Report Quality Evaluation

To our clients:
To ensure that the highest standards of report quality are maintained, INPUT would appreciate your assessment of this report. Please take a moment to provide your evaluation of the usefulness and quality of this study. When complete, simply fold, staple, and drop in the mail. Postage has been pre-paid by INPUT if mailed in the U.S.

Thank You.

1. Report title: **The EDI Market in Japan, 1992-1997** (EDPAC)

2. Please indicate your reason for reading this report:
   - ☐ Required reading
   - ☐ Area of high interest
   - ☐ Area of general interest
   - ☐ New product development
   - ☐ Business/market planning
   - ☐ Product planning
   - ☐ Future purchase decision
   - ☐ Systems planning
   - ☐ Other _____

3. Please indicate extent report used and overall usefulness:

	Extent		Usefulness (1=Low, 5=High)				
	Read	Skimmed	1	2	3	4	5
Executive Overview	☐	☐	☐	☐	☐	☐	☐
Complete report	☐	☐	☐	☐	☐	☐	☐
Part of report (_____ %)	☐	☐	☐	☐	☐	☐	☐

4. How useful were:

	1	2	3	4	5
Data presented	☐	☐	☐	☐	☐
Analyses	☐	☐	☐	☐	☐
Recommendations	☐	☐	☐	☐	☐

5. How useful was the report in these areas:

	1	2	3	4	5
Alert you to new opportunities or approaches	☐	☐	☐	☐	☐
Cover new areas not covered elsewhere	☐	☐	☐	☐	☐
Confirm existing ideas	☐	☐	☐	☐	☐
Meet expectations	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐

6. Which topics in the report were the most useful? Why?_____

_____

7. In what ways could the report have been improved? _____

_____

8. Other comments or suggestions: _____

_____

Name _____ Title _____

Department _____

Company _____

Address _____

City _____ State _____ ZIP _____

Telephone _____ Date completed _____

Thank you for your time and cooperation.

M&S 633/01 12/89

INPUT

FOLD HERE

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS   REPLY   MAIL
First Class   Permit No. 982   Mountain View, CA
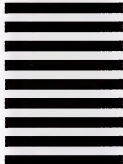
POSTAGE WILL BE PAID BY ADDRESSEE

Attention: Marketing Department

INPUT
1280 Villa Street
Mountain View, CA   94041-9912

IIIııılıIIIıııIıIıIIIıIıIıIıIıııIIııIIıIıI

FOLD HERE

THE EDI MARKET IN JAPAN
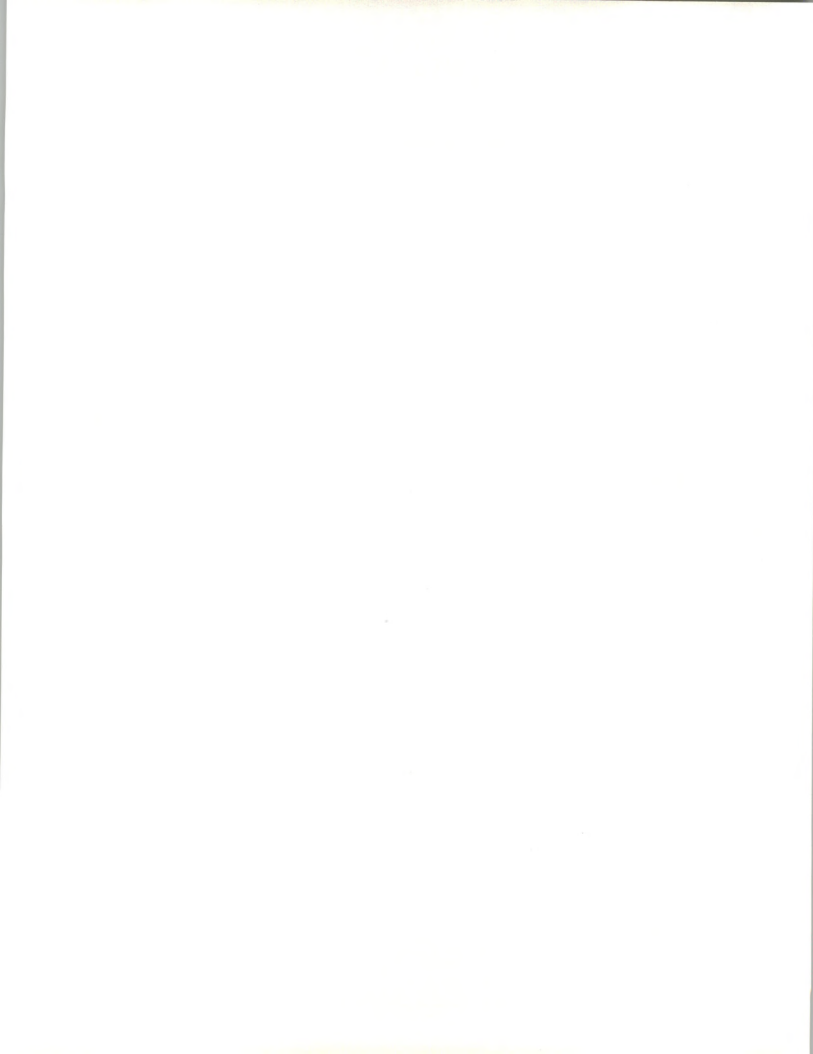
1992-1997

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

EDI and Electronic Commerce Program
(EDEDI)

The EDI Market in Japan, 1992-1997

Abstract

Japanese corporations are examining the use of standardized electronic data interchange. Already, proprietary EDI has been deployed in a number of industry sectors, for example, chainstore distribution. A concerted effort is under way by private and government organizations to develop EDI data standards and systems that are appropriate for Japanese business practices. There are unique Japanese requirements as well as requirements to interface with organizations outside of Japan.

This report examines the status of EDI usage in Japan. It estimates how much users are spending on EDI software products and services. The report forecasts these expenditures for five years. It examines the institutions responsible for EDI standards development. And it looks at the status of EDI adoption in 12 specific industry sectors. It contains 30 pages and 10 exhibits.

Table of Contents

Exhibits

I

Introduction and Overview

A
General Activity

INPUT estimates that more than five years will be required for the popularization of electronic data interchange (EDI) in Japan. Early adoption of EDI will be done piecemeal by isolated industry groups.

Every major electronics manufacturer has its own on-line purchasing network with a proprietary data format. Components manufacturers currently use various order formats, and they are pushing for EDI standards in the industry. After almost a year of development, EIAJ (Electronic Industries Association of Japan) introduced the EIAJ standard in 1988.

Other major manufacturing industries have proprietary supplier networks generally called "purchasing VANs." These networks serve the "keiretsu" trading communities that surround a large hub company. These networks are very strong.

In general, the operating procedure of the core or hub company becomes the standard for all the companies that operate in its value chain. Manufacturers are generally stronger than suppliers or distributors and establish closed networks in order to lock out competitors and lock in customers.

Because of the competitive advantages afforded by these proprietary VANs, manufacturers of automobiles and machinery (and other manufacturing groups) are not yet interested in implementing standardized EDI systems and networks.

In Japan's distribution industries—particularly chainstores, supermarkets, department stores, beauty products, and processed foods—an unsophisticated form of EDI is practiced. This kind of EDI has fixed-length formats, based on the JCA (Japan Chainstore Association) standard.

International EDI has received impetus from U.S. importers, particularly
buyers of automobile and computer peripheral goods. Major service
vendors in Japan are ISI-Dentsu (GEIS), NEC (GEIS), IBM, Japan ENS/
AT&T, Network Information Services (British Telecom), and Mitsui
Knowledge Institute (Infonet). ISI-Dentsu, a joint venture of Dentsu
(66%)—Japan's largest advertising company—and GEIS (34%), was the
first network provider to promote EDI in Japan. In the spring of 1990,
Global VAN (Ordernet) began promoting its international EDI services.

B
Standards Activities

1. Background: The Center for the Informatization of Industry (CII)

In 1988, the Japanese government established an EDI committee, the
National EDI Standardization Promotion Committee, in the Center for the
Informatization of Industry of the Japan Information Processing Develop-
ment Center (JIPDEC/CII), which is an association affiliated with the
Ministry of International Trade and Industry (MITI).

• The EDI Center formerly planned to develop a Japanese standard very
similar to EDIFACT by adding Japanese-specific factors to EDIFACT.
But, since the Japanese standard cannot be fully compatible with
EDIFACT, there is no benefit to developing an EDIFACT-based stan-
dard. Instead, the EDI Center is developing a Japanese national standard
with a format simpler than EDIFACT for easier application to various
industries. Syntax rules for the standard have not yet been defined, but it
should support Kanji characters. Standard messages, dedicated for
Japanese users, will also be developed. There is currently no reason for
Japanese companies not to use EDIFACT for international EDI.

• The center completed a draft of CII syntax rules in April, 1991. The
center released the syntax for general commercial use effective April 1,
1992. If there are no problems (approximately six months will be
required for the acceptance procedure), MITI will promote EDI syntax
based on the CII rules among various industries, especially distribution.
Based on this syntax, each industry will develop an industrial standard
individually. Until spring 1991, JIPDEC/CII wanted to make the stan-
dard applied as a Japan Industrial Standard (JIS). But it now has no plan
to do so because there is no benefit to using a JIS for EDI instead of a de
facto standard.

Two organizations in addition to CII are promoting EDI in Japan:

• The Special Type II Telecommunications Carriers Association is an
association of value-added network (VAN) service vendors and is
studying standardization of connections or interfaces among VANs.

• JASTPRO, a trade facilitation organization, is focusing on standardization of international trade and customs procedures.

2. Characteristics of the CII Syntax Rules

The CII syntax rules are different from those of EDIFACT. CII rules were developed for use by Japanese companies in Japan for domestic trade. The differences in procedures between domestic and international trade are great enough that two standards—CII for domestic and EDIFACT for international—made sense. This is similar to the situation in the United States, where the approximately 20,000 to 25,000 EDI using companies use ANSI X12 and other national standards for domestic trade and EDIFACT for international trade. Japan's CII syntax can be translated into EDIFACT.

The basic characteristics of the CII EDI syntax rules are listed below:

• Variable-length format

• Supports Japanese characters (Kanji, Hiragana, and Katakana)

• Can be used for complex business procedures

• Flexible structure to minimize message or element length

• The number of data elements is 61,439 at maximum

• Supports OSI transmission protocols (FTAM and MHS), the ZENGIN protocol and the Japan Chainstore Association (JCA) protocol

• Runs on the networks supporting EDIFACT (ISO 9735)

• Compatible with the Electronic Industries Association of Japan (EIAJ) standard

3. International EDI Considerations

Although CII syntax (very different from EDIFACT) is being adopted for domestic trade, there is no reason for Japanese companies not to use EDIFACT for international trade. The Japanese EDIFACT Committee was established within the Japan Association for Simplication of International Trade Procedures (JASTPRO) in 1991. It is sending a representative ("rapporteur" in the United Nations nomenclature) to the United Nations/EDIFACT board and working with the Singapore committee on the Asia-Pacific EDIFACT board.

Thus, EDIFACT usage will occur in Japan for international commercial activities alongside CII syntax use for domestic activities. This is similar to the situation in the United States, where ANSI X12 EDI standards will continue to be used and expanded for domestic use and EDIFACT will be adopted for international use.

4. Legal Issues

JIPDEC/CII has set up a committee to study the legal issues of EDI.

C
EDI Market

The Japanese market for EDI software, network services and professional services purchased externally is estimated to be $30 million in 1991. INPUT expects that it will grow by $10 million (35%) in 1992 and reach $180 million in 1997, reflecting a 35% compound annual growth rate. Exhibit I-1 depicts the market growth of EDI in Japan.

EXHIBIT I-1

Market for EDI Software Products and Services in Japan
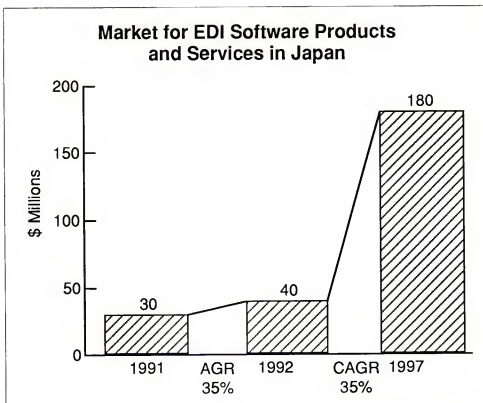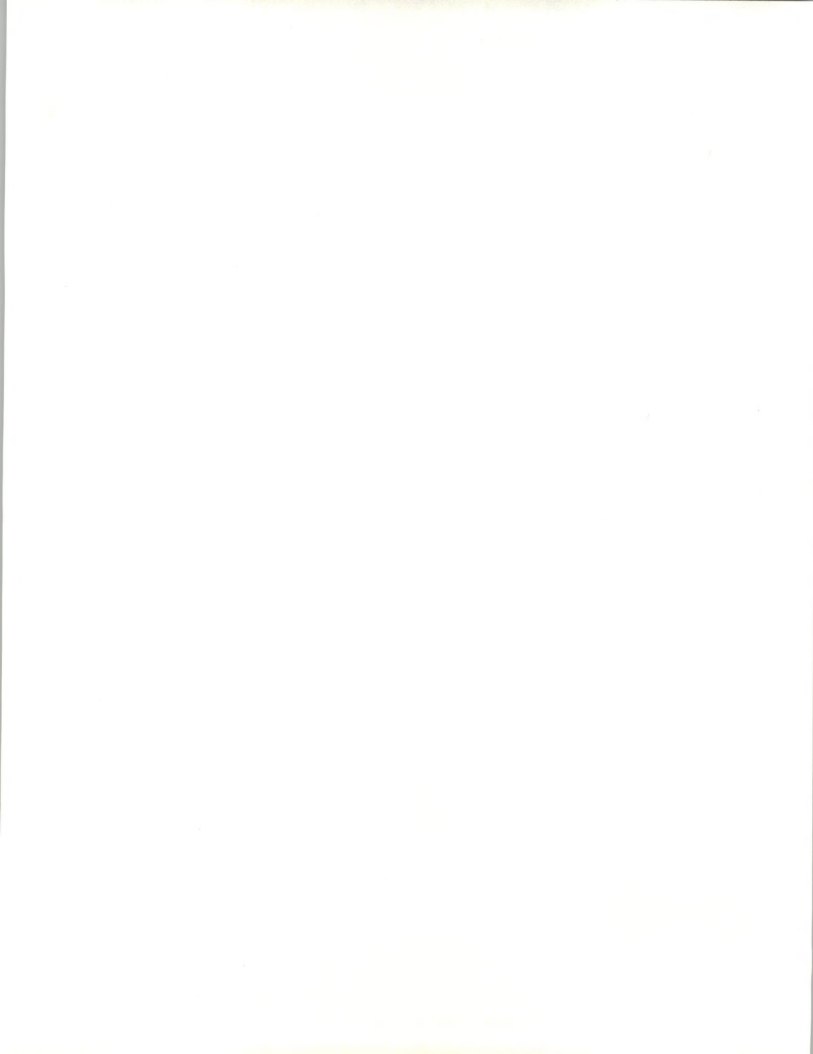
As mentioned previously, this growth will occur because:

• The basic syntax and framework for standards development have been established.

• Companies are beginning to recognize EDI's benefits.

Total information technology (IT) spending on EDI in Japan includes hardware purchases and expenditures on personnel within the organization working on EDI implementations. These numbers are shown in Exhibit I-2.

EXHIBIT I-2

EDI-Related Expenditures in Japan, 1991

	$ Millions
Software Products, Network and Professional Services Purchased Externally	30
EDI-Induced Hardware Purchases	60
Expenditures on In-House Personnel Doing EDI Project	60

Hardware expenditures include purchases of CPU devices, modems and other communications equipment, terminals, data collection, and other hardware. Often, companies will not purchase hardware strictly for EDI. Either they will install EDI software on existing hardware or the new hardware they purchase will support other software applications and functions. INPUT's hardware expenditure estimate of $60 million is for the purchases that are principally aimed at supporting the EDI function.

In-house personnel expenses take into account that Japanese firms typically have a larger number of people directly working on, and more upper-management involvement in, the EDI project than do American or European firms.

The Japanese distribution and manufacturing industries have the largest potential for EDI use. Banks are not interested in EDI at this time. After the industrial sectors introduce EDI, financial sectors will begin introducing EDI or integrating EFT into EDI.

The most influential driving forces for initiating Japanese EDI may be pressure from U.S. buyers and requests for standardization from foreign authorities.

A considerable number of companies are planning to introduce or enlarge their EDI systems. To promote EDI smoothly, however, a set of standards, low-priced equipment, and a wide range of software are necessary. Also, many implementation issues remain to be resolved by users and vendors.
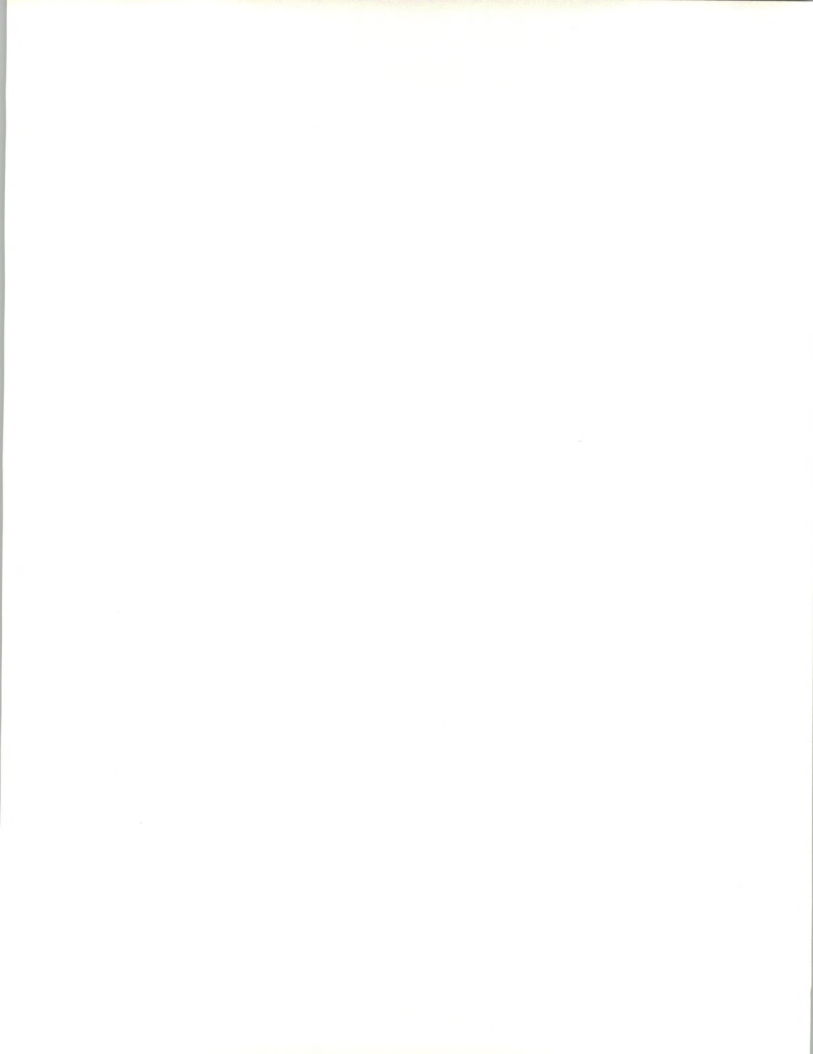
II

EDI and the Japanese Business Environment

A
_____

How Industry Structure Determines EDI in Japan

1. How Keiretsus Impact EDI

In recent years, the term "keiretsu," or group management, has become popular in the U.S. Often the term is used to describe how the Japanese market is closed. Japanese keiretsus are seen as barriers to entry of U.S. companies in the Japanese market.

The keiretsu is indeed a barrier, but it is also one of the strengths of Japanese industry. We might say it is a kind of "outsourcing."

In the manufacturing sector, for example, Japanese manufacturers use more parts suppliers as subcontractors than do U.S. manufacturers. The major purpose of such outsourcing is to reduce labor costs as well as to source parts more efficiently.

In this environment, a hub company has strong control over the parts suppliers. This differential of power is impacting the development of EDI in Japan.

Each automobile manufacturer, for example, has a proprietary purchasing VAN and requires its parts makers to use its proprietary format. Hub companies do not consider it inconvenient to use proprietary formats. Therefore, no automobile manufacturer has considered implementing standardized EDI. Parts suppliers are dissatisfied with the situation but, in general, don't have enough power to ask their hub company to change the format.

Now however, most hub companies will consider switching to EDI standards when they replace or enhance current information systems. The reasons for this are:

- Significant efforts and costs are required to develop and maintain the proprietary systems.

- When the number of business connections becomes large, it will be very difficult for hub companies to support business partners for software and its maintenance.

- It is expected that cross-industry electronic data interchange will grow in the future. When this happens, even big companies will be unable to maintain their proprietary systems.

Large companies are beginning to examine the use of standard EDI. This portends well for EDI's future in Japan. It is possible that the introduction of standard EDI will grow rapidly among big, hub companies in Japan in the next few years.

2. Impact from Japan's Current Soft Economy

The Japanese economy is experiencing a slowdown in 1992. In such a climate, companies make great efforts to reduce costs and to be more cooperative, rather than aggressive, toward competitors. Both of these tendencies will encourage the growth of EDI in Japan.

Japanese companies have a tendency to go in the same direction with competitors. If a leading company introduces EDI, other companies in the industry will do the same. When popularization starts, it will spread very rapidly.

B

Intercorporate Networks

To understand the context for EDI in Japan, it is necessary to grasp the development of information networking in Japan. The trend of computer use during the 1980s was away from intracompany toward intercompany/interindustry. The scale of systems changed from local standalones to nationwide, on-line systems and information networks. In the mid-1980s, progress in information networking was most apparent for applications in physical distribution, sales, and finance. Company groups built their own value-added networks. In April 1985, the Telecommunication Business Law permitted a free market for VAN service providers that provided telecommunication and information processing services using communications networks. These VAN providers are classified as Type II carriers as opposed to Type I carriers, which own the physical network. The proliferation of these service providers contributed to the rapid expansion of on-line systems and systems for various information processing services.
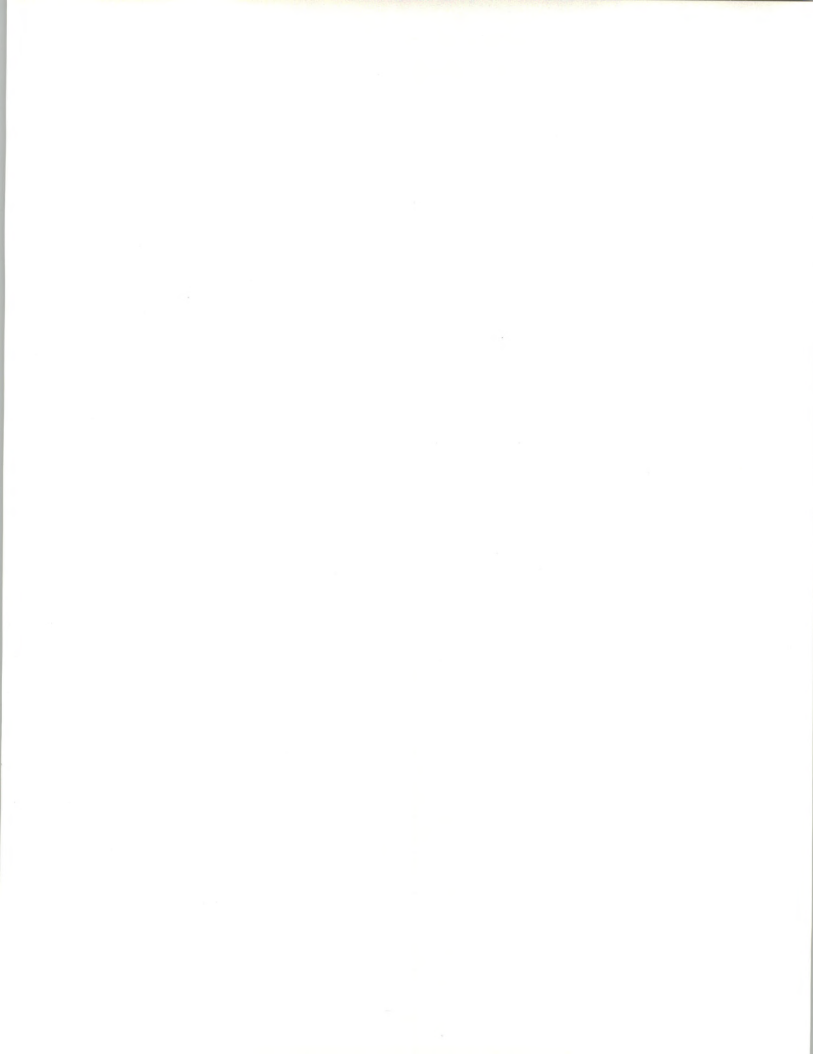
In consumer goods distribution, through services provided by VAN service vendors, many on-line systems have been established to exchange purchase order and product-received data among manufacturers, wholesale dealers, agents, and retail outlets. Petrochemical manufacturers use VAN services to send shipping reports and records among manufacturers and affiliated warehouse companies. In the manufacturing sector, large networks have vertically integrated big enterprises with their suppliers for material supply and control. In the banking industry—in addition to the ZENGIN system, which is an interbank interchange system—major banks are forming new systems called "the third on-line system" that expand customer services, such as corporate banking and new applications in securities trading and international affairs. To some degree, all industries have begun networking for information gathering or business transactions.

In the early 1980s, about 9% of Japanese companies had intercompany networking, consisting mostly of on-line linkage with other companies. In 1988, approximately 33% had some form of intercompany networking. INPUT estimates that today just under 50% of Japanese companies use some form of electronic network with trading partners.

With this background of networking trends, each industry is further devising information-intensive systems and networking, called SIS (strategic information systems). Competition has become more intense with the increased diversification of consumer needs and the multiplicity of individualized products and services. In order to survive, each company must make strong efforts to cope with a changing market environment—efforts such as business diversification, systemization, and reduction of inventory and delivery time.

Information systems in Japanese industries have been developing steadily through inter- and intracompany networking. Information processing is expected not only to play an important role in enterprise strategies—such as enhancing opportunities or instigating globalization—but also to act as a tool that makes business management more efficient.

Beginning a few years ago, many companies in various industries began to move away from traditional paper-oriented dealing toward EDI. This trend is expected to increase as corporate activities diversify and become more international.

III
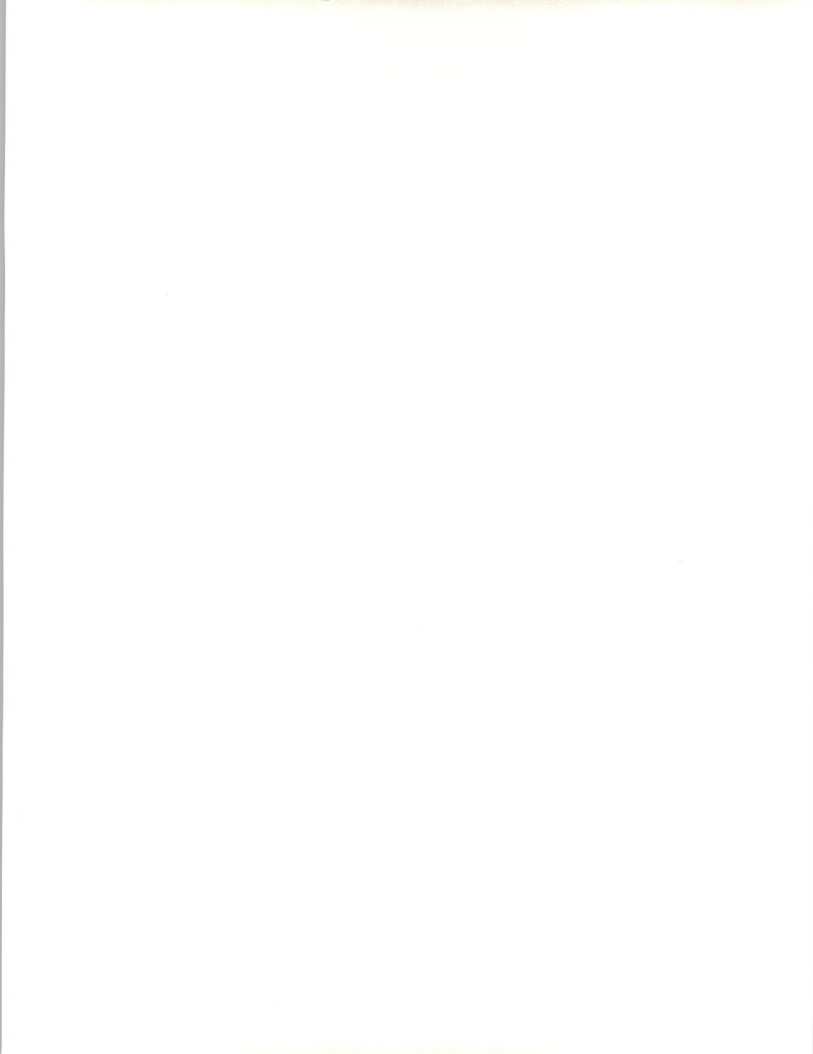
EDI in Japanese Industries

Because of the liberalization of the telecommunications business in 1985, VAN business—which in Japan generally means Type II enterprises—was opened to private companies. Since liberalization, the number of VAN business vendors increased; over 1,000 firms operated VANs as of the end of 1991 (up 22% since 1989). These firms provide various kinds of VAN services. EDI is provided by 40% of the VAN vendors and shows a higher growth rate than other VAN services. There are about 750 systems with EDI services provided by Japanese VAN service vendors.

There are two types of EDI VANs in Japan: those operated by large corporate groups serving all companies in the group, and those operated by independent companies that service a vertical industry. In either case, a "hub-spoke" phenomenon typically forms where a large enterprise is the center with many smaller suppliers and customers connected to it via the network.

Suppliers to a big company connect their terminals to the purchase order system of the hub company. Business data formats are determined by the hub company. Each hub company's data format is unique, and no unification or standardization with other hub systems occurs.

Transmission protocols are not as varied as data formats. In most cases, either one protocol is selected from the following, or some of the following are combined:

- The central (hub) company's computer architecture dictates the protocol used.

- The JCA (Japan Chainstore Association) procedure

- The ZENGIN (provided by the Federation of Bankers Associations of Japan) procedure

The second kind of EDI service provider is the industrial VAN, which is a VAN used in specific industries. Systems that use EDI as industrial VANs are estimated to account for 10% of all EDI services. Currently, it

is most common to have more than two industrial VANs in one industry; however, for the sake of data interchange convenience, it is desirable that the whole industry adopt one industrial VAN.

Because information networking is an effective measure for organizing suppliers and customers, the fight for VAN supremacy takes place in network formation. When EDI is implemented with an industrial VAN, the business data formats are standardized in the industry. A transmission protocol is adopted in the industry to provide easy connection with a network and terminals. In many cases, a number of protocols are supported to allow users a free selection of terminals and other devices.

Today, the biggest difficulty in Japanese EDI is to come to a consensus on data format design, particularly where a single company deals with many different industries. When an industry has more than one industrial VAN, the potential for standardization is low. Because there are differences in each industrial VAN's business data formats, it is very difficult to implement EDI among companies that belong to different industrial VANs. In these cases, most users request that their industrial VAN vendor make a bilateral connection to the other's industrial VAN and protocol conversion services. Considering the efficiency of data interchange among users, it is better to combine existing multiple industrial VANs than to connect them. For VAN vendors, combining will be beneficial because it allows them to increase the number of EDI users and to sell value-added conversion services.

A

EDI in the Shipping Industry

The Japanese shipping industry has pursued rationalization. The industry was affected by the appreciation of the yen and the less-expensive labor on foreign ships in the main lane—the North American lane.

The shipping industry was one of the first in Japan to implement information systems, having done so more than 20 years ago. For efficiency, each firm installed computers for general transportation management—from payroll processing and accounting to seat reservations and shipping instructions. Internal on-line systems (domestic and international) have also been established. In the attempt to survive, each company is currently introducing EDI. Shipping companies are cooperating with clients in order to differentiate themselves from competitors.

In April 1986, SHIPNETS (Shipping Cargo Information Network System) began with 43 companies. It is operated by four industry associations relating to marine transportation. In October 1988, a union—attempting to pursue S.C. Net (Shipper/Carrier Shipping Information Network System)—was organized, and after completion by seven consignors and 13 shipping companies, it began operation.

Computerization in this industry aims at efficient control of containers that move worldwide. Recently, the importance of computerization has changed to emphasize more-strategic purposes, such as quick response to consignors' needs, cost reduction in total flow of freights, and improvement of information services for consignors. This new use of computers suggests the inevitable widespread use of EDI deployed over an international network. To this end, shipping companies are expanding their data networks.

The computerized fields in the industry can be roughly classified into four areas, as shown in Exhibit III-1.

EXHIBIT III-1

Computerized Fields in the Shipping Industry

Internal System	General accounting system Freight/operation cost system Payroll-processing, statistics system
Customer Service System	S.C. Net (Shipper/Carrier Net) Provides B/L data Status of ship
Data Base Service	Tariff information Harbor information
EDI	SHIPNETS Freight in/out information at container terminals Freight flow data among railways and trucking Data interchange with banks

Except for the internal systems, all the other types of systems in Exhibit III-1 can be considered EDI or EDI-like.

SHIPNETS, one of the systems that is in operation, uses DRESS (Denden Realtime Sales Management System) as a processing center. DRESS is a VAN service provided by NTT Data. Therefore, its procedure is proprietary. Another system, S.C. Net, is a data interchange system of bill-of-lading (B/L) information, which is transmitted between a shipping company and a consignor. Though this system uses the telecom DRESS protocols as well as SHIPNETS, it can also use the ZENGIN protocols.
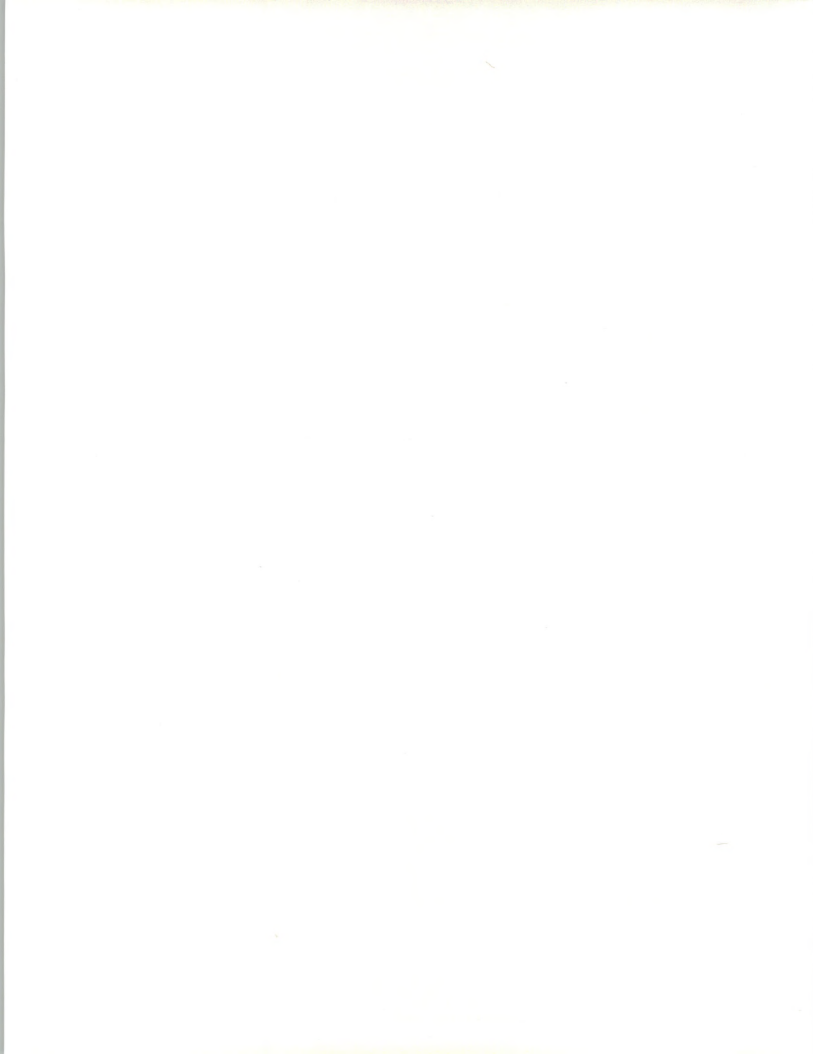
B

EDI in the Automotive Industry

EDI standardization in the automotive industry falls behind standardization in other Japanese industries. The biggest factor blocking standardization is severe competition. Each company makes an effort to provide more-attractive, lower-priced, more-efficient, and higher-quality products than competitors', placing great importance on product differentiation. Under these circumstances, standardization in the industry has become secondary. At present, EDI is generally pursued by individual manufacturer groups separately.

Each manufacturer has a proprietary network system. This industry will be the last industry to introduce the CII standard in Japan.

Japanese car manufacturers are eagerly building plants abroad; meanwhile, competition has become more intense in the domestic market. Within this business environment, production and distribution efficiency and sales network consolidation are encouraged. For these reasons, more-advanced information systems have been developed.

Companies place emphasis on networks or information interchange through networks. Japanese automobile manufacturers are building information networks to link domestic dealers, domestic plants, and parts manufacturers, and overseas plants and sales agencies. Business functions that use networks between automobile manufacturers and dealers include:

• Automobile purchase orders (monthly orders, quarterly orders, and daily orders)

• Delivery information

• Status information (production and transportation)

• Automobile disposition information

• Retailers' inventory information

• Invoice information
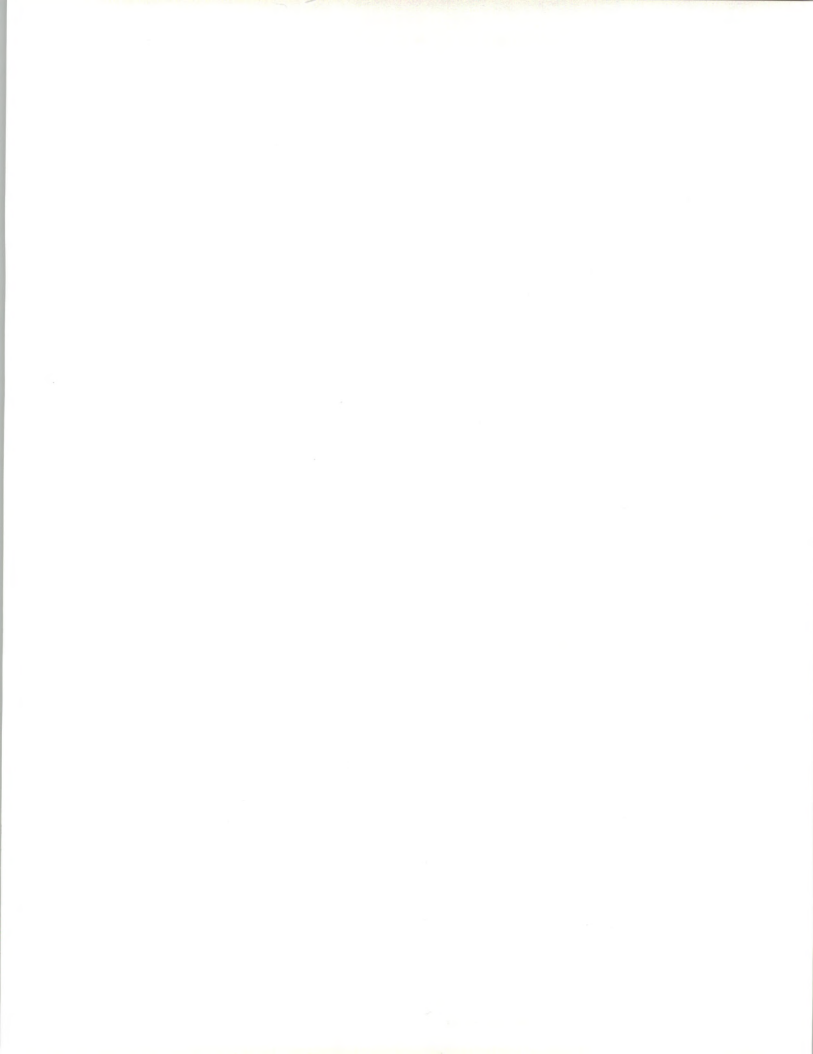
Business functions between automobile manufacturers and parts manufacturers include:

• Parts purchase orders (monthly orders, daily orders, and urgent orders)
• Delivery information
• Shipment information
• Inventory information
• Invoice information

International networking is more avidly pursued due to the trend of locating plants abroad. Networking with overseas plants is similar to intracompany networking. The overseas firm is usually considered an extension of the computer network within the company. In terms of information, although purchase order/receive order and delivery information are interchanged, the overseas organization is situated in the same information system chain as an intracompany connection.

Due to local designing and supplying of parts, data interchange of product engineering data (using CAD) has begun between headquarters and overseas plants. Data interchange conducted by overseas plants with local suppliers is usually operated by the AIAG (Automotive Industry Action Group).

In the Japanese automotive industry, parts manufacturers play significant roles. Automobile makers rely heavily on their parts suppliers; typically 60% of a car's value is provided by suppliers. Consequently—in order to resolve issues such as rationalization of production, diversification of specifications, and reduction of delivery time—it is necessary for automobile makers, along with suppliers and related manufacturers, to form a tight systems interconnection.

Parts makers include a broad range of suppliers—some specialize in car parts, some work in the electric industry, and others work in the rubber or glass industries. Suppliers of raw materials vary considerably, from those dealing in ferrous and nonferrous metals to those dealing in chemicals.

Affiliations are complicated. Some parts makers are affiliated with a specific automobile manufacturer; some parts makers are independent; and others have relationships with trading companies. Consequently, many parts makers do business with several car manufacturers whose standards or parts numbering systems are different. Therefore, EDI can be simultaneously important and a cause of great difficulty for automobile manufacturers and parts makers.
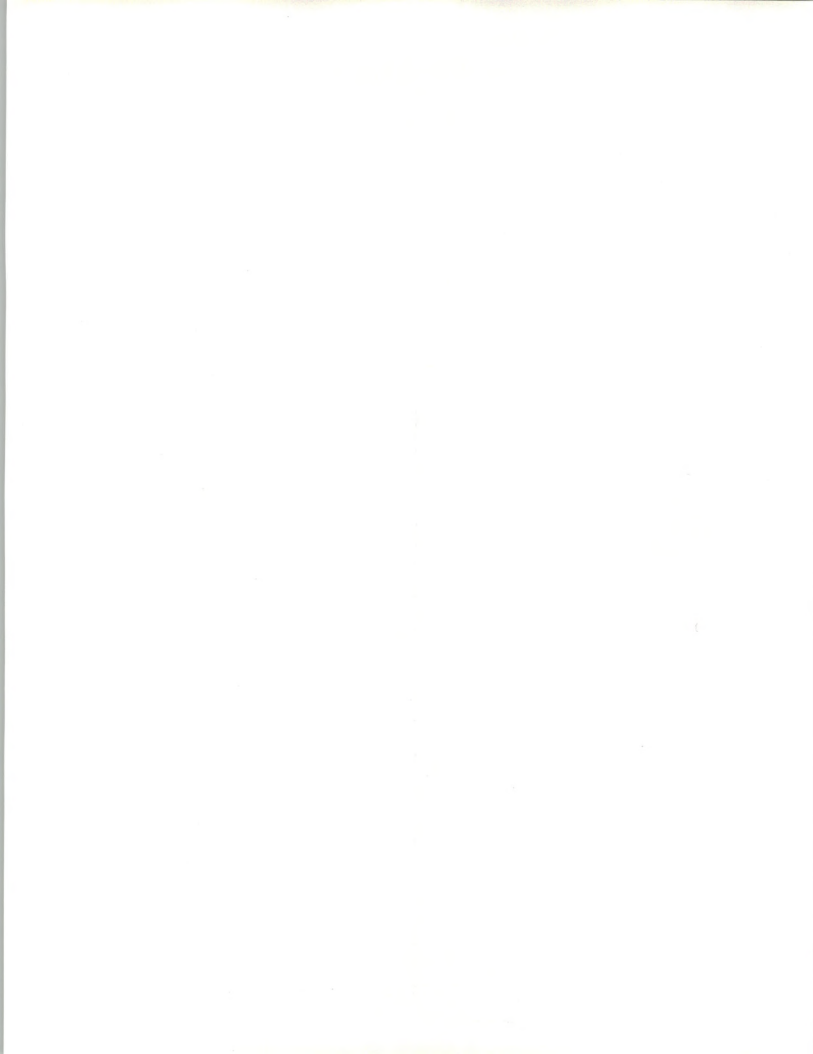
C
EDI in the Air Cargo Industry

The air cargo business includes cargo booking, delivery, shipment slips issuance, customs formalities, and freight custody between a consignor or a consignee and an airline.

Recently, traders (called forwarders)—responsible for transportation from a consignor to a consignee and who utilize airlines, trucking, or warehousing businesses—have appeared. They are not confined to the domestic market but extend abroad, founding overseas corporations to offer services such as air agency, customs formalities, and warehousing and trucking arrangements. In the air cargo industry, the competition is becoming more intense because of enhanced consignors' needs, diversification, and administrative deregulation and liberalization, which are causing profits to stagnate. Therefore diversification of function, and the enlargement of networks to extend internationally become necessary.

The air cargo industry and consignors interchange information—including cargo inventory, shipment status, transportation, invoices, and past records. EDI systems handle this information, and JCA formats are generally used for transmission procedures. In many cases, carriers are obliged to use proprietary formats according to each consignor's requirements. Exhibit III-2 shows EDI status between the carriers and consignors.

The expected merits of implementing this system are the following:

- Labor reduction in making trade-related documents
- Shipment status available in a timely manner
- Rapid processing of sales transactions
- Easy and accurate transaction of transportation information
- Labor savings in payment and accurate management of the costs

EXHIBIT III-2

EDI between the Air Cargo Industry and Shippers
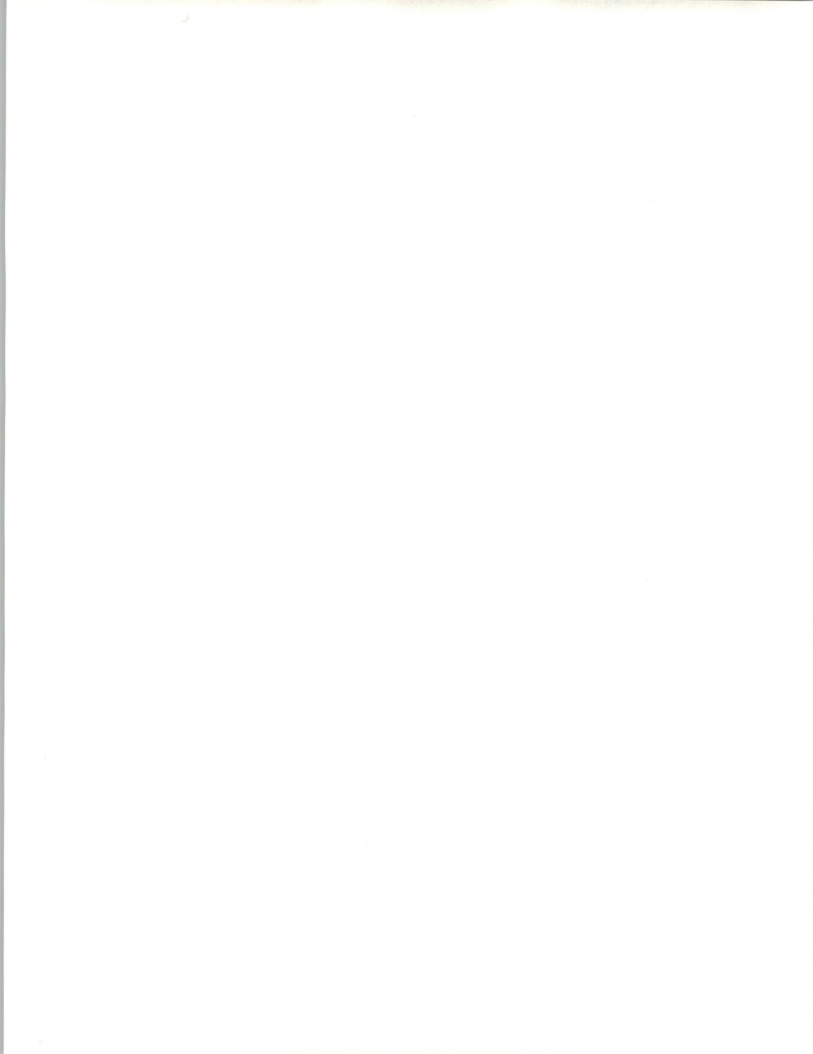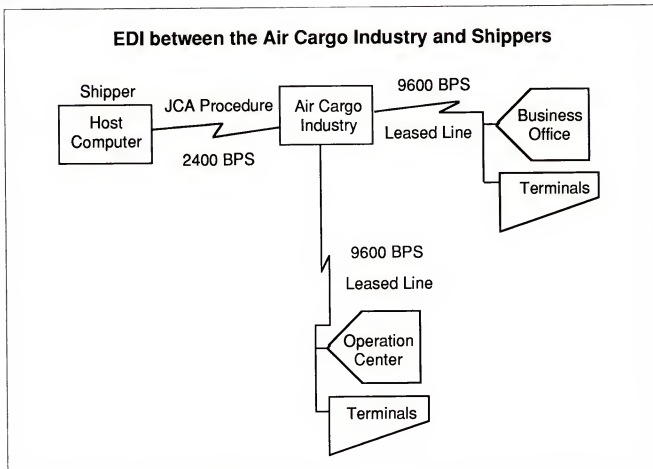
D

EDI in the Electronics Industry

The Electronic Industries Association of Japan (EIAJ) was the first indus-
trial association to develop an EDI standard and to promote EDI. The
number of electronics companies for which corporate codes for EDI were
registered was 150 in 1989, 350 in 1990, and 650 at the end of 1991.
EIAJ's EDI effort is growing successfully. Exhibit III-3 shows this
growth.

EIAJ has begun to work with the transportation industry in the first test of
cross-industry EDI in Japan. The standard for messages will be developed
by September 1992, at which time testing will begin. EIAJ has promoted
purchase orders as the first application. Shipment status reporting by
carriers to shippers, however, is the next priority for message develop-
ment.

EXHIBIT III-3

Users of the EIAJ EDI Standard

Use of on-line ordering systems is widespread in the Japanese electronics industry, and it is growing. An EIAJ study examined this type of interorganizational system. It found th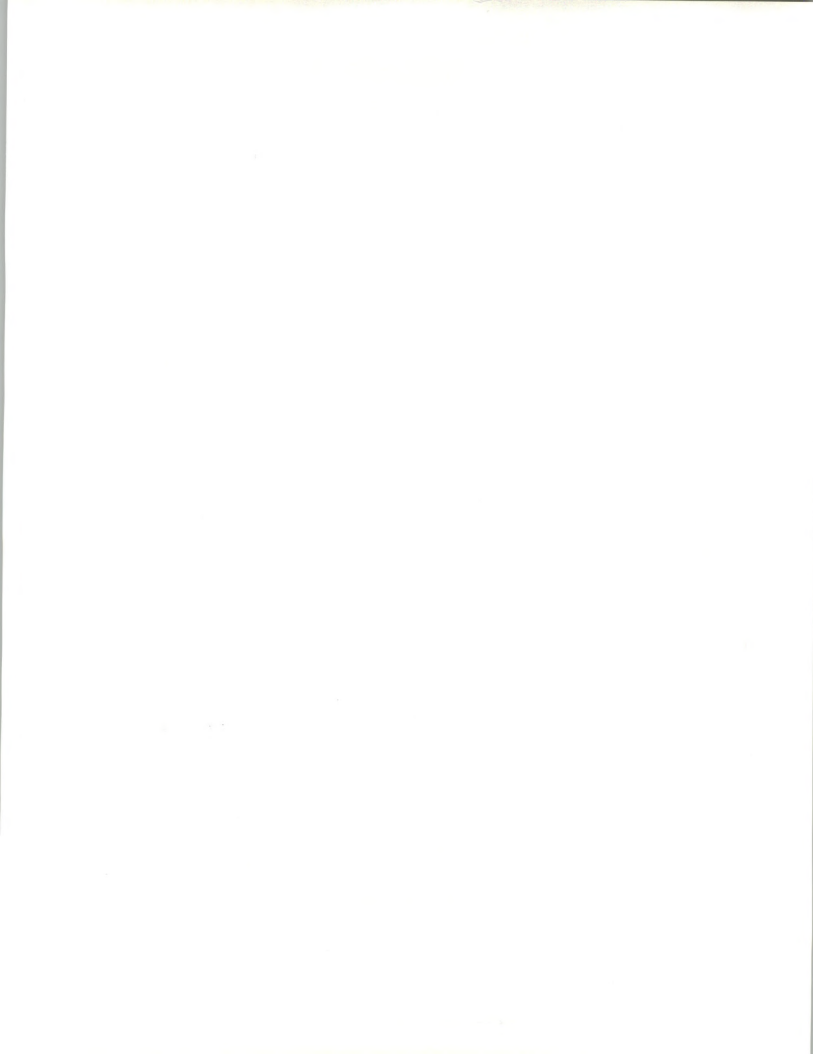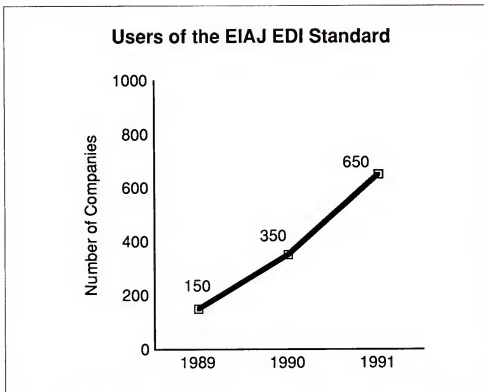at in April 1990, the majority of the electronics companies received 30% or less of their orders via on-line systems. The study, however, estimated that by 1992 the majority of the companies will be receiving more than 50% of their orders on-line. Some companies are exceptions to this rule. Sony, for example, already receives more than 90% of its orders via an on-line ordering system.

The EIAJ developed an EDI data format standard in 1988, but as of April 1990, fewer than 10% of electronics companies were using it. Proprietary EDI and on-line standards still predominate. However, electronics giants such as Sony, Matsushita, and Toshiba have established EDI and on-line systems that incorporate the EIAJ standards. Also, the niche sectors of audio-visual electronics and electric machinery have adopted the EIAJ standard faster than has the industry as a whole. Other industries have adopted the EIAJ standard for their own use. These industries include electric wire and cable makers and electric power utilities. Use of the EIAJ EDI standard will grow quickly in the next few years.
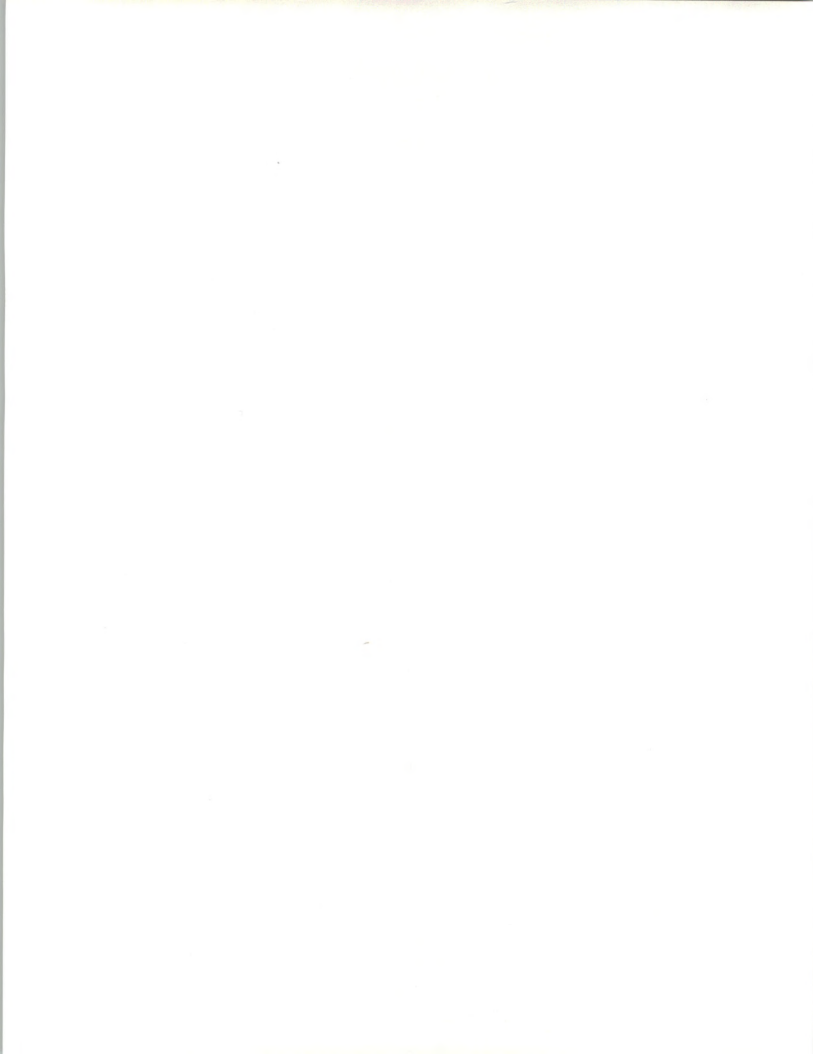
E

EDI in the Steel Industry

Japanese steel makers are interested in EDI. However, the problem for them is that automobile manufacturers, which are the biggest customers of the steel makers, have no interest in adopting standard EDI.

Also, in the Japanese steel industry the majority of orders are custom. Therefore, there are differences with other industries in the information interchanged among steel makers, trading companies, and clients. For example, detailed production-related data are needed at the order stage. In order to standardize specifications information, steel makers and trading companies began a standardization study.

According to the study, formats and codes used by each steel maker are closely related to production control, cost management, and sales affairs. Therefore, it is difficult to execute overall standardization unless systems change. Driving EDI forward is difficult because the product variety and management structure of each steel maker are significantly different. However, industry participants agree that the long-term benefit brought by standardization will be great, and they are willing to promote EDI despite initial high investment expense.

EDI-like standardization efforts have been under way in the Japanese steel industry since the 1970s. At first, items considered for standardization included formats of forms such as order forms, data element definitions, codes, abbreviations, and writing instructions. During the study, participants decided that item and code should have priority in standardization rather than form formats. This decision was made because of an expectation that systems that transmit information by magnetic tape or on-line between steel makers and trading companies will skyrocket in the near future.

Fifty-seven items were selected from the study discussed above, including definition of the data elements, code, abbreviations, and writing instructions. These 57 items include the following:

- Maker
- Buyer
- Contract number
- Delivery terms
- Payment terms
- Weight
- Delivery time
- Unit price for sales
- Amount of money
- Purpose
- End user
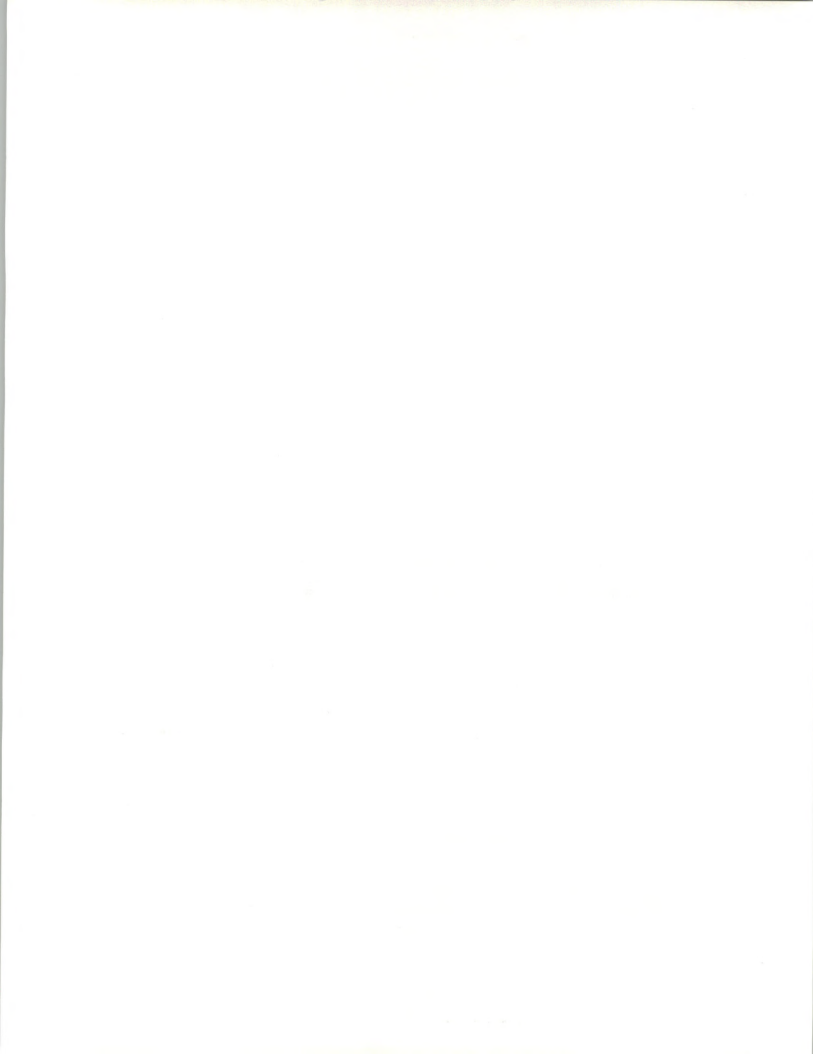
The following effects of standardization are expected:

- Reduction of writing errors on order forms made by the trading companies

- Improved efficiency of business transactions among trading companies by setting key items for check-up

- Foundation for standardization

After the initial step of the standardization study in 1971, the steel makers and trading companies aimed at simplification, rationalization of trading firms' business, and labor savings in data entry of shipping/invoice data. Therefore, they created the industrial standard of the magnetic tape format for shipping slips and invoice data. In the same year, invoice unit price/amount and a formula to figure material weight were also standardized, which simplified calculations.

In 1975, a recommended order form model was made on the basis of the 57 standard items. This model prescribed the size and format of forms, MT format, code, and writing instructions. The purpose was to give a guideline to makers intending to develop or alter an order transaction system and to make them use it practically. This order form model will be one factor in the growth of EDI in the Japanese steel industry.

F

EDI in Trade and Distribution

1. General

Japanese trading companies consist of sales departments—which are separated according to the industries they deal with—and management departments, which are separated according to functions. Japanese trading companies are similar to American distribution companies, but a greater proportion of Japanese companies' business is with overseas suppliers and customers.

Sales departments include the machinery department, metals department, energy department, textile department, processed foods department, etc. Management departments include the finance department, accounting department, and personnel department.

Each sales department is operated as if it were an independent company. Not all work is done within a department, but the amount of work involving multiple departments is small. Given these organizational circumstances, the EDI needs of Japanese trading companies can be discerned.
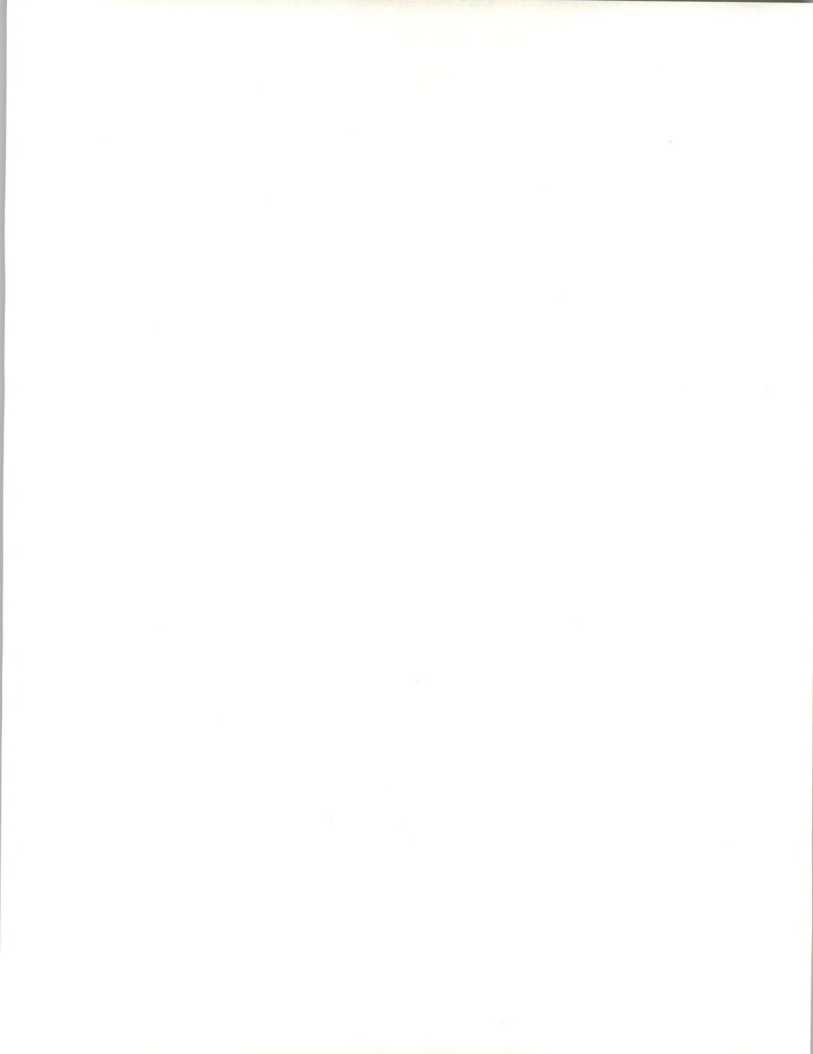
Each department, as it moves to establish EDI, tries to accommodate the standards and conventions of the industries it works with. For example, within the steel industry, formats and code standards of the steel industry will be applied.

Because each division of a trading company must accommodate the standards of the industry with which it deals, it will be very difficult for the trade and distribution industry to adopt a standard EDI.

The most important activity of trading companies is buying goods from manufacturers and then selling the goods to customers. The variety of goods and trade-related business transactions is so great that enormous time and manpower commitments are required.

EDI introduction would affect trading companies very positively. One characteristic of trading companies is the high ratio of overseas business. In most trading companies, overseas business accounts for more than 50% of total sales. However, international EDI has not yet been pursued. The development of international EDI is expected in the future.

EDI was first introduced in Japanese trading companies in 1984. At the time, communication networks were established in all of Japan, and restrictions of networks were liberalized. Also, standards such as ZENGIN procedures and Japan Chainstore Association (JCA) procedures were established and became popular in some industries. Therefore, EDI made rapid progress in the trading companies.

The current status of EDI in trading companies is as follows:

Data communication protocols between host CPUs are a major issue. Data communications from PC to PC or PC to host are mainly used by small companies. As a transmission medium for large-scale EDI, DDX-net is used, and for small-scale EDI, public networks are used. When the relationship between a trading company and its customer is close and significant data are exchanged, a leased-line medium is usually used. The ZENGIN protocol is used when data volume is high, and the JCA protocol is used when data volume is low.

As previously described, EDI systems in trading companies vary from industry to industry. Exhibit III-4 shows a typical case of EDI use in the textile industry, which is a network of synthetic-fiber makers, cotton-spinners, processors, apparel makers, and distributors.
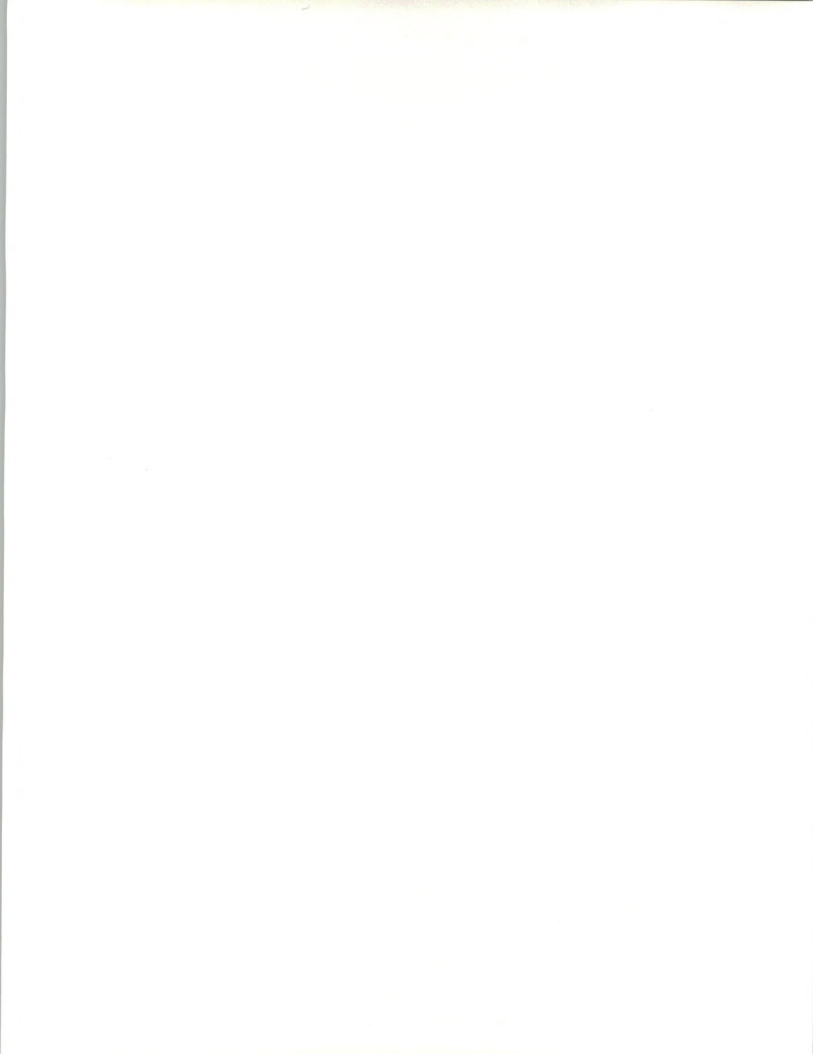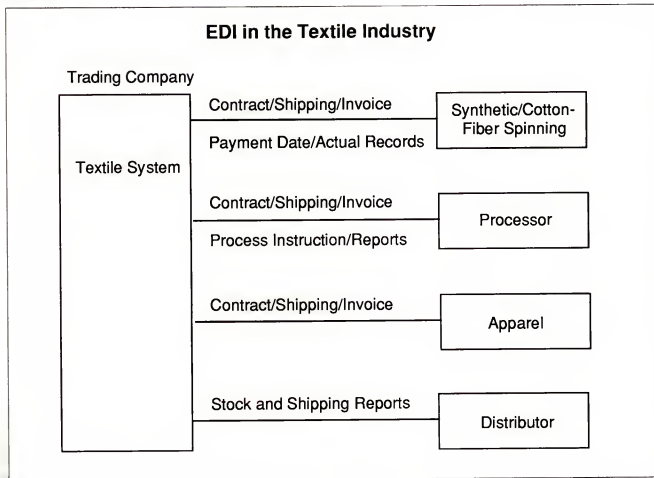
EXHIBIT III-4

EDI in the Textile Industry

Trading Company

Textile System

| | Contract/Shipping/Invoice | Synthetic/Cotton-Fiber Spinning |
| | Payment Date/Actual Records | |

| | Contract/Shipping/Invoice | Processor |
| | Process Instruction/Reports | |

| | Contract/Shipping/Invoice | Apparel |

| | Stock and Shipping Reports | Distributor |

2. Chainstores

More than 80% of Japanese chainstores have introduced EDI using the Japan Chainstore Association (JCA) format. The newly established CII formats provide more functionality than the older JCA formats. But chainstores most likely will not adopt the CII formats any time soon. In the CII formats, goods can be quantified in terms of units as well as measured bulk amounts (metric tons, liters, etc.). The JCA formats can describe goods only in terms of units. Despite this shortcoming, the JCA formats will still be used by chainstores because bulk measurements are not needed.

3. Chainstores of Consumer Electronics and Appliances

Several stores started test using EDI in August 1990. They use it for inventory inquiries and orders to manufacturers. Computer systems of 10 leading manufacturers can be accessed by them on-line. Nippon Telephone & Telegraph's (NTT) data network is the chosen network for conducting EDI.
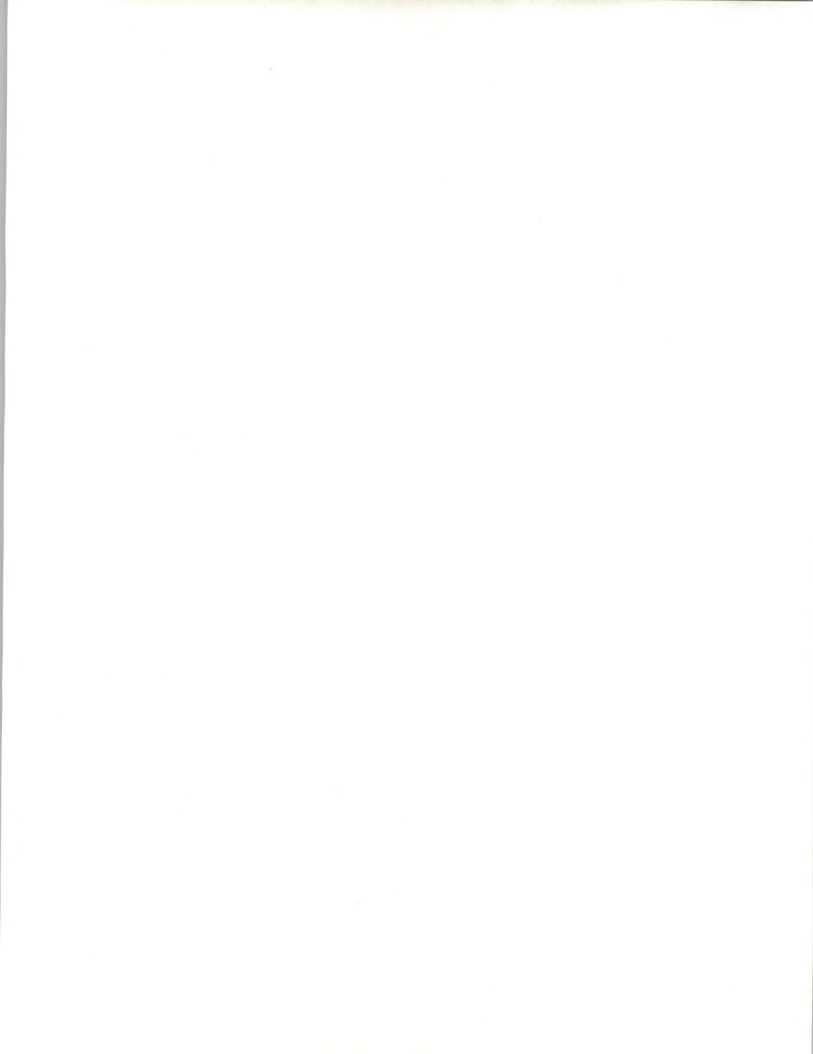
G
EDI in the Finance Industry

In financial institutions, EFT systems exchanging on-line data among banks began to be used in 1970. EFT has also been used in the life insurance, non-life insurance, and securities industries. However, no Japanese bank currently has plans for EDI.

In April 1973, 88 banks cooperated to develop a national banking data communication system and started EFT. This system was enhanced and evolved to a second and then a third version. In 1980, the first on-line data interchange in the banking industry was established. In 1983, the ZENGIN procedure was developed as the standard communication protocol. Recently, the ZENGIN procedure has been widely used in companies and industries besides banking.

In 1980, the life insurance, non-life insurance, and securities industries developed an EFT similar to that of the banking industry. The national bank data communication system, as shown in Exhibit III-6, connected 42,303 offices of 5,298 financial organizations in December 1987. The system currently conducts approximately 1,700,000 exchange transfers each day.

In the life insurance industry, the LINK network was built in 1986 as a cooperative venture of several insurance companies. Life insurance companies began to interchange settlement data. Current volume is 200,000 transactions per month.

In the non-life insurance industry, a network was built in 1986 that started data interchange among companies. Since 1988, it has evolved to a second-version system with more than ten domestic non-life insurance contractors and overseas insurance companies connected to the network. The ZENGIN standard is used in this application.

In the securities industry, each company connects on-line to banks, and EFT is used for settlement of securities transactions. In 1985, an ATM network was built in cooperation with the entire securities industry. Data interchange is executed between each company's center and ATMs installed at sales offices. Large securities companies also build networks to provide stock information services to customers.

Exhibit III-5 characterizes EDI-like communications in the Japanese banking industry.
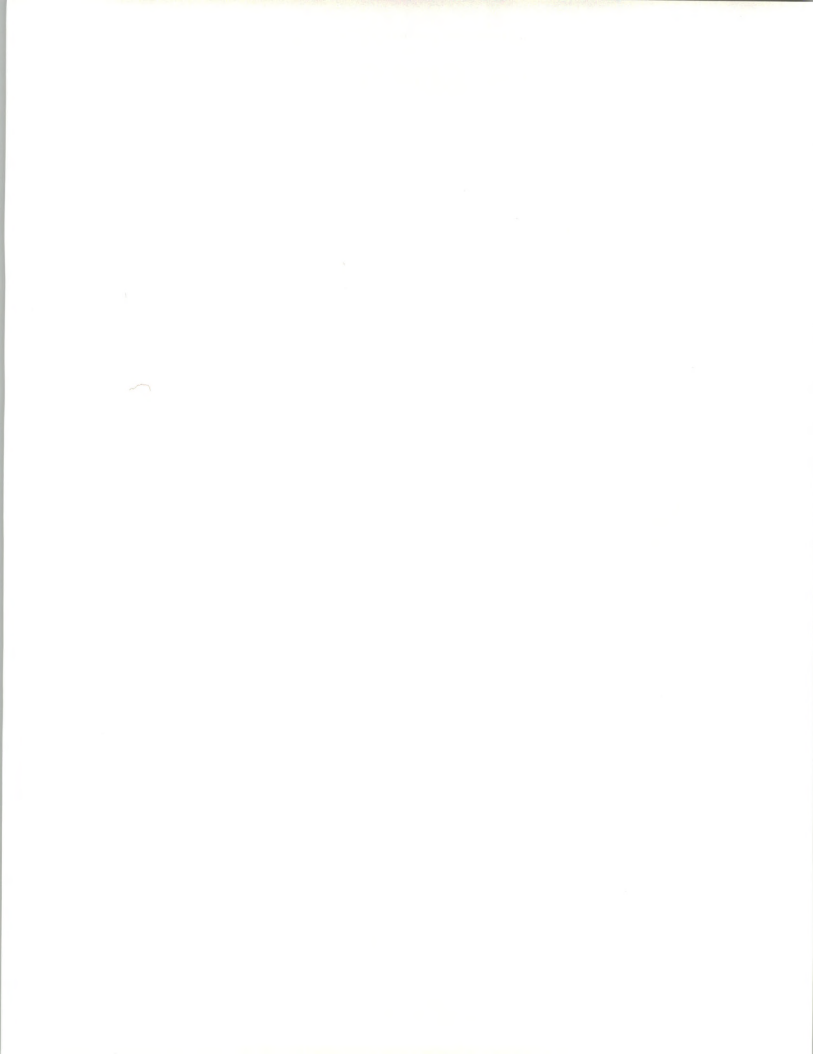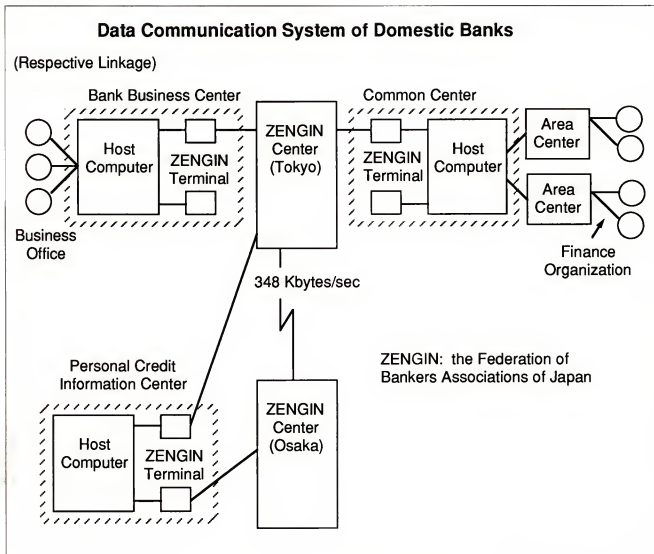
EXHIBIT III-5

Data Communication System of Domestic Banks

(Respective Linkage)

ZENGIN: the Federation of Bankers Associations of Japan

H

## EDI in Other Industries

1. Construction

The construction industry established the CII-based network called Construction Industry Network, or CI Net. INPUT expects the use of EDI to grow rapidly in this industry.

2. Government

Government agencies are using traditional paper formats and procedures. This sector lags behind all sectors in adopting EDI and stands to gain the most in productivity.
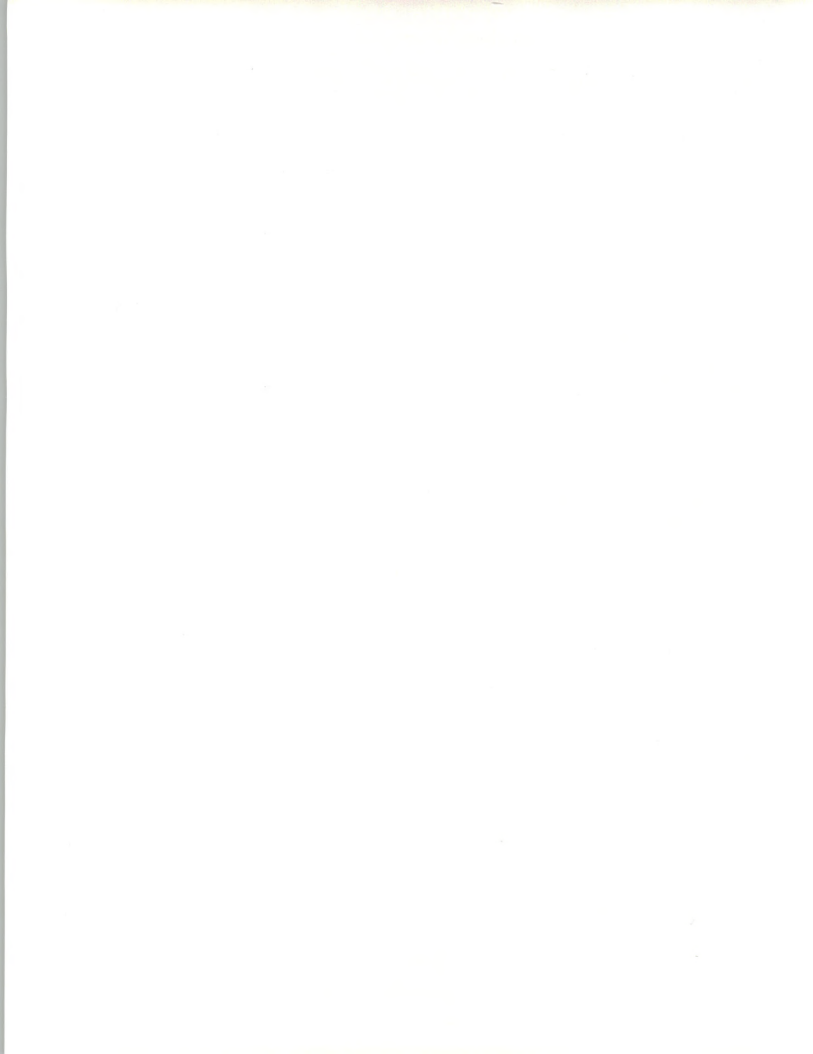
### 3. Petrochemicals

Major makers of plastics and chemicals plan to change their systems to support EDI and to implement EDI with their major customers. The EDI formats will be based on the CII syntax.
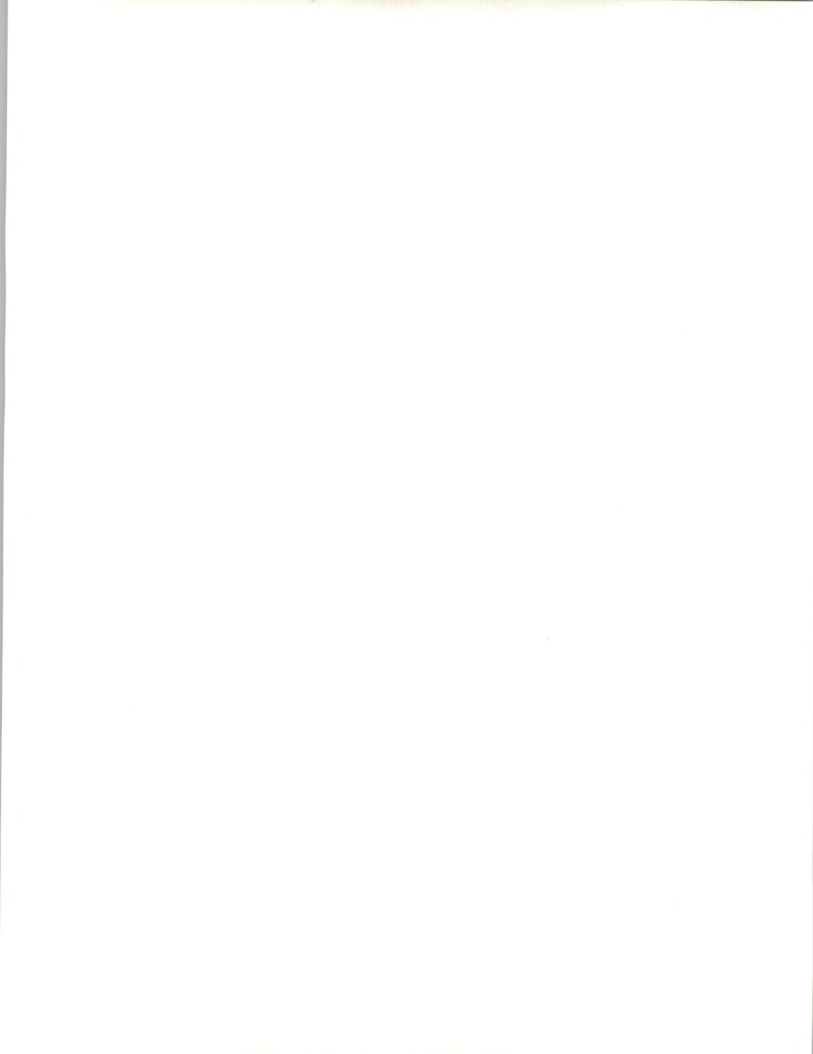
4. Electrical Equipment and Power Industries

In this trading community, EDI is at a test stage now.

5. Gas Industry

Major companies have started preparing for and standardizing EDI.
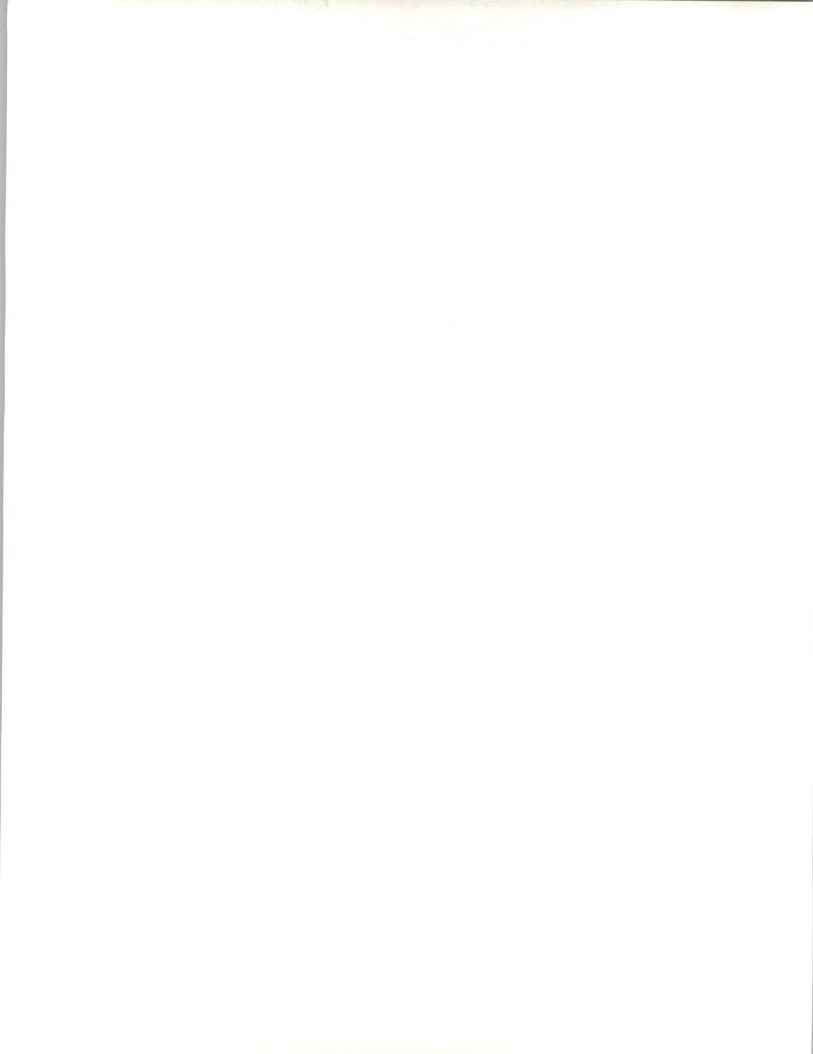
IV

Competitive Environment

In Japan, the company that provides EDI services as a vendor is generally identified as a VAN business provider and provides EDI as one service.

The electronic telecommunication business in Japan is classified into three categories, as shown in Exhibit IV-1.

EXHIBIT IV-1

Japanese Telecommunication Business Classifications			
	Type I Carrier (owns and maintains circuits)	Type II Carrier (rents circuits owned by other carriers)	
		Special Type II	General Type II
Start-up	By permission	By registration	By notification
Contract Approval	By permission	By notification	Free
Service Area	Specified	Domestic or international	Domestic
Main Contents	Basic transmission	Communication handling and information processing	
User	Unspecified	Unspecified	Unspecified
Foreign Capital Regulation	Less than one-third	No limitation	
Remarks	Be under an obligation to indicate contract articles	—	
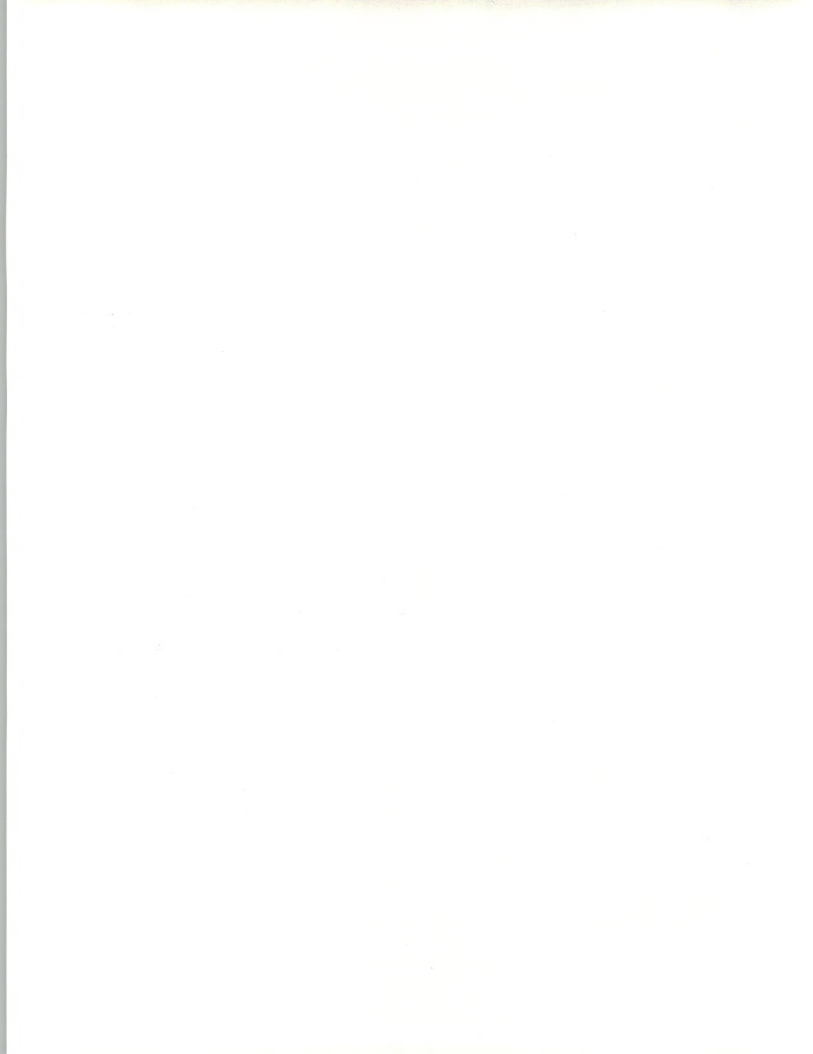
The industry is roughly separated into Type I and Type II carriers, depending on whether companies retain communications networks at their own expense. As service providers, NTT, KDD, and newcomers called "shin denden" are Type I enterprises. VAN service providers that rent networks from the Type I vendors and provide telecommunication services and value-added services, such as data processing, are Type II enterprises.

Type II enterprises are divided into Special Type II enterprises and General Type II enterprises according to the scale and content of the enterprise.

Special Type II enterprises are large telecommunication service providers that can offer services for an unlimited number of people and typically offer overseas telecommunication services (international VAN services). General Type II enterprises are the keiretsu-oriented VANs that offer network services to a limited, specific group of users.

VAN services in Japan can be roughly divided into telecommunication services and information processing services.

Telecommunication services are conversion services that change data formats and communication protocols without changing the content of the data. It is an effective service when users with different telecommunication systems want to interchange data with each other. VAN service vendors also provide conversion services of protocol, codes, format, line speed, media, etc. Telecommunication services also include other VAN services such as electronic mail, personal computer communications services, voice mail services, domestic and international PC communication networking, and gateway services to access data bases.

Information processing services are services in which vendors provide some processing of the data. A representative example is a purchase order transaction created by a remote computing service (RCS) from point-of-sale (POS) data. The advantage of using information-processing services is that complicated and troublesome transaction work is left to third-party service providers.

As of November 1990, the number of Type II enterprises in Japan was 914, representing growth of approximately 17% over the preceding year, as shown in Exhibit IV-2. In November 1991, the number of Type II enterprises was 1,011.
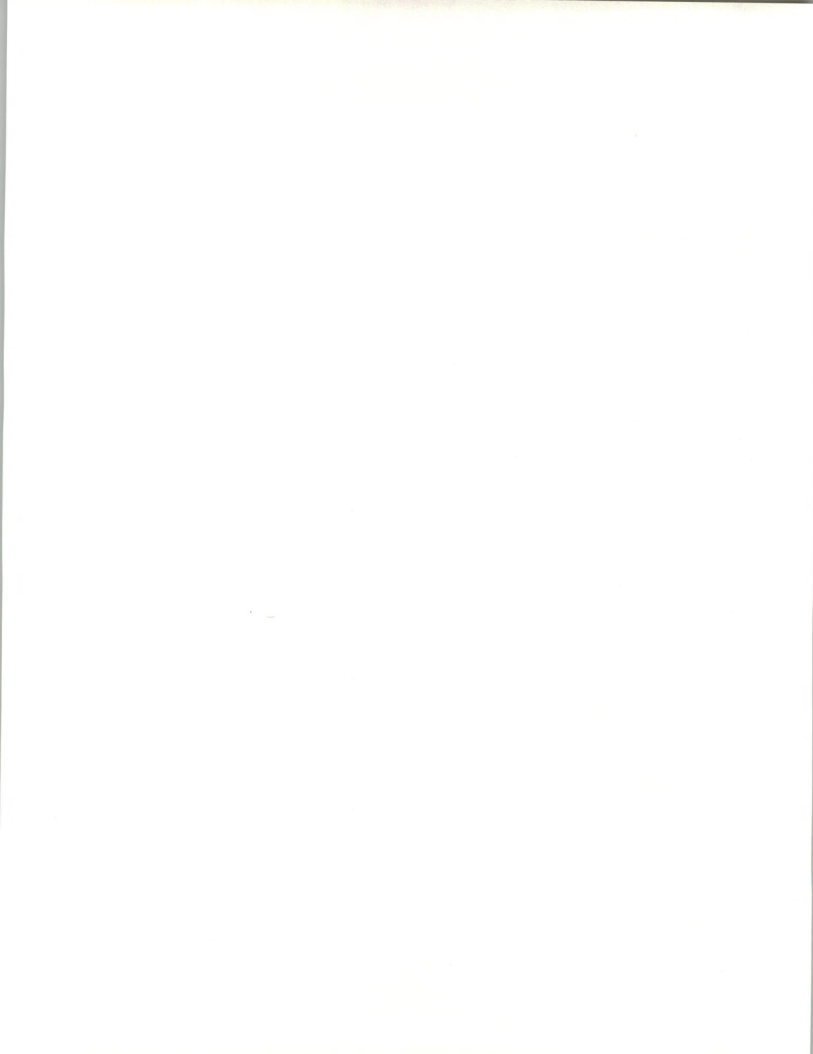
EXHIBIT IV-2

|								
Number of Companies in the Telecommunication Business, by Type								
	1985 April	1986 April	1987 April	1988 April	1989 April	1989 October	1990 November	1991 November
Type I	0	5	11	35	43	55	66	67
Type II	85	209	356	530	693	782	914	1,011
Special	0	9	10	18	25	27	29	33
General	85	20	346	512	668	755	885	978
Total	85	214	367	565	736	837	980	1,078

It is difficult to name major EDI vendors in Japan because the EDI revenue produced by each vendor is difficult to ascertain. Information-processing service providers whose EDI business is growing are expected to exert themselves in the field of EDI and positively begin working on EDI for the future.

Leading VAN vendors are listed in Exhibit IV-3.

EXHIBIT IV-3

Leading EDI VANs

- Fujitsu
- NEC (GEIS)
- NTT Data
- IBM Japan
- United Net
- INTEC
- NRI

- Hitachi Information Network
- ISI-Dentsu (GEIS)
- Japan ENS (AT&T)
- Network Information Services (BT Tymnet)
- Mitsui Knowledge Institute (INFONET)
- Global VAN Japan (Sterling Software)
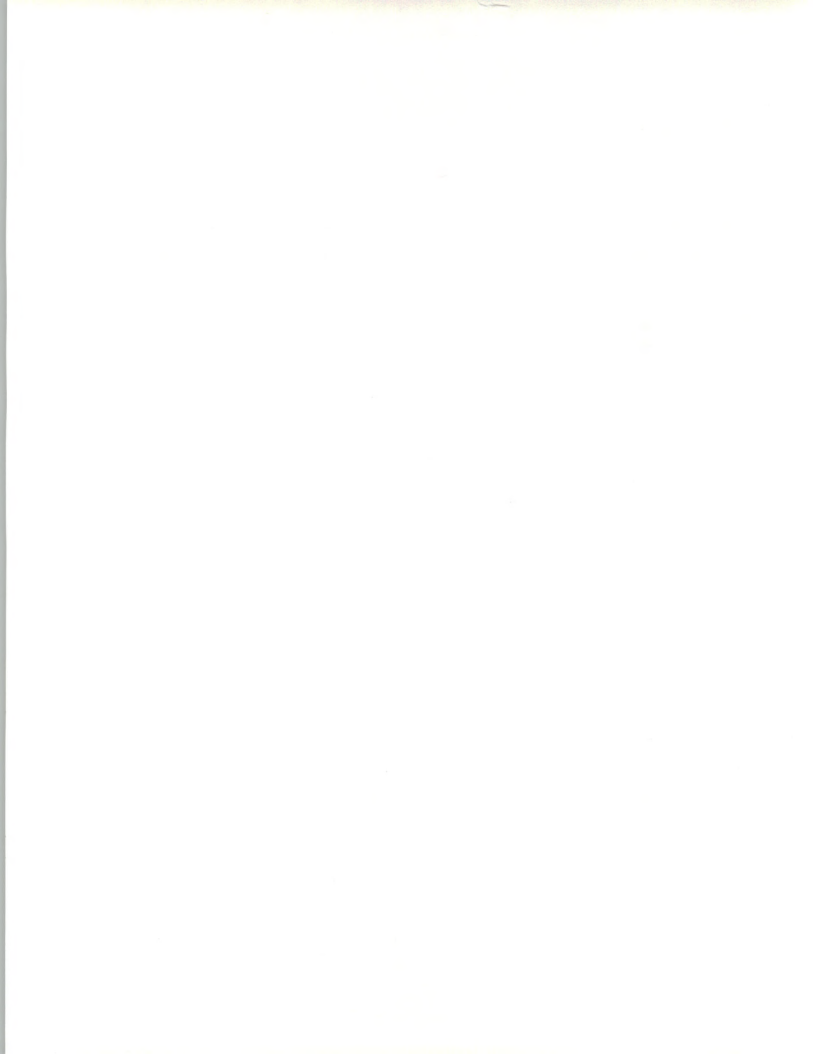
About INPUT

INPUT provides planning information, analysis, and recommendations for the information technology industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Subscription services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services. INPUT specializes in the software and services industry which includes software products, systems operations, processing services, network services, systems integration, professional services, turnkey systems, and customer services. Particular areas of expertise include CASE analysis, information systems planning, and outsourcing.

Many of INPUT's professional staff members have more than 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

— INPUT OFFICES —

North America

San Francisco
1280 Villa Street
Mountain View, CA 94041-1194
Tel. (415) 961-3300 Fax (415) 961-3966

New York
Atrium at Glenpointe
400 Frank W. Burr Blvd.
Teaneck, NJ 07666
Tel. (201) 801-0050 Fax (201) 801-0441

Washington, D.C.
INPUT, INC.
1953 Gallows Road, Suite 560
Vienna, VA 22182
Tel. (703) 847-6870 Fax (703) 847-6872

International

London
INPUT LTD.
Piccadilly House
33/37 Regent Street
London SW1Y 4NF, England
Tel. (071) 493-9335 Fax (071) 629-0179

Paris
INPUT SARL
24, avenue du Recteur Poincaré
75016 Paris, France
Tel. (1) 46 47 65 65 Fax (1) 46 47 69 50

Frankfurt
INPUT LTD.
Sudetenstrasse 9
W-6306 Langgöns-Niederkleen, Germany
Tel. 0 6447-7229 Fax 0 6447-7327

Tokyo
INPUT KK
Saida Building, 4-6
Kanda Sakuma-cho, Chiyoda-ku
Tokyo 101, Japan
Tel. (03) 3864-0531 Fax (03) 3864-4114