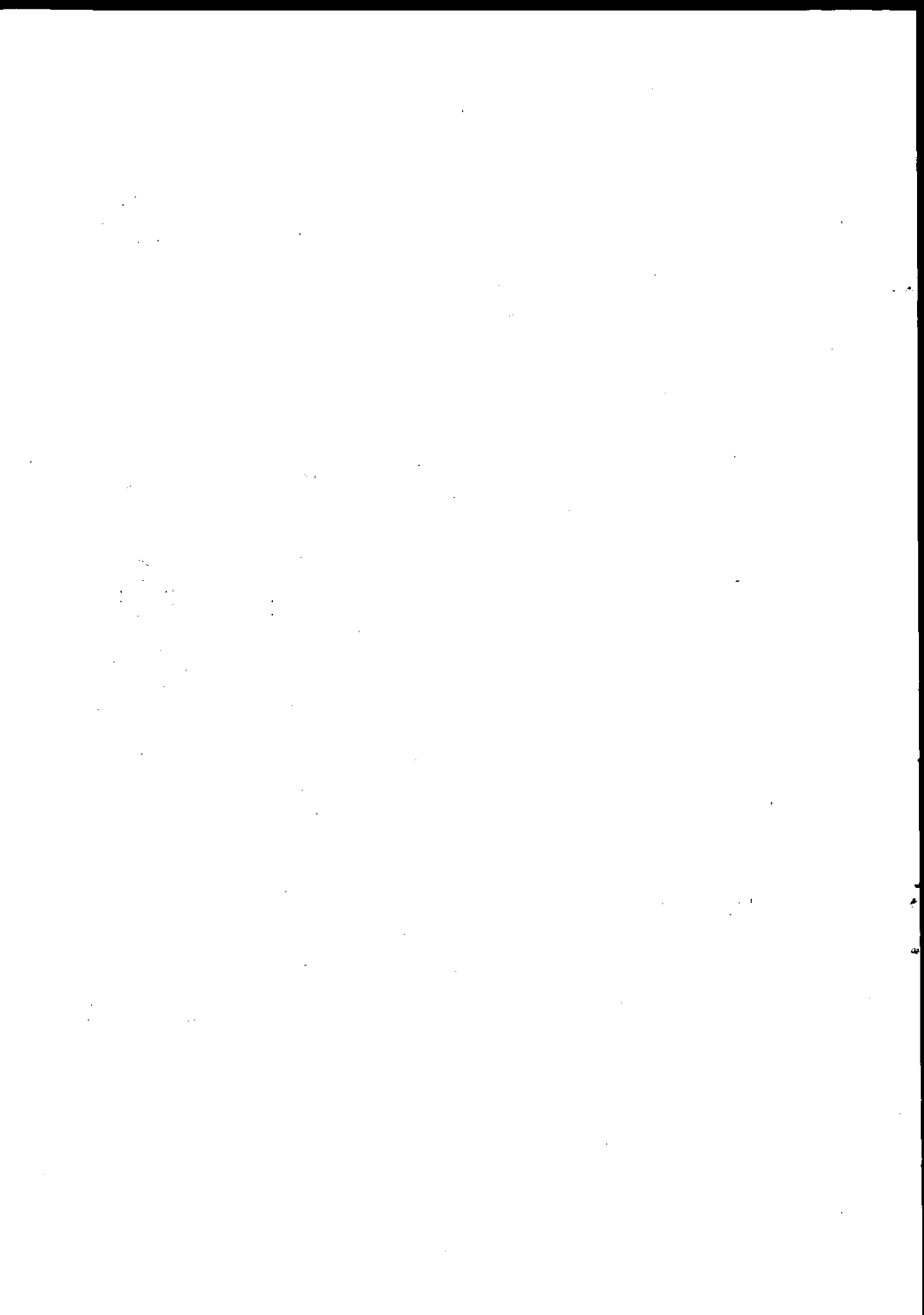
There will be other small problems such as practice of typing of keyboard. We shall have to solve this kind of problems which will arise from the change of customs, systems and procedures.

The third challenge will be the development of sophisticated technology. These are as follows:

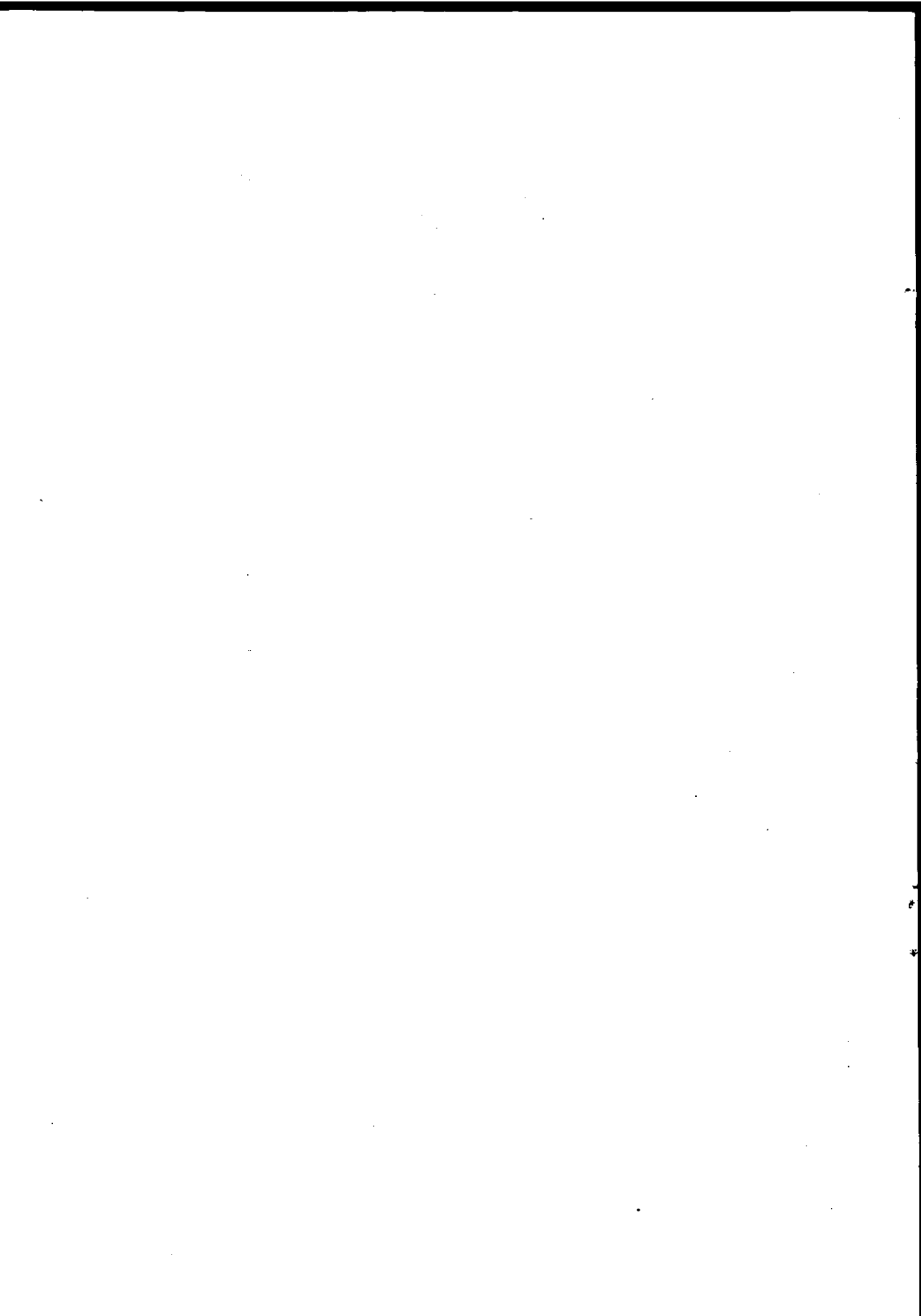
- (1) Large memory
- (2) Large scale computer for time sharing use
- (3) Voice response units which can be connected
with the fourth generation computer
- (4) Same axle cable

COMPUTERIZATION CHART OF SOCIETY IN 1980





APPENDIX 2. SUMMARY OF THE REPORT OF THE U.S.A.
AND EUROPE INFORMATIONALIZATION
INVESTIGATION MISSION AND PROPOSAL



1. Purpose of the Investigation Mission

(1) The purpose of this mission were as follows:

- to discuss and exchange opinions with intellectual people and experts in the U. S. A. and European countries about "the information society vision in 1980" which was stated in the interim report of the Computerization Committee of the Japan Computer Usage Development Institute.
- to investigate the current situation and future directions of the computerization in the U. S. A. and European countries.

The members of the mission were as follows:

Head : Yoneji Masuda

Director, Japan Computer Usage Development
Institute

Chief investigator, Computerization Committee

Members : Seiichiro Yahagi

Senior associate, The Boston Consulting
Group

Member of the Computerization Committee

Shiro Shimaya

Staff Editor

Industrial Division, The Editing Department,
The Japan Economic Journal

Member of the Computerization Committee

Muneco Ogita

Researcher, Japan Computer Usage Development
Institute

Member of the Computerization Committee

2. Period of Trip, Visited Organizations and Interviewees

(2) Schedule, visited organizations and interviewees were as follows:

Period of Trip

33 days from Oct. 21, 1971 to Nov. 22, 1971

Visited Organizations

European countries	10 places
France	3
West Germany	2
Sweden	5
U. S. A.	18
Total	28
Government offices	6
Private enterprises	8
Universities	8
Institutes	6

Number of interviewees 130 people

3. The Characteristics of the Mission

- (3) The Attitude of the mission was to act with the principle of "give and take" rather than "take only" though the number of the members of the mission were only four people and small group with no interpreter.
- (4) The purpose of the investigation mission was to exchange opinions and discuss with foreign people rather than hearing and seeing.
Therefore the main characteristics of the mission was a discussion group rather than fact finding survey group which was usual type of Japanese study team in the past.
- (5) The mission sent the interim report of the Computerization Committee in English before the departure from Japan, and brought the slides and drafts relating the information society plan. These preparations shortened the meeting hours because of the efficient use of time.
- (6) The summary of the interim report of the Computerization Committee was explained by the head of the

mission using the slides and a over head projector before the discussion at each meeting. Then mission members and interviewees exchanges questions, answers and comments, finally we discussed about the information society in the future.

4. The Responses of Interviewees in Overseas Countries for "the Information Society Vision in 1980"

(7) "Information society vision" of the Computerization Committee was highly appreciated in the U. S. A. and European countries. The main points of these appreciations by foreign people may be summarized as follows:

- a. The basic stand point which is try to solve critical problems in 1970's (scarce of labor forces, increase of information gap, congestion in urban area such as pollution etc.) by informationalization.
- b. The presentation of an integrated and overall birds-eye view of the information society in the future which will be desireble and feasible.
- c. The description of 10 targets to realize the information society, and the intermediate targets, means and methods in the process of the realization of the information society.

(8) On the other hand, the doubt and critics for the information society vision were as follows:

- a. The detailed study for the requirements of investment amount, time period of achievement, possibility of technological development were not included in the vision.
- b. The underestimation of the difficulties of conservativeness such as politics, procedures, customs and habits.
- c. If the information society involve social and human side of problems, man-machine interaction will be one of the big obstacles and computer mind (the new way of thinking which is appropriate for the information society) will not be popularlized.
- d. If the government take the leadership of the realization of the information society, then the risk of a controlled society will be increased.
- e. But private enterprises will not take the leadership of the promotion of the informationalization

in social areas such as medical care and education because of paiaability.

- (9) The well-meant advices and suggestions may be summarized as follows:
- a. A sub system which can reflect the people's opinion has to be built in the total system.
 - b. The policies and the procedures such as protection of privacy and other prevention policies for information pollution should be prepared.
 - c. The projects in the information society plan have to be implemented one by one like a half column in accordance with the priority and the importance.
 - d. A dynamic system which can easily change and improve in the process of the implementation of the project to be considered.
- (10) There were various responses of the people such as positive supporting argument, modest supporting argument, critical argument, antagonism and no interest. And there were the following two patterns of the responses.
- a. The supporting arguments were taken by professors and government officers who attach importance to the social side of the impact of computer.
 - b. Scientists, engineers and business men expressed critical opinions and antagonisms.
5. The Current Situation and Characteristics of the Informationalization in Various Countries
- (11) The specialization of informationalization which is centered on computerlization in various countries are affected by nationality, value system, climate, political system, social environment and economic structure etc.
- (12) French are negative for the promotion of social control type informationalization such as traffic control or distribution information center because of the national characteristics which prefer arts and elegance rather than rationality and control. And the computer usage in complex sciences such as Biochemistry and Meteorology are advanced in France. In the future, France will be specialized probably science

oriented informationalization.

- (13) West Germany will be specialized administration oriented informationalization centering the establishment of administration data bank and nationwide information network which backed by rationality and centralized government administration systems.
 - (14) Sweden introduced the most advanced medical information system in the world because of the welfare state, and other advanced social systems such as regional development. In the future, Sweden will be specializes social welfare oriented informationalization.
 - (15) The computer usage in the U. S. A. was changed from big sciences such as national defense and space development to management information system in large corporations. Now MIS are expanding in international basis by super national enterprises. On the other hand nationwide social welfare oriented informationalization such as medical care and education reached a deadlock because of decentralized political system and business base informationalization.
 - (16) In the past, Japan promoted "follow American" type informationalization centering large corporations and government organizations. In the future, Japan will has the possibility of the specialization to nationwide social development type informationalization such as the prevention of the congestion in urban area, integrated traffic system which will be reflected nation's overall development policies and prevention of pollution and distribution system.
6. The Development Stage of the Informationalization and the Role of Japan
- (17) The informationalization in the world is now entering a new development stage though the informationalization in various countries have special features at present. The new development is a change from organization centered informationalization such as government and corporations (managerial informationalization stage) to social welfare and social development oriented informationalization (social informationalization stage).

(18) If we consider this new trend in the world, Japan will have the advantages to take a important role because of the following reasons:

- a. The U. S. A. which took leadership of the informationalization in the world reached a deadlock when the development stage transferred from corporate base informationalization (managerial information-zlization stage) to social base informationaliza-tion (social informationalization stage).
- b. On the other hand, European countries will take leadership of informationalization in the specific and limited fields because of the specialization of informationalization.
- c. Japan will have many favorable conditions to promote the nationwide social informationalization because of the following reasons:
 - (a) The social needs for social information-alization will be big because of the super congested society.
 - (b) Nationwide information networks such as telephone lines, newspaper and TV net-works are already installed in Japan.
 - (c) Nationwide information policy will be easily implemented because Japan has centralized government organizations.
 - (d) The nessity to change private investment oriented economic growth to public investment oriented economic growth will be bigger and bigger.
 - (e) Japanese are consist of one and only race instead of many races. Japanese culture is homogenous. And the intellectual curiosity are strong.
 - (f) The establishment of the information related industries such as computer industry and software industry was already succeeded in Japan.

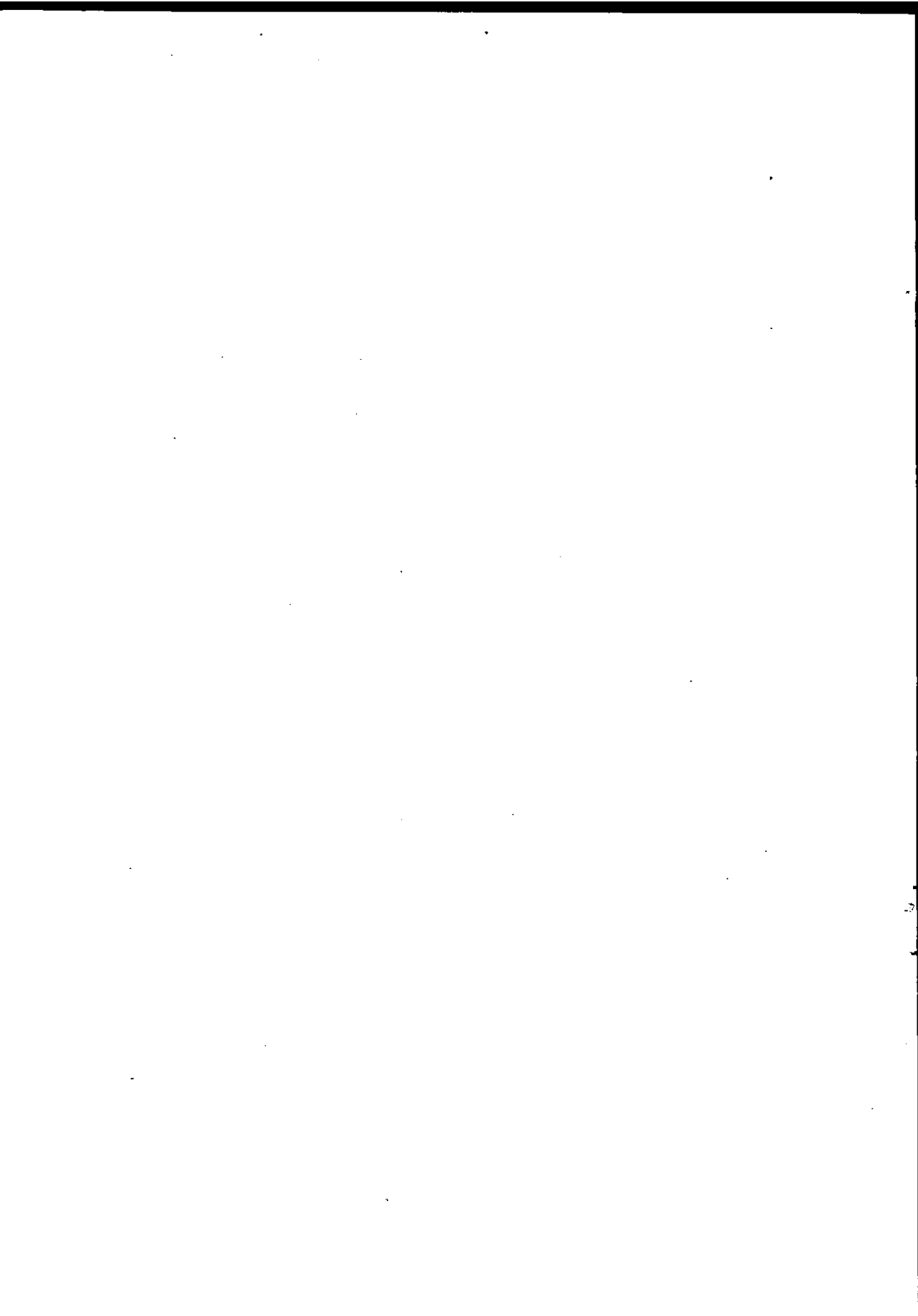
7. Proposal for the Social Informationalization

(19) We recommend that Japanese government will take the leadership of the social informationalization in Japan to promote the following policies:

- a. To formulate a master plan of the social informationalization as soon as possible.
 - (a) The main targets of social informationalization will be social development type project such as traffic, transportation, distribution and urban development, and sub targets will be welfare type projects such as pollution, medical care and education.
 - (b) We will have to promote the nationwide scale informationalization instead of a limited scale in a region, and also promote the standardization and community in international base.
 - (c) To develop integrated indicators to measure the degree of the progress of the social informationalization.
- b. To promote social informationalization in the form of the following national projects.
 - (a) To appoint special officer in charge of informationalization and establish cabinet member meeting.
 - (b) To utilize private organization such as think tank and developer in the process of planning and implementation.
 - (c) To use the newest scientific methods such as cost benefit analysis and TPBS (Targets Setting, Policy Model Building Scheduling developed by the Computerization Committee) for the selection and management of the national projects.
- c. To implement concurrently a series of policies to have supports and coordinations from people in Japan.
 - (a) To legislate laws and procedures for the protection of privacy, exclusion of centralization and monopolization of information.
 - (b) To introduce a feedback system to reflect people's ideas and opinions about informationalization policies of the central and local government.

- d. To implement radically computer oriented education from the long range stand point to cultivate and popularize a new way of thinking to respond information society in the future (computer mind).
 - (a) To introduce computer oriented education such as man-machine interaction type education to develop problem solving ability by the individual education in the elementary and the secondary school.
 - (b) To set up new information science department or expand the information science education to study professional techniques concerning interdisciplinary knowledge and systems analysis in the high grade education such as university and high school.
 - (c) To develop learning system to utilize network of knowledge for the education and the potential capability development of babies and children and reeducation of the member of the society.
 - (d) To prepare new education method to learn new morals to popularize the democratic way of action to meet the information society in everyday living.

APPENDIX 3. WHAT IS TPBS ?



What is TPBS?

TPBS is the abbreviation of Target Setting, Policy Model Building & Scheduling. TPBS was developed by the Computerization Committee in the Japan Computer Usage Development Institute in 1971. It is a new method which may be used for any large scale planning. Two computer programs were developed to formulate and evaluate the information society plan in Japan using a color display unit and a terminal.

In the first stage of TPBS, a final target has to be decided. Then the process to attain the final target is divided into many stages. Finally the conditions of target attainment such as money, people and facilities are expressed in figures, and the effects of changes of conditions for the target attainment are simulated by computer.

The Characteristics of TPBS

1. It is a generalized system for the formulation and evaluation of a large scale plan.
2. TPBS can examine the change of the degree of target attainment by the operation of the chains of the means.
3. TPBS is an open system, and it is easily improved after the finishing of planning.
4. Professional knowledge is not required to use TPBS.
5. Man-machine interaction mode TPBS using time sharing system is the best way to utilize TPBS although batch processing mode TPBS is available.
6. Systems analysis was introduced into TPBS as one of the basic concepts. The qualitative factors in forecasting and planning can be analyzed by TPBS.
7. TPBS starts from a desirable and idealistic plan based upon intuitive long range forecasting. It also requires information concerning a feasible plan which is an extension of the current conditions. Then the gaps between the desirable plan and the feasible plan are examined by the simulation of policy model to get final answer.

Three Basic Design Principles of TPBS

The followings are the basic design principles of TPBS:

- to utilize man-machine interaction to insight relationships among the qualitative factors.
- to select critical factors carefully and built in these critical factors to the system. In other words, unimportant factors are ignored to prevent meaningless and complicated analysis.
- to use module structure to give the flexibility to meet the dynamic change of environment.

Procedures of TPBS

There are three phases in TPBS.

Phase 1. Target setting

1. to make clear a desirable and feasible vision in the future. (example: the final features of the information society in 1985).
2. to establish major targets and sub targets (example: the establishment of computer mind in Japan and the development of management information systems).
3. to describe means for each sub target by the development stage. (example: software development and training of systems engineer).

Phase 2. Policy model building

1. to set up functional elements which are a combination of money to be invested, people to be required and facilities to be constructed etc., and collect data for functional elements. (example: government funds for the software development and numbers of trainers for the training of systems engineers).

2. to make a network system which combines logically targets, means and functional elements. This network system is called as the policy model.

Phase 3. Setting of time limit and method

1. to set ideal time limit, probable time limit and feasible time limit for target and sub target. (example: 1985 for administrative data bank and 1976 for management information system training center).
2. to set priorities for feedback simulation. (example: #1 priority for target C and #2 priority for target H etc.).
3. to set weight to dissolve the gap between the desirable target value and the feasible target value. (example: weight 8 for the target A and weight 3 for the target B etc.).
4. to decide code numbers to identify targets, means and functional elements in a same category. (example: #1 for software development and #2 for data bank etc.).

Phase 4. Evaluation by simulation of policy model and feedback

1. to print out the first results of a simulation in a given conditions from a computer program.
2. to print out the gap between desirable target value and the first simulation results.
3. to examine the dissolution of gaps by the following feedback mechanisms.
 - extension of time limit
 - decrease of the scale of project
 - grade down of the development stage
4. to analyze the dissolution of the gaps by the change of values of means and functional elements by the change of priorities and weights for each target.

5. to select a final plan which is not only desirable but also feasible after the analysis of the comparison of many alternatives.

Input of TPBS

Input of TPBS are the following items:

- (1) Final target and its time limit
- (2) Major target and its time limit
- (3) Sub target and its time limit
- (4) Means and its time limit
- (5) Functional element and its time limit
- (6) Relationships among these factors
- (7) Unit of the extension of time limit, the decrease of scale of project and grade down of development stage
- (8) Priorities
- (9) Weights

Output of TPBS

Output of TPBS are the following items and figures:

- (1) The first simulation results in a given initial conditions
 - Achievement year in each stage
 - Total amount of investment to be required and details
 - Total number of people to be required and details
 - Number of facilities to be required and details
 - Period to be required to implement a project

(2) The gap between target and the first simulation results

- Period
- Funds
- People
- Facilities

(3) The results of gap adjustment by Nth feedback

- Period
- Funds
- People
- Facilities

(4) Final plan before final adjustment

(5) Results of gap adjustment by the priorities and weights

- Degree of improvement
- Period
- Funds
- People
- Facilities

(6) The best plan to be implemented and its details

Comparison among TPBS and Other Methodologies

The comparison among TPBS and other methodologies may be helpful to explain the characteristics of TPBS indirectly. K L Method was developed by Dr. Jiro Kawakita which is frequently called the Brain Storming Method in Japan. We think that K J Method can contribute in the very early stage of planning to make explicit the targets and means. The members of the Computerization Committee used K J Method to discuss and make explicit the desirable targets of the information society in Japan. Then we used TPBS for the formulation and

evaluation of the information society plan. There is a common factor in TPBS and K J Method. This common factor is to put importance for the intuition. But K J Method and TPBS are different because the former is applied in the early stage of planning and the latter is applied in the later stage of the planning.

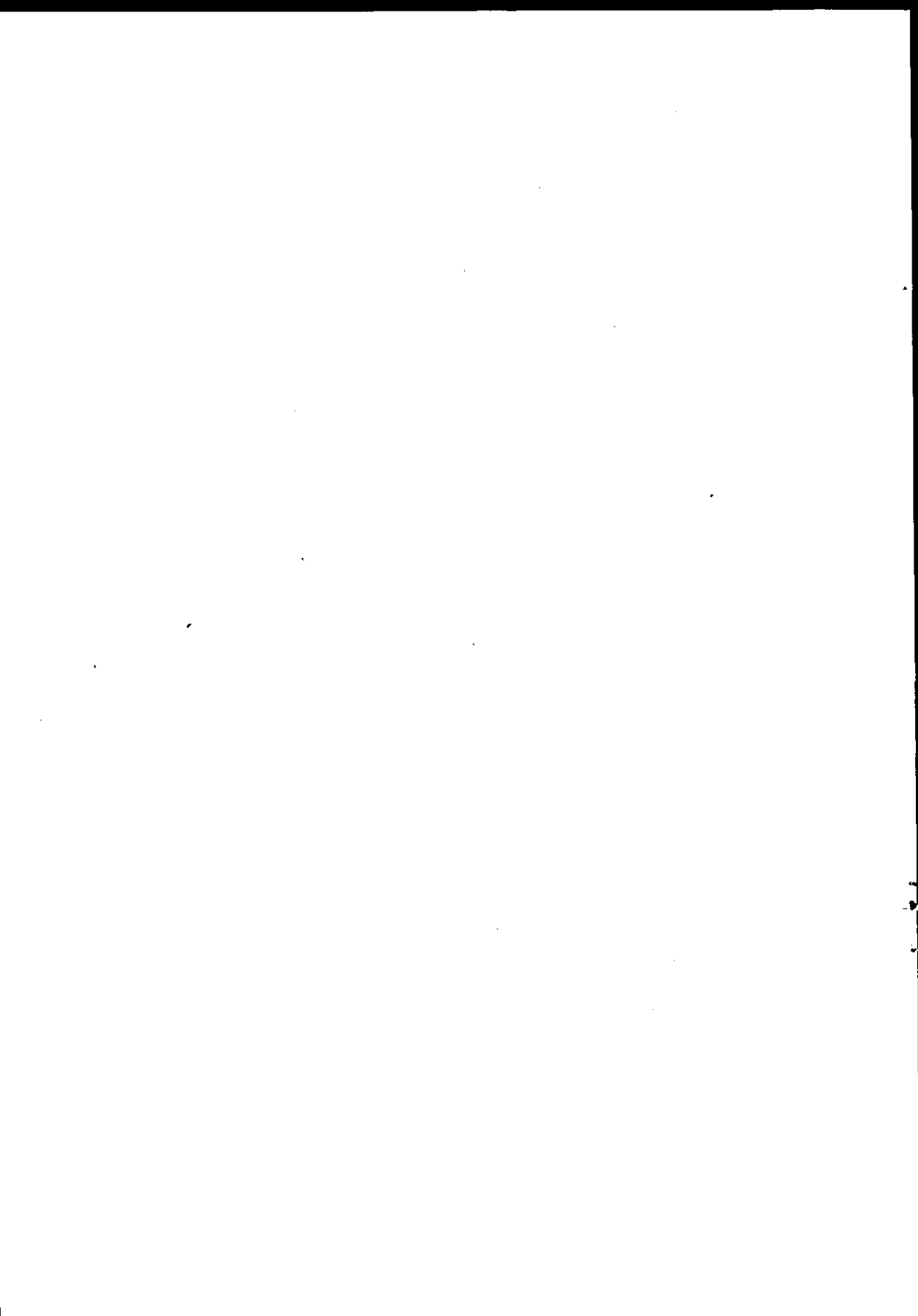
Delphi Method is useful for the technological forecasting. Delphi Method is useful for technological forecasting but not useful for the long range planning because it does not contain logical relationships to predict the future. TPBS is a network system which can be simulated by the operation of functional elements.

Cross Impact Matrix Method is a new method for the technological forecasting. The advantages of the Cross Impact Matrix Method is that it can analyze not only the main effects but also sub effects in the future. On the other hand, TPBS is more concerned about the possible combination of means which is called functional element to attain the target. Functional element is expressed in a form of amount, number of people, number and scale of facilities which can be controlled by policy. In other word TPBS is a policy-oriented method to shape the future such as information society in 1985.

PPBS was developed by the Department of Defense in the U. S. A. The introduction of systems analysis concepts are the common factor between PPBS and TPBS (and also the similarity of the abbreviation). We believe that TPBS is more easy to use in the government and corporation than PPBS, and TPBS considers broader framework and emphasize the importance of qualitative factors which is frequently called Japanese way of thinking.

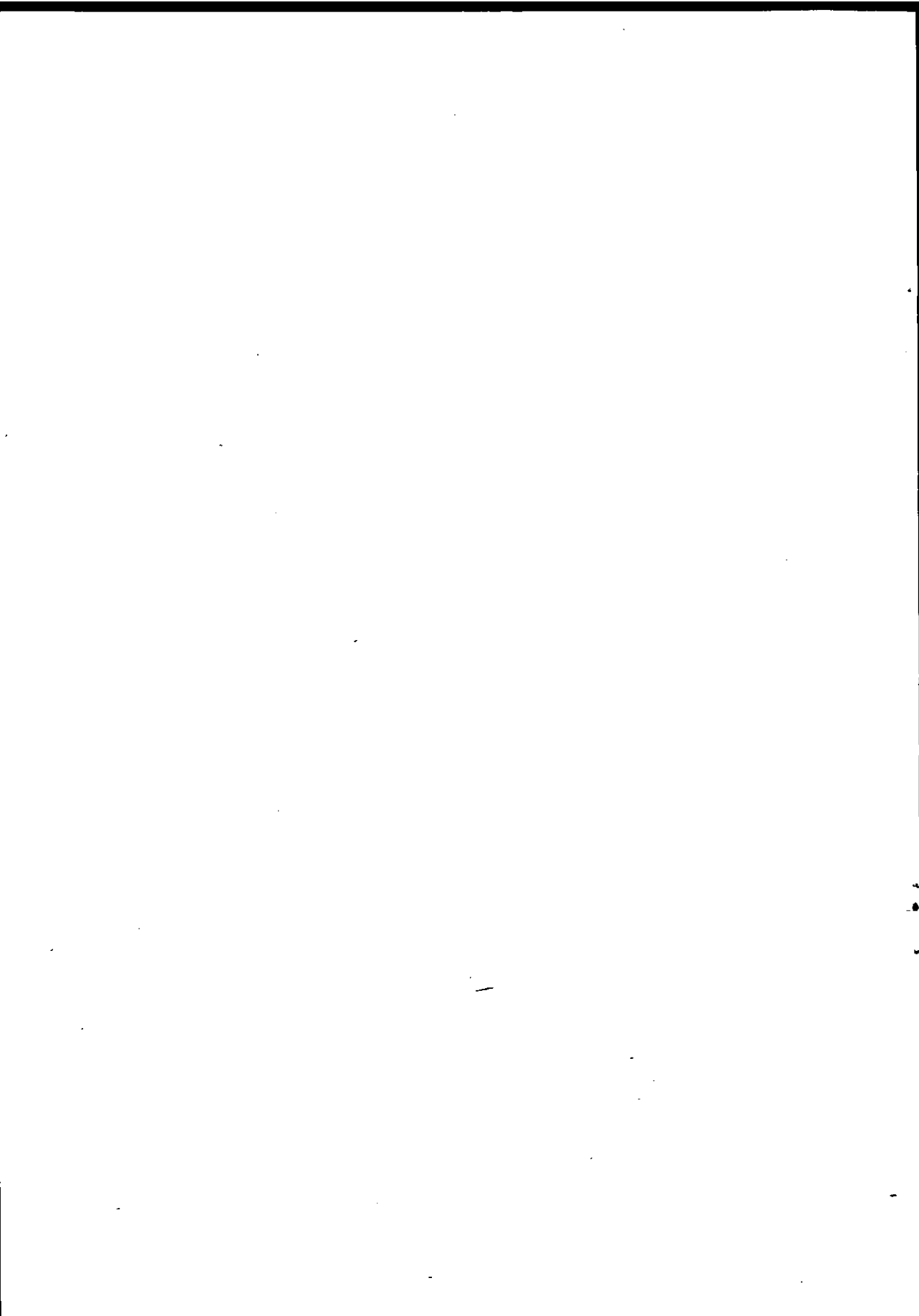
Linear Programming is widely used in various fields such as transportation problems and optimal allocation problems. Linear Programming provides a best solution for a specific problem which is appropriate for LP. TPBS can not provide an optimal and best future plan in terms of LP terminology. For instance there may be another better information society plan in Japan rather than the Computerization Committee plan. But how can we identify the optimal future plan? We don't know. One of advantages of TPBS is that it can apply for central, local and managerial long range planning in various fields. Sometimes better plan and general purpose planning system may be more helpful than best solution and limited application.

Please note that we are not saying "TPBS is better than any other methodologies". What we try to say was that difference among TPBS and other methodologies. We understand that each method has each advantages for a specific purpose, and these advantages turn to disadvantages for other purposes.



APPENDIX 4. THE INTERNATIONAL OPINION POLL ON

THE "PLAN FOR INFORMATION SOCIETY"



The international opinion poll on the 'plan for information society'*

**Shuzo Inaba and
Yoneji Masuda**

*Japan Computer Usage Development Institute
Tokyo, Japan*

Preface

'It is the result of a considerable imaginative effort. It tries to determine new, interesting, non-material objectives for mankind. The world should be grateful to the Japanese people for presenting so clearly issues which are vital to the future of mankind'.

J. M. Gibb
Assistant Director,
General Commission
of the European Community,
Luxembourg

'I am a very strong supporter of the idea that information covers by far more than is usually recognized of the governmental and administrative activities as well as of industrial management. I hope that I shall be able to remain in contact with you for a further exchange of views'.

H. Konig
Ministerial dirigent,
France

'I have taken the liberty of having the questionnaire completed by staff members of the Common Carrier Bureau. The proposed plan is bold and stimulating, and has given our staff additional insight into the potential impact of information systems on our society'.

Dean Burch
Chairman, Federal Communication
Commission, USA

'I am very enthusiastic about your project. I wish you the best of success with it.
I hope that ICCC will be able to actively contribute to your efforts'.

Reg. A. Kaenel
ICCC Founder, USA

'The amount budgeted to global cooperation in the development of the world information society reflects the importance of information as a tool toward global interdependence.
For allocating resources to this humanistic goal, Japan and the ICUDI deserve to be applauded'.

J. Richardson
Acting Director US Department
of Commerce, Office of
Telecommunication, USA

'This is a fascinating document and views and ideas expressed therein are a most useful background for our work of long term forecasts of demand for data communications services'.

G. Dale
Controller, Data Communications
Marketing, England

'I think this plan is a magnificent effort at trying to handle an entirely new emerging actual situation and a social aspiration toward a new kind of society which is basically concerned with higher levels of self-actualization of the individual'.

A. J. Dakin
Professor of Urban and
Regional Planning, Canada

'The study shows what kind of problems can be tackled in a vigorous development of technology and what resources will be necessary for this attack'.

G. Hambræus
Daniel Sundstrom IVA,
Sweden

At the outset of this report, we introduced some of the comments and letters addressed by respondents. We did this in order to express our gratitude in this way to Japanese and foreigners for their deep understanding of our questionnaire and for their positive cooperation in our work.

This report has been prepared to sum up the results of the international opinion poll on the 'plan for information society', which was earlier prepared by our institute. The cooperation of the respondents in this questionnaire was more positive than we had expected. In filling out this questionnaire, addressed to individuals the following organizations to which such individuals belonged, held discussions on the items of the questionnaire: The Federal Communication Commission of the United States, The National Economic Development Agency of the United Kingdom, the Banking Manage-

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ment Institute of the United States, the Bell Laboratories of Canada, the Watson Institute of IBM, Lytton Industry. Further, more than 10 respondents gave detailed comments in addition to filling out this questionnaire. (The respondents are listed and their comments are summed up at the end of Part I of this report.) I avail myself of this opportunity to express my deep gratitude to these organizations and individual respondents for their positive cooperation. These facts, we understand, mean that the 'plan for information society', worked out by us, has aroused deep reaction and interest not only among people concerned here but also among people and organizations concerned in foreign countries.

Our institute will hereafter pay utmost attention to opinions and comments by these Japanese and foreigners who cooperated in our questionnaire in order to improve our plan and make it really acceptable, and is resolved to make increased efforts for its realization.

October 1973

Shuzo Inaba, President

Yoneji Masuda, Project Director

Japan Computer Usage Development Institute

Summary of the 'plan for information society' - a national goal toward the year 2000

1. It is our conclusion that Japan has to change its goal from industrialization to informationalization in order to prevent social and economic problems such as dollar shock, pollution and congestion in urban areas, which have been caused by the extension of industrialization.
2. If we adopt the principle of laissez-faire in the process of the realization of the information society, corporate MIS, automation and commercial-based computerization will be augmented, on the other hand however the computerization of medical and educational fields will be postponed and we will face the flood of information. Therefore we recommend that the Japanese government formulate an integrated plan for information society and guide enterprises and people in Japan.
3. We propose a medium-term plan and a long-range plan for information society. We also propose that the final national goal is to realize a new information society, which will bring about 'a general flourishing state of human intellectual creativity' by the year 2000, and the medium goal year of the plan will be 1985.
4. The medium-term impact plan is a five year plan (1973-1977) and will require 1,000 billion yen investment of national funds. The following are the major projects in the medium-term impact plan:
 1. Computopolis plan
 2. Computer oriented education experiment school district
 3. Think tank center
 4. Labor force redevelopment center
 5. Computer peace corp
5. The long-range basic plan will require 20,000 billion yen investment of national funds. The following are major projects in the plan:
 1. Formation of the nationwide information network (1 million cables)
 2. Administration information center for the integrated policy decisions
 3. Data bank by industry up to fifty industries
 4. Computer oriented education which covers elementary, secondary and high schools all over Japan
 5. Remote medical care to replace doctorless areas (currently there are 570 doctorless areas in Japan)
 6. Pollution information center including warning of the pollution
 7. Large scale supermarkets which sell fresh foods up to 1,000 stores
 8. CVS in the center of Tokyo (automatic driving transportation system)
 9. International cooperation of medical and educational networks using communication satellite
6. We recommend the establishment of the national conference which includes the representatives of labor unions and consumers and the citizen coordination system. We also recommend the promotion of the third sector, which includes hospital supply public corporation to increase the efficiency of hospital management, think tank center, new town development public corporation, industry data bank and compulsory education.
7. The merits of the realization of this plan are as follows:
 1. Formation of information industry (20,000 billion yen sales) as a leading industry in Japan
 2. Prevention of illness which resulted from pollution
 3. The fantastic changes in educational and medical systems such as gradeless education and individual medical data file
 4. The installation of home terminal up to 250,000 sets
8. There will be a possibility of demerits in the process of the realization of the information society. We will have to solve problems by administrative and technical treatment such as laws, information

reviewing organization and labor redevelopment center, etc.

The demerits may be summarized as follows:

1. Invasion of privacy and information flood
 2. The increase of class gap between intellectual elite and people who enjoy leisure
 3. Information pollution such as loss of humanity and morals
9. The important prerequisites for the realization of this plan will be as follows:
1. The transformation of the nature of computerization from a commercial base to a social base
 2. Sustained growth of GNP centering knowledge industry
 3. The change of basic government policy from the promotion of the development of information industry to the promotion of society conscious computerization
 4. The level of the human intellectual creativity through a man-machine oriented way of thinking
10. We propose the following three trigger factor projects and three urgent projects from the long-range point of view.
1. Remote medical care system
 2. Computerization of school business
 3. Administration data bank
- Urgent projects:
1. Computer oriented education in elementary, secondary and high schools
 2. Information assessment board
 3. Nationwide data transmission networks

Outline of results of the international opinion poll on the 'plan for information society'

The computerization committee (chairman: Kazue Kitagawa, adviser to Sumitomo Electric Industries, Ltd.) of the Japan Computer Usage Development Institute conducted an international opinion poll by sending a questionnaire to authorities and specialists here and abroad who are directly or indirectly involved in the above-mentioned question, in order to further enrich and improve the contents of a report entitled 'A plan for information society' earlier prepared by the committee.

The questionnaire was sent to 560 persons, that is, 372 persons living in Japan and 188 persons abroad. As a result, 191 replies to the questionnaire were received from Japanese and 58 replies from foreigners. The rate of replies to the number of persons to whom the questionnaire was sent was 51.34% for Japanese, and 30.85% for foreigners. These percentages were higher than the committee had expected. Since about 70% of the Japanese respondents and slightly more than 80% of the foreign respondents were specialists, it may be

said that the results of the opinion poll were highly significant.

Three replies were received from abroad, after the replies from abroad had been tabulated. Therefore, the total number of replies from abroad reached 61 (32.44%). Although these three replies were not included in the tabulation, their comments were used in analysing the results of the opinion poll.

Results of the opinion poll are outlined below:

1. Almost all the respondents (97.4% Japanese, 100% foreigners) highly appraised our plan for information society. As reasons for appraisal, many Japanese and foreign respondents cited the vision, purpose and the comprehensive nature of the plan.

However, two of the Japanese respondents (1%) replied that the plan was 'harmful', saying that it accepted information society unconditionally as an 'ideal picture of society'.

2. As for the 'establishment of computer-mind' (living and thinking attitudes consistent with the requirements of information society), which is set as a medium range target in the plan, nearly 70% (68.1% Japanese, 67.2% foreigners) of the respondents supported it as 'appropriate', while 21.4% of the Japanese respondents and 25.9% of the foreign respondents, said that it was not 'appropriate' and 'rather erroneous'.

Many of these respondents pointed out that it was not the setting itself of 'establishment of computer-mind' as the medium range target but the wording that they considered 'improper', saying that the image it gives was rather technical and special and that the expression tended to be misunderstood as meaning 'mechanization of individuals'. At the same time, some were of the opinion that man's thinking and attitudes can not be changed in such a short time.

3. As for 'the year 1985' by which time the medium-range target is to be accomplished according to the plan, Japanese respondents were rather optimistic, with about 60% of them replying that the target was proper - some of them even went so far as to say that the year 1985 seemed to be too late - whereas 50% of the foreign respondents, or a slightly lower rate than for Japanese respondents, said that the target was 'reasonable'.

In contrast to Japanese respondents, many of the foreign respondents who took a negative attitude toward this target, said that it was too ambitious and judged that it would be impossible to hit the target by 1985. The largest group among them held that the proper date for the accomplishment of the target would be around 1995.

4. Regarding the proposed 'utilization of the third sector' (enterprises invested in jointly by the government and private enterprises), about 60% of the Japanese and foreign respondents supported the idea, while

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some 15% of them did not support it.

Many of those who considered the establishment of the third sector 'not proper', held that the government should undertake the work exclusively.

Among those who did not espouse the idea of the third sector, there were some who said that the work should be undertaken by private enterprises, while others proposed that the work should be managed by those who invested in it.

5. With respect to the fact that in our plan emphasis is laid on 'the introduction of information oriented sys-

tem into social areas' such as medical care, education, goods distribution and anti-pollution systems, about 85% of both the Japanese and foreign respondents supported the concept. The percentage for Japanese respondents in this respect was surprisingly close to that for foreign respondents. A respondent said that 'I would pay tribute to Japan if Japan has succeeded in making the Vietnamese and the Chinese understand the significance of these social systems'.

6. As for our question: 'Which of the nine projects listed in the medium-range impact program, would have the strongest impact effect?' the marked differences in ranking between Japanese and foreign respondents are listed in Table 1.

Table 1

Japanese respondents		foreign respondents	
1. Broad-area medical care system	(24%)	Computopolis plan	(30%)
2. Administrative data bank	(21%)	Computer-oriented experimental educational system	(17%)
3. Broad-area anti-pollution system	(19%)	Broad-area anti-pollution system	(14%)
4. Computopolis plan	(14%)	Administrative data bank	(12%)
5. Computer-oriented experimental educational system	(12%)	Think tank center	(11%)
Total	(90%)		(84%)

There is a remarkable difference with respect to the 'medical care system', which ranked first among the Japanese respondents and placed sixth among the foreign respondents. Regarding this difference, we may say that this reflected differences in medical care systems between Japan and the United States. (The Japanese system is of a mutual aid type, while the medical system in the United States is undertaken by private enterprises.)

The fact that the computopolis plan was supported at a high rate by foreign respondents, is explained by its high demonstration effect. The high ranking for a com-

puter-oriented experimental education system given by foreign respondents was based on the recognition that education is to play an important role in the development of information society or in the fostering of computer-mind, indicating their deep understanding of information-society.

7. In contrast to sharp differences in the ranking of medium range impact projects, there was not much difference between Japanese and foreign respondents in 'the ranking of the 11 projects incorporated in the long-range fundamental program' (see Table 2).

Table 2

Japanese respondents		foreign respondents	
1. Nationwide information network	(22%)	Nationwide information network	(22%)
2. Modernization of medical care system	(16%)	Popularization of home terminals	(15%)
3. Computer-oriented education	(13%)	Rationalization of administration	(15%)
4. Rationalization of administration	(12%)	Computer-oriented education	(14%)
5. Measures against public damage due to information	(9%)	Modernization of medical care system	(10%)
6. Popularization of home terminals	(4%)	Measures against public damage due to information	(9%)
Total	(76%)		(85%)

However, there was a conspicuous difference between Japanese and foreign respondents in the ranking of the project of 'popularization of home terminals', which ranked second among foreign respondents and sixth among Japanese respondents. It is considered that this is due to the fact that Japan is backward as compared with foreign countries in the popularization of time sharing systems (joint utilization of computers).

Further, respondents proposed various projects which they considered more important than the projects listed above. It is interesting to note that respondents made project proposals related to political affairs, with some Japanese proposing 'a national consensus collection system' and foreign respondents suggesting introduction of 'an automatic voting system for the masses'.

8. Concerning the measures proposed in the plan for 'the prevention of public damage or nuisance due to information', about 40% of the Japanese respondents and 50% of the foreign respondents replied that the measures proposed were sufficient, while about 20% of the former and some 40% of the latter said that they were insufficient. Thus, the percentage of foreign respondents who were critical of the measures proposed, was higher than that of Japanese respondents replying in the same way, and more than 20% of the Japanese respondents were 'noncommittal'. This seems to indicate that the Japanese still have a lower individual consciousness and that they are still lacking in the recognition of harmful public effects that may be caused by information.

9. Replies to the question, 'Do you think that similar systems will be implemented in your country in the near future?' showed that there is a time lag of about five years between Japanese and foreign respondents. Thus, as many as 70% of the Japanese respondents expected that part of this plan would be implemented within five years, while 30% of the foreign respondents replied that such a plan would be drawn up within 10 years, and about 20% of them, within 20

years. Countrywise, the percentage of those who took a negative attitude toward projects of this kind was relatively higher for those in the United States, Britain and Italy, while the percentage was lower for those in Sweden and France. At the same time it was interesting to note that about 60% of the respondents in the United States, the home country of free enterprise, recognized the possibility of planning in the future.

10. Asked 'if a plan of this kind would be developed into one of an international scale', Japanese respondents replied in the affirmative at a rate double than that for foreign respondents (40% of the Japanese respondents, and 20% of the foreign respondents). Thus, Japanese respondents were more optimistic about the development of information-oriented systems on an international scale.

11. Foreign respondents were asked what they thought was the greatest problem in this plan. About 60% of the foreign respondents commented on this question. The largest group of them expressed doubts about the accomplishment of the target for 'computer-mind', presenting a more basic question of whether or not man's natural character can be changed by communication technology. Next in order of importance, they presented problems concerning the economic aspects of the plan (doubts about sustained economic growth, and enormous funds required), time limitations placed on the plan (target set on 1985 for accomplishment), and behavioral consciousness (resistance) of the masses.

12. Some 40% of the correspondents made concrete proposals for improvement. The proposals thus made, numbered more than 70. Proposals on measures against the 'demerits of information society', particularly those against the invasion of privacy, were the largest in number, followed by proposals on 'enlightenment and popularization' and on 'model experiments' for the purpose of assessment and fact-finding.

Part I

Summing up of replies to the questionnaire from foreigners

The following is an outline of the replies to the questionnaire from foreigners.

Q1. Where do you belong in the following categories regarding this survey? (Check the appropriate box.)

Table 3

	Japan		other countries	
	number	%	number	%
1-1 Have actual work experience	79	41.4	29	50.0
1-2 Have special knowledge through research or study	53	27.7	20	34.5
1-3 Have general knowledge through reading or hearing	47	24.6	8	13.8
1-4 Have not sufficient knowledge	9	4.7	0	0
	3	1.6	1	1.7
Total	191	100.0	57	100.0

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The questionnaire was sent to a total of 188 foreigners, of which 58 persons or 30.85% replied. Of those who replied to the questionnaire, 49 persons (84.5%) were specialists and 8 (13.8%) were non-specialists. One person (1.7%) did not give a valid reply (see Table 3). Thus, slightly more than 80% of the foreign respondents were specialists, and this percentage was slightly higher than that for the Japanese respondents. The specialists who replied to the questionnaire are broken down as follows: 29 persons (50%), who 'were

experienced in the work related to this project', 20 persons (34.5%), 'who were not experienced in the work but had a specialist knowledge of the work through their research work', and 8 persons (13.8%), who 'had a general knowledge of the question through reading books or attending seminars'.

Classified by country, 22 persons (37.9%) were Americans, 9 (15.5%) Swedes, 5 (8.6%) Englishmen, 4 (6.9%) Frenchmen, another 4 (6.9%) Italians, 3 persons (5.1%) each were West Germans and Canadians, 2 (3.5%) each Dutchmen and Belgians, and 1 (1.7%) was Finnish. The nationality of the remaining 1 person (1.7%) was not known.

Q2. How do you evaluate the 'plan for information society'?

Table 4

	Japan		other countries	
	number	%	number	%
2-1 Value highly	113	59.2	34	58.6
2-2 Value to some extent	73	38.2	24	41.4
2-3 Do not value highly	0	0	0	0
2-4 Think the plan is harmful	2	1.0	0	0
	3	1.6	0	0

Of the foreign respondents (see Table 4), 34 persons (58.6%) said that they 'highly valued the plan for information society', while 24 (41.4%) replied that they 'valued it to some extent'. Thus, all the respondents highly valued the significance of the plan. In this respect, 97.4% or almost all of the Japanese respondents attached importance to the plan.

Comments by foreign respondents

Of the 34 persons who replied that they valued the plan highly, 27 persons made comments on the plan. Of these, 23 persons stated the reasons why they highly valued the plan, 14 persons emphasized the significance of the plan and 8 made casual comments, while three persons expressed their opinion or made critical remarks on the plan. The total number of comments was larger than the number of respondents because there were some persons who made comments on two or more items.

The contents of the main comments are as follows:

The reason why they highly value the plan

'It is the result of a considerable imaginative effort'.

'It is the only comprehensive master-plan ever worked out'.

'The plan has been elaborated concretely and thoroughly'.

'The basic philosophy is solid and clear'.

Significant

'It tries to determine new, interesting, non-material objectives for mankind'.

'It is important that these problems are investigated and that plans are made for the future'.

'It meets adequately an actual need of changing the structure of the society'.

Impression

'Imaginative and far-reaching'.

'It is good but optimistic'.

'Public recognition is an essential step in the developmental process'.

'Maximisation of opportunity for human intellectual creativity as ultimate goal'.

'Feedback effects are explored and taken into account'.

Advice

'Rationale for the plan and overall framework not sufficiently well developed'.

'A clearer picture of how to get from here to there is needed'.

'Much more experience is needed with pieces of the plan'.

On the other hand, of the 24 persons who said that they valued the plan to a certain extent, 23 persons made comments. Of these, 9 persons gave the reasons why they valued the plan, 9 made casual comments, while 24 persons gave their opinions or made critical remarks on the plan. The number of comments is larger than that of the respondents, because there were persons who made comments on two or more items.

The contents of the comments made are as follows:

Reasons and impressions

'The plan shows a possible way to solve present and future problems of society'.

'The proposed plan is both bold and broad in scope'.

'Public recognition is an essential step in the developmental process'.

'Represents a realistic view of the future and the im-

portance of planning. Japan is a very advanced society to recognize this'.

'The reports seem over-enthusiastic and over ambitious. This detracts from its credibility'.

'It seems to be a little too optimistic'.

'Plan is linked to economic growth which might not occur to some extent'.

'Many key definitions vague (computer mind) ...'

Q3. The basic framework of the plan consists of the following. What is your opinion about each of them?

Q3-1. About setting 'establishment of the computer mind' as an intermediate target.

Table 5

	Japan		other countries	
	number	%	number	%
3-1-a Appropriate	130	68.1	39	67.2
3-1-b Not very appropriate	36	18.8	12	20.7
3-1-c It is wrong	5	2.6	3	5.2
3-1-d Cannot answer	15	7.9	3	5.2
	5	2.6	1	1.7

The 'plan for information society' defines its ultimate objective as the establishment of 'a society in which the intellectual creative capacity of people attains a general efflorescence', and sets 'establishment of the computer mind' as the intermediate target to be attained on the way to the achievement of the ultimate objective. Asked if the setting of 'establishment of the computer mind' as an intermediate target is appropriate or not, 39 persons (67.2%) said that it was appropriate, while 12 persons (20.7%) replied that it was not appropriate and 3 (5.2%) said that it was wrong (see Table 5).

These results show that the foreign respondents were divided on this question in about the same way as the Japanese respondents were, but the fact that slightly less than 70% of both the foreign and the Japanese respondents regard the setting of this target as 'appropriate', appears to indicate the reasonableness of this intermediate target in the plan for information society.

However, it is necessary to pay special attention to the fact that 26% of the respondents said that the establishment of the computer mind as an intermediate target was either improper or wrong. Most of those who took this negative attitude, gave neglect of human nature as the main reason.

Comments

The questionnaire did not ask those who replied that it was proper, to make comments. Consequently, no comments were made. Some of the comments made by those who replied that it was not proper are as follows:

'Establishment of the computer-mind sounds too technical'.

'Computer-mind implies machine-like behavior and mechanization of the individual'.

'The concepts of information and communication should be stressed'.

'Computer is only a tool or skill'.

'Computer-mind can be achieved only in the long term, also would require complete reversal of mankind's ethical behaviours'.

'Reeks too strongly of mind control'.

'This is a specific example of extreme application of value judgement'.

'Adapt the system to the people, not the people to the system'.

Q3-2. About setting the year 1985 as the target year for the attainment of the plan.

Table 6

	Japan		other countries	
	number	%	number	%
3-2-a Appropriate	109	57.1	22	37.9
3-2-b Not very appropriate	34	17.8	29	50.0
3-2-c Utterly wrong	6	3.1	1	1.7
3-2-d Cannot answer	35	18.3	5	8.7
	7	3.7	1	1.7

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As for setting 1985 as the year for the accomplishment of the intermediate targets, 29 respondents (50.0%) or half of the total of respondents said 'not very proper'. Twenty-two respondents (37.9%) replied that the year set was 'proper', while one respondent (1.7%) said that it was 'rather wrong' (see Table 6).

There is a wide gap between Japanese and foreign respondents in their replies to this question. Japanese respondents were far more optimistic than foreign respondents, as more than half or 57.1% of the total Japanese respondents said 'proper', in contrast to 50% for foreign respondents. We may point out one of the reasons for this wide gap by the fact that the expression 'information society' was coined in Japan, where there

is a fairly established social consciousness of a transition from industrial to information society.

Comments by those who said 'not very appropriate'

'Too optimistic, seeing all difficulties'.

'Material investments underestimated'.

'The plan must be evolutionary over years and generations'.

'It supposes a peace situation, and a growing of GNP which is not very probable during a period of 15 years'.

'It is too early; people change more slowly and the problem is more complex than envisioned'.

The target year set for the attainment of the plan
Ten of the respondents specified the years to be set for the attainment of the plan, and of this number, half specified the year 1995 or thereabout. The breakdown of the years specified are as follows:

Two - 1990, two - 1993, three - 2000, 1 - one generation, 1 - two or three generations.

Q3-3. While relying on the national government for funds, let non-governmental body manage the organization.

Table 7

	Japan		other countries	
	number	%	number	%
3-3-a Appropriate	116	60.7	35	60.3
3-3-b Not very appropriate	31	16.2	9	15.5
3-3-c Utterly wrong	2	1.1	4	6.9
3-3-d Cannot answer	38	19.9	10	17.3
	4	2.1	0	0

As for the utilization of the third sector (utilization of both government and private funds), 35 respondents (60.3%) replied that it was 'appropriate', while nine persons (15.5%) said that it was 'not so appropriate'. Four respondents (6.9%) said that it was 'utterly wrong' (see Table 7).

As compared with the replies by the Japanese respondents, those who replied that it was 'utterly wrong' was higher in percentage than the Japanese respondents who chose the same answer. It may be said that the concept of utilization of the third sector is internationally supported to a certain extent.

Comments

Comments made by those respondents who replied that it (utilization of the third sector) was proper, are as follows:

'Program such as this can only be controlled by the Government'.

'Democratic control essential both to objectives and task organization'.

'Government has funding, but NGO has know-how'.

'Government bodies most likely most contribute even to the management'.

Q3-4. About setting the computerization in social fields as the main project of the plan.

Table 8

	Japan		other countries	
	number	%	number	%
3-4-a Appropriate	161	84.3	50	86.2
3-4-b Not very appropriate	21	11.0	6	10.3
3-4-c Utterly wrong	1	0.5	0	0
3-4-d Cannot answer	5	2.6	2	3.5
	3	1.6	0	0

Concerning the fact that emphasis in the 'plan for information society' is placed on computerization in social fields, 50 persons (86.2%) or nearly all of the respondents said that it was 'appropriate', while 6 persons (10.3%) replied that it was 'not very appropriate' (see Table 8). The foreign respondents reacted to this question in a manner very close to the way the Japanese respondents did. Thus, an overwhelming majority of the respondents supported computerization in social fields.

Comments

'It would be wiser to consider implementing non-social

projects before tackling large-scale and complex social ones'.

'Dependence on 10 percent sustained growth of GNP is ridiculous'.

'Need experience in more manageable application areas before starting large-scale social information system projects'.

'The social field overlaps the private and business fields almost completely. They must develop together or not at all'.

Q4. Which project is most important in the plan in your opinion?

Q4-1. As intermediate impact plan, (Select one from the view-point of impact.)

Table 9

	Japan		other countries	
	number	%	number	%
4-1-a Administrative data bank	43	21.7	8	12.1
4-1-b Computopolis plan	27	13.6	20	30.3
4-1-c Inter-regional remote control medical system	47	23.8	4	6.1
4-1-d Computer-oriented education in an experimental school district	23	11.6	11	16.7
4-1-e Inter-regional pollution prevention system	37	18.8	9	13.6
4-1-f Think tank center	8	4.0	7	10.6
4-1-g Introduction of MIS in medium-sized business	7	3.5	2	3.0
4-1-h Manpower redevelopment center	5	2.5	2	3.0
4-1-i Computer peace corps	1	0.5	3	4.6

Asked which of the projects was considered most important from the standpoint of an impact-giving effect, 20 persons (30.3%) selected 'computopolis' (CATV), 11 (16.7%) 'education', 9 (13.6%) 'pollution prevention systems', 8 (12.1%) 'administrative data bank', 7 (10.6%) 'think tank center', 4 (6.1%) 'remote control medical systems', 3 (4.6%) 'computer peace corps' and 2 (3.0%) 'manpower redevelopment center' (see Table 9).

In contrast to this, the three top-ranking items selected by Japanese respondents were 'inter-regional remote control medical system', 'administrative data bank', and 'inter-regional pollution prevention system'. Each of these items won a percentage of about 20 in contrast to the fact that 30% of the foreign respondents selected 'computopolis' as the most important impact project - this percentage was far larger than the percentage won for any other projects listed.

It is interesting to note that only 6% of the foreign respondents gave priority to 'inter-regional remote control medical system'. With this percentage, 'medical system' ranked fourth among the projects.

Comments

First place - Computopolis (CATV)

The respondents who selected this project were scat-

tered among the United States (7), Sweden (4), Italy (3), Britain (3), France (2) and Canada (1). This seems to indicate that this represented an internationally shared view. Most of those who selected this project, emphasized the significance of 'computopolis' as a model of the future information society.

'A model affecting all aspects of life is a community'. 'This plan will allow the practical experimentation of the maximum number of problems'.

'Greatest demonstrational impact'.

'Results most apparent to public'.

'Broadest experiment in applications - also has greatest communications impact'.

Second place - Computer-oriented education in an experimental school district

Most of those who selected this, stressed 'education' as a basic condition for changing man's consciousness and emphasized the need for the training of specialist engineers.

Basic condition (8)

'Required to start developing the computer-minded generation'.

'Education vital in any progressive society'.

'High visibility to the public'.

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'Education precedes 'think tank center' feasibility'.
'Education is a fundamental prerequisite to progress'.

Third place - Pollution prevention system in a broad region

'Because it is a condition to maintain the growing of GNP, which is the basis of the whole plan'.
'Before we create new problems through advanced technologies, we should try to clear up our living environment'.
'The pollution problem is pressing now'.
'Pollution control is one of man's most serious problems'.
'Problem cannot be solved locally'.
'The solving of the pollution problem represents a very important factor to appreciate a private life'.

Fourth place - Administration data bank

'Comprehensive all-over impact anyhow'.
'It seems to be essential to start with the most general problems and to proceed from general to specific tasks'.
'Would elicit the most immediate and dramatic results'.
'The very precondition for other public projects'.
'It can be closely related to the finance'.

Fifth place - Think tank center

'This is the key item for the successful development of the others'.
'The choice is difficult, because the joint effect is larger than the sum of the individual effects'.

Four of the respondents said that they highly valued the projects they selected, and three persons replied that they evaluated their choices to a certain extent. Thus, a total of 7 persons said that they evaluated the projects in some way or another.

Comments by those who said that they highly evaluated the projects

'Management education in MIS and Computers'.
'Computer usage popularisation attack through mass communication media'.
'A complete universal data network comparable to the present telephone network'.
'Additional emphasis on learning and manpower development within the framework of the Computopolis plan'.
'Equally important may be the use of person-to-person telecommunications'.
'Education on high level of politicians and people in government'.

Q4-2. Of long-term basic plan.

Table 10

	Japan		other countries	
	number	%	number	%
4-2-a Nationwide information network	44	21.8	16	21.6
4-2-b Rationalization of administration	24	11.9	11	14.8
4-2-c Upgrading of MIS	8	3.9	1	1.4
4-2-d Computer-oriented education	26	12.8	10	13.5
4-2-e Modernization of health care	33	16.3	7	9.5
4-2-f Pollution prevention system	10	4.9	3	4.1
4-2-g Modernization of distribution channels	9	4.4	1	1.4
4-2-h Computerization of traffic systems	7	3.4	1	1.4
4-2-i Diffusion of home terminals	13	6.4	11	14.8
4-2-j International cooperation in computerization	4	1.9	1	1.4
4-2-k Measures to eliminate demerits of computerization	18	8.9	7	9.5
	6	2.9	5	6.7

As for the projects for the long-term basic plan, 16 respondents (21.6%) selected 'nationwide information network' as the most important project, 11 (14.8%) 'rationalization of administration', 11 (14.8%) 'diffusion of home terminals', 10 (13.5%) 'computer-oriented education', 7 (9.5%) 'modernization of health care', 7 (9.5%) 'measures to eliminate demerits of computerization', 1 (1.4%) each 'MIS', 'modernization of distribution channels', 'computerization of traffic systems', and 'international cooperation in computerization' (see Table 10).

The selection by foreign respondents shows the same tendency as the selection by Japanese respondents in that 'nationwide information' ranks first for both Japanese and foreign respondents and that 'rationalization of administration' and 'modernization of health care' rank high. At the same time, 'diffusion of home terminals' ranks second for foreign respondents and sixth for Japanese respondents, indicating a difference in the understanding and recognition of home terminals between Japanese and foreigners (undeveloped state of time sharing systems in Japan).

No. 1. *Nationwide information network* (15)

'Basic to all the rest of most fundamental projects'.
'Creation of opportunities to other developing forces'.
'Despite the huge investment required, it is the first necessary step towards the information society'.
'Choice again dictated by the global concept, as the starting point'.

No. 2. *Diffusion of home terminals* (5)

'It will act as a stimulus for private industry to provide home services'.
'This is the most critical point for establishing 'the computer mind''.
'Home terminals are a condition to merge the whole nation into a big cybernetic system'.
'Until people learn to use computer power as a way of life and feel that they understand it, the other projects will not work'.
'Allows all citizens to participate'.
'Provides for intellectual advancement'.

No. 3. *Rationalization of administration*

'A prerequisite for an efficient society'.
'Represents the basis for most of the following points'.

No. 4. *Computer-oriented education*

'Education is the key to a socially aware society'.
'Education has the most long-range impact'.
'Educate before you attempt major changes'.
'Important that children get used to the computer'.
'To change a nation's concept of society, one must do it through education channels'.

No. 5. *Modernization of health care*

'Major impact on people's lives'.
'Man's most basic urge is survival'.
'The growing number of aged people will give rise to an increased health care problem'.
'This system, by providing needed medical services to the people, permits them to observe the personal benefits of using computers'.

No. 6. *Measures to eliminate demerits of computerization*

'If the demerits are not removed, each of the attained projects is threatened'.
'Demerits of plan must be evaluated, understood and analyzed in detail to insure public confidence'.

Four respondents said that they highly evaluated the long-range projects which they considered most important, and three replied that they valued them to a certain extent. In this way, a total of seven respondents supported the long-range projects which they considered most important.

'Popular referendum system - automated polling-system of the populace'.

'Computerization of production: CAD and robots'.

'Definition and standardization of information carriers and representations, and of messages'.

'Personalized information for institutions and individuals alike, as a major contribution to improving the quality of life and freedom'.

Q5. Do you think that the measures for eliminating demerits, to be provided along with the realization of the plan, are sufficient?

The concrete measures that are provided in the plan are:

1. Basic laws concerning information (protection of privacy, elimination of information monopoly, and the principle of opening to the public, etc.)
2. Information assessment organization
3. Manpower redevelopment center
Will of the people - direct reflection system
4. System for directly reflecting people's political will

Table 11

	Japan		other countries	
	number	%	number	%
5-1 Sufficient	80	41.9	30	51.6
5-2 Not sufficient	43	22.6	24	41.4
5-3 They don't work as measures to eliminate demerits	15	7.8	0	0
5-4 Cannot answer	44	23.0	2	3.5
	9	4.7	2	3.5

As for the measures for eliminating the demerits of computerization, 30 respondents (51.6%) replied that the measures listed in the questionnaire were 'sufficient', while 24 (41.4%) said that the measures were 'insufficient' (see Table 11). These results showed that the question of measures against the demerits of computerization were considered a complex and difficult question by foreign respondents, too.

The respondents were divided almost equally between the two attitudes.

While 45% of both the Japanese and foreign respondents said that these measures were 'sufficient', 40% of the foreign respondents replied that they were 'insufficient', or double the percentage of the Japanese respondents who said that the measures were 'insufficient'. These figures indicate that there is not sufficient recognition of the demerits of computerization among Japanese respondents.

Comments

No comments were made by those who said that these measures were 'sufficient', as they were not asked to express their views on this point.

Of the 24 respondents who said that these measures

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were 'insufficient', 22 or 90% made comments, showing among them a great interest in this question.

Difficulty of eliminating the demerits (8)

The largest group of respondents pointed out the difficulty of eliminating the demerits of computerization. The group was divided into two sub-groups.

One (a) pointed out the difficulty of defining and forecasting the demerits, while the other (b) emphasized the difficulty of eliminating the demerits from the standpoint of human nature and socio-economic systems.

'Extremely difficulty to foresee all the demerits that could occur in the very complex development of the information society'.

'It is questionable whether he/she is able to absorb the 'future shock'.

'There's always something unthought of'.

Insufficient planning (4)

The following comments pointed out insufficient planning and study, concerning the measures for eliminating the demerits of computerization.

'More detailed analysis of policy alternatives is needed before suitable judgements in this area can be made'.

'Need more planning and study'.

Complementary means (7)

Some respondents proposed measures other than those listed in the questionnaire.

'Laws and similar provision against unauthorized use and tampering provide only a partial solution and in fact raise more complex issues'.

'Distributed systems with checks and balances are preferable'.

'The measures envisaged will have to be worked out in cooperation internationally'.

Several other projects were proposed as 'more important'. The general contents of these proposals and the opinions of the respondents were as follows:

'More education and training will be required than the redevelopment center can provide'.

'Think tank' project to study elimination of demerits and to recommend protective measures.'

'Need a 'plurality' of information assessment centers'.

'A policy to secure the possibility of participation of all individuals to the information society, e.g., a simple and straightforward language for the access to information systems'.

'The more that members of society are aware of the characteristics, potential, and problems with information society, the less possibility there is for 'demerits' to occur in the system'.

'Major structural changes in society are necessary: institutions. Some knowledge of these is required before safeguards can be formulated'.

Q6. Do you expect that a plan similar to this will be formulated in your country in the near future?

Table 12

		(Japan)		other countries	
		number	%	number	%
6-1	Yes, in 5 years	(18)	(9.4)	9	15.5
6-2	Yes, in 10 years	(137)	(71.7)	18	31.0
6-3	Yes, in 20 years	(5)	(2.6)	10	17.3
6-4	Such possibility is almost nonexistent	(26)	(13.7)	17	29.3
		(5)	(2.6)	4	6.9

Within brackets are answers to the question concerning the realizability of the plan in Japan.

Nine respondents (15.5%) replied that they expected that similar plans would be formulated within five years, and 18 (31.0%) said that such plans would be formulated within 10 years. These comprised nearly 50% of all the respondents. On the other hand, 17 (29.3%) said that there was hardly any such possibility. In this way, the respondents were considerably divided over this question (see Table 12).

As Japanese respondents were asked a slightly different question, it is not possible to compare foreign respondents with Japanese in a simple way. But we may point out the following general tendency. Thus, while 71.7% of the Japanese respondents replied that part of the plan would be realized in Japan within five years, 31% of the foreign respondents said that a similar plan would be formulated within 10 years. There was a time lag of about 5 years between Japanese and foreign respondents.

Further, while 13.7% of the Japanese respondents were non-committal (or had doubts about the feasibility of the plan), 29.3% of the foreign respondents said that there was no possibility of such a plan being formulated. Thus, the percentage was double that for Japanese respondents. Classified according to country, those who took a negative attitude toward the formulation of such a plan were scattered widely among all the countries with the exception of the French who did not reply.

Countrywise percentages of respondents who said that there was no possibility of such a plan being formulated, in the total numbers of respondents classified by country are set out in Table 13. As this table shows, respondents who took a negative attitude were large in both absolute number and percentage for American, British and Italian respondents, while such respondents were few in number and percentage among Swedish respondents.

Table 13

	the number	negative answer	%
USA	22	8	37
Sweden	9	1	91
England	5	2	40
France	4	0	0
Italy	4	2	50
Canada	3	1	33
West Germany	2	2	100
Holland	2	0	0
Belgium	2	0	0
Luxembourg	2	0	0
Finland	1	1	100
Unknown	1	0	0

Comments

Comments on this question were made by those who made a negative reply (4). However, among those who replied 'Yes, in 5 years' or 'Yes, in 10 years', there were some who marginally commented 'probably' or 'I hope so'.

Of the 17 respondents who made a negative reply, 15 made comments.

Difference of national systems (6)

The largest number of them pointed out that such a plan was unacceptable in the light of the nature of their national systems. This tendency was particularly marked among the American respondents. Reasons given were somewhat different according to the different countries. American respondents pointed out the laissez-faire nature of their country, while Italian and Finnish respondents indicated problems regarding funds required and the consciousness of politicians.

USA

'We feel this program would meet insurmountable resistance from such national groups as the American Medical Association, School Teachers Unions and numerous other professional and semi-professional trade groups'.

'The development of such detailed plans in the social sector is not the common practice in the USA'.

'If my country lasts for 20 years, then many of the planned systems will have been realized independently. However, overall planning is virtually impossible here'.

'Such a national plan is incompatible with our present values of independence and free enterprise.

It is more likely that we may have a plan of subsidies and tax benefits to encourage developments along these lines, but not according to any plan'.

'American people will not cooperate with government-developed plans except temporarily during emergencies'.

Other countries

'The limited resources of the country'.

'Little awareness with responsible authorities'.

'The political instability of our country does not allow the statement and the fulfillment of such a comprehensive and complex plan'.

'For the time being the Danish community is far more interested in developing the human individual into a person who participates and is responsible for the well-being of the individual company, and society, etc.'.

'UK culture favours pragmatic, not idealistic, approach'.

'Partial plans will certainly be formulated; but in the political/social structure of the UK a similar comprehensive plan would be unlikely to gain acceptance'.

Q7. If this plan should be realized in Japan, to what extent will it influence your country?

Table 14

	(Japan)		other countries	
	number	%	number	%
7-1 It will give great influence	(110)	(57.6)	23	39.7
7-2 It will give some influence	(52)	(27.2)	28	48.3
7-3 It will not give much influence	(1)	(0.5)	6	10.3
7-4 It will only give a negative influence	(23)	(12.1)	0	0
	(5)	(2.6)	1	1.7

Within brackets are answers to the question asked to Japanese respondents.

Asked 'If this plan should be realized in Japan, to what extent will it influence your country?', 23 respondents (39.7%) said, 'it will give great influence' and 28 (48.3%) replied, 'it will give some influence' (see Table 14).

Thus, a total of 51 respondents or about 90% of the respondents said that it would give influence, while only 6 respondents (10.3%) said, 'it will not give much influence'.

This seems to indicate that foreign respondents are greatly interested in this plan for information society.

As the question asked to Japanese respondents is not identical with that asked to foreign respondents, it is not possible to compare their replies simply. But the following figures may be introduced here. A total of 110 (57.6%) of the Japanese respondents replied that 'there is a possibility of a similar plan being formulated' and 52 (27.2%) said that such a plan 'may be formulated'. If we regard these replies as replies recognizing the influence of such a plan on foreign countries, 85% of the respondents may be regarded as anticipating the influence of such a plan on foreign countries. Thus, the

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figure for Japanese respondents is close to the percentage for foreign respondents.

Comments

A total of 45 respondents or 80% of the respondents made comments on this question. Of these, 19 said that it would give an overall impact, and 10 said that the impact would be partial and not so positive. On the other hand, five said that it would give an international impact, while 7 highly appraised the Japanese plan. All these respondents said that they would watch the future development of the plan with keen interest.

Overall impact (19)

These respondents said that it would promote the formulation and implementation of similar plans in their countries. The largest group, or 43% of these respondents said that it would give a great stimulating effect. They were found mostly among the respondents who replied, 'it will give great influence'.

'If the plan can be realized in Japan, it will provide impetus for similar undertakings in many other countries, and may in fact, force a reevaluation of priorities'. 'Americans are competitive and will try to achieve leadership'.

'USA still too heavily involved in the Industrial Society and such plans usually have long gestation periods. Competition for international trade will encourage similar planning'.

'Stimulation of social and intellectual thinking; but small effect on political action'.

'The effects will of course depend on how successful your plan will be'.

'It will provide a small scale example of how we may attack a much larger problem'.

'Japan is a technological leader'.

'Japan is an important economic power'.

'Drastic changes in a big nation such as Japan will greatly influence the whole world'.

'The influence will probably be felt both directly and indirectly, i.e. via European institutions, such as the EEC'.

Q8. Do you expect that this kind of plan will be taken up on an international scale in the future?

Eleven respondents (19.0%) said that they 'certainly expected' that 'this kind of plan will be taken up on an international scale in the future' (see Table 15), while 26 (44.8%) replied that they 'expected so to some extent'. Those who made these replies accounted for slightly more than 60% of the total respondents. On the other hand, 16 (27.5%) said that they 'did not expect so much'.

Meanwhile, 41.9% of the Japanese respondents, or double the percentage for foreign respondents, said that they 'certainly expected so'. But at the same time 21.5% of the Japanese respondents - in contrast to less than 9% for foreign respondents - said that they 'opposed such a plan'. Those Japanese respondents who said 'I expect so to some extent', amounted to 30.9% of the total - somewhat close to the percentage for foreign respondents. These figures seem to show that Japanese respondents are more optimistic about the development of information society on an international scale than foreign respondents.

Table 15

		<i>Japan</i>		<i>other countries</i>	
		number	%	number	%
8-1	I certainly expect so	80	41.9	11	19.0
8-2	I expect so to some extent	59	30.9	26	44.8
8-3	I don't expect so much	4	2.1	16	27.5
8-4	I oppose such a plan	41	21.5	2	3.5
		7	3.6	3	5.2

Comments

Of the 24 respondents who made comments on this question, three positively supported the development of information society on an international scale, while six others proposed 'limited scope and methods' for the development of information society on an international scale. These totaled nine persons, or about 4% of the total. As against this, two respondents made 'negative comments', while nine others said that it was difficult because of many obstacles. Four others said that it will take a long time for it to be realized. Thus, those who made negative replies, accounted for more than 60% of the total. Respondents were more divided on this question than on any other question.

'The state of international cooperation and economic development will not permit such an ambitious plan in the near future'.

'Information should flow from country to country even more easily than goods. World-wide networks giving access to information should be established'.

'The development of international programs are complex and take much time'.

'ICCC is attempting to provide a form for this type of development on an international scale'.

'The time scale will be very long in countries where other priorities exist'.

'It will be too difficult to get people of diverse backgrounds and goals to work together to the extent needed'.

'The establishment of international agreement on information exchanges, standardization of communication languages and interfaces, etc., is unlikely to be achieved before the year 2000'.

Q9. A system called TPBS was developed for formulating this plan. How do you evaluate TPBS?

Table 16

	Japan		other countries	
	number	%	number	%
9-1 I value it highly	-	-	17	29.3
9-2 I value it to some extent	-	-	23	39.7
9-3 I do not value it so much	-	-	1	1.7
9-4 I do not value it at all	-	-	2	3.5
9-5 Cannot answer	-	-	14	24.1

This question was not posed to Japanese.

As for the TPBS (see Table 16) 17 respondents (29.3%) highly appraised it, while 23 (39.7%) valued it to some extent. Thus, 70% of the respondents recognized this method as being effective. Most of them said that it was effective for exploring the possibilities of realizing a future society, a civilized society or other major questions and also for formulating procedures to tackle them. Some of the respondents noted that for this purpose the key to the success of this method lies in the question of whether or not, persons of learning and experience with creative capacity and with a broad integrated vision, are available for such planning.

Comments

'Being considered as one of the international pioneers for programme-budgeting, I am paying a lot of attention to each approach by using appropriate elements of it for national concepts'.

'Has certain improved features compared with TPBS and other methods'.

'It seems to be a useful tool'.

'Rational approach to construction of large-scale program of tasks'.

'A process is no better than the input. The firmness of the input should be weighted so that a probability of success or probable variation from plan would be available'.

'The possibility is given to incorporate policy functions, such as social systems, citizen's behavioral consciousness.

'Feed back is possible while the plan is underway'.

'Some form of project control system is vital'.

'The description of the system is not concrete enough to give a sufficient idea of it'.

'Politics in general only cover a 2-4 year immediate issue but never covers long-range planning beyond the 'office period'.

'Profound examination on a theoretical basis will be necessary to evaluate it'.

'TPBS does not take sufficiently into account people's reactions and the viscosity of the present society'.

Q10. We would appreciate your frank opinion on the following points throughout the entire plan.

As the respondents were asked to answer this question on five different points, only 6 persons (10.0%) gave no answers on any of these points. The remaining 54 respondents (that is, 90% of the total number) made fairly detailed comments. Here we will classify these comments and introduce only representative ones. (The total number of respondents was increased to 60, as three respondents, who sent replies to the questionnaire after the tabulation was over, were added to the number of respondents.)

Q10-1. Most impressive point (54)

The largest group commented on the characteristic features of the plan. A total of 23 respondents (43.4%) or more than 40% of the total pointed out 'vision and will' (10), 'insight and far-sightedness' (6) and 'intention of social transformation' (7), and others as the most impressive point of the plan. The second largest group pointed out the features of the plan itself. Thus, a total of 21 respondents (39.9%) pointed out the 'comprehensive nature of the plan' (14) and the 'composition of the plan' as the most impressive point, of the whole plan. These two groups accounted for about 80% of the total. In addition, three stressed 'the computer mind' and 'the enormous sums of funds' as the most important point.

Most impressive point

'The scale, breadth, and range of the plan as a whole'.

'The most impressive point of your plan is the creativity and vision that went into the preparation of the plan'.

'The existence of a national plan which attempts to project the long-range benefits of computer and communications, and to present a phased approach to achieving these (and possibly unforeseen) benefits. Such a coordinated approach is essential to the best realization of the potential'.

'The courageous attack on a very difficult problem'.

'The attempt to formulate the scope for all possible long-range effects of computer technology on society'.

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'Bold vision and desire to establish information society as a national goal'.

'The great devotion to the purpose and the big investments in the plan'.

'The global and simple structure of the future society, based essentially on the central idea of the large scale information diffusion'.

'Scope and breadth of the plan. Many significant issues are raised with respect to industrial growth and the impact of such growth upon information system needs'.

'Deliberate switch from industrial to information society'.

'Clear view of the basic problem which is of a psychological nature, i.e. creation of computer mindedness, as the first precondition for success'.

'The courage and foresight to embark on this plan'.

Q10-2. Most outstanding point

A total of 50 respondents made comments on this point, and the contents of the comments were varied and scattered. Twenty respondents (40%) said that the most outstanding point of the plan was 'the composition of the plan' (9), the 'comprehensiveness of the plan' (6) and 'purposefulness and vision' (5) and other points, which were close in content to the replies to the 'most important point'.

Apart from these, the largest group pointed out as the most outstanding point of the plan, the fact that the central character of the plan is 'application of information technology to social fields' (8, 16%), and the second largest group pointed out 'consideration of both aspects - of 'demerits and merits' - of computerization (4, 8%), the 'leading role of the government' (3, 6%), etc. Further, many respondents referred to intermediate targets and sub-targets set in the plan. The number of respondents who referred to these reached 10 (20%). Among them, four pointed out the 'establishment of the computer mind' and two 'computer-oriented education'.

Comments

Social application (8)

Most outstanding point

'That the plan is directed towards social progress rather than pure economic progress'.

'The most outstanding point of your plan is the creativity and vision that went into the preparation of the plan'.

'That there is a significant change from an industrial society to an information society and that this change requires testing previous assumption'.

'A well-balanced choice of priorities and application areas'.

'Efforts to include human and social aspects and to avoid a purely technocratic approach'.

'That the large amount of money will be appropriated to realize the plan'.

'Society that brings out the terms like 'the computer mind'.

'Japan with a centralized administration may be in a very advantageous situation for the period of transition'.

'The stated goal of using technology to reduce or eliminate national ills and serve society'.

Q10-3. Most questionable point

A total of 56 respondents (93.3%) made comments on this point. The largest group raised the question whether or not such targets as 'intellectual creation' and 'computer mind' were attainable or not. In short, they posed the most essential question - whether or not human nature can be changed with the appearance of communication technology. Doubts about this question are reflected in their replies to the 'diffusion of home terminals'. The groups of respondents who raised these doubts about the computer mind and home terminals, reached 15 (26.8%). Following these groups, nine (16.1%) raised as questionable points 'economic aspects of the plan' (9, 16.1%), 'limitations on time' (8, 14.3%) and 'behavioral consciousness of the masses' (7, 12.5%). In addition, five (8.9%) pointed out the insufficiency of the plan' and made critical comments on the plan itself (5, 8.9%).

Comments

Intellectual creation, computer mind (10)

Many respondents called into question the 'establishment of computer mind' as an intermediate target to be attained on the way to the ultimate accomplishment of the plan - establishment of a society where 'intellectual creation generally flourishes'. The respondents differed somewhat in their negative attitudes toward the establishment of computer mind. Thus, (1) two respondents pointed out the 'inaccuracy of the definitions of these words', (2) another two emphasized the need for simultaneous development of man's spiritual life, and (3) 15 respondents raised 'doubts about or questioned, the concepts of intellectual creation and computer mind'.

Most questionable point

'The utopian nature and ambiguity of various social goals'.

'The affirmation that the ultimate goal is human intellectual creativity'.

'Perhaps the plan is too idealistic and does not recognize enough the average human attitudes and possibilities for a basic change toward intellectual behaviour'.

'The contribution of the information society to the happiness of the individuals'.

Diffusion of home terminals (5)

Diffusion of home terminals is closely related to the above-mentioned intellectual creation or computer mind, as it would be impossible to develop intellectual creation among ordinary citizens without home terminals. On this point, some respondents made negative comments.

'Home terminals, which I am not sure will ever be wanted as presently conceived'.

'A home terminal will be available for US \$40 in 1973'.

'Use of terminals in homes, and other similar points, will not be possible unless better methods for man-computer interaction have been developed'.

Economic aspects

Those respondents who raised doubts about the plan from an economic angle, have been divided into three groups (1) a group of respondents who pointed out 'enormous sums of funds required', (2) another group who said that priority to investment for computerization was a prerequisite to the realization of the plan and (3) a group who noted that the realization of the plan presupposed a continuous economic growth.

'Your estimate that Japan's future economic growth will increase at a rate of 10%'.

'Estimation of such high percentages of GNP and government expenditures devoted to information'.

'Excessive emphasis on export has already done extensive damage to Japan's environment and culture'.

Time limit (8)

A considerable number of respondents also pointed out limitations placed on time in the plan. Most of them said that the time limit set for 1985 was too short.

'The time limit set is too short for an effective implementation of the plan'. 'There is little possibility of complex social, political and technological transformations being carried out in a relatively short time'. 'It would take 20 years for computer-minded administrators of a new era to be trained'.

Behavioral consciousness of the masses (8)

Many respondents also pointed out that the behavioral consciousness and resistance of the masses would work as restrictive conditions for the implementation of the plan.

'It would be impossible to implement the plan without the cooperation of the people'. 'The plan underestimates resistance from ordinary masses'. 'Such a plan should be formulated on the basis of the desire and will of the Japanese people'. 'The plan does not give sufficient consideration to the wishes of individuals and their freedom of choice'. 'Alternative plans are not yet studied'. 'There are doubts about thinking on and procedures for the selection of projects'.

Critical comments (5)

Those who made critical comments on the plan itself, expressed doubts about priorities in policy being given to the plan or said that the plan was too idealistic.

'Priority should be given to more important national targets such as the energy problem'. 'Computerization should not be allowed to be developed independently or as an independent activity'. 'The plan should be implemented with the backing of technology'. 'The Computopolis is a utopia'.

Q10-4. Concrete measures for improvement of the plan (36)

Relatively few or 36 (60%) respondents made comments on this point. Some of them presented several measures, and the proposals for improvement totaled more than 70. The largest group (8, 22.2%) emphasized the need for 'taking measures for eliminating the demerits of computerization', and most of them urged for stronger measures for the protection of privacy. The second largest group (8, 22.2%) made proposals for 'enlightenment and propagation' as an important means of realizing the plan. These two groups accounted for about half of the total. In addition, five (13.9%) proposed a mode test for prior evaluation and problem-finding prior to the implementation of the program. Four (11.1%) emphasized the need for 'education' to train officials, managers and specialists, and another four (11.1%) made proposals for 'international cooperation' for the development of the plan on an international scale. In addition, many and varied proposals were made; all other proposals made were grouped as 'others'.

Comments

Concrete measures for improvement of the plan

Measures against demerits (8)

'Assessment of demerits and detailed policies and procedures on issues relating to individual privacy'.

'Built-in safeguards for individuals and corporate bodies (both public and private)'.

'Emphasize the protection of the individual's rights, privacy and liberties'.

'Development of details related to privacy legislation before a balanced judgement can be made regarding such demerits'.

Enlightenment and popularization (8)

'More thorough investigation of human and social side of the problems, e.g., man-machine interaction, customs and habits'.

'Explain the relationship between the information and the industrial society'.

Model test (5)

'Need to establish pilot projects to check out the assumptions and projections made in the plan'.
'Greater emphasis on small pilot or prototype projects to explore potential worth in many areas'.
'Select 'pilot' projects for experimentation first'.
'Develop expertise in the economic impacts information and the information society so as to achieve free market of ideas'.
'More discussion on how to improve social adaptation and social understanding of information society'.
'Emphasize the education of a computer mind'.
'Initiate international consultation and cooperation, especially in the area of legal arrangements'.
'Emphasize setting direction from single central agency, with broad implementation by public and private agencies'.
'Increased software development'.
'Computerization committee should be dominated by public interest groups, including experts on education,

health, ecology, and management methods'.
'Clearer definition of computer mind'.

Q10-5. Other comments

Several respondents made comments on this last point, many of which were similar to those already made on other points of this question. Here we will introduce new comments and critical views expressed by two respondents.

'Any plan like this one for information society is not expected to be successful unless it satisfies the following two basic conditions. One is to grasp important symptoms and remove irrelevant ones, and the other is to realize an optimum division of labor between man and machinery (mind and computer)'.

'Failure of a project like this lies in the difficulty of 'selling' such systems to users. As, according to this plan, the entire society are to be beneficiaries, it would then be the people in power in the 1980's or 1990's and not those who intend to start a program such as this who will reap its fruit. Will the Japanese government seriously concern itself with a long-range plan like this?'

Appendix to Part I: Special comments from respondents

I. Begin with pilot experiment

The 'plan for information society' is a most interesting document.

The reason that I am submitting my comments at the deadline is that I have been studying the general areas addressed in your plan, and wanted to give it my full consideration. While my comments are my own, they are the result of many discussions with other scientists and market planning people.

I have attempted to follow the format of the questionnaire faithfully but have also some remarks which do not fit conveniently into questionnaire format. I feel the plan has much merit. The following comments are intended to be helpful and do not necessarily imply disagreement with the plan.

1. I feel that the development of such a plan is very valuable as it presents in a coherent way many of the potential benefits of the combination of computers and communications. Since we cannot say with certainty that any long range goals are achievable or desirable, there must be a continuing planning, implementation and evaluation cycle. This cycle must be much shorter than that set forth in the long range goals of such a plan. The long-range plan must allow (as yours does) for both a strategic direction with relatively specific goals, and shorter range implementations which permit assessment of the correctness of the general direction and means.

2. Because of the wide range of potential benefits set forth in the plan, I feel that the approach should be to implement as many of the applications as is economically feasible on a test case or pilot basis so that the benefits, cost and approach can be assessed quickly and at a minimum cost. The promising applications can then be expanded rapidly under the guidance of a coordinating plan such as this.

3. It is my personal view that this plan should not be implemented by a single authority, either governmental or private. Rather, both governmental and private agencies should be en-

couraged to develop services along the lines presented in this plan.

4. Proper adherence to the current plan should be achieved in two ways:

a) a regulatory body should exist to prevent abuses and to set minimum standards for compatibility. The regulatory function should *not* be combined with the implementation or service functions. b) Progress in the direction of the plan could be encouraged by such techniques as Federal grants, contracts, and by incorporation of the techniques in the internal workings of the governmental bodies, both national and local. Private endeavor could also be encouraged to move in the directions of the plan by means of tax credits. Such means of persuasion rather than fiat or coercion would minimize the risk of a fiasco resulting from errors in selecting goals, planning and executing the services.

5. The combination of computer and communications, offers a better and cheaper means of delivering various services to individuals and organizations. It does not represent means of delivering fundamentally new services. It should be possible to deliver these services in a way that is transparent to the user, at least in many cases. If the services in this plan are dependent on the development of the 'computer mind' in the population at large, I feel it will unnecessarily delay progress, in spite of intensive education efforts. Serious effort should be made to introduce these services in ways that require minimum re-education. This can be accomplished using appropriate user-oriented high level languages which are essentially subsets of the languages (dialects, vernaculars, jargons), of the users. These languages must be developed.

6. While a centralized 'Think tank' is a good idea, to have only a centralized 'Think tank' is not, for two reasons. First, vulnerability; either to natural calamity or hostile acts. (For the same reason, the central data base should not be only centralized. It should be distributed with subsets of the copies also

distributed geographically.) The second reason is the fact that intellectuals may not all want to live in one place. A distributed system of 'Think tanks' has the added value of disseminating the information and intellectual stimulation geographically among the population. Computer communications make a distributed system more feasible.

Again, the above comments reflect principles which I feel are appropriate in the environment which I know. Various factors may not make them as relevant in Japan. Thank you for the opportunity of reviewing and commenting on your fine plan. If you have any questions regarding my comments, I would be happy to continue this correspondence.

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II. Consideration of social, cultural, economic changes needed

To my comments on the questionnaire I would like to add the following notes:

1. The great virtue of the study is its emphasis on striving for firm and clear statements maturing into an actual plan for nothing less than a major reconstruction of Japanese society.

2. The obverse of this great virtue is that inevitably little attention has been given to the general context of an already changing society into which this major component of yet further change is proposed to be injected.

3. Therefore, it seems to me, that if, without more detailed cultural-social-economic study, the plan is initiated by the Japanese government, there may be very serious unexpected effects or impacts which may delay or even jeopardize the achievement of the plan.

4. I would therefore suggest that the next stage of study should consist of two parts carried out simultaneously and intermeshed:

- a. Further work on the plan as at present conceived.
- b. Parallel work on the cultural, etc. changes which form the context.
5. By changes I would essentially stress the fact that many elements are bearing along together with the progress of the telecommunications/computer technology in modern societies, to name a few visible already in Canada:
 - a. A great deal more attention is being paid to leisure. A psychology of release from unnecessarily hard toil is already well developed.
 - b. Communal responsibility for the basics of life is growing. We thus have medicare, extensive welfare services, concern for education for all age-groups, etc. Several experiments of guaranteed income are going on.
 - c. Particularly young people are de-emphasizing the mere earning of a living and heavily stressing that their jobs should be *meaningful to themselves*.
 - d. Devolution of governmental power is both desired and is being worked out.

6. I think very important indeed, is your concept of the coming society as one in which a very basic value (perhaps the key value) will be the individual's drive for self-actualization. This is my own preference of emphasis. I rate it as much higher than societal concern. That is, one views the societal framework as only valuable because it cherishes the individual.

7. A brief outline of my recent research is enclosed separately. This is about to go to press and will be ready for distribution by the end of May, I hope. I shall, of course, send you a copy.

I shall await with great interest your next publication and

news of how your government proposes to respond.

Dr. Alexander King of OECD was over here recently. He said that the thought the international conference scheduled for the Hague will probably be in Paris in November. I shall very much look forward to talking with you there.

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III. Model to support the plan should be developed

Our discussions were far-ranging and frank; I hope that my comments were of some help to your colleagues as they ponder the problems of Japan's future.

Concurrently, I was afforded the privilege of reading your manuscript 'The plan for information society', dated May 1972. This is by way of thanking you for giving me the unique opportunity to review this plan; in accordance with your request I have taken the liberty of developing some general and specific comments.

Permit me to begin with the general statement that this is a very well-conceived document which deserves careful study and attention. Obviously a great deal of effort has gone into its development and I am impressed with the intellectual effort which it represents. The overall concept of transforming an industrialized society into an information (or cybernetic) society is remarkable and undeniably valuable. Perhaps the only fundamental question that I can raise at this point is: *How soon?*

Having given the report several readings I am led to assume that you are in possession of considerable background material which you did not reference for whatever reasons. The paper refers occasionally to models' but I gathered that these are not computerized models with a vast data base but conceptual models introduced for the purpose of discussion and elucidation. Perhaps you are planning to develop such computerized models to support your findings and conclusions more strongly. If not, may I suggest that you give this matter very serious consideration in connection with the overall plan. Government decision makers everywhere are prone to ask a myriad of 'what if?' type questions when confronted with the messy task of establishing parameters or dates. The only way such questions can be answered authoritatively is through modelling and simulation. I will later on say more about this point when I critique Jay Forrester's World Dynamics Model. Suffice it to indicate here that a dynamic model of the Japan Economy would be very helpful in establishing a sound basis for priorities and decisions.

My detailed comments will reference specific pages and items. Hopefully their extent will not tire you nor your associates:

Chapter I: Conceptually excellent; would feel more comfortable if additional stress were placed on development of feedback mechanism within information society, through dynamic planning horizons.

Chapter II, page 10: While a very good first attempt at solving world dynamics problems, Forrester's Model has a fundamental weakness which may, in fact, be the reason for all the dire predictions made from it. It is conceived as a continuous model but many researchers will agree with me that only discrete models can do justice to degenerate conditions arising from congestion, saturation, or similar extreme conditions.

page 12ff: Analysis of these three alternatives should be supported by development of a national economic (input/output type) model.

page 13: Fully agree that only an integrated plan will be successful. It must be monitored by milestones set up through the mechanism of a dynamic planning horizon.

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Chapter III, page 19: Disagree on long-range validity of continued growth concept. Countries as highly developed as Japan (and the US, of course) must soon learn to plan for a levelling-off type of economy in which productivity will equal consumption and where the GNP approaches (asymptotically) some equilibrium level:

pages 19-21: Were these figures developed from an economic model? If they are merely estimates, they deserve another round of refinement under treatment by simulation in depth.

page 22: How do you plan to reduce the cost of timesharing communications? By conversion of existing system to PCM? By introducing competitive carriers? By decree? In the US, we have experienced almost *no* cost reduction in TS communications, *some* reduction in peripheral hardware, *great* reduction in CPU's. Therefore, we are looking forward to distributed intelligence in such networks, to compensate for high cost of communications.

page 24: Disagree with priorities (probably out of sheer ignorance of your real needs). Would put construction first, computerization second. Would leave recreation entirely in the hands of private investment and the citizens themselves (as an added incentive).

page 26: Item 2 can be improved by targeting computerization investment into those areas yielding maximal returns. To do so effectively, we must have a good working model of the economy, as mentioned earlier. This model should be detailed enough to provide decision-makers with the confidence that its recommended courses of action, or preferred alternatives, are statistically superior to intuitive decision-making by man.

Chapter IV: The proposed plan should be developed with the help of a dynamic (floating) planning horizon, requiring review and revision at least every two years, but more often if conditions warrant it. Such a model might well cause a reordering of the nine priority projects listed on pages 30/31. It could also drastically alter the funding levels indicated on pages 31/42, even cause you to delete some projects or add others.

page 47: Three points excellently stated.

page 49: If you get away with this you will receive world acclaim! A general observation by cyberneticists concerns this empirical finding that all complex systems tend to increase in complexity. It would be very desirable to develop a national goal to simplify government and administration as you propose here. The point should be emphasized much more strongly because of its note-worthy implications.

pages 62/63: How about tax incentives to accelerate the implementation of timesharing systems in homes and offices?

Chapter V, Table 3, after page 67: Sophisticated simulation model required to support these ratings. Therefore, great emphasis must be placed on support of information science programs at universities and colleges, at private and government supported laboratories, etc.

page 70: The 'Liquidation of government agencies' is a delightful concept (see above). Question is whether you will get away with it...

page 75: Item (2) implies what kind of wideband data communications network? Operated and controlled by whom?

page 79: Item (2) implies the much debated concept of collective societal wisdom. Careful examination will reveal some serious flaws in the argument that vox populi knows best.

page 82: The third project might benefit from the earlier mentioned tax incentives on timesharing terminals.

pages 83/84: This fear is very real, everywhere, although totally unfounded. It is best countered by extensive education

of the public and by providing economic benefits and trade-off data to the people.

pages 85/86: The concept of a governmental 'Ombudsman' is receiving increased attention to cope with this problem area. Such an agent (or agency) should have a broad charter with great freedom to act and inquire.

pages 86/87: I doubt that such a gap will indeed materialize. The incentives can be made enticing enough so that this gap may never become reality. However, it bears watching as you point out correctly.

Chapter VI: This represents in essence the planning horizon.

pages 95/96: What is the model mentioned on page 98 with regard to the adjustment of scale values shown here? No description of this model is furnished.

Chapter VII, page 108: I would reverse the order entirely to make better use of the feedback-amplification inherent in this process.

The essence of the foregoing comments is a need for spelling out in greater detail the modelling concept which evidently is fundamental to your plan. The support of a project to develop such a model should have the greatest priority, in my opinion. Almost everything else will fall into place nicely, like the pieces of a jigsaw puzzle, once you have such a model. You will also find that building the first model will only give you the experience to construct its successor; in fact, inductive steps to sequential model development should be part of the planned effort itself!

Again, many thanks for giving me the opportunity to look at your fine document. I hope that you will find my comments to be constructive and of some interest. They are offered in the hope that your important project will thereby benefit at least an infinitesimal amount!

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IV. Government decision desired

The plan would have been desirable if more representatives were determined to present and discuss their relevant goals, methods and programs.

However you asked me to give you my impressions and views on the plan for an information society designed under your direction. Firstly the plan seems to be a constructively forward looking, and in itself balanced result of a thorough analysis of what we are getting used to call *the task of predicament of mankind and societies*. In Europe, as far as I know, there is no equivalent in scope and ambition. We are only just beginning to consider our GNP as an instrument disposable and subject to some national or European goals.

It is, indeed, an attractive idea to adapt traditional growth mentality to environmental growth limits by developing information technology and relevant consciousness and needs in our societies. Also I agree in general and in detail with the conception and choice of your proposed policy, i.e. the strategic function of the intermediate impact plan, and the structural function of the long-term basic plan.

However, if I understand you correctly, the whole plan is not yet adopted by government or industry. So far, it may occur that other powerful interests compete so share the budget. I would greatly appreciate it if you would manage to heave the plan over the hurdles of the national decision-making process. Perhaps you will kindly, keep me informed about that.

In Germany there are also national data processing programs. However, they are hardly policy or objective-minded. Rather, they are a matter of cost-effectiveness and, therefore rational-

zation. Unfortunately these programs are in German, i.e. nearly unreadable outside Germany. If, nevertheless, they might be useful, please, let me know.

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Part II

Summing up of Japanese replies to the questionnaire

The following is an outline of the replies to the questionnaire from Japanese respondents.

Replies from Japanese analyzed

Q1. The questionnaire was sent to a total of 372 persons, of whom 191, that is, 51.34%, sent replies. Of the respondents, 132 (69.1%) were specialists, and 56 (29.3%) were not specialists, while 3 (1.6%) did not say anything about their professional background. Thus, about 70% of the respondents were specialists. Of the specialists, 79 persons (41.4%) said that they had 'actual work experience', while 53 (27.7%) said that they had no actual work experience but that they had 'special knowledge through research or study'. In contrast to this, of the non-specialists, 47 (24.6%) said that they had 'general knowledge through reading or hearing', and 9 (4.7%) said that they had not sufficient knowledge (see Table 3).

Q2. Of the respondents, 113 (59.2%) replied that they highly evaluated the plan, and 13 (38.2%) said that they evaluated it to some extent. These two groups comprised 98.4% of the total. However 2 (1.0%) said that they thought the plan was harmful (see Table 4).

Comments

Of the 113 persons who said that they evaluated it highly, 100 made comments. Of them, 64 emphasized the significance of the plan in their comments, 26 made constructive comments, and 35 explained why they evaluated it highly or made passing remarks on it. The number of comments is larger than that of the respondents, because there were some respondents who made many comments.

Some of the main comments are as follows:

Significance of the plan emphasized

'The plan gives orientation'.
'The plan is full of suggestions'.
'It gives a concrete image of future society'.
'It indicates a first step toward planning a computerized society'.
'It shows a target'.

'It gives a long-term guide to action'.
'It can serve as an integrated guide'.
'It serves to plan long-term policy'.
'I would like to find significance in the fact that such a plan has been worked out'.
'It is significant in that it makes us give thought to what is urgent and important'.
'It indicates a direction in the application of computer technology in medical care'.
'It will heighten the efficiency of education', etc.

Opinions and criticisms

'Such a plan requires national consensus'.
'It will require a proper period of preparatory work'.
'It also needs mutual adjustment and coordination'.
'There is need for appeal to broad sections of the society'.
'I expect that this will stimulate active discussion on this question'.
'It would be necessary to lead public opinion toward this end'.
'It would be necessary to consider the social aspects of computerization'.
'It would be necessary to clearly define the content of information society', etc.

Reasons for appraisal, impressions

'Natural, comprehensive, all-inclusive'.
'The plan is a prerequisite to social transformation'.
'It is essential for a systems-oriented organization of society'.
'The plan lays a basis for social life'.
'It will serve the building of a highly organized state and society'.
'It takes up the demerits of information society'.
'It gives priority to social welfare and social development'.
'There is a growing demand for information', etc.

On the other hand, of the 73 persons who said that they evaluated the plan to a certain extent, 65 persons made comments. Of them, 29 emphasized the positive significance of the plan, 11 recognized its significance to some extent, 27 expressed their opinions and made critical comments, and 7 explained the reasons why they recognized the significance of the plan or made casual comments. Main comments are as follows.

Significance positively recognized

'It gives orientation'.
'It gives concrete targets'.
'I find significance in the fact that the plan has been worked out'.
'A vision is necessary for a new, unknown world'.
'It will contribute toward policy-planning'.
'This plan shows a desirable picture of future society'.
'I approve of the main content of the plan', etc.

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Significance recognized to some extent

'This serves as material that can be useful in developing discussions'.

'I must say that we should find some significance in the fact of plan-making itself'.

'This will be useful in making definitions'.

'This is of significance as the basis on which further discussions should be developed'.

'This should be appraised for the impact it gives'.

'This makes us problem-conscious to some extent', etc.

Opinions and critical remarks

'It would be dangerous to assess this plan one-sidedly'.

'This makes practically no projections on changes in values'.

'It appears to me that there is a limit beyond which this plan cannot go'.

'This plan presupposes national consensus'.

'This question cannot be discussed fruitfully separated from other questions'.

'The term 'information' (revolution) is not clearly defined'.

'This plan is of no use if it is not feasible'.

'There are many factors which cannot be solved by computers'.

'Philosophy is lacking in this plan'.

'I cannot assess this plan off-handedly'.

'I am opposed to total dependence on computers'.

'It is necessary to approach this question from various sciences'.

'There is need for steady efforts in the formulation of a plan such as this', etc.

Reasons for significance, impressions

'This plan makes it possible to sort and select information'.

'This plan makes it possible to obtain information quickly'.

'This will lead to the solution of various problems, including labor shortage, traffic congestion and environmental disruption', etc.

The two respondents who thought that the plan was harmful, made the following comments:

'This plan has its own merits, but it would be necessary to make a careful social appraisal of the plan prior to its implementation. Further, it is dangerous to presuppose that information society is an ideal society'. 'I feel inclined to question the thinking that it is in information society that man's intellectual creativeness will flower. It is impossible to make any headway without a minimum consensus being reached on what is good and what is bad'.

Q3. The plan sets 'society in which the intellectual creativeness of the people effloresce generally' as its ultimate objective, and sets 'establishment of the computer mind' as an intermediate target to be attained on the way to the accomplishment of the ultimate objective. A total of 130 respondents (68.1%) said that this was 'appropriate', while 36 (18.8%) said that this was 'not very appropriate'. Further, 4 respondents (2.6%) replied that this was 'wrong' (see Table 5).

Comments by those who said that they were opposed to setting 'establishment of the computer mind' as an intermediate objective, were as follows.

Meaning not clear

'I am of the opinion that this is proper, but the term 'computer mind' is not necessarily appropriate'.

'The words 'computer mind' are vaguely reminiscent of hardware'.

'The meaning of the words 'computer mind' is not clear, and I think the words 'computer mind' will cause misunderstanding, to say the least, as man's intellectual creativeness is incompatible with the computer'.

'It appears to me that 'establishment of a correct attitude to information and a correct way to handle information' is more important as an intermediate target than the computer mind'.

'The logic of the mechanisms of man or human society is entirely different from the binary logic that is behind the computer mind'.

All these respondents found fault with the vagueness of the meaning of the words and point out that the establishment of the computer mind may be understood as something suggesting the superiority of the computer over man'.

Q3-2. As for the setting of the year for the attainment of this intermediate target on 1985, 109 respondents (57.7%) said 'appropriate'. Or, slightly less than 60% of the total respondents approved of it. At the same time, 34 respondents (17.8%) said 'not very appropriate', while 6 (3.1%) replied that it was rather 'wrong' (see Table 6).

Earlier realization desired

'It is necessary to further accelerate the attainment of the intermediate target. If it is not attained quickly, the plan for information society itself will lose much of its value'.

'The attainment in the 1980s is too late. I think if it is possible it would be preferable to attain this target by 1980'.

'I think it would become necessary to attain the target earlier'.

Realization by 1985 considered too early

'It would be impossible to attain the intermediate target

of establishment of the 'computer mind' in some 10 years. I would like to set the attainment of this target on 1995 at the earliest'.

'The remarking of a nation such as the efflorescence of man's intellectual creativeness would be possible only through the change of generations, and therefore it will take at least a quarter of a century or 25 years'.

'It appears to me that the time schedule is a bit strained. It would be necessary to allow a sufficient period of time, as it is essential to have the public fully understand the intermediate target'.

Q3-3. As for the utilization of the third sector, 116 respondents (60.7%) or more than 60% of the total supported the idea, while 31 respondents (16.2%) replied that it was 'not so appropriate' and 2 (1.1%) said that it was 'rather wrong' (see Table 7).

Concern expressed over the utilization of private interests

'While the tendency is that the traditional propelling force of government guidance has been gradually giving place to the leading role of private interests, there are some apprehensions concerning restraint on the part of private enterprises on excessive competition'.

'Private enterprises in Japan are not yet fully prepared to undertake big projects'.

'Non-profit organizations should undertake the project'.

'Private enterprises will be swayed too much by the principle of profit to maintain the public nature of the project'.

Q3-4. Concerning the fact that emphasis in the 'plan for information society' is placed on computerization in social fields, 161 respondents (84.3%) said that it was 'appropriate', while 21 respondents (11.0%) said that it was 'not very appropriate' and 1 respondent (0.5%) replied that it was 'utterly wrong' (see Table 8).

Wider scope desired for social fields

'It is natural that emphasis should be placed on social fields, but at the same time other fields, such as production, transportation and people's living should not be underestimated'.

'Social fields' should be interpreted more broadly to include such national projects as 'rationalization of medium and small enterprises'.

Urgency

'Medical care and education are non-productive areas where computerization is urgently needed'.

'The direction for welfare society should be taken as a natural direction'.

The above are some of the comments made by the respondents.

Q4-1. Asked 'which of the projects included in the medium range plan is considered most important from the standpoint of 'impact-giving effect'?' 47 respondents (23.8%) selected 'medical care', 43 (21.7%) 'administration', 37 (18.8%) 'pollution prevention systems', 27 (13.6%) 'computopolis' (CATV networks), 23 (11.6%) 'education', 8 (4.0%) 'think tank centers', 5 (2.5%) 'manpower redevelopment centers', and 1 (0.5%) 'computer peace corps' (see Table 9).

A total of 73 projects were suggested as important outside of the projects listed. Thus, those who said that they valued the medium range plan highly, suggested 39 projects, and others who said that they evaluated it to some extent, 34 projects. Projects suggested by these two groups are as follows.

Projects suggested by those who evaluated the plan

'Enforcement of a system of code numbers for all members of the population'.

'Development of system for polling public opinion'.

'Public recruitment of specialists to form a group to work on a plan for information society'.

'Development of forecasting natural phenomena such as earthquakes and typhoons'.

'Establishment of information centers on leisure pursuits'.

'Systems-oriented, integrated agricultural administration and management of agricultural enterprises'.

'Systems-oriented energy supply and long-term vision for energy supply'.

'Project for thorough improvement of administrative functions'.

'Re-examination of policy of developing domestic computer industry'.

'Establishment of a nationwide system of information on prices'.

'Establishment of graduate schools of information science and research institutes', etc.

Projects suggested by those who evaluated the plan to some extent

'Establishment of a Japanese version of the ARJA network of the United States, which links research institutes in the United States, and establishment of cooperative relations with the ARPA of the United States'.

'Establishment of a system of information on land utilization'.

'Establishment of a price-adjusting system'.

'Establishment of a housing supply system'.

'Establishment of networks for prevention of tax evasions and other similar acts against society'.

'Prevention of hazards due to doctors'.

'A radical reform in the education system'.

'A radical reform in administration'.

'Practical application of broadcasting and communication satellites'.

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'Computerization of administrative services for local inhabitants'.

'Establishment of networks for provision of information such as government statistics'.

'Establishment of a system for an integrated energy policy'.

'System for optimization of foodstuff supply systems'.

'Development of software which will link up individual projects and decide on the order of priority', etc.

Q4-2. As for the various projects listed in the long-term basic plan, 44 respondents (21.8%) selected as the most important 'nationwide network of information', 33 respondents (16.5%) 'medical care', 26 (12.8%) 'education', 18 (8.9%) 'measures to eliminate the demerits of computerization', 13 (6.4%) 'diffusion of home terminals', 10 (4.9%) 'pollution prevention system', 9 (4.4%) 'modernization of distribution system', 8 (3.9%) 'MIS (management information system)', 7 (3.4%) 'computerization of traffic system', and 4 (1.9%) 'international cooperation in computerization' (see Table 10).

A total of 21 respondents said that they evaluated the projects they selected as the most important. Thus, 13 respondents said that they highly evaluated the projects they chose, and eight others said that they evaluated to some extent the projects they selected as the most important.

Comments by those who said they highly evaluated the projects they chose

'Study for the simplification of management information systems by means of mini-computers and terminal equipment capable of simulation'.

'Strengthening of social education of computers for the purpose of social utilization of computers'.

'Establishment of computerized integrated planning system for optimum distribution of financial and manpower resources'.

'Establishment of an integrated leisure and education system for the entire people'.

'Unconditional open use of information networks'.

'Utilization of CAI for agriculture, fishery and livestock-breeding'.

'Automation, in the broadest meaning of the word, of production and distribution system'.

'Promotion of social system projects'.

'Development of a model for changes in the international balance of forces', etc.

Comments made by those who said that they evaluated to some extent the projects they selected as the most important

Thirteen of those who said that they highly evaluated

the projects they chose as the most important, made comments or made proposals on other measures to eliminate the demerits of computerization, which they thought would be more effective, while 16 respondents who said that they evaluated to some extent the projects they chose as the most important, made similar suggestions. Thus, a total of 29 respondents made suggestions in this respect.

Suggestions made by those who said that they highly evaluated the projects they chose as the most important
'It would be impossible to eliminate the demerits of computerization until 1995'.

'As model tests are continued, new projects will have to be taken up as important'.

'There is need for a system of compensation for the demerits of computerization'.

'A long-term guidance in the course of education will be necessary'.

'There is a need for education on information and also education for the restoration of humanity'.

'There is a need for a large-scale campaign for the formulation of a basic law on information'.

'It would be necessary to make full use of neutral think-tanks'.

'It is necessary to strengthen research and development of social systems', etc.

Suggestions made by those who said that they evaluated to some extent the projects they selected as the most important

'Prevention of the appearance of too many commercial information enterprises'.

'To slow down the pace of computerization and to make it flexible'.

'It would be dangerous to enforce such plans as are proposed'.

'It would be necessary to organize a larger group of specialists and have them study the question'.

'To expand and strengthen information-related education'.

'To study the system and methods of control on information'.

'Re-examine the plan for computerization itself'.

'To listen more broadly to the opinions of the people', etc.

Q5. As for measures for eliminating the demerits of computerization such as the formulation of a basic law concerning information, 80 (41.9%) respondents said that the measures listed in the questionnaire were 'sufficient', while 43 respondents (22.6%) said that they were insufficient. Still, 15 respondents (7.8%) said that they won't work as measures to eliminate the demerits, while 44 (23.0%) were non-committal. These figures show that they considered this question to be a complex and difficult one (see Table 11).

Q6. As for the possibility of the plan being formulated as a concrete policy within five years, 137 respondents (71.7%) said that part of the plan would be adopted as a concrete plan. Further, 18 respondents (9.4%) said that the plan would be fully adopted, while 5 (2.6%) replied that no part of the plan would be adopted (see Table 12).

Political viewpoints

'In Japan where things move very slowly, there is a tendency that nothing is carried out without a precedent'.

'The plan would not be realized early because of bureaucratic sectionalism'.

'It would be difficult to obtain national consensus for the plan because of political reasons'.

Urgency

'Even if there may be some opposition to the plan, it is necessary to carry out at least a part of this plan forcibly'.

'This plan will be carried out as part of the Japanese Archipelago Remodelling Plan'.

Financial restraints

'As the funds required are so large that it would be impossible to carry it out within five years'.

National consensus

'It would be very difficult to obtain national consensus for the plan, as each of the projects, such as medical care, distribution systems, prevention of pollution, are directly related to the interest of the people concerned'.

Q7. As for the possibility of a similar plan being formulated in foreign countries, 110 respondents (57.6%) said that there was ample possibility of such a plan being worked out in foreign countries, while 52 respondents (27.2%) said that there might be such a possibility. These respondents accounted for 80% of the total. At the same time, 1 respondent (0.5%) said that there was no such possibility at all (see Table 14).

Peculiarly Japanese in nature

'This plan worked out in Japan which has high population density and which is a country of homogeneous people, is peculiar to Japan'.

'It would be possible for universities and research in-

stitutes to formulate such a plan in foreign countries but it would be impossible for a government agency to work out such a plan in a foreign country'.

'It would be difficult for a foreign country to work out such a plan in view of differences in national traits and in outlook on computers'.

Necessary

'The advent of information society is necessary'.

'There is need for international cooperation in medical care, pollution prevention and modernization of distribution systems'.

South-north question

'The south-north question will be the bottleneck'.

'There are too many disputes among nations in the world such as those between Israel and Arab countries'.

The countries where the respondents thought similar plans would be formulated were, in the order named, (1) the United States, (2) West Germany, (3) Britain, (4) France, (5) Sweden. Other countries they mentioned as such included China, Canada, the Soviet Union, and Italy.

Q8. Asked if there was a possibility of the plan being developed on an international scale, 80 respondents (41.9%) said that there was a sufficient possibility, while 59 respondents (30.9%) replied that there might be such a possibility. Four respondents (2.1%) said that there was no such possibility at all.

International

'As the distances between countries are being shortened in terms of time, international relations must necessarily be strengthened further'.

'The world as a whole is moving in this direction, taking it as a common task'.

'Questions of this kind are common to all countries in the world and the plan will sooner or later be internationalized'.

Actuality

'In Sweden a medical care information system is already in practice'.

'In the United States, the symbols of commodities were unified on March 31, and a step is going to be taken toward POS'.

