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***EDI Development
in Japan***

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No. 99

From the Editor

Radical reform is required in many enterprises in Japan in terms of corporate structure under the influence of a long-term depression and the appreciation of the yen. That is, it has become urgent that we implement enterprise reengineering, cuts in production cost through improved productivity and structural reform, business reform, and reviews of relationships among enterprises with a view toward establishing transparent trade practices.

Downsizing and networking in information systems are progressing rapidly through advances in the development of today's information and communications technologies. This has led to further improvement in the informatization of industries and enterprises. This is, in turn, expected to bring about an efficient structural reform of the industry, enhanced industrial competition, and a further improved national lifestyle.

The informatization of industries in Japan has mainly centered on improving the efficiency of mass routine paperwork and the systemization of

divisions, enterprises, and corporate groups. Although results can be seen in individual cases, however, these need to be extrapolated in such a way that information can be shared among different divisions within and among enterprises. It must be determined how to proceed with networking among different enterprises and different industries, cooperation among enterprises through such action, and business process engineering. This will necessitate the structural reform of enterprises and adjustment of conventional business practices and corporate culture. In the new industrial information network, the construction of an open information network and promotion of electronic data interchange (EDI) on a large scale based on this will become very important. It will become essential to open up and standardize systems. EDI standardization makes possible efficient low-cost investment in informatization, and the promotion of EDI will also promote the paperless office concept.

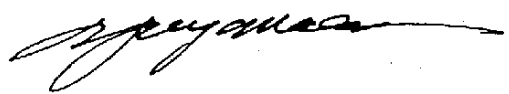
Continuous acquisition and life-cycle support (CALS), which was estab-

lished in the U.S., is also attracting attention in Japan as a way to integrate and share information generated in the total life cycle from product design to disposal in common and to implement advanced informatization and paperless work in the industry. The Ministry of International Trade and Industry (MITI) has determined to support CALS positively because MITI considers CALS to play a very important role in the informatization of industries in Japan and is closely related to EDI. Specifically, it will establish a CALS promotion conference by about March 1995 for the purpose of disseminating CALS and international cooperation and inaugurate a CALS Technological Research Association to effectively use CALS in private manufacturing by addressing related industries. The Research Association will prepare a specific model for electric power companies in the form of a three-year plan, and about 400 million yen has been earmarked for the first fiscal year's government budget (1995). On this basis, the Research Association is preparing a model which can be used in steel, aviation, electronic, and other industries. It is expected that CALS will deepen the relationship

with EDI and have a great impact on industry informatization. However, similarly to EDI, the promotion of standardization in individual fields, international harmonization of systems in different countries, and similar issues will become important in future with the international expansion of CALS.

To promote EDI in Japan, the Center for Informatization of Industry (CII), which is an institute associated with JIPDEC, has held a number of seminars and symposiums, actively participated in international conferences, and disseminated CII standards. CII also has cooperated as the secretariat of the Japan Electronic Data Interchange Council (JEDIC).

The status of EDI in Japan is being reported on in this special issue of the JIQ, and we hope you will find it both interesting and informative.



Yuji Yamadori
Director
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EDI Development in Japan

- Today and Tomorrow -

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Managing Director of JIPDEC

Director of Center for the Informatization of Industry (CII)

1. Introduction

Japan had achieved a high level of economic growth since World War II, and now occupies one of the leading positions in the world economy. Occupying only 0.3 percent of the Earth's surface, Japan accounts for 2.4 percent of the world's population and 15 percent of the world's total gross domestic product (GDP) in 1992. According to OECD statistics, Japan's GDP was 4.6% of the world's in 1960, growing to 20.0% in 1992.

A strong will to rise from the ruins of the war was not the only factor that brought about this high level of economic growth. One of the important factors was Japan's adoption and absorb of the world's advanced technologies and then developing them into the types of technology needed.

Among the technological innovations

that supported Japan's economic growth, the role of computers was quite large. Computers use in industry began in the 1960s and, in the ten-year period from 1965 to 1975, the number of computers installed and operating increased 30 percent a year, later dropping to the present annual rate of about 20 percent. This vigorous computerization was at a somewhat higher rate than the actual rate of economic growth, which peaked at about 10 percent.

In other words, the proliferation of informatization that came with the rapid computerization of industry contributed to the streamlining of corporate management which, in turn, further provided incentives for new investment. This brought about the formation of a positive investment cycle that contributed greatly to the modernization of Japanese industry and economic growth.

When corporations introduce computers to streamline and modernize their businesses, they are initially applied only to internal business operations. Then, inevitably, business operations between companies are also computerized. These operations include business transactions such as issuing and receiving orders which are transferred over telecommunications lines. This is a clear example of electronic data interchange (EDI). Thus, in discussing the present situation of EDI in Japan, it is first necessary to look at the trends in computerization in Japan on which current EDI is based.

Looking back over the history of computerization in Japan, we see that, from 1960, this progress could be divided into ten-year stages. First came the batch-processing age in the 1960s, followed by the online age of the 1970s and the network age of the 1980s (Figure 1).

The 1990s could be called the global networking age, in which we can expect steady progress toward an environment in which corporations can freely, efficiently, and safely execute business transactions electronically, however large the number of customers.

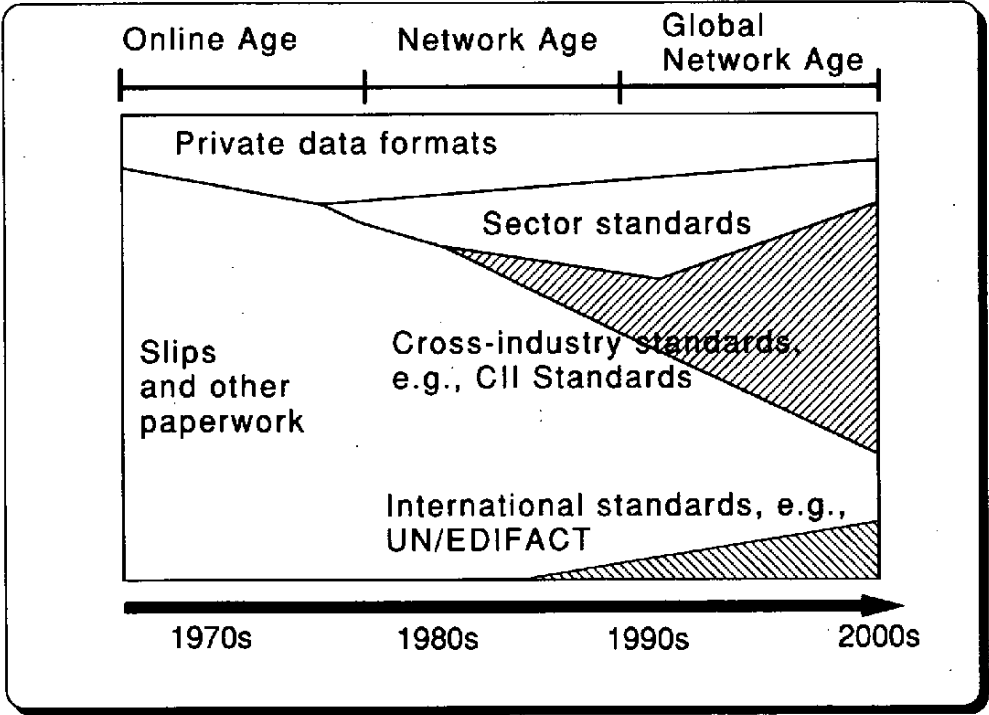


Figure 1. Overview for EDI

2. Development of Transaction Data Interchange into EDI

Looking at the development of EDI in Japan, several steps become apparent. In the 1980s, with the progress of computerization and the deregulation of the Telecommunication Business Law, commercial transactions between companies started to be executed electronically or through EDI systems (Figure 2).

EDI in computerization followed the steps below, although not necessarily in the same sequence for all companies, corporate groups, and industrial sectors (Figure 3).

(1) Step 1

To collect and manage business data, companies first had to convert data on paper, e.g., vouchers, to a computer-readable form using punch cards and the like. Differences in the data format of vouchers between corpora-

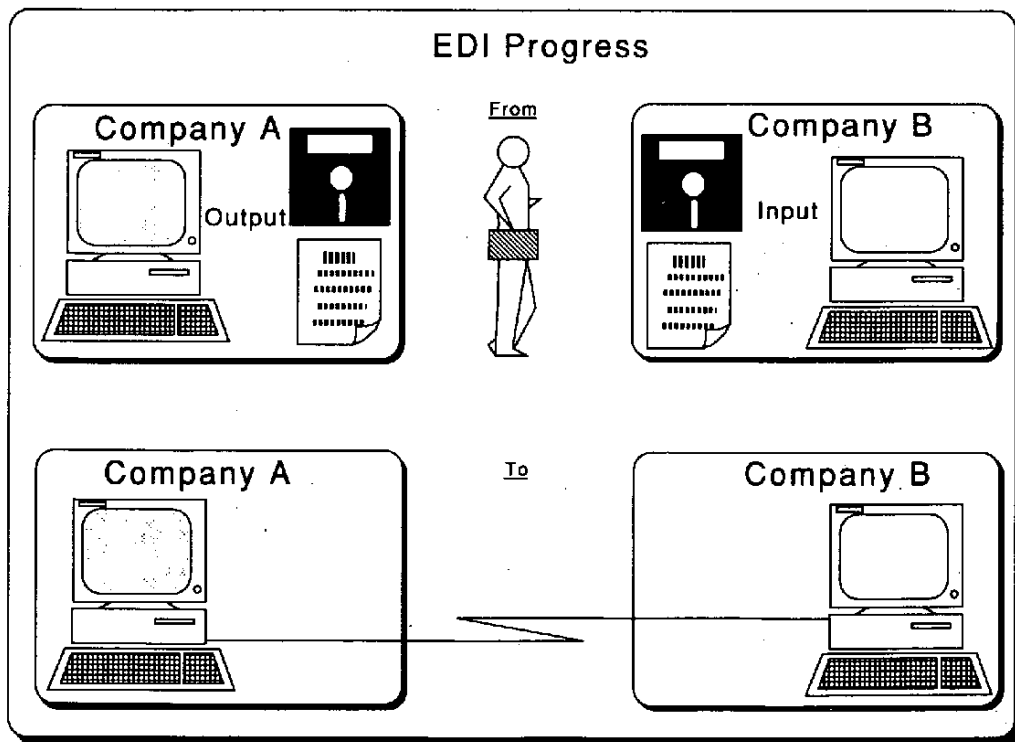


Figure 2. Commercial Transactions between Companies

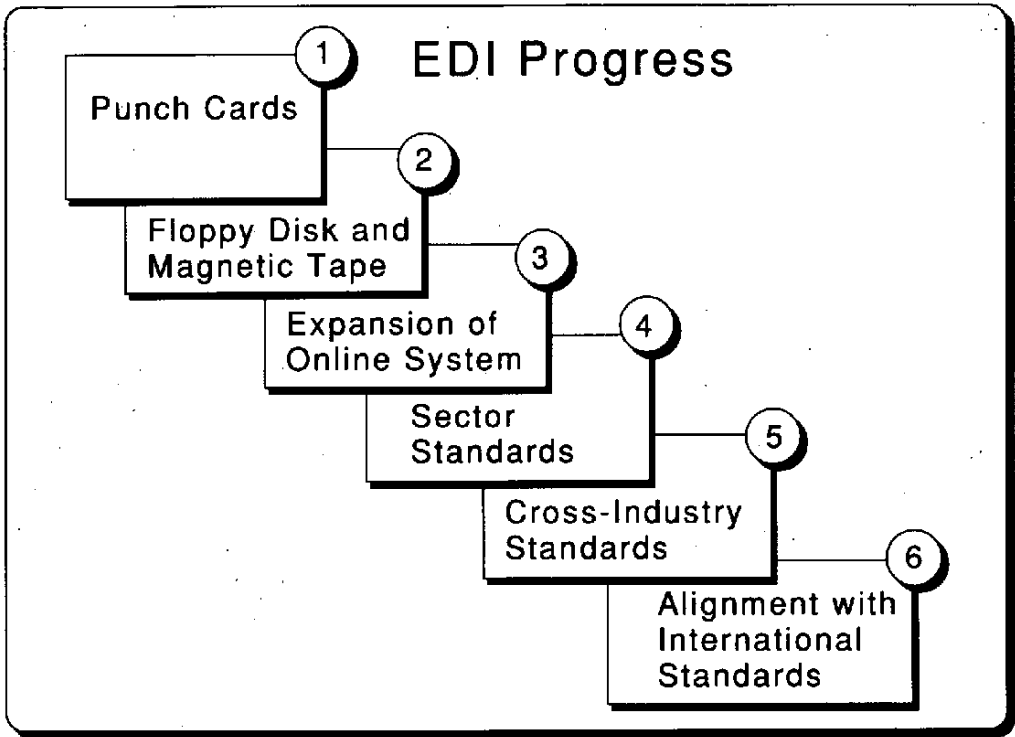


Figure 3. Evolution of Data Interchange

tions and their client companies, however, made it inefficient initially to process data using computers. Unification of the voucher format constituted the first step in EDI (Figure 4).

(2) Step 2

As the formats of paperwork such as vouchers became increasingly standardized, however, other problems arose. One was that of redundancy, with companies A and B electronically converting the same data individu-

ally, for example. Another was that of format conversion: even if company B received converted data from company A, company B might have to change the format because that used by company A's electronic media was different from that which company B was using. In addition, even if company B received similarly converted data from other companies, it might have to make further format conversions.

Problems such as these were solved by standardizing the format of elec-

From
Standardization
To

ORDER

Date

Seq. No.

From To

Amount

Memo

Goods	Unit price	Number

ORDER Date

Goods	Unit price	Number	Spec.

Buyer

Seller

Memo

Standardized Slip

ORDER

Order No.

Buyer

Seller

Date

Total Price

Note

Person in charge

Item Code	Unit price	Number

Figure 4. Standardization of Vouchers

tronically converted data on magnetic tapes and floppy disks. Thus, some groups and sectors standardized the content of their standardized paperwork in the process of conversion to electronic media, and exchanged business transaction data through electronic media (Figure 5).

(3) Step 3

At the time data exchange through electronic media was increasing, exchange was also being conducted

through telecommunication lines. As an extension of corporate online processing, online terminals were installed in client companies or data was exchanged between companies' computers through their own telecommunications protocols.

The development of these methods of electronic exchange converting business transaction data differed between companies, resulting in the following developments:

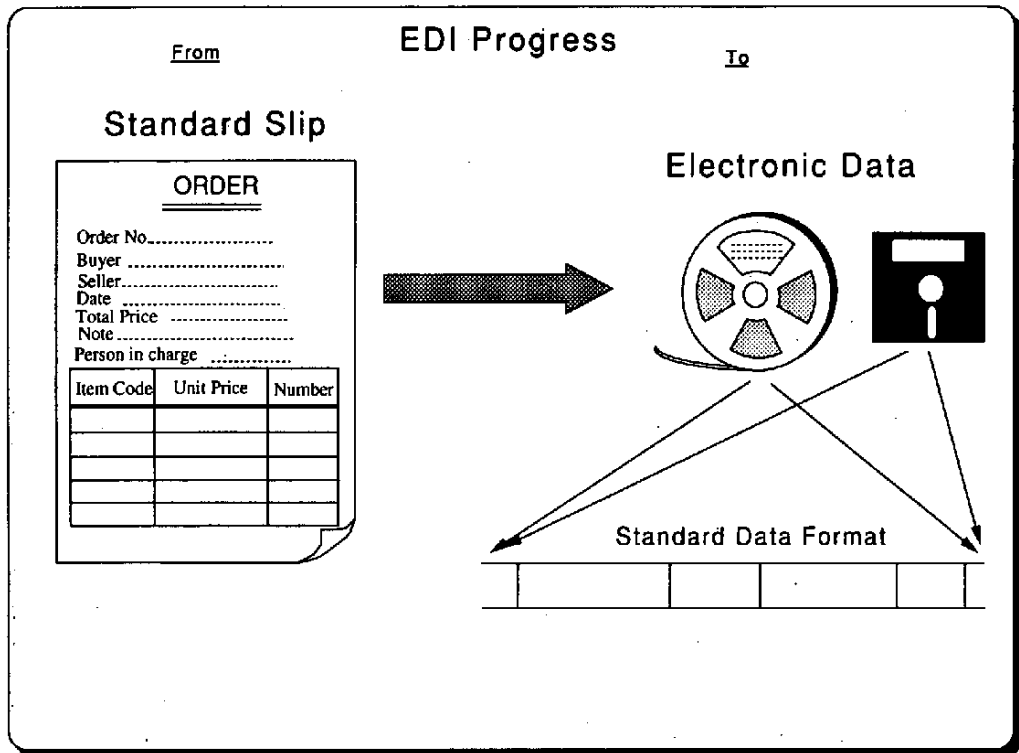


Figure 5. Exchange of Business Transaction Data through Electronic Media

- A proliferation of different terminals appeared as different online systems were installed in individual client company.
- The burden of converting different data formats from client companies to a company's own electronic data format increased (Figure 6).

(4) Step 4

Groups and sectors attempting to

surmount these obstacles found that standardizing transaction data was more difficult than expected, however, because the extent, content, methods, and other factors in each company's business environment differed and because individual companies had a vested interest in sticking to their own formats, which was considered less expensive than investing in an unfamiliar system, for example. Nevertheless, standardization has been increasingly implemented

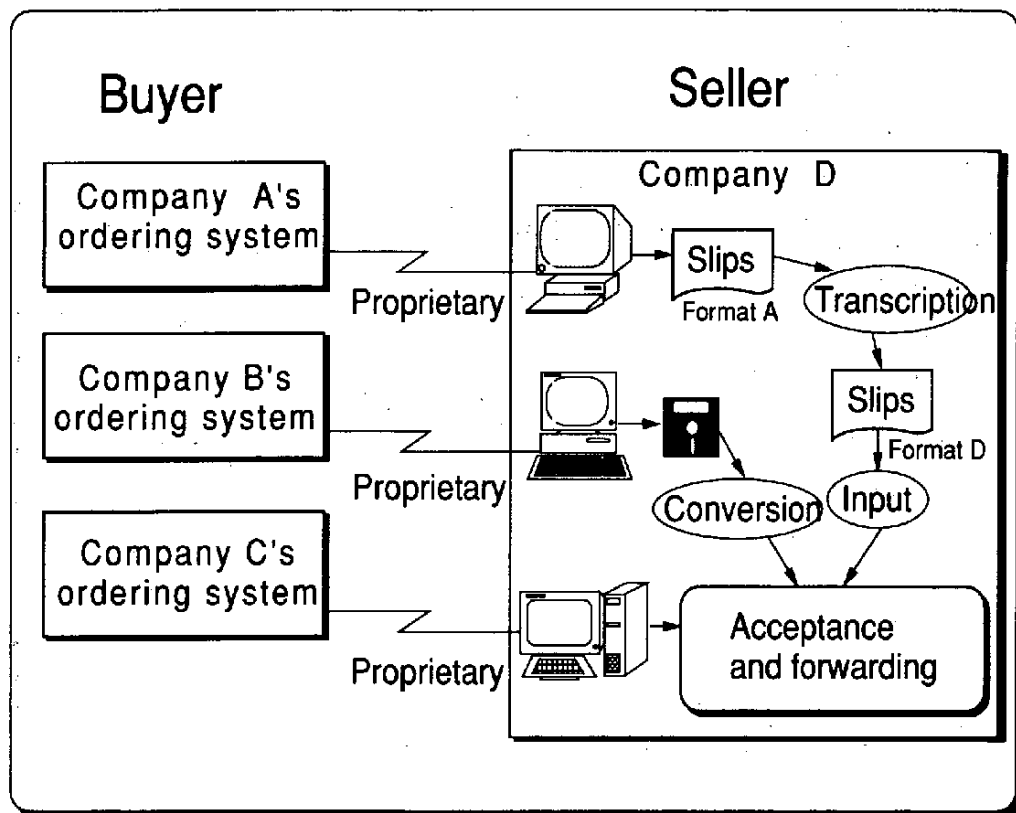


Figure 6. Proliferation of Terminals

among corporate groups and industries.

Value-added networks (VANs) for businesses were set up to facilitate the smooth operation of these standardized formats. Thus, in the 1980s, many independent business-sector VANs were set up, and standardization was promoted in individual industrial sectors (Figure 7).

(5) Step 5

Business-sector VANs enabled data to be interchanged only among participating companies, however, which is to say that it was very difficult to connect different VANs.

To realize cross-industry standardization, much more work is needed than that involved in conventional standardization.

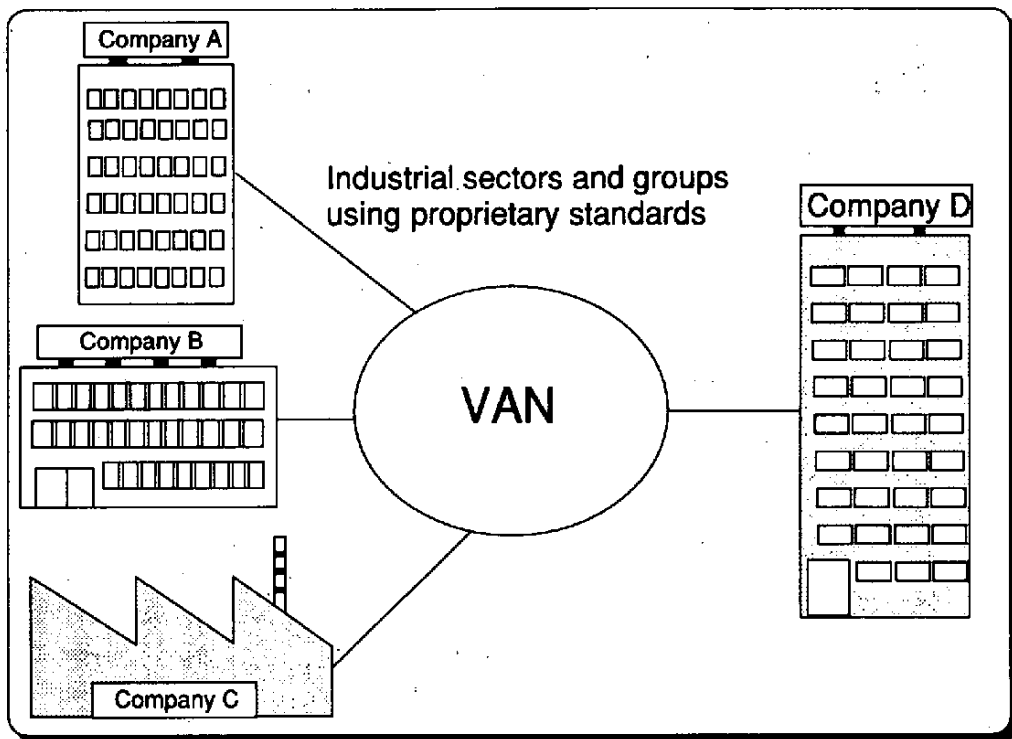


Figure 7. Independent Business-sector VAN

It is, in fact, almost impossible to readjust the achievements of individual industrial sectors to facilitate standardization with other sectors. Any attempt to standardize a data format to a fixed length, as in the past, would result in excessively large numbers of data items, thereby defeating the purpose. In other words, in information interchange within industries, data items which are used in other sectors would have to be dealt with as standardized items. This would involve many more data items

than most companies would either require or desire.

Thus, data sent to client companies over telecommunication lines uses a variable length rather than a fixed length. The more companies and industries which participate in business-sector VANs, the more meaningful it becomes to send data in a variable length. It would thus be more efficient to send only the data items required by counterparts using a variable length format.

3. Development and Spread of Syntax Rules

The electronic equipment industry in Japan has thus had to deal with the standardization of variable-length transaction data.

Although a corporation and its transaction group may have developed an internal common business protocol which increases efficiency, this efficiency is offset by the fact that a parts manufacturing company, for example, which has similar transactions with a large number of big corporations, is forced to comply with the different systems of each corporation, resulting in a proliferation of different terminals, complicating the information system and driving cost up. The electronic parts industry was thus the first to do something about this problem.

In 1987, the Electronic Industries Association of Japan (EIAJ), which is made of electronic equipment and parts manufacturing and related enterprises, took a neutral position and began—in cooperation with the Center for the Informatization of Industry (CII), which is part of JIPDEC, which promotes the use of information in all industries—the study of format standardization.

The result was the conclusion that a rational format should consist of syntax rules for variable-length format, standard messages, and standard data items. Such a format configuration was similar to ANSI X.12 in the United States and EDIFACT (ISO9735), which were under discussion at the time.

The latter two syntax rules could not be applied to the Japanese situation, however, for two major reasons:

- Kanji characters used in Japanese commercial transactions could not be included.
- The development of rules for standard messages in Japanese would take much time.

This led them to the development of new syntax rules taking into account these considerations and the eventual establishment of the EIAJ Syntax Rules in 1989. To enable this standard to be used in other industries, the CII consulted with related industry circles and developed the CII Syntax Rules in 1991. This extended version of the EIAJ Syntax Rules provides upward compatibility with EIAJ rules.

Industrial sectors that are presently already using or have decided to adopt

the CII Syntax Rules include electronic equipment, electric equipment, electric wire and cable, petrochemicals, iron and steel, electric power, gas supply, construction, and housing equipment distribution.

Other industrial sectors considering adoption of CII Syntax Rules include automobile, textiles, and mercantile distribution.

The CII Standards are thus a de facto national standard. The CII Standards consist of the CII Syntax Rules and standard messages based on the rule, and are administratively explicitly noted in the Guideline for Cooperative Use of Computers (MITI) under the Law on the Facilitation of Information Processing.

4. Current Trends in EDI Diffusion

EDI has thus been developed and introduced in about 50,000 companies, excluding financial institutions. Not all companies and industries are so advanced, however, but individual companies and industries understanding the necessity are taking the required steps.

A simulated survey of EDI develop-

ment and spread in Japan shows that, at present, although transactions using paperwork are steadily decreasing, they still account for the majority. This means that steps 1 and 2, above, have been undertaken, i.e., the steps before transaction data is exchanged over telecommunications lines. EDI as an extension of corporate online systems increased in the online era (Step 3), but, after obstacles appeared and industrial sector standards were set up (Step 4), EDI decreased. Since the CII Standards, as a national standard, went into practical use for cross-industry standards, industrial sector standards have also begun gradually moving toward the CII Standards, which had been adopted by more than 1,300 companies by 1994 (Figure 8).

In addition to the domestic transactions described above, international transactions have, after consultation with overseas client companies, usually involved ANSI X.12 in addition to proprietary formats. UN/EDIFACT is rarely ever used, but, in accordance with EDI progress in counterpart countries, UN/EDIFACT use is expected to gradually increase in international trade in the near future.

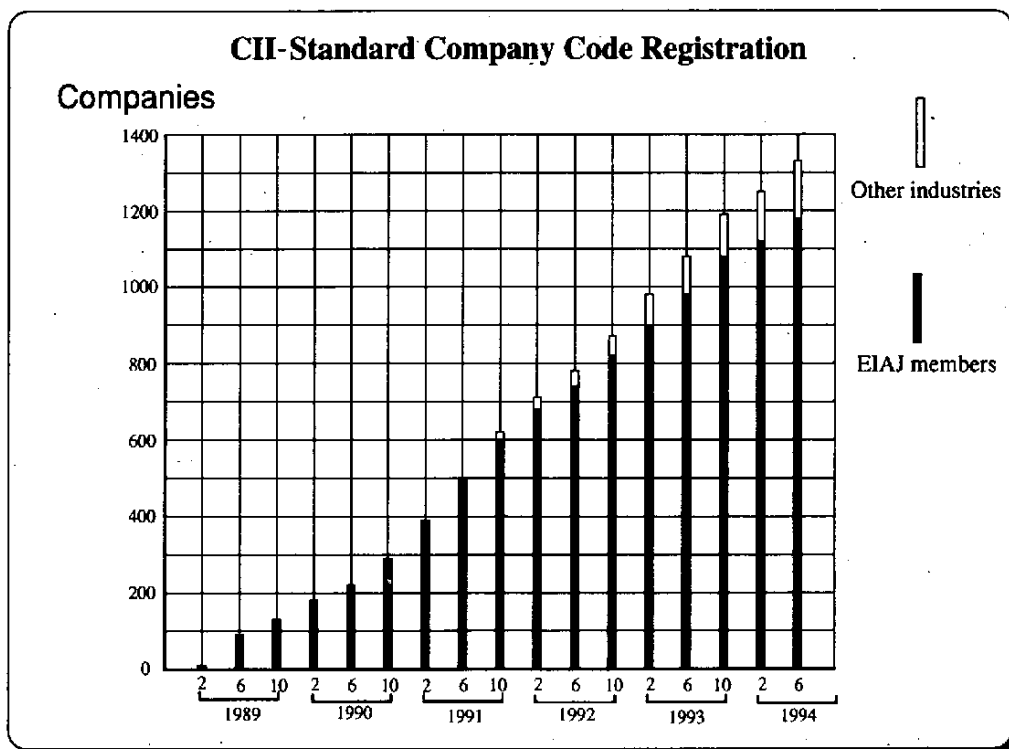


Figure 8. Increase of Registration of CII Standard Company Code

5. EDI Scheme Based on the CII Standard

(1) CII Translator

In-house business formats are usually fixed formats unique to each company. In EDI exchanges using CII Syntax Rules, companies sending messages must convert their formats to the CII standard format, and vice versa—a conversion process that requires a translator (Figure 9).

The CII translator is designed to reduce the labor needed when users introduce EDI by converting their fixed formats and the variable-length format based on the CII Syntax Rules. CII translators developed also handle binary data such as CAD/CAM data.

In 1991, to minimize problems created by differences in translator products, the CII defined CII Syntax Rules in detail in cooperation with more 20 vendors to facilitate its uniform inter-

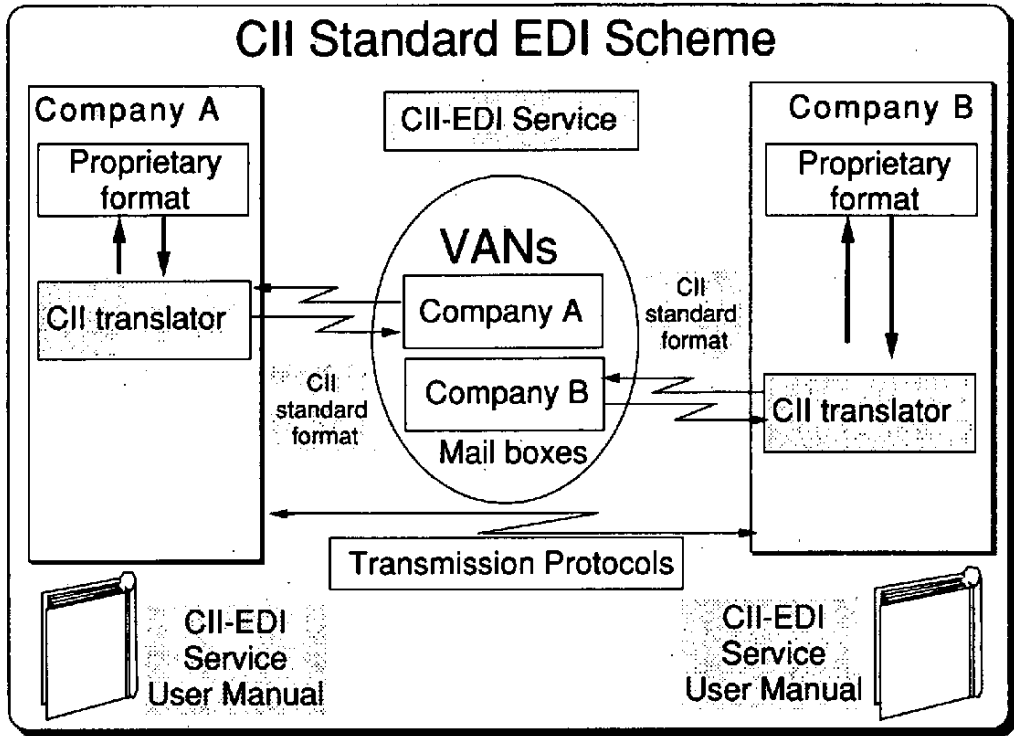


Figure 9. CII Translator

pretation. In 1992, CII started the CII translator recommendation system enabling the CII translator to maintain interconnectivity and quality among translators and furthering the dissemination of the CII standard.

(2) CII EDI Service on VAN

In many cases, EDI transactions with client companies are conducted through VANs, which presents no problems if both parties belong to the same VAN. The existence of more than 800 VANs in Japan, however,

virtually ensures that EDI is not conducted within the same VAN, and makes for many problems in VAN-to-VAN connections. It is therefore necessary to standardize the CII Standard EDI service supplied by VAN carriers (Figure 10).

To this end, the CII prepared a report, "Operating Guidelines of CII-EDI Service," and publicly issued all common basic specifications and interfaces for VAN-to-VAN connections in September 1993.

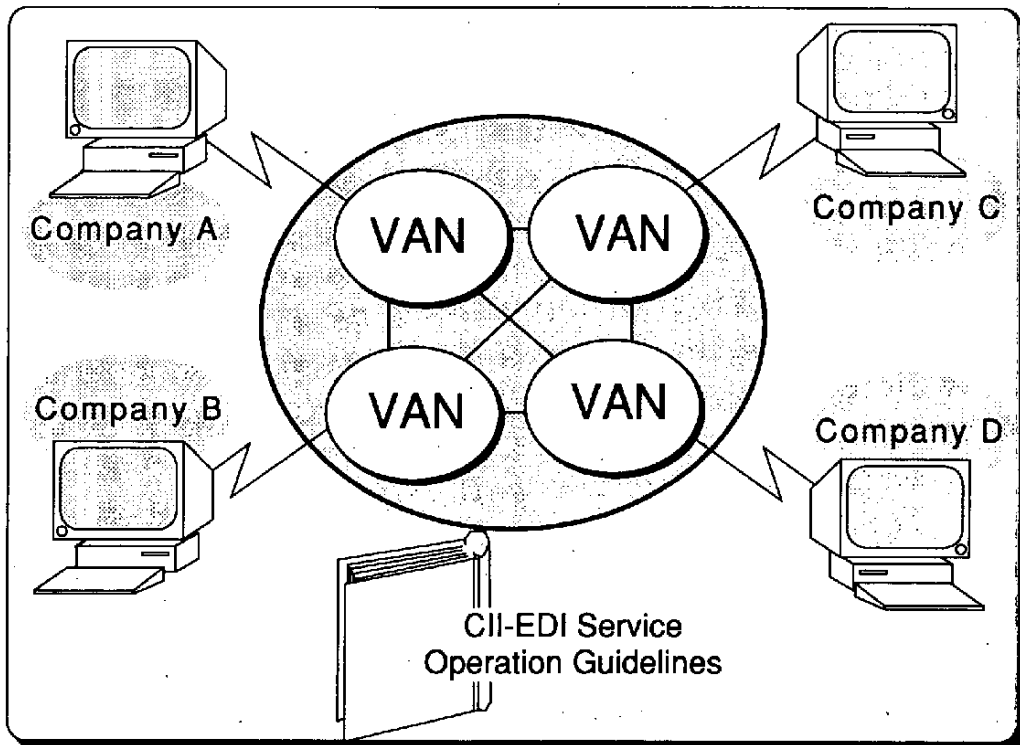


Figure 10. CII-EDI Service

User manuals are also required for the CII-EDI Service for companies. Following the guideline for VAN carriers, the CII issued "CII-EDI Service User Manuals" in March 1994.

Corporate users belonging to either of these VANs, which provide CII-EDI services can conduct EDI with any client company with no special consideration.

(3) Transmission Protocols for CII Standard

Computers in Japan are provided by a relatively wide variety of manufacturers compared to other countries. Improving the dissemination of EDI thus requires that attention be paid to interoperability between computers.

When different manufacturers maintain their own telecommunications protocols, as in Japan, then, telecommunications between computers of different manufacturers is difficult (Table 1). It is therefore necessary to make common EDI transmission protocols independent of computer manufacturer protocols.

Transmission protocols used in Japan at present, such as the J and Z (Zengin) Procedures were developed early and are in current use.

Transmission protocols based on OSI, such as the H Procedure based on MHS and F Procedure based on FTAM, have also been developed and implemented. Of these, the Z Procedure is mainly used as the transmission protocol for framing CII Syntax Rules.

(4) CII Standard Message Formulation

The formulation of the standard message to which the CII Syntax Rules

Table 1. Present Situation of EDI in Japan (Outline)

Industry	Business Protocol		Transmission Protocol	
	Standard messages	Syntax rules		
Manufacturing Electronics Petrochemical Construction Ironsteel ⋮ Automobile ⋮	<div>EIAJ Standard</div> <div>Petrochemical Standard</div> <div>CI-NET Standard</div> <div>Ironsteel Standard</div> <div>⋮</div> <div>Proprietary standards</div> <div>⋮</div>	<div>EIAJ rule</div> <div>CII rule (Variable format)</div> <div>Fixed formats</div> <div>⋮</div>	<div>Z-Procedure</div> <div>F-Procedure</div> <div>⋮</div>	
Distribution Chainstore Departmentstores Confectioneries ⋮	<div>Chainstore Standard</div> <div>Proprietary standards</div> <div>Confect.VAN Standard</div> <div>⋮</div>	<div>Fixed format</div> <div>Fixed format</div> <div>Fixed format</div> <div>⋮</div>	<div>J-Procedure</div> <div>Z-Procedure</div> <div>H-Procedure</div> <div>⋮</div>	
Finance Inter-Bank Firm Banking ⋮	<div>Inter-Bank Standard</div> <div>Private & Z Standards</div> <div>⋮</div>	<div>Fixed format</div> <div>Fixed format</div> <div>⋮</div>	<div>Z -Procedure</div> <div>⋮</div>	
International Trade Customs Shipping ⋮	<div>NACCS Standard</div> <div>SHIPNETS Standard</div> <div>⋮</div>	<div>Fixed format</div> <div>SHIPNETS rule(Semi Variable format)</div> <div>⋮</div>	<div>NACCS-Procedure</div> <div>DRESS-Procedure</div> <div>⋮</div>	

apply differs from that of UN/EDIFACT's standard message, although messages contents are the same (Figure 11).

Standard messages based on CII Syntax Rules are currently being developed from the bottom up, with the underlying concept being that each industry will develop them according to its needs. Unlike the top-down development used by UN/EDIFACT,

in which a standard set of messages is first made with consideration of all users, after which each user develops and uses a subset, CII development gives primary consideration to the different cultures of the individual industries and industry groups, and then works to construct as standardized an EDI as possible, which is one of the reasons CII standards will be easily adopted by nearly all industrial sectors.

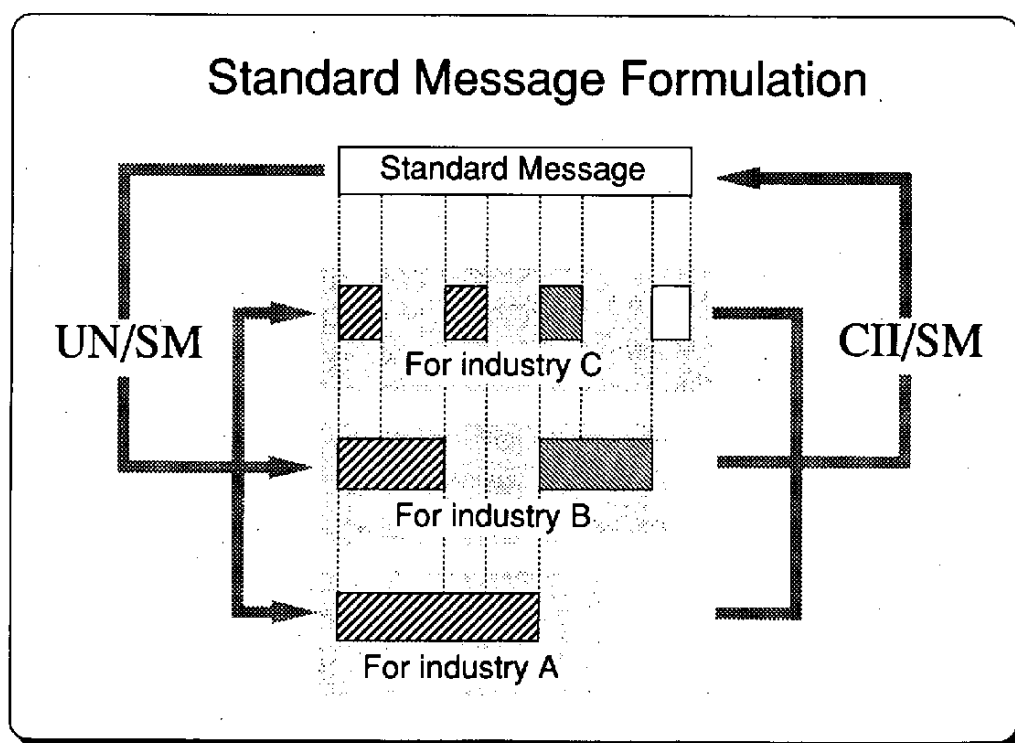


Figure 11. Formulation of Standard Message

The CII must manage standard messages, however, which will include providing instructions to industries and companies which need standard messages.

6. Promoting EDI Dissemination

(1) EDI for Cross-Industry Use

Orders sent and received result in the transport of goods. Messages are thus exchanged between transport

and manufacturing industries. Companies issuing orders must pay for goods and transportation costs. Such commercial transactions are generally concluded after payments are made through a bank. A commercial transaction involving the issuing and the receiving of orders is thus concluded through the physical distribution of transporters and the settlement of accounts with a bank. Such EDI is called cross-industry EDI (Figure 12).

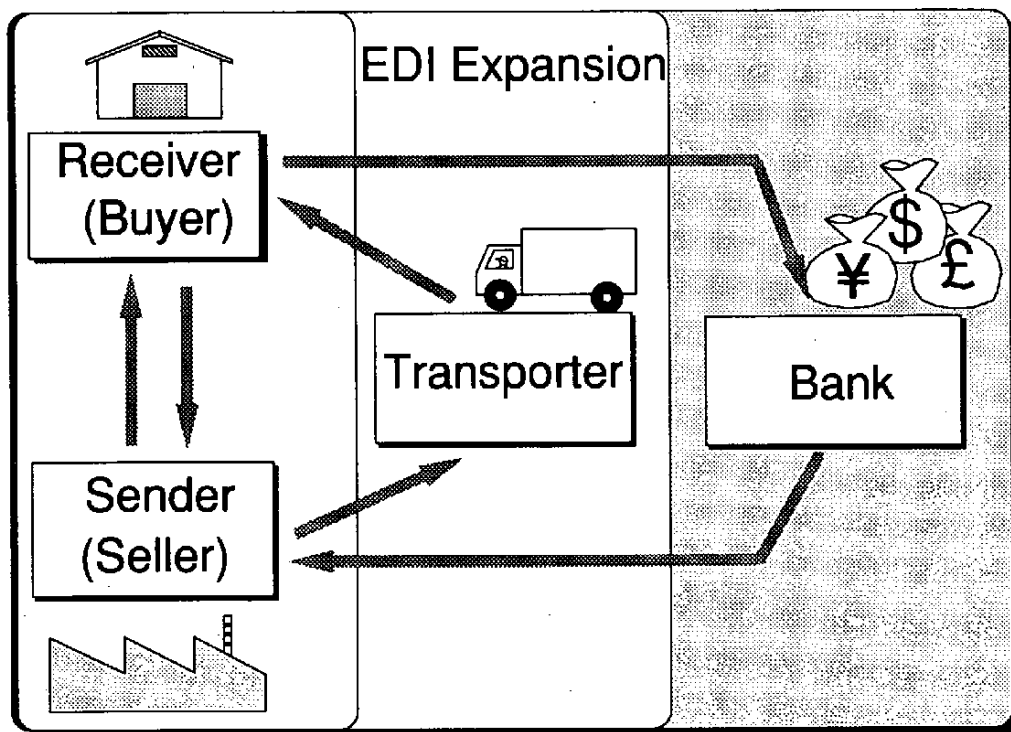


Figure 12. EDI for Cross-industry Use

The Ministry of International Trade and Industry (MITI) has recognized the difficulty of developing EDI messages among companies with different business environments, and started research and development of a pilot model in cooperation with the CII in 1992. The Ministry will complete this physical distribution model project in March 1995, and then may start cross-industry EDI in the settlement-of-accounts model project.

(2) EDI for Small and Medium Business Enterprises

Informatization has not made much progress in small and medium business enterprises, even in their own operations. Even among those companies that have made progress, however, it is often because they have been forced to by their parent companies. Thus, few people can deal with data processing in small and medium companies, where the meaning of informatization as such is little understood.

In many cases, even though these small and medium enterprises understand the meaning of EDI and can squeeze out enough money for personal computers and other related hardware, they do not attempt to invest in personnel who can operate EDI or bear the necessary service-

related costs, including those for technical training.

The Small and Medium Enterprise Agency of MITI thus started research in cooperation with the CII to promote the dissemination of EDI into small and medium enterprises in a two-year plan since 1993. This project focuses on whether or not a low-priced, easy-to-operate EDI system can be built as a software package for personal computers.

(3) EDI for Interactive Exchange

EDI through the use of a batch processing system has been put into mostly practical use in the past. Now, however, with the diversification and advancement of business transactions, EDI is becoming increasingly in need of a much faster real-time processing system to get its work done. In the transaction of business such as inventory and deadline inquiries, for example, immediate processing is needed and the requirements are growing for shorter and shorter response times. Under these circumstance, the most immediate processing needs can be maintained to some extent, even with EDI using the existing batch processing system, but instantaneous responses cannot be made, and the need for the develop-

ment of instantaneous and interactive EDI is becoming increasingly urgent. In Japan, the CII has been investigating this matter since 1993, as are the distribution, finance, and travel service industries.

(4) EDI and Legal Issues

Companies cannot be expected to adopt EDI smoothly and without worry until legal preparations are completed. No special laws concerning EDI have yet been established in Japan, but the CII has been considering legal issues from different angles since 1988. In several industries, *contract and memorandum models* for EDI transactions have already been prepared as a set of guidelines for EDI-user companies within these industries.

Considering these models as a reference, the CII published a report, "Points on preparation of electronic business transaction contracts — consideration of legal issues on EDI," in 1993. The CII will also complete Japanese models of EDI contracts after researching contract models in foreign countries and trends in the United Nations Commission on International Trade Law (UNCITRAL) in 1995.

EDI should, at least in theory, be pa-

perless, but EDI users seldom can enjoy this possibility. The Japanese Corporate Tax Law, for example, states no explicit rule as to whether or not electromagnetic data is admissible in lieu of documentation for tax purposes, such documents must be retained or for how long. It must be arranged so that electromagnetic data is admissible under the law under some conditions without first creating paper documents.

(5) Relationship with UN/EDIFACT

UN/EDIFACT, written originally in English, is very difficult to translate into Japanese, which is one reason why international standards cannot be disseminated easily in domestic trade. Companies are expected to follow the trend to adopt UN/EDIFACT for international trade in the near future, however.

CII and UN/EDIFACT syntax rules are nearly identical, which means that mechanical conversion is possible, and this is now being studied by the CII (Table 2). Alignment with UN/EDIFACT regarding standard messages is becoming easier and national messages can be developed soon under the scheme of UN/EDIFACT message development. Alignment should be gradually accomplished when the UN/

Table 2. Structure of EDIFACT and CII Syntax Rule

	MESSAGE	DATA -SEGMENT	DATA-ELEMENT	CHARACTER -DATA	BINARY DATA
EDIFACT SYNTAX RULE (ISO9735)	DESCRIPTION OF ONE TRANSACTION	GROUPING OF DATA -ELEMENT -IDENTIFIED BY SEGMENT-TAG -VARIABLE LENGTH USING SEGMENT SEPARATOR	SINGLE & COMPOSIT DATA-ELEMENT -IDENTIFIED BY SEQUENCE ORDER OF DATA-ELEMENT WITHIN A DATA-SEGMENT -VARIABLE LENGTH USING DATA-ELEMENT SEPARATOR	-ALPHABETIC & NUMERIC & SPECIAL CHARACTERS	---
CII SYNTAX RULE	DESCRIPTION OF ONE TRANSACTION	(ONLY USED AS MULTI DETAILS (REPUTATION OF DATA-ELEMENT GROUP) -IDENTIFIED BY MULTI DETAIL HEADER -NL-MARK & TRAILER (SEPARATOR CHARACTER)	TFD STYLE -IDENTIFIED BY DATA-TAG -VARIABLE LENGTH USING LENGTH-TAG	-ALPHABETIC & NUMERIC & SPECIAL CHARACTERS -JAPANESE KATAKANA -JAPANESE KANJI	-CAD/CAM & IMAGE DATA

EDIFACT and CII standard schemes are stabilized individually in the future.

7. Organizations Promoting EDI

EDI is essential to the infrastructure underlying the efficient and effective use of industrial information systems, and an awareness of the need for EDI has gradually developed in Japan, but its diffusion and standardization has, up until now, been handled independently by different industrial groups. This is shown by the fact

that, in Japan, EDI has developed successively from small corporate groups to larger corporate groups or industries (viz. Section 2).

(1) Japan EDI Council (JEDIC)

An interindustry organization geared to the harmonious conclusion of EDI issues of mutual interest has clearly become necessary. The Japan Electronic Data Interchange Council (JEDIC) was thus set up in October 1992 at the initiative of industry leaders and with the cooperation of the relevant government ministries

to develop a common base for discussions among all industries and to cooperatively develop both domestic and international EDI standards.

At present, the JEDIC has a membership including 45 industry groups, such as the EDI Center of the ELAJ and the Iron and Steel Network Study Committee, and EDI-related institution, such as JASTPRO, DSRI, and the CII. Four government ministries—the Ministry of International Trade and Industry, the Ministry of Finance, the Ministry of Transportation, and the Ministry of Construction—also participate as observers.

The JEDIC formed its Planning and Steering Committee, its Awareness and Dissemination Committee in 1993, and its International Committee in 1994. The JEDIC secretariat is managed by the CII of the JIPDEC.

(2) Japan EDIFACT Committee (JEC)

The Japan EDIFACT Committee (JEC) was established in 1990 to develop and promote EDIFACT-related standards in Japan in cooperation with other member committees of the Asia EDIFACT Board (AS/EB) and to support Rapporteur and AS/EB activities.

Its 50 members include industrial groups and EDI-related institutions, plus observers from the Ministry of International Trade and Industry, the Ministry of Finance, and the Ministry of Transportation.

Activities are divided among four groups: Support, Technical Support, Legal Aspects, and Message Development.

The secretariat of JEC is managed by JASTPRO.

(3) Center for the Informatization of Industry (CII)

The CII was established as part of the JIPDEC in 1985 to investigate and research industrial informatization and promote it smoothly through business protocol standardization activities. Among their activities are consultation on the effective utilization of information systems and the promotion of OSI. The CII-EDI Standard was completed in 1991 after four years of research on all domestic trade, enabling the use of Japanese-language characters. The F Procedure based on FTAM/OSI was developed in 1993 to provide high-speed, and large-capacity transmission. These activities are highly appreciated both by industry and government Ministries.

The CII is also engaged in many matters concerning EDI, including promotional activities, operational matters, technological development, security, and legal issues.

Furthermore, regarding ISO activities, the CII is acting as the secretariat for the ISO/TC 154 Japan Consultative Committee and supporting ISO/IEC JTC1/SC30 "Open-EDI." Regarding other international activities, the CII supports and participates in UN/ECE/WP.4 (EDIFACT) and Asia EDIFACT Board activities through the JEC, EDICOM annual meetings in Asia, and working group of Telecommunications/APEC.

The overall current status of EDI in industrial circles in Japan has been described above. The specific EDI status, enforcement, and details will be described in Part 2 for each individual industry. As indicated by the description, the importance and use of EDI have been gradually but widely recognized in industrial circles. EDI has demonstrated obviously advantageous effects. Among enterprises which have introduced EDI, it is said that electronic data processing

has been reduced and transfer errors largely eliminated. In addition to these direct effects, customer services have apparently been improved and inventories of products, raw materials, and materials have been greatly reduced. EDI is also having a strong impact on the business process reengineering of enterprises and industries.

It must also be pointed out, however, that the introduction of EDI in the area of administration has been virtually nil, except for some highly specialized business transactions. Although both the customs clearance (NACCS) system (Section 13, Part 2) and the patent application system (No. 97) are proprietary formats, they can be positioned as EDI in the broad sense. The government is currently examining the construction of a national information infrastructure for the coming information-oriented society. In this examination, informatization in administration has also become a hot issue for discussion. Applications by enterprises and individuals and the authorization and notification involving the government are expected to be conducted using EDI in the near future.

Present Status and Future of Industries Advanced in the Practical Operation of EDI

1. Electronics Industry

The Electronics Industries Association of Japan (EIAJ) deals with a large number of transactions within the industry and individual business transactions have been proceeding with the development of purchase order and acknowledgment systems many years. Taking advantage of the 1985 amendments to the Electrical Transmission Law, purchase order and acknowledgment systems were, step by step, brought online using an original system of the order industry. This effort, however, resulted in new problems, termed the phenomenon of "multiple terminals and data exchange hell", with the necessity of a standardized electronic data interchange (EDI) being recognized. It was at this point that the EIAJ got together with companies which supported this standardization from June 1987 to discuss EIAJ standards. In order to promote this even more strongly, the EDI Promotion Center

(currently, EDI Center) was established in September 1988.

Under the supervision of the EIAJ information society promotion office, the EDI Center operates with 187 member companies (20 companies participate in internal committees) and 76 companies acting as supporting members. The Center receives assistance funds from the EIAJ and membership fees from each company. With a total membership exceeding 200, including administrative committees dealing with the information society, planning and chief investigative board and each working group, the examinations of how to further promote an information society continue. The results of such examination were documented as EIAJ-EDI Standards and were practically used as a bible for dealing with the system for carrying out EDI transactions under comprehensive operation rules. Furthermore, in order to disseminate and determine an EDI not confined to

only one industry, we are cooperating with related administrations and groups by holding seminars, issuing bulletins, participating in international conferences, and managing unified corporate codes.

The EIAJ Standards specify the individual types of messages related to transport and trade, syntax rules, and various operation rules. A bar code label system and standard delivery system are being developed and operated as EDI applications. In particular, as shown in the 1994 edition of EIAJ-EDI Standards in which current activities are summarized, the ways in which EDI is used are being disseminated to a wider range and higher level through such efforts as the addition of items used in the electrical wiring and cable and electrical industry, based on the Guideline for Cooperative Use of Computers to standard messages in trade, and the development of a standard delivery system that uses EDI with the aim of improving the efficiency of delivery operations. A transport EDI used for the Research and Development on Industrial EDI Pilot Model has already been partially completed. We have begun making a business model and standard messages concrete and utilizing CII syntax rules.

With the publication of the previous

1994 edition as industrial standards, the EIAJ Standards are considered to have attained quite a high degree of completeness. In future, while pursuing industrial EDI and international EDI, we are considering promoting EDI expansion by cooperating with related administrations and groups in order to make it useful in the revitalized management of companies as a business process reengineering (BPR) tool.

2. Electric Power Industry

Currently, Japan's electric power industry is composed of 10 power companies from Hokkaido in the north-east to Okinawa in the southwest. The main objective of the Federation of Electric Power Companies (FEPC) is to resolve issues common to these companies. The FEPC was established in 1952 with 9 companies. Electric power companies provide stable electricity to approximately 70 million users across the nation. Huge facilities must be built and maintained in order to do this. To make the amount of huge office processing of related computation of electrical charges, materials, and management and facility management operations more efficient, individual electric power companies started working toward systematization in the mid-

1950s. Bringing each of the electric power company systems online had been almost completed in the early 1980, and online connections with outside companies had also begun.

In the middle of the 1980s, the need for a higher level of computerization, as an industry, increased. Simultaneously with the reporting period of the Electric Industry Computer Connection Usage Guides published in 1987, the organization of the FEPC was upgraded. At the base of this organization, the main issue is the resolution of common issues such as business protocol standardization, construction of an industry-wide database system, and software distribution and codevelopment. Of these, EDI for material procurement operations was selected as the focal issue, and creation of a business protocol standard was undertaken. The two industry standards Business Protocol for Material Purchase Order Operations and Business Protocol for Electrical Charges Collection Operations were prepared in 1990.

In October 1991, through EDI cooperation between the Tokyo Electric Power Co., Inc., and an electrical wiring manufacturer, the Material Purchase Order Operations Business Protocol was revised to Version 1A and made to conform to EIAJ Stand-

ards. After receiving notice from the four electric industries regarding the Guideline for Cooperative Use of Computers in 1991, Version 2B was created to use CII standards and adjust data items to EIAJ standards and make the adjustments required by the Japanese Electric Wire and Cable Maker's Association (JCMA), Electronic Industries Association of Japan (EIAJ), and the Japan Electrical Manufacturers' Association (JEMA). Based on this, the Tokyo Electric Co., Inc. has, from October 1993, been executing EDI with pole transformer manufacturers, and is planning to execute EDI with several other companies from this year. The FEPC has also established the EDI System Operation Guideline and EDI Implementation Manual.

For the FEPC, EDI is an important infrastructure in this advanced information society because it will contribute greatly to the efficiency of office work and the shortening of delivery dates. The FEPC is thus aggressively undertaking the preparation of the Contract Construction Purchase Order Operations Business Protocol.

3. Wire and Cable Industry

The Japanese Electric Wire and Ca-

ble Maker's Association (JCMA) is a nationwide organization composed of electrical wire and cable manufacturers, that was established in 1945 as the Japanese Electric Wire and Cable Maker's Cooperative to rebuild and revive the wire and cable industry after World War II. In 1957, the name was changed to the current one. There are 161 member companies and, under the board of trustees, more than 20 special committees, miscellaneous committees, and technical committees, these take on various issues related to the wire and cable industry.

The Association has been become involved in EDI through such activities as those of the Industry Computerization Support Committee to support high-level computerization in the industry since 1984. Since 1988, activity has been focused on EDI. In the initial deployment of EDI, this committee took under consideration the Material Procurement Business Protocol Standard prepared by the FEPC and the EIAJ Standard for Informationization in Transaction prepared by the EIAJ, with which the industries have been strongly tied, and identified problem points in regard to the transaction of information in the wire and cable business. Using the actual billing forms and information processing methods used by each member com-

pany, they listed up their questions and requests. In 1991, an industrial EDI Guideline for Cooperative Use of Computers was proposed for the four electrical industrial groups (wire and cable, power, electronics, and electrical) by Japan's Ministry of International Trade and Industry (MITI), and it has been investigated inside the Association with cooperation of the electrical industry.

The practical implementation of EDI using other industry standards has been considered in parallel with this type of standardization activity. EDI between the electrical power industry (Tokyo Electric Power Company) and the wire and cable companies actually started in 1991. In 1993, in conformance with the Guideline for Cooperative Use of Computers, investigation started with the transition to the CII standard.

Future activities for standardization include using the results of the above investigations based on the CII and organizing the features of the business protocol featured for the wire and cable business.

The promotion and deployment of EDI inside the industry is also to be planned together with standardization investigations. Last year, a survey of the actual status of EDI was

conducted among member companies, and a strong interest in EDI and its necessity was discovered, which led to EDI seminars to be planned and held.

In the electric wire and cable industry, the activities of the Association should be continued in line with those trends toward the inter-industrialization and internationalization of EDI.

4. Electrical Manufacturing Industry

The Japan Electrical Manufacturer's Association (JEMA) was founded in 1948 and now covers more than a thousand products, including heavy electrical equipment for electric power generation, transmission, distribution and control, "white (standardized-color) goods" such as refrigerators and washing machines, and software and engineering products. The JEMA has 265 members, including 96 supporting members.

The EDI Promotion Committee, established within the JEMA in September 1991 in accordance with the Guideline for the Cooperative Use of Computers by Four Industries: Wire and Cable, Electronic Equipment, Electrical Apparatus, and Electric Power Utilities, issued by MITI, be-

gan operation by (1) promoting EDI among the four industries above, (2) studying two ways of selling and purchasing as a manufacturer, and (3) studying the standard business protocol to be used by the JEMA.

On the basis of the CII Standards to be adopted as Syntax Rules and as the result of discussions, the Committee decided to adopt the standards of the Federation of Electric Power Companies for sales and that of the EIAJ for purchases as standard messages in the business protocol to avoid an additional standard for the JEMA. The Committee proposed that the Federation and EIAJ revise their standards for the additional data necessary for the JEMA's own use.

In applying standard messages, the Committee planned to start with a study of the business process of selling and purchasing, then to enlarge items and business fields. In 1992 and 1993, the Committee therefore studied transformers to be sold to electric power utilities and wire and cable to be purchased by manufacturers of wire and cable. The Committee will expand items to distribution equipment other than transformers for sales and to materials and components for purchase.

Several manufacturers of transform-

ers among the Committee members started implementing EDI for selling transformers to the Tokyo Electric Power Company in October 1993, and will expand items and information. Some Committee members will also start EDI for purchasing wire and cable with manufacturers. The Committee will expand members to join the EDI in JEMA and partners in trading companies (*shosha*) in 1994.

An investigation conducted for the full JEMA membership in 1992 shows that 79% in purchasing and 76% in selling of those who replied have already computerized their business processing. It seems that the basic conditions for disseminating EDI in the JEMA are comparatively favorable. The Committee should, however, consider, when promoting EDI, that 59% of all JEMA members have fewer than one thousand employees. They are therefore planning to publish the Guide to An Introduction to EDI and to have seminars for JEMA members who are starting EDI for the first time

In addition, because the Committee wants to expand international EDI links, it will also start investigating trends in other countries regarding the UN/EDIFACT in 1994.

5. Petrochemical Industry

With the expansion of the sophisticated advanced information society, the Japan Petrochemical Industry Association (JPCA) started in August 1985 to look into the standardization of a business protocol to specifically address the exchange of data between companies. It investigated other industries involved in intercompany data exchange and analyzed the details of each company's actual state of affairs. In February 1990, it established a standard business protocol for the petrochemical industry that provided a consistent framework for all business transactions, from the establishment of contracts with trading companies to the collection of payments.

After that, it aggressively began instruction and PR activities targeting member companies and trading companies to implement EDI based on this standard business protocol. Upon the advice of the Center for the Informatization of Industry (CII), it held an introductory seminar on the standard protocol for the Japan Foreign Trade Council (JFTC), the organization which represents trading companies. In 1991, a common working group was established to implement EDI common to the two groups. The result of the investigations of the

working group was a review of the standards which reflected input from trading companies and an evaluation of the applicability of the standards, such as conformance to CII syntax rules. In 1992, it was decided to implement industrial EDI among four companies belonging to the JFTC and two companies belonging to the JPCA. After the evaluation based on actual use, a second edition of the standards was published in August 1992.

In 1992, as part of EDI promotional activities, the Association began developing a purchase order and acknowledgment software package that runs on a personal computer and conforms to the standard business protocols, using CII syntax rules. This package, which is oriented toward specialized trading companies rather than large general trading companies, was completed in October 1993.

The plans of the Association include the expansion of the number of enterprises using EDI based on the standard business protocol from the two companies described above to seven during 1993. It also intends to continue promotional activities connected to trading companies, system preparation, investigations into applicable methods for member companies, and the dissemination of the purchase order and acknowledgment

software package described above to more specialized trading companies.

One of the future issues to be taken up, given the state of transactions in this industry, even in the composite resin field that these standards were mainly based on, is that the directions for converting to EDI differ with each company being dealt with and with each product. This implies that the proportion of EDI among the total number of petrochemical product transactions is still low. Because of this, to expand transactions being performed using EDI, with the expansion in the number of product fields, it will be necessary to add EDI related to fields with which there are direct transactions, such as automobiles and home appliances, in addition to trading companies. Transport EDI for the transport industry, and EDI for purchasing transactions and the field of exports will also become issues. In any case, it will be an industrial EDI, and the direction of EDI in the other industries becomes the primary information of interest. Just as the activity with the JFTC described above was an extremely effective step toward actual implementation, cross-industry information exchange and modification from a neutral standpoint will also become necessary.

In addition to this, given the current

severe recession, the information-related investment that each company can make is limited, because there is little leeway for installing EDI. To promote EDI implementation in companies under current conditions, it is desirable that the nation debate the expansion of various types of low-interest financing and measures for easing taxation.

For petrochemical products which are international, the state of EDI in export transaction fields is an important issue. The spread of EDIFACT in Europe is in particular being scrutinized closely. The use of EDIFACT in Asian regions, which are the main targets of exports, can be anticipated to have an effect on Japan soon. Because of this, in addition to quickly making the CII syntax rules currently in use the national standard, it is also desirable that, in future, a smooth transition be made from CII syntax rules to EDIFACT.

6. Trading Industry

The Japan Foreign Trade Council (JFTC), which is a group of trading companies, has connections with almost all types of industry. Trends toward EDI started quite some time ago, since some companies in the group have already been utilizing EDIs such as ANSI X.12 standard-

ized in the U.S. and ODETTE in Europe.

There was no idea of setting up a unique industrial business protocol such as the Japan Trading Organization Business Protocol (BP). Instead, an attempt was made to establish a study group or coworking group with the participants from each industry in order to promote the industrial EDI. The status of the coworking group jointly cooperating with the Japan Petrochemical Industry Association is introduced in the sections that follow. Identical activities are also being conducted in the Iron and Steel Network Study Group.

Japan Petrochemical Industry Association (JPCA)/JFTC EDI Coworking Group

In February 1990, the JPCA announced a standard BP aimed at utilizing EDI in the same industry and, furthermore, received a proposal establishing a coworking group in order to test for EDI applicable to the same business protocol in the JFTC, which consists of a group of major clients.

The JPCA business protocol was something that aimed at actual EDI that covered almost all applications, from contracts to purchase orders,

shipping, billing, and final payment. There were even advantages for trading companies that developed a data transfer system in order to expand their business, such as lower development cost and shortened development periods.

May 1991:

Participation of seven petrochemical manufacturers and seven trading companies to establish the coworking group.

Goals:

- (1) Verification of JPCA business protocol validity
- (2) Verification of practical JPCA business protocol usage
- (3) Testing of EDI utilizing the JPCA business protocol
- (4) Investigation of the standardization of a basic transaction protocol and business operation protocol

July 1992:

The test was started by four petrochemical manufacturers and five trading companies.

Dec. 1992:

The test was evaluated at the 15th

meeting of the coworking group, after which the group was disbanded.

Plans for the next step:

Active participation in research conferences among each domestic industry and association, to promote industrial EDI and plan to continue the Study Team for EDI Standards in Physical Distribution and International Standard EDIFACT.

7. Iron and Steel Industry

With the recent liberalization of telecommunications service, construction of basic telecommunications networks and the rapid development of electronics technology, activities for improving business processing for all types of information transmission, together with possibilities and needs, have been spreading among industries in Japan.

In the Japanese iron and steel industry, leading steel manufactures have almost all completed the implementation of basic information transmission, such as order information and bill information with general trading companies, starting with standardization of formats and code for systematization.

Trustworthy standardized guidelines

and fair leadership are indispensable for promoting EDI among all industrial fields related to the iron and steel industry (steel manufacturers, trading companies, processing industries, distribution centers, warehouses, transportation, retailers, and users).

In October 1990, the Japan Iron and Steel EDI Standardization Committee was established by the Ministry of International Trade and Industry (MITI) (Iron and Steel Production Division, Iron and Steel Administration Division), six leading steel manufacturers, and seven general trading companies. The secretariat is the Kozai club (Iron and Steel Trade Association).

Research on EDI is being promoted for the following reasons:

- (1) Development of EDI and standardization of business dealings in Europe and the U.S.
- (2) Application for the improvement of distribution
- (3) Need for individual, high-level, detailed information and transmission for each delivery points in the consumer industry

In October 1993, the Committee pub-

lished the Draft for Iron and Steel Production EDI Standards based on its research. It works with other industries as follows:

- (1) It began studying the bar code delivery inspection and acceptance-related information with the Japan Automobile Manufacturers Association, Inc.
- (2) It set up EDI for delivery service information of steel plate and an order information standards draft with the Japan Shipbuilding Industry Association.
- (3) It started practical standardization trials for the Research and Development on Industrial EDI Pilot Model with the national processing industrial group (EDI subcommittee) in charge of steel material distribution.

In January of this year, the Japan Iron and Steel EDI Standardization Committee and Iron and Steel Distribution Information Committee in the Kozai club were dissolved and reorganized into the Center for EDI Standardization of the Japan Iron and Steel Industry for adapting to the shift of EDI research to a practical stage.

The organization for the implementation of EDI is as follows:

Supervision of the planning operation board of governors.

Standards actualization group

Automobile distribution team and shipbuilding team:

Share responsibility for negotiations and investigation with other industries.

Standard development control group

Transport bar code working groups (WGs), trade WGs and quality control WGs;

Share responsibility for item definition and establishing and revising standard messages.

Industrial EDI research and development committee:

Deals with the system technology examination groups, trading company examination groups and commissioned research.

Introduction of standardization includes:

- (1) Creation of 31 standard messages for transport and trade information.
- (2) Utilization of the Zengin procedure for communication protocols.
- (3) Adoption of the CII, which is considered to be a character and communication system matching Japan EDI, for syntax rules.

There are plans to change to the OSI/F procedure in future.

8. Automobile Industry

The use of advanced electronic data interchange (EDI) for business transactions in the automobile industry has been realized through aggressive computerization and networking to maintain the competitive edge of each company's production method, order receipt and planning method, and logistics. By the early 1980s, most automobile companies had established databases and networks for their main business systems, and had conducted EDI with major parts suppliers. During the 1980s, networks had evolved to the level where in-house systems were connected. Entering the 1990s, each company has integrated its network and business systems to quickly respond to customer needs so that sales and production systems are connected more tightly. A customer's order is taken directly into the production schedule for ex-

ample, and the status of vehicles can be retrieved from dealers so that sales personnel can tell customers exact delivery dates.

As a result, at this point in time, the rate of EDI usage between manufacturers and dealers is almost 100%. In the area of business transactions between manufacturers and parts suppliers, it is more than 90%. From the point of EDI standardization in the industry, however, the stage of standardization still remains within each company group because each company has developed EDI as a tool to keep its own competitive edge to make it just fit the company's business processing. In this sense, industry-wide EDI standardization is the issue to be faced from here on.

The industry's experience in using EDI standards in overseas production activities makes clear the advantages of EDI standards, for example, in the ease of network startup, in the use of existing equipment, etc. Now that each company's implementation of EDI has been completed, the industry faces the difficulty of replacing current EDI with standardized EDI all at once. Considering upcoming needs of networking among parts suppliers and among auto-manufacturers, it is, time to establish a direction concerning indus-

try standardization.

9. Housing Industry

1) Overview of Residential Industry Information Service Foundation

The Residential Industry Information Service Foundation, established in November 1971 under the supervision of the Ministry of International Trade and Industry (MITI) and the Ministry of Construction (MOC), is organized as follows:

- (1) Business proposal for residential information service
- (2) Statistical handbook
- (3) Certification for good company-wide quality control for providing prefabricated housing and construction materials
- (4) Investigations and research into residential industry
- (5) Housing Industry Information Service Network (HIIS-NET) Information operation

2) HIIS-NET Details

April 1987:

An examination committee was set

up, centered on 27 companies related to the residential construction industry and the distribution industry, with the goal of constructing an information system network in the residential industry.

Committee name: High-Level Information Society Investigation and Research Committee for the Residential Industry

March 1990:

The importance of the open network function was stressed and it was decided to use CII syntax rules in the committee.

March 1992:

Under the supervision of MITI, the committee completed the results of 5-year investigative research activities and EDI standards for the residential industry (HIIS-NET standard business protocol Ver. 1.0) in the committee.

April 1992:

Cooperative guidelines were received from MITI for the residential industry, i.e., guidelines for cooperative use of electronic computers in the distribution industry for residential equipment.

July 1992:

Planning for the opening of the HIIS-

NET information operation was completed.

September 1992:

The first edition of the HIIS-NET Guide About HIIS-NET Information Operation was completed.

An effort was begun to disseminate EDI information and instruct companies in the industry.

November 1992:

A roundtable discussion was opened for explaining HIIS-NET to the top management of companies participating in the committee and to exchange opinions.

November 12:

A total of 11 sales and wholesale companies participated in the distribution-related roundtable discussion on HIIS-NET.

November 18:

A total of 8 companies (manufacturers) participated in the "manufacturer roundtable discussion on HIIS-NET.

December 1992:

An examination group was formed to work toward actual operations by utilizing the strong intentions of 8 companies (3 manufacturers and 5 wholesalers), from among the companies participating in the roundtable

discussion, to use HIIS-NET. Preparation of an actual operation manual began.

July 1993:

The operation manual for actual operation related to shipping and billing data was completed.

September 1993:

Trial shipping data exchanges began between 1 manufacturer and 1 wholesaler.

November 1993:

A roundtable discussion was opened for the purpose of explaining HIIS-NET to 7 main stores related to residential materials and exchanging opinions.

A base was created to expand HIIS-NET to manufacturers, wholesalers, and sales outlets.

December 1993:

Actual operation in shipping data exchange started with the above 2 companies.

February 1994:

An operation manual aimed at actual operation of a purchase order and acknowledgment and delivery confirmation data exchange system was started.

It was determined to implement 1 manufacturer and 1 wholesaler. An in-house system and mutual meetings toward its implementation was begun.

3) Future Topics

- (1) Major manufacturers are developing a vertical VAN and, because of the phenomenon of multiple terminals that occurs due to a vertical VAN, are deciding which way to go from here.
- (2) At present, an effort is being made to expand EDI for the distribution of residential materials and then make concrete the application for material purchases by major manufacturers.
- (3) Progress is being made toward fulfilling the need for realtime processing in purchase order and acknowledgment and delivery confirmation for the distribution industry.

10. Construction Industry

1) Improved Productivity for the Industry as a Whole

The Construction Industry Information Network (CI-NET) started building a common information net-

work for the industry with the objective of improving productivity for the construction industry as a whole, on the initiative of the Ministry of Construction in February 1988. Target CI-NET users include all companies involved in the construction industry, with special consideration being made for medium and small companies. CI-NET is regarded as the core of productivity improvement measures in the Construction Ministry's Second Structural Reform Program.

2) Providing an EDI Promotion Environment

The EDI concept was not involved in the initial design of CI-NET. EDI became known after research on CI-NET had started. Since then, EDI implementation in the construction industry has become a primary issue of CI-NET.

In December 1991, the Guideline for Cooperative Use of Computers" was published by the Minister of Construction and, in April 1992, the CI-NET Promotion Center was established within the Fund for Construction Industry Promotion as the central organization for promoting EDI.

The Promotion Center has developed and published standard business protocols based on CII syntax rules.

After analyzing computer applications in the construction industry, the CI-NET Promotion Center concluded that a PC-based translator was indispensable, and developed its original translator, which achieved good results in actual experimental use. In 1993, however, the policy was changed to using commercially available translators. Since then, the Promotion Center has worked to test and evaluate translators sold on the market and recommend applicable ones to users after registering them.

3) EDI Implementation Areas in the Construction Industry

The construction industry is characterized in that companies and personnel change with each construction project. In addition, most business processes in construction companies comprise information exchange among numerous organizations in various fields, including different divisions within the same companies, facilities owners, public agencies, design offices, consultants, constructors, suppliers and so forth. With the widespread use of computers, electronic data interchange using EDI is expected to greatly improve productivity.

At present, the CI-NET Promotion

Center is reviewing the overall business processes in the construction industry from the standpoint of using EDI. EDI should, ultimately, be implemented not only in business applications such as placing or accepting orders, but also in technical applications. Information related to drawings, for example, includes both character-based transaction data and binary CAD data. The Promotion Center is therefore observing STEP development with keen interest.

In the construction industry, it is necessary that information from both business transactions and technical fields related to production activities be expeditiously exchanged. EDI implementation in the construction industry will evolve in areas around transactions and technical data, which could well be called EDI for product data.

4) Promoting Internationalization

The CI-NET Promotion Center has dispatched research teams to the U.S. and Europe, and sent a delegation to the UN/EDIFACT Joint Raporteurs Team (JRT) meeting twice a year to create closer relationships with the U.S. and European construction EDI communities, and to promote the

mutual exchange of information.

Japan's construction industry is involved in many international business transactions, so UN/EDIFACT development and EDI implementation overseas are of practical significance. The CI-NET Promotion Center continues to pay careful attention to international trends, and considers it very important to determine the appropriate measures that Japan's construction industry should take.

11. Distribution Industry

1) Distribution EDI

The distribution industry covers the movement of products transaction and transport from the manufacturing industry that produces consumable goods to wholesale and retail outlets.

The distribution system in Japan comprises 200,000 manufacturers (based on industry statistics), 400,000 wholesale offices, and 1,600,000 retail outlets (based on commerce statistics), and each company has round-the-clock transactions with other companies and offices.

It was recognized early on that the streamlining of the distribution industry would depend heavily on the promotion of EDI systemization.

(1) Business protocol standardization started in the latter half of the 1970s

The standardization of business protocols for common billing/order forms, common customer codes, and POS started from around 1972, and was the foundation for today's EDI.

(2) The spread of online purchase order and acknowledgment systems started in 1980

With the standardization of the JCA procedures (standard transmission control procedures) in 1980 came the instant spread of online purchase order and acknowledgment data exchange systems between chain stores and wholesalers, and between wholesalers and manufacturers. By 1990, it had spread not only to large enterprises, but also to medium and small companies.

This led to progress in standardization (local EDI) within each type of industry because the intricacy of transaction-related details within each type of industry meant it was enough to get a consensus for standardization within the industry. This will probably be the main pattern for the future as well.

2) Transition to Global EDI

Applicable operations for distribution industry EDI can be expanded to other operations from purchase order and acknowledgment to billing/payment, product information, delivery, financing, etc. There is also a trend toward the gradual interindustrialization and internationalization of the range of products involved in transactions.

The preparation of a foundation for EDI standardization is beginning at both national and international levels. For the EDI standardization formula, it does not matter which technology is used. The problem in the basic preparation is to determine what extent standardization covers.

Currently, the CII standard is being promoted domestically as an interindustry standard. If ISO9753, etc. (UN/EDIFACT), are being promoted as an international standard, it is important that any future distribution EDI follow this standard.

People in the distribution industry as well as other industries have been involved in the investigation for global EDI support since 1990.

Although the future direction of EDI is still in the survey stage, the trend

is to aggressively support both CII and UN/EDIFACT in new fields.

It is important at the same time to protect existing assets, and the policy is to promote the use of existing systems as is when change is not necessary.

From 1992, the CII formula was used experimentally in actual systems, yielding possibilities for usage and know-how regarding points that require attention during use, so the effect has been satisfactory.

3) Japan Chain Store Association

The chain store industry is unique in its custom of doing business across a nonspecific, numerous-level collection of differing industries (wholesalers, manufacturers, warehousing, transport, finance, etc.) and the general consumer. Efficiency cannot be expected without standardization. In this industry, above all, EDI was taken as a link to standardization of business protocols from early on. The EDI Research Committee was established and is currently investigating how to implement an effective EDI system for the chain store industry as a whole.

With the development of the JCA

Procedure in 1980, EDI mainly centered on purchase order and acknowledgment became widespread in the distribution industry. According to the 1991 Japan Chain Store Association survey, there were over 30,000 companies with EDI dealings with association affiliated companies. This shows that, even in the sphere of Japanese industry, the spread of EDI is widest in the distribution industry.

EDI itself will go one step further, as shown by the example of efficient consumer response (ECR) in the U.S. In the beginning, the objective was the systemization of transaction processing between companies in areas such as purchase order and acknowledgment. In future, however, EDI will comprehensively integrate the steps from production of a product to its distribution and sale. It is anticipated that even better low-cost and high-performance operations are possible. As one step toward that goal, we are currently involved in the investigation of distribution EDI, electronic transaction rules, and EDI technical standards.

Commissioned by the Distribution Systems Research Institute to research transport EDI, a committee of operators in chain store and delivery industries was established and is currently performing investigative

research related to distribution information system (distribution EDI). Topics being investigated include the standardization of bar code labels for identifying products being delivered, delivery (shipping) data transmission formats, and transmission procedures.

Electronic transaction rules and EDI technical standards investigations are under the guidance of the Commerce Policy Division of the Industrial Policy Bureau of the Ministry of International Trade and Industry (MITI). The Electronic Transaction Standardization Research Committee was established in May of last year to promote the dissemination of EDI in the distribution industry. The Distribution Systems Development Institute is in charge of the office. The Japan Chain Store Association participates in the committee and working groups, and they are currently in the process of detailed investigations.

In addition, the Association was responsible for developing the JCA-H procedure with MHS as the basic communication protocol. Specifications were announced in April 1991. Since then, with the assistance of the Distribution Systems Research Institute, the protocol, commonly called the H Procedure was designated as the standard communication proce-

dures for the distribution industry in Japan by MITI.

For the past almost 20 years, the Association has worked in cooperation with the Distribution Systems Research Institute promoting computerization of distribution. For the future as well, the Association will continue to work in close cooperation with related industries and government agencies such as MITI to promote EDI in the distribution industry.

12. Physical Distribution Industry

1) Objective of the Survey Research

Although EDI in the commercial transactions field of purchase order entry and delivery operations within the same types of industry is quite advanced, industrial EDI between shippers, warehousing, and transport industries is a problem that must be addressed in Japan. A basic condition for that promotion is an arrangement of standard messages that can be used across the industries without regard to the type or state of the industries, and which has the consensus of a majority of the people involved.

Japan Institute of Logistics System (JILS) is composed of 763 companies

that represent the country. Of these, 42% are from the manufacturing industry, 11% from the distribution industry (wholesale, retailing), and 34% from the physical distribution industry (transportation, warehousing). Of physical distribution, independent land transportation companies comprise 33%, warehousing companies 15%, and subsidiary companies 38%. The proportion of shipping companies to physical distribution companies is well-balanced, and each is working on the systematization of physical distribution. Each also has a suitable environment for this type of research.

With the support of MITI, the JILS has worked to develop standard EDI messages for the flow of goods between shipping and physical distribution companies. Starting with member companies, it will be offered widely for general use and should contribute to the systematization of each company. We started investigative research in 1992.

2) Messages Used in Industrial Transport Transactions

In 1992, in order to determine the actual state of messages and the particular data items used in physical distribution transactions between shipping and physical distribution

companies, we conducted a survey of 1,102 companies in the manufacturing, distribution, and physical distribution industries, including member companies, and received 359 replies (32.6%).

Although the companies covered by the survey tended to lean toward medium-sized and larger companies, less than 24% of the companies had absolutely no online physical distribution transactions, and 38% of the companies already perform over 40% of operations online, so the need for EDI can be strongly felt. The foremost problem in information exchange given by more than 56% of the respondents is the usage of special forms such as goods delivery forms specified by the customer. Many other points indicated that EDI will hopefully solve such problems as key input costs and correctness problems, lack of speed, mismatch in terminology definitions, etc.

3) Messages Requiring Urgent Development

From the results of the survey of the first year, that of the flow of operations in physical distribution, it was decided to give priority to the development of standard messages related to transport requests, storage requests, storage removal requests, and billing.

Each includes messages for planning, decisions, changes, and reporting.

For data items, together with defining 62 items set in the first year, a further 97 items which were mainly clarification items were set and defined. For each standard message and each data item, a written proposal was created to determine whether it is indispensable, selectable, or unnecessary.

In 1994, the JILS will increase the applicability of the results of these two years, and would like to perform an evaluation of an actual experiment in use. During this time, it will proceed to make adjustments in accordance with EDI projects in physical distribution being conducted by other organizations, and develop standards to enable real-world use.

4) Study Team for EDI Standards in Logistics

Background

(1) Increased need for support of computerization in the transport field

In the domestic transport field, with increasingly tighter restrictions in primary factors such as the labor shortage, environmental pollution,

and road congestion, transport needs have tended to increase. Although progress is required in making each type of transport more efficient, it is important to create an environment where a smooth information network can be constructed.

In the international transport field, with the power of Europe, the U.S., and Australia at its center, the cargo and customs information processing that have conventionally been done using paper and telephone is starting to be processed using EDI. Because of this, it will become indispensable for people involved in the industry in Japan as well to be able to use information systems and plan correct, swift, and efficient responses to maintain international competitiveness.

(2) Changes in the computerized environment

Recently, with price reductions and downsizing of computers proceeding together with the liberalization of communications line use, a tendency is being increasingly seen toward intercompany computerization. Because communications procedures differ with the party being contacted, however, the tendency has emerged to place one party's terminals at the other party's site, resulting in huge

additional investments required to develop converters to connect different types of machines. This type of inefficiency is an increasing problem.

(3) Regulations and international standardization for EDI

To resolve the problems related to EDI indicated in (2), above, there is a movement to create a widely accepted standard agreement. The International Telecommunications Union (ITU), etc., is working on the communication protocol, and, for the business protocol, the United Nations and Economic Commission for Europe (UN/ECE) Trade Procedures Simplification Working Party (WP.4) is progressing in standardization work for UN rules for the Electronic Data Interchange (UN/EDIFACT) for administration, commerce, and transportation.

(4) Necessity of EDI standard regulations for international transport

It is indispensable for people involved in international transport, e.g., shipping, aviation, sea freight, and air freight forwarding in Japan to use the international standard protocol UN/EDIFACT when dealing overseas.

(5) Necessity of EDI standard regulations for people involved in domestic shipping and transport industries

People involved in domestic transport, e.g., land transportation, warehousing, domestic shipping, mostly do not feel the need for data interchange under international standards. Rather, those involved in domestic physical distribution tend to be affected by the intentions of shippers. Shippers also strongly feel the need for standardization, and have already set EDI standards such as formats within subareas of the industry. However, transporters who deal with shippers in different subareas gain little when standards differ across different areas. It is therefore necessary to focus the attention of the transport industry on the study of a transindustry standard domestic protocol.

(6) Necessity of EDI standard regulations for domestic transporters

In addition to domestic transport, a second large flow of information exists between transporters themselves. With middle-sized companies, they have many more chances for data interchange between those companies involved in trunk line trucking industry, warehousing industry, truck-

ing industry, and rail.

Before attempting to establish various protocols within industrial spheres, therefore, a standard protocol for extensive use must be established and promoted throughout the domestic transport industry as a whole.

(7) Necessity for implementation and expansion of harbor information networks

For the promotion of transport computerization together with the standardization of the EDI protocol, the use of commonly operated EDI networks should prove effective. The procedures related to marine cargoes, in particular are extremely complicated and, because comparison processing of information is necessary, the use of a value-added network (VAN) is most efficient.

(8) Necessity for preparing systems

To plan a steady response for the equipping and standardization of logistic networks, an organization is required in which people involved in actual operations from the government and public and people with specialized knowledge of EDI can work in continuous cooperation to construct

the required systems.

(9) EDIFACT Working Group Activities

The international transport field in UN/EDIFACT research has seen participation in Joint Rapporteur's Team (JRT) meetings from the spring of 1991 and the exchanging of information with people involved in transport from different regions. The transport working group has the highest number of participants of all of the JRT working groups and, at the current time, has also developed the largest number of standard messages. From the standard messages developed and already finalized under this environment, a user's manual for standard messages has been prepared that can be used in Japan.

The Data Model SWG has completed a current business operations flow for export containers, and is next targeting the completion of an ideal business operations flow that excludes various types of restrictions and barriers. Once this work is completed, the standard messages that are necessary and usable for Japan's international transport industry can be selected and their implementation into the industry planned.

In overseas transactions, especially

those related to container terminals, the interchange of electronic data using UN/EDIFACT has almost reached the shores of Japan, and, given the current state of affairs, we cannot afford not to study UN/EDIFACT.

13. Cargo Clearance

The Nippon Automated Cargo Clearance System Operations Organization, commonly known as the NACCS Center, is responsible for the operations of cargo clearance systems. The center was established and promulgated with the approval of the Minister of finance, and operates the Nippon Automated Cargo Clearance System for Air Cargo (Air-NACCS) and the Nippon Automated Cargo Clearance System for Sea Cargo (Sea-NACCS).

Air-NACCS is contributing greatly to expediting and smoothing the customs clearance and physical distribution for air cargo by handling the tremendous volume of business occurring in the flow from arrival to delivery. Sea-NACCS is a computer system designed and developed for the purpose of making the same procedures for maritime cargo efficient and accurate. The customs clearance formalities proceed through the use of terminals at the offices of customs, customs brokers, and banks.

These systems are contributing to the progress in international physical distribution, as they come to serve as a bridge between Japan and other nations around the world.

These two systems provide the following advantages:

- (1) Customs clearance procedures become quick and simple because import and export declarations can be filed at terminals in users' offices, notifications of permission are provided to terminals in users' offices, and immediate permits can be obtained in the case of a simplified examination when electronic fund transfer is used.
- (2) By using the bank account opened for electronic funds and transfer, customs duties and taxes can be paid automatically. The person making a declaration therefore need not go to a bank to make individual payments.
- (3) Stored data which has been input by a user for a certain purpose can also be used by other users for other purposes in the system. Information duplicated among users need not be input, thus simplifying input work. Statistics are compiled automatically

from accumulated data for the reference of users.

- (4) The system enables users to instantly and accurately trace the status of cargo, such as arrival, loading, and customs clearance, so it is possible to answer customer's inquiries promptly, thus improving service.

14. Travel Industry

Online real-time seat reservation and ticket sales systems for public transportation facilities went into operation in the earlier 1960s, both in the air services industry and at Japan Railways (JR). The three largest air transportation corporations constructed their own passenger management systems, which mainly handle seat reservations and ticket sales, and set up terminals at their sales outlets and travel agencies. The number of terminal units installed by the three companies in domestic facilities currently totals approximately twenty-odd thousands. These systems are directly connected to JR offices and travel agencies, enabling customers to purchase airline tickets at special reservation counters called "Green Service Counters" (midori no madoguchi), for example, at railway stations.

Similarly to the airlines, JR set up seat reservation and ticket sales systems for the Shinkansen Bullet Trains and limited expresses, and installed terminal equipment at its offices and travel agents. These systems are also linked up to airlines and travel agencies. In addition, major travel agencies have their own systems directly connected to the systems operated in railway stations and at airline ticket counters. Some agencies have even had their systems connected to CRS overseas. Following the trend toward total computerization, travel agencies are becoming equipped with increasing numbers of terminals used for JR, airlines, and travel agencies. The standardization protocol introduced most often for connecting these systems is EDI, or, specifically for the travel industry, EDIFACT. EDIFACT, which is the standard under review by the UN-ECE and an IATA subcommittee, is widely used in international connections between airline systems and for transmitting data on passengers to the United States Immigration authorities.

HDLC-ARM, the conventional national standard initiated by JR, is also available.

15. Financial Industry

Networking has been progressing steadily for some time in the financial industry and the exchange clearance system between banks has been operating since the second half of the 1960s. Networking has also been making progress in life and nonlife insurance and securities industries and EDI electronic fund transfer (EFT).

The Zengin (All-Bank) Data Communications System was developed in the banking industry in April 1973 and has been expanded and is connected with many financial institutions at present. Since October 1989, the Bank of Japan has constructed a nationwide Bank-of-Japan Financial Network System whose purpose is to implement the transfer operations of the current deposit system with financial institutions. This network connects 469 institutions and 34 branches of the Bank of Japan.

Financial transactions (farm banking: FB) including the transfer of employee salaries has also come to be generalized among ordinary enterprises, and international EFT using SWIFT has also been implemented.

In the life insurance industry, the Life Insurance Joint Center (LINC), whose purpose is to encourage the exchange of data transactions such as the settlement of accounts among enterprises has been operating since May 1986. A similar nonlife insurance network system jointly developed by original domestic nonlife insurance companies has also been operating in the nonlife insurance industry since October 1986, and is used for exchanging data such as that on automobile insurance. This network is currently patronized by 26 institutions.

The securities ATM network system for jointly utilizing ATM has gone into operation in the securities circle and is currently patronized by 20 securities firms.

Global Joint Activities Covering EDI Standardization in the Electronics Industry

Yasuyuki Sakakibara
General Manager, EDI Center
Electronics Industry Association of Japan (EIAJ)

1. Introduction

(1) Background

Individual companies within the Japanese electronics industry have developed their own procedures and systems for order and order acknowledgment separately in order to manage the high volume of intercorporate transactions. Buyer companies subsequently established their own online systems for purchasing and material management. These numerous, individual developments, each with its own system, generated difficulties including "too many types of terminals" and "too-complex data conversion," however, and this situation fueled the drive for EDI standardization. In 1987, EIAJ member companies which supported this growing requirement to create a unified standard, initiated action to support

EIAJ standardization. In order to promote these activities in a more tangible manner, the EDI Center was established in 1988. The EIAJ EDI standard has since been adopted by more than 1,200 companies.

(2) Membership

The EDI Center is maintained by membership fees from participating companies and subsidies from the EIAJ combined with additional revenue sources. Member companies are divided into two categories: (a) full memberships, of which there are 183, and associate memberships, of which there are 72. Companies with full membership status are also EIAJ members while companies with associate membership status do not belong to the EIAJ but are mainly drawn from VAN and software service corporations which support the EDI

1. Membership: 255 companies

Full: 183 Associate: 72

2. Committee members: 20 companies

Alps Electric	Oki Electric
Fuji Electric	Pioneer
Fujitsu	Sanyo Electric
Hitachi	Sharp
IBM Japan	Sony
Kyocera	Tamura
Matsushita Components	TDK
Matsushita Electric	TI Japan
Mitsubishi Electric	Toshiba
Murata Manufacturing	Victor Japan
NEC	

Figure 1. Membership and Committee Member Companies

Center's activities (Figure 1).

(3) Organization and Functions

The EDI Center promotes EDI standardization and is operated by more than 200 members belonging to the Management, Planning, and Assessment Committees, and a number of Working Groups (WGs).

Items which are examined and approved by the EDI Center are documented as EIAJ EDI Standards,

which are to be used as basic guidelines for establishing the EDI system and for applying operational rules to EDI transactions.

In order to disseminate EDI standards that are also open to other industries, the EDI Center supports seminars, publishes news, participates in international conferences, and manages unified corporate codes in cooperation with the related authorities and associations (Figure 2).

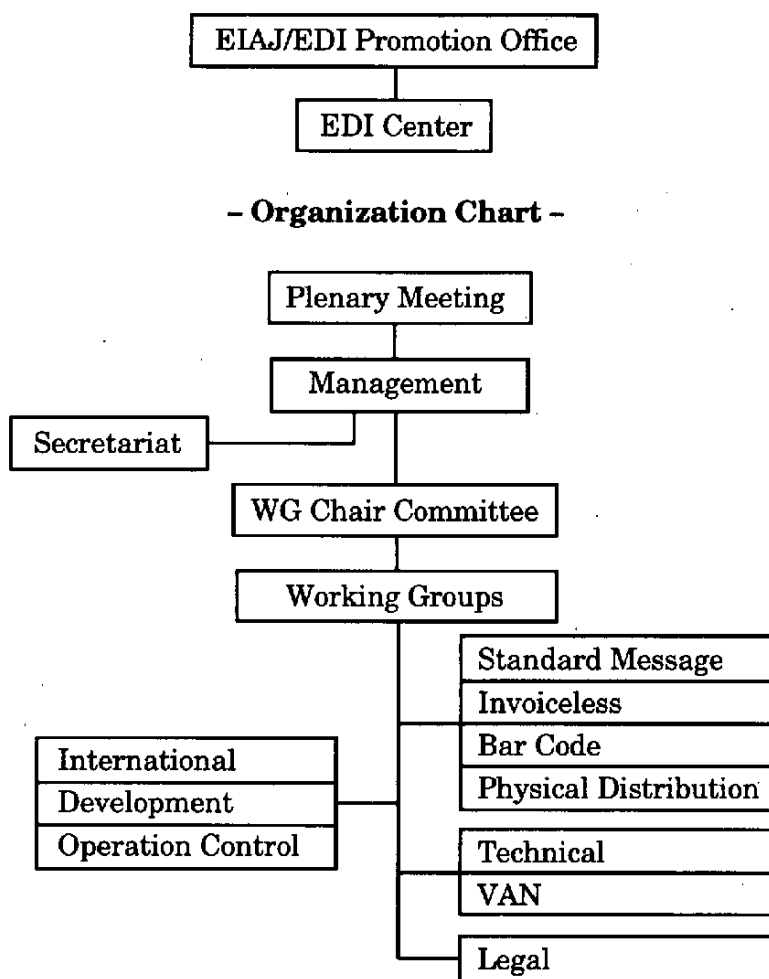


Figure 2. EIAJ/EDI Center

(4) International Standardization Activities

Recent EDI Center activities have included the promotion of conformity to interindustry EDI and international EDI. In fact, since 1992, special attention has been concentrated upon

advancing international EDI standardization efforts in concert with Europe and American electronics industry associations. The effort has focused on preparing operation guidelines for standard messages (subsets) pertaining to order, shipping, and payment cycles. Furthermore, since

1993, the EDI Center has also promoted the standardization of bar code labels.

(5) Summary of This Report

This report summarizes the progress in EDI standardization activities in the EIAJ and explains the contents, accomplishments, and results of an international standardization project which is being advanced in cooperation with European and American electronics industry associations.

2. Promotion of Standardization Through Committee Activities

The decision-making bodies of the organization include the Informatization Management Committee and Planning/Assessment Committee, under which a number of WGs operate. The following standardization activities are currently being conducted by the major WGs:

- The Standard Message Working Group develops, maintains, and updates standard messages. This currently consists of 27 commercial transaction messages and 2 physical distribution messages.
- The Legal Working Group reviews and improves circumstances sur-

rounding the so-called paperless promotion issue and other legal implications concerning the EDI.

- The Invoiceless Working Group has designed a tag with a bar code label and standardized the procedure for using such tags. This contributes to the establishment of conditions for streamlining commodity shipping and reception operations. This tag utilizes the bar code label which is currently being examined by the Bar Code Working Group.
- The Bar Code Working Group has been developing a bar code label that conforms to the US electronic industry's EIA standard. In addition, the group is cooperating with the Invoiceless Working Group in the pursuit of better use of the bar code for realizing a paperless transaction system. The recent activities of this group will be discussed in a later section.
- The Physical Distribution Working Group has played a pioneering role in applying the first open EDI in Japan, inaugurated recently, in the physical distribution field.
- The Technical Working Group, which has stipulated syntax rules and standard communications

protocols, is planning on introducing new communications protocols that implement recent technological advances.

- The VAN Working Group establishes standards for VAN operation and inter-VAN connection and issues a VAN user's guide to streamline the implementation of EDI.
- The International EDI Working Group is divided into two subgroups. The Development Group is developing a UN EDIFACT subset. The Operation Control Group is working to establish an operating environment for international EDI and to advertize and disseminate it by publishing an EDI user's guide.

A detailed description of the recent activities of the international groups will be given in a later section.

3. EIAJ Standard Status Quo

3.1 Status of Use

(1) Status of development and use of standard messages

Since the inception of a project for

preparing the EDI standard in 1987, the development of the initially intended messages has been almost completed. Determining the utilization status of messages as revealed through questionnaires, it has been found that the ratio of message use that pertain to ordering, production planning, acceptance, and accounts payable is high (Figure 3).

(2) EIAJ standard dissemination status

The number of enterprises that make use of the EIAJ EDI standard now exceeds 1,200 companies in total. The number is increasing at the rate of 15 to 20 companies per month. This may well prove that the EIAJ standard has taken a firm hold in Japan. This figure indicates the number of registered unified corporate codes that are administered by CII of JIPDEC. The unified corporate code is used not only to represent a company in the message but also to designate the destination of the message. Member companies are placed under obligation to apply for registration of their corporate code prior to putting EDI into practice. The actual number of enterprises that is actually using the EIAJ standard is estimated from the number of registrations (Figure 4).

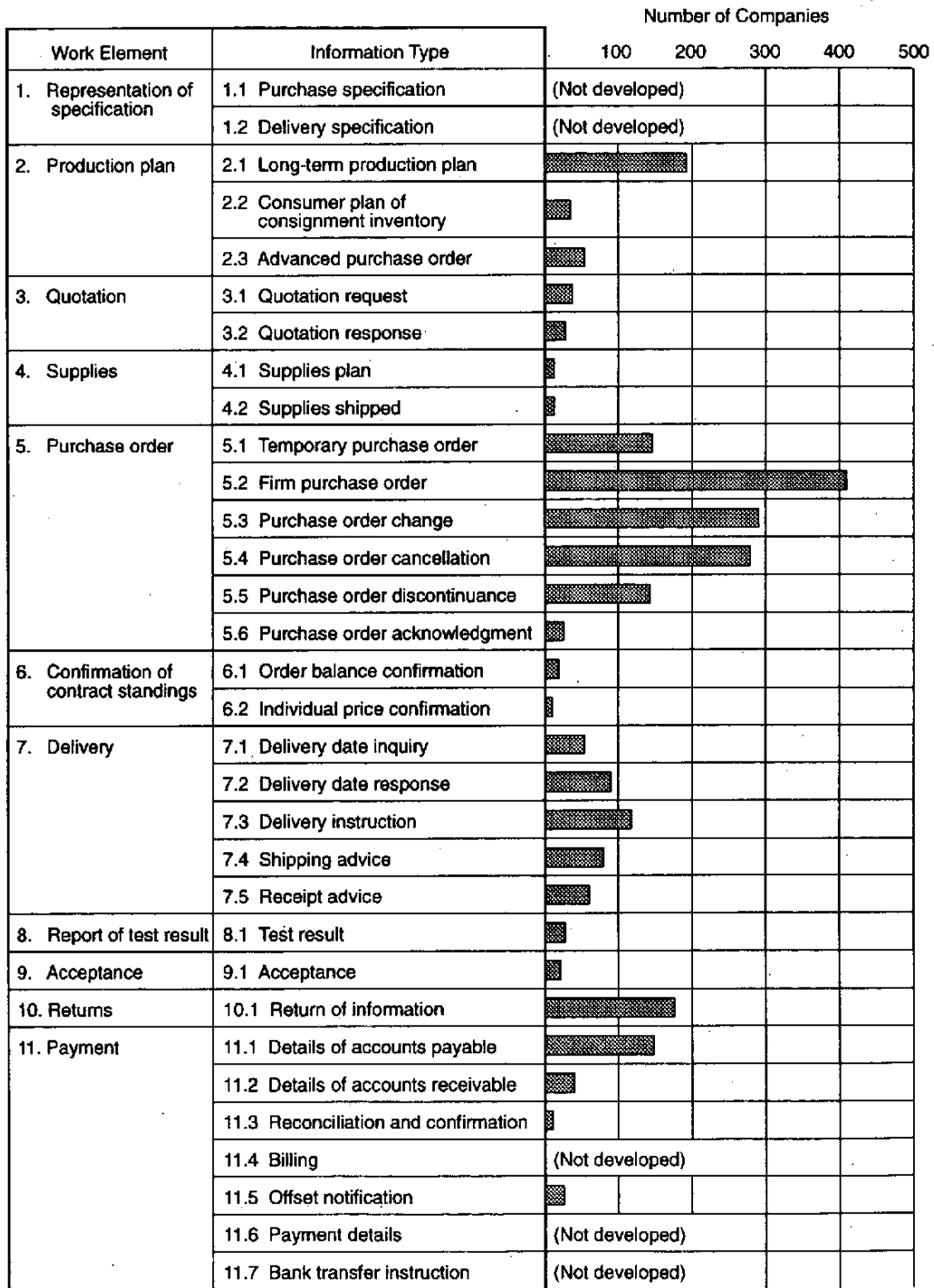


Figure 3. Domestic Transaction Standard Messages

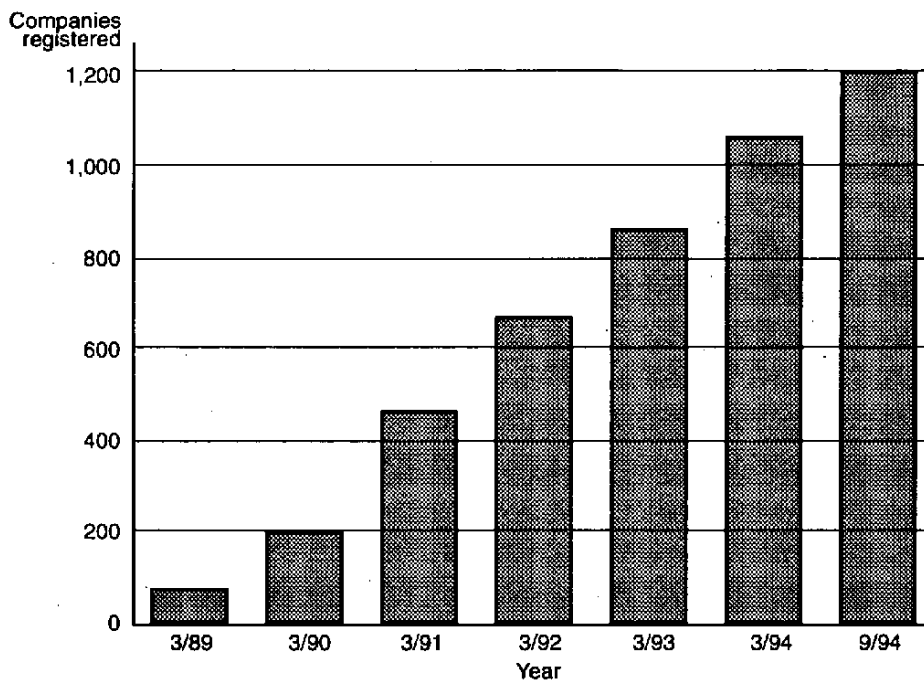


Figure 4. EIAJ-EDI Standard Development and Registered EDI-Unified Codes

(3) Motives, objectives, and effects of EDI standard introduction

The results of the questionnaire on the above items are shown in Figure 5. EDI is introduced with the objectives of reducing the office workload and work time, in response to requests from customers, of taking measures in advance by obtaining necessary information promptly, and of reducing clerical mistakes and operating errors. EDI is producing satisfactory results in these respects.

3.2 Relationship Between the EIAJ Standard and EDIFACT

Although the use of EDIFACT is limited to international transactions for the time being for the following reasons, we intend to implement measures that will enable it also to be used in domestic transactions:

- (1) Problems that are anticipated to arise when EDIFACT is used in domestic transactions (items that need improvement)**

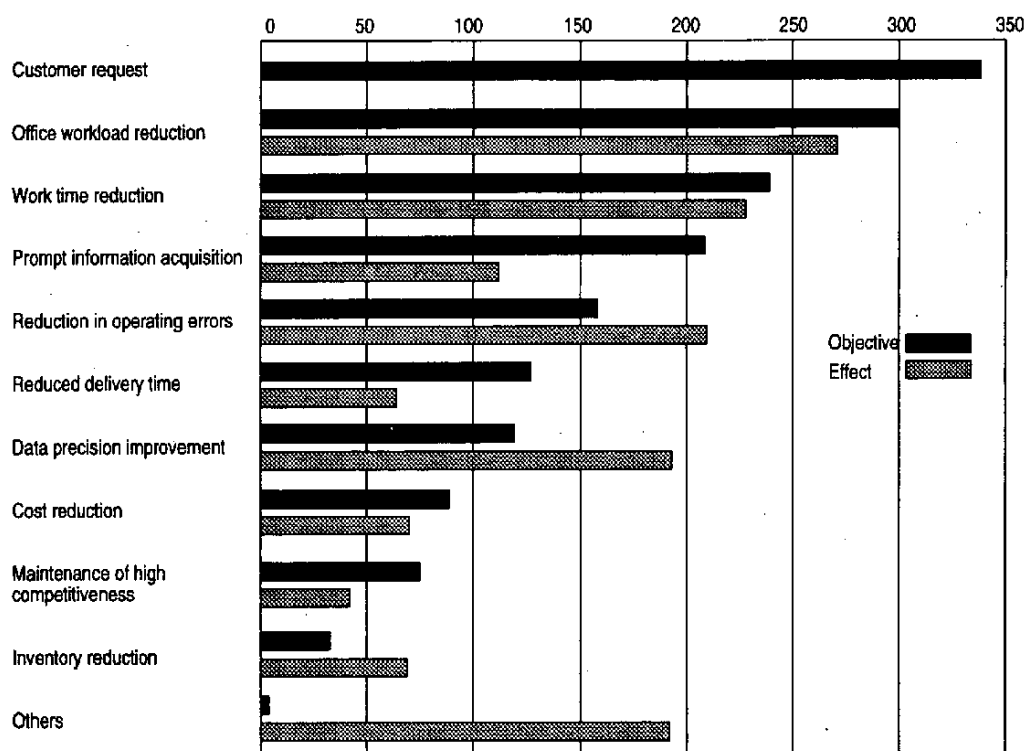


Figure 5. Introduction of EDI Standard

- Part of messages are incompatible with Japanese business practices and transaction processing systems.
 - The present operating environment is set up entirely in English, and it is necessary to establish a Japanese operating environment.
 - EDIFACT is less adaptable and flexible in actual use, e.g., in code registration and DMR handling.
- (2) Future action**
- To make proposals for the improvement of international standards so that they can be used in Japan.
 - To make Japanese business practices close to international business practices (in the long run).
 - To establish an operating environment for making use of EDIFACT in domestic transactions.

4. International Standardization Projects in the Electronics Industry

Objectives of the joint development project:

To promote worldwide electronics industry efforts in electronic commerce, EDI, and bar code activities and to develop common understanding, business models, and implementation guidelines in order to effectively implement EDI programs within and across geographic boundaries.

5. Joint Development of Standard Messages (Subset) for the Electronics Industry

(1) Organizations participating in development

- EDIFICE: Western Europe, made up of approximately 70 companies in the electronic industry in the EU.
- EIDX: USA, EIA/EDI promotion division.
- EIAJ/EDI Center: Japan, EIAJ/EDI promotion division.

*: EDIMAN: EDI promotion or-

ganization in Singapore, joined as a new member in September 1994.

(2) Business flow for international trade and EDI messages

The business flow of international trade and associated EDI messages is shown in Figure 6. EDI messages that pertain to pricing, ordering, shipping, delivery, and payment are now in the process of development.

(3) Definition of business models and scenarios

The messages to be developed are classified into the following three categories, in which a business model (standard business structure) and a scenario (processing method and procedure) are defined for the individual cycles:

- Order cycle consisting of traditional orders and blanket orders (Figure 7)

Price quotations, ordering, delivery instructions, and delivery

- Shipping cycle
Scheduling, shipping, shipping advice, and receipt advice

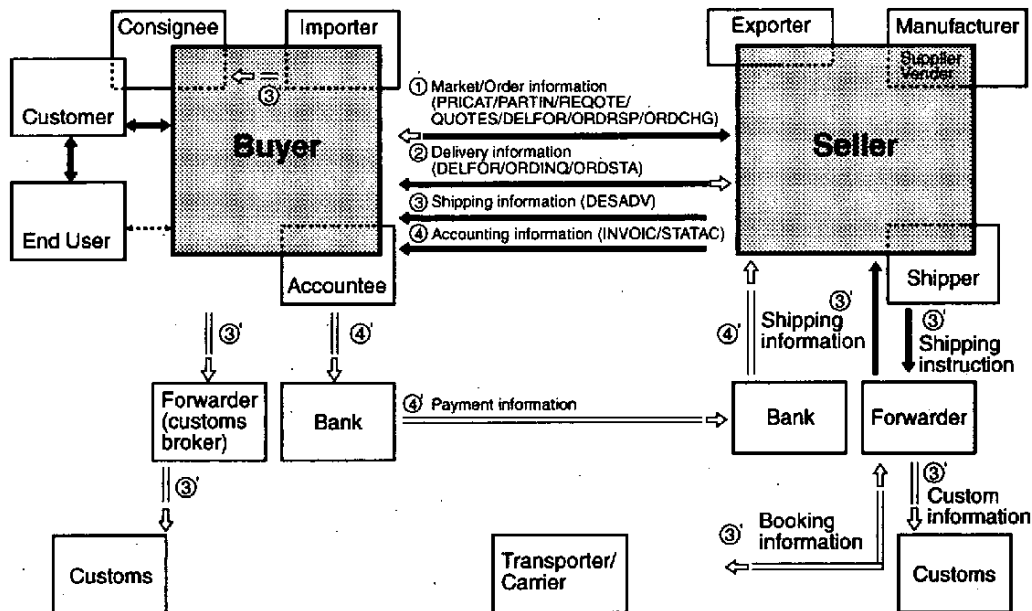


Figure 6. Business Flow in International Trade

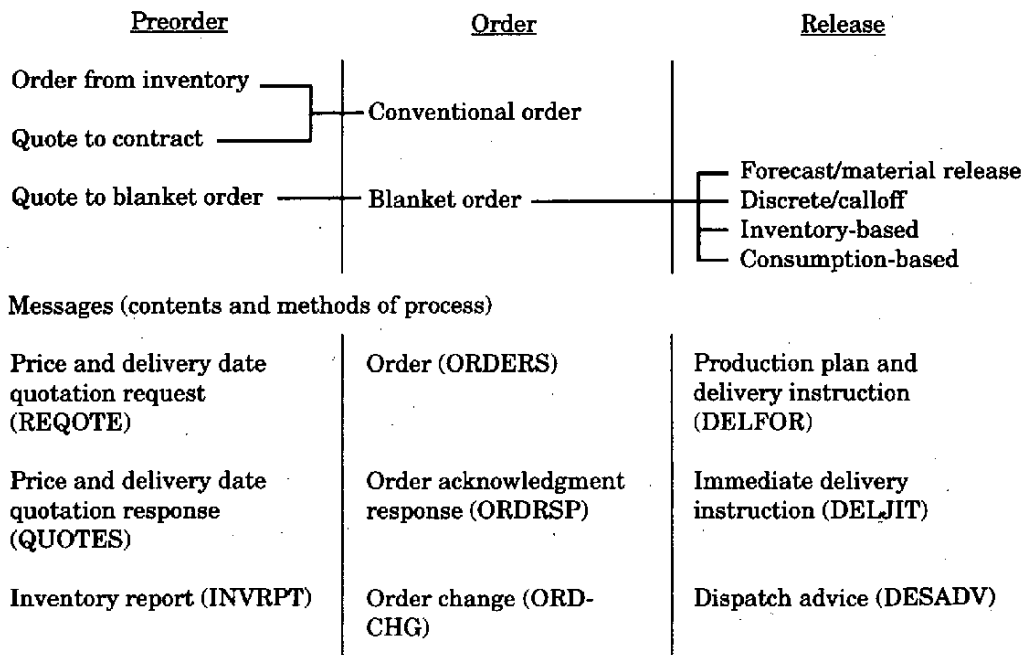


Figure 7. Business Model Order Cycle

- Payment cycle
Invoices, etc.

(4) Implementation guideline development rules and principles

- Provide capabilities for complex messages such as multiline, multischedule PO.
- Identify specific code values, eliminating so-called "mutually defined" values.
- Discourage the use of free-form text (NTE/FTX segments).

Encourage 100% machine processible messages.

- Notes and examples on recommended usage at the segment and code levels should accompany all guidelines, making them self-contained, except for reference to general code lists.
- Establish separate guidelines to support unique business processes as outlined in EDI Business Scenarios/Models. Contents will be agreed upon based on business needs and technical requirements.
- The expectation is that a trading partner/business agreement has

been defined and exchanged prior to any EDI messages.

- Do not include "unnecessary" information that has been previously documented/exchanged.

(5) Usage rules and principles

- Guideline definition: Guidelines are to include common business practices; we will not attempt to cover all possible business environments or combinations. The 80/20% rule will be applied to incorporate the practice if it applies to 80% of the business practices within a region or between regions.
- The UN/EDIFACT messages version is 92.1.
- Common code utilization: Codes to be used in the joint guidelines are as follows:

Joint-industry utilization

M: Mandatory

R: Required

A: Advisable

O: Optional

Local practice or trading partner agreement

X: Not used

EDIFACT designator

M: Mandatory

- C: Conditional (optional)
- C: Conditional (optional)
- C: Conditional (optional)
- C: Conditional (optional)

(6) Methods and procedures for implementation guideline development

- Have the advocate of each job and region prepare a draft.
- Distribute drafts, exchange comments, and make mutual arrangements through e-mail.
- Discuss and examine drafts at joint meetings twice a year, make required overall arrangements, and provide official approval.
- Progress of meetings conducted:
 - Meeting 1: Brussels, Sept. 1992
 - Meeting 2: San Francisco, March 1993
 - Meeting 3: Geneva, Sept. 1993
 - Meeting 4: Munich, Sept. 1994

(7) Publication and maintenance of electronics industry guidelines

- Publish a reference manual for a subset of UN EDIFACT standard messages.

- Print and distribute the manual according to the editorial requirements specific to the individual regions, e.g., A4-sized or loose-leaf, in both English and Japanese.

- Establish a procedure for maintaining and managing guidelines after their development.

6. Bar Code Label Standardization

6.1 Progress in Bar Code Label Standardization

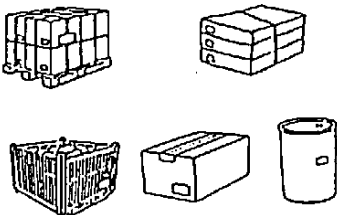
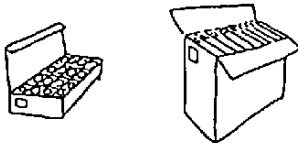
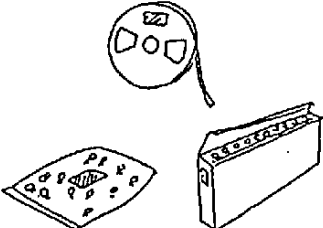
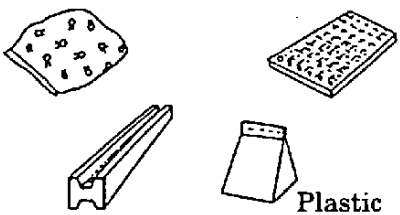
(1) 1988

Modes A (shipment package) and B (primary packaging) were established as outer packaging standards (Figure 8). They were made to conform to US EIA EIA-556 to ensure harmony with the standards stipulated in European and American countries.

Symbology: Code 39 was adopted to maintain compatibility with that which is employed in the European and American electronic industries; the code must be for industry use and wide use.

(2) 1994

The following modes have been stipulated as EIAJ-specific modes:

Label Packaging		Examples of packing level	Labels
Outer	Shipping containers		Mode A The standard distribution label will be reviewed.
	Primary packages		Mode B Mode B is also applicable if the EIAJ standard delivery system is not applied.
Inner	Unit package No. 1		Mode C
	Unit package No. 2	<div>Vinyl bag</div> <div>Tray</div> <div>Stick (magazine)</div> <div>Plastic or paper bag</div> 	Not applied These items are labeled using individual methods.

Notes

Shipping container: Generally a shipping unit of multiple primary packages

Primary: A package containing multiple units corresponding to the size of an order

Inner: A unit package for a product, the minimum packaging unit, or individual wrapping

Figure 8. Packaging Levels and Applicable Modes

Mode C-3: For packaging electronic or semiconductor device products

Mode D: For standard delivery tags

6.2 New Items Defined

The following two data items have been defined to avoid confusion that could occur if a product is exported:

- Data identifier: "3N" identifies an EIAJ standard format.
- EIAJ bar code line identifier: the level of data is identified as counted from the top.

6.3 Trends in International Standardization

(1) Promotion of standardization through joint meetings twice a year among Japanese, European, and American electronic industry representatives:

- Participating organizations

Electronics Industries Association (EIA)

EDI Forum for Companies with Interest in Computing and Electronics (EDIFICE)

Telecommunication Industry Forum (TCIF)

Semiconductor Equipment and Materials International (SEMI)

Electronics Industries Association of Japan (EIAJ)

- Meeting progress

Spring 1993: USA (San Francisco);
fall 1993: USA (Dallas)

Spring 1994: Germany (Freising);
fall 1994: Japan (Tokyo)

(2) Future actions

- To review a shipping cycle business model on the assumption that EDIFACT is adopted.
- To review two-dimensional symbols.

6.4 Bar Code Label Standard System

(1) New standard delivery system

The new standard delivery system uses EDI information and EIAJ standard delivery tag (D label) in conjunction with the standard delivery document (Figure 9).

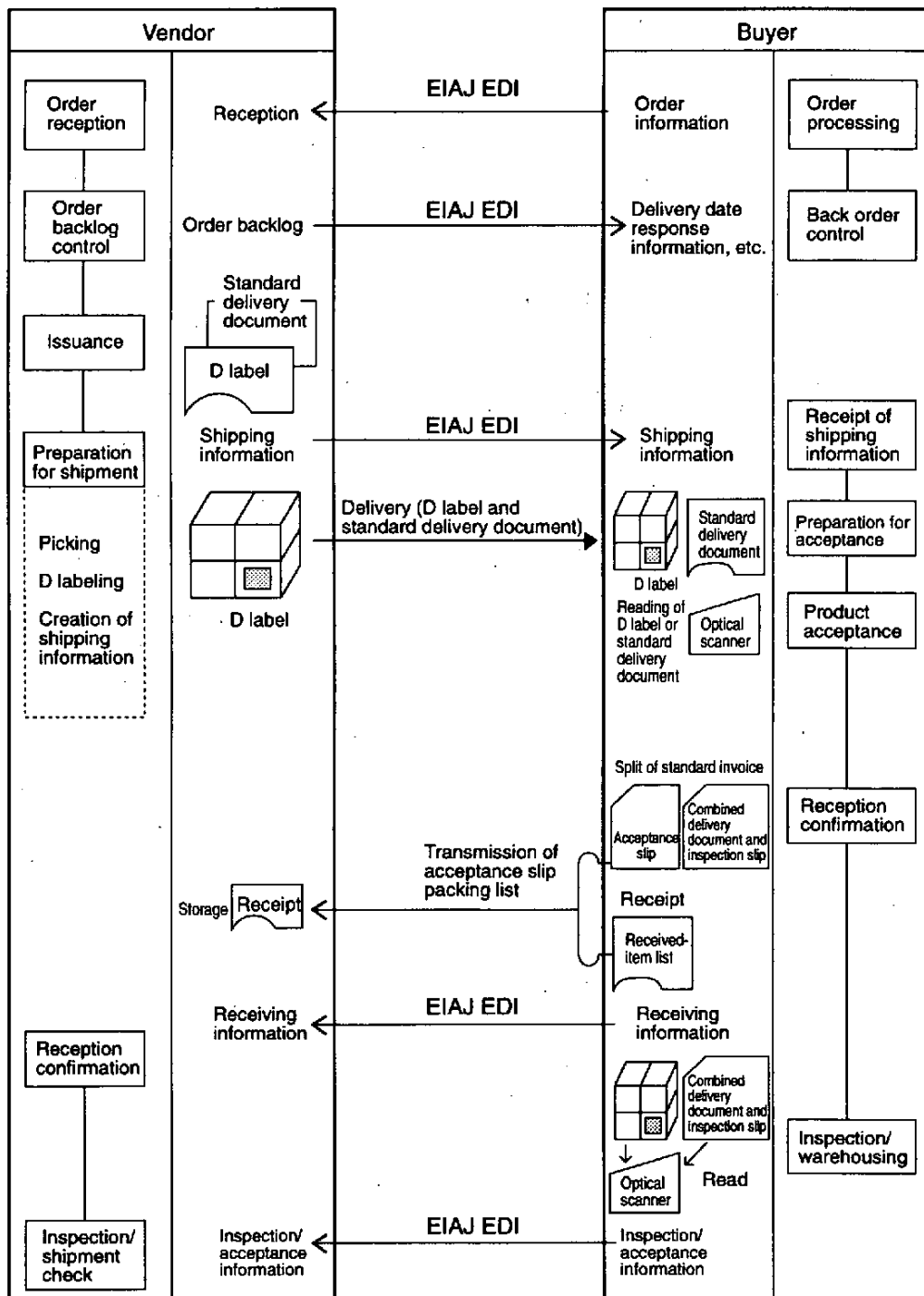


Figure 9. New Standard Delivery System

Business Model Using EDI Information, D Label, and Standard Invoice

(2) Definition of standard delivery tag and document

An EIAJ standard delivery tag and document have been defined as industry-standard formats. Delivery slips that had been used by various companies in their own formats have been abolished.

(3) Objectives and effects

- Improved shipping control by the vendor and in reception control by the buyer
- Improved data entry brought about by bar code label use
- Labor saving and increase in job accuracy, etc.

7. Projected Issues and Problems

- (1) Development and dissemination of international electronic industry/EDI standards
- (2) Maintenance and promotion of EIAJ-EDI standards
- (3) Clarification, promotion, and establishment of the environment for disseminating the standards in medium- and small-enterprises
- (4) Accommodation to interindustry EDI and new technologies

Current News

*** NEC Moves into IBM-Compatible Field**

NEC will move into the field of IBM-compatible machines in the domestic computer market, revising its previous policy to hold to original-spec computers. NEC has already started marketing IBM compatible overseas, but had remained the only single manufacturer in Japan which had refused to shift entirely over to the compatible field. However, under the growing competitive pressure of lower prices from overseas manufacturers against the background of the strong Japanese yen, NEC apparently found it wiser not to stick to its original specification simply because of policy. The company decided, as a consequence, to hop onto the IBM-compatibles bandwagon in the field of server-based personal computer systems.

NEC will release IBM-compatible servers that incorporate the PC AT, which has currently become the de facto world standard. The new server

will enable easier connection with a variety of personal computers and with overseas networks. What is more, the servers will enable the use of more inexpensive parts and peripherals. Servers, which are the equipment used to manage data exchange and communications among computers, are currently in increasing demand for use as the core of network systems for business use. In the procurement of the systems, blanket orders are often placed with one manufacturer. This means that the strength in the server market greatly influences the share of the computer market. The PC-98 Series, NEC's original personal computers, will also be able to be connected with the new servers. NEC recognized the necessity of modifying its server strategy to maintain the competitive edge held by the PC-98 Series, which amounted to more than a 50% share of the domestic market. The company will be bringing out LAN servers for business use and multimedia systems both domestically and overseas.

*** Hitachi to Participate in Next-Generation Telecommunication Experiment in Georgia**

Hitachi will be participating in the Georgia Research Alliance (GRA), a research institute dealing in advanced telecommunication technology. The GRA is a nonprofit association which was established in 1990 at the initiative of the American state of Georgia for the purpose of developing communities provided with high-tech facilities such as remote education and remote medical care service functions. The major participants include the Georgia state government, corporations involved in information and telecommunications businesses such as IBM, AT&T, Northern Telecom, and Bell South, and six major state universities, including the Georgia Institute of Technology.

Hitachi will fund GRA research efforts through Hitachi Telecom USA, a U.S. subsidiary of Hitachi which manufactures telecommunication equipment, and will deliver to GRA two asynchronous transfer mode (ATM) exchanges to serve as the core of its next-generation telecommunication network equipment. The company will test interconnections in the ATM system by cooperating in multimedia

experiments, including full-motion video and superfast (620 Mbps) data transmission between universities.

Hitachi Telecom USA is serving as Hitachi's development and production base for telecommunications devices, such as PBX equipment, which are sold on the U.S. market. Hitachi Telecom USA plans to start producing ATM-related devices and superfast optical transmission units, aiming for 50 billion yen or more sales in 1998, and operation is slated for 1994. The company has been highly regarded for its emphasis on operation in close connection with local communities. This is why the Georgia Institute of Technology suggested to Hitachi that it consider participating in the GRA. Hitachi thus becomes the first Japanese manufacturer to have taken part in a state-level research institute.

Keeping the 1996 Atlanta Olympics in mind, the GRA is constructing the Georgia Advanced Telecommunications Technology Center, and plans to demonstrate advanced telecommunications technologies to the visitors from around the world who are expected to flock to the Olympic Games. In future, Hitachi may also consider participating in multimedia experiments conducted at the Center.

*** Fujifilm Develops High-Capacity Floppy Disk**

Fuji Photo Film has developed a high-capacity 3.5-inch floppy disk, having the same size as disks already widely used for personal computers and word processors but able to hold 100 to 200 megabytes of data — 50 times as much as disks currently on the market. The company has achieved this high capacity by applying magnetic thin film technology that has already been adopted for its videotapes. It has also implemented the high density achieved by decreasing the width of the storage groove on a disk by a factor of 10. For a capacity of 200 megabytes, this means the equivalent of 2,000 images or a 20-minute moving picture, and is equal to the capacity of 3.5-inch magneto optical disks or MiniDiscs. Floppy disks have long been a storage medium used mainly for characters and numbers. The new disk, however, will enable the capture of images or voice information. This makes the floppy disk a potential candidate for the storage media to be used in the era of multimedia.

While the new floppy disk requires the replacement of conventional drives, the prices of the new units are expected to still compare well with those currently on the market. The

new disk can be priced at less than 1,000 yen — about one third the market price for magneto optical disks. Fujifilm used magnetic tape, which is a widely available material, to achieve this lower price.

Some 450 million floppy disks are in demand per year in the current domestic market alone, making this the largest share in the field of storage media.

Many had forecast that floppy disks would be replaced by magneto optical disks and other high-capacity media in the multimedia era, when the capacity to store images will be an important element. This outlook is based on the fact that conventional floppy disks can hold no more than 2 to 4 megabytes of information. With the advent of a high-capacity floppy disk, other disk manufacturers will be forced to review their strategies.

*** Sony to Release Portable Telecommunication Terminal in U.S.**

Sony will place its Magic Link Personal Intelligent Communicator, a next-generation portable telecommunication terminal, exclusively on the U.S. market through home appliance outlets. The unit is priced at \$995 and weighs about 540 g. Sony com-

mercialized the product by incorporating the technologies that are adopted in two types of software: Magic Cap, an operating system for portable terminals, and Telescript, communication software for terminal-to-terminal data exchange. Both were developed by General Magic, which is contributing capital to this project.

Magic Link has a variety of wire communication functions. It can transmit stored text information via facsimile or electric mail, serve as a pager and an electronic organizer, or even be used as a word processor when the keyboard is displayed on the liquid crystal display.

Some portable telecommunication terminal products are already available. Apple sells Newton, which was developed in collaboration with Sharp; Tandy and some other companies also provide similar products. They are all suffering, however, from anemic sales. Sony has released the new product with the intention of achieving improved versatility and operability with General Magic's technologies.

Ten corporations in the U.S., Japan, and Europe, including Sony, Matsushita, Toshiba, Fujitsu, NTT, AT&T, Apple, and Motorola, own equities in General Magic. All are planning to

develop portable terminals and other equipment that incorporate the multimedia software technologies of General Magic, and Sony has taken the lead in commercialization.

*** Pioneer to Enter Personal Computer Market**

Pioneer will enter the personal computer market in partnership with Apple. Pioneer plans to develop and sell a computer with the Mac OS, which was developed by Apple for its own computers, and with the Power PC, a RISC MPU jointly developed by Apple, IBM, and Motorola. The newly commercialized multimedia computer will enable image-capture and facilitate connection with Pioneer's audiovisual equipment, such as laser disk players and stereo sets. Pioneer will market the machine through its existing outlets, such as mass merchandisers, and will further move abroad, mainly into Southeast Asia. Based on its entry into the market, the company plans to expand its information and telecommunication business such as CATV and peripheral devices. The ratio of sales in audiovisual equipment to those in telecommunication devices is currently 9:1, and the company expects this ratio will shift to 2:1 in three to five years.

Currently, more than 80% of the personal computers worldwide have Microsoft operating systems. Apple, which was sticking to its original machines, has been in a hard race confronted by the recent trend toward open systems and less expensive personal computers. Multimedia features and ease-of-use were most characteristic of the Mac OS, but these features are becoming less attractive as Windows, the Microsoft operating system, becomes more widely disseminated. Sensing the growing crisis, Apple de-

cided to take countermeasures by introducing the computer with the Power PC onboard, and established the Apple Alliance (*see fax message) by opening up the Mac OS. This is the first time that Apple has ever opened its operating system. Microsoft currently has a commanding share of the market, but Apple, working to shake up this competitor, is appealing to major manufacturers of personal computers in Japan and U.S. for the introduction of the Mac OS.

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