

INTERNATIONAL ELECTRONIC
DATA INTERCHANGE SERVICES

INPUT

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**Electronic Data Interchange Planning
Service (EDIPS)**

***International Electronic Data Interchange
Services***

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Abstract

The International EDI (IEDI) market ended 1986 virtually nonexistent, consisting largely of traffic borne on private networks and dial-up data calls. Third-party service providers have only just begun to address the market, which will grow at an average annual rate of 147% to become a \$219 million market by 1992.

A number of issues will inhibit users' abilities to optimize their IEDI usage: incompatible systems domestically and internationally, transborder data flow issues, and varying states of "EDI Readiness" in trading countries. However, these issues underscore the role of third-party service and software providers to bridge incompatibilities and address user needs.

This study describes the IEDI opportunity, discusses issues that will inhibit and drive IEDI, and analyzes EDI usage around the world. The international activities of 27 service providers, banks, and other vendors are also described.

The study contains 122 pages, 33 exhibits, and two appendices.



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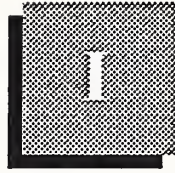
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Introduction





Introduction

A

Background

This report, produced by INPUT's Electronic Data Interchange Planning Service (EDIPS), examines International Electronic Data Interchange (IEDI) issues and opportunities for users and service providers. It focuses on U.S.-based IEDI – that is, EDI transactions exchanged between U.S. companies and overseas trading partners and agencies.

The reasons for using EDI include the time value of information, cost avoidance, better inventory control, and benefits realized through the integration of EDI data and corporate information processing. There are even more compelling reasons to use International EDI (due to complex trade document requirements):

- In addition to the principal trading partners in an international transaction are transportation carriers, freight forwarders, brokers, banks, insurers, customs agencies, other government agencies, and the like. This situation is illustrated by Exhibit I-1.
- The cost of managing and controlling the paperwork associated with these multiple interfaces inhibits profitability and slows the process of international trade.

B

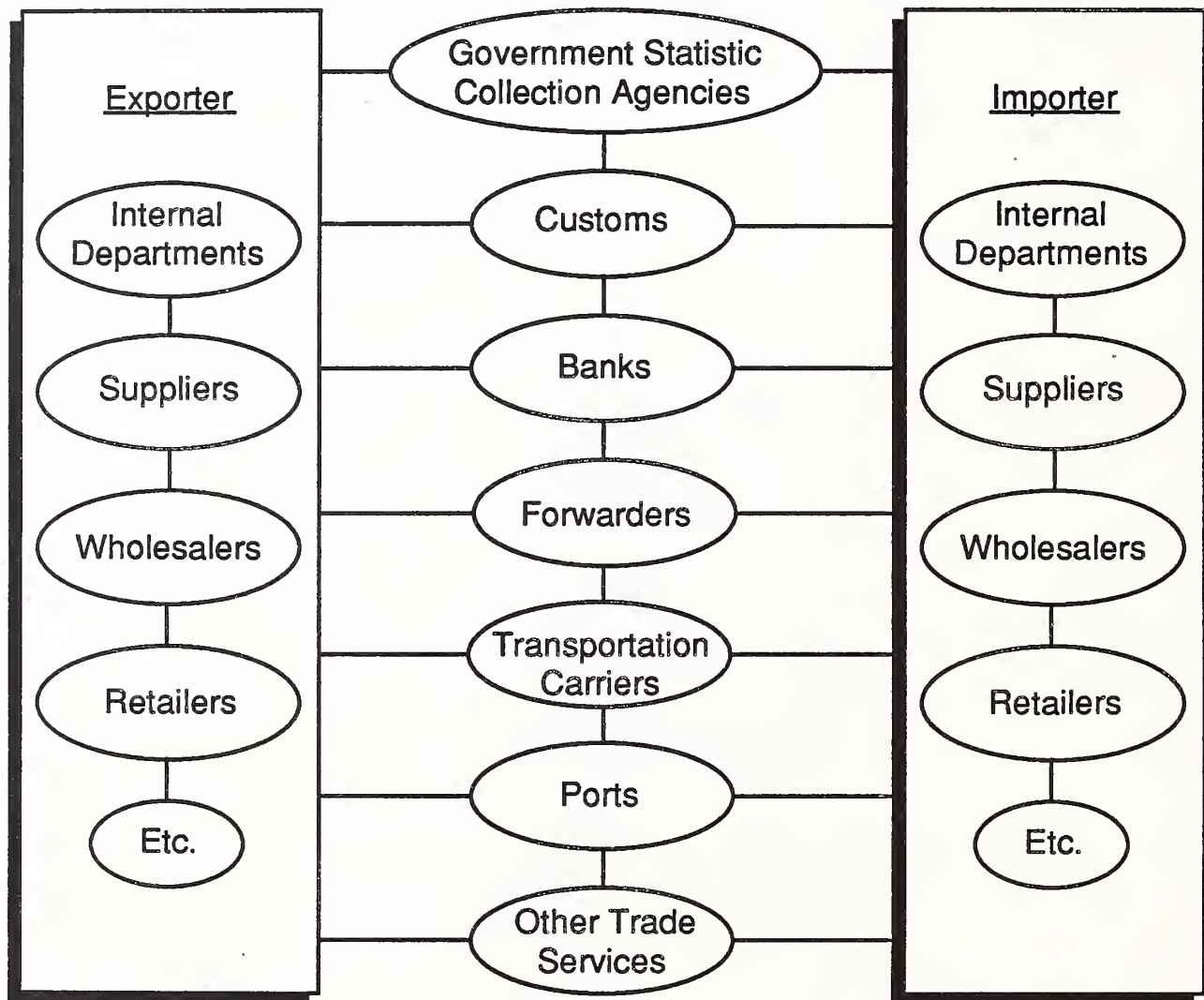
Scope

The study addresses the following topics:

- EDI and International Trade, with an overview of EDI, analysis of the need for IEDI, and a review of related EDI automation initiatives in international trade. (Chapter III).
- A review of in-country EDI in several regions of the world; an evaluation of “EDI-readiness” in terms of telecommunications, economic, and cultural environments; and an analysis of third-party service provider strategies in IEDI (Chapter IV).

EXHIBIT I-1

TRADE DATA/DOCUMENT FLOWS



- IEDI issues including standards, international regulatory constraints, and transborder data flow issues (Chapter V).
- The IEDI opportunity, examining relevant statistical indicators impacting IEDI development, and providing INPUT's IEDI forecast (Chapter VI).
- Recommendations and Conclusions (Chapter VII.)

Chapter II is an Executive Overview of the entire study. Appendix A contains profiles of current and potential third-party international EDI service providers. Definitions of terms used in this report are in Appendix B.

C

Methodology

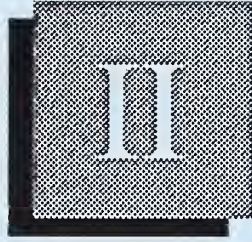
The research for this report consisted of:

- Corporate Interviews.
 - Structured, in-depth interviews were conducted with Information Systems (IS), telecommunications, and business management personnel in fifteen industries between February and March, 1987. Additional unstructured interviews were conducted throughout the year.
- Vendor Interviews.
 - Interviews were conducted with senior level management of VANs, RCS firms, software providers, and professional service firms.
- Industry Representatives.
 - Interviews were conducted with industry association representatives and academic observers of EDI and IEDI developments.
- Product and Service Analysis.
 - INPUT collected and analyzed information on EDI services, vendors planning EDI services, and reviewed secondary research sources.
- Custom Research Projects.
 - INPUT has been engaged in consulting projects bearing on International EDI. Although no proprietary information is revealed, the knowledge gained is represented in this report.
- Government, Agency, and Trade Association Studies/Seminars.
 - INPUT has analyzed reports and attended seminars having a bearing on international EDI.
- International Affiliations.
 - INPUT has wholly owned subsidiaries or affiliates in Europe, Japan, and Australia that provided information relevant to this study of IEDI.

D**Related INPUT
Reports**

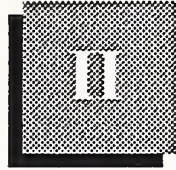
This study is one of a series from INPUT's EDI Planning Service. Other reports in the 1987 series are:

- U.S. EDI Service Markets 1987-1992
- EDI Service Provider Profiles
- Western European EDI Market Opportunities
- EDI Software Markets 1987-1992
- EDI Software Provider Profiles
- A Guide to EDI Implementations
- Prospects for Government Paperless Procurement



Executive Overview





Executive Overview

A

Electronic Data Interchange and International Trade

EDI is the interorganizational computer-to-computer (and preferably, application-to-application) transfer of data representing business documents in an agreed format or standard. It is an emerging, rapidly growing application that addresses a business fundamental: paperwork reduction in routine commerce.

Approximately 30 U.S. industries are now using, or piloting, EDI implementations.

Due to the growing importance and complexity of international trade, increased attention on global competition, added costs caused by delayed or error-ridden documentation, losses from document fraud, national policy considerations related to trade deficits, and government agency requirements for trade statistics, international EDI will grow from its current low usage.

- The costs of international documentation to U.S. shippers is estimated at \$8 billion annually, and \$40 billion annually worldwide, representing some 7 billion original trade documents plus copies each year (see Exhibit II-1).

These and other factors combine to create compelling reasons to use EDI internationally as a promising way of electronically improving trade documentation procedures to save costs, improve timeliness, and enhance global competitiveness.

EXHIBIT II-1

**ELECTRONIC DATA INTERCHANGE AND
INTERNATIONAL TRADE —
INTERNATIONAL TRADE DOCUMENTATION**

- \$6 - 8 Billion per Year (U.S.)
- \$40 Billion (Worldwide)
- 7 Billion Documents + Copies
- .5 Billion U.S. Customs Documents/Year

B**Complicated Trade
Interfaces**

In addition to the primary international trading partners are transportation carriers, freight forwarders, agents, customs agencies, banks, insurers, and governmental bodies. These multiple parties often reuse at least some of the data originally entered by another participant in a trading transaction.

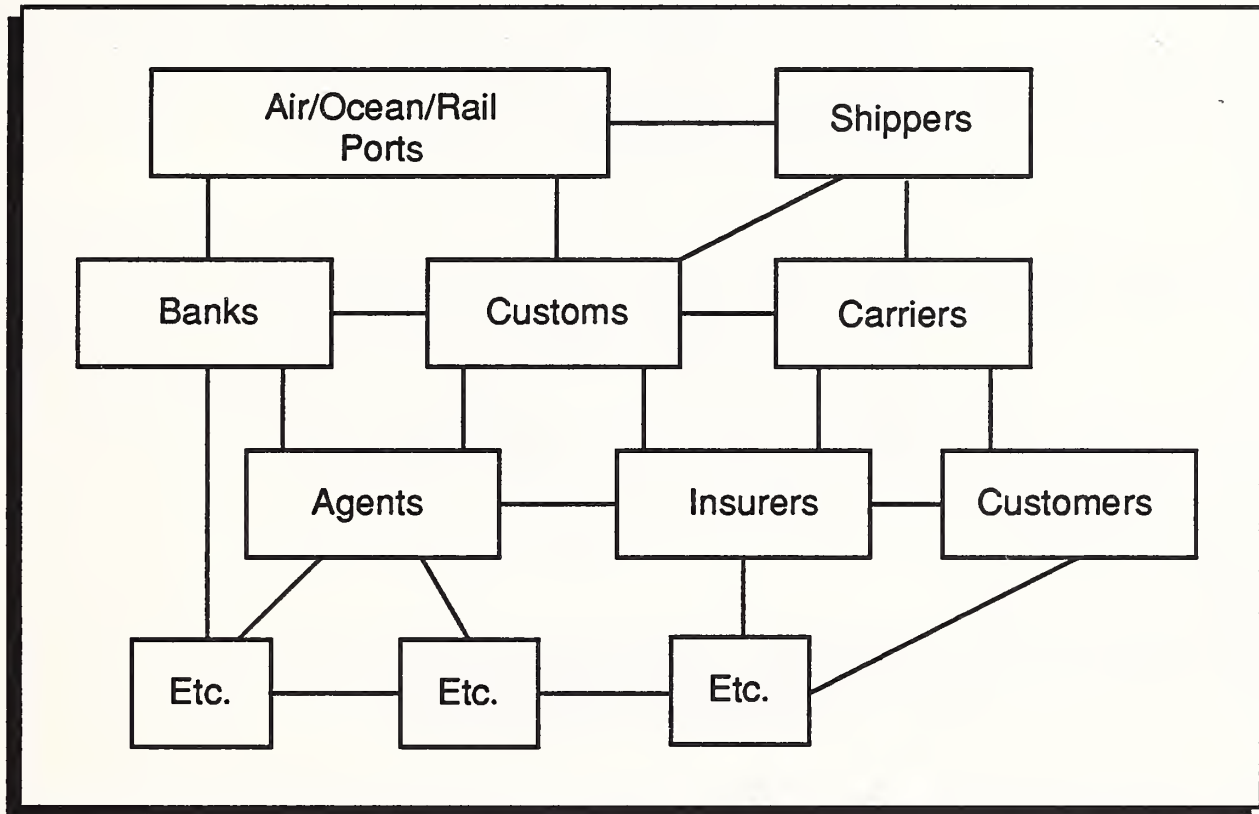
The components of International EDI (IEDI) are diversified (see Exhibit II-2). Transactions include purchasing and logistics information as well as information required by intermediaries. The implied complicated procedures and policies are ripe for operational improvements.

For users, however, these complexities currently tend to limit the benefits of systems designed to facilitate trade.

C**IEDI—Opportunities
and Difficulties**

The pieces of the IEDI puzzle are fitting together. The US business environment is in the first stages of what promises to be widescale EDI use. EDI use within certain regions (notably Canada, Western Europe, and Japan) is also growing. Third-party EDI service providers are target-

EXHIBIT II-2

COMPLICATED TRADE INTERFACES

ing multinational companies and international traders as clients who will benefit from IEDI services.

International data standards for EDI, and its application cousin Electronic Mail are being developed to address IEDI functionality. The latest version of the X.400 international E-mail standard contains features directly addressing EDI functions.

However, several international trade participants are developing information systems that are not compatible with EDI's dominant trends, impeding IEDI optimization by users.

For example, the US Customs Agency's Automated Commercial System, and the Commerce Department's Census Bureau data collection processes, both with international trade information needs, are not compatible

with each other, or with most EDI standards. Internationally, developing automated port systems are often incompatible, and EDI systems in use within various countries often use data standards and communications methods out of synch with others.

Also impeding IEDI optimization are Transborder Data Flow issues that inhibit the transfer of business data, and business/cultural issues such as a willingness to accept the changes EDI represents in the ways companies and individuals do business.

The existence of technological incompatibilities and difficult business issues underscores the need for third parties with software, processing, network, and professional service expertise to bring the pieces of the IEDI puzzle together in a seamless mosaic that assists users in successfully implementing and productively using IEDI techniques. These points are summarized in Exhibit II-3.

EXHIBIT II-3

IEDI: OPPORTUNITIES AND DIFFICULTIES

Opportunities

- U.S., Others "EDI Ready"
- Third-Party Providers Available
- Standards Evolving

Difficulties

- Transborder Data Flow Issues
- Business/Cultural Issues
- Incompatible Systems

Third Parties Can Bridge the Gap

D**IEDI Services: A
\$219-Million Market
by 1992**

IEDI processing/network services – supporting electronic document transactions representing a wide variety of international logistics and trade documents exchanged between trading partners – represented less than \$1 million in user expenditures in 1986.

The market, based on US user expenditures for IEDI processing/network services, will grow to \$219 Million by 1992, representing an Average Annual Growth Rate of 147% (Exhibit II-4).

High growth will be maintained as domestic EDI use increases and as its benefits are recognized by multinational and trading corporations, and as more off-shore businesses adopt EDI.

Fueling growth will be the emergence of the X.400 international E-mail standard as an enveloping structure for various EDI documents, the development of an international EDI syntax, and standard international electronic transactions.

Continuing the growth pattern in the outer years of the forecast period will be the inclusion of major trading nations (such as Japan) as they start adopting IEDI standards now under development.

Participating in the market are the continuing third-party service providers, government agencies internationally, banks that have formed Export Trading Companies, and a variety of services that support the international trading community.

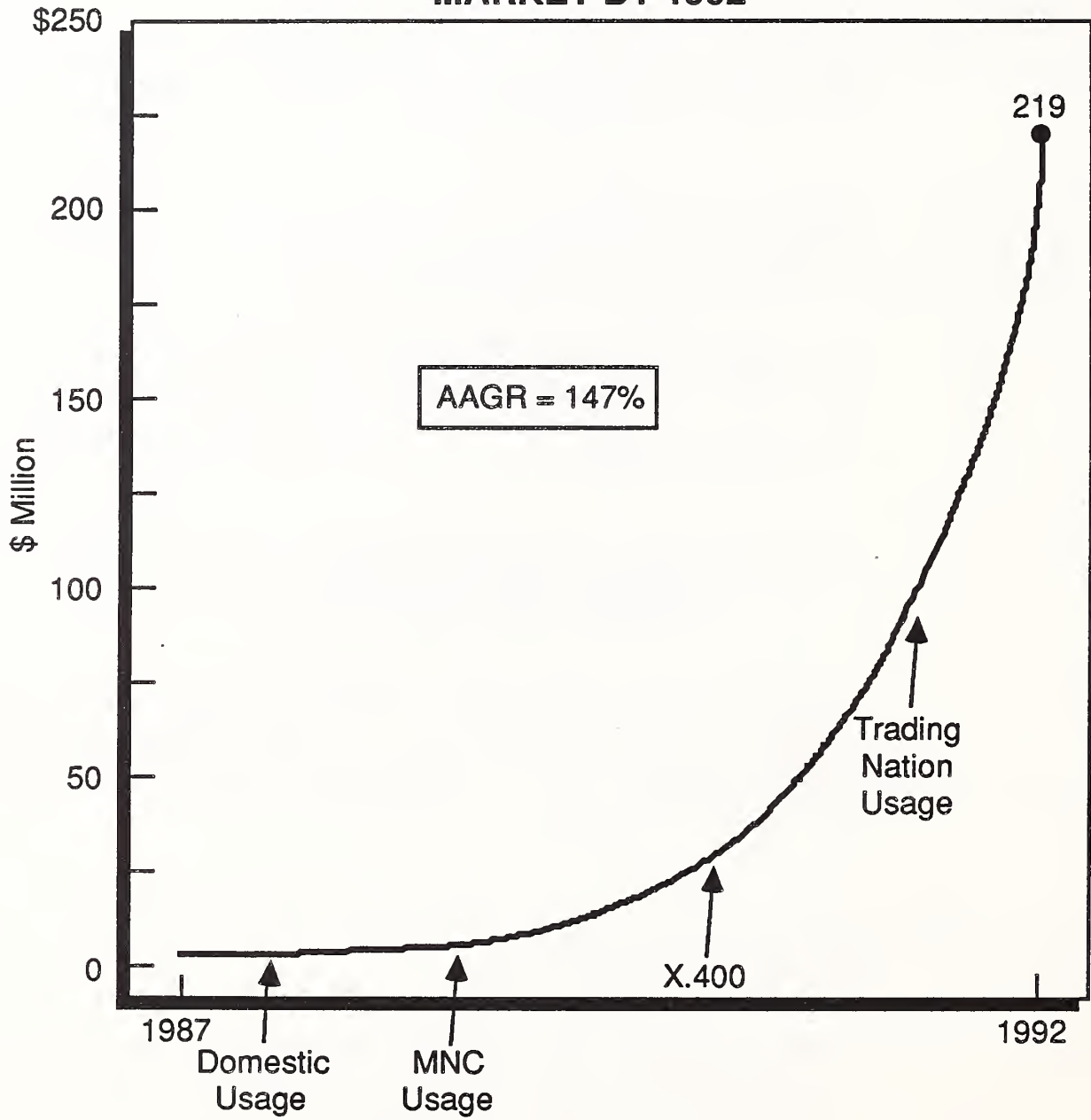
E**Third-Party Services'
IEDI Strategies**

Third-party service providers are taking a variety of approaches to the IEDI market (see Exhibit II-5).

- GE Information Services (GEIS) works through international subsidiaries and affiliates and has demonstrated an alliance strategy. Domestically, GEIS has vertical market software companies as EDI agents, and a relationship with money center banks for international financial transactions. In the United Kingdom, GEIS has formed a joint venture with another EDI service provider, and will likely enter additional partnering relationships to further develop its international capabilities.
- IBM has expanded the reach of its international data network by linking several regional facilities, and has entered relationships with overseas information services companies. Its domestic strategy is to first con-

EXHIBIT II-4

IEDI SERVICES*—A \$219 MILLION MARKET BY 1992



*Network/Processing Services

centrate on current IBM suppliers worldwide, with the plan being that once introduced to EDI, additional use will follow.

- McDonnell Douglas' plan is to licence its technology to European telecommunications administrations who would become partners for international processing and messaging due to compatible systems.

The common characteristic of these strategies is alliance formation, sharing risks and rewards, and expanding market presence and expertise through synergistic technology, networking, and marketing expertise.

EXHIBIT II-5

**THIRD-PARTY SERVICES' IEDI
STRATEGIES**

- Partnering, Agents
- Linking International Facilities
- Technology Licensing

F**Vendor and User
Recommendations**

Vendors with domestic EDI services should develop strategies for offering international capabilities for two reasons:

- Large multinational corporations will require international support.
- IEDI reflects a service provider's "full-service" position and approach in the marketplace.

Those entering or approaching the IEDI market would be well advised to enter appropriate partnering relationships to minimize risks in market development and to improve the value of their services.

Partnering options include banks, particularly those with trade services; accounting firms that are developing systems for multinational trading firms; software providers selling to international trading customers; and even large users who may now be handling applications better suited for EDI through private network implementations, and who may have valued expertise in international telecommunications.

Advanced services (such as EDI and E-mail integration, graphics transmissions in support of EDI transactions and data bases ancillary to international trade, and those created from IEDI traffic) can be premium priced and will enhance profitability.

Users of IEDI services should avoid "reinventing the wheel" by using available services and software to quickly gain benefits that may otherwise be delayed by protracted internal development. Rather, users can work with vendors to address unique needs, to attain competitive advantage by using EDI services to reduce costs, improve profitability, enhance customer service, quicken turnaround, and gain greater control.

These points are summarized in Exhibit II-6.

EXHIBIT II-6

VENDOR AND USER RECOMMENDATIONS

Vendors

- Offer IEDI for MNCS, and as "Full Service"
- Consider Partnering to Reduce Risks
- Evaluate Advanced Features/Services

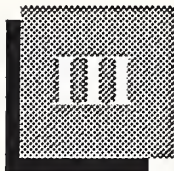
Users

- Don't "Reinvent the Wheel"
- Partner with Vendors for Unique Needs



EDI and International Trade





EDI and International Trade

A

EDI Defined

INPUT defines EDI as the electronic transfer of business information between the computers (and preferably the applications) of organizations in a structured application (Exhibit III-1).

EXHIBIT III-1

ELECTRONIC DATA INTERCHANGE

The Computer-to-Computer Exchange of
Intercompany Business Documents
and Information

- Overcomes Incompatibilities
- Standard Formats

- The information represents standard business documents such as invoices and purchase orders.
- EDI techniques are also used for other applications such as health insurance claims, but these are not central to this study.

Although EDI can be accomplished directly between trading partners, for market analysis purposes this report focuses on third-party IEDI and related international data communications services between the U.S. and overseas trading partners or trade service organizations. Only U.S. user expenditures are represented in the forecast.

- There is some examination of intracompany IEDI to indicate market direction; however, internal EDI falls outside the “business-to-business” definition of EDI.
- Intracompany and intercompany private-network EDI implementations often require professional services for development, software, and network services for data transmission, which are part of the available market. However, this study focuses on the network/processing services market segment.

EDI commonly involves the transmission of data in one of several standard formats, with ANSI X12 and Transportation Data Coordinating Council (TDCC) formats the principal domestic (U.S.) standards and EDIFACT the emerging international standard. There are also industry specific standards used in pharmaceuticals, grocery distribution, and other sectors.

- It may be necessary for data to be translated to a standard either prior to transmission, or by a third-party service acting as an intermediary in the transaction.
- It may also be necessary for the data to be translated again into formats recognized by a trading partner’s computer.
- EDI standards are discussed in Chapter V.

B

The Need for International EDI

1. User Needs Market Requirements

Although few companies interviewed by INPUT require international EDI, increasing numbers of U.S. corporations are becoming involved in international trade for the following reasons:

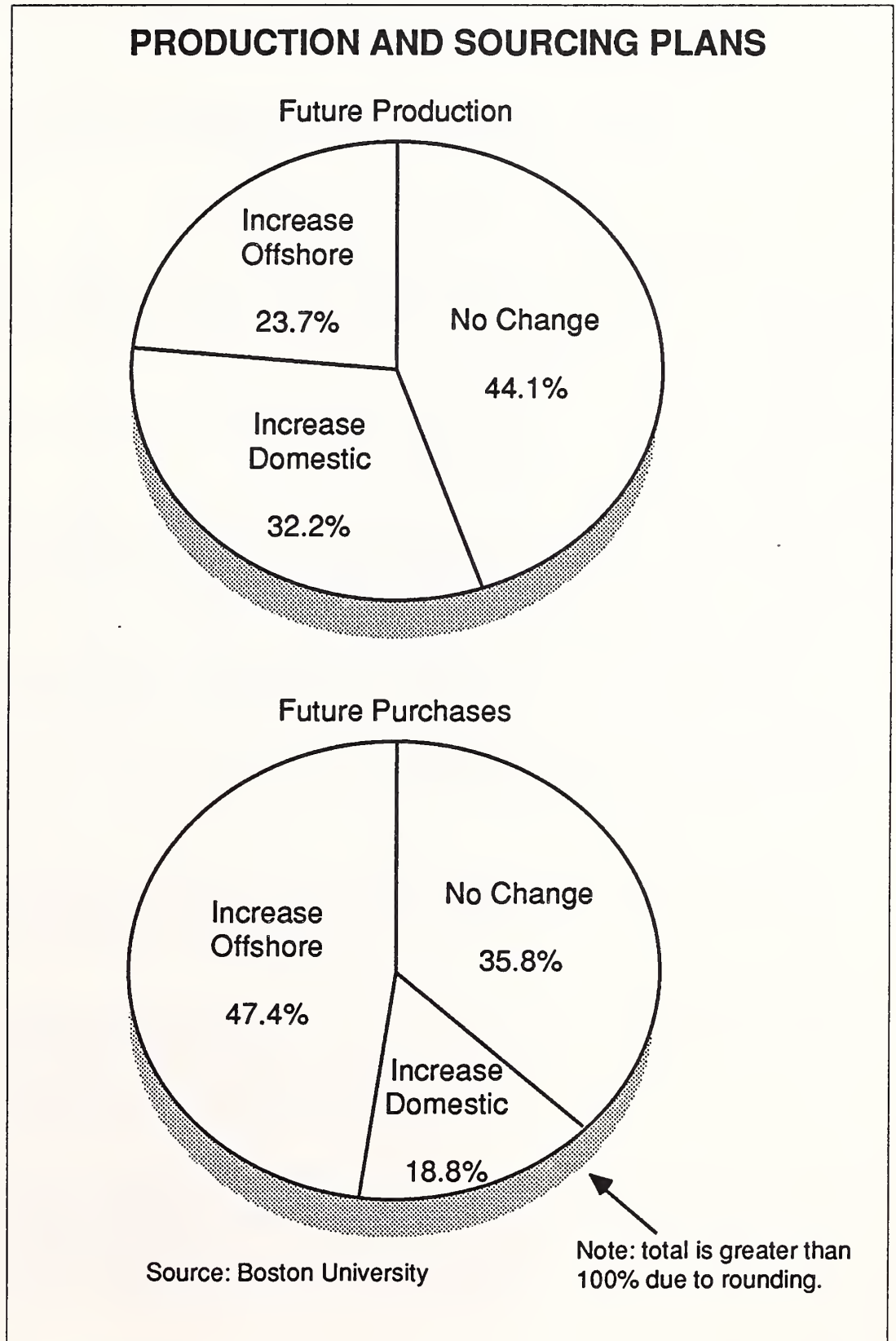
- To source materials from offshore suppliers due to the costs of domestic production.
- To fulfill local content requirements in countries where manufacturers sell products.
- To expand from domestic markets, and to extend product life.

With regard to sourcing, a 1987 Boston University School of Management study of 207 companies (mostly larger than \$200 million) found over 32% planned increases in domestic production, an increase from the 19% reporting such plans one year earlier, and a larger increase from the 12% reporting such plans in 1984.

However, over 47% of these companies plan to obtain more components from offshore sources, compared to 39% one year ago.

Exhibit III-2 shows these findings.

EXHIBIT III-2



The reasons for these changes are:

- The reduced numbers of domestic suppliers.
- Desire to take advantage of prior experiences in offshore sourcing.
- Need to control costs.

These are all reasons for increasing attention on international procurement, marketing, and distribution, all functions that benefit from IEDI.

2. Trade Documentation Costs

To compete in international markets, U.S. manufacturers must provide not only quality goods, but be price competitive. One way to reduce prices is to reduce costs. IEDI reduces international trade documentation expenses.

- International trade documents are more complex than those used domestically.
- Documentation errors can cause expensive delays in shipment. These errors and delays are compounded by the distances involved, language barriers, government regulations, and other factors.
- The costs of international documentation to U.S. shippers is estimated at \$8 billion annually, and an even larger amount (\$11 Billion) is estimated for trading within the European Community.
- Worldwide, trade documentation is estimated to cost \$40 billion annually.
- These expenses represent some 7 billion trade documents plus the required number of copies. Anecdotally, it is said that for any given shipload, another of paper needs to accompany it—an exaggeration that demonstrates the point.

Estimates vary, but for a single shipment of goods, as many as 28 different organizations may be involved with over 40 documents between them: bills of lading, letters of credit from banks to exporters, manifests, etc. The total cost in paperwork for each consignment is \$300-\$400.

Errors are also a factor. Approximately half of all issued letters of credit contain clerical errors. Errors in other trade documentation can delay a shipment, adding storage costs and impacting the downstream manufacturing, distribution, and sales chains.

According to the International Chamber of Commerce, document fraud in bills of lading, letters of credit, and other paper may be costing as much as \$100 million per year. Electronic documents are difficult to forge and offer various security controls such as password protection, call-back modems, and, if necessary, encryption.

These points are summarized in Exhibit III-3.

EXHIBIT III-3**TRADE DOCUMENTATION**

- Complex – 28 Organizations per Shipment
- Errors Cause Expensive Delays
- Worldwide Documentation:
 - 7 Billion Forms/Year
 - \$40 Billion/Year
- Document Fraud: \$100 Million/Year

As with domestic documents, international trade requires that each party to the transaction review and select information. Additional information may be added to the core information.

With electronic means, significant savings in time, expense, and effort can result from reusing the initially entered data, and from less reliance on multipart or photocopied documents.

Additionally, electronic distribution speeds document processing, an important factor in an age when a shipment may arrive prior to its paper-work.

3. National Policy Implications

The U.S. Trade Deficit is approximately \$300 Billion, a sum greater than the combined amount owed by all Latin American countries to U.S. banks. A Japanese economic research firm believes the U.S. will likely default when this deficit reaches \$600 Billion.

4. Government Regulations

Various applications, assurances, reports, certifications, and other paperwork are required in international trade. The cost of complying with government agency and trading partner requirements adds to the expense of international trade documentation.

For the reasons cited above, IEDI will undoubtedly become an important network/processing services application. Although its development is not without problems (as will be discussed), there are agencies working on procedural improvements in international trade, and there are a number of IEDI-related initiatives.

C

IEDI-Related Initiatives

1. Trade Facilitation Bodies

Many nations have trade facilitation bodies formed by major shippers and related service and government agencies.

Exhibit III-4 lists these bodies.

The U.S.-based National Committee on International Trade Documentation (NCITD) is a membership organization dedicated to simplifying international trade paperwork by 50%, in part through the use of electronic communications.

- CARDIS (Cargo Data Information System) was designed by the NCITD to meet the information needs of customs, carriers, brokers, draymen, forwarders, and other parties involved in international cargo handling within a shipping facility or port.
- CARDIS is supported by the U.S. Department of Transportation; however, it appears to be largely unimplemented, eclipsed by Customs' Automated Commercial System.

2. Automated Commercial System (ACS)

The U.S. Customs Agency is proud of its tradition that dates to the 18th century. However, its methods have not been keeping pace with faster transportation, increased statistical needs, and required reporting.

Despite high priorities in drug enforcement and import restrictions, the agency has participated in the development of the Automated Commercial System.

- The goal of ACS is to speed clearance of routine shipments, often before arrival.

EXHIBIT III-4a

TRADE FACILITATION ORGANIZATIONS

COUNTRY	ORGANIZATION	ADDRESS/PHONE/TELEX
Afghanistan	Trade Facilitation Committee	Ministry of Commerce, Kabul
Australia	Trade Facilitation Committee	Australian High Commission, Canberra House, Maltravers Street, London WC2R 3EH, United Kingdom tel (44.1) 4388000
Austria	Trade Facilitation Committee	Bundeswirtschaftskammer, Stubering 12, Vienna, Austria tel (43.2) 2265050 telex 111871
Bangladesh	BANPRO	Export Promotion Bureau, Chamber Building, 122-124 Motijheel Commercial Ard, Dacca-2
Belgium	SIPROCOM	Office Belgie du Commerce Exterieur, World Trade Centre, Boulevard E Jacquain 162, B-1000 Brussels tel (32.2) 2194550 telex 21502
Bulgaria	Trade Facilitation Committee	12 Sofiiska Komuna, Sofia tel (350.2)882011, telex 22024
Costa Rica	CENPRO	Edificio Murray 4to piso, Apartado Postal 5413, San Jose de Costa Rica
Czechoslovakia	FITPRO	Czechoslovak Chamber of Commerce and Industry, Argentinska 38, 17005 Prague tel (42.2) 8424111, telex 121862

EXHIBIT III-4b

TRADE FACILITATION ORGANIZATIONS

COUNTRY	ORGANIZATION	ADDRESS/PHONE/TELEX
Denmark	DANPRO	HC Andersens Boulevard 18, DK 1596 Copenhagen V tel (451) 152233, telex 22993
Dominican Republic	CEDOPEX	Centro Dominicano de Promoción de Exportaciones, Plaza de la Independencia, Santo Domingo
El Salvador	Trade Facilitation Committee	ISCE, Paseo General Escalón 4122, Apartado Postal (01) (19), San Salvador
Finland	FINPRO	Finnish Foreign Trade Association, Arkadigatan 4-6B, SF 00100 Helsinki 10
France	SIMPROFRANCE	61 rue de l'Arcade, 75008 Paris, France tel (33.1) 429 30 302, telex 640 795
Fed. Rep. Germany	DEUPRO	Bundesministerium für Wirtschaft, Postbox 140 260, 5300 Bonn1, West Germany tel (49.228) 6151, telex 886747
German Dem. Rep.	Trade Facilitation Committee	Unter den Linden 44-60, DDR-1080 Berlin
Guatemala	GUATEXPO	Centro Nacional de Promocion de las Exportaciones, Torre Professional, 6a Avenida 0-60 Zona 4, 5e nivel, Guatemala

EXHIBIT III-4c

TRADE FACILITATION ORGANIZATIONS

COUNTRY	ORGANIZATION	ADDRESS/PHONE/TELEX
Honduras	Trade Facilitation Committee	Ministero de Economía, Tegucigalpa
Hungary	Trade Facilitation Committee	Ministry of Foreign Trade, Honved Utca 13-15, H-1880 Budapest V tel (361) 530000, telex 225578
Hong Kong	Trade Facilitation Committee	Trade Industry and Customs Department Ocean Centre 726, Canton Road, Kowloon, Hong Kong telex 45126
India	INDPRO	Indian Institute of Foreign Trade, Ashok Bhawan, 93 Nehru Place, New Delhi 110019, India tel (91.11) 655124
Ireland	EIRPRO	Irish Export Board, P.O. Box 4 Dublin 4, Rep. of Ireland tel (353.1) 695011, telex 93678
Italy	ITALPRO	Ministero delle Finanze, Direzione Generale, Studi della Legislazione Comparata e le Relazioni Internazionali, Piazza Marconi 25, 00144 Rome-EUR
Japan	JASTPRO	7th Floor, Daiichi Daimon Building Shiba Daimun 2-10-1 Minato-ku, Tokyo, Japan telex 222916
Kenya	KENPRO	Kenya External Trade Authority, P.O. Box 43137, Nairobi

EXHIBIT III-4d

TRADE FACILITATION ORGANIZATIONS

COUNTRY	ORGANIZATION	ADDRESS/PHONE/TELEX
Republic of Korea	SITD	Administrative Improvement Commission Office of the Prime Minister, Room 503 Capitol Hall, Seoul, Republic of Korea tel (82.2) 7202081
The Netherlands	SITPRONETH	Nederlands Normalisatie-Instituut Postbus 5059 2600 GB Delft, The Netherlands tel (31.15) 611061, telex 38144
New Zealand	SIDAP	Customs Department, Head Office Investment House, Whitmore Street Wellington, New Zealand tel (64.4) 736009, telex 31213
Nigeria	NITPRO	Nigerian Export Promotion Council, PMB 12776, 103 Lewis Place, Lagos
Norway	NORPRO	Nordic Trade Procedures Committee, P.O. Box 2526 - Solli, N-Oslo 2, Norway tel (47.2) 314050, telex 78670
Panama	Trade Facilitation Committee	Directro General de Comercio Exterior Ministerio de Comercio e Industria Apartado Postal 9658, Panamá 4
Paraguay	CEPEX	Centro de Promoción de las Exportaciones, España 374 (CC 1772), Asunción

EXHIBIT III-4e

TRADE FACILITATION ORGANIZATIONS

COUNTRY	ORGANIZATION	ADDRESS/PHONE/TELEX
Philippines	PHILPRO	Philippine Export Council Buendia Avenue Extension Corner, Repose Street, Makati Metro Manila, Philippines
Poland	POLPRO	Polish Chamber of Commerce of Foreign Trade, Rue Trebacka 4 PL 002 81 Warsaw, Poland tel (48.22) 260221, telex 814361
Romania	Trade Facilitation Committee	Sous-comite pour la Normalisation des Documents du Commerce Extérieur Ministere du Commerce Extérieur, 14 Boulevard Republicii, Bucharest, Romania
Senegal	SENPRO	Centre Senegalais du Commerce Extérieur BP 8166, Dakar Yoff, Senegal telex 3286
South Africa	SITPROSA	Nedbank Central, P.O. Box 9039 Johannesburg 2000, South Africa tel (27.11) 3394041, telex 424111
Sweden	SWEPRO	P.O. Box 450, S-40127 Gothenburg, Sweden tel (46.31) 637277, telex 424111
Switzerland	SWISSPRO	61 Avenue de Cour, CH-1007, Lausanne

EXHIBIT III-4f

TRADE FACILITATION ORGANIZATIONS

COUNTRY	ORGANIZATION	ADDRESS/PHONE/TELEX
Turkey	Trade Facilitation Committee	Anlasmelar Genel Mudurlugu Ministry of Commerce, Milli Muhabir Unite, Ticaret Bankanligi, Ankara, Turkey telex 42204
United Kingdom	SITPRO	Almack House, 26/28 King Street London SW1Y 6QW, United Kingdom tel (44.1) 9300532, telex 919130
United States	NCITD	National Committee of International Trade Documentation, Suite 1200 350 Broadway New York City, NY 10013, USA tel (212) 925 1400
USSR	Trade Facilitation Committee	Management and Information Systems Department, Smolenskaya SQ 32, Moscow G-200
Zambia	Trade Facilitation Committee	Chamber of Commerce and Industry Lusaka

There are two ACS modules:

- The Automated Broker Interface (ABI) allows brokers to electronically file necessary documentation.
- The Automated Manifest System (AMS) supports the traditional listing (by destination) of all cargo transported by a carrier and of other information needed by customs and port officials.

3. Harmonized System (HS)

Another IEDI-related development being implemented on January 1, 1988 is the Harmonized System or Harmonized Code.

- HS is an internationally developed nomenclature to describe imported goods, and to standardize how they are treated by customs.
- There are some problems inherent in HS, such as inconsistencies in classifications.
- Also, the U.S. has yet to ratify the agreement under which HS is going into effect. There are hopes the agreement will be approved on a "fast track" through Congress and will proceed to the President.

Regardless of adoption, having a uniform, worldwide system to identify goods will assist IEDI implementations.

4. Increasing Role of Banks in International Trade

Prior to passage of the Export Trading Company (ETC) Act of 1982, federally regulated banks were prohibited from commercial activities.

- ETCs provide a variety of services related to international trade such as locating overseas distributors and buyers, credit checking, shipment consolidation, and handling freight forwarding and international trade documentation.
- The ETC Act seeks to increase U.S. exports by encouraging more efficient export trade services, improving trade finance, and removing antitrust concerns from export activities.
- Under the act, banks are able to invest in ETCs. Approximately 50 investments have been approved, mostly in wholly owned subsidiaries of bank holding companies, with money center banks accounting for the majority of the total investment. Most ETCs are located on the East and West coasts.

Banks provide a variety of services as part of their international trade activities, with letters of credit, a basic tool of international trade, an example. Banks find it attractive to offer fee-based services to their customers, not only for the income, but because these services can lead to other business.

Several banks are now offering EDI-compatible electronic letters of credit, which are transmitted into the "back-office" processors of international correspondent banks. Software supporting these services is provided by Integrated Cash Management Services (New York), American

Management Systems (Arlington, VA), Micro Bank Automation (Atlanta), Kapiti (London), and others.

The activities of several banks in IEDI services are described in greater detail in Appendix A.

5. Computerized Ports

To handle their functions ports worldwide are automating, often engaging professional services firms in systems integration and often requiring follow-on facilities management contracts. Such systems incorporate automated cargo clearance systems. For example:

- The Miami International Cargo System (MICS) is described as the first fully integrated cargo clearance system in the U.S. Similar systems are being implemented in England, France, and Australia by Computer Sciences Corporation and the U.K.-based National Data Processing Service, creating a *de-facto* standardized automated cargo clearance system.
- The Port of Baltimore has implemented the ACROSS service, which links to the Customs Automated Manifest System, and supports the Automated Broker Interface. Other functions are local cargo tracking, document generation, ship scheduling, statistical reporting, and electronic messaging. ACROSS is operated by Network Solutions (Vienna, VA) under subcontract with Arthur Andersen.
- The Port of New Orleans offers a series of computer services called Crescent (for Computer Reporting and Expediting of Shipments to Control Essential New Orleans Trade). Crescent provides interactive manifest preparations, customs form creation, freight quotes, container tracking, statistics, and a services directory/data base. The system was developed by the Cyber Data Systems Division of McDonnell Douglas.
- In Europe, the Port of Antwerp is implementing Systems Electronic and Adapted Data Interchange (SEAGHA) for the port community, with approximately 385 potential users. The project is being managed by a co-operative and will use international EDI standards.
- Several ports in the U.K are implementing a computerized customs clearance system called Customs Handling of Important and Export Freight (CHIEF).
- Marseilles is developing Procedures for the Handling of Information (PROTIS), and Rotterdam is developing the International Telecommunications and Information System (INTIS), designed to be a total harbor information system, linking the port with shippers, carriers, customs, and several other ports using X.400 and international EDI standards.

- These initiatives, which are representative of such activities worldwide, are summarized in Exhibit III-5.

EXHIBIT III-5

REPRESENTATIVE COMPUTERIZED PORTS	
PORT SYSTEM	COMMENTS
Miami: International Cargo System (MICS)	Developed by CSC/NDPS. Similar Projects: England, France, Australia
Baltimore: ACROSS	Operated by Network Solutions/Arthur Andersen
New Orleans: CRESCENT	Developed by Cyber Data (MDC)
Antwerp: Seagha	Cooperative Development

6. Adoption of EDI by International Transportation Carriers

Major international transportation companies are implementing EDI to provide customers with shipping information through other means than paper correspondence and telephone customer service. For example:

- Sea-Land (Port Elizabeth, NJ) offers Sea-Trac software for IBM-PCs and compatibles. This software allows users access to Sea-Land's computers for booking, scheduling inquiry, tracing, and bill of lading reporting.
- American President Companies (APC, Oakland, CA) has been using its information services and telecommunications capabilities to add value to its basic transportation services. The company's analytical tools allow customers to manage logistical needs.
- APC is implementing EDI arrangements with its major customers, including a Japanese automaker (using APC's Pacific Region Network). EDI allows the manufacturer to manage "just-in-time" auto assembly at U.S. plants.
- APC is also implementing interfaces to Customs' ACS at most of the major ports it serves.

7. Inconsistencies in Approach

Although there are a number of parallel developments in international trade that should lead to increasing use of IEDI, inconsistencies in approach remain.

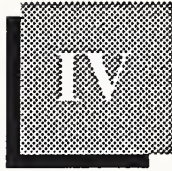
- For example, the U.S. Customs Agency's ACS is using proprietary formats that are incompatible with X12 formats, and with the U.S. Census Bureau's electronic collection of Shipper's Export Declaration data for statistical reporting. Some TDCC transaction sets in the OCEAN series can be used with ACS.
- These and other issues will be discussed in Chapter V.

The next chapter provides a brief survey of EDI initiatives in several regions of the world, with a view toward identifying "EDI-ready" areas offering development opportunities for vendors and users.



EDI around the World





EDI around the World

In general, most EDI activity is currently in North America and Europe, with growing use in Japan. Activity in other regions is limited. There are several reasons for these limitations:

- The U.S., Europe, and Japan are among the most technologically advanced nations; Europe is two-to-five years behind the U.S.
- Companies in the U.S. and Europe have had commercial reasons and the resources to implement EDI in response to world competition.
- EDI standards development is generally responding to the North American/European sphere of influence.
- The infrastructures for data processing and telecommunications are more developed in these areas than in many regions of the world.

However, there are glimmerings of EDI and EDI-related activities in other regions.

This chapter reports on EDI activities in North America, Europe, and Asia; the chapter examines the data processing, telecommunications, and relevant regulatory environments of these regions. Because of Japan's economic importance, extensive information is given about this country. The chapter is a starting point for evaluating EDI traffic patterns and opportunities for IEDI development and use.

The chapter concludes with an analysis of three U.S. EDI service providers' strategies in IEDI. Appendix A contains profiles of these and other providers, as well as several potential providers. Specific attention is paid to international operations and capabilities.

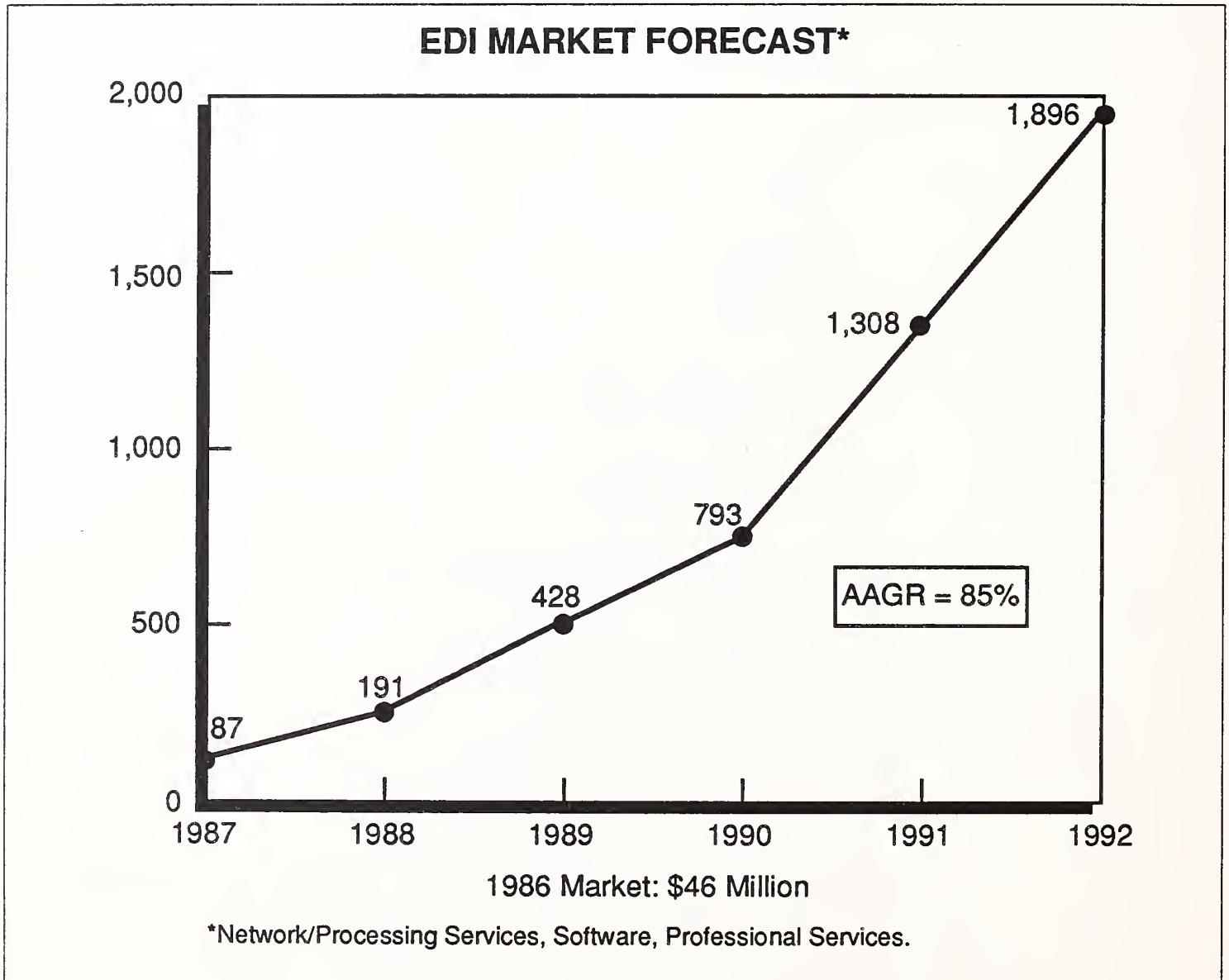
A

North American EDI Activities

1. The United States

The total 1986 U.S. market for EDI network, processing, and professional services plus software was \$46 Million. As shown in Exhibit IV-1, this market is expected to grow at an average annual rate of 85% to become a \$1.9 billion market by 1992.

EXHIBIT IV-1



This market includes trade EDI (i.e., purchasing related), logistics data interchange (e.g., shipper assistance messaging), electronic healthcare, property and casualty insurance applications, and other implementations of EDI.

It should be noted that computer equipment dedicated to EDI is not currently included in the forecast.

Approximately 30 industries are now involved in EDI, with some large companies using private networks. The major third-party service providers (GEIS, McDonnell Douglas, and Sterling Software) are being joined by other information services firms, and several alliances have formed.

The U.S. EDI Market is described in the INPUT report *U.S. EDI Services 1987-1992*.

2. Canada

Canadian imports grew approximately 5% in 1986, and U.S. exports to Canada in the 1981-1985 period have grown over 25%, while imports from Canada in the same period have grown over 60%. Canada is the U.S.'s largest single trading partner. The Canadian EDI network/processing services market is currently \$1 million per year.

The EDI Council of Canada was formed in December, 1984. Its members evaluated various EDI options, and learned from U.S. EDI experiences. The Council's policy requires participants to use third-party services, rather than implement private EDI systems.

The X.400 electronic mail standard is used to connect EDI mailboxes and to support various communications speeds and protocols. This approach is leading to faster development of Canadian EDI than otherwise would have been possible.

The major third-party networks and services providing EDI services in Canada are affiliates of U.S. vendors (GEIS, IBM, Sterling Software), U.S.-based Kleinschmidt, and two fully Canadian firms: CrownTek and Telecom Canada.

- Crowntek Communications, which operates the Canadian National Communications Network (CNCN), entered the EDI market in May, 1986. Its activities are limited to Canada.
- Trade Route EDI services have been provided for three years through iNet 2000 network services from Telecom Canada.

Like Crowntek, Trade Route is also a domestic service, although Telecom Canada maintains an X.400-based gateway to Telenet in the U.S. This gateway can support cross-border transmissions.

In late 1987, Ameritech Services, Telecom Canada, and Telenet initiated a joint venture establishing iNet America, which will offer EDI and other services in the U.S., and which will eventually link with the Canadian service.

The Canadian telecommunications industry is a mix of public and private companies with a complicated array of regulations, standards, and tariffs.

- Telecom Canada represents an alliance of virtually all Canadian telephone companies, some formed by provincial governments and others being private companies providing regulated monopoly services.
- Bell Canada, the largest private company, is being reorganized to become a more aggressive participant in information services, both domestically and internationally.
- Unlike the U.S., there are few Canadian computer service firms providing international services using their own proprietary software.

The recently signed U.S.-Canada free-trade agreement will remove national barriers against value-added data services, allowing both U.S. and Canadian information services to participate, and form partnerships, in each other's countries. Since the agreement will facilitate trade between the two countries, IEDI will become more important.

B

Europe EDI Activities 1. Overview

The U.K. is the most mature European market in terms of third-party services. INPUT estimates there are approximately 1,000 users of European EDI services, with 70% of users in the U.K.

Projects are using the first implementations of the international EDIFACT standard, which will be harmonized with the ANSI X12 standards.

The Commission of European Communities (ECC) is sponsoring several EDI projects, including COST 306 for the transportation sector and the CD project in the customs area.

Work toward a Single Administrative Document (SAD) to simplify Pan-European trade is progressing.

Additionally, there are several closed user group services offering the benefits of security as well as circumventing difficulties in PTT interrelationships. Examples are the Swiss-based L'Association des Service Transport Informatique (ASTI), with services to 150 companies in freight forwarding; and WEX, which links over 100 wine buyers and sellers in Western Europe and North America.

According to INPUT, Ltd., the 1986 EDI market in Western Europe (the U.K., France, West Germany, and Italy) was \$3 million and is expected in those countries to have an average annual growth rate of 125% to

become a \$170 million market by 1991, with the U.K. representing \$71 Million of the 1991 market.

Exhibit IV-2 compares EDI service market forecasts by country.

EXHIBIT IV-2

COMPARISON OF EDI SERVICE MARKETS BY COUNTRY, 1986-1991

MARKET SUBSECTOR		\$ MILLIONS						AAGR 1986- 1991 (Percent)
		1986	1987	1988	1989	1990	1991	
United Kingdom	L	1.8	3.6	9.0	18.0	35.0	57	100
	M	2.3	4.5	11.0	22.0	43.0	71	
	H	2.8	5.5	15.0	29.0	58.0	93	
France	L	0.3	0.6	1.4	3.5	8.0	25	150
	M	0.4	0.8	2.1	6.0	14.0	42	
	H	0.6	1.1	2.8	8.0	20.0	59	
West Germany	L	0.1	0.2	0.5	1.5	6.0	25	200
	M	0.15	0.3	0.7	2.5	10.0	35	
	H	0.2	0.4	1.0	4.0	15.0	45	
Italy	L	-	0.1	0.3	0.9	3.5	12	230 *
	M	-	0.15	0.4	1.2	5.0	18	
	H	-	0.2	0.5	1.5	6.0	24	
Total	L	2.2	4.5	11.2	24.0	52.5	119	125
	M	2.85	5.75	14.2	31.7	72.0	166	
	H	3.6	7.2	19.3	42.5	99	221	

*AAGR: 1987-1991.

L = Low, M = Midpoint, H = High Estimate.

Obviously, EDI in Western Europe is in the early development stage; however, it is one of the key VAN and software opportunities there.

- EDI's strategic importance is reflected in very high levels of interest and a commitment to its development shown by government bodies and commercial associations representing a broad industry cross section.
- For example, the U.K. Department of Trade and Industry is sponsoring the Vanguard Program to promote EDI and other Value-Added Data Services.
- The European Common Market is sponsoring the TEDIS (Trade Electronic Data Interchange Systems) program to promote a standardized approach to EDI by all potential industry and government users, and to examine legal, technical, and implementation issues.

Based on the level of interest and activity throughout Europe (and not just in the four countries examined), the forecast may be conservative.

2. The United Kingdom

The process of telecommunications liberalization in the U.K. is now almost total.

The U.K. is especially important in IEDI development, serving as a principal hub and gateway for data between Western Europe and the U.S.

Several companies provide EDI within the U.K., including affiliates of U.S. information services firms.

International Network Services Ltd. (INS - a joint venture of GEIS and ICL), was formed in 1987. It is initially targeting businesses within the U.K. INS offers several EDI services:

- Tradanet (commercial), endorsed by the Article Numbering Association (ANA - the UK's version of the U.S. Uniform Communications Council, which established barcoding), uses the ANA's Tradacoms standard.
- Motornet (automotive manufacturers, suppliers, customs, agencies, and shippers), created by GEIS in conjunction with the Society of Motor Manufacturers and Traders (SMMT), and the Organization for Data Exchange by Teletransmission in Europe (ODETTE).
- Brokernet (insurance).

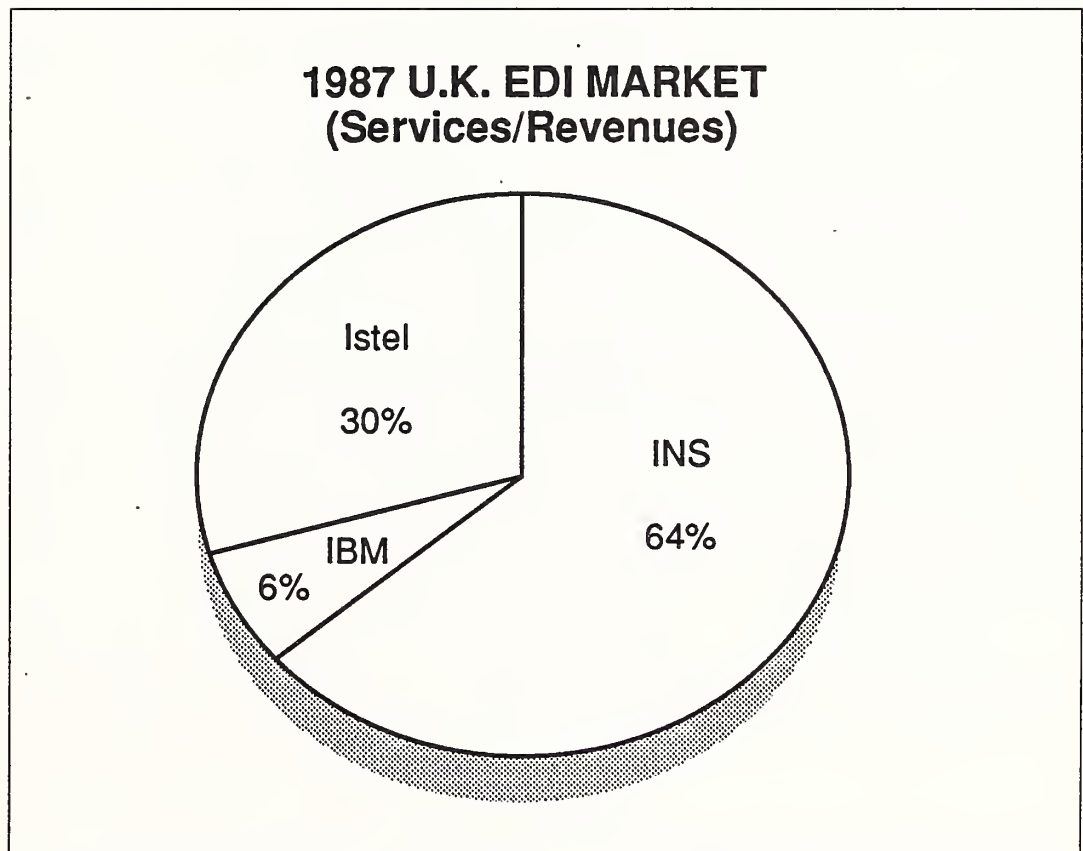
There are plans to expand INS internationally through GEIS' U.S.-based EDI*Express and Trade*Express services.

The other major European EDI service providers are IBM, with Shipnet and the Information Exchange; and Istel, one of the largest European systems houses and the provider of EDICT, a general-purpose EDI service that supports various standards. Both EDICT and INS' Motornet have been endorsed by the Automobile Manufacturers' Association.

A joint EDI venture between British Telecom and McDonnell Douglas was abandoned in 1987 after failing to sign clients after 18 months of operations.

As Exhibit IV-3 shows, INS holds an estimated 64% (by revenues) of the 1987 U.K. services market, Istel has 30%, and IBM 6%.

EXHIBIT IV-3



The U.K. EDI market has been fostered by telecommunications liberalization, and the rapid development of EDI standards for a broad cross-section of industries.

There are several community-of-interest trade initiatives in the U.K. For example, Data Interchange for Shipping (DISH) was launched in late 1985 by several carriers and exporters, using ICL's Tradanet. DISH has been limited largely to domestic traffic due to legal and security problems.

Another trade initiative is Shipnet, developed by IBM's Business Network Service, which links freight forwarders, carriers, exporters, insurers, and banks. Representing a trade community larger than DISH, Shipnet also links to a shipping industry data base called Transportel.

In late 1987, Transportel, provided by Lloyd's of London Press in partnership with European freight publishers, joined with Marine Cargo Processing to offer international trade document EDI services starting with the new year. The service, operating over IBM's network, will be available initially in the U.K. and Europe and eventually worldwide.

3. France

Despite the presence of an automated customs system for transborder trade, France is one of the less mature European markets for EDI, due to several factors:

- Lack of awareness of EDI's benefits.
- Lack of standards agreement.
- The lack of a government-sponsored initiative to promote EDI development.
- Bureaucratic requirements that inhibit the development of EDI services. For example, hard copies must accompany electronic versions of documents.

The French PTT had called for delays in large-vendor VAN operations (such as IBM's) to allow smaller companies to establish a market presence. Entrepreneurs are now able to lease lines for new services.

Also opposed to deregulation are postal and telecommunications trade unions fearing job losses.

Nevertheless, some movement has occurred toward VAN liberalization, but there are continuing impediments.

- Direction General des Telecommunications (DGT), the French telecommunications administration, had proposed a usage-based private line tariff prior to opening the VAN market. This tariff was intended to prevent cream-skimming by third parties of basic services now provided by the PTT.
- However, in late 1987 new rules maintained fixed rates on lines leased from the PTT. The rules do restrict charges: they must be limited to no more than 15% for basic carrier services, with the balance from value-added services.

- Groupe Bull and other French companies have opposed allowing IBM to enter the VAN business, saying the company's dominance in computer services and equipment would be strengthened. One measure of this resistance is the new requirement that data service providers conform to the Open Systems Interconnect (OSI) standard, rather than IBM's SNA. IBM has expressed support of OSI and has introduced OSI products in European markets.

Movement toward broader deregulation of France's telecommunications services will not occur at least until after the presidential elections in spring, 1988. A proposal being considered calls for the formation between 1990 and 1992 of a public telecommunications company from the PTT. The new company would provide all basic (i.e. not "value-added") services.

4. West Germany

West Germany has a highly export-oriented manufacturing economy. However, the country's ability to participate in transborder electronic trading is inhibited by its bureaucracy.

Nevertheless, EDI within West Germany is becoming a generic method of business communications implemented via leased lines, the public network, and the DATEX-P data network. Border crossing and customs procedures are automated in several areas, as are various ports.

West Germany is the most highly regulated major Western European market, with the Deutsche Bundespost maintaining its telecommunications monopoly.

- There is considerable pressure for liberalization, with court challenges planned because many practices protecting existing PTT services are prohibited under ECC laws.
- A two-year study has recommended the formation of a new body, Telekom, which would maintain a monopoly on basic services and allow competition in VAN and other services.

5. Benelux

Despite highly regulated telecommunications, EDI is being used in these nations.

- Several retail distributors are using a network established by GEIS.
- Rotterdam harbor is being automated by a joint venture of the PTT, the Ministry of Economic Affairs, and several private shippers.

- Links between a customs import computerized system called Sagitta and the INTIS ports system are being developed.
- The Antwerp Port Authority is being computerized to handle international trade documentation.

The market for IEDI services in Belgium is influenced by its position as an European economic center, and as the headquarters for various government bodies, multinational corporations, and financial institutions, including SWIFT, the international electronic funds transfer network.

6. Scandinavia

The Scandinavian countries are believed to be excellent markets for EDI implementations due to high labor costs and dependence on international trade.

In Finland, EDI is being used in the forest products industry; approximately 15 companies actively trade electronically with nearly 100 international partners.

Swedish distributors use EDI under the Dakom standards developed in 1976. Currently, some 50 wholesalers and 72 suppliers are involved, with the larger companies using direct links and smaller firms using public or commercial data networks.

Transport Data Link Corp. (TDL - Gothenburg, Sweden) offers EDI services to approximately 15 companies in Scandinavia, England, and Belgium. Industries represented are transportation services, auto manufacturers, financial services, and insurance companies.

A Swedish customs clearance and control system called TRK is being developed.

The Danish PTT KTAS and IBM/Denmark have formed the DanNet joint venture for EDI applications.

Five Scandinavian PTTs have formed Scandinavian Telecommunications Services AB (called Scantel) to offer a variety of telecommunications and value-added services to Scandinavia-based multinational corporations. Scantel will compete with other European international carriers.

- Initially, links between Scandinavia and world trading centers will be opened, first to the Eastern U.S., Canada, Australia, Singapore, and Hong Kong.

- Additional services will be added at a later date, including X.400 E-mail products. Customer demand will dictate the timetable for introduction of advanced services.

7. Eastern Europe

The Communist-block countries are represented by Poland's Foreign Trade Data Center in UNECE Working Party 4 for the Facilitation of International Trade Procedures, the agency working on international EDI standards.

Although there is no evidence of EDI usage, the region is believed able to participate rapidly once the decision is made by governmental central planners.

8. European EDI Software Providers

Software supporting EDI is available from some of the third-party services, and also from the U.K. trade facilitation organization Simplification of International Procedures Board (SITPRO) with Interbridge and SPEX packages; Systems Designers PLC; Gellschaft für Logistik und Information Systeme MBH (GLI - West Germany) with Intertex TDI; and large user organizations such as Phillips and Volkswagen.

9. European EDI Conclusions

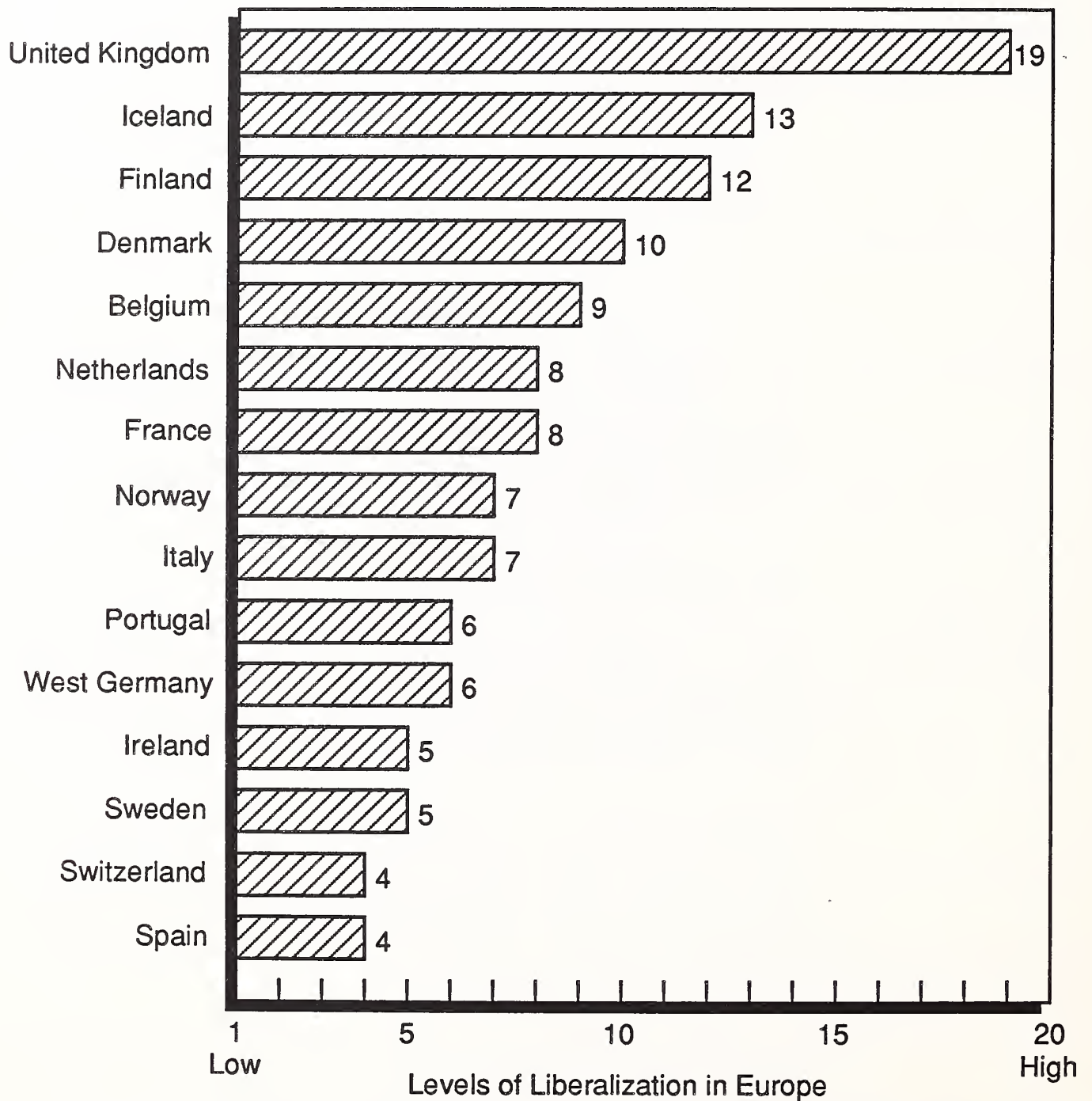
Exhibit IV-4 provides a measure of the level of liberalized PTT regulations in Western European countries. Liberalization will emerge as a consequence of user pressure, but the development is not without opponents who argue that liberalization has led to the waste of scarce resources through price competition in a free market.

As the telecommunications environment becomes more liberalized, and new competitive services emerge, new partnering options are being opened. Further, multinational corporate users and newly computerized ports may serve as alternative partners to traditional network and information service providers for late market entrants seeking to open EDI channels, and for direct user access.

From a telecommunications and data processing perspective, the extended European community is very fragmented and subjected to various transborder data flow regulations, as well as incompatible standards. Thus third-party services throughout Europe are a difficult undertaking.

The European Economic Community has announced plans to create a single market for telecommunications by 1992, allowing for a standardized service menu for companies with offices and subsidiaries throughout

EXHIBIT IV-4

**TELECOMMUNICATIONS LIBERALIZATION -
THE EUROPEAN SCENE**

Europe. Standards, called Normes Européennes de Telecommunications, or NETS, would be created through a new European Telecommunications Standards Institute similar to Bell Communications Research in the U.S. However, some observers are pessimistic about this proposal.

Accordingly, international partnering is believed necessary. The most likely partners, the PTTs, are being courted by virtually every network service provider and hence are in a nearly immobilizing quandary regarding the best directions to take. Also, since IEDI will take place between European countries as well as other international markets, the deliberations are further complicated.

EDI Opportunities in Western Europe is the subject of a 1986 INPUT report, and the subject will also be covered in a 1988 study, *Value-Added Data Services in Western Europe*.

C

Pacific Basin and the Far East

1. Japan

a. Background

Japan is the second largest market for U.S. goods and the second-largest free-world economy. Further, it is the hub of the developing Pacific Rim and the major competitor of U.S. firms for other markets in the region.

The U.S. is Japan's largest trading partner, taking 35% of Japan exports and supplying nearly 20% of its imports. Japanese companies are being pressured to expand their imports due to an increasing U.S. trade deficit.

b. EDI in Japan

Due to the deregulation of the telecommunications environment, as described below, many VAN services are appearing, including several with major U.S. VAN participation.

EDI services are now being provided by individual transportation companies, a hospital and medical supply cooperative, and in several industries such as textiles, food, auto, and steel. However, the term *EDI* has yet to be adopted.

Nippon Telegraph and Telephone (NTT) offers two EDI-like services, DRESS and ANSER.

DRESS (for Dendenkosha Realtime Sales Management System) operates over NTT's public data network. In addition to service reservations and various inquiry applications, DRESS supports the centralized processing of orders, shipping notices, invoicing, and payments between manufacturers, wholesalers, and retailers.

Among DRESS users are:

- Yamaha Motor Company, which links its Y-Needs domestic sales network to the NTT service for domestic parts supply operations.
- In agricultural produce distribution, retailers, wholesalers, and credit companies unify orders, shipping, and billing applications.
- A Shipping Cargo Information Network System called SHIPNETS uses the network to handle export documentation and communications between shipping companies, freight inspectors, and other agents.
- Kokuyo, a stationery and office equipment manufacturer, uses DRESS for part of its Kokuyo Retailer Order Entry System (KROS), with which agents and retailers can make inventory inquiries and give shipment instructions.
- The Tohan TONETS book network supports bookstore management with an on-line book ordering and delivery system.
- Kao Corporation (formerly Kao Soap) uses DRESS for a system that links with retailers and distributors. Additionally, the system collects sales statistics and links to data bases carrying information about rival companies such as Procter and Gamble.

The other NTT service, ANSER, supports automatic notification of inquiries in either voice response or text and is used by distributors for purchase order processing in "shopless" or "no-store" sales networks.

Additionally, INPUT estimates that over 150 Japanese VANs (of the over 350 registered) support EDI or EDI-like activities within Japan. Since several VANs are linking to U.S. and international networks, IEDI applications will grow.

EDI or EDI-like services within Japan are developing without benefit of industrywide standards, paralleling U.S. industries, which began using EDI before the formation of ANSI X12.

- In February, 1988, a delegation from the international EDI standards group UNJEDI will work to establish Japanese representation.
- It is likely that the lack of widely accepted standards will be addressed by study groups, as Japanese companies become involved in international EDI standards development.

Respondents to a recent Japanese survey indicate that 40% are involving the computers of other firms in their own networks. This involvement is expected to increase to nearly 52% over the next five years.

American President Companies (APC, Oakland, CA), is using its Pacific Basin network in support of IEDI for at least one Japanese customer.

- For an automaker that assembles cars in North America, APC provides transportation/logistics data interchange in support of the manufacturer's Just-In-Time processes.
- Containers with materials for assembly are tracked at every stage of shipment, until loading on railroad cars when the railroad takes over tracing responsibility.
- This information is transmitted twice daily, in EDI formats, from APC's California data center to the automaker's data center in Tokyo, via APC's private network.

Several Japanese automakers are using proprietary formats to exchange data with their U.S. affiliates and subsidiaries. The data is then translated to X12 standards for distribution to domestic suppliers.

c. Telecommunications Environment

Growing competition and innovation is characterizing the Japanese telecommunications industry following the privatization of NTT in April, 1985.

NTT is implementing the Japanese version of the Integrated Services Digital Network (ISDN), called the Information Network System (INS), which will ultimately provide a mix of voice, data, text, and video services through digital facilities. DRESS and ANSER are part of the INS set of services.

The national policy is to foster competition by supporting new enterprises.

Japan's telecommunications policy calls for two classes of carriers:

i. Type I Carriers

Type I carriers provide basic telecommunications services using their own transmission facilities. They may provide facilities-based services directly to customers, or lease facilities to Type II carriers.

Currently operating are five Type I carriers:

- NTT, which has the only national network.
- Japan Telecom Company.
- Teleway Japan Corporation.

- Tokyo Telecommunications Network Co.
- Daini Denden Inc.

These network service firms are being financed by Japan's largest manufacturing and trading companies. Among those participating are Sony, Toyota, C. Itoh, Mitsubishi, Sumitomo, Mitsui, and the Japan National Railway. Some of these firms have invested in more than one carrier.

Three existing Type I carriers are focusing their efforts on fiber optic networks, while the fourth (Daini Denden) is focusing on microwave links. Looking to satellite networks are two other Type I carriers: Japan Communications Satellite Company and Space Communications Corp.

An additional two Type I carriers have yet to begin operations: Lake City Cablevision and Osaka Media Port.

Although only NTT is required to provide services to the general public, Type I service carriers will target commercial customers, particularly in the Tokyo-Nagoya-Osaka corridor where Japanese businesses are concentrated.

ii. Type II Carriers

Type II carrier services will be targeted to specific business clusters or limited geographical areas. These carriers lease facilities from Type I carriers, and provide enhanced (value-added) network services. Type II carriers are also subject to less regulation than Type I carriers.

There are two classifications of Type II carriers: General and Special.

- Special Type II carriers provide communications for "many and unspecific persons" of a value-added nature, and also international services. These are "open-user" services. Approximately 10 Special Type II carriers have been approved.
- General Type II carriers are all other services, of a "closed user" nature.

There are over 300 General Type II carriers, leading to expected heavy competition for customers through innovative services. However, many of these carriers are large private networks and nearly half are based in Tokyo. Approximately 150 VANS nationally are offering on-line computing services, including the transfer of order data between wholesalers and retailers (i.e. EDI).

d. U.S. Involvement in Japanese VANs

Several U.S.-based VANs are involved through investment and partnering with Japanese companies in Value-Added Networks. Some of these VANs are listed in Exhibit IV-5. Many of these VANs will interconnect, facilitating international data exchanges including IEDI.

EXHIBIT IV-5

MAJOR U.S./JAPANESE VALUE-ADDED NETWORK PARTNERSHIPS

JAPANESE COMPANY	U.S. COMPANY*	COMMENTS
Hitachi	Tymshare	"Hi-Net" Interconnects Hitachi Group Companies
INTEC	Telenet	
Mitsui	AT&T	Joint AT&T Venture is "ENS."
	CSC	CSC Collaboration is International
NEC	GEIS	Plans to Link to GEIS' VAN
NTT	IBM	Nippon Information and Communications is SNA-Based and Links to NTT's "DRESS" VAN

*May be Japanese affiliate company, or partly owned by U.S. firm.

e. International Services

The monopoly enjoyed in international telecommunications by Kokusai Denshin Denwa (KDD) will likely be eroded by newly organized Japanese carriers, many formed through international partnering.

- A consortium of companies, including U.S. and U.K. firms, has organized International Digital Communications. Another, all-Japanese consortium, International Communications Japan Inc., has also indicated an intention to enter the market.

- Both consortia will apparently be licensed by Japan's Ministry of Posts and Telecommunications (after the failure of a merger proposal).

The Japanese international telecommunications market is expected to grow between 10% and 18% per year, compared to an expected domestic growth rate of 5%. International VAN revenues are approaching \$80 million in 1987.

Users predominantly use the public network for international communications, but traffic over the KDD's VENUS-P international packet service is expected to double over the next five years, according to surveys of Japanese companies.

According to KDD, approximately half the international telephone traffic from Japan is facsimile. The amount of traffic is growing because ease of use; because Kanji, graphics, photos, and handwriting can be sent; and because of lower costs. Often FAX is less expensive than E-mail when considering complicated log-ins that are charged as usage time.

f. Economic Factors

Just as U.S. companies first felt price and quality competition from the Japanese, now the Japanese are feeling pressures from Korea, Singapore, Malaysia, and other Pacific Rim countries.

This indicates that the benefits of EDI will be necessary for Japanese industries to remain competitive, and more importantly, for trade with EDI-capable trading partners worldwide.

It is likely that the U. S. subsidiaries of Japanese manufacturers will introduce EDI to their trading partners. Although currently these companies do not participate in the automobile manufacturing trade association (which was formed to compete with Japanese companies), invitations have been extended.

Further, as noted in the profile of GE Information Services (Appendix A), a newly formed American subsidiary of ISI-Dentsu will be marketing GEIS' services to Japanese companies operating in the U.S., such as banks and manufacturers.

- This arrangement is an extension of an agreement in place since the early 1970s under which the Japanese firm represented GEIS' teleprocessing services worldwide.
- GEIS also distributes teleprocessing services via C&C International, a joint venture with NEC Corporation.

g. The Role of Trading Companies

Japanese trading companies date from the 1870s, when the country resumed international trade after two centuries of self-imposed isolation. These companies serve as trade intermediaries, concentrating required expertise in a relatively few specialized organizations.

Trading companies provide trade facilitation and promotion services, and offer significant economies of scale in transportation, warehousing, and financial services for both imports and exports involving Japan, and also between other nations.

The ten largest trading companies are called general trading companies or *sogo shosha* – they handle about half of all trade. Specialized trading companies, or *senmosha*, are smaller concerns that limit themselves to a narrow range of products such as sophisticated industrial products. Captive trading companies handle trade functions for their parent firms.

Trading companies have developed extensive overseas business and telecommunications networks to carry information on opportunities.

In support of these activities, several of the trading companies are major investors in the Japanese VANs being born from deregulation, and several companies are using EDI-like applications.

Exhibit IV-6 summarizes the EDI situation in Japan.

EXHIBIT IV-6

JAPAN'S EDI ENVIRONMENT

- Telecommunications Liberalizing
- Increasing Intercompany Networking
- Many VANs
 - Half with EDI-Type Services
 - Leading EDI Service: NTT's Dress
 - Some U.S. VANs Involved
- No EDI Standards
- Heavy International FAX Use

2. Hong Kong

Annual trade documentation costs in this trading nation are estimated at between \$256 million and \$2 billion, creating a sizable incentive for EDI.

- Accordingly, the "Hotline" project, designed to link the entire international trading community, has been proposed to the government.
- Primary advocates of Hotline are the Hong Kong Trade Facilitation Council, the Hong Kong Air Cargo Terminal, and the Hong Kong Bank. Implicit in the proposal are streamlined trade documentation procedures.

Since Hong Kong covers a small geographical area and contains only one airport, one seaport, and one rail station, a system controlling trade activities is more easily managed than in a larger nation. Hong Kong's Hotline system would interlink approximately 10-12 computer centers with an international network.

Data communications services and related consulting in Hong Kong are provided by subsidiaries of Hong Kong Telephone (HKTel), which itself is a subsidiary of Cable and Wireless Group.

- Computasia provides computer services and software development.
- Communications Services Ltd. provides various telecommunications services.
- The DataCom Services business unit supports all nonvoice services, including the Datapak packet network for national and international data services. Datapak supports an EFT/POS network for Hong Kong and Shanghai Banking and for 35 for other banks through the Electronic Payment Service Company.
- Hong Kong and Shanghai Banking has a worldwide network via dedicated lines supplied by Cable and Wireless (HK) Ltd.

3. Korea

Korean telecommunications guidelines have been recently liberalized to permit intercompany electronic communications.

To promote EDI use, a delegation of U.S. software and network services companies has met with executives of Korea's automotive industry and with Data Communications Corporation of Korea (DACOM)

- DACOM, a company with both public and private participation, has responsibility for basic and enhanced data communications services.

- Commercial data services were introduced in 1983, and electronic mail the following year.
- DACOM has a relationship with McDonnell Douglas Corporation, which will likely become its international network services and/or EDI development partner.

Currently, EDI-type applications are using proprietary standards. The Korean automotive companies will consider use of the X12 format and migration to the EDIFACT international standard.

4. Australia/New Zealand EDI

Australia is part of an extensive communications network for South East Asia, and a major user of telecommunications because of its isolation and diversity.

The EDI market here is at an early stage. Activities appear largely limited to discussions in the Australian automaking industry, implementation of automated port systems for international trade, pilot testing with 20 suppliers by Coles (a major retailer) through GEIS' network, and an Australian government purchasing system.

The Australian Product Number Association is evaluating its appropriate role in developing EDI domestically. Similar associations in the U.S. and Europe have been instrumental in promoting EDI usage.

Among potential participants/partners in this area are ACI Computer Services, IDAPS Australia, Control Data, IP Sharp, and Paxus, as well as the Australian Telecommunications Commission and its international unit, the Overseas Telecommunications Commission.

There are debated proposals to privatize through sale the two Australian government carriers. This move is opposed by the Labour Party (although the prime minister, a member of the party, has supported privatization), and by trade unions.

In Australia, a network developed by the Commonwealth Scientific and Industrial Research Organization is being commercialized for a variety of services, including messaging, data bases, and various applications.

New Zealand's PTT has been separated into three government-owned entities. Value-added data services can be supplied with minimal regulatory restraints.

5. India

The Indian subcontinent is characterized by growing international interests in trade, licensing agreements, technology transfers, and joint ventures.

The country has trade interests in a broad range of industry sectors, particularly electronics, food processing, oil and gas equipment, and renewable energy.

India's electronics industry market is about \$3 billion, with an annual growth rate of 40%. Total trade with the U.S. is \$4.5 billion.

Issues facing the country include excess bank credits, production bottlenecks, rising prices, labor unrest, and shortages.

India's software industry amounted to \$30 million in 1986, and the country is said to have the world's third largest trained pool of engineers and other technically oriented workers. India's policies governing IS industries have been liberalized, as have trade import policies.

D

Latin America

1. Overview

Latin American countries have not taken a regional approach to data service regulations.

- The Conferencia de Autoridades Latinoamericanas de Informatica (CALAI) was formed to coordinate such policies and for users to share their experiences.
- CALAI's goals are to define common technical procedures, such as what data transmission protocols are to be used. CALAI is also evaluating regional software developers, and joint development projects may be implemented.

2. Brazil

Revenues from information services in Brazil amounted to \$580 million in 1980. In that year, nine of the largest twenty data processing services were state owned, nine were private, and two were affiliates of transnational corporations. More recently, the country's information services industry has been sized at \$2.2 billion.

a. Network/Processing Policy

Brazil has established an information services public policy to protect its domestic industries, improve citizen access to information, and enhance its cultural and political environment.

Accordingly, the country is developing its technological infrastructure to contribute to industrial development.

The country has established the Special Secretariat of Informatics (SEI) to oversee this process. Data communications within Brazil are controlled by the state monopoly.

- Private networks are permitted only when the public data network is inadequate for a specific application.
- SEI reviews and approves international data communications channels to make sure they fit within policy guidelines. Such channels are approved for specific applications, and for a limited time, although channels may be extended. Applications that apparently conflict with public policy can be negotiated.

The Brazilian government is promoting the use of information services (particularly data bases) through the state-owned SERPRO service bureau. Data bases containing information on the national economy, imports, exports, and business assistance are being established.

The Brazilian government generally discourages international data flows of processing information generated within the country.

The intent is to promote domestic processing. Accordingly, Varig Airlines was required to restructure its international data communications network to handle processing within Brazil.

b. Imported Software Policy

Brazil, in an attempt to support its domestic software industry, established three categories of software:

- Software developed in the country by citizens and their corporations, or by people living in the country;
- Software for which there are no other alternatives available domestically, but that are important to domestic economic interests. In this case, the rights to the program must be transferred to a national corporation.

The third category covers all other software.

The government gives highest priority to the first category, requiring state agencies to use them whenever possible. Software import contracts must be approved by the state informatics secretariat.

As demand for certain types of software increases in Brazil (as shown by state registrations), domestic companies are notified of market opportunities, thus encouraging local development.

Under Brazilian law, foreign software companies selling to Brazil must enter technology transfer agreements giving product title to a domestic company. The result is that the product can be enhanced and exported by the Brazilian company, enabling it to compete with the sourcing vendor.

In November, 1987, U.S. sanctions were placed against Brazilian trade in retaliation for the country's software restrictions. The action followed several years of negotiations. U.S. software sales to the country were banned.

- Autodesk (Sausalito, CA) had established a distribution agreement with Digicon S.A., a major equipment maker. Digicon was forced by the government to set up a separate marketing company. The arrangement still ran into opposition from the Brazilian government, and distribution was ultimately halted.
- Microsoft (Redmond, WA) was prohibited from marketing its MS-DOS software, and found its product pirated in the country due to the Brazilian system.

Brazil has said it would appeal the new trade sanctions with the General Agreement on Tariffs and Trade.

Brazil's TDF policies are summarized in Exhibit IV-7.

3. Mexico

Commercial service bureaus in Mexico are restricted to batch services. The government holds a monopoly on processing that requires data communications but does issue licenses to private companies. Two U.S.-affiliated companies have been authorized: Teleinformatica de Mexico, SA and Tiempo Comparitido, SA.

In 1980, the Mexican data processing industry consisted of some sixty companies, with two-thirds employing fewer than twenty employees, and only three companies having over fifty employees.

Mexico's technology transfer laws require users to register contracts for foreign-source software. Imported software may be purchased only if the specific package is not available domestically, or if it would be difficult to develop locally.

EXHIBIT IV-7

TRANSBORDER DATA FLOW POLICY BRAZIL

TYPE OF INFORMATION SERVICE	CORPORATE PROCESSING	COMMERCIAL SERVICES
Data Transmission	No Personal Messaging Restrictions	Requires Use of PTT but Partnering Possible
On-line Data Bases	Data Base or Copy Should Be Hosted in Country	Same. If Not Feasible, Access Requires Use of PTT but Partnering Possible
Processing Services	In-Country Processing Preferred	In-Country Processing Required Except under Rare Conditions
Imported Software	Government Policy Requires Technology Transfer and Allows Brazilian Importer to Resell Enhanced Products	

The "Maquiladora" Border Industrial Program was established in 1967. It provides for American manufacturers to establish plants in Mexico where products are assembled using parts shipped from the U.S. The resulting finished goods are imported and subject to U.S. duties only on the value of the added labor. This politically controversial program is designed to help stabilize the border economy. U.S. companies benefit from lower labor costs and Mexico realizes revenues from worker employment.

E

Africa

1. Overview

U.S. exports of manufactured goods to Africa totaled \$3.6 billion in 1986, with declines of nearly 60% shown in the 1981-1986 period. This low level of trade is due to poor economic conditions in the region, with little improvement forecast. Additionally, South African trade is declining due to economic sanctions and the withdrawal of major U.S. firms.

2. Senegal

The French trade facilitation agency Simprofrance is supervising the development of the SENEXPORT project, which aims to establish an international trade document-handling system in this nation.

F

Third-Party Service Provider IEDI Strategies

The leading U.S.-based third-party EDI services are taking varying approaches to international IEDI, but most have entered alliances to expand their market presence and to share risks. Additional information about these and other companies is in Appendix A.

1. GE Information Services

Within the U.S., GEIS has been the most aggressive participant, investing in a direct-sales organization targeting specific vertical markets, including international trade. GEIS has also signed EDI sales agent agreements with vertical-market software and turnkey systems vendors. This partnering approach is also apparent in its international activities. For example:

- In the U.K., GEIS has joined ICL to create International Network Service (INS). INS initially targeted European business, but branched to international trade through GEIS' Trade*Express service.
- GEIS is pursuing relationships with Honeywell-Bull (France), Nixdorff (West Germany), and Nokia Information Network Services (Finland).
- GEIS holds equity in several overseas data processing companies and has affiliations with others as distributors. These liaisons will facilitate IEDI implementations for the company.
- First National Bank of Chicago has joined with GEIS to offer the Accelerated Trade Payments service specifically for international trade.

Further partnering is likely in the international arena as GEIS puts more emphasis on its global services now that it is achieving market share goals in the U.S.

- Among potential partners are firms selling trade documentation software, other banks with trade services, and large international brokers and trading companies.
- Indirectly, GEIS' largest MNC customers will become effective GEIS advocates through their requirement that trading partners adopt IEDI.

2. McDonnell Douglas Corporation

After a failed joint venture in the U.K. with British Telecom, McDonnell Douglas Corporation's current international strategy is to license its new EDI II Tandem-based technology to PTTs that would become partners due to systems compatibility. So far this strategy has borne little fruit. INPUT believes only one such agreement has been signed.

The Tymnet VAN is accessible in 70 countries through IRC connections and leased lines; however, the company sold its partial ownership of FTCC, an international record carrier.

3. IBM

IBM's recently stated domestic strategy is to use EDI with IBM's suppliers and large customers. Once introduced to the service, this user community would presumably be inclined to use the Information Network's SNA-based Information Exchange EDI service with other trading partners.

In 1986, IBM announced Intercontinental Information Services to link transnational offices in the U.S., Asia, Europe, Africa, and the Middle East with a variety of services. EDI functions would continue to be hosted in the Tampa data center.

In Europe, IBM's affiliates have used joint ventures to pursue EDI and other network services. For example, in Italy an affiliate has signed with Fiat to create INTESA, which will offer EDI and other services. IBM France has joined another computer services company and two French banks to form a countrywide VAN. In the U.K., the company has joined with a group of shipping interests to promote Shipnet EDI, logistics, and data base services.

Exhibit IV-8 summarizes these strategies.

EXHIBIT IV-8



Appendix A contains profiles of current and potential third-party EDI service providers from an international perspective.

G

The Role of the International Record Carriers

International Record Carriers (IRCs) are potential participants or partners in international EDI.

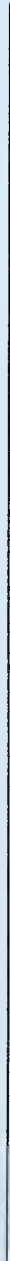
- IRCs often connect to existing VANs, and all IRCs now interconnect with each other.
- They are permitted to offer services domestically as well as internationally.
- Some of the IRCs have expanded their offerings to include voice communications, packet-switching services, and private networks.
- IRCs are no longer competing on price alone, but are adding services to meet changing customer needs.

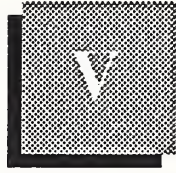
INPUT believes that IRC resources should not be overlooked when considering partners in strategic alliances, or potential competitors in the international EDI marketplace.

The next chapter examines issues that will affect the development of International Electronic Data Interchange.



Issues in IEDI Services





Issues in IEDI Services

This chapter examines IEDI issues, and specifically factors that may promote or inhibit market development and/or the availability of international EDI services. Additional factors driving IEDI were described in Chapter III.

A

Multiple EDI Standards

The “generic” and dominant US EDI standards are the American National Standards Institute (ANSI) Accredited Standards Committee (ACS) X12 standards, and those developed by the Transportation Data Coordinating Council. These standards have evolved to acceptance and approval of approximately 150 transaction sets.

X12 has been adapted domestically by several industry groups.

- Predating the formation of the ANSI committee are several industry-specific formats (e.g. drug wholesaling, warehousing, grocery).
- Large corporate users have also developed their own EDI formats that may, but more often do not, have elements in common with the other standards.
- Each industry or large user often has unique nuances that must be considered; accordingly there are subtle variations even in the basic standards that take into account various measurements, special billing requirements, and/or shipping instructions.

One of the problems facing those involved with standard development is that multiple parties have needs that must be accommodated, and decisions are made in a committee environment.

- This situation often leads to lowest-common-denominator standards and duplicate transaction sets covering the same type of electronic documents, but with different formats.
- This problem is compounded in the international arena.

There is movement toward compatibility between industry-specific, private EDI standards and X12 transaction sets.

Until recently, international standards were called General Trade Document Interchange (GTDI). They were endorsed by a UN committee and evolved from the United Kingdom's Trade Facilitation Board.

An earlier coordinator of various industry and international groups was called the Joint Electronic Data Interchange Committee, known as JEDI.

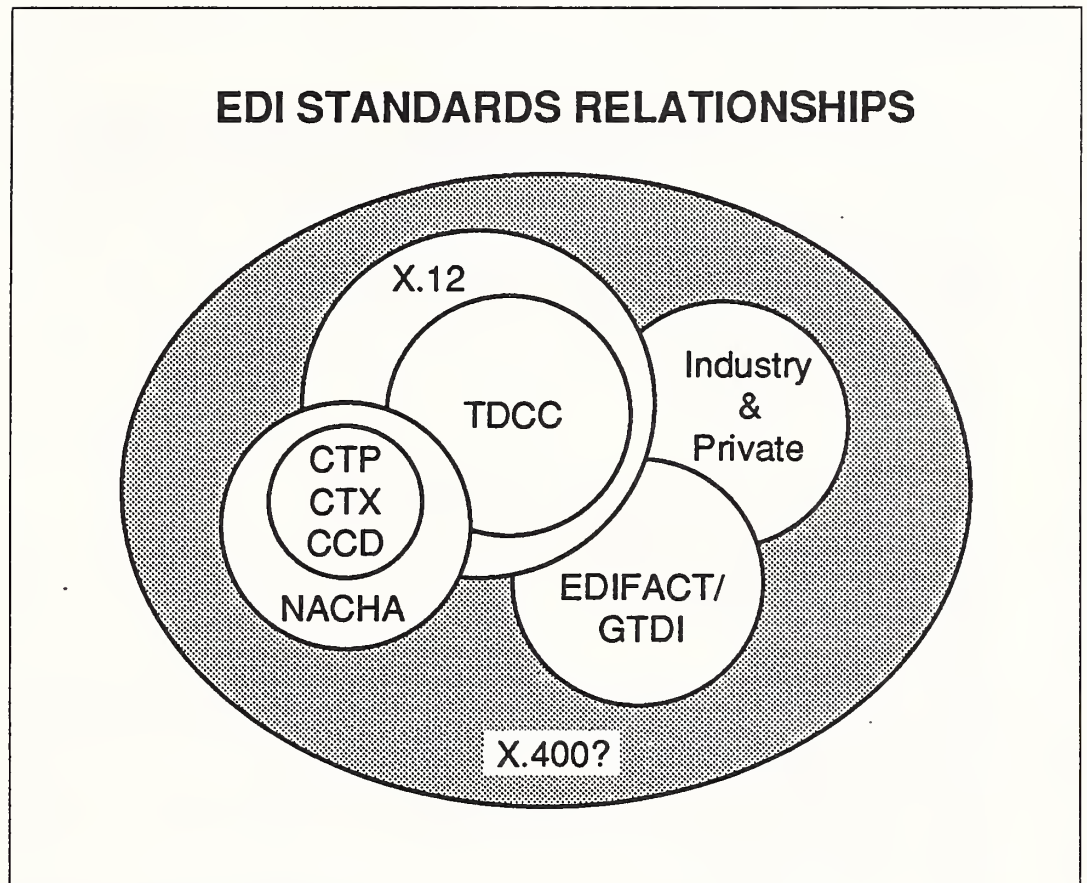
- JEDI's activities have been superseded by the UN Economic Commission for European Working Party on Facilitation of International Trade Procedures (UNECE WP 4). Now the international standard is known as EDIFACT (EDI for Administration, Commerce, and Transport). These UNECE WP 4 efforts began in late 1985.
- EDIFACT encompasses the capabilities of the X12 standards and provides additional functions for international use. In late 1987, the ANSI X12 committee endorsed the efforts of the UN committee and started a process to bring US EDI standards into synchronization with international standards.

This synchronization effort is moving forward, with the first international document in testing, and others to follow. The syntax or basic "grammatical" framework has been approved by the International Standards Organization.

A North American International EDI Users' Group has been formed by several multinational corporations to address common concerns, develop pilots, and promote awareness of IEDI methods. Exhibit V-1 shows EDI standards and their relationships, with the shaded intersections implying a degree of compatibility.

- The NACHA grouping of standards refers to the National Association of Clearing Houses, which is responsible for electronic funds transfer. Of the three standards shown, CTX is most closely aligned with X12.
- Note that the outer circle in the referenced exhibit represents the X.400 standard. Some expect this international messaging standard to eventu-

EXHIBIT V-1



ally encompass the subspheres of EDI by placing EDI messages within an X.400 "envelope." The latest enhancements to this standard, called X.400-'88, include additional support for use in EDI.

- Exhibit V-2 provides the names and addresses of agencies involved in setting international EDI standards.

INPUT believes that multiple standards will not represent a significant impediment to IEDI. Standards supporting international trade are increasingly available, and the work of the UNECE is proceeding fairly rapidly. Further, X.400-'88 will work to overcome incompatible systems and support internetwork communications.

B**Market Inhibitors**

There are substantial problems to overcome in developing and optimizing the IEDI market. Some of these obstacles are due to historical procedures that may be difficult to change; other obstacles relate to incompatibilities in newly developed systems that could facilitate IEDI applications.

EXHIBIT V-2

**INTERNATIONAL STANDARDS GROUPS
WITH SOME EDI INVOLVEMENT**

American National Standards Institute (ANSI)
1430 Broadway
New York, NY 10018
(212) 354-3300

Data Interchange Standards Association
1800 Diagonal Road Ste. 355
Alexandria, VA 22314
(703) 548-7005

Consultative Committee for International Telegraph and Telephone (CCITT)
International Telecommunications Union
Place des Nations
CH-1211 Geneva 20, Switzerland
(41-22) 995-111

European Postal and Telecommunications Conference (CEPT)
Box 1283
3001 Berne, Switzerland
(41-31) 622-081

International Organization for Standardization (ISO)
1, rue de Varembe
CH-1211 Geneva 20, Switzerland
(41-22) 341-240
Telex: 23 88 7 ISO CH

United Nations Economic Commission for Europe
Palais des Nations
Ch-1211 Geneva 10, Switzerland
(41-22) 346-011
Telex: 28 96 96 Unations

Japanese Ministry of Posts and Telecommunications
Kasumigseka 1-3
Chiyoda-ku, Tokyo, Japan
(03) 504-4798

1. International Trade Community Automation Impediments

The U.S. Customs Department, and international trade itself, is using procedures that are several centuries old. Automation within companies involved in international trade is often primitive. Small companies, in trade and elsewhere, are struggling with developing IS capabilities. Government agencies involved in international trade are competing for IS development resources with other agencies, and systems being developed are largely incompatible with EDI standards.

2. PTT Impediments

Most foreign PTTs are monopolies and therefore less likely to be innovative. IEDI services may likely be delayed to protect lucrative telex revenues.

The PTTs are also receiving a variety of proposals from network service providers. Given the opportunities being presented, INPUT believes that PTTs are uncertain regarding what direction to take and therefore may be slow to make changes.

3. Transborder Data Flow

In various surveys, MNCs have identified Transborder Data Flow (TDF) restrictions as a major impediment to international operations and international trade.

TDF restrictions are based on nations trying to protect the privacy of their citizens or the economic well-being of their economies.

- Laws to protect personal privacy also apply to legal persons—that is, corporations.
- There are national security and national economic trade protection reasons for interborder data restrictions. Some countries are using regulations to ensure a share of information-processing markets.
- Some countries have outright restrictions on sending financial data across borders.

TDF problems lead to restrictive policies and regulations in the use of equipment, software, or processing facilities.

- Many countries have laws regulating international information exchange. These laws were initially designed to protect individual privacy.
- Even data transfers between branches of a company may be restricted in some circumstances.
- The laws of various nations are not uniform, and there is no central U.S. agency concerned with the issue.
- Regulations are evolving based on voluntary guidelines followed by information services vendors.

There are also restrictions on leased lines, with the West Germans moving to volume pricing rather than flat-rate fees; volume pricing is designed to encourage public data network usage. However, the policy discourages the economies of scale that are possible with private lines.

Finally, there is a problem in addressing TDF issues since they have no single focus. Domestically, there are many agencies involved such as the FCC, the US Customs Agency, and the Census Bureau. User groups are involved, domestically and internationally. There are multiple forums for addressing international trade and communications issues. The problem becomes, Where does an interested party focus its limited energy most productively?

4. Technical Impediments

Other impediments to IEDI are technical and standard incompatibilities. These exist internationally and domestically. For example:

- EDI, the Automated Commercial System (ACS), and the Census Department's electronic reporting requirements are not compatible.
- Private networks and competing services in industry segments (such as the automotive industry) are often incompatible.
- Automated port systems are often incompatible with each other.

5. Cultural and Business Inhibitors

Other issues inhibiting IEDI are the cultural differences between nations and the often-informal business relationships between companies, their agents, and the agencies responsible for regulating international trade.

Culture also impacts the technology used. Telex is a historically important messaging service for international trade.

- Many software packages supporting international trade documentation provide automated telex generation.
- These packages will undoubtedly migrate to automated EDI generation when customers require it.
- Migration may be coming soon. FCC statistics show declines in telex usage, and a National Telecommunications and Information Administration study indicates the same trend, with users reporting increased use of higher-speed dial-up data transmissions, leased lines, packet-switched services, and E-mail.

Use of facsimile for trade documents has also increased primarily due to lower prices on equipment and international calls. Several EDI services integrate telex, other forms of electronic mail, and facsimile delivery options with their EDI services, thus acknowledging a need to bridge technologies, at least in the short term.

D

The Role of Third Parties

Exhibit V-3 lists, by frequency of mention, the concerns voiced by over 100 users of international telecommunications in a study commissioned by the US Department of Commerce.

International EDI through third parties can reduce an individual company's concerns because the vendor handles many of the issues described above.

- For the vendor, handling PTT relationships may be a delicate matter, one usually requiring strategic partnering with the PTT and/or data processing affiliates within the host country. Such relationships may only be developed after a lengthy negotiation process.
- Those vendors with a competitive advantage are the several information service vendors with subsidiaries and affiliates in trading nations, and those maintaining their own staffs in those locations.

E

Trade Deficits and Declining Growth

Continuing U.S. trade deficits may lead to import restrictions that affect international trade, and hence create the opportunity to develop and utilize IEDI services.

EXHIBIT V-3

**USERS' INTERNATIONAL
TELECOMMUNICATIONS CONCERNS**

1. PTT Policies and Practices
2. Circuit Quality and Reliability
3. Service Availability (Including Leased Lines)
4. Time Delays
5. Transborder Data Flow Policies/Practices
6. Equipment Incompatibilities
7. Service Incompatibilities
8. Costs
9. Circuit Usage Restrictions/Lack of Interconnections

Source: NTIA

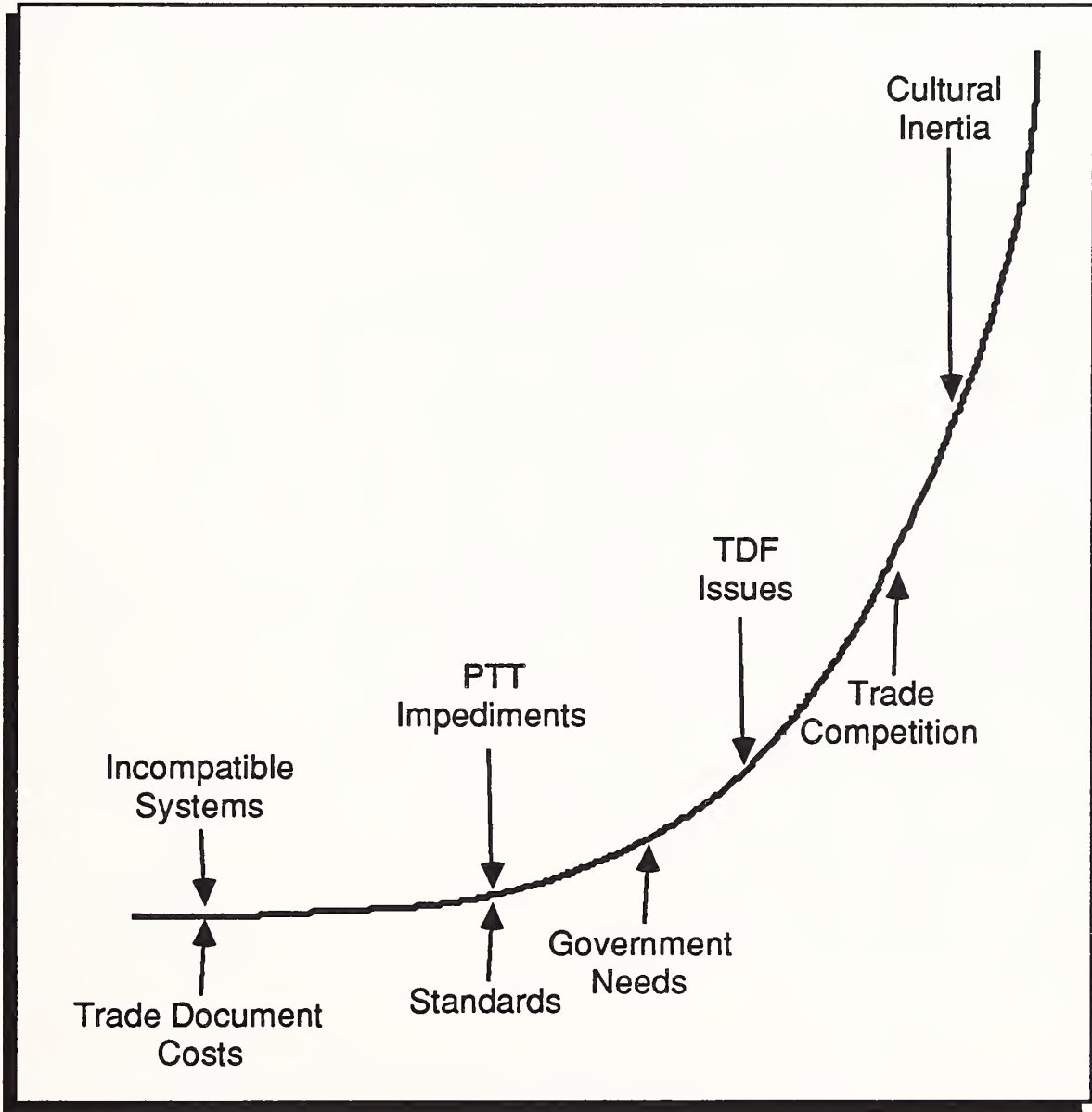
The devaluation of currencies combined with declining growth, and in some cases economic reversal, particularly in European nations, may have a similar impact on U.S. exports.

The positive and negative factors influencing IEDI services are shown in Exhibit V-4.

The next chapter presents INPUT's research assumptions regarding international telecommunications, messaging, and trade patterns; these assumptions form the basis of forecasting the IEDI market.

EXHIBIT V-4

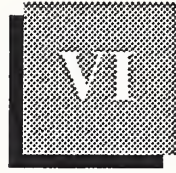
FACTORS IMPACTING IEDI





The International EDI Service Opportunity





The International EDI Service Opportunity

This chapter presents INPUT's research findings relevant to international information services and trade. The IEDI forecast was derived from this research.

A

International Telecommunications

The overall international communications market is estimated at \$3 billion and is growing 12.5% annually.

International public telecommunications traffic is borne by carriers in the originating and receiving countries, with the originating carrier paying access fees to receiving carriers.

International telecommunications patterns serve as a backdrop for understanding the dynamics affecting International EDI transactions. Findings from several sources are presented here.

1. INPUT's 1986 Survey

In a 1986 survey of approximately 100 IS and Telecommunications Managers, INPUT found that users estimated a small percentage of traffic went offshore, with increases projected. The primary reasons given for growth were support of overseas offices, and interdependencies between companies and their trading partners.

- On average, users with international communications estimated 7% of their traffic to be international.
- This international share was expected to increase to approximately 11% in two years (by 1988), representing approximately a 50% increase.

Representative comments include:

- “We belong to a foreign company, and our product line relationships are getting closer.”
- “Coordinating phone calls across international time zones is a real problem. Electronic mail is more efficient.”
- “Some of our greatest market opportunities are overseas, and we’ve formed partnerships with European companies.”
- “We have more international suppliers than before. We’re becoming more of a global company.”
- “We’ve had a change in focus toward more international marketing.”

2. NTIA Survey

A survey of over 100 firms performed on behalf of the U.S. Commerce Department’s National Telecommunications and Information Administration (NTIA) projects a 20-30% increase in international telecommunications service demand overall between 1986 and 1990.

Growth is forecast in international message services, wideband circuits, telex alternatives, and Intelsat Business Service (IBS), whereas limited or no growth is projected for alternate voice/data circuits or telex.

a. International Electronic Mail Demand

Ninety percent of those sampled for the NTIA say they will use electronic mail by 1990 for international communications. The survey predicts a possible decrease in international telex use. Currently, only 10% of the sample does not use telex, growing to 23% in 1990.

b. International Packet-Switching Service Demands

Nearly 80% percent of the respondents indicated probable or possible requirements for packet-switching services by 1990, with strongest interest among the largest companies for internal, private-packet networks.

3. A Private International Survey

An international network service organization conducted a survey of 100 U.S. IS and telecommunication managers. The survey reported more of a need for data communications to Europe than to the Far East. However, many surveyed are planning increased communications to the Far East.

- A prior survey found 30% needing data communications capability to Europe, whereas 19% needed it in the Far East.
- In the 1987 survey, 31% needed communications to Europe, and 22% required it with the Far East.

Although the statistical changes are small, they do represent a 16% increase in interest in the Far East, pointing to a growing regional importance as a source of production and commerce for U.S. companies. Europe represents the major area of interest, but there has only been modest growth in trans-Atlantic data flows, according to the survey's sponsors.

4. FCC Telex Statistics

As shown in Exhibit VI-1, telex traffic—as measured in messages, minutes, and revenues—since 1984 has declined by most measures, illustrating a trend away from an antiquated technology and toward higher-speed messaging.

B

IEDI Services Forecast

1. Methodology

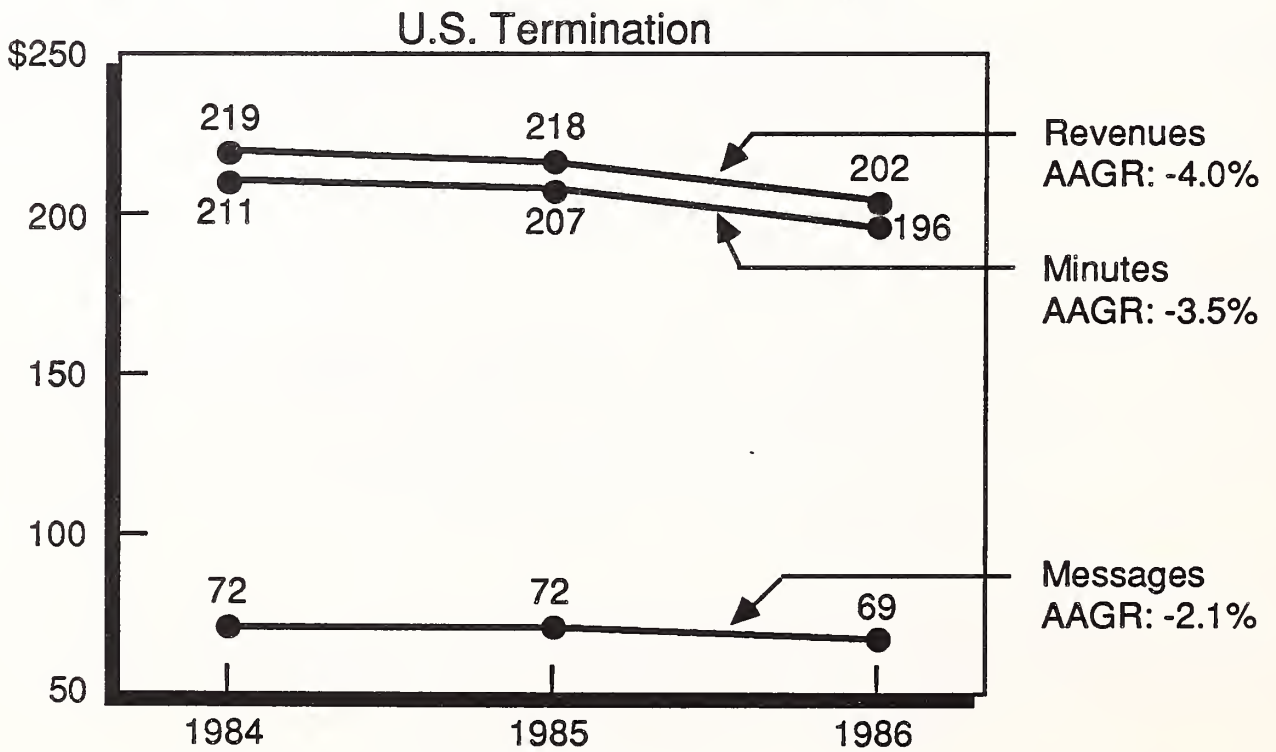
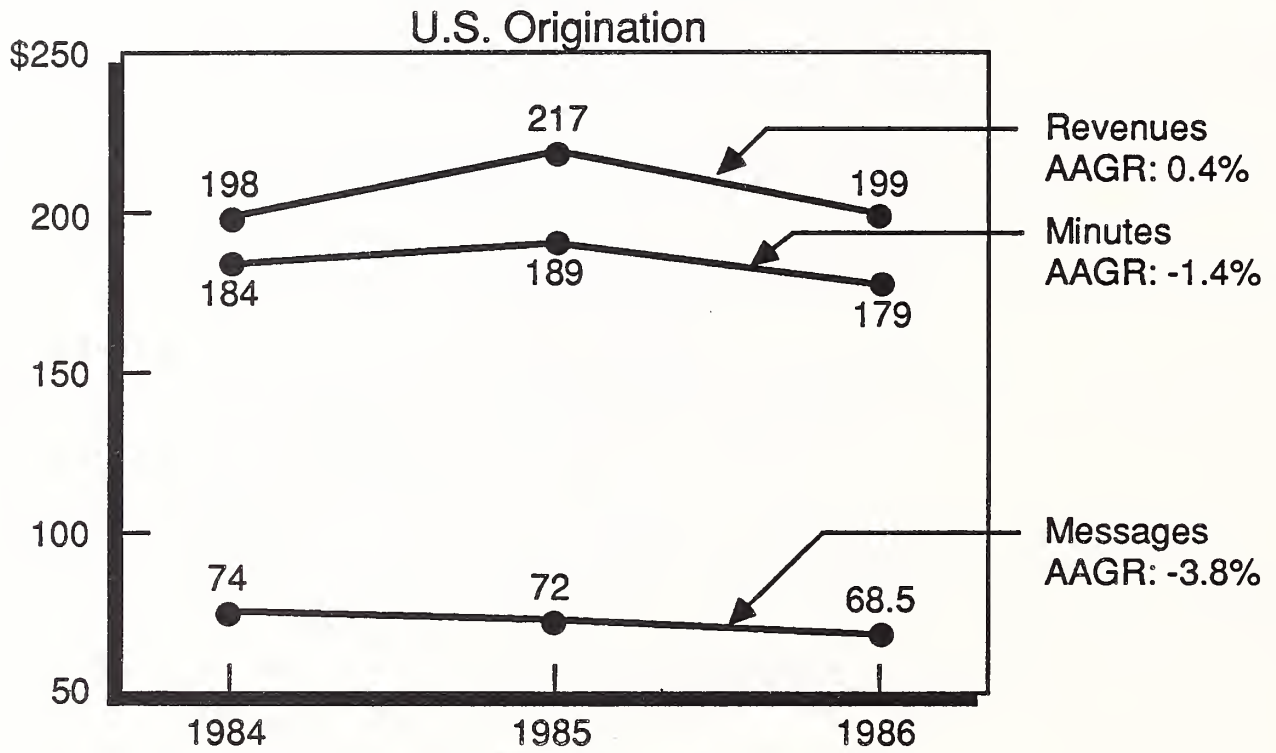
The forecast covers U.S.-based user expenditures for international network/processing services fitting the definition of EDI. These services include the transmission of data representing electronic purchase orders, invoices, logistics information, letters of credit, bills of lading, and other trade documents.

Providers and several major users of EDI and EDI-like trade services were questioned regarding their international capabilities and traffic growth patterns. When necessary, revenue estimates were made and aggregated to estimate the 1986 market.

As can be expected given the nascent nature of the overall EDI market, international EDI contributed marginally to the \$46 million 1986 U.S.

EXHIBIT VI-1

TELEX MARKET EROSION



Measured in Millions, Revenues in Dollars.

Source: FCC Statistics

EDI marketplace. Accordingly, high growth rates in the early years of market development represent a significant statistical increase, but a relatively small market. However, high growth rates will continue based on several factors, described below.

International postal service statistics, trade patterns, telex, and other telecommunications traffic patterns were analyzed to derive geographic market sizing. Factoring was applied regarding regional "EDI readiness" as the forecast period progresses.

- For example, although a high proportion of trade and telecommunications traffic takes place between Japan and the U.S., the country was not seen as immediately participating at a significant level.
- However, EDI traffic to and from Japan (as well as other Pacific Rim destinations) does become more significant in the later years of the forecast.

2. Forecast Assumptions

As the market represents U.S. dollars, it is assumed inflation will be maintained at under 5%.

The value of the U.S. dollar against foreign currencies does become relevant. Because of lower costs, several companies (e.g., Tandy, and Honda) have shifted from offshore production of some products to U.S. production.

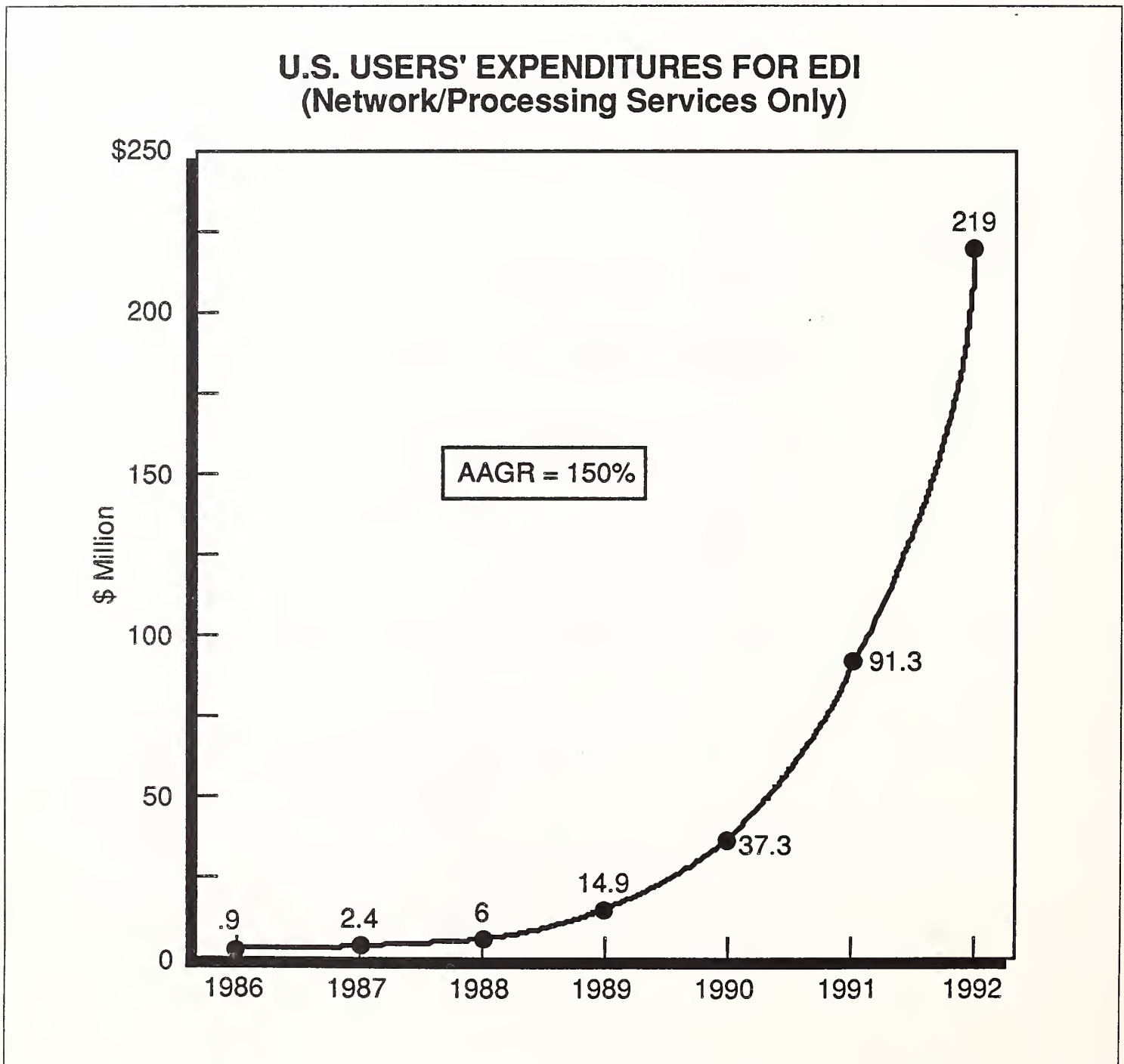
The value of the dollar is also relevant in the settlements process for shared costs of international data traffic. However, for analysis purposes, it is assumed that current values will remain fairly constant.

It is further assumed that trading patterns shown in recent Department of Commerce Census Bureau figures will not dramatically change within the forecast period. New trading sanctions (such as those now being applied against South Africa) will have an impact, as will initiatives such as an early opening of substantial trade with the People's Republic of China. In trade imitative scenarios, telecommunications infrastructure development will often be necessary to support IEDI applications.

3. International EDI—A \$219 Million Market by 1992.

As shown in Exhibit VI-2, U.S. user expenditures for IEDI services were under \$1 million in 1986, and will grow at an average annual rate of 147% to become a \$219 million market by 1992.

EXHIBIT VI-2



User expenditures for IEDI will largely be shifted from other forms of international communications. Principal casualties will be postal and courier service, FAX, telex (which is already showing a decline), and computer-based electronic mail, file transfers, and private networks. Public services will prove more manageable for dealing with the complicated universe of agents and partners involved in international trade. There is evidence of domestic private networks (including several multinational companies and those sourcing overseas) that are migrating to public services.

The forecast includes an estimated \$11 million in 1992 (or 5% of the market) for a proportion of private network and direct-dial costs when such methods are used to link trading partners and for EDI applications. This forecast is a decline from the 1986 estimate of 50% of the market for international EDI implemented via private and dial networks.

In addition to shifted revenues, IEDI will result in new revenues as additional transactions and applications are found. For example, electronic links between shippers and insurers may represent such an application.

IEDI and domestic EDI will also grow as companies require their trading partners to use electronic means as a condition of doing business, and because the nature of trading requires multiple documents, and hence multiple electronic transactions, in the trading cycle.

Vendor revenues beyond those shown in the forecast will be generated by offshore users, by users throughout the world needing software and professional services, and by computer equipment dedicated to IEDI.

4. Regional IEDI Potentials

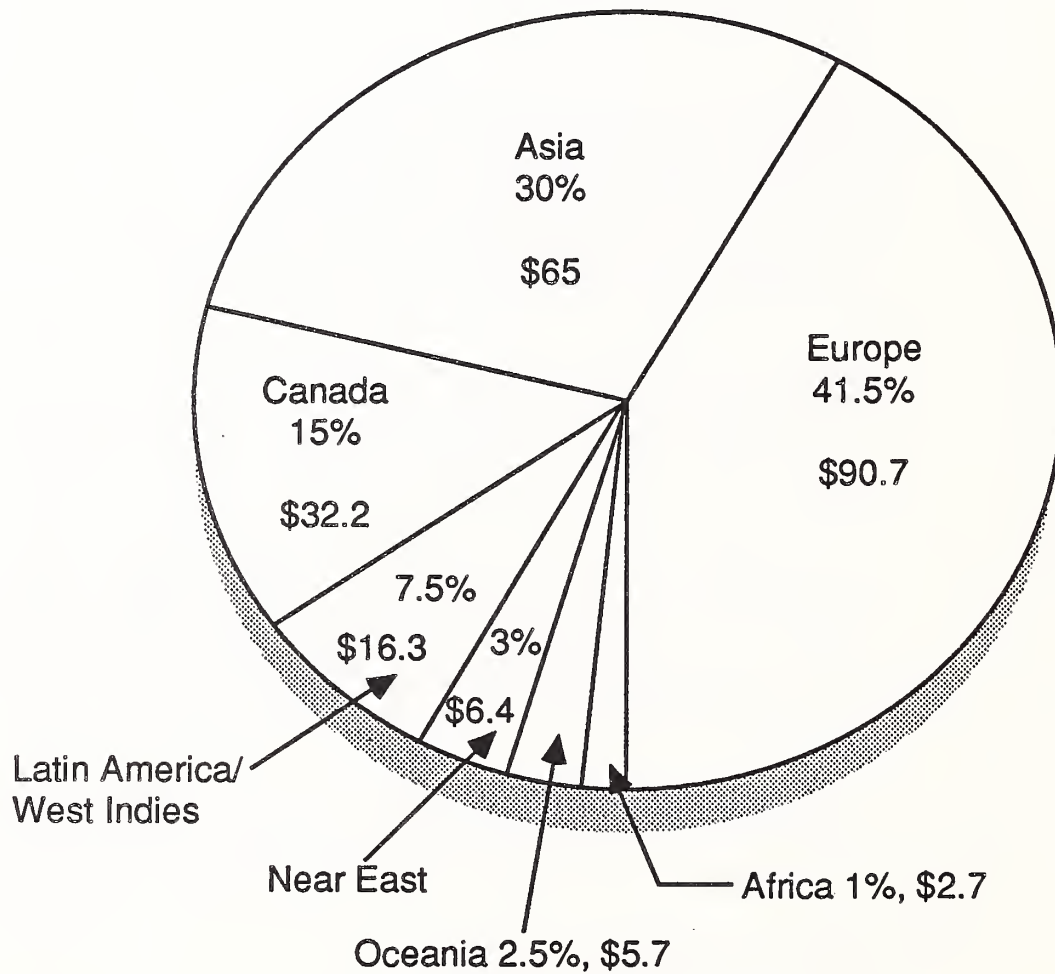
IEDI activity will expand, first to other English-speaking and Western European countries, and then to trading countries in the Pacific Rim.

Exhibit IV-3 breaks out INPUT's 1992 forecast by traffic between the U.S. and global trading regions, based on international trade and telecommunications flows, as described above, and applying an "EDI readiness" factor in those regions.

As shown, the primary opportunities are in supporting trade with Western Europe (over 41% of the 1992 market), Asia (nearly 30%), and Canada (nearly 15%).

EXHIBIT VI-3

**U.S. USERS' EXPENDITURES FOR IEDI
BY TRADE REGION
1992
(\$ Millions)**



Note: Totals more than 100% due to rounding.

- Canada has well-developed EDI systems in place, with U.S. vendors participating. EDI systems are prominent, particularly in automotive manufacturing, transportation, and related industries. The free-trade agreement will lead to open competition among the network service vendors of both countries, which are the world's largest trading partners.
- Western Europe and particularly the U.K. also have a well-developed EDI environment, which is quickly catching up to the U.S. EDI market's level of maturity. Also, the U.K. is important as a gateway to the rest of Europe.
- Although domestic EDI use in Asia, and particularly in Japan is growing, Japan is at least 3-5 years away from substantial IEDI participation. However, long-term benefits will accrue to companies willing to integrate Japanese accounting, inventory management, and other systems with EDI functionality (that is, using the international EDIFACT standards on a professional services basis). IEDI opportunities in Japan will be related to Japanese automakers assembling finished goods in the U.S. to conform to trade requirements, to supporting the export of U.S. goods to Japan's style-conscious consumers, and to the importation of Japanese products to the U.S.
- Other areas of the Pacific Basin are IEDI opportunities because of the competitive nature of so-called "Tiger" nations—Hong Kong, Singapore, and Korea—and because of Australia and New Zealand.
- Latin America represents an opportunity since the area is relatively highly computerized, although software distribution remains a problem in several countries.

5. Industry Opportunities

Industries now using EDI and that participate broadly in international trade are naturally the primary industry opportunities for third-party service providers and potential users. Opportunities are in discrete manufacturing (automotive, heavy equipment, apparel, electronics, and components), process manufacturing (petroleum, other chemicals, pharmaceuticals, and grocery products), financial services in support of international trade, and of course in various transportation modes and service firms.

6. A Variety of Entry Points

The point of entry for IEDI may vary: in-country information service providers, PTTs, U.S. information service company affiliates, automated

port authorities, and multinational corporation private networks may all serve as focal points and/or partners for varieties of IEDI.

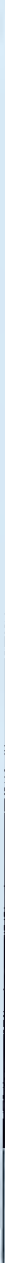
Currently most international data flows take place within multinational corporations (MNCs); there are over 1,000 such intracompany international networks. MNCs account for the majority of world trade, financial flows, and transactions. Because of internal needs, MNCs are often on the cutting edge of information services – as users, drivers, and developers of transactions applications.

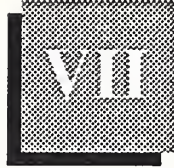
However, PTTs do not generally permit the use of private networks (consisting of leased lines) by third parties, although it is not easy to distinguish between, on one hand, a computer service providing commercial services to several entities and, on the other hand, communications between third parties. The problems of interpreting and distinguishing between applications has had an impact on the internationalization of VAN services and will continue to do so in the IEDI arena.

The final chapter presents INPUT's IEDI recommendations and concludes the study.



Recommendations and Conclusions





Recommendations and Conclusions

A

Recommendations to Service Providers

1. The IEDI Requirement

INPUT believes that despite problems remaining to be overcome, IEDI is an opportunity, and probably a requirement for companies serious about offering EDI services on a third-party basis.

- Large accounts (such as multinational corporations) will require IEDI.
- IEDI reflects the service provider's position and image in the marketplace. A full-service EDI provider is expected to have international services, even though most accounts – primarily the smaller ones—won't need such services.

However, INPUT recommends caution in the marketing investment and in the use of alliances where appropriate.

2. Partnering Opportunities

Third-party service providers will normally require a variety of partners to facilitate and optimize IEDI service. For example, banks, particularly those with trading company subsidiaries, often have in place networks, and have developed financial management products useful to international trading.

- Bank networks supporting international needs can often be made available at a marginal cost to other corporations.
- Further, the expertise of banks in technical and engineering services may be available to build additional networks in regions currently

unserved, or to make recommendations for approaching the marketplace.

Other partnering options may be found among the "Big Eight" accounting firms, which are developing accounting and information management systems for multinational trading firms.

Software vendors selling packages to international trading customers can bring active customer lists and application-specific expertise to a partnering relationship.

Large multinational corporations will naturally be the prime targets for IEDI service, but they also may serve as codevelopers of such services. Large multinationals often have internal expertise that may be leveraged in broader markets, and may consider migrating their private network implementations to public services as IEDI availability, usage, and acceptance grows.

3. Understand Cultural and Business Environments

With respect to marketing and implementing IEDI services, third parties need to understand cultural and business issues within end-user environments that may be leveraged to improve EDI usage, or that must be overcome to ensure success.

4. Advanced Services

Advanced services can be used as a product differentiator and, because they will be priced at premium prices, are potentially lucrative if development and marketing costs can be kept under control. Desirable advanced services are similar to those already offered in domestic EDI:

- EDI and E-mail interconnectivity, with hardcopy options for trading partners not now using EDI. The need for parallel paper and electronic systems would be obviated.
- Graphics in association with EDI purchasing documents.
- The creation of data bases from IEDI transactions (with participant approval) for use in market planning and analysis.
- The availability of international trade-related data bases with IEDI service, especially those data bases closely coupled to the central IEDI service.

With respect to trade data bases, likely candidates would be Department of Commerce Import/Export rules and regulations, restriction lists, tariffs, transportation services, exchange rates, etc.

INPUT has identified two new trade-related data base services:

- Company Line USA (San Clemente, CA) provides a data base of domestic and international product sourcing. The service is targeted at buyers in a variety of industries; the service collects and redistributes purchase order/requests via telex, fax, and the on-line data base.
- Tradetech Exchange, Inc. (Miami, FL) offers data bases on transaction terms and requirements under commodity trading regulations, a listing of buys and sells between traders, and gateway service to a variety of international data bases. GEIS developed the software and provides network access.

Exhibit VII-1 summarizes service vendor recommendations and partnering options.

B

Recommendations to Large Users

INPUT's recommendations to large users first relate to the problems presented by transnational data flow issues. Large companies need to monitor actions related to data restrictions and to audit their own practices. These companies should be developing a corporate code of conduct in conformance with the voluntary TDF guidelines established by the Organization of Economic Cooperation and Development.

Exhibit VII-2 outlines those guidelines. Companies should participate in the appropriate international bodies – such as the International Chamber of Commerce, the International Telecommunications Users' Group, The North American International EDI Users' Group, and trade facilitation councils that represent user and service provider concerns. Naturally, users must decide how to allocate resources.

In countries where data flows take place, one must realize that such activities generate revenue and jobs for that economy. Companies should be as concerned about the reasons for restrictions as are the regulating bodies; companies should also build in the needed protection systems.

To move the technology and the possible benefits forward, lobbying for relief from data flow restrictions is needed, along with a spirit of cooperation among the regulating nations.

EXHIBIT VII-1

IEDI SERVICE VENDOR RECOMMENDATIONS

- Recognize the IEDI Requirement: Multinationals, "Full-Service" Market Position
- Form Partnerships to Reduce Risks and Strengthen Presence:
 - Banks, Accounting Firms, Turnkey Vendors, Large Users
- Understand Cultural/Business Issues
- Consider Advanced/Value-Added Services to Increase Margins:
 - EDI/E-Mail Integration
 - Graphics
 - Data Bases

With regard to IEDI usage, users should avoid "reinventing the wheel." IEDI services and software are becoming available from several well-established remote computing services and value-added networks. By working with these providers on unique needs, the development process can be truncated, and the possible benefits realized sooner than with internal development by the user

C**Concluding Remarks**

Based solely on trade documentation costs, IEDI represents a significant opportunity, but cost avoidance is not the only reason for its adoption. U.S. businesses are increasingly competing on an international scale and selling products, services, and sourcing materials throughout the world.

EXHIBIT VII-2

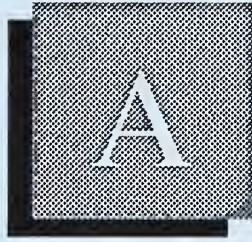
**ORGANIZATION FOR ECONOMIC COOPERATION
AND DEVELOPMENT (OECD)
PRIVACY GUIDELINES/TRANSBORDER DATA FLOW
SUMMARY**

- Data Collection Limited to Necessary Information
- Data Must Be Obtained Lawfully and Fairly, Preferably With Consent of Subject
- Intended Use of Personal Data to Be Specified
- Disclosure Must Be Consistent with Purpose for Which Data Was Gathered
- Security Measures Are Required
- The Existence and Nature of Data Must Follow a General Policy of Openness
- Subjects May Access Data and Challenge Accuracy

The U.S. is the most advanced information society. Advances in technology are being used to enhance competitive stance, and EDI should, and will, be included as a tool for productivity, higher profits, and improved customer service.

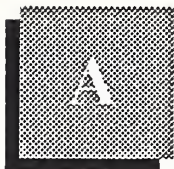
As global trading and sourcing increases in importance, competitive advantage becomes more than a buzz phrase. This phrase is joined by another: "competitive parity," which is the matching of competitive thrusts to maintain an equal, or perhaps a superior, stance in commerce.

Although international trade, despite the best efforts of advocates in the public and private sectors, remains a quagmire of paperwork, rules, regulations, interagency reviews, restrictions, shipping rates, control lists, and special cases, computerization can and is helping and IEDI will be part of the new world trade landscape.



Appendix: Profiles of Companies with Current or Potential IEDI Services





Appendix: Profiles of Companies with Current or Potential IEDI Services

A

Automatic Data Processing, Inc. (ADP)

ADP provides RCS and distributed processing services to banks and other financial institutions, supplies on-line data bases, supports collision estimating for the insurance industry, and has services for automotive dealers.

ADP's Network Financial and Communications Service group provides remote and on-site distributed processing through the Autonet international VAN. Access is available from 55 countries.

ADP will add EDI functionality to the RCS and will add distributed processing applications that will benefit from such enhancement. ADP is also adding additional service applications that are inquiry and sales oriented, and therefore have EDI-like features.

B

AT&T

AT&T formerly offered an EDI service called Information Interchange as part of the Net 1000 packet-switched network/remote computing service. The service was withdrawn in June, 1986 as not meeting profit objectives.

Despite the failure of NET 1000, INPUT believes AT&T will remain involved in the EDI market. The company maintains an EDI presence through a joint-marketing relationship with Control Data's Redinet. Redinet uses Accunet facilities, and is marketed as RediAccess by AT&T.

AT&T also continues to promote what it calls Electronic Order Exchange (EOE), which refers to on-line order entry systems and EDI applications.

The company's continuing Accunet Packet Service, which was the backbone for Net 1000, is available in 99 U.S. cities. Through the joint effort with CDC, EDI service can be accessed from a total of 150 locations. CDC provides packet-switching equipment and adds multiprotocol (asynch/bisynch/synchronous) support to the basic service.

Accunet Packet Service is available from approximately 20 international interconnections; however, access to Accunet's international network is apparently limited to users of the domestic service.

C

Bank Involvement in IEDI

Several banks provide IEDI or IEDI-like services in support of international trade. This listing is representative of such services, and the software supporting them. Bank international trade services are often provided through subsidiary trading companies, as described in Chapter III.

1. First National Bank of Chicago (First Chicago)

Using GEIS' international network, First Chicago (which is the tenth-largest bank in the U.S.) offers the Accelerated Trade Payments (ATP) service, designed to speed the process by which international trading partners receive payment.

- ATP customers can shorten by 4 to 18 days the time it takes to present documents to their banks.
- Credits that are reimbursable overseas can be transmitted to First Chicago's international offices for payment by local banks.
- Users' benefits are improved cash flow and increased interest income.

INPUT believes that First Chicago's ATP service is under review for a 1988 revamping.

2. Chase Manhattan

Under the names Chase Trade Manager and Chase Trade Exchange, Chase offers several services and software packages used in international trade.

- Electronic Letter of Credit currently creates a single instrument on a microcomputer and transmits it to Chase for relay into the back-office operations of an advising bank. The Chase Data Network, a combina-

tion of direct-dial and GEIS' international VAN, is used. The data is translated between private and TDCC/X12 codes. The microtranslator was developed from Transportation Data Coordinating Committee (TDCC) software, with enhancements by Chase.

- Trade Reporter tracks trade transactions that are conducted through the bank. Various international credit and document instruments are covered.
- Letter of Credit Advisor provides electronic notification of export letters of credit advised or confirmed by the bank, speeding document delivery time.
- Chase Electronic Bill of Lading (CEBOL) supports exporters' creation and transmission of the Bill of Lading and Export Declaration to freight forwarders and carriers. Transmissions can be done micro-to-micro, micro-to-mainframe, or micro-to-electronic-mailbox. The electronic documents conform to TDCC and NCITD standards. A security/authentication feature is available. As of December, 1987, the service was being used by 23 companies, including transportation carriers, shippers, and freight forwarders.

Other software in support of international trade is the Discrepancy Analyst, which monitors trade document discrepancies in export operations.

Chase's Trade software can be integrated with GEIS' Trade*Express workstation. Although supporting some currently used EDI formats, company officials are watching EDIFACT developments for future implementation, and are evaluating additional documents.

CTI is being expanded with pilot tests in Hong Kong and Brussels; CTI branches are being established at Chase branches worldwide.

3. Irving Trust

Irving Trust uses Telenet for its electronic letter of credit services, which conform to the X12 format. The service is supported through three processing centers, including one in Hong Kong.

4. First National Bank of Boston

This bank has over 200 offices located in over 35 countries, with what it claims is the fourth-largest international network among U.S. Banks. Like many banks, it provides trade services to customers, principally through Trade Service Representatives. Electronic transmission services

are available between a customer's microcomputer and the bank. These services, called Trade Key, also support the creation and tracking of various documents.

5. Chemical Bank

This bank provides micro software called ChemLink L/C, which supports the creation of, and on-line status monitoring of, commercial letters of credit, amendments, airway releases, and steamship guarantees.

D

Regional Bell Operating Companies (RBOCs)

1. Technology

Several of the Bell Operating Companies (BOCs) are offering intra-LATA (Local Access and Transport Area) packet-switched networking with asynchronous-to-X.25 conversions. These local networks are known as Local-Area Data Transport (LADT) networks.

Connections between LADTs and national VANs are planned, with Southern New England Telephone connected to McDonnell Douglas' Tymnet and ITT's WorldCom. Tymnet also links with Southwestern Bell's packet network. SNET is expected to offer EDI under a resale agreement with a third-party provider. The ITT international service has also entered agreements for interconnections to several other BOC LADTs. Bell South's PulseLink has interconnected with Telenet.

LADT services will make EDI more attractive, at least in some areas, by reducing dial-up or direct-link costs to EDI services. Several of the RBOCs are known to be evaluating their EDI involvement, and some are promoting their LADT services for EDI. As participants in the Telecommunications Industry Forum users' group, several BOCs are internal users of EDI.

2. Recent Regulation Impacting BOC Enhanced Services

Recent regulatory rulings allow the BOCs to provide minimal gateway information to enhanced information services. The provision of most types of information services (including EDI) by the BOCs divested under the Modified Final Judgement is prohibited, although waivers will likely be sought. Nondivested BOCs (Cincinnati Bell, SNET) and independent telephone companies are not generally subject to such conditions.

Accordingly, handoffs and joint ventures will be required if the BOCs seek a more active role. At least one BOC (Ameritech, discussed below) is pursuing EDI, and others (particularly the nondivested, independent telephone companies) are expected to enter into resale agreements.

These nondivested BOCs and independents, plus those receiving waivers, may be expected to participate as agents of third-party EDI services through interconnections of local data networks to wide-area VANs and, by implication, to international services.

3. International Activities of BOCs

Several of the BOCs are actively seeking international business, often in partnership with foreign Postal, Telephone, and Telegraph (PTT) monopolies; other international alliances have been formed. One BOC's relationships have EDI components.

a. Ameritech Services

Ameritech is involved in two projects with EDI potential.

i. DOMINI

Ameritech Services (Schaumburg, IL), a subsidiary of the RBOC, and Groupe Francais D'Infomatique (GFI-Paris) are jointly engaged in a research, development, and one-year trial of a service called DOMINI.

- GFI is a wholly owned subsidiary of Scicon International, a division of British Petroleum.
- DOMINI will offer EDI, E-mail, and computer conferencing.
- GFI is contributing hardware, software, and data processing equipment.
- Ameritech will supply its Local-Area Data Transport (LADT) network.
- GFI has an X.400 standard E-mail product called Comutex 400; a modified version will be used for DOMINI.
- The trial service will not require a waiver of the Modified Final Judgment, which currently restricts BOCs from offering information processing services, because GFI will be performing these functions.

- A service bureau will be established in one of Ameritech's BOCs, with services offered solely within that BOC's Local-Access and Transport Area (LATA).

ii. INet America

In late 1987, Ameritech, Telecom Canada, and Telenet announced a joint venture to establish iNet America, a U.S. version of a network service offered in Canada. In Canada, Telecom Canada offers the Trade Route EDI service.

Services planned for iNet include data bases, electronic mail (based on Telenet's Telemail), and EDI.

- Although Telenet will host the applications, data base gateways, and some networking for the venture, it is unclear whether the EDI service will be Telenet's private-labeled version of Sterling Software's Ordernet service, for which Telenet has an earlier agreement.
- Connections to the Canadian EDI service are probable, based on customer demand.
- Connections to the DOMINI service, assuming it continues, are also probable, although there appears to be redundancy in these two efforts.

b. Bell Atlantic International

This company is providing professional services and software to PTTs for telephone company order processing, and maintenance/installation control.

c. Bell South International (BSI)

BSI is active in Europe, India, Central America, and the Far East. BSI is developing digital network services for Guatel in Guatemala. In India, BSI will provide data communications training and technical support for a nationwide data network.

d. NYNEX International Co. (NIC)

NIC has opened offices in Europe and the Far East and has agreements with Japan's NTT and France's DGT for personnel and information exchanges leading to new products and services. With the French PTT,

Nynex will jointly market services via seminars to customers in France and within Nynex's home territory.

Nynex is also a participant in a joint venture for fiber optic services between the U.S. and Europe.

The company's motivation for pursuing international activities is the presence of MNCs in the New York and Boston areas. MNCs in this customer base are likely to use or need foreign-operated services, thus giving the RBOC an entrée to the market.

e. Pacific Telesis International (PTI)

PTI has developed relationships with the PTTs of Spain (for research and development facilities), Kuwait (for cellular radio), and Thailand (for digital paging services).

- In Japan, PTI company plans a 10% investment in International Digital Communications, a transpacific carrier, pending approval from federal regulators.
- In its pursuit of international business, Pacific Telesis is representing itself as a source of California high technology.

f. Southwestern Bell

The St. Louis-based company is working with PTTs in Europe on software development, primarily applications for managing telephone company operations. Southwestern Bell is also providing support for automated directory services (Israel) and directory advertising sales (Australia).

g. U.S. West Information Systems

The company's recent acquisition, Applied Communications, is installing a POS transaction network in Australia. The network will ultimately link 60,000 terminals. The company also claims strengths in EFT software design.

4. Comments

These international relationships mostly form the basis for professional services to PTTs and others in support of a variety of projects that may

have EDI in their portfolio. However, with the noted exception of Ameritech, there are no apparent EDI projects under development between BOCs and international carriers at the present time, although SNET's resale agreement may have this capability.

This neglect of EDI may change. One venue for such change will be the BOCs' involvement as users of EDI through the Telecommunications Industry Forum (TCIF), which is establishing standards in support of BOC procurement and provisioning requirements. As several of the BOCs distribute customer premises equipment manufactured offshore, the industry's use of EDI implies international activities.

E

British Telecom PLC

British Telecom Private Limited Company was created through the privatization of the former government telephone service monopoly.

Since it is now participating in a competitive marketplace, the company will adapt to advancing technologies and users' needs for diversified services.

- The bureaucratic decision-making process is being changed, with several units formed to address specific market and customer needs.
- BT is becoming more market driven, and is more involved in international activities. It has developed strategic partnering relationships and made acquisitions to further these directions.

As reported in the profile on McDonnell Douglas, the BT/ McDonnell Douglas EDINET joint venture in the U.K. was disbanded in late 1986.

Within the U.K., British Telecom will probably wait for other computer service companies to create a market before capitalizing on the opportunity. British Telecom's strength is in supporting and maintaining commodity services—e.g., EDI—after a critical mass has been established and growth is self-perpetuating.

The convergence of E-mail and generic EDI could lead to BT's X.400 messaging service becoming the major vehicle for U.K. and possibly international EDI traffic in two or three years.

BT's joint venture with McDonnell Douglas, part of a plan to enter U.S. markets, is not the company's only partnering example. BT has several partnerships with international EDI implications.

- A unit of the company has worked with Computer Sciences Corporation (CSC) to develop automated customs agency systems in the U.S. and elsewhere.
- BT bought ITT's Dialcom (Silver Springs, MD) in 1986. Dialcom provides E-mail, forms processing, data base access, and other forms of remote computing services, several of which have EDI-like capabilities. Dialcom is believed to be investigating EDI services.

BT is expected to use its experience in managing large networks to offer total information solutions worldwide, in developed and developing areas.

F

Control Data Corporation

CDC's Redinet Intercompany Business Transaction System (RediIbits) was formed in spring, 1985 under a joint marketing agreement with AT&T.

The service uses AT&T's Accunet as the transmission network, with AT&T responsible for network marketing under the name of RediAccess. Insofar as this network is accessible on an international basis, CDC can support IEDI. However, the company's EDI success domestically has been limited.

The company may have a role in supporting IEDI through private networks:

- Its Redi-Agent service is a customized EDI transaction retrieval and forwarding service for helping suppliers access larger trading partners who have private EDI networks.
- Control Data acts as an authorized agent to access and retrieve business information from one or several private EDI systems, with translations.
- Data is then forwarded to the customer's Redinet mailbox, or delivered via a dial-out service, directly to the company.

Redi-Agent obviates the supplier's need to handle this activity directly, or to develop customized EDI interfaces to private networks.

RediNet also supports internetworking with GEIS and McDonnell Douglas, only charging for one side of transactions forwarded or received through a third party.

G**CompuServe
Incorporated**

CompuServe's Network Services is a VAN available to corporations, government agencies, and financial institutions with access in over 200 U.S. cities and in countries via IRC gateways. Additional access is possible through other VANs.

Transaction processing in 1985 is said to have increased 25 times over 1984 volume (to 4.2 million transactions monthly), thus becoming one of the fastest growing company activities.

In addition to POS services, other services include electronic mail, on-line data bases, shopping services, airline ticket reservations, and financial services including economic analysis, discount securities trading, home banking, and international funds transfer for overseas credit union members.

The EasyPlex (consumer) and Infoplex (business) electronic mail services and MCIMail were linked in early 1986. Infoplex is used by approximately 150 Fortune 1000 companies.

CompuServe has an agreement with Computer Sciences Corporation for CSC to market CompuServe's services (principally financial data bases) overseas.

CompuServe has been providing private EDI networking for its customers, and is expected to make a general EDI service available this year.

CompuServe has an exclusive agreement with two Japanese firms (Fujitsu and Nissho Iwai) to provide international services between Japan and the U.S. One example of these services is financial market information exchanges, which position the company for further overseas activities.

H**Computer Sciences
Corporation (CSC)**

CSC's international value-added network (INFONET) was formed in August 1983.

- INFONET currently serves approximately 400 international cities, with dedicated links to 20 nations, gateways to the public data networks of 12 of those countries, and 75 additional countries served via IRC connections. However, US access is limited to 50 nodes and access via Tymnet.

- INFONET's international profile is enhanced by CSC representatives versed in local languages, customs, and procedures in 28 served countries. Local support locations are shown in Exhibit A-1. CSC's approach is distinctive about the network, which is well positioned for international EDI services.

EXHIBIT A-1a

**COMPUTER SCIENCES CORPORATION
INFONET
LOCAL SUPPORT LOCATIONS AND NETWORK ACCESS**

COUNTRY	LOCAL SUPPORT	NETWORK
Argentina	Servicios de Computación (SEDECO)	
Australia	Computer Sciences of Australia	Austpac
Belgium	Computer Sciences Europe	DCS
Canada	Computer Sciences Canada	Datapac
Denmark	Datema A/S	
Finland	Datema OY	
France	Interpac	Transpac
Fed. Rep. Germany	Computer Sciences International Deutschland GmbH	Datex-P
Hong Kong	Communication Services Ltd. (Subsidiary of Hong Kong Telephone)	
Italy	Informatica Distribuita SPA	Itapac
Japan	Mitsui Knowledge Industry	DDX-P
South Korea	Data Communications Corp. of Korea (DACOM)	
Mexico	Secretaria de Comunicaciones y Transportes	Telepac

EXHIBIT A-1b

**COMPUTER SCIENCES CORPORATION
INFONET
LOCAL SUPPORT LOCATIONS AND NETWORK ACCESS**

COUNTRY	LOCAL SUPPORT	NETWORK
Netherlands	CSC Nederland BV	
New Zealand	Computer Sciences of New Zealand	
Norway	DATEMA Norge A/S	
Philippines	Mega Computer Corp.	
Portugal	Telematica y Base de Datos	Telepac
Singapore	Integrated Information Pte. (Telecommunications Authority of Singapore subsidiary)	
South Africa	Computer Sciences PTY Ltd.	Saponet
Spain	ENTEL	Iberpac
Sweden	DATEMA Information AB	
Switzerland	CSC AG (SCHWEIZ)	
Rep. of China	China Data Processing Ctr.	
United Kingdom	Computer Sciences Company Ltd.	PSS

Approximately 95 countries are served via direct and IRC links.

The company targets large multinational and multilocation organizations, including Fortune 1,000 companies, and the communications, distribution, and manufacturing industries. However, the majority of business has come from federal and state agencies.

CSC feels it has relied too heavily on government business and is working to expand its activities into more profitable commercial activities.

CSC has several EDI-related services and applications:

- On-line inventory control.
- Applications for the distribution industry.
- Use of E-mail forms capability for EDI-like functions. At least one customer (in apparel) uses this service on an international basis.
- The Brazilian Trade Commission uses Infonet to match importer and exporter needs in 55 countries.

EDI-related professional services activities include a systems integration and facilities management contract for an automated cargo clearance system.

- The Miami International Cargo System (MICS) is described as the first fully integrated cargo clearance system in the U.S.
- The system is similar to those designed by CSC for England, France, and Australia.
- A subcontractor and frequent CSC partner is the British Telecommunications unit National Data Processing Service (NDPS).

Working to provide a de-facto standardized automated cargo clearance system for several U.S. ports, CSC and NDPS have worked toward additional contracts that represent an excellent position for developing a role in international EDI.

CSC also developed a customized international sourcing network (called Sinet) for a garment manufacturer.

CSC is believed to be investigating an adaptation of Notice for EDI applications, although CSC may seek to acquire a firm with EDI expertise, or enter a joint venture.

The company has entered a variety of relationships for international network services marketing.

- In 1985, Mitsui Knowledge Industry, CSC's Japanese licensee, began supporting VAN services to that country through upgraded nodes in Tokyo and Osaka. Infonet is providing VAN services to over 600 companies located throughout the Far East, an increase of 40% between 1986 and 1987.
- In late 1986, CSC announced an agreement for the Infonet division to market CompuServe's data base services internationally. CompuServe is profiled above. CSC is also distributing France's Minitel videotex services in selected U.S. cities.
- In 1986, the company signed with ALPI Consultores Ltda, a Brazilian computer services firm and Servicios de Computación, S.A. (SEDECO), a Buenos Aires-based information services company, to market messaging products and to assist CSC Infonet clients in Brazil, Argentina, and Uruguay.
- Toronto (Canada)-based TIL Systems Ltd. was signed in 1986 to market and support Infonet services as part of its own line of terminals, networking, and financial market data base services.
- In 1987, VTR Telecomunicaciones was signed for Infonet marketing, customer support, and data communications in Chile. VTR provides IRC, Telex, and telephone services in Chile, and is installing a packet network in that nation.
- Also in 1987, the company added Telematica y Base de Datos of Lisbon, Portugal to market enhanced communications services and provide technical support to customers in Portugal.

In 1987, the company enhanced its VAN with new equipment and software, adding features, higher speeds, increased error-checking, and additional support for 3270 terminal users.

- Access can be geographically limited.
- Log-on procedures have been simplified.
- Network capacity has been improved to accommodate traffic, which increased 100% between March 1986 and September 1987.

CSC's international profile and its work for customs agencies suits it well for service to multinational corporations.

- Its relationships with government agencies may also lead to governmental EDI projects.

- Its professional services capabilities means it can handle complex projects and systems integration tasks.

I

Digital Equipment Corporation (DEC)

DEC may prove to be a "wild-card" in IEDI. The company's European subsidiaries are providing intracompany networks, and the company maintains an extensive international network that is available for a limited number of applications by its customers.

- The Enhanced Application Network Services, part of the company's Service Bureau, provides access to the DEC network.
- This network can combine terminals or micros, customer host processors, and DEC host processors for a distributed but integrated application.

Currently, the network is limited to product information data bases, hardware and software evaluation, peak load processing, and other incremental computer resources. Services are accessed locally and delivered remotely from the DEC's computer services centers.

Exhibit A-2 shows DEC's worldwide network.

J

General Electric Information Services Company (GEIS)

GEIS (Rockville, MD), established in 1984, is a division of General Electric. It provides the Mark*Net VAN, available in over 750 cities worldwide, with 600 access points in the U.S.

GEIS offers a broadly based service, with applications supporting international commodities, securities and currency markets, and international banking. Other industries served domestically and internationally are manufacturing, shipping, retail, health care, and computer hobbyists.

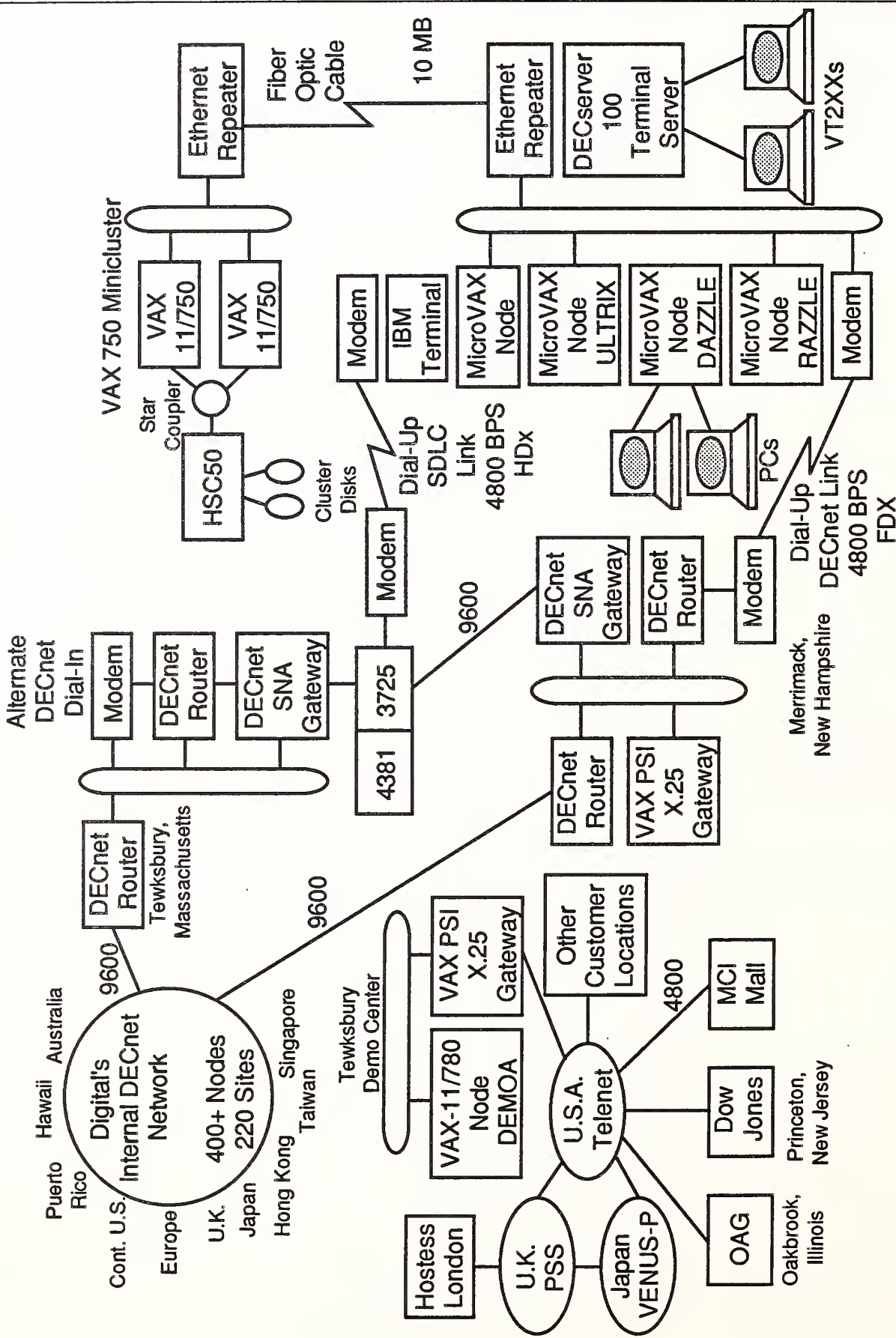
GEIS has positioned itself to become a major EDI provider, both domestically and internationally. This direction is underscored by the name of the EDI division: Worldwide Intercompany Logistics Business.

The company reaches a total of 71 countries through various facilities, and maintains processing supercenters in the U.S. and the Netherlands.

GEIS works with industry groups to develop alliances and win endorsements for its EDI services.

EXHIBIT A-2

DEC'S WORLDWIDE NETWORK



GEIS's EDI and EDI-related services are:

- EDI*Express (domestic).
- Trade*Express (International).
- EMC*Express (health claims processing).
- Design*Express (CAD/CAM engineering and specification drawings), which will be used to distribute apparel manufacturing graphics on an international basis under a resale agreement.
- GEIS is actively pursuing international EDI applications and supports the GTDI and EDIFACT international standards in its services and software. Trade*Express is designed for mailboxing and transmission of trade documents.
- Trade*Express—targeted to exporters, freight forwarders, banks, carriers, custom house brokers, and others involved in international trade—integrates EDI, electronic mail, a bulletin board for sharing information, computer conferencing, and trade data base inquiry and retrieval capabilities.
- Through the First National Bank of Chicago, GEIS supports the bank's Accelerated Trade Payments service for international trading companies. This service improves international financial transactions.
- In the United Kingdom, GEIS Ltd. has joined with STC International Computers Ltd. (formerly ICL) to form International Network Services Ltd., which offers EDI services. This joint venture will likely serve as a gateway to the European community for IEDI traffic.
- The company is pursuing relationships in West Germany, France, and elsewhere. With Finland's Nokia Information Network Services, the company will establish a processing center in 1988 for domestic and international EDI, licensing its EDI software to the partner. GEIS and the Swedish software firm Transtema will integrate their systems and services, targeting freight and shipping industries.
- The Japanese GEIS affiliate ISI-Dentsu has been distributing GEIS' teleprocessing services in Japan since 1971. In July, 1987, ISI-Dentsu of America was formed to market GEIS' services to Japanese companies operating in the U.S. The new company will be based at GEIS' Rockville (MD) headquarters.
- Over 150 Japanese concerns are operating in the U.S. in financial services, automotive manufacturing, electrical/electronics, machinery, and trade.

- The new company should lead to increased Japan-U.S. EDI traffic.

GEIS' teleprocessing services are sold by its affiliates and distributors worldwide. Exhibit A-3 lists many of these distributors.

GEIS has made a significant investment in its EDI business and is operating under a three-year business plan to reach break-even by the end of 1988.

Now that the domestic business is well underway (approximately 1,500 customers, making it the market leader as of late 1987), more attention will be focused on IEDI.

GEIS's corporate philosophy is that the company will not enter any business where it cannot achieve a dominant or near-dominant position.

- GEIS's plan is to leverage the worldwide network presence, and to focus on selected cross-industry applications. GEIS earlier defined "focused markets" as including EDI itself, business logistics (or the movement of goods and materials), and international trade. The renaming of the EDI division reflects this approach.

Within EDI, the company is intent on signing with agents to sell its services with the agents' industry-specific software and equipment. Agreements are in place with Apparel Computer Company (New York/Concord, CA), American Business Computer (Farmington Hills, MI; selling primarily to the auto industry), Baxter-Travenol (health care products), MSA (Atlanta, GA), and Microdyamics (Dallas, TX) for Design*Express (apparel industry).

GEIS apparently feels that an aggressive approach to the domestic and international EDI market will bring it long-term relationships with its customers, agents, business partners, and private EDI network users. Once signed, users may be reluctant to move to another company. Thus, gathering market share early in the game may be worth the significant investment GEIS has made.

K

IBM'S Information Network (IIN)

IIN was upgraded in 1985; the network added new computer center facilities and other measures designed to improve large-users' abilities to connect their own SNA networks and to link with other customers.

Earlier, IIN maintained nodes in a few U.S. cities. These nodes represented a majority of IIN's large-mainframe customer installations. Now

EXHIBIT A-3a

GE INFORMATION SERVICES INTERNATIONAL DISTRIBUTORS

COUNTRY	DISTRIBUTOR
Australia	GEIS, A Division of Australian General Electric (Sales) Ltd.
Austria	General Electric GmbH
Bahrain	National Company for Commerce and Industry
Belgium	S.A. General Electric Information Services N.V.
Canada	Canadian General Electric Company Ltd., Information Services
Denmark	EAC Data (DK)
Egypt	Nile-Net International
Finland	NOKIA Corporation
France	S.C.J. Informatique and GE Information Services
Ireland	GEISCO Ltd.
Italy	General Electric Information Services S.P.A.
Japan	Dentsu, Ltd.; C&C International; and NEC Corporation
Korea	Data Management International, Ltd.
Malaysia	Formis Computer Services
Mexico	Tiempo Compartido, S.A.

EXHIBITA-3b

GE INFORMATION SERVICES INTERNATIONAL DISTRIBUTORS

COUNTRY	DISTRIBUTOR
Netherlands	General Electric Information Services B.V.
Norway	General Electric (USA) Information Services A/S
Phillipines	General Electric Information Services, a Division of General Electric International Operations
Saudi Arabia	Saudi American General Electric Company
Singapore	General Electric (USA) Asia Company
Spain	General de Informatica S.A.
Sweden	General Electric (USA) Information Services AB
Switzerland	General Electric Information Services S.A. and AG
Taiwan	Vanguard Information Center, Inc.
United Arab Emirates	General Electric Technical Services Company
United Kingdom	GEISCO Ltd.
Venezuela	GEISCO
West Germany	General Electric Information-Service GmbH

dial-up access is possible from 200 access points, and the network may also be accessed through Telenet.

IIN supports two services:

- Network Services, for linking a customer's mainframes and terminals in a managed SNA network environment.
- Information Exchange, which provides "store and forward" and other value-added services, including EDI.

In 1986, IBM announced Intercontinental Information Services to link transnational offices in the U.S., Asia, Europe, Africa, and the Middle East with data processing, office system, and file transfer services. IEDI is technically possible, but marketing issues need to be addressed.

Within Europe, the company has been successful in several competitive ventures, and has entered several alliances. For example:

- The company has won a contract with Lloyds of London and other U.K. insurers to provide services similar to those supported in the U.S.-based IVANS network. Approximately 150 agents and 20 brokers will use the U.K system, with later enhancements planned to provide data transfer on premiums to participating banks.
- With Fiat, the company has formed an Italian-based venture called INTESA with a budget of \$45 million over five years. INTESA will conduct trade messaging between manufacturers and suppliers. The new venture will optimize "value-added" stock control applications.
- In France, IBM has joined with two French banks and SemaMetra, a computer services firm, to establish a Value-Added network within France. This network will support the OSI standard. IBM holds 45% of the joint venture, the Parabas bank 30%, Credit Agricole 20%, and SemaMetra 5%.
- In the U.K., the company has joined with a group of shipping interests to promote Shipnet services and access to the Tranportel transportation data base. The community involved is approximately four times larger than that involved in the competitive Data Interchange for Shipping (DISH) project, which uses ICL's Tradanet.

IBM in Europe is supporting the developing EDIFACT standard, and is distributing Tradacoms software, originally developed by the trade facilitation agency SITPRO.

At its Tampa processing center, IIN hosts Ad/TRACs (Advanced Transaction Rearrange and Conversion System) from Advanced Technology Systems (Norcross, GA), for EDI translations and also for IIN's Insurance Communications Services. However, the company discourages on-network translations; IIN encourages users to transmit transactions in the necessary format.

Despite the status of on-network translation, IBM appears to be placing more attention on EDI services. For example, in late 1986 IIN began distributing microcomputer EDI software from two vendors and restructured its network/processing services fees.

Users of IIN's EDI capabilities domestically include chemical, textile, automobile manufacturing, insurance, and electronics companies. These users tend to be dedicated IBM shops, including many multinational corporations with international trade needs.

In electronics, parent company IBM is using the network to communicate with suppliers internationally, thus forming a cornerstone for the company's recently stated strategy.

- The idea is that once familiar with the application, and recognizing that many trading partners are also on the network, intersupplier transactions will result.
- However, IBM's own international trading group, which is named the International Purchasing Office and Distribution Center and is based in Boulder (CO), tends to use the network's electronic mail (rather than EDI) for international functions.

L

Kleinschmidt, Inc.

Kleinschmidt (Deerfield, Ill.) provides car location and shipper administrative messages (CLM and SAM) services as well as other EDI mailbox and translator services to a cross-section of industries in the U.S. and Canada.

Among industries served are: railroads, grocery and food processing, warehousing, chemicals, petroleum, consumer products, forest products, brokerage firms, distributors, and trucking carriers.

The company's international profile appears limited to U.S./Canadian processing.

M**McDonnell Douglas Corporation (MDC)**

In 1984, McDonnell Douglas purchased Tymshare and its VAN, Tymnet. These and other acquired companies have been placed in the Information Services Group. Until late 1986, EDI was provided by the McDonnell Douglas Electronic Data Interchange Systems Company. Now, EDI services and MDC's other electronic messaging units have been merged into the Applied Communications Systems Company (ACS).

Tymnet serves approximately 70 international access points and over 500 U.S. cities. International access is supported via International Record Carriers (IRCs); however, the company's majority ownership of FTCC (an IRC) was recently sold to a unit of Pacific Telecom.

The Information Services Group sells services to vertical and horizontal businesses through focused operating groups, and also provides products and services to other ISG companies.

The principal EDI service, EDI*Net, was introduced in 1981. It supports mailbox and outdial services, and uses TDCC, X12, international GTDI, and UCS standards. However, the service does not provide on-network translations. EDI*Net clients are predominantly in the transportation, grocery, electronics, telecommunications, aerospace, oil, and warehousing industries.

In late 1986, a joint venture with British Telecom for EDI services in the United Kingdom was abandoned by both firms, which cited a belief that the market had not developed as expected. In 18 months of operations, the venture failed to sign any customers. INPUT believes the venture failed due to fundamental cultural differences between the companies, and marketing/sales problems.

- BT is technologically driven and production oriented, whereas MDC is marketing oriented. The two organizations did not work well together at functional or administrative levels.
- The U.K. marketing effort was targeted to innovative EDI users who were primarily committed to the development of another vendor's EDI service (ICL's Tradanet).
- BT's sales force was familiar with selling to telecommunications managers, whereas EDI needs to be promoted at a general management level. Telecom managers are often removed from decision-making and new development, and are an inappropriate target for early market development.

MDC officials report an effort to license the company's EDI technologies to public telephone and telegraph agencies (PTTs), with the goal of providing gateways to U.S. service for international EDI applications.

The company's strategy has been to recruit companies representing many industries to MDC's EDI services, with these companies drawing trading partners to the network for data interchanges. This strategy contrasts with the strategies of other VANs that are taking a more targeted approach.

In 1986, the company began upgrading its central processors from IBM mainframes to Tandem fault-tolerant computers.

- In mid-1987, the company was scheduled to release EDI Version 2.0 and had plans to convert all customers to the new system within one year.
- These technical improvements will support additional EDI services such as transaction totalling, extensive management reports, and detailed billing.
- EDI II, as the new implementation is called, is being marketed to PTTs, with one European sale believed to be secured. The idea is that PTTs will provide EDI services that can then link to the compatible technology supported within the U.S. and other nations licensing EDI II.

N

MCI Communications Corporation (MCI)

Aside from offering networking in support of private EDI implementations, MCI is known to be monitoring EDI developments as a parallel technology to MCI Mail services. MCI Mail is accessible internationally through a variety of means, and offers hard copy output options.

The company's Scripts service permits EDI-like fill-in-the-blanks capabilities and could serve as a migration path to true EDI services for customers.

MCI has announced it will support X.400 E-mail standards, which may eventually incorporate EDI capabilities on an international basis.

IBM's partial ownership of MCI may be a factor in its future direction.

- IBM's resources could be helpful in new-product and service development.

- Although IBM's involvement is primarily an investment position rather than a functional merger, any MCI EDI initiatives could compete with IBM's Information Network EDI Services and therefore may be discouraged.

MCI's experience in the highly competitive interexchange carrier market has caused write-downs and staffing cuts. These losses may suggest that the technical and marketing investment in any new EDI service should be examined carefully.

Further, if the speculative merger of MCI and U.S. Sprint (to accumulate market share in the long-distance market) occurs, any new service such as EDI would likely be delayed.

MCI International (Rye Brook, NY), an international record carrier, is also a potential market participant, particularly in international funds transfers associated with EDI. This MCI unit is being merged with RCA Global Communications Services, which was purchased by MCI from General Electric, the new owners of RCA. Also, a consolidation of Global Communications Services with MCI Mail's operations is being considered.

O

Railinc Corporation

Railinc (Washington, DC) is a wholly owned data processing and telecommunications subsidiary of the Association of American Railroads (AAR). It started as a service exclusively for railroads and later added services for other users through its private network, called TeleRail Automated Information Network (TRAIN II).

Most major railroads in the U.S. and several in Canada use the network, although usage is concentrated in the Eastern U.S. Railinc's two primary EDI services are SAM (Shipper Assist Message) service for high-volume users and CARLO (Car Location Message Dial-In Service) for low-volume needs, both developed by the AAR and the National Industrial Traffic League. As their names imply, both services are logistics applications. Additionally, waybills and invoices are exchanged between carriers and shippers.

Since it is a for-profit subsidiary, Railinc can pursue business opportunities in nonrail industries. Possible areas of involvement are electronic funds transfer, interchanges between railroads and ocean carriers, and data interchanges with U.S. Customs. However, INPUT feels that the company's efforts will be directed primarily at rail customers and major

railroad users and that any international activities will likely be limited to North America.

P

Sterling Software (SSW) Ordernet Division

Sterling Software (SSW) Ordernet division provides EDI services to the pharmaceutical, medical/surgical, hardware, hard goods, service merchandising, ocean freight, warehousing, and automobile supply industries. The unit was formerly part of Informatics General, which was acquired by SSW in 1985.

The company processes 80% of the pharmaceutical industry's purchase orders, with service to provide nearly all of the top wholesalers and manufacturers.

In mid-1987, the company entered an agreement with Telenet Communications Company (A U.S. Sprint Company) whereby Telenet will private-label and resell Ordernet's services to Telenet's Fortune 500 customers.

Since July, 1987, Ordernet's Services have been available from Management Horizons Data Systems, a division of Computer Horizons Ltd. in Canada, under a resale agreement.

In 1985, the company completed a software development project for the Department of Defense. The project automated all U.S. Army commissaries in Europe and the Near East. In late 1986, the Air Force Commissary service began pilot testing of UCS standard communications through Ordernet, with plans for 140 locations to communicate with military brokers.

Sterling Software also developed the initial service offering for International Health Information Applications, Inc., which provides information on pharmaceuticals and creates a data base of drug usage through data capture and retrieval procedures. Ordernet is also involved in tracking drug purchases for mainland Chinese hospitals.

Due to its relatively early market entry, Sterling Software holds a significant portion of the EDI service market based on numbers of customers.

Ordernet claims to be market-driven. Through continual monitoring of industry practices and needs, and through its users groups, Ordernet seeks to anticipate market demands.

SSW faces a dilemma with regard to international activities in that its current U.S. customers may view IEDI services as providing competitive parity to offshore suppliers in the industries Ordernet now serves.

Sterling Software's corporate strategy is to select market niches offering high growth potential; acquire successful businesses providing services and products to those niches; group them by target markets; give them marketing, financial, and management support as needed; and help the units maintain their autonomy as a way to keep them productive.

Sterling Software reached its current size through acquisitions. Company officials state that Sterling will pursue large acquisitions. Although no major acquisitions have been made since the purchase of Informatics General, it is possible this strategy will be applied in the EDI arena to strengthen current markets, or to gain entry into new ones.

Sterling Software's development of international EDI capabilities for Army and Air Force Commissaries may lead to further involvement in international EDI, and in other government agency paperless-procurement activities.

Q

Telenet Communications Corporation

Telenet (Reston, VA) is now part of U.S. Sprint, which was formed jointly by GTE and U.S. Telecom. It is the largest and, INPUT believes, the most profitable value-added network, largely due to its provision of private networks.

Telenet has access points in approximately 350 U.S. cities, and overseas connections in 55 nations through PTT and IRC facilities. Telenet itself is a licensed international record carrier, and as such can provide end-to-end packet services through agreements with international networks, which are primarily PTTs.

An additional 110 access points are being added to the network in 1987.

Exhibit A-4 lists international access to Telenet's network.

Telenet supports The Telemail E-mail service, which has direct connections to Telecom Canada's Envoy (the first link between electronic mail systems), and with Japan's Acemail service.

EXHIBIT A-4a

TELENET INTERNATIONAL ACCESS

COUNTRY	SERVICE PROVIDER	NETWORK
Argentina	ENTEL	
Australia	Telecom Australia Overseas Telecommunications Commission	AUSPAC (domestic) MIDAS (international)
Austria	Radio-Austria A.G.	DATEX-P
Bahamas	Batelco	
Belgium	Regie van Telegrafie en Telefonie	DCS
Brazil	Embratel	Interdata and Renspac
Canada	Telecom Canada Teleglobe Canada	Datapak Globedat
Chile	ENTEL	ECOM
Columbia	Empresa Nacional de Telecomunicaciones	
Peoples Rep. of China	Beijing Telecommunications Commission	
Denmark	PTT	Datapak
Finland	General Directorate of Posts and Telegraphs	Datapak
France	Direction des Telecommunications des Reseaux Extérieurs	Transpac

EXHIBITA-4b

TELENET INTERNATIONAL ACCESS

COUNTRY	SERVICE PROVIDER	NETWORK
Norway	Norwegian Telecommunications Administration	Datapak
The Philippines	ETPI Philippine Global Communications	
Singapore	Telecommunication Authority	Telepac
South Africa	Postmaster General	Saponet and Transnet
Spain	Compañía Telefonica Nacional de España	TIDI and Iberpac
Sweden	Stockholm Telecommunications Administration	Telepak
Switzerland	Suisse PTT Radio Suisse	Telepak Datalink
Taiwan	International Telecommunications Administration	
Thailand	Communications Authority	
United Arab Emirates	Emirates Telecommunications Corp.	Tedas
United Kingdom	British Telecom	International Packet-Switched Services (IPSS)

Plus Additional Access Via IRC Connections

EXHIBITA-4c

TELENET INTERNATIONAL ACCESS

COUNTRY	SERVICE PROVIDER	NETWORK
West Germany	Deutsche Bundespost	Datex-P
Greece	OTE Athinai Telex	Helpak
Hong Kong	Cable & Wireless Ltd.	Intelpak (International Gateway)
	Hong Kong Telephone	Datapak (Domestic)
Ireland	PTT	Eirpac IPSS
Israel	Ministry of Communications	Isranet
Italy	Italcable	Dardo and Itapac
Japan	NTT KDD	Venus-P
Korea	Data Communications Corporation of Korea	
Luxembourg	Centre des Telecommunications	Luxpac
Malaysia	Telekom Malaysia	Maypac
Mexico	Secretaria de Comunicaciones y Transportes	Telepac
Netherlands	PTT	Datanet-1
New Zealand	Post Office	Pacnet

- Additional E-mail links are planned with Australia (Telememo), Belgium (DCS Mail), Italy (Itamail), Norway (Teleboks), Sweden (Telebox), and Taiwan (Pipmail).
- The Telemail International Licensees Association was formed in late 1987 to promote E-mail and other forms of exchange services (including EDI), and to foster interconnectivity via X.400 standard gateways.

As noted in the section on Bell Operating Companies, Telenet is providing networking and host-processing service for the iNet America joint venture being established with Telecom Canada. Inet America officials say the new venture will offer EDI.

In late 1987, Bell South announced it will connect its PulseLink packet network to Telenet.

Telenet will be privately labeling and reselling Sterling Software's Ordernet services in an agreement currently limited to Telenet's Fortune 500 accounts.

The company has fewer equity-based affiliations overseas than does rival GEIS. Rather, most international access to Telenet is also supported through independent PTT packet networks, many of which were developed with Telenet's assistance. In late, 1987 the Telemail International Licensees Association was formed to promote interconnectivity for E-mail and other services, presumably including EDI.

Also in late 1987, Telenet and the UK's Plessey entered an agreement to market data and packet network technology in Europe, believed to be an entry strategy into Europe's growing VAN/VADs market.

Telenet's EDI agreement with SSW apparently does not include provisions for Telenet to become active in the IEDI arena. However, since Telenet's accounts include Multinational Corporations (MNCs), and since its messaging strategy is global in nature, the agreement may soon be tested by customer demand.

The links between Telecom Canada's Envoy/iNet services and Telenet presently do not support EDI, a functionality that may be added due to customer demand for trade with Canada as the effects of the recently agreed free-trade agreement lead to more intercountry commerce.

R**Western Union Corporation (WU)**

This pioneering company in Upper Saddle River (NJ) has faced significant challenges, including administrative and organizational problems that have developed over its long history. In late 1987, stockholders were expected to approve a reorganization plan and takeover by LeBow Industries, and also approve the merger of WU's telex operations with those of ITT.

WU is focusing its efforts on its core business as a record carrier, electronic mail service vendor, and provider of private data networks. WU's EDI service will be part of the Easylink E-mail service as a menued option.

WU is seeking to upgrade current telex customers to electronic mail services and presumably will do the same with EDI.

In late 1986, WU opened its internal Packet Transport Network or PTN-1, which supports Easylink. PTN-1 will provide packet-switching services for business customers. The network can also access EasyLink and data base services.

- Additional access points are bringing the network to 180 cities, and 800-number access is being provided.
- New domestic and international services are planned with POS networks, insurance agent-company communications, and EDI services viewed as primary opportunities.

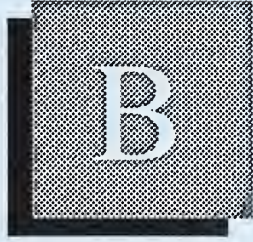
Western Union is introducing EDI services in conjunction with its E-mail EasyLink services. EasyLink E-mail services claim approximately 150,000 subscribers and a volume of 7 million messages monthly.

Although the company has experienced financial difficulties, company officials maintain that by layering EDI services onto its existing network services, and by using its current marketing organization, WU will be able to participate with only a relatively small investment.

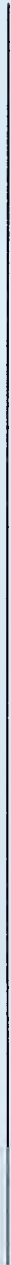
WU's EDI service will work seamlessly with the company's other messaging products, and will be able to deliver EDI transactions to facsimile machines.

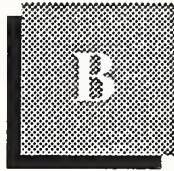
WU is expected to eventually leverage its international capabilities into the global market; however, IEDI development may be delayed due to

the task of integrating WU's and ITT's network facilities. The company has signed with Telecomet Japan to market EasyLink services to Japanese business customers.



Appendix: International EDI Terms





Appendix: International EDI Terms

- *ANA* - Article Numbering Association. The UK industry group that introduced barcoding to that country and developed the Tradcoms EDI standard.
- *ACH* - Automated ClearingHouse, a banking industry mechanism for electronic funds transfer. Also see NACHA.
- *ACS* - Automated Commercial System, the US Department of Commerce Customs Department's automation project. Has two primary modules: ABI (Automated Broker Interface) and AMS (Automated Manifest System).
- *AIAG* - The Automotive Industry Action Group, a trade association. Also refers to EDI formats developed by the association.
- *ANSI* - American National Standards Institute.
- *ASC* - Accredited Standards Committee.
- *ASTI* - L'Association de services Transport Informatiques, a French-based association for transportation information.
- *ATP* - Accelerated Trade Payments, an international trade service offered by the First National Bank of Chicago through GEIS.
- *Bar Coding* - A standardized method of identifying products that facilitate data entry through scanning of coded printed labels.
- *Batch Processing* - A data processing/data communications method that groups transactions. Compare to real-time processing.

- *CAD/CAM* - Computer-Assisted Design and Computer-Assisted Manufacturing, a set of applications that use graphics to manage these functions.
- *CALAI* - Conferencia de Autoridades Latinoamericanas de Informatica, the Conference of Latin American Informatics Authorities, formed to coordinate regional policies.
- *CARDIS* - Cargo Data Information System, a program of the National Council on International Trade Documentation and the US Department of Transportation.
- *CCD* - Cash Concentration and Disbursement, an electronic funds transfer format.
- *CEFIC* - The Brussels-based Council of European Chemical Manufacturers, which sponsors an EDI project.
- *CIDX* - Chemical Industry Data Exchange, a standard based on X12.
- *CLM* - Car Location Messages, applied to rail car logistics.
- *Compliance Checking* - A function that verifies that document information is received in the right order and in the proper format.
- *COPAS* - Council of Petroleum Accounting Standards, an industry association developing EDI standards.
- *COST 306* - An EEC EDI project in the transportation sector.
- *CSI* - Commercial Systems Integration. A professional service whereby vendors take complete responsibility for designing, planning, implementing, and sometimes managing a complex information system.
- *CTP* - Corporate Trade Payments, an Electronic Funds Transfer application.
- *CTX* - An electronic funds transfer mechanism that is compatible with the EDI X12 standard, and that carries information about a payment and transfers value.
- *DISA* - Data Interchange Standards Association, the administrative and support agency for the ANSI X12 committee, the primary US EDI standards body.
- *DISH* - Data Interchange for Shipping, a project sponsored by a European group of shippers, carriers, and agents.

- *DRESS* - Nippon Telephone and Telegraph's VAN service, which supports EDI functions.
- *ECC* - Commission of European Communities, the European "Common Market" agency.
- *EDI* - Electronic Data Interchange. Computer-to-computer communications based on established business document standards. EDI uses translations by EDI software housed on users' computers, located at remote computer service bureaus, or utilizing value-added network processors.
- *EDICT* - Istel's UK EDI service.
- *EDIFACT* - EDI for Administration, Commerce, and Transport; the evolving international EDI standard.
- *EDX* - Electronics Industry Data Exchange, based on the X12 standard.
- *EFT* - Electronic Funds Transfer, the transfer of value.
- *Electronic Mail* - The transmission of text, data, audio, or image messages between terminals using electronic communications channels.
- *Electronic Mailbox* - A store-and-forward facility for messages maintained by a transmission or processing facility.
- *EMBARC* - An EDI standard being promoted for use in the paper, printing, and publishing industries.
- *ETC* - Export Trading Company, a company that provides to exporting companies a variety of services, such as locating overseas distributors and buyers, checking credit, consolidating shipments, handling freight forwarding, and documenting international trade. ETCs are also called EMCs or export management companies.
- *GTDI* - General Trade Data Interchange, an international standard developed from TDI. GTDI accommodates the objectives of French participants in SITPRO, the agency behind the U.N.'s standardization efforts. GTDI is evolving into EDIFACT.
- *HS* - Harmonized System, an international nomenclature describing internationally traded goods.
- *ICOPS* - The Industry Committee on Office Products Standards, sponsored by two office products trade associations for EDI applications.
- *IEDI* - International EDI.

- *INS* - International Network Services, a UK-based joint venture of GEIS and ICL.
- *IRC* - International Record Carrier, a common carrier providing messaging and network services, but no longer limited to international communications.
- *IVANS* - Insurance Value-Added Service, provided on IBM's Information Network by an insurance industry association.
- *JEDI* - The Joint Electronic Data Interchange Committee, which consisted of representatives of industry trade associations that coordinated development of an international reference dictionary for new EDI transactions, segments, or data elements. JEDI's work has largely been supplanted by UNECE Working Party 4.
- *JIT* - Stands for just-in-time, an inventory management philosophy that plans delivery of needed materials and components immediately prior to final manufacture or assembly.
- *LDI* - Logistics Data Interchange - information about the location of materials in transit through the manufacturing/distribution cycle.
- *NCITD* - National Coalition on International Trade Documentation, the US trade facilitation agency whose goal is to reduce trade documentation through electronic and other means.
- *OECD* - Organization for Economic Cooperation and Development, created by industrial nations to discuss and coordinate economic policies.
- *ODETTE* - Organization for Data Exchange through Teletransmission in Europe, an automaker's association EDI standard.
- *Ordernet* - Sterling Software's EDI service. Also refers to EDI standards developed by the National Wholesale Druggists' Association for use in pharmaceuticals.
- *NACHA* - National Automated Clearing House Association, a banking services industry group.
- *PTT* - Post, Telephone, and Telegraph Administrations; generically, the government monopoly that in many countries administers, and often regulates, telephone and data communications.
- *Real-time* - A data processing or transmission method in which data are entered interactively. Response to input is fast enough to affect subsequent input. The results are used to influence a current process.

- *RCS* - A Remote Computing Service facility that processes some or all of a user's workload. Similar to a VAN (see below), but without network services.
- *SAM* - Shippers Administrative Messages, a logistics service/application.
- *SITPRO* - Simplification of Information Trade Procedures, a UK EDI standards and trade facilitation board that reports to the Department of Trade and Industry.
- *SMMT* - Society of Motor Manufacturers and Traders. An automotive industry association responsible for the ODETTE project.
- *Store and Forward* - The capability of a transmission or processing facility to hold messages or data until requested, or until a prescheduled time.
- *TALC* - Textile/Apparel Linkage Council, a subcommittee addressing EDI standards.
- *TAMCS* - Textile/Apparel Manufacturers' Communications Standards.
- *TDCC* - The Transportation Data Coordinating Committee, an early advocate for EDI. Also refers to U.S. EDI standards.
- *TDI* - Trade Data Interchange, an international shipping standard. Also see GTDI.
- *TEDIS* - An EEC program to promote Trade EDI throughout industry and government.
- *Tradanet* - An ICL (UK) EDI service.
- *Tradcoms* - Standards endorsed by the Article Numbering Association based on the UN TDI syntax.
- *Trade Facilitation Bodies* - Agencies established in most major countries to streamline trade documentation through electronic and other means.
- *Translation* - Transforming information sent in one format to another format.
- *UCS* - Uniform Communications Standards, the EDI standards used by the grocery industry, based on X.12, and coordinated by the Uniform Product Code Council.

- *UNECE* - United Nations Economic Commission for Europe. Despite its name, a broadly based representational body developing the international EDI standards called EDIFACT.
- *UNJEDI* - United Nations Joint EDI Committee, which develops technical and procedural standards on EDI.
- *VAN* - Value-Added Network. A common carrier network transmission facility, usually augmented with computerized data packeting, may also provide store-and-forward switching, terminal interfacing, error detection and correction, and host computer interfaces supporting various communications speeds, protocols, and processing requirements.
- *VANGUARD* - A UK Department of Trade and Industry-sponsored awareness and promotional program for VAN and EDI services.
- *VICS* - Voluntary Interindustry Communications Standards, a committee developing EDI standards between retailers and manufacturers.
- *WINS* - Warehouse Information Network Standards, promoted by two representational associations, the International Association of Refrigerated Warehouses, and the American Warehousemen's Association.
- *WP4* - Working Party 4 of the Economic Commission for Europe; commissioned by the UN to develop trade facilitation procedures and international EDI standards.
- *X12* - A set of generic EDI standards approved by the American Standards Committee.
- *X.400* - An international electronic messaging standard.

