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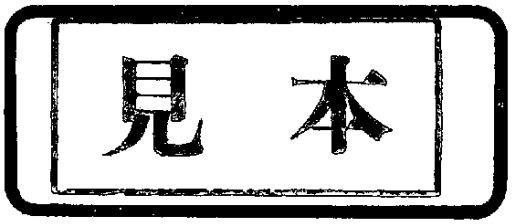

Recommendations for G7 Conference and Program for Advanced Industrial Information Infrastructure

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From the Editor

The G7 Ministerial Conference on the Information Society was held in Brussels, Belgium, on February 25 and 26, 1995, with Japan's cabinet ministers attending. Experts representing the information industry in Japan participated in the industrialists' round table discussion, which was held during the conference session.

Lively international discussions on developing information infrastructure have been made, such as Vice President Gore's Global Information Infrastructure (GII) declaration at the ITU conference in March 1994 and World Information Infrastructure (WII) talks at the Napoli Summit followed each country's measures toward NII. The situation urges G7 nations to gain a consensus in this field. Japan, as a G7 member, was asked to make suggestions, and the issue has been discussed at subcommittees in the Information Industries Committee of the Industrial Structure Council, as the Information Policy Subcommittee and the Subcommittee on Interoperability.

Following the suggestion made by the Information Industries Committee of the Industrial Structure Council in June 1993, the Ministry of International Trade and Industry (MITI) decided to take specific measures and announced the Program for Advanced Information Infrastructure in May 1994. Based on this program, the government's roles include supplementing and enhancing initiatives taken by the private sector. Two specific major roles are (1) promoting development of information infrastructure in the public field and (2) developing the environment for the information infrastructure in the private sector. The program was introduced in JIQ NO. 98.

To discuss the basic policies for informatization and specific measures to develop the information infrastructure in the public field, the Advanced Information and Telecommunications Society Promotion Headquarters was established in the cabinet in August 1994 under the direction of the Prime Minister. The development of the communication infrastructure, mainly by the private sector, and promotion of the development of the in-

formation infrastructure for the public field were included in the Basic Plan for Public Investment made in October. In this way, specific measures are being established for (1) promoting the development of the information infrastructure in the public field.

As for the other government role, (2) the developing of the environment for the information infrastructure in the private sector will be discussed to create specific measures at the Informatization for Industry Subcommittee in the Information Industries Committee of the Industrial Structure Council. As a result, the "Program for Advanced Industrial Information Infrastructure" was announced as a report by the above subcommittee in November 1994.

In this report, we introduced (1) Recommendations by the Information Policy Subcommittee and (2) Recommendations by the Subcommittee on Interoperability, which have been discussed at each subcommittee in preparation for the G7 conference held in Brussels, and the overview of the Program for Advanced Industrial Information Infrastructure.

We hope this report will lend an understanding of the issues.

Yuji Yamadori
Director
Research & International Affairs

Recommendations by the Information Policy Subcommittee of the Industrial Structure Council

Preface

(1) The Present Situation and Pending Issues of Our Country's Informatization Policies

As pointed out in the "Program for Advanced Information Infrastructure," which was approved last May by the Information Industries Committee of the Industrial Structure Council, an advanced information infrastructure not only raises the living standards of the nation at large, but also makes it possible to raise the standard and productivity of various industries by creating new business opportunities and by raising the productivity of intellectual activities.

Therefore, the realization of an advanced information infrastructure is an essential issue for the future economy and society.

A comparison with Europe and the U.S. shows, however, that in our country, the progress of informatization is extremely slow in the public sector, which should really lead the private sector in the movement toward advanced informatization. Moreover, our industries are far behind Western countries in the processing of non-standard business operations, such as intelligent manufacturing using new information systems.

The information industry is undergoing a large change in industrial structure, from a vertical to a horizontal model, and in the demand structure due to the introduction of the client-server systems, outsourcing and solutions business.

We must urgently consider how our country's information industry is going to adapt to such radical changes and what policies are needed for adaptation. The promotion of an advanced information infrastructure will create an advanced market within the country, and is therefore extremely important for the structural change of our domestic information industry.

In view of this situation, the issues

which we need to work on for the realization of an advanced information infrastructure are as follows:

(i) Establishment of an advanced information infrastructure in the public sector

(ii) Promotion of informatization in our industries

(iii) Revision of systems related to informatization

(iv) Establishment of systems which are mutually operable

(v) Establishment of security/privacy measures

(vi) Appropriate protection of intellectual property rights.

It is the opinion of the Information Industries Committee of the Industrial Structure Council that the issues listed above should be taken up by the entire government for comprehensive and systematic consideration. The committee has proposed that the government should draw up basic directives aimed at the establishment of an advanced information infrastructure. Therefore, the action taken by the government last August to establish the Advanced Information and Telecommunications Society Promotion Headquarters is to be highly applauded. We hope that the basic plans for the establishment of an advanced information society, now being drawn up by the above Headquarters, will be as specific in content as possible so as to enable the comprehensive and systematic promotion of administrative policies.

The Subcommittee will keep the basic plans drawn up by the above Headquarters in mind in continuing concrete discussions on the problems related to the realization of advanced informatization. We must consider how to promote technological developments, how to promote the database industry, software industry, and other information-related industries so that they will be adapted to the structural changes in the information industry.

(2) Background of the Recommendations

The Subcommittee is now working on policies aimed at the establishment of an advanced information society and laying the foundations upon which to build an information industry. This February, the G7 cabinet members will meet in Brussels to discuss the establishment of an advanced information society. For this meeting, the Subcommittee drew up these

Recommendations, based on discussions held so far concerning our country's role in the realization of a global-scale advanced information society, basic concepts on ways to fulfill that role, and basic concepts on the various problems involved.

It is hoped that our country's government will make use of these Recommendations in displaying its basic concepts on the realization of an advanced information society and on international cooperation to achieve that aim. We strongly hope that our government will take active measures on an international scale for the establishment of an advanced information society and, by so doing, play a leading role in the advance of informatization in the world sphere.

1. Basic Concepts on the Realization of an Advanced Information Society on a Global Scale

(1) The Significance of Advanced Informatization on a Global Scale

In recent years, there have been rapid advances in information communication technology, making it possible to realize an advanced information society on a global scale. Enterprises, households, and individuals throughout the world will be able to use various information equipment connected by numerous networks to access and process all sorts of different information, such as placement or receipt of orders, payment, joint design and development, shopping, obtaining books or visual software, electronic mail services, etc. This will be possible not only within a country, but beyond borders, regardless of time or distance. It is now becoming technologically possible to establish such a seamless network, which is an important precondition for the realization of an advanced information society.

Such a network will bring about drastic changes, not only in people's lifestyles, but in every phase of society, such as industrial organizations, the relationship between enterprises and consumers, the relationship between management and labor, etc. The network will not only encompass a single country but will be connected to networks throughout the world for the advance of informatization on a global scale. In the micro sphere, advanced informatization will raise the productivity of intellectual activities, and through the sharing of information, etc., will help to strengthen market functions. High informatization will change the industrial structure by creating new business oppor-

tunities such as home care and welfare services, electronic publishing, personal information appliances, etc.

Moreover, increased investments in informatization in each of the various fields will have a large impact on the macro economy as well, and will contribute greatly to solving problems in the advanced countries which arise along with the maturing of their economy, such as unemployment and low economic growth.

In the developing countries, the advance of informatization will help raise the productivity of the country's industries, and by giving access to new markets and new information, will ensure stable and continuous growth.

Such an advanced information society is made possible by optical fibers, satellites and other communication infrastructure, with networks which make use of this infrastructure for processing of information between information equipment, with content which is integrated by these networks as if it were part of a single database, with engineers and technologists to establish and operate such networks and contents and with the end users who make use of all these for industrial operations or personal daily purposes. All of these are vitally important factors in the "Global Information Infrastructure" (GII). We need to keep improving all these factors and keep them well adjusted.

The adjustment and improvement of the Global Information Infrastructure must be promoted in answer to the needs of society. Basically, it is better that these operations be led by the private sector, but it is necessary for the government to make sure that the operations are performed in an environment which is in harmony with international interests.

(2) Basic Responsibilities which the Governments of the Advanced Nations Must Assume Harmoniously for the Realization of a Global-Scale Advanced Information Society

In order to realize a global-scale advanced information society that coincides with the basic concepts stated above, the advanced nations of the world, including Japan, must assume the following 5 basic responsibilities.

The meeting of the G7 and EU leaders in February should attempt to clarify these responsibilities, announce to the world that each country will make a clear definition on these responsibilities, and immedi-

ately take follow-up action.

(i) Preparation of an environment for the establishment of a seamless network

For the realization of a global-scale advanced information society, it is absolutely necessary to establish a seamless network, like Internet, in which all the users of the world are connected by a single large, seamless network without being hindered by differences in the communication infrastructure, equipment, or software. To prepare for the establishment of such a network, it is most important that all the hardware and software used in the world be interoperable. The governments of the advanced countries should reach a consensus on the basic policies to be adopted to achieve mutual operability, discuss ways to speed up international standardization, and endeavor toward international harmonization.

(ii) Promotion of fair competition in the private sector

It is only when there is fair and free competition in the private sector that diversified services, at lower costs, and the supply of economical high-function products are realized that reflect technological advances and consumer needs. The governments of the advanced countries should lead the world toward the realization of an advanced information society by working actively on deregulation and free market access, and the promotion of fair competition among private enterprises.

(iii) Establishment of systems to ensure security, privacy, intellectual property rights, etc., in an advanced information society

In an advanced information society, all types of information will be distributed and processed in a seamless network which extends beyond national boundaries. In such a society, the appropriate protection of security, privacy, and intellectual property rights will become an important issue.

Looking at the present situation, even in the most advanced countries, preparations for an advanced information society

are inadequate. Moreover, the systems and regulations that differ from country to country will definitely be a hindrance to the establishment of a seamless network. In view of this situation, it is necessary for each country to revise its policies and work toward international harmonization.

(iv) Supporting the developing countries

By promoting advanced informatization in the developing countries as well, and by connecting them by networks to the advanced countries, we can expect the disparity between the advanced countries and developing countries to be narrowed in many aspects. On the other hand, if we were to promote informatization in the advanced countries alone, the disparity between these countries and the developing countries will widen all the more. However, there is a limit to how much the developing countries can promote high informatization on their own because they lack technological know-how, human resources and financial resources. The governments of the advanced countries should therefore, give the needed support for establishment of an information intensive society in the developing countries as well.

(v) Promotion of understanding of the need for an advanced information society and the sharing of information

The advance in informatization will bring about large changes in the relationship between enterprises and workers, and among organizations and enterprises, etc.; in addition, the added values of the industrial world will be shifted, and frictions can be expected to arise in many areas. It is important, of course, to deal with such frictions individually; however, an advanced information infrastructure will, as stated before, induce economic growth by raising productivity and creating new businesses, and also creating new jobs. On the whole, the advantages for the world are considerable, and to promote the establishment of an advanced information infrastructure, it is necessary to gain a wide understanding of its significance. The advanced

nations should take the lead in working on pilot projects to develop a variety of different applications. These pilot projects should be undertaken by the nations of the world as joint projects on a global scale. These projects will be extremely effective in demonstrating advantages to be reaped from an advanced information society. Needless to say, it is important for the administrative sector to promote informatization and to introduce electronic systems into its own activities.

In working on problems or projects related to the establishment of an advanced information infrastructure, it is necessary for the various countries of the world to share information concerning their undertakings related to the advanced information society and their statistical data on software trade and other matters related to the information industry.

2. Basic Concepts on Each Individual Problem

Concerning the individual problems which will probably be discussed at the meeting of G7 cabinet members on the formation of an advanced information society, our Subcommittee has drawn up the following basic concepts from discussions held so far.

(1) Achievement of Mutual Operability

[Background]

Mutual operability has always been an important issue in efforts toward advanced informatization. Both government and private sectors have been working on this issue. However, in the present environment: (1) in which we are taking definite steps toward the establishment of a seamless network and the realization of an advanced information society; (2) in which the information industry is undergoing a structural change from a vertical to a horizontal model, and; (3) in which the mutual compatibility and accessibility of the information industry is being promoted, we should increase our efforts for interoperability as an important step toward the establishment of an advanced information society.

[Basic concepts on interoperability in an advanced information society]

Interoperability forms the foundation

upon which to build an advanced information society, where enterprises and individual users use networks to process all different types of information. Discussions on the basic concepts of interoperability should be held from the standpoint of user interests.

In considering the issue of interoperability from the standpoint of the users, the following points are required.

First, the equipment, software, networks, etc. which are supplied to the users should be mutually accessible for information processing. To avoid redundant investments by the users in the same kind of equipment, mutual compatibility in data conversion, etc., should be possible at a low cost.

Secondly, interoperability should be the foundation upon which the market mechanism functions. The competition among private enterprises will lead to new technological advances so that good quality products and services will be supplied to the users at low cost.

The difficulty with these points is that, for example, if to obtain interoperability, standardization prior to manufacturing were to be introduced rigidly within a short period, it would hinder technological advances, and in the medium and long-term, could obstruct consumer interests. Therefore, actions toward interoperability should be well-balanced. In dealing with this extremely difficult issue, the government and private sector should keep the following basic concepts in mind.

(i) The importance of an open interface

In securing interoperability, the various interfaces needed for common operations will be provided by public standardization organizations, by private level forums within the industrial world, and by individual enterprises. To promote the development of technology and products in conformity with such interfaces, it is important that they be open.

(ii) The importance of securing interoperability in conformity with the open interface

If we are to realize interoperability, it is necessary to supply good quality products in conformity with the open interface.

Such products are born out of competition among private enterprises. To promote the man-

ufacturing of such good quality products by the private sector, it is often necessary to demonstrate the effectiveness of the interface through trial use. Therefore, it is necessary to prepare test beds to confirm the effectiveness of the prototypes of the interface and conformity of products to the interface.

Moreover, as the information industry gradually shifts to a horizontal model, numerous different interfaces will come to be used with products and services. In order to achieve interoperability in systems used by end users, those users will have to be able to judge whether or not each product is in conformity with the interface.

Applicability/operability tests and certification can be conducted by each supplier, by standardization organizations, by third party institutions, and others. It will, however, be up to the industrial world and governments to make interface applicability reliable for the users.

(iii) Protection of intellectual property rights in harmony with the openness of the interface

Even when interoperability has been achieved, the appropriate protection of intellectual property rights will be necessary to arouse the incentive of private enterprises to conduct technological developments. While making sure that the interface can be used freely by all users under appropriate conditions, intellectual property rights should also be appropriately protected.

(iv) International harmonization

In an advanced information society, interoperability should be achieved on a global scale. In working toward global scale interoperability, the means of putting standardization into effect and the choice of the standards and specifications to be used will be important. The users should be able to choose freely, from among the products and services offered throughout the world, selecting those they think are the best in quality and most reasonable in cost. To achieve this aim, all the processes from the establishment of open in-

terface to applicability tests/ interoperability and authentication should be carried out in harmony on an international scale.

[The role of the government in efforts toward interoperability]

In view of such basic aims and concepts, the role of the government in the efforts toward interoperability are: (1) to present a vision of what interoperability is like; (2) to make reforms in the standardization procedure for public standards; (3) to offer test beds; (4) to promote the use of open interface in public systems, and; (5) to support applicability/interoperability tests.

Concerning interoperability, the basic concepts and policies are now being discussed in detail by the Subcommittee on Interoperability in the Information Industries Committee of the Industrial Structure Council.

(2) Appropriate Protection of Intellectual Property Rights

In an advanced information society, not only text factors but also audio, visual and image information is handled as digital information. Contents in digital form will be distributed to all parts of society through an extensive network system. For such a new society to function effectively, it is necessary to establish an environment in which everyone may share the same information through the network and in which everyone will be able to use the information freely under the same conditions.

With the development of digital systems and networks, it will be easy to copy, use, or alter the contents without the consent of the person who provided the information, and thereby cause disadvantages to the provider of the information. If we have to ask for the consent of the rightful claimant every time we make alterations in the contents or transmit the contents to others, however, it will greatly hinder utilization of the contents. Such problems and many others pertaining to the distribution of contents through the network will arise.

For an advanced information society to function successfully, it is important that the contents be supplied sufficiently and that the contents be easily accessible through the networks. There must be a good balance between protection of the right holder and securing unhindered use of the contents. Therefore, in dealing with this problem, it is important that the legal aspects, the institutional aspects, and

technological aspects of the problem be dealt with comprehensively. Specifically, the following measures are required.

(i) Legal aspect

When the existing intellectual property rights laws were enacted, there was no consideration for the advance of digital systems and networks. It is, therefore, necessary to reconsider the laws to make them better adapted to the new environment. Specifically, it is necessary to reconsider the concept and meaning of [right of reproduction] and [right of wire transmission] provided in the Copyright Act, the meaning of the limitations on copyright such as reproduction for private use, etc., and the [moral rights], etc.

(ii) Institutional aspect

Whenever the contents are altered, copied, or transmitted through a network, it may become necessary to ask for the copyright owner's consent individually. This may hinder the smooth use of digital information and the appropriate protection of rights. To avoid this, it will be necessary to consider an intensive supervision of copyrights.

(iii) Technological aspect

The problems of unauthorized copy and unauthorized use of digital information obtained through networks cannot be solved unless copying and employment of digital information can actually be controlled and supervised. It is extremely important, therefore, to use software technology and hardware technology to develop technological measures for controlling the use of information distributed through the network. Together with the development and diffusion of systems to supervise the use of information, it also will be necessary to consider legal regulations to prohibit actions which will partly or completely damage the functions of the supervisory systems.

Through the network, the contents will be distributed to all parts of the world instantly. Therefore, it will be important to work on the protection of intellectual property rights on an international scale in har-

mony with the other countries of the world. It is desirable that The World Intellectual Property Organization (WIPO) begin a concrete and full-scale discussion immediately on whether the existing treaties such as the Berne Convention are adapted to the new environment created by advances in digital and network technologies, and if not, to consider which points need revision.

Moreover, for the realization of international harmonization, it is necessary to discuss the institutional and technological aspects of the problem as well. It would be advisable to work on such themes as the intensive supervision of copyrights on an international scale, and the development of an experimentation with digital information control systems as international projects.

(3) Security/Privacy

In an advanced information society, it is extremely important to set up measures to guarantee the security of information systems and to protect personal information obtained through information systems. For example, if the information system were to break down or be attacked, the harm would not be restricted to economic activities but could spread to every phase of people's daily lives. Also, along with the diffusion of information systems, all sorts of information concerning an individual may be collected and stored while the person himself is completely unaware of the fact. Such personal data can be abused or used for many different unexpected purposes. As for security measures, we have computer systems security standards, computer virus prevention standards, the certification system of recognizing business establishments of information processing service as acting on the safety measures for computer systems and a computer virus damage reporting system. As for privacy measures, there is a personal information protection law for the public sector, and for the private sector, guidelines for the handling of personal information.

However, along with rapid developments in information-communication technologies as seen in the downsizing of computers and open networks, information systems are changing from the former central processing types with the mainframe computer at the center, to distributed processing types like the client-server system. Moreover, open computer networks like Internet are developing at a rapid pace.

In such a situation, the revision of existing measures and the establishment of new measures are issues needing urgent attention. To explain in detail, we need to work on the following measures:

(i) Measures against hackers and computer viruses

Along with developments in distributed processing and open networks, we can expect damage by hackers and computer viruses to grow even more serious than before. Existing measures are not effective in dealing with such new problems. We need to revise the computer virus prevention standards and the computer virus damage reporting system. R&D on computer virus prevention should be promoted and legal measures also should be considered. It also is advisable to cooperate internationally by establishing a system whereby countries can share information on hackers and computer viruses with other nations of the world.

(ii) Measures for encryption and authentication

Encryption and authentication technologies, which make it possible to develop secrecy functions to prevent data leakage, and to assure completeness of data and the authenticity of digital signatures, are extremely important to ensure the security of information systems. In our country, there is a lack of awareness of the need to use encryption and because the infrastructure is not sufficiently prepared, encryption and authentication technologies are not used effectively. In other countries, there are discussions on the use of encryption and authentication technologies, on safety guarantees, criminal investigations and protection of the individual's privacy. In view of such facts, we should endeavor to prepare an infrastructure in which to develop encryption and authentication technologies, and to promote the dissemination and use of encryption and authentication systems. Moreover, to enable information processing beyond national boundaries on an international scale, it is important that the nations set up integrated systems related to the use of encryption and authentication technologies.

(iii) Measures to protect privacy

For an advanced information society to function smoothly, it is important that personal information be justly protected. In order that the public organizations, private businesses, etc., handle personal information correctly, and in order for personal information to be controlled justly, it is necessary to consider the contents and application of the existing guidelines. It is also necessary to consider how we can establish internationally acceptable protection levels and protection methods for personal information.

(iv) Revision of the electronic computer system safety standards

In view of recent advances in information technology, such as the development of open systems and the downsizing of computers, it is necessary to revise the existing security standards so that end users can set up security measures effectively.

Moreover, in order to set up security measures which are in harmony with international interests, it is necessary that our standards be coherent with the enacted OECD security guideline and the security evaluation criteria now being discussed at ISO/IEC.

(v) Security evaluation criteria

It is important that our country participate actively in the current ISO/IEC efforts to establish international standardization of security evaluation criteria. Considering the fact that the U.S. and countries of Europe already have security evaluation criteria which they apply to information systems-related equipment to evaluate their security level and to grant authorization, we must establish similar security evaluation and authorization systems in our country, too, at as early a date as possible.

Moreover, in order to achieve international harmonization in the application of evaluation and authorization systems, it is necessary to discuss measures whereby the countries of the world can mutually approve

each other's evaluation and authorization results.

(4) Supporting the Developing Countries

There are two kinds of support which we can give to the developing countries in their efforts to establish an advanced information society. One is to help them build up the necessary human resources, technology and communication infrastructure. This can be done by giving financial assistance through yen loans, offering technological assistance, and by supporting their R&D activities.

Another way to give support is to establish a network connecting the developing countries with the advanced countries. Such a network will help to diminish the disparity in informatization standards between the developing countries and the advanced countries. Moreover, the network will give the developing countries greater access to new markets and new information, and will thereby speed up economic growth.

At the APEC meeting of ministers on small and medium businesses held last year, the problem of access to information was taken up. The Asian area seems to have strong interest in advanced informatization, and our country's responsibility is extremely large. We should be careful that in giving support, we should not try to apply the logic of advanced countries, but should consider the individual needs of each country in the promotion of informatization.

(5) Strengthening of International Cooperative Ties Through Joint Projects

Internet, which has now grown into a large network with over 30 million users, was originally a network used in the research field. This fact shows that the impact of public projects on the advance of informatization is extremely large. It is through such public projects that the general public will come to have a deeper understanding of an advanced information society. At the same time, such issues related to the realization of an advanced information society as standardization, intellectual property rights, security and privacy, etc., will take large strides towards resolution in the development process from pilot projects to applications for actual use. For this reason, it is of great importance for the advanced countries to conduct pilot projects. Furthermore, these pilot projects should be conducted as joint projects on an international scale. Each country should regard these projects as

important undertakings toward the realization of an advanced information society and participate in these projects actively. It is necessary for our country to make further efforts to promote application development projects, such as the model project to join elementary and junior high schools to Internet, the model remote medical care project to join specialized physicians in hospitals in large cities with clinics in remote rural areas of the country, and a research and development project on a model electronic library which would offer the technological data needed in an advanced information society. It is also necessary for our country to undertake new projects such as an electronic network between the government and small and medium enterprises for electronic commerce, additional research is needed for the realization of an advanced information society in areas such as electronic signatures, electronic notarization and electronic account settlement. In working on such projects and research, it is necessary to strengthen international cooperative ties and promote the undertakings as joint projects. In so doing, it is desirable that our country take a leading role and make large contributions to the promotion of the establishment of the world information infrastructure.

Establishing Interoperability for the Realization of an Advanced Information Society (Recommendations by the Subcommittee on Interoperability of the Industrial Structure Council)

1. Background behind the Recommendations

The achievement of interoperability among alternate information systems has always been an important issue pertaining to information processing, and various attempts in this direction have been maintained among both public and domestic sectors. However, the issue has now gained unprecedented importance in the pursuit of an advanced information society, considering the flow of events as depicted in the following sections.

The first factor to be considered is the increased weight placed on interoperability in the advanced information society. With the continued downsizing of computers, information processing instruments initially limited to large corporations have gradually infiltrated into smaller businesses and households, with expectations for the incorporation of digital household appliances in the long term. Accordingly, the focus of integrated informatization has shifted from the processing, transmission and sharing of data within an independent enterprise or group of affiliated enterprises to those among departments and intercorporate networks. Open computer networks incorporating households and individuals are already emerging, as represented by the tremendously popular Internet, although various problems such as security are being pointed out.

A seamless network environment enabling various information processing activities such as order processing, settlement, joint designing, shopping, retrieval of documents/images, and exchange of electronic mail among corporations, households and individuals using various information processing tools interconnected with the network infrastructure is an essential quality in the achievement of the envisioned advanced information society. In this context, achievement

of interoperability is an important issue.

The second factor is the increased weight placed on interoperability in the structural change of the information industry. The industrial structure is gradually shifting from a "vertical structural model" to a "horizontal structural model." The former consists of mainframe manufacturers integrally developing the entire system from elements to basic software in a broad sense. The latter involves competing companies respectively developing/supplying devices, basic softwares, and middleware on their own. The situation has resulted in the prevalence of alternate interface methods. The achievement of interoperability among different systems for the benefit of users is emerging as an issue requiring administrative attendance.

The third factor is the change in the promotion structure for interoperability within the information industry. Interoperability of information processing has always been a subject of standardization by ISO, JIS and other public standardization agencies, similar to other industrial standards. However, owing to the rapid progress of information processing/communication technology in recent years, administrative efforts are unable to keep pace with technological innovation, and specifications more technologically advanced than those that are publicly accepted are being recognized as a dominantly used specification. Concurrently, standardization attempts conducted within forums organized independently from public standardization agencies are becoming a significant factor in the achievement of interoperability. In view of this situation, the administrative role including the state of public standards must be considered.

In view of the circumstances, the subcommittee is evaluating the fundamental role to be partaken by the administration, the desired condition of interoperability for respective technical domains, and the raison d'etre of distributed information processing as an inseparable aspect for the achievement of a seamless networking environment. These recommendations are an intermediate conclusion of the subcommittee concerning the basic reasoning for the achievement of interoperability.

The interoperability issue is to be brought up as a subject of discussion within the ministerial meeting of the seven advanced countries on global information infrastructure scheduled in February 1995. Interoperability is an extremely important factor in the

achievement of an advanced information society, and the subcommittee strongly advises the formulation of fundamental consensus regarding this matter on an international scope with reference to this proposal.

The issue involves extremely difficult problems to resolve, and certain aspects of the recommendations are left to future studies. The direction of achieving interoperability within respective technical domains, and the future image of distributed information processing are still in the early stages of examination. The subcommittee intends to conduct further evaluations and recommendations on this subject.

2. Basic Concepts on Interoperability in an Advanced Information Society

As stated above, interoperability forms the basis for an advanced information society, offering the capabilities of conducting various information related transactions to corporate and individual network users. Its basic concepts on interoperability must be constructed with a consideration for the benefits of the users.

Interoperability should offer users the following.

First, interoperability should be obviously achieved, so that the information should be processed by interconnecting various equipments, software and networks provided to the user, while the simultaneous compatibility should be achieved without forcing redundant investment and excessive cost of data conversion onto the users.

Second, sound marketing principals should be encouraged based on interoperability, to facilitate a healthy competition among the private sector, thus introducing technical innovation for providing users with appropriate products and services inexpensively, as the envisioned advanced information society can only be achieved gradually through unceasing technical innovation.

The two conditions indicated above are difficult to satisfy with adequate balance, as standards determined prior to product development for interoperability on a short term may obstruct technical evolution, thus working adversely against the benefits of the users in the mid- to long-term. The problem should be tackled by the public and private sectors according to the basic reasoning indicated below.

(1) The Significance of an Open Interface

Interfaces subject to standardization in achieving interoperability are provided by public standardization agencies, private forums organized within the industry and individual corporations. Interfaces should be provided openly in order to facilitate the development of technology and products compliant to the interfacing method. An open interface is generally considered desirable to companies marketing products based on the specification, in order to promote the development of various products in accordance with the open interface. This is reflected in the fact that voluntary attempts are in progress among various forums of the industry for the establishment of common open-structured interface standards. Accordingly, public standards such as ISO and JIS should actively participate in the standardization efforts for the establishment of an open interface, utilizing the results of the private sector.

There are some views that an openness including determination procedures shall be required in case of interfaces with significant importance in establishing interoperability promoting competition.

Currently, many interfacing standards are in existence. The priority of standardization differs among respective standards. The specific priority of standardization among interfaces as well as the methods of standardization within respective fields are the subject of further study within the subcommittee.

Additionally, the definition applicable to "open interface" itself remains an issue of controversy, with opinions calling for "indiscriminative capabilities to access the specifications of the interface by users and manufacturers alike," or indicating the importance of "an open architecture providing for specification alteration procedures." The openness required in respective fields is subject to future determination.

(2) Significance of Achieving Interoperability on a Practical Basis in accordance with an Open Interface

To achieve interoperability on a practical level, well conceived products compliant to the open interface should be actually supplied.

Although the products should eventually be supplied as a result of corporate competition, the effectiveness of the interface must be confirmed

through experimental distribution in many cases before the standards are adopted by the companies. Thus, a test bed should be prepared for confirming the effectiveness of an interface or prototype products compliant to the standard.

With the shift in industrial structure of the information processing industry to the horizontal model, the products and services currently in use are generally dependent on a number of interfacing standards. To achieve interoperability on the user-based systems, the users should judge whether or not the products are in conformity with the related interface. The conformity test/interoperability test and certification processes may be entrusted to the manufacturers/suppliers, standardization agencies, and third party organizations; however, an industry and government based approach is required to gain the confidence of the users for the compatibility of interfacing methods.

(3) Protection of Intellectual Property Rights in Harmony with the Openness of the Interface

Adequate protection of intellectual property is the basis for the technical development incentive of the private sector, and it should naturally be established in promoting the openness of interfaces. Concurrently, the granting of exclusive license rights to specific companies for the intellectual property that is essential in the achievement of interfaces may potentially obstruct technical development, thereby working to the disadvantage of the users. In this context, the subject is under discussion by ISO and other agencies from various approaches, and the development of an adequate protective measure is desired.

(4) International Harmonization

Within an advanced information society, interoperability must be achieved on a global level. Additionally, the users should be offered the liberty of selecting products and services excelling in price and quality on an international scope. This calls for an international effort to coordinate them from an open interface to the conformity test/interoperability test and certification activities.

As informatization processing is deeply related to the economic behavior and cultural background of respective countries, the variation and differences among countries must be considered in establishing interoperability on a global level.

True, the achievement of world-wide interoperability and accessibility to networks, providing a wide range services is beneficial to all of humanity, but negative aspects as represented by the question of security and privacy protection must also be considered. This is not a matter of discussion within the committee, but the significance of the issues pertaining to network management should also be considered.

3. The Role of the Government in Efforts toward Interoperability

The role to be assumed by the administration for the achievement of interoperability following the basic reasoning described in the previous sections are as indicated below:

(1) To Present a Vision on Interoperability

The advanced information society can only be achieved gradually through unceasing technical innovation in a multitude of domains, and interoperability within this environment in the mid- to long-term is dependent on the efforts of innumerable bodies including public standardizing agencies and industrial groups. The administration should propose technical visions of interoperability on a mid- to long-term basis to assist the activities of such public standardizing agencies and industrial groups.

(2) To Improve the Standardization process for Public Standards

Advances in technology are extremely rapid, and various organizations are conducting activities for standardizing interfaces in addition to public standardizing agencies. It takes longer for the public standardizing agencies to determine the standards than for private groups because of the necessity to reach a consensus among the parties concerned. Therefore, the untimely standardization of public standardizing agencies by inadequate adoption of achievements from the private sector and inadequate attention to domains neglected in the industrial efforts is the subject of criticism. For this reason the ISO/IEC JTC1 have determined the procedures for promptly adopting private specifications as international standards. The Long-Range Plan for the Promotion Industrial Standardization of the Japanese Industrial Standards Committee (JISC) have discussed similar provisions. The adoption process for information processing-related public standards, however, should be improved and accelerated.

(3) To Offer Test Beds

The effectiveness of an interface is often confirmed through experimental distribution used, in many cases, to promote commercialize by private companies. Thus, a test bed should be prepared for confirming the effectiveness of an interface or of prototype products compliant to the standard. The Ministry of International Trade and Industry (MITI) is in the process of establishing an Information Technology Research Center to function as a basis for the promotion of projects, including the pilot model of an electronic library, New Industry Creation database Center, and Educational Software Development Center. Those centers are required to be utilized as the test beds for interfacing standards.

(4) To Promote the Use of Open Interface in Public Systems

It is desirable for the government to assume a leading role in the adoption of an open interface architecture. The adoption is also beneficial to the administration in that such architectures contribute to the achievement of interoperability with private systems and the reduction of costs incurred in system operation. Improvement of determination processes for public standards is an important step in the adoption of open interface architecture to public systems.

(5) To Support Conformity/ Interoperability Tests

To achieve interoperability, the research and development oriented toward the enhancement of efficiency in interface certification procedures are important. Currently, the Information-technology Promotion Agency, Japan (IPA) is working with the X/Open for research and development of interface definition languages (ADL) for test case generation. It is desirable to continue promoting the research and development in such a field.

Support should also be provided for the development and preparation of test suites involved in the conformity and interoperability tests.

Program for Advanced Industrial Information Infrastructure (Summary: Draft)

November 1994

1. Fundamental viewpoints and trends of industry informatization

<Fundamental viewpoints>

(1) Under an extremely severe economic environment, Japanese industries have been urged to undertake a total reengineering of enterprises and to review their inter-corporate relationships among a specific group of enterprises as represented by the so-called "keiretsu" (grouping of affiliated enterprises). In order to achieve these aims, the effective use of information systems is essential to restore the competitiveness of Japan's entire industry.

(2) It is important to explore user's needs for "multimedia" technologies, then to build up applications based on them. The informatization of Japanese industries using multimedia technologies will be the key to the evolution of multimedia technologies in Japan.

<The trend of informatization in the industrial area to date>

(1) Deployment rate of on-line information systems has made steady progress.

(2) Japan still lags behind the U.S. in networking and LANs.

(3) Informatization in Production and distribution (logistics) areas have made great progress; however, in general administrative areas, non-routine businesses such knowledge based business have lagged behind.

(4) Japanese industries have been pursuing "local optimization" within each information (such as

corporate sector, enterprise and enterprise groups); however, integration of those information systems have not yet grown sufficiently.

- Change in on-line ratio in Japanese enterprises
  1985: 65% 1993: 92.4%

- Network ratio between Japanese enterprises
  1985: 18.3% 1993: 36.6%

- Proliferation ratio of personal computers in office sectors (1993)
  Japan: 9.9% U.S.: 41.7%

- Networking ratio of personal computers (1993)
  Japan: 17% U.S.: 66%

2. Environmental changes of industries and issues of current information systems

<Changes in the industrial environment, industries, issues and new direction in reengineering>

(1) To cope with environmental changes such as satisfaction of fundamental needs, resulting in diversification of people's needs, and Asian NIES's race to catch up with Japan → it is essential to create and expand markets by timely grasping of fractionated markets and diversified demands, and deploying businesses with agility and effectiveness.

(2) Basic direction of reengineering

- Operational reform (Business Process Reengineering)

  - Integration of indirect business. Reduction of redundant business processes.

- Organizational reform

  - Integration of indirect sectors. Reduction of hierarchy.

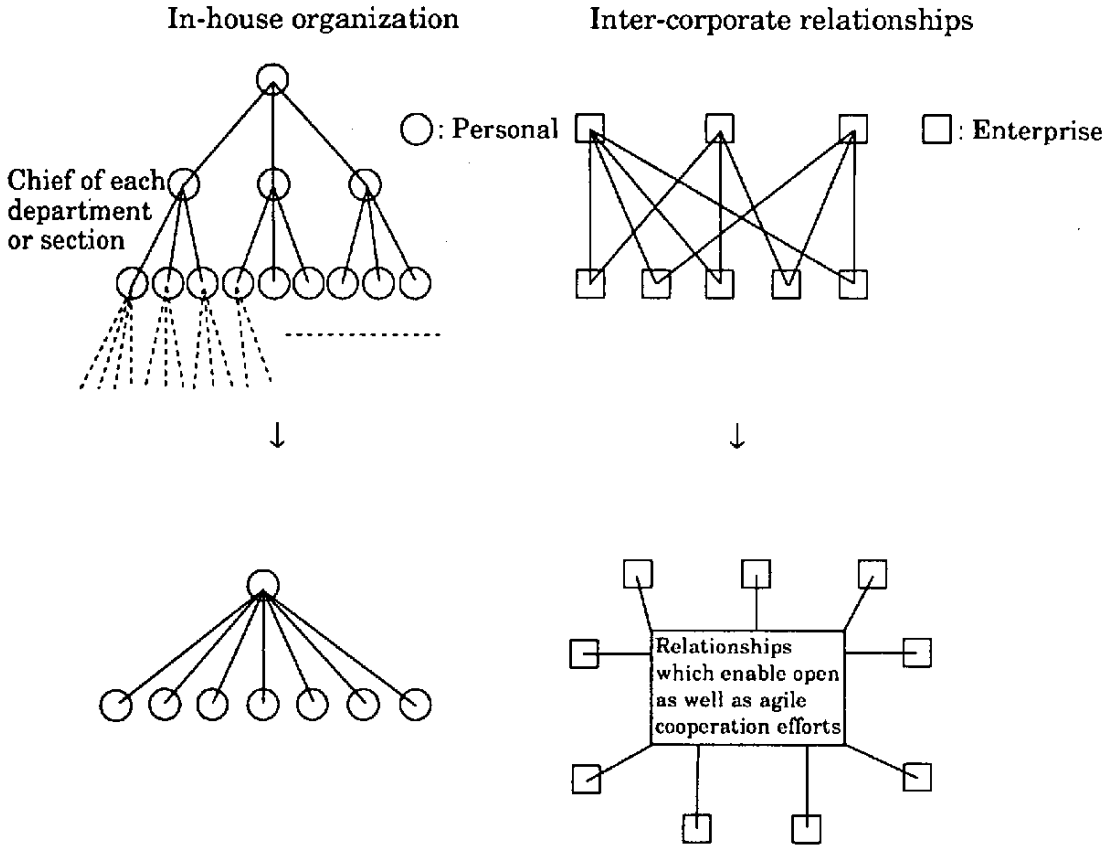
  Agile response to external changes with shared information.

- Review of inter-corporate relationships

  - Preponderant undertaking of management resources.

  Effective use of external resources.

  → To implement enterprise cooperation by product and/or project unit.



<Current industrial information systems issue>

In additional industrial information system pursued locally optimized effectiveness and functinality gives rise to the following issues:

- "Isolated islands of information" phenomenon has appeared;
- A "Paper flood" phenomenon has appeared;
- "A multi-platform phenomenon" or "conversion nightmare" has appeared.

As long as information investment remains at the local level, marginal utilities will decline significantly in the context of investment efficiency.

(1) "Isolated islands of information" phenomenon

When interface with external

organization cannot be maintained, organizations double-process information they could share, or information which should be used effectively by being shared between organizations remains hoarded without being used.

(2) "Paper flood" phenomenon

Information is exchanged with external organizations through great quantities of paper, and office productivity even deteriorates despite the intended purposes of improving efficiency. Additionally, such tremendous social redundancy is included in the tremendous inefficient process of digitized information received/printed on paper, being re-input and digitized again.

(3) "A multi-platform phenomenon" or "conversion nightmare"

Enterprises in a weak bargaining positions dependent on powerful customers face the "multi-platform phenomenon" in which they are forced to install more than one type of computer systems, each of which is for compatibility with a different customer, or face a "conversion complexity phenomenon" in which they are forced to make a significant investment in the conversion of software or change their own system every time they get a new customer.

3. Deployment of the industrial information system in the future and the future shape of the industrial society

<Advanced cases of industrial information systems>

Advanced enterprises have used information systems and realized the following improvements:

- Concurrent engineering in development, design and production processes
- Shortening of business processes from production to sales and realizing "Quick Response" through the system integration involving in the production and sales sector.
- Streaming indirect business by inter-corporate cooperation through EDI
- Productivity enhancement of white-collar workers using LAN and personal computers

- Multi-functionalization of white-collar workers and flattening of the corporate organizations
- Added more value to their business using information systems and information
- Expansion of business opportunities using information systems and information

(1) Concurrent engineering in development, design and production processes

① Intra-corporate integration between development and production sectors

Y company, a computer and measuring instrument manufacturer has integrated its information system. Individual sectors were isolated into management planning, research and development and production sectors. The company has also introduced concurrent engineering, thereby significantly reducing development lead-time, and realizing rationalization.

② Concurrent engineering by inter-corporate cooperation

Five Japanese aircraft manufacturers taking part in the international joint development project for a new aircraft have networked their three-dimensional CAD systems, thereby implementing concurrent engineering. This has permitted not only to complete computerization of more than 30,000 sheets of design drawings but has enhanced design accuracy, thus reducing by 75% of misconformity found at the assembly site.

(2) Shortening of business processes from production to sales and realizing "Quick Response" through the system integration involving in the production and sales sectors

① Intra-corporate integration of production and sales sectors

Y company has integrated its order receiving process activities with an information system; the processes were previously performed separately by the sales and the production sectors. Integration not only reduced the time from order receipt to delivery to as little as one-fourth of the former time, but it also raised the per-person order processing

efficiency by 18.5%. Resulting in decreasing the number of personnel by 30%.

② Inter-corporate integration of production and sales sectors

K company, a health and chemical products manufacturer has collected POS data transmitted from sales stores using a production and sales integration system, thus quickly reflecting changing demand trends into the production plan:

This allows the company to centrally manage the total corporate production activities of widely separated areas. At the same time, the company's system is linked with the supermarkets' shelf allocating system, thereby providing them with shelf allocating instructions.

W company, a U.S. mass marketer has disclosed its POS data to product manufacturers and introduced an automatic supply system using EDI, thereby introducing a quick response system by which its product supply is left to manufacturers. This has permitted the company not only to shorten the inventory period from ten weeks to three or four weeks, but also decreases remarkably the defective product rate.

(3) Business process reengineering by inter-corporate cooperation through EDI

Both S company, an electric appliance manufacturer and M company, a component manufacturer have adopted the standard EDI; S company provides planning information, including required quantity to M company, from which M company decides the delivery date and quantity, and then performs its inventory control. At the same time, M company has automated activities relating to production arrangement and sales. Moreover S company has reduced its inventory to one-fourth and also shortened its procurement leadtime from four days to one day. M company has also succeeded in reducing the volume of clerical work from four days to one day.

(4) Productivity enhancement of white-collar workers using LAN and personal computers

The energy division of I company, a general trading firm has prepared a divisional LAN as well as a one-person one-PC system. In addition, the company has introduced a paperless sales support system (in which the number of copies per annum has decreased from 75,000 to 40,000 sheets). Overtime has been reduced by 21%.

(5) Multi-functionalization of white-collar workers and flattening of the corporate organizations

K company, a Finland general chemicals manufacturer has integrated its information system including purchasing, production, physical distribution, sales and finance, thereby reducing inventory by 20% overall. Meanwhile, its finance division has achieved greater versatility in white-collar workers by issuing order instructions according to the sales situations. In addition, the company has halved its six middle management classes by rationalizing the clerical work management sector of each division.

(6) Adding more value to their business using information systems and information

① Distributors' access to the backyards of supermarkets by retail supports

R company, a foodstuff distributor has collected sales data and analyzed marketable information from the whole country, thereby providing supermarkets with information on the optimum shelf allocation. In addition, at the time of delivery, the company supplies retailers with merchandise in such a way that they only place merchandise on the shelves by simply taking the items in the order that they are loaded (this is so called a "distributors' access to the backyards of supermarkets"). This has allowed retailers to simplify bill and product inspection activities, shorten purchase time as well as display time of merchandise and decrease inventories.

② Users' purchase agent

M company, a distributor of production components has broken away from the traditional order-driven distributor's concept now sees itself as the "users' purchase agent" that the company keeps a rich assortment of what users want in stock as a package.

Because the number of merchandise items that M company carries amounts to 200,000 items, and the number of customers reaches ten thousand and more, it is imperative for the company to use the information system effectively and to make its system more advanced.

③ Armed with information using multimedia

J company, a major retailer, has introduced a multimedia satellite communications system as a tool to promote both low cost management and an adequate merchandise supply system by properly grasping consumers needs. The company uses the system multilaterally including collection and distribution of POS data through 200 stores across Japan, construction of extension telephone networks, distribution of background music, video images of new product information, merchandise display instruction and personnel education.

(7) Expansion of business opportunities using information systems and information

① Practical use of external resources through information networks, and international deployment of business

A U.S. company has partnered with domestic and foreign enterprises having competitive sales forces, thereby not only constructing a sales network in twelve countries around the world but also deploying marketing, sales support and customer services through the information network. As a result, the company has increased its annual sales by eightfolds over the past two years.

② Deploying electronic stores using the Internet

D company started non-store sales using Internet, concentrating on the sale of books imported from foreign countries, a market which is far from satisfying customers' needs. For example, it conventionally takes three months or even five months for a customer to receive a book after placing an order with a book store. Because this company neither needs to keep an inventory nor to burden itself with personnel expenses, it has succeeded in low-

ering the price of such imported books by almost 30%, and it also supplies the books within an average of two weeks to one month.

<Future industrial informatization and issues>

The characteristics of advanced cases and common issues are sorted into order, as follows:

(1) Characteristics viewed from management strategies

① Operational integration through cooperation of the information system (operational reform)

② Rationalization of the accumulated sectors by integration (organizational reform)

③ Sharing of live information and its strategic utilization

④ Expansion of the above mentioned advantages by intensifying cooperation beyond enterprises

(2) Characteristics viewed from the information system

① Radical end-user computing and networking

② Pursuit of the best mix of distribution and integration

③ Active adoption of multimedia

④ Adoption of openness, scalability and standards

⑤ Unbundling (separation) of data, software and hardware

⑥ High cost sensitivity of information systems including communication fees

(3) Future issues viewed from advanced cases

① Factors in advanced enterprise's success (= issues of general enterprises)

a. Strong leadership by top management
b. Reform of business flow

② Future issues

a. Lack of interoperability of equipment and systems
b. Proprietary specifications in business protocols including production codes, and data formats, etc.
c. Delay in informatization of small and medium enterprises (SENs)

d. Immaturity of Solution Vendors
e. Informatization gaps between trade partners
f. Legal issues

<Future images of the industrial information system>

(1) Specific shape of future industrial information systems

- EC (Electronic Commerce) which exchange information concerning any business process by communication on the open network.

- CALS (Continuous Acquisition and Life-cycle Support) in which the digitized exchange of technical and trade information can be done by any concerned bodies independent of specific equipment or systems in the respective domains of development, design, and procurement extending to maintenance and operational processes.

(2) The EC and CALS open and novel, "soft" industrial information network can turn, inter-corporate cooperation, create virtual corporations and enterprise integration into reality.

These new industrial information networks are a new Japanese industrial infrastructure as well as a platform for further development. It is therefore necessary for both public and private sectors to construct them together as a common asset of the Japanese industrial world.

(3) From "local optimization" to "macro optimization."

- EC (Electronic Commerce)

① Outline

This can be defined as a wide range of enterprise information systems relating to all processes involving trading in which market research, advertisements, selection of customers, negotiations of price, quality and delivery, contracts, shipment, billing and payments, are linked by networks and in which every process of trading shall be performed electronically on the information network. Use of EC will permit small and medium size companies, individuals and others to openly procure or trade on the networks connecting to personal computers.

② **U.S.'s challenge**

At Silicon Valley in California, 45 major companies consisting of computer and semi-conductor manufacturers, banks and mail-order companies selling personal computers have participated in the Commerce Net project where they are developing and experimenting, in order to perform all trading process on date exchange through the Internet.

- CALS (Continuous Acquisition and Life-cycle Support)

① **Birth of CALS and its changes**

This is the concept of an information system that the U.S. Department of Defense (DOD) originally developed for logistic support (Computer Aided Logistic Support) and spread into industries. It has now extended and changed into a Continuous Acquisition and Life-cycle Support.

② **What is CALS? - The three aspects of CALS**

a. Measures enabling the generation of a user-oriented data environment, allowing the digitized inter-divisional and inter-corporate exchange of technical information, such as drawings, and trade information, including purchase orders, independent of specific equipment or systems.

b. An innovative industrial infrastructure enabling divisions, corporations and all other concerned entities to smoothly exchange information interactively, sharing and utilizing the necessary information in respective domains of development design, and procurement extending to maintenance in order to facilitate reduction of development and procurement lead time, enhancement of productivity, and achieve total cost-effectiveness throughout the product life cycle thereby affiliating the entities concerned as a united body (ex. virtual corporation).

c. A futuristic industrial information system facilitating the exchange of multimedia information, including images and voices, such as design drawings and manuals, instead of being restricted to numerical data.

③ Contents of CALS

a. Standards for information entry and exchange

b. Rules for the exchange and sharing of information

c. Related softwares

④ Specific effects of CALS - Quantitative benefits shall depend on the U.S. survey

a. Development/design

Standardization of data exchange interfaces and protocols has enabled not only open data exchange but concurrent operations, thus shortening designing time for new developments by 50% and processing time for specification change by 30 to 50%.

b. Manufacturing

Introduction of CALS has enabled instantaneous reflection of nonconformities in the manufacturing process to the development and design processes, thus shortening start-up lead time of the production process and eliminating manufacturing misses. This has resulted in an 80% improvement in product quality and a 15 to 60% manufacturing cost reduction.

c. Procurement

CALS has enabled direct exchange of digitized information including technical information (video images) such as specification sheets and drawings, thereby reducing errors incidental to data transmission by 98%.

d. Operation management

The integrated databases across all participants concerned over networks allows them consistent information management, including documents and drawings, thus reducing time to update and modify documents by 30%, because every item of information at all sites concerned is revised without omission even when such documents are revised due to remodeling and repairs. Connection of electronic manual devices to the system permits not only automatic judgment and display of any faulty portions on the screen but also automatic access to the repair orders and

design drawings, thereby improving accuracy in detecting faulty portions by 35%.

⑤ U.S.'s challenge

a. The U.S. industries have recognized the worth and effectiveness of CALS as a base for sharing information when they perform TQM (Total Quality Management), CE (Concurrent Engineering) and BPR (Business Process Reengineering).

   Industries such as automobiles and aircraft manufacturing have actually introduced a system based on the concept of CALS.

b. The U.S. government has gradually been spreading a procurement system by introducing CALS, and the government obligates any enterprises, ranging in size from multinational enterprises to SMEs, who hope to be trade partners with the federal government, to be subject to CALS program by the year 2000. In this way, proliferation of CALS has been promoted by the public and private sectors as well; in particular, the government has been providing SMEs with CALS education program.

<Future shape of industrial society>

Development of industrial information networks has generated a new industrial society.

(1) Working style

- Practical use of personal computers and LANs has permitted the worker force to more intelligent activities.

  Meanwhile, how white-collar workers can utilize information, adding value, raise a new issue.

- Mobile computing has freed the sales, product planning and finances, work forces from time and space restrictions.

  New working systems such as home offices and flextime systems will provide women and housewives with more opportunities to play their roles, thus having enterprises review the management strategies, including deployment of branch offices.

(2) Enterprise organizations

- The enterprise organization has changed from sector-to-sector cooperation to person-to-person cooperation where each person cooperates responsively with the project unit, thereby altering positions of management including sector chiefs.

- Walls between sectors and enterprises have collapsed and such enterprise organizations have been constructed in which each person is more respected and given more consideration, and where personal intelligence and skills are interconnected together by the information network. This change will intensify the tendency towards personal shifting and personal mobility.

(3) Trade practices and industrial organization

- With product and project units, more mobile virtual corporations and enterprise integration have appeared. Dividing of a company's established divisions into independent subsidiaries and outsourcing have made great progress together. This tendency has resulted in a generation of a horizontal type industrial organization which allows free and drastic combinations and separations depending on a convenience and external circumstance.

- The radical change from conventional management strategies to concentrating on injection of management resources into strong fields and inter-corporate cooperation, including cooperation with rival enterprises, has been accelerated.

- "Business Interface," a fundamental standard for trading methods, based on the Electronic Commerce system, has formed into a new trade practice.

(4) Change of enterprise culture

- Information sharing methods have been changing from a "big room" system to electronic mail.

  (In Japan, offices are organized in an open plan system without dividers ; communication is face to face across the room; E-MAIL would change this system)

- Inter-corporate cooperation methods have been changing from a plate system to CALS.

- Practical use of multimedia in industries has produced a base for multimedia to proliferate into general households.

4. Undertaking of policy for future industrial informatization

<Key words to realize the future industrial information network>

In order to realize the future industrial information network, "Digitalization," "Openness" and "Information sharing and cooperation" are critical factors of it's success.

<The government's concrete undertaking of promoting future industrial informatization>

Future industrial information shall be promoted by the private sector initiatives. The government's role should be to supplement and reinforce such private sector initiatives.

The government must promote standardization not for the individual intra-corporate system, but for macro-minded optimization as a whole, take measures for computer security, review various systems to keep up with information progress and perform environmental preparation and arrangement including fundamental software technology development.

(1) Proliferation and promotion of standard EDI

① Practical use of the scheme for setting common guidelines for cooperative use of computers in industrial sector, "Guideline for cooperative Use of computer."

② Proliferation and promotion of CII standard (Preparation and arrangement of an aftercare system)

③ Response to internationalization

④ Research and development project for cross-industry EDI pilot model

⑤ Enlightening top management standard EDI

⑥ Development and education of personnel

(2) Research and development of production, procurement and operation support integration information system (Promotion of CALS)

(3) Preparation and arrangement of systematic foundations for realizing EC (Electronic Commerce)

① Rules relating to the establishment of agreements

② Data preservation and verification

③ Verification responsibility at the time of troubles and sharing of responsibility

④ Study from a viewpoint of consumer protection

⑤ Study relating to the mechanism of electronic settlement of payment

⑥ Security protection of data

(4) Promotion by small and medium size companies of informatization

① Promotion of EDI introduction to SEMs Networking

② Information collection and supply

③ Preparation and arranging of support systems to SEMs

(5) Structural reform using industry-specific information

(6) Promotion of information in the public areas - an initiator of information to the entire society

① Introduction of electronic filing of applications notice and reports

② Introduction of Electronic of administrative information

③ Introduction of Electronic of government procurement

④ Other undertakings relating to information in the public areas (education, research, medical service and library)

(7) Review of various systems

① Rearrangement and readjustment of such established laws (for example, commercial laws, tax laws and stamp tax laws) that would become impediments to industrial information

② Study of various sorts of countermeasures to prevent alteration and tampering with the system audit and data

(8) Ensuring of interoperability

(9) Enhancement of security and reliability

① Computer security measures

② System audit

③ Computer virus measures

④ Registration of an encryption algorithm

(10) Cultivation of information literacy

Report by the Informatization for Industry Subcommittee through InterNet or the like

On Opening of "Program for Advanced Industrial Information Infrastructure" to the public

We are pleased to notify that we will open the "Program for Advanced Industrial Information Infrastructure" drafted by the Informatization for Industry Subcommittee to the public.

(Address)
http://www. aist. go. jp/Htmls/Doclib.html

Current News

* Epson to Enter IBM-Compatible PC Market

Seiko Epson, a computer equipment maker producing PCs compatible with NEC's 98 series, announced it would enter the IBM-compatible PC market with its own brand name. The company will market its Epson PC V series of desktop-type personal computers based on the high-speed Intel Pentium MPU. Epson PC V products will not be produced by Epson, but supplied from DEC Japan as an OEM.

Epson has produced PCs compatible with NEC's 98 series since 1987. On the other hand, as IBM-compatible PCs came into wide use and achieved world standard status, Epson began marketing IBM-compatible PCs as an agent of DEC Japan from July, 1992. The company also set up a subsidiary specializing in mail order business, and started marketing IBM-compatible products under the brand name Endeavor. This time, Epson decided to enter the IBM-compatible PC market with its own brand in order to meet an increasing demand for IBM-compatible products from company users as well as its agents.

Epson said while it would continue to market PC98-compatible products the company planned to sell 50,0000 units of the PC V Series in its debut year, a figure which corresponds to 20% of its total sales forecast.

Epson has also developed data-conversion software, Platform Emulator 98/V, to allow IBM-compatible PC users to use business application software designed originally for the 98 series. With this software, 80% of the company's business software can now be used with IBM-compatible PCs.

Fujitsu, marketing PCs with its own architecture, also expressed their intention to enter the IBM-compatible PC market. Japan's personal computer industry, where IBM-compatible PCs experienced exceptional difficulty making inroads into the market, is undergoing substantial change.

* Sharp, Fujitsu to Link up for Multimedia Development

Sharp Corp. and Fujitsu Ltd., in November, 1994, concluded a broad tie-up in the areas of information, telecommunications, and image, all constituents of multimedia.

As a first step, Sharp and Fujitsu will conduct joint research and development efforts in the areas of: 1. network information services, 2. groupware and 3. personal computer-linkage software and optical communications, by connecting Zaurus, Sharp's new portable information device, with Fujitsu's software and network services, in an aim at cultivation of a new market for personal digital assistants.

The two companies will start PC communications services using Zaurus as a terminal, setting up a special forum on NIFTY Serve, and marketing software connecting Zaurus with Fujitsu's groupware, TeamOFFICE, so that Zaurus can handle network information in TeamOFFICE.

Fujitsu will also support optical communication systems called DASK, proposed by Sharp as a world standard, and start marketing devices and data-conversion software to link Zaurus with Fujitsu's personal computers and word processors by way of cordless communications.

From now on, the two companies intend to develop new multimedia devices and services, to lead the world in the cordless communications and mobile computing fields.

* Delivery of PCs to see Upturn for First Time in Three Years

The Japan Electronic Industry Development Association (JEIDA) forecast that the delivery of PCs in 1994 would amount to 3.21 trillion yen, an increase of 2% over the previous year and making this the first upturn in three years. PC delivery showed double-digit negative growth for the last two years due to Japan's prolonged economic stagnation. In '94, while general-purpose machine sales remain sluggish, down 8% from the previous year's showing, personal computer and workstation sales increased 20% and 8%, respectively, pushing up overall growth figures.

JEIDA expects 1995 will reveal further growth in sales of products in lower price ranges, and personal computer and workstation sales are forecast to increase 10% and 6%, respectively, above 1994's showing. As

for general-purpose machines, cost-performing parallel computers are expected to find wider use, which will help to boost the growth rate to a minus 5% of 1994's figure.

* Apple to Enter Game Machine Market

Apple Computer announced that it has developed new standards for game machines and multimedia-players for educational purposes, and would tag Bandai, a major toy manufacturer, as the first licensee.

The new standard, called Pippin, uses the Power PC MPU. It also incorporates the Macintosh operating system (OS), which allows its users to play Macintosh CD-ROMs with a few modifications. Thus, Apple emphasizes, a new Pippin machine can play a far larger number of CD-ROM than any other CD-ROM game machine. Pippin has almost the same structure as a personal computer, with high extendability to PC communications networks such as Internet.

Apple, as always on the defensive with IBM-compatible PC makers, has decided to make the Macintosh OS available to other makers. Bandai becomes the first licensee and plans to start marketing new products based on Pippin this summer.

* New Card System for Cellular Phone

The Telecommunications Technology Committee (TTC) has standardized user number IC-card registration technology to separate phone and terminal numbers for cellular and car telephone services.

At present, two numbers, a terminal number and subscriber number, are registered for a terminal of a cellular or car telephone, and the subscriber number is used when ringing up the phone. However, a telephone carrier actually rings the phone by recognizing a terminal through the terminal number. For this reason, a subscriber can use a designated terminal only.

The newly standardized technology to place subscriber numbers on an IC card will enable the carrier to recognize the terminal from the subscriber number as well as the terminal number. The carrier will be able to recognize the terminal and ring up the phone and charge using the subscriber number only.

From now, both cellular and car telephone carriers will start developing new terminals that can be used by inserting an IC card, thereby upgrading network functions. The new terminals are expected to create fresh

demands, such as allowing the user to use an IC card for a company's cellular phone on business and for a personal cellular phone in private, or, for a car telephone and for a cellular phone elsewhere. New services are expected, such as inserting a IC card into a taxi's mobile telephone to ring up a phone through a subscriber number.

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