

INTERNATIONAL EDI MARKETS

1992 - 1997

INPUT

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D E C E M B E R 1 9 9 2

INTERNATIONAL EDI MARKETS

1992-1997

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EDI and Electronic Commerce Program
(EDEDI)

International EDI Markets, 1992-1997

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Abstract

This report overviews EDI usage around the world by region, country and industry. It assesses those areas, industries and locales that are developing EDI linkages between companies. The report estimates expenditures by EDI-using organizations on software, network services and professional services (including systems integration) that are purchased in the market. Expenditures on internal development of EDI systems are not estimated. Expenditure estimates are forecast five years into the future. Also, this report reviews the leading companies providing EDI software and services in the various regions and to what extent some of them are providing services globally.

For each major region of the world (Europe, Pacific/Asia, the Americas, and "other"), INPUT examines key industries, key projects, vendors, and users; INPUT estimates the total number of users, estimates the total level of expenditures on software and services, and assesses the use of standards. Each region is detailed with an analysis of individual national markets.

The report consists of 86 pages and contains 33 exhibits.

INTERNATIONAL
EDI MARKETS
1992-1997

EDINT
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C.I.

AUTHOR

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DATE
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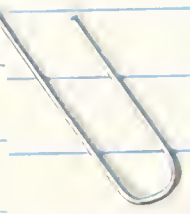


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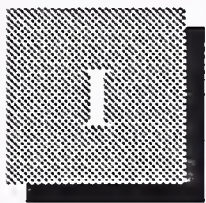
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Introduction

A

Scope of Report

This report overviews EDI usage around the world by region, country and industry. It assesses those areas, industries and locales that are developing EDI linkages between companies. The report estimates expenditures by EDI-using organizations on software, network services and professional services (including systems integration) that are purchased. Expenditures on internal development of EDI systems are not estimated. Expenditure estimates are forecast five years into the future. Also, this report reviews the leading companies providing EDI software and services in the various regions and to what extent some of them are providing services globally.

Both users of EDI and vendors of EDI software and services will find this report valuable. It gives a comprehensive world view of EDI activity. User organizations will be able to learn from their peers in other regions of the world and/or other industries. Vendors will be able to recognize opportunities.

For each major region of the world (Europe, Asia-Pacific, the Americas, and "other"), INPUT examines key industries, key projects, vendors, and users; INPUT estimates the total number of users, estimates the total level of expenditures on software and services, and assesses the use of standards.

Some of the issues examined in the report include:

- What industries are pioneering EDI given a particular country/region? (For example, how is EDI in Singapore different from EDI in Australia?)
- What EDI standards are being adopted worldwide and why? In particular, where is EDIFACT being used and where are national standards being used?

- What vendors have a greater global presence and which are merely national? What vendors are the closest to being able to deliver global EDI services?
- Is there a different set of business and technical needs for the company when it does local/domestic EDI and when it does global/international EDI?
- How are trading bloc alliances, such as the European Economic Community and the North American Free Trade Agreement, affecting the implementation of EDI?

As the table of contents demonstrates, the organization of the report follows a geographic logic of presentation: a chapter is devoted to each general region—Asia-Pacific, Europe, America and other. Within each chapter, the region is given more detail by an analysis of individual national markets.

A “Conclusions and Recommendations” chapter offers a summary of the findings along with recommendations.

B

Methodology

Analysts in INPUT’s California, Tokyo and London offices gathered and prepared the data that went into this report.

This data gathering and research consisted of:

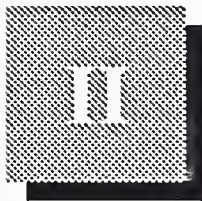
- Interviewing representatives of EDI vendors in various countries and asking their assessments of the markets and customers they serve. Also, INPUT asked these vendors for information regarding the dollar amount of sales and numbers of customers.
- Interviewing representatives of EDI user organizations. INPUT asked about the amount the organization was spending on EDI software and services, how many trading partners the company conducts EDI with, the objectives and plans of the company and other issues.
- Attending EDI trade shows
- Using INPUT’s library resources—including files on over 3,000 information services companies, CD ROM data bases, and extensive trade press publications

C

Related INPUT Reports

This report is part of INPUT's EDI/Electronic Commerce Program. The program has covered EDI since 1986. The most recent publications of the program are available and will supplement the information contained in this report. Contact any INPUT office or call our California office at (415) 961-3300 for more details (8 a.m. to 5 p.m. Pacific Standard Time).

Electronic Commerce: The New Foundation for Trade
Electronic Commerce in the Media Industry
Electronic Commerce in Health Care
Electronic Commerce in Trade and Transportation
Electronic Commerce in Travel and Tourism
Electronic Commerce in Grocery Production and Distribution
Electronic Commerce in Apparel and Retail
Electronic Commerce in the U.S. Federal Government
Opportunities in Electronic Payments (due 4th quarter 1992)
Electronic Commerce: Comprehensive Market Assessment
The U.S. Electronic Data Interchange Market, 1992-1997
The Electronic Data Interchange Market, Europe
The Electronic Data Interchange Market, Japan
Trends in Electronic Corporate Trade Payments
EDI Vendor Profiles and Competitive Analysis



Executive Overview

A

Findings

Over the next five years, the number of companies in the world that use electronic data interchange to communicate with trading partners will grow from approximately 38,000 today to about 70,000 in 1997, an annual growth rate of 13%.

Expenditures on EDI translation software, network services and professional services purchased in a market (and not counting salaries and development expenditures internal to the firm) is expected to rise from a little over 0.6 billion dollars today to 2.5 billion dollars by 1997, for a compound annual growth rate of 33%.

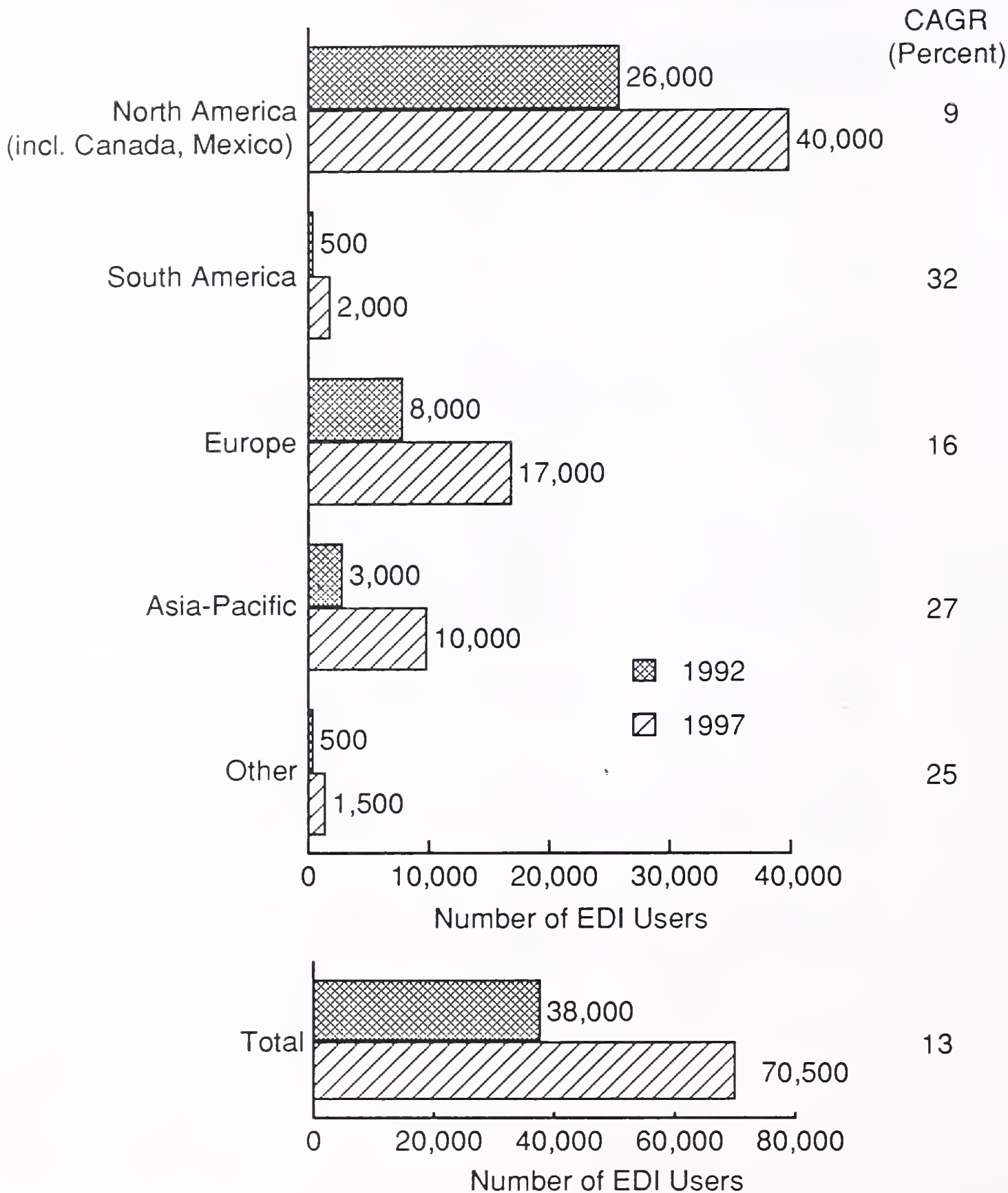
Exhibits II-1 and II-2 summarize these two essential indicators: growth in users and expenditures.

The top three EDI-using countries are the U.S., the U.K. and Japan, and together account for 68% of total world spending on EDI software and services purchased on the market.

By region, more than half of the worldwide EDI market expenditures are made in North America, as shown in Exhibit II-3.

EXHIBIT II-1

EDI User Distribution by Region



January 19, 1993

Dear Client,

Whoops! We made a typographic error in the report we just sent to you, *International EDI Markets, 1992-1997*.

Two exhibits — exhibit II-3 on page II-3 and exhibit VII-4 on page VII-4, both of them bar charts — show the EDI market for the Asia-Pacific region to grow from \$130 million in 1992 to \$160 million in 1997.

It should show the market to grow from \$130 million to \$660 million over the same period. (See attached page).

The mistake was confined to these two exhibits only, in the report and in the Executive Overview. The text and other exhibits including market totals for the world reflect the \$660-million figure.

We recommend that you correct the error by penciling in an extended bar length followed by the correct dollar figure. The correct bar length should mirror the bar length of the European market forecast, which is right above the Asia-Pacific bar in both exhibits.

We apologize for any inconvenience.

Sincerely,



Torrey Byles
EDI/Electronic Commerce Program Manager

Enclosure

EXHIBIT II-2

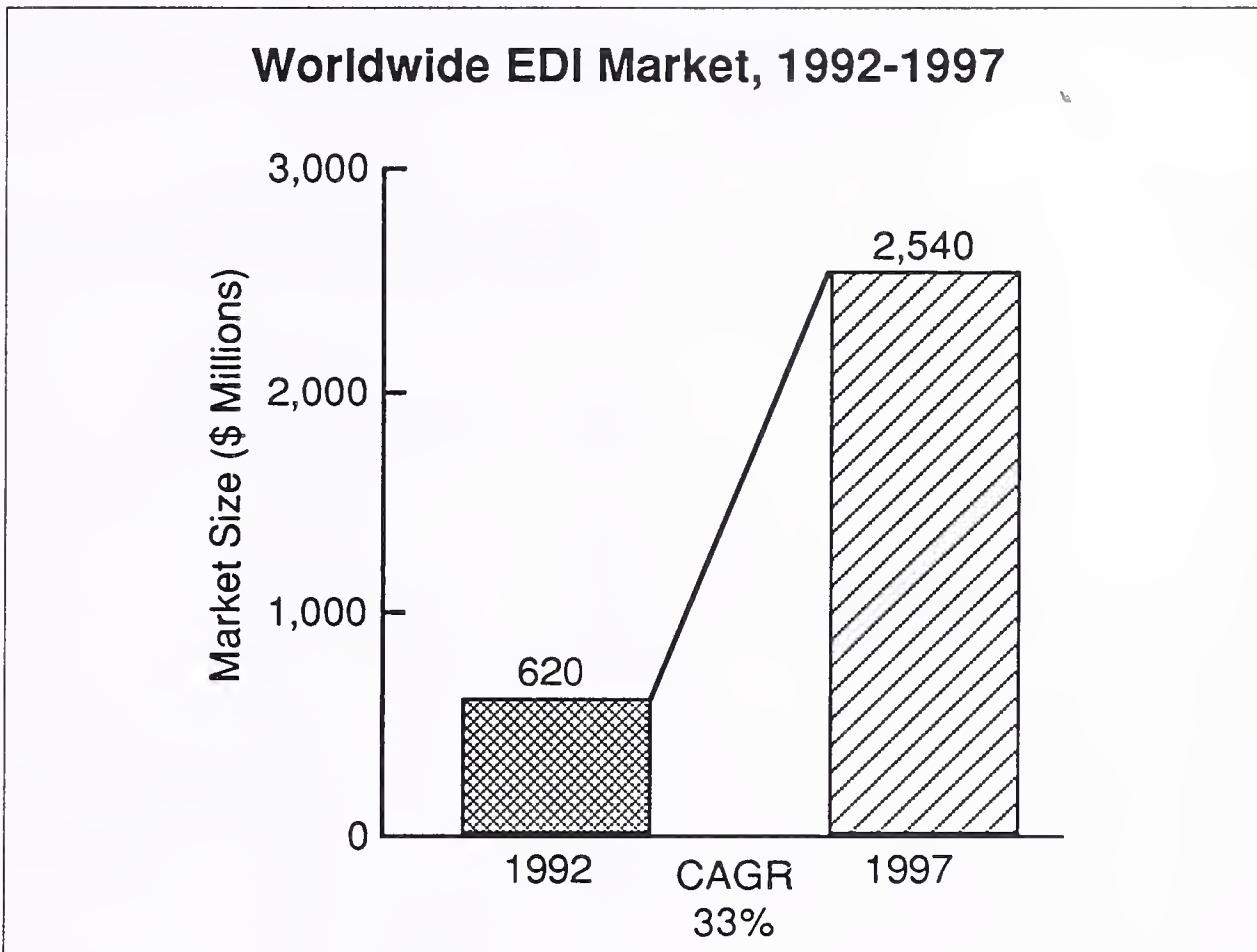
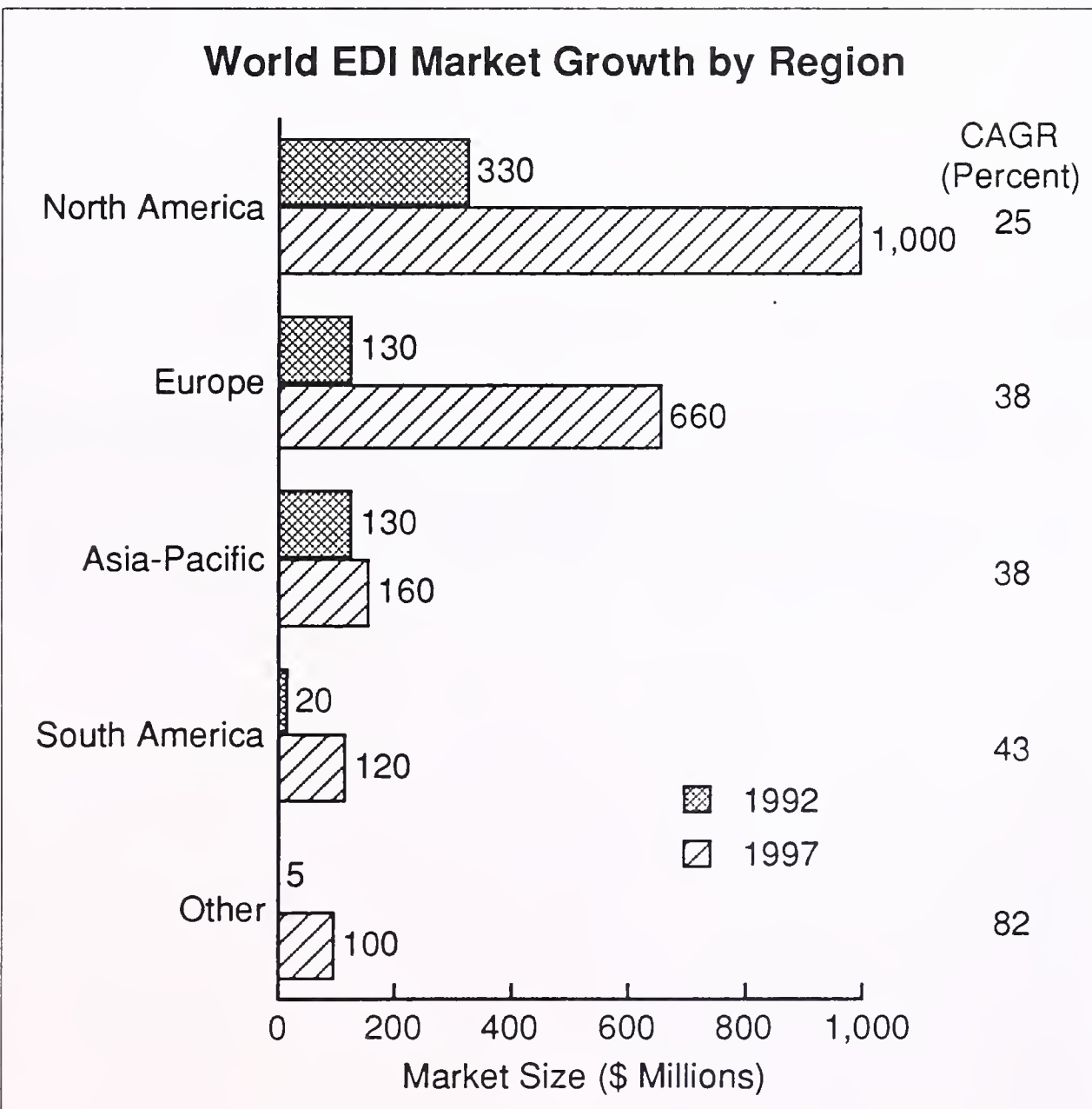
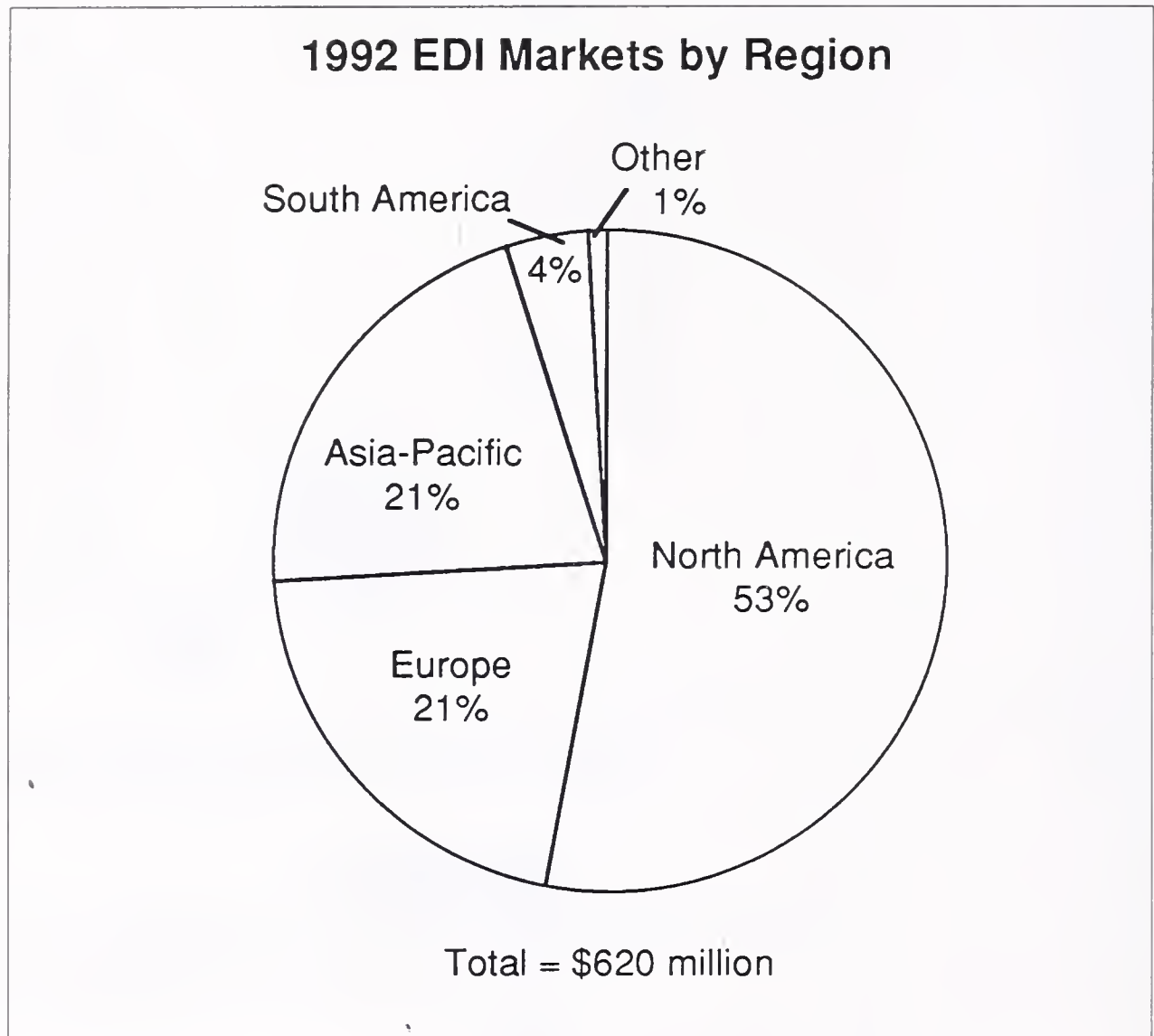


EXHIBIT II-3



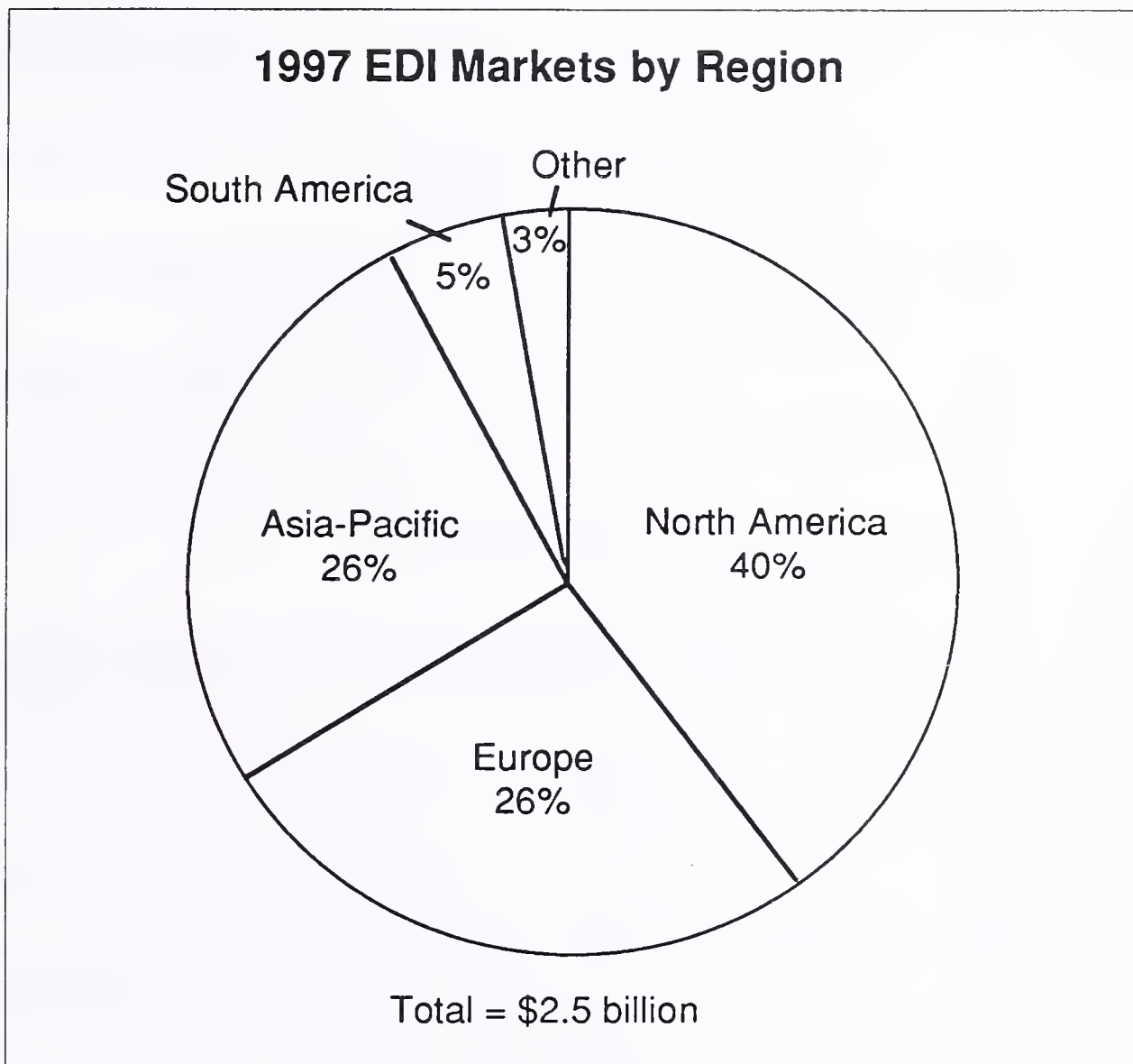
Over the next five years, EDI will grow more rapidly outside North America. The distribution of spending will change, as reflected in Exhibits II-4 and II-5.

EXHIBIT II-4



The breakdown of expenditures is 60% on network services, 30% on EDI translation software and 10% on professional services. INPUT believes that these proportions will remain unchanged through 1997.

EXHIBIT II-5

**B****Issues**

Generalizations about the nature of EDI adoption around the world are listed in Exhibit II-6.

These trends are explained in further detail in Chapter VII, Conclusions and Recommendations, and in the various sections of this report on the regional and national issues.

EXHIBIT II-6

Trends of Worldwide EDI Market

- There is little international EDI, much domestic EDI.
- EDIFACT is gradually adopted, but local formats always needed.
- National telecommunications infrastructure and policy is the foundation for EDI.
- Telecommunications liberalizations are opening up opportunities for competing EDI network services.
- Government programs—particularly in telecommunications, taxation, customs and health care—are key stimuli to EDI growth.
- Trade and transport EDI systems are top priority in export-driven economies.
- Trade, transportation and retail sectors are showing the fastest EDI growth.
- Financial EDI is relatively unused, but should grow rapidly over the next five to seven years.

C**Recommendations**

Recommendations to EDI users are listed in Exhibit II-7 and are explained in detail in Chapter VII.

EXHIBIT II-7

User Recommendations

- To do international EDI, global vendors may be better, but are not mandatory
- Use EDIFACT for international transactions, but national or industry-specific data formats for local transactions

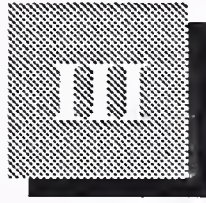
Recommendations to vendors of EDI software and service are summarized in Exhibit II-8 and are explained in detail in Chapter VII.

EXHIBIT II-8

Vendor Recommendations

- High-growth opportunities are in Asia, Eastern and Southern Europe, Mexico and South America.
- Critical mass opportunities are in the U.S. and the U.K.
- Vendors should use alliances, distributors or own facilities to penetrate foreign markets.
- Vendors should attempt to serve foreign markets only if they can fully support users there.
- International EDI network services may never be significant compared with domestic services.
- Serving industry and geographic niches is viable; being a global player not (yet) necessary.

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Asia-Pacific Region

A

Overview

EDI growth in Asia is explosive and open for opportunity to software and services vendors. This is a region that is building EDI systems from scratch. The vendors that can establish themselves in Asia now will have the long-run advantage. Expenditures on EDI software and services external to the user organization is approximately equal to expenditures in Europe.

Exhibit III-1 shows EDI expenditures by country and the anticipated growth.

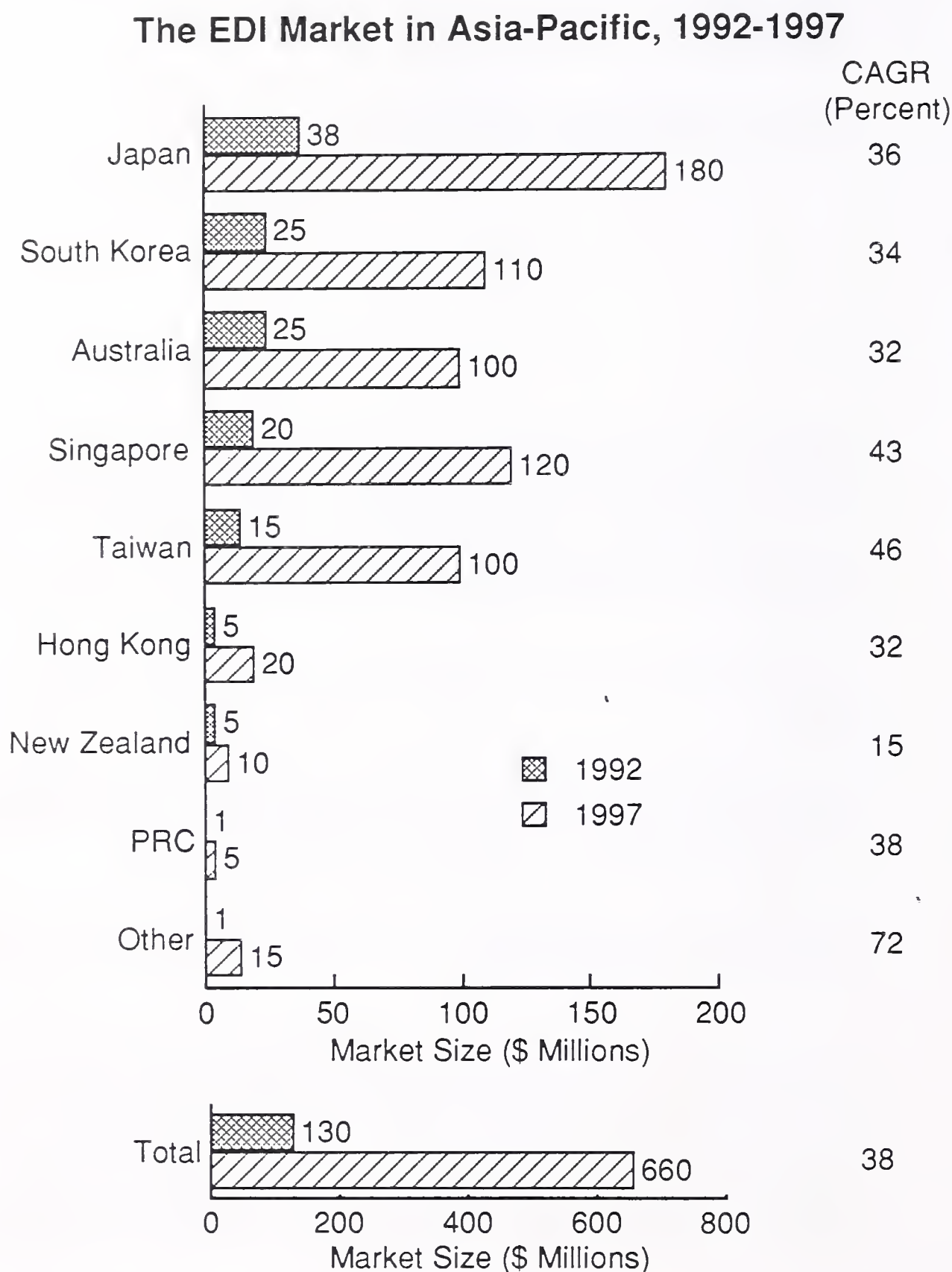
The leading industries adopting EDI in Asia are those associated with foreign trade: transportation, customs, electronics and automobiles. This is not surprising with the export-driven economies of Asia.

The only Asian countries that use EDI for strictly domestic trade purposes are Japan and Australia. Here the applications of EDI are in the distribution and manufacturing sectors.

Japan, South Korea, Taiwan, Hong Kong, Singapore, Indonesia, Australia, New Zealand and India are marked by their extraordinary plans for upgrading telecommunication networks. "There is explosive growth in the data networking market throughout Asia," says Northern Telecom's president for Asia-Pacific, Jim Long. While EDI is only part of these national infrastructure projects, improved telecommunication networks are the prerequisite to widespread EDI use.

The governments of Taiwan and Singapore are launching high-profile, multibillion dollar infrastructure programs that, among many other areas, enhance the EDI capacities of their respective countries.

EXHIBIT III-1



As is typical in the East Asian, export-driven economies, the governments see the investments in infrastructure and particularly EDI as a competitive necessity. Each country is battling the others to be the lowest cost, most efficient, most attractive production site to overseas customers. EDI facilities are part of the necessary next step for bringing greater customer satisfaction.

Fred Li, chairman of a Taiwan VAN, Vanguard Information Center, Inc., expects to see a repercussion back to North America in about two years when North America's East Asian trading partners start demanding to conduct trade by EDI. Widespread EDI adoption in East Asia, soon to be a reality, will "create a push on U.S. firms," says Li.

In almost every country, the EDI application with the most priority is automating customs, ports and the whole import-export procedure. Also, government tax agencies are implementing EDI programs.

EDI in Asia is often delivered as a turnkey solution from a single vendor (itself possibly reselling others products and services). This contrasts with the American markets and some European markets where software, network services and professional services are acquired by the user in separate transactions.

B

Competitive Environment

The EDI vendors to Asian countries are a combination of local players and regional/international players. We start with the international players. The local players are addressed in the individual national market profiles.

AT&T EasyLink. AT&T EasyLink has operations in Japan, Hong Kong and Australia. The Japanese operation is called Japan Electronic Network Service (JENS) and is a joint venture with other large Japanese equipment vendors. AT&T has a majority ownership. In Hong Kong, AT&T is in a joint venture with Hutchison and has a network node/processing center. In Australia, AT&T EasyLink Australia Ltd. is a joint venture with Paxus and Qantec (the latter being the data processing service arm of Qantas airlines). Paxus is a leading EDI network service in Australia (see Australia section below). AT&T owns 51% of the Australian venture. AT&T is rapidly expanding and is assessing its options in Singapore and Malaysia. It has offices in Taiwan but no local access point to its network.

IBM Information Network. IBM Information Network provides EDI network services in Australia (particularly with its main EDI client, P&O, a shipping line) and in Japan.

GE Information Services. GEIS has resellers of its network (including local access points) in Japan, South Korea, Taiwan, Hong Kong, Singapore, Australia and New Zealand. Its largest EDI business in the Asia-Pacific region is in Australia where it has the largest retailer in Australia, Coles Meyer, as its client. Also, in Australia it has a number of shipping lines as EDI clients.

British Telecom. BT is moving into Asia and in 1992 won a large contract in Taiwan (from the government) to provide the country with a general-purpose value-added network. Mark Baker is president and CEO of British Telecommunications North America.

Sterling Software. Sterling Software has relationships with Global VAN Japan, an independent third-party processing services company in Japan. Global VAN resells Sterling's EDI processing services. At this point, both relationships are showing little activity.

Cable & Wireless PLC. Cable & Wireless is a British telecommunications company that owns 58% of Hong Kong Telecommunications Ltd., which in turn provides the Intertrade EDI service in Hong Kong. Cable & Wireless makes more than half of its profit from operations in Hong Kong. Cable & Wireless has a 24.5% investment in Optus Communications, which has a contract for domestic and international telecommunications services in Australia.

Control Data. CDC in Asia is known principally for its systems integration work. It has extensive good will in Asia and has converted this to work throughout the region. It is doing EDI projects in Malaysia, Taiwan and South Korea, particularly in the tax and customs areas. It has a strategic relationship with EDI software vendor, St. Paul Software (St. Paul, MN).

Sprint. Sprint installed China's first EDI switching facility in Guang Dong province.

Datacom. Datacom is a small EDI microcomputer software maker that introduced the first translation software package that handles Chinese, Kanji and Korean scripts. It has a large contract with Dacom of Korea.

Dacom. This is the South Korean government's data communications company. It is building EDI network services in a variety of industries in Korea. D.K. Kim is managing director of Dacom.

NTT. The huge Japanese telephone company is the largest cross-industry EDI value-added network provider in Japan. The company is not attempting to provide global EDI services at this time. It is focused on the domestic EDI market of Japan. It has a subsidiary in the U.S. that provides data communications services between Japanese companies in the U.S. and their headquarters in Japan. NTT is not promoting an EDI service as a part of this data communications service.

INFONET. This international data network is owned by a consortium of telephone companies (including U.S. Sprint and France Telecom). INFONET has direct access communication facilities in Hong Kong, Japan, Korea, the Philippines, Singapore and Australia, along with gateway to Indonesia, Macao, Malaysia, Thailand and China. It offers general data communication services and E-mail. At one time it offered EDI services, but is downplaying this service now.

Vanguard Information Center. This is a small EDI software and services company in Taiwan that has been active in developing EDI in the island state. The company provides systems integration services, specializing in LAN, EDI and telecommunications applications. It is also a time-share/remote computing service vendor primarily to banks. It is an authorized Taiwan distributor of the GEIS data network.

Scitor. This wholly owned subsidiary of the Societe International Transportation Aeronautique (SITA) was formed in 1990 to commercialize EDI software and network services for the air transport community worldwide. Wherever planes fly, Scitor has a potential customer base. It is promoting the use of its EDI software to airlines and their service/supplier companies worldwide. The software, in conjunction with the SITA network, allows airlines to order parts, fuel and services.

C

Analysis of National Markets

1. Singapore

The National Computer Board of Singapore aims to computerize the entire country with its IT2000 project. The government has met with industry leaders to decide on a national computer-based infrastructure and has come up with several target applications. These include extensive use of electronic data interchange (EDI) for interaction with industry and government, an intelligent road system and a videotex infrastructure for all homes.

Already the government has awarded a contract for development of a smart-card system for cars that allows any car entering a particular toll area to be automatically billed.

The country's Tradenet utilizes EDI in the automation of clearing shipments through customs, while its Medinet system processes medical claims using EDI.

Singapore Network Services (SNS) handles 93% of all trade and customs declarations for 2,300 users. The SNS system was developed with IBM at a cost of U.S. \$10 million and uses EDIFACT standards. Through an affiliation with Tradelink, SNS conducts Asia-wide EDI business, including China Merchants Container Lines, Ltd., an agent for Cosco of China. The Port of Singapore Authority (PSA) Portnet system is linked to the German Teleport. Through this linkage, Singapore is Asia's largest data processor and has become the third largest oil and non-oil cargo port in the world, after Rotterdam and Kobe.

Also, the Port of Singapore is linking with U.S. Customs with the VISA project. Ship manifests of hazardous cargoes are sent via EDI from one agency to the other. U.S. Customs is more prepared to accept dangerous cargoes with advance information. IBM IN (Advantis) is the principal network service provider for the project.

Other industries that the government has targeted include: finance, manufacturing, leisure, retail/distribution, media, construction, health care, telecommunications, education, transportation and government. All these industries will receive extensive value-added network services.

The IT2000 project, if successful, will help Singapore hold its position as one of Asia's leading trade centers.

Singapore is perhaps the most advanced EDI user in Asia.

2. Hong Kong

Hong Kong has had trouble instituting EDI. A consortium of banks, transportation companies and telecommunication companies formed Tradelink Electronic Document Services Ltd. in 1988 with the purpose of establishing an EDI service. Until 1992 Tradelink pursued endless feasibility studies. Only now has it finally put out a request for quote/proposal for a service. Actual service is not expected until late 1993 or mid-1994.

At this time, Hong Kong's only EDI service is Intertrade, which is aimed at automating shipping and international trade procedures. Intertrade is operated by Hong Kong Telecom-CSL, a unit of Hong Kong Telecommunications Ltd. (which is primarily owned by Cable & Wireless PLC). Intertrade has a handful of customers. Intertrade will probably merge with Tradelink if Tradelink ever begins service.

In 1992, AT&T and Hutchinson Global Data, a network service provider in Hong Kong and Asia, agreed to provide EDI, facsimile and E-mail services to Asian users through AT&T's Hong Kong node. This service will likely rival the Tradelink service.

According to an AT&T spokesperson, AT&T views Hong Kong as a strong market. Thirty-seven percent of all Hong Kong trading is done in the U.S., and more than 385 of the global *Fortune* 1,000 companies have locations in Hong Kong. AT&T is targeting these international businesses. AT&T will offer facsimile, EDI and E-mail services over its own leased-line international connections. AT&T is waiving the international surcharge on its U.S.-to-Hong Kong E-mail traffic so that it costs the same to send a message between Los Angeles and Hong Kong as to send it from Los Angeles to San Francisco.

Bringing EDI to Hong Kong has been uniquely difficult because of the tens of thousands of small family-owned businesses that, because they use Chinese, are devoted facsimile machine users and have little use for personal computers. The predominance of this kind of small entrepreneur is much more widespread than in Singapore, Taiwan, South Korea or Japan—other Asian locales that use ideographic text.

Tradelink's shareholders are Hong Kong Air Cargo Terminals, Ltd., Hong Kong International Terminals, Ltd., Modern Terminals, Ltd., Maersk Hong Kong, Ltd., Swire Pacific, Ltd. (owner of Cathay Pacific Airways, Ltd.) Hong Kong Telecommunications, Ltd., Hong Kong & Shanghai Banking Corp., Standard Chartered Bank, and China Resources (Holdings), Ltd. Tradelink has been conceived as a system to link Hong Kong's shipping, trading and banking firms with companies overseas. Tradelink's estimates are that 100,000 Hong Kong firms did some international trade in 1991.

Using EDIFACT standards, Tradelink expects to handle 1,900 messages for 180 users its first year and expand to 150,000 users sending 496,000 messages per year by the end of the proposed seven-year contract. The government of Hong Kong will own 30% of the system, and trading firms will own 70%. TDSI estimates that EDI will save U.S. \$9.8 billion per year, or 5% of the value of goods moved through Hong Kong annually. This 5% is also the estimated value of traditional paper transactions. Eighty percent of Tradelink's messages are expected to go overseas.

3. Taiwan

Taiwan will spend \$320 billion over the next six years. Thirty-billion dollars are earmarked for telecommunications, of which U.S. \$76 million are set aside for an automated EDI clearing network for trade-related transactions.

British Telecommunications PLC has an agreement to sell EDI to the Taiwanese Ministry of Finance. The proposed project is called TRADE VAN and will bring an EDI service to the ports and international trade community of Taiwan. The Taiwanese expect to cut clearing times from an average of two days to 15 minutes.

This will be the first large EDI project in Taiwan, a country where EDI is still little used except by large multinationals (particularly retailers, consumer goods manufacturers and semiconductor makers).

The Ministry of Economic Affairs is pushing EDI, particularly in the retail sector. It is considering making importers and exporters file documents electronically or else face financial penalties and slow processing of claims. The government is also considering establishing "information stores" throughout the country. At the stores, businesspersons could access commercial data bases and have documents in Chinese keyed into EDI or E-mail messages; consumers could purchase tickets for trains, museums and theaters, and file government visa/passport and vehicle registration documents. Fifteen thousand stores are planned.

INFONET, the international data network, established a communications facility in Taipei in 1992. Taiwan's business community can gain direct access to INFONET's network for worldwide data, E-mail, store and forward, fax and telex transmissions in more than 118 countries.

Plans are underway to interconnect the INFONET network with Taiwan's PACNET national public data network. PACNET subscribers may then access the INFONET network by making a local phone call from Kaohsiung, Taichung, Tainan, Taipei, Keelung, Hsinchu and other major cities in Taiwan.

The China Data Processing Center will maintain the INFONET communications facility, which is located on the premises of the Data Communications Institute (DCI) in Taipei.

Communication specialists at the China Data Processing Center will connect local businesses to INFONET's network and NOTICE 400 messaging service and install NOTICE 400 PC E-mail software at their sites. These professionals will make the necessary arrangements for users to access the INFONET network via PACNET as well.

4. South Korea

South Korea has recently enacted a Trade Promotion Law that will mandate EDI use for all government-related activities eventually. To this end, the Ministry of Communication (MOC) liberalized and deregulated the value-added network (VAN) business as of July 1, 1989. Now, any firm can enter into any type of VAN/EDI business.

Some of the projects and proposals include:

- The Pacific Rim EDI Pilot Project is a plan to link South Korea and North America through the cooperation of Dacom (a Korean EDI network provider) and Martin-Marietta, McDonnell-Douglas, EDI, Inc. and the EDI Council of Canada.

- Closer to realization is the Korean Trade Network (KT-NET), a forthcoming U.S. \$580 million EDI network that will allow domestic and foreign traders, government bureaus and port operators to exchange EDI messages and documents. In design and function it will closely mirror Singapore's TradeNet and will use EDIFACT standards.
- And recently, British Telecommunications Systems reached an agreement that will allow BTP to sell EDI systems in South Korea.

However, EDI is not new here. The steel and automotive industries each have a value-added EDI network. Started in 1987, STEEL VAN links ten of the top Korean steel manufacturers and transmits purchase orders, order acknowledgments and production status reports. MOTOR VAN, started in 1989, connects South Korea's second largest automaker, KIA Motors, to 39 suppliers for purchase orders and order acknowledgment.

Northern Telecom Asia/Pacific has acquired two major data network contracts in South Korea.

Under the contracts with Korean conglomerate Daewoo, Northern Telecom will provide data packet-switching equipment to Korea Telecom and Korea Air, while Daewoo will provide associated computer systems and local service and support.

The value of the contracts is expected to exceed \$25 million over an initial three-year period. The order from Korea Telecom calls for Northern Telecom to supply data packet-switching equipment for a national public data network.

In addition to providing electronic mail service, the network will be used to support Korea Telecom's HiTEL videotex service.

Korea Telecom has a vision to provide an inexpensive data communications service throughout Korea.

For Korean Air, Northern Telecom will supply an international private data network with major nodes in Seoul, Los Angeles and Tokyo. The network will provide computerized reservations and value-added services.

5. Japan

1992 was an important year for EDI in Japan.

- In April, the Center for the Informatization of Industry (CII) in the Japan Information Processing Development Center (JIPDEC) released the CII syntax rules as a national standard for EDI. This syntax is different from EDIFACT, ANSI X12 and other EDI syntaxes. It accommodates some

of the unique requirements of domestic business practices in Japan (the use of non-alphabetic script, for one). Using this general syntax, Japanese industries are expected to develop industry-specific implementations of the syntax.

- In October, 39 industry associations, including such majors as the automobile and steel industries, established the Japan EDI Council. The purpose of the council is to promote EDI across industries, using the CII syntax.
- The automobile industry association set up an EDI promotion section. This is significant because until now, the major Japanese automobile manufacturers have been reluctant to adopt standard EDI formats for fear of losing a competitive edge. They felt that their proprietary, on-line ordering systems with suppliers kept their suppliers from working with competitors.
- In the autumn, Fujitsu opened an EDI Solution Service center to provide EDI education, consulting, and systems integration services. Other vendors, especially IBM Japan, are expected to follow suit.
- Electronics manufacturers, the most progressive users of EDI, are rapidly adopting EDI. The number of companies within the Electronic Industries Association of Japan (EIAJ) that have registered for electronic addresses has risen close to 30% in nine months, to 805 in October from 650 at the end of 1991.
- Sony, the most advanced EDI user in the electronics industry, makes approximately 50% of purchase transactions via EDI. When it uses EDI for its top 300 suppliers (roughly 10% of its total supplier base), it expects EDI to account for roughly 80% of its purchases.
- The total expenditures on EDI software and services (not counting internal development expenditures) will come to approximately \$38 million in 1992, up 27% over last year's expenditures. INPUT expects this spending to grow by 30% per year for the next five years.

a. The CII Standard

The CII syntax is different from EDIFACT and ANSI X12. It was developed to accommodate the unique requirements of conducting business in Japan. It uses 16-bit character codes, instead of the common 8-bit codes, to allow for ideographic script of Japanese (Kanji, hiragana and katakana).

Exhibit III-2 lists the characteristics of the CII syntax.

EXHIBIT III-2

Characteristics of the CII Syntax

- Has variable-length format
- Supports Japanese characters
- Can be used for complex business procedures
- Has 61,439 data elements maximum
- Is compatible with OSI transmission protocols (FTAM and MHS), ZENGIN (banking) protocols, Japan Chainstore Association protocols, and the Electronic Industries Association of Japan EDI standard
- Runs on networks supporting EDIFACT (ISO 9735)

The opinion among Japanese IS managers is that the CII standard will be used for domestic trade (within Japan) while EDIFACT will be used with foreign companies for international trade.

b. EDI Adoption by Industry

The Japanese keiretsu industry organization is especially important in determining how EDI is adopted in Japan. A large manufacturer (a Toyota or a Sony, etc.) forms the nucleus of the keiretsu, with the manufacturer's many suppliers (including its major bank) surrounding it. Often, the manufacturer operates its own value-added network, which it uses to communicate with its suppliers. These networks are registered with the communications ministry.

The keiretsu organization, however, matches the common "hub and spoke" pattern of EDI implementation, where EDI adoption is centered around a large company (the hub) and its many suppliers (the spokes).

The keiretsu and its data communication network (usually employing a proprietary EDI format) forms the basis on top of which EDI communications will travel.

Below, INPUT examines EDI adoption by specific industry groups.

i. Shipping

The shipping industry was one of the first in Japan to implement information systems, having done so more than 20 years ago. In the late 1980s, EDI was a natural extension.

In April 1986, 43 companies established SHIPNETS (Shipping Cargo Information Network System). It is operated by four industry associations relating to marine transportation. SHIPNETS uses DRESS (Denden Realtime Sales Management System), a VAN service provided by NTT Data. It is a proprietary EDI system.

In October 1988, seven shipper companies and 13 shipping companies started S.C. Net (Shipper/Carrier Shipping Information Network System). The network is used to send bill-of-lading information between shippers and carriers. This system uses the DRESS telecommunication protocols as well as the ZENGIN (EFT/payment) formats.

ii. Automotive

Japanese automobile manufacturers are reluctant to adopt a standardized EDI format for fear of losing a competitive edge over rival car makers. Each manufacturer has a proprietary network system to link domestic dealers, domestic plants, parts manufacturers, and overseas plants and sales agencies.

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

This industry will be the last industry to introduce the CII standard in Japan.

iii. Air Cargo

The air cargo business includes cargo booking, freight forwarding, carrier services, customs brokering, customs formalities, and freight custody between a consignor or a consignee and an airline.

The air cargo industry and consignors interchange information—including cargo inventory, shipment status, transportation, invoices and past records. EDI systems handle this information, and Japan Chainstore Association formats are generally used. In many cases, carriers are obliged to use proprietary formats according to each consignor's requirements.

iv. Electronics

The Electronic Industries Association of Japan (EIAJ) was the first industrial association to develop an EDI standard and to promote EDI. The number of electronics companies for which corporate codes for EDI were registered has rapidly grown from 150 in 1989 to 805 by October 1992. EIAJ's EDI effort is growing successfully.

EIAJ has begun to work with the transportation industry in the first test of cross-industry EDI in Japan. Purchase orders and shipment status messages are the first EDI messages implemented.

Use of on-line ordering systems is widespread in the Japanese electronics industry, and it is growing. An EIAJ study estimates that electronics companies receive approximately 50% of their orders on-line. Sony, for example, already receives more than 90% of its orders via an on-line ordering system.

The EIAJ EDI standard, developed in 1988, has fewer than 10% of electronics companies using it. Proprietary EDI and on-line standards still predominate. However, electronics giants such as Sony, Matsushita and Toshiba have established EDI and on-line systems that incorporate the EIAJ standards. Also, the niche sectors of audio-visual electronics and electric machinery have adopted the EIAJ standard faster than has the industry as a whole. Other industry niches, including the electric wire and cable and the utility industries, have adopted the EIAJ standard for their own use. The EIAJ standard has been incorporated with the CII standard. Use of the EIAJ EDI standard will grow quickly in the next few years.

v. Steel

The Japanese steel industry wants to adopt the CII standard, but is partly discouraged in doing so for two reasons: (1) its major customers are the automobile manufacturers, and they want to continue to use their proprietary systems; and (2) most orders for steel are very customized and don't lend themselves to standardization.

Nevertheless, the steel industry has made progress in standardizing its trading procedures. After the initial step of a standardization study in 1971, they use an industry standard for the exchange of shipping slips and invoice data via magnetic tape. Also, a standard order form with 57 data elements has been established.

vi. Trade and Distribution

Japanese trading companies are similar to American distribution companies, but a greater proportion of their sales are abroad compared to American companies.

Each sales department within the trading company is operated as if it were an independent company. Each department, as it moves to establish EDI, tries to accommodate the standards and conventions of the industries it works with—for example, machinery, metals, energy, textiles, processed foods, etc.

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

In most trading companies, overseas business accounts for more than 50% of total sales. International EDI has not yet been pursued, but INPUT expects it will grow in the latter 1990s.

EDI was first introduced in Japanese trading companies in 1984 when industry-specific communication networks were established as a result of government liberalization of telecommunications. Also, the ZENGIN EFT and Japan Chainstore Association (JCA) data format standards were established and became popular in some industries.

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

- Most EDI is in the form of a direct terminal-to-host type of architecture. Data communications from PC to PC or PC to host are mainly used by small companies. As a transmission medium for large-scale EDI, DDX-net is used, and for small-scale EDI, public networks are used. When the relationship between a trading company and its customer is close and significant data are exchanged, a leased-line medium is usually used. The ZENGIN protocol is used when data volume is high, and the JCA protocol is used when data volume is low.
- More than 80% of Japanese chainstores have introduced EDI using the Japan Chainstore Association (JCA) format. The newly established CII formats provide more functionality than the older JCA formats. But chainstores most likely will not adopt the CII formats any time soon. In the CII formats, goods can be quantified in terms of units as well as measured bulk amounts (metric tons, liters, etc.). The JCA formats can describe goods only in terms of units. Despite this shortcoming, the JCA formats will still be used by chainstores because bulk measurements are not needed.
- Several consumer electronic and appliances stores use EDI for inventory inquiries and orders to manufacturers. Computer systems of ten leading manufacturers can be accessed on-line by stores. Nippon Telephone & Telegraph's (NTT) data network is the chosen network for conducting EDI.

vii. Finance

Japanese banks have used EFT to settle payments among themselves since the 1970s. The insurance and securities industries also use EFT for settlement purposes among themselves. Very little EFT or financial EDI, however, is currently underway for payments among corporations.

In 1983, banks created the ZENGIN data format standard for EFT settlement among banks.

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

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

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

viii. Other Industries

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

Government agencies are using traditional paper formats and procedures. This sector lags behind all sectors in adopting EDI.

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

In the electrical equipment and power generation industries, EDI is at a test stage now.

Major gas utilities have started preparing for and standardizing EDI.

KAMINET is a network developed and implemented in February 1989 by the paper and pulp industry for on-line order placement and acknowledgment among 28 specialized paper trading companies and secondary wholesalers. KAMINET uses the Japan Chainstore Association formats.

1,800 stationery manufacturers, agents and retail stores are connected to an EDI system used for on-line order placement, stock inquiry and other business. This system follows JCA standards.

MEGANET links 500 optical retail stores to suppliers and manufacturers. Another system links between 800 and 2,000 other stores to three large optics manufacturers.

PLANET has been in use since January 1986 by 240 sundry goods wholesalers and 25 manufacturers.

FINET connects approximately 22 foodstuffs manufacturers and 60 wholesalers.

And JD-NET connects 79 pharmaceutical manufacturers and 127 wholesalers.

6. Australia

The automotive, retail, trade and transportation, hospital supply, chemical and government sectors are using EDI in Australia.

The major EDI providers in the country are value-added network companies. These companies typically provide software and professional services support in addition to network services. EDI, in Australia, is delivered as a whole, turnkey solution by the vendor, and the vendor is largely a network provider.

Key network providers in Australia are:

- AOTC. The Australian and Overseas Telecommunications Corporation (the product of a merger between Australia Telecom and Overseas Telecommunications Corporation) is one of the two largest EDI providers in Australia. AOTC is the dominant provider of EDI to the automotive industry, government suppliers, exporters and the suppliers of Woolworth, one of the largest retailers in Australia. AOTC has approximately 2,000 EDI customers. It also offers E-mail services, as well as telephone services.
- AT&T EasyLink Services is the other largest EDI player. It is a joint venture between AT&T (which owns 51%), Paxus (34%) and Qantec (15%). The company was formed in the autumn of 1992. Paxus was an established value-added network and had won the Tradegate contract with Australian Customs in 1989 and uses the AT&T Istel EDI engine.

Qantec is the technology and network group of Qantas Airlines. AT&T EasyLink has a large market share in trade and transportation. Tradegate Australia Pty. Ltd. is used by Australian Customs and allows users in the trade and transport industries to file customs entries. Tradegate also functions as a gateway between different user/industry systems such as port authorities and airports.

AT&T also supports EDI in health care (with links between hospitals and their suppliers). AT&T EasyLink has approximately 2,000 users, most through the Tradegate service.

- NEIS is a smaller EDI player specializing in niche areas—mainly retailer, suppliers, electric utilities and its largest customer and its suppliers, Broken Hill Prop. (an industrial conglomerate in chemicals, steel and cement).
- GEIS is a minor player. It is strong in retail, having Coles Meyer as a client. It also has most of the shipping lines into Australia with its Interport service. Interport EDI has been operational since August 1990. It was started by the Australian Association of Port and Marine Authorities (AAPMA). Twelve ports use Interport, which utilizes EDIFACT standard messages ISHPMV for international ship movements and IFCSUM for forwarding and consolidating hazardous cargo.
- IBM has very little EDI business in Australia. It is working with P&O shipping lines.

Looking to get into the Australian EDI market are Nynex, Scitor (the wholly owned subsidiary of SITA), BT and Optus (the recently created second telephone company in Australia that has BellSouth and Cable & Wireless as principal share holders).

The total spent on EDI software and services in Australia is approximately \$25 million. AT&T and AOTC each maintain approximately 40%.

Government administrations are also using EDI. The City of Brisbane, for example, is the largest EDI user in the State of Queensland. Brisbane has had EDI for two years, and no longer uses the regular mail to carry orders to suppliers.

Port Services EDI has had some difficulties being implemented. It is based on the Tradegate*Express developed by the Port of Melbourne Authority and Lamarian Systems. The latter entity has estimated Port Services would generate A\$400 million (U.S. \$270 million) over the next 10 years, after a capital outlay of A\$10 million.

Port Services has been hard to sell because it is an open system for the whole Australian port community and requires more time and coordination. Also, most Australian ports have yet to develop their EDI capabilities to link to Interport because of the cost. And because Australian ports are government organizations and the AAPMA is an industry one, there is little precedent for cooperation between the two entities. Development costs are also a concern, as is the need to establish a formal commercial enterprise to decrease the ominousness of the project.

7. New Zealand

The New Zealand Customs Service (NZCS) has developed the Customs Automated Passenger Processing System (CAPPS). This system acts as passenger- and customs-clearing system for international travel and air shipping. The Customs Electronic Data Interchange for Passengers network (CEDI PAX) is a related system.

8. The People's Republic of China

To date, only one EDI project exists here—a joint venture between the China Ocean Shipping Company (Cosco) and General Electric Information Services (GEIS). The Cosco project will provide communications and shipping data transfer (bills of lading) for the 600 ships in the Cosco fleet. The current plan is to adopt EDIFACT standards for this system. Various sources hope the Cosco project will be EDI's foot in China's door, which will lead to expanded EDI usage by 1995.

China's EDI adoption may first come on the heels of its burgeoning trade with its two estranged territories (currently sovereign states), Hong Kong and Taiwan. Hong Kong has always been a gateway for trade in and out of China. In the past few years, trade with Taiwan, including direct investment in China by Taiwanese nationals, has risen tremendously. The business activity brought to China by Hong Kong and Taiwan businesspeople will probably be the site of the early EDI installations.

Taiwan businesses are actively funding ventures and/or trading in light manufacturing, telecommunications equipment and computers.

EDI use in China is held back by the country's poor telecommunications, particularly data communication, facilities. This circumstance is changing quickly, however, with recent projects to upgrade China's data networks.

China's Ministry of Posts and Telecommunications (MPT) has selected Northern Telecom to supply packet-switching equipment and software for China's first nationwide data communications network.

The \$9 million contract will see Northern Telecom's DPN-100 switches form the backbone of the planned CHINAPAC network.

The CHINAPAC 32-node network will service 28 provinces and autonomous regions and three municipalities. CHINAPAC will support both public and private networks and be available on a subscription basis to a wide range of businesses and industries. In its final configuration, the network will carry millions of computer transactions each day.

Installation is planned to start in the second quarter of 1993, and the network is expected to be in operation by the end of that year.

The project marks an important step in China's plans to modernize its communications network. China's present data communications network (CNPAC) is limited to 11 locations, including Beijing, Shanghai and Guangzhou.

Northern Telecom's managing director for the Peoples' Republic and Hong Kong, Michael Lambert, says "the DPN-100 network will be central to the communications needs of a wide range of business and industries—including banks, airlines, post and delivery services organizations, transportation companies, customs offices and energy bureaus."

Sprint International also won a contract to provide China with a public data network switching facility. It is installing its EDI processor in this contract. This is the processor that Sprint licenses from Harbinger EDI Services (Atlanta, GA).

9. India

In an attempt to further globalize its economy, India's Commerce Ministry is planning to mandate the use of the U.N. EDIFACT EDI standard for all government and state-owned enterprises. The Ministry has set up a high-level committee to look into the feasibility of adopting this standard.

The Ministry believes that it will be difficult to trade with the developed and newly industrialized countries without adopting this international standard.

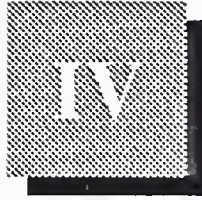
Implementation of EDI in India may be delayed, since the initiative to adopt is not coming from specific government agencies like those for the ports, customs, railways and airports. These agencies are pursuing separate computerization plans, which need to be coordinated.

Also, India's lack of a good data communications network that handles X.25 packet switching to enable the implementation of EDI is an obstacle to EDI use in the country. However, I-net, set up by the Department of Telecommunications, is a tentative beginning in this direction.

10. Indonesia, Thailand, Philippines and Malaysia

The Malaysian Trade Ministry has called for EDI development in order for Malaysia to keep up with larger global trading nations. Malaysia plans an electronic data base as part of its Malaysia Export Trade Center. This will link the government's headquarter trade center in Kuala Lumpur with various Malaysian trade commissions overseas. Also, the government is targeting tax and customs procedures.

Like Malaysia, Indonesia, the Philippines and Thailand are waiting until a larger percentage of their businesses computerize before entering into EDI. Nevertheless, large government spending on telecommunications bodes well for EDI services.



European Region

A

Overview

The twelve nations that comprise the European Community represent a \$4.7 trillion market with over 300 million people. The emergence of Eastern Europe adds another 110 million people to the European market.

European Community unification, although moving slower than anticipated, will pave the way to reshape the European economy, including: more focused manufacturing facilities and regional distribution across Europe; the emergence of Pan-European transportation companies; and an increased use of communication and information technologies, including EDI, that cross borders.

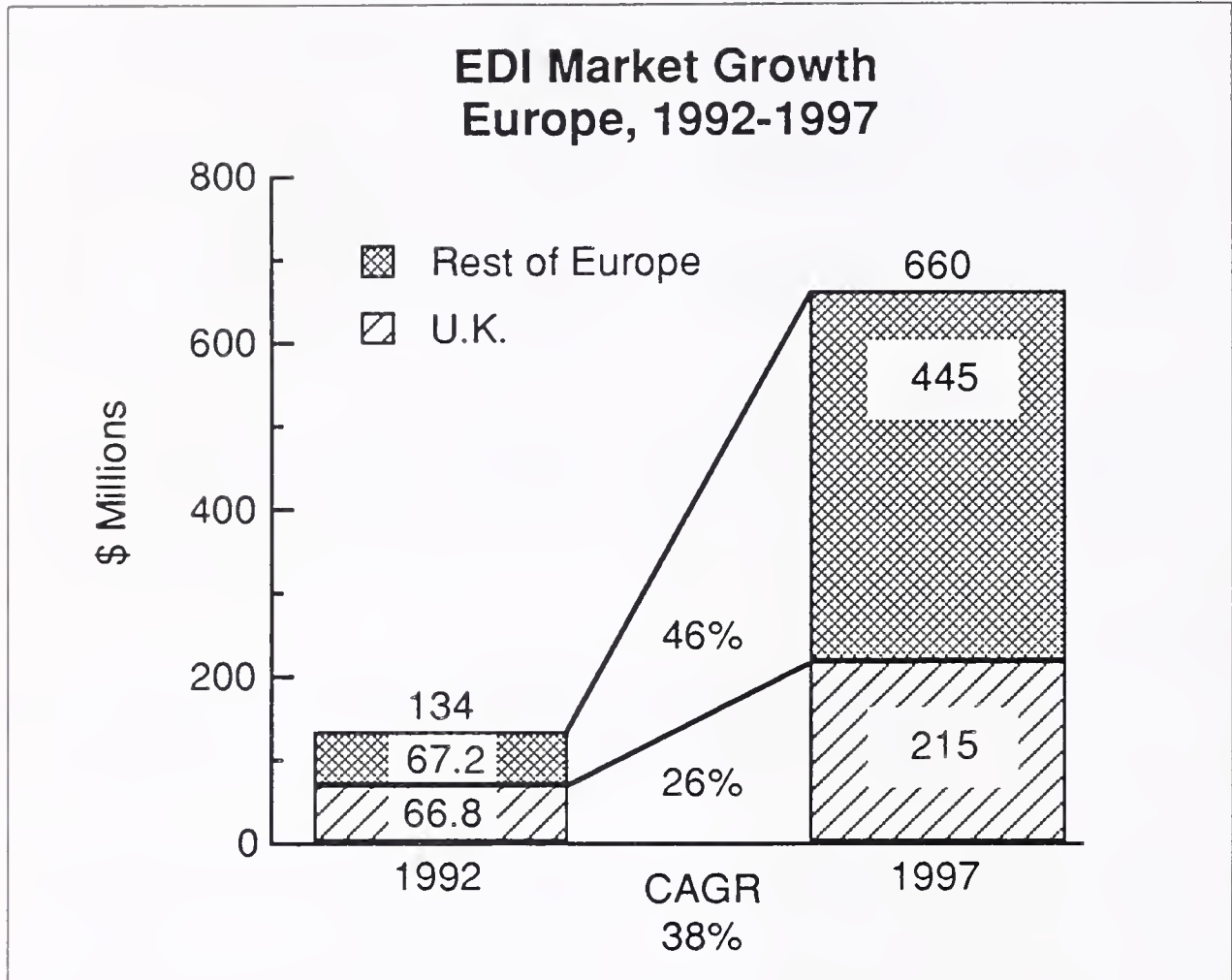
Electronic Data Interchange (EDI) is one of the fastest growth sectors of the telecommunications market in Europe. Exhibit IV-1 illustrates INPUT's predicted EDI market growth to 1997.

The market cannot be strategically targeted as a coherent whole. For example, the U.K. market is relatively mature compared to the rest of Europe. It represents approximately half of the total European market, yet exhibits the smallest growth rate.

The European EDI market must be viewed on a nation-by-nation basis. And, at the national level, two kinds of indicators are important:

- The number of restrictions and characteristics that influence the market. Restrictions can take the form of PTT monopoly, regulations, economic restrictions or government intervention.
- Changes in EDI expenditure in terms of network services, professional services and software. Trends in expenditure are largely influenced by the maturity of the given national market.

EXHIBIT IV-1



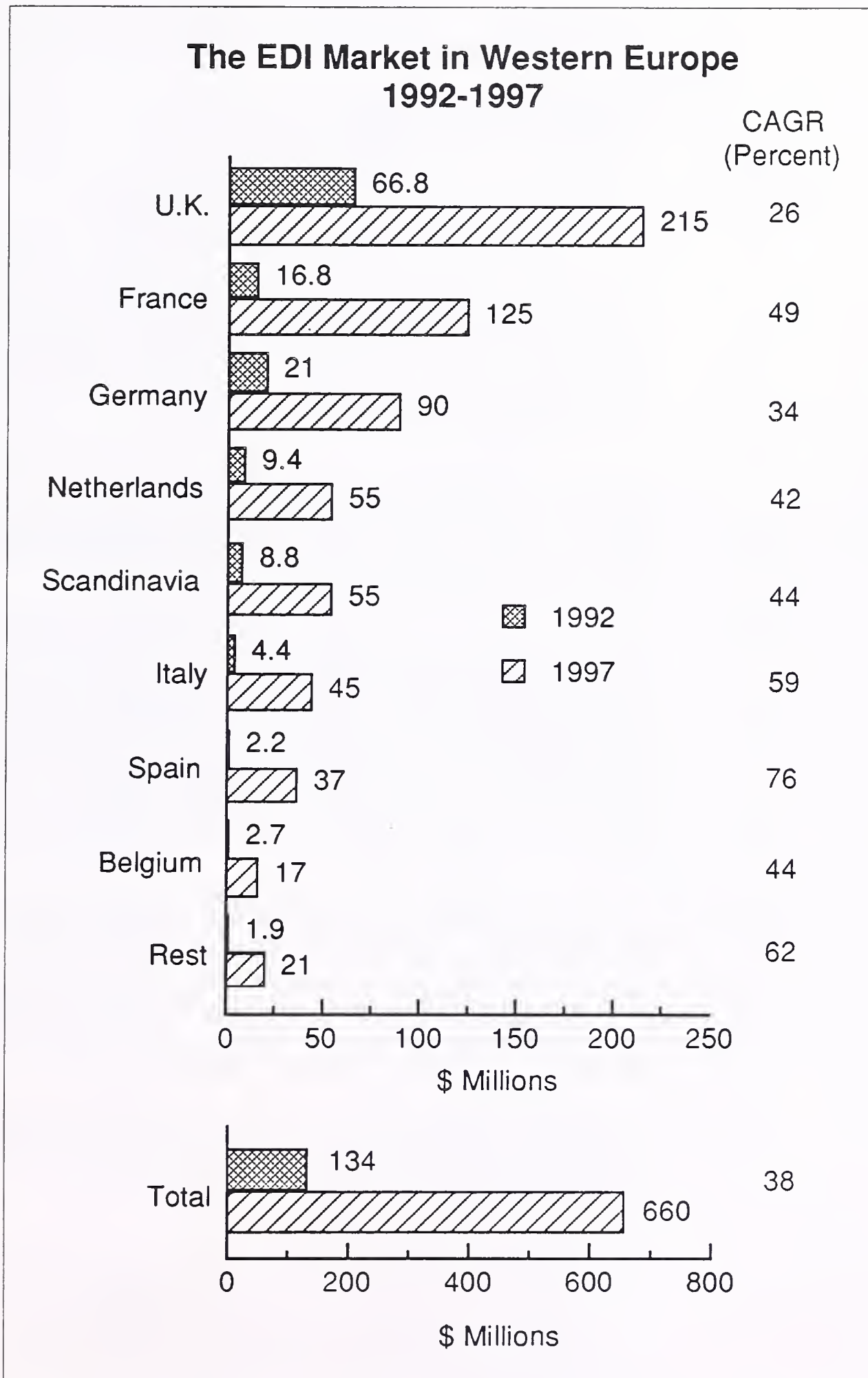
Despite the strong vertical orientation of EDI, individual countries and their respective inhibiting or accelerating factors to EDI adoption come into play largely on a country level.

Vendors of EDI products and services need to be aware of national differences in order to focus their marketing strategies. Country market developments and the resultant level of maturity are the most important determinants of strategy.

(All of the forecasts given are for the third-party EDI software and service markets, which use public standard, rather than proprietary, data formats.)

The high level of disparity in Europe means that individual countries are having very individual experiences with the technology. The relative growth and size of the country markets in Europe are illustrated in Exhibit IV-2.

EXHIBIT IV-2



The disparities between the size of country markets are a direct result of a number of influences:

- The economic climate
- The PTT monopoly status and regulatory environment
- Government intervention, subsidies and promotion
- Telecommunications infrastructure development

The U.K., which has been positively influenced by most of these factors, accounts for half of the total market value in Europe in 1992. However, the relative maturity of the market and poor state of the economy have produced the lowest growth rate in EDI expenditures of all countries, just 20% between 1991 and 1992. Excluding the U.K. from the total European figure shows a much healthier picture.

Over the five-year forecast time period, those countries showing the greatest growth—i.e., CAGRs of around 65%—are starting from the lowest levels of installations. Consequently, despite the high growth, they will not be of comparatively great value by 1997.

These countries include Spain, Italy and the “Rest of Europe” category, which includes Austria, Switzerland, Portugal, Greece and Ireland. There are a number of factors that have held back the development of EDI within these markets. Spain, Portugal and Greece have suffered from poor telecommunications infrastructures, which detracts from these countries’ attraction as investment for VAN (value-added network) service providers. Without a strong supporting network infrastructure, EDI activity is limited.

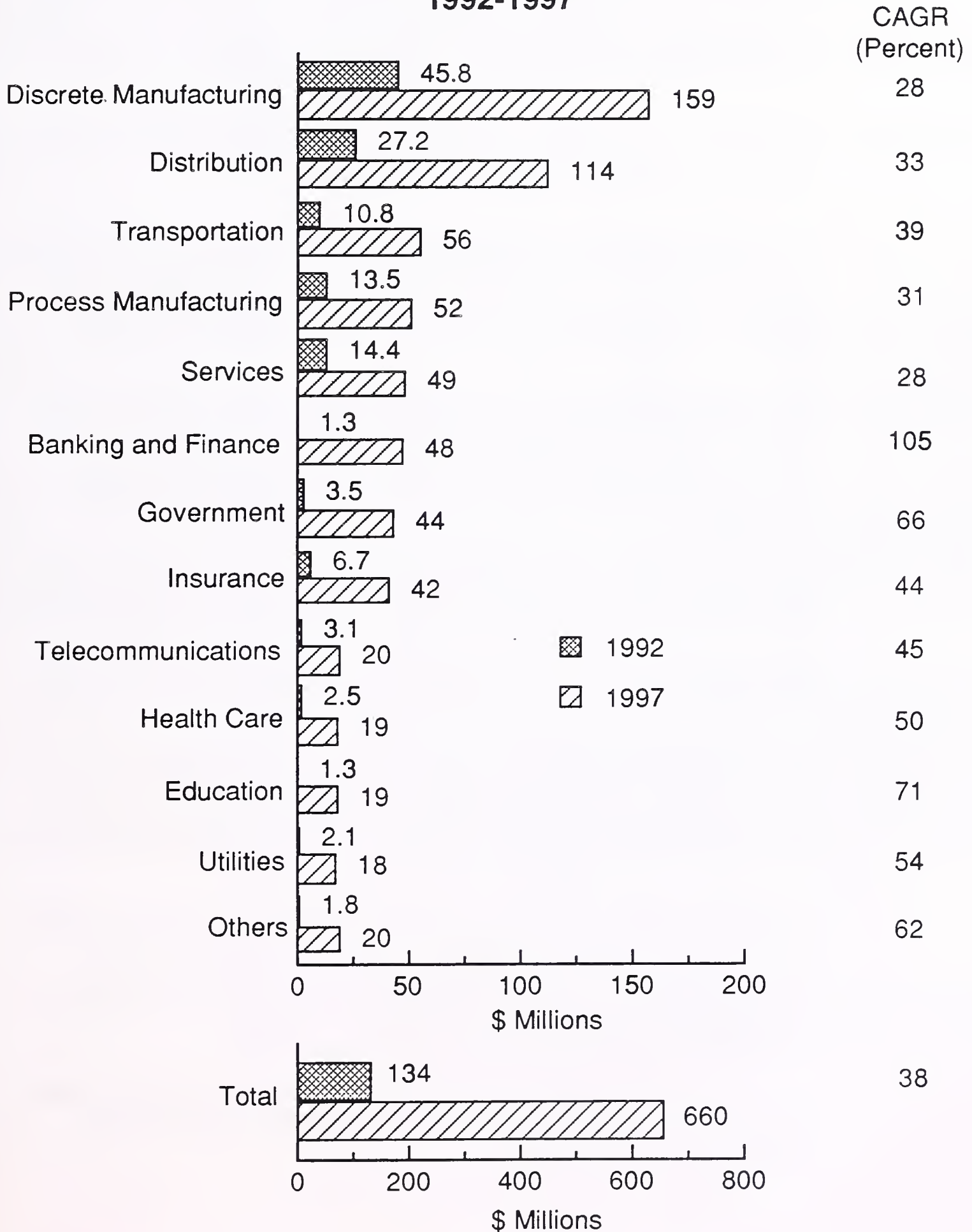
The Dutch, Italian and French markets will experience a high level of growth. This is partially a result of the support that EDI is receiving from the governments within those countries; the government sponsorship of EDI through the Department of Trade and Industry in the U.K. was one of the initial catalysts to growth. This contrasts with the slower growth and indifferent government activity in Belgium.

The largest vertical market is currently in the manufacturing sector, which accounts for 44% of the total market value in 1992, with discrete manufacturing accounting for 34%.

In view of the trend toward improvement in pan-European communications and the increasing facility to achieve this through transborder network services, the retail and distribution sector, transportation sector and the business services sector reflect a high level of EDI activity. The relative size and growth of a number of vertical sectors is illustrated in Exhibit IV-3.

EXHIBIT IV-3

The EDI Market in Western Europe by Industry Sector 1992-1997



The markets that are going to experience the most growth over the forecast period are banking and finance, and government. There is currently a low penetration in these markets, and the progression down the supply chain to include electronic payments and progression of the SWIFT EDI project will serve to encourage the banking market in the medium term. Additionally, the outsourcing and cost-cutting policies of governments will aid the development of the market in terms of administrative cost cutting.

The transportation sector is very actively adopting EDI, particularly in port systems as the European community drops barriers to the movement of goods across borders, trucking, air and rails.

EDI is such a strongly user-driven market that it is one of the few areas in telecommunications that is most likely to succeed in the widespread use of an agreed industry standard—i.e., UN/EDIFACT. This will be within a relatively short timeframe in comparison to the standards-making process—for example, for ISDN.

The relative proportions of the market value in terms of components will remain stable over the forecast period for Europe as a whole. Levels of market maturity and degree of telecommunications liberalization in individual country markets will, however, influence expenditure in these categories.

Currently, the majority of EDI expenditure is on network services. This will remain the case to the end of the forecast period. The increasing level of competition in the market as network services become more open will drive down the prices of these services. This will, in turn, reduce actual spending, although usage and network numbers will continue to increase.

Professional services expenditure is currently in its greatest period of growth. This reflects the early stages of development of EDI in the majority of European countries and the resultant high requirement for outside support in the implementation of systems and restructuring of information flow within organizations.

As markets mature, software will retain its proportion of the EDI expenditure despite inevitable price decreases. This will be due to software replacement when companies reach a critical mass of trading partners and enhanced software is increasingly required to accommodate increased throughput requirements.

Given that the EDI market is still in the very early stages of development in the majority of European countries, there is a great deal of market opportunities open to vendors.

The success of a particular vendor will be determined by its approach to the market. The two main factors that should determine this approach are vendor size and the stage that a given country market has reached in the cycle of maturity.

The smaller vendors are restricted in their approach to software and professional services. Competition is expected to increase among software vendors.

In the longer term, in order to survive in country markets that are maturing, the smaller vendors will be forced to

- Establish partnerships with network providers
- Specialize in vertical niche market offerings

These approaches will become more crucial to the survival of the smaller companies as competition increases across Europe alongside deregulation.

Additionally, the network providers will benefit from the ability to offer in-house software expertise alongside their services. This will serve as a market distinguisher as competition increases.

The more mature the EDI market becomes, the less penetrable it will be. The market entrants that are successful at the early stage of market development will be the ones that will become the market leaders in the long term. The success and high market share of INS and the widespread use of Tradanet in the U.K. illustrate this.

The user-driven nature of the EDI market is such that in the initial stages of vertical market development, the “hub” EDI users—through the encouragement of trading partners to use the technology—are predominantly responsible for market development and growth. Vertical sectors are set to become more horizontal through increased use of EDI further down the supply chain. In the majority of countries in Europe, however, vertical markets are at such embryonic stages that the opportunities are still open for vendors to lead selected markets.

Transnational joint ventures are springing up.

A joint venture of North European ports will allow the ports to exchange messages regarding hazardous cargoes. Ports include Rotterdam, Antwerp, Felixstowe, Bremen and Hamburg.

B

Competitive Environment

The liberalization of national telecommunications services by European governments is setting the stage for competitive activity, mergers, acquisitions and partnering by companies offering EDI network services. British Telecom is the most aggressive.

The following are the leading EDI providers in Europe.

International Network Services (INS) is the joint venture between GEIS and ICL, which was formed in 1987. INS offers Tradanet, its basic EDI value-added network service, which is applicable to all types of general trading and especially to the wholesale and retail sectors. INS is the U.K.'s leading EDI service, providing store-and-forward and clearinghouse services in over 20 market areas, including: food, clothing, chemicals, mail order, department stores, pharmaceutical wholesaling, white goods, electronics, public utilities and authorities, distribution services, brewing, leisure goods, oil and petroleum products, opticians, music, fast food outlets and publishing. INS is interconnected with the GEIS EDI*Express network, giving it an international reach.

GEIS also offers EDI software and network services independently of INS, its joint venture with ICL/Fujitsu. It is strong in Italy, France, the U.K. and Benelux countries. It has pursued the trade and transportation sector with its Cargo*Link offering.

AT&T/Istel is the U.K.'s other leading value-added network. Istel was acquired by AT&T in 1990. Along with AT&T EasyLink services, AT&T Istel offers enhanced facsimile and E-mail along with EDI. Istel has a strong base of manufacturers on its EDI service. Its main EDI switch software, EDICT, has been resold abroad, notably in Hong Kong for the Intertrade EDI service. AT&T is converting the EDICT software to a UNIX-based platform that will transport EDI messages using the X.400 and X.434 protocols.

SEVA is an Italian network service provider. It was established in 1985, and its shareholders include Olivetti, SIP and a number of finance houses. In 1990, it licensed the Edict software from AT&T Istel to use in its clearing center. SEVA has 36 access nodes across Italy and can offer an international capability through the AT&T Istel network.

IBM. Despite its widespread presence in hardware, its many acquisitions recently and its alliances with other information technology vendors (such as Bull) in Europe, IBM Information Network/Advantis is not a conspicuous EDI player in Europe. In fact, in 1992 IBM handed over much of its

data communications traffic to be managed by Syncordia, British Telecom's U.S. subsidiary. Syncordia manages data networks for large corporations using BT-supplied circuits.

EDS/SD-Scicon. EDS, the subsidiary of General Motors, purchased the U.K.-owned systems integrator, SD-Scicon, in 1991. INPUT estimates SD-Scicon's 1991 revenues to have been \$472 million. SD-Scicon has been actively installing EDI systems and offers PC and IBM mainframe EDI translation software. It has a large customer base, particularly with manufacturing companies. In addition, EDS has network access points in Europe that principally GM's EDI traffic is carried on.

GSI (Generale de Service Informatique) is a FF 2 billion French company that offers systems integration, systems operations, network services and software, including those for EDI systems. GSI has a strong EDI customer base in the automobile retail sector, travel and transportation and banking/finance. GSI has the contract for the development and operation of Transponet, an EDI service linking European carriers and their customers. It provides a network information service that links automobile manufacturers and their dealers. It has more than 8,000 dealers in eight European countries. It is building a car rental clearing system between travel agents and Avis, Budget, Europcar and Hertz that operates in 15 European countries. GSI has a partnership with the U.S. bank outsourcer, Systematics (Little Rock, AR).

CAP Gemini Sogeti is a \$2 billion French company and the largest independent professional services vendor in Europe. It has entered into a joint venture with equipment vendor Bull for EDI.

The Societe International Transport Aeronautique (SITA), based in Paris, is an international consortium of the world's airlines. It has a global data network through which it is offering EDI connections between airlines and their suppliers, especially spare parts and fuel suppliers. SITA created a wholly owned subsidiary, Scitor, which develops and commercializes EDI software. At this time, SITA is concerned with the airline and supplier community only.

British Telecom (BT) is Europe's most aggressive telephone company in pursuing pan-European data network services. Its Syncordia subsidiary (based in Atlanta, GA, U.S.) manages data networks for large corporations using BT-supplied circuits. Through BT North America, another U.S. subsidiary, BT offers EDI value-added services. BT has created a single data network domain connecting North America and Western Europe so that transmission fees are the same for sending a message from Los Angeles to London as from Los Angeles to Las Vegas. BT signed a contract with IBM to carry IBM Information Network's traffic in its X.25 packet network. It has a similar deal with Digital Equipment Corporation.

Transpac is one of nine companies that are owned by Cogecom, a holding company controlled by France Telecom. Transpac owns the world's largest packet-switching data transmission network, counting over 15,000 clients and 90,000 network access points. Services offered by Transpac include the packet-switched data network, ATLAS 400 (an X.400-based messaging service), EDI and other value-added services. Transpac is part owner of INFONET, the international value-added network based in El Segundo, CA.

Philips markets a range of EDI hardware and software products under the brand name, PHAME (Philips Advanced Means of EDI). The product range is designed to meet all of a company's EDI needs. Philips' initial focus is on establishing bridges between users' internal EDI systems and external communities such as INTIS, the EDI network for the Port of Rotterdam, or Transpotel, the network of European freight companies.

C

Analysis of National Markets

1. United Kingdom

The U.K. is the most advanced country in Europe using EDI and accounts for approximately half of all market expenditures by EDI users on software, network services and professional services.

EDI in the U.K. has grown up around the distribution and retail industries. A majority of U.K. users are linked with the Article Numbering Association's retail and distribution initiative. The ANA developed the Tradacoms standard, which was developed prior to the EDIFACT standard and is still widely used.

The leading value-added networks in the U.K. are INS' Tradanet service and AT&T Istel's service.

Motornet is a specialist trading service aimed at automotive manufacturers, suppliers, customs agencies and shippers. It was created by GEIS in conjunction with the U.K.'s Society of Motor Manufacturers and Traders and the European-wide Organization for Data Exchange by Teletransmission in Europe (ODETTE), which has national branch organizations in each country. Motornet provides a commercial document exchange for the automotive industry, primarily in the U.K., but also handling international links. Principal documents are invoices, schedule releases and advice notes.

Pharmnet is another specialist trading service aimed at the pharmaceuticals supply chain. It provides a service for Regional Health Authorities, wholesalers, other suppliers and the pharmaceutical manufacturing companies to enable them to transfer documents electronically. As in the cases of Tradanet and Motornet, Pharmnet is linked to GEIS' EDI*Express service.

INS also offers Brokernet, a specialist EDI service for motor and general insurance businesses, offering a leasing facility to brokers, insurance companies and syndicates. Brokernet standards are based on Tradacoms but also support EDIFACT.

The U.K. has numerous EDI projects in shipping, freight, trucking, banking, supermarket retail, manufacturing, health, pharmaceuticals and insurance.

The Dover Ferry Port Fast Freight Network went on-line in January 1992. The network processes 30% of port vehicle export traffic and was developed by SEMA Group Systems. Dover handles 1 million freight vehicles per year. By 1993 this is expected to reach 1.75 million. However, the Dover system may become redundant in 1993 when the European Community single market comes into effect. Only 10% of the U.K.'s exports through Dover go to non-EC countries.

INS-Internet is a joint venture between International Network Services, Ltd. (INS) and Fujitsu, Ltd. formed in October 1991. INS-Internet will allow 3,000 U.K. users to communicate with 9,000 Fujitsu Fenics users and provide access to the GE Information Service network. Also, INS and the National Westminster Bank PLC developed a banking EDI system in 1990.

In shipping, Community Network Services, Ltd. (CNS) and Maritime Cargo Processing PLC are working toward standardized shipping EDI in the U.K. Ediship, an EDI system for deep sea shipping, has been operational since 1990 and is linked to Bifanet, a system developed jointly by the British International Freight Association and GEIS.

GEIS has also helped develop a Trucking Project that aids in tracking freight on land. GEIS owns 30% of the project while companies and PTTs of other EC countries own 70%.

2. France

France is the second largest market in Europe for EDI software and services. The retail, distribution, automotive, government and aerospace sectors are the most advanced.

The leading value-added network in France is Transpac, the free-market subsidiary of France Telecom (the state-run telephone company, PTT). Because there were relatively few EDI applications in France before 1988, Transpac has been successful in introducing X.400 to EDI users in France. French users of EDI are using X.400 protocols to send EDI messages.

Transpac has been well protected by government regulations as the monopoly supplier of the X.25 national packet-switching network. To offer its customers international connections, Transpac uses Interpac, which is run on the INFONET network. INFONET (El Segundo, CA) is owned by a consortium of telephone companies around the world, including France Telecom.

Various industry-specific clearinghouses have been established and are operated by various vendors—including Bull, Digital Equipment Corporation, IBM, Hewlett-Packard and Telesystemes. They include:

- Galia, an EDI system used by a group of 200 automotive industry manufacturers and suppliers. The system uses the EDIFACT and Odette message standards.
- TEDECO, a system developed to tie private companies into the Ministry of Finance. TEDECO was formed by a joint venture between Transpac and Bull/CAP-SESA, the equipment and software vendor. Additionally, TEDECO will link the Finance Ministry to a major portion of the 2,000 local governments with which it interacts. This network is expected to generate U.S. \$3.3 million per year in savings.
- Assurnet, a system for linking 60 insurance industry users, utilizes Assurnet and proprietary EDI standards.
- Allegro, an EDI system developed by GENCOD, a trade organization with 8,000 affiliated members in the distribution community. More than 100 users are on this system, which uses GENCOD EDI standards.
- EDONI is another distribution industry clearinghouse.
- EDICONSTRUCT, a system in development for the construction industry, is expected to use EDIFACT standards.
- Eucom, a joint venture involving French, German, and Dutch PTTs and GSI Transport-Tourisme (partly owned by France Telecom), is building Transponet. Transponet is a European-wide EDI service for truckers and shippers and is aimed at small independent trucking companies.

3. Germany

German businesses run some of the most sophisticated networks in Europe, but the business climate has always favored the private/proprietary network approach. This has done little to stimulate the creation of value-added networks. EDI similarly has tended to be run for the benefit of a single large company, with direct links to its suppliers. Standard EDI in Germany has lagged behind that of France and the U.K.

Germany's car manufacturers have developed extensive networks to provide direct links to their suppliers. The German banking system is adopting its own brand of settlement EDI.

In addition, Germany's shipping and cargo industries have developed the following projects:

- EDI-Frankfurt (EDI-FRA), which took U.S. \$1.65 million and two years to develop. As of June 1990, this system was in use by the Frankfurt Airport Authority Cargo Information Systems group to send and receive air freight forwarding and air bills-of-lading messages with the EDIFACT standard. The prediction then was that the EDI-FRA system would expand to include airport authorities across Germany.
- The Bremen/Bremerhaven Teleport dbh was developed in 1988 by Bremer Lagerhaus Gesellschaft (BLG). This system uses EDI to link the ports of Bremen and Bremerhaven, which supports a traffic load annually of 10,000 vessels, representing 200 shipping lines and 1,000 international ports. In 1991 alone BLG handled 31 million tons of cargo and 1.3 million TEUs (20-foot equivalent units). The Teleport transmits inventory checks, storage status and custom report messages between the two German ports and to many of the shipping companies they serve.
- The New York and New Jersey Port Authority System (ACES) forged an EDI link in late 1991 with the Bremen/Bremerhaven Teleport dbh. With help from GEIS, this project enables the two port authorities to transfer cargo data and arrival messages.
- UPS (United Parcel Service) has transplanted its package delivery concepts to its hub in Cologne, Germany.

The operation and regulation of national telecommunications services in Germany has historically been entrusted to a federal body, the Deutsche Bundespost (DBP). With liberalization in 1989, data network services (packet switching, EDI and E-mail) have been opened up to other parties. Yet, due to a rule forbidding the connection of private services with public networks, third-party value-added network services (outside of those offered by DBP's Telekom service) have been discouraged.

4. Italy

Teledis is an EDI network service provided by Televas, SpA. Televas is 50% owned by STET, Italy's state-owned and -run communications holding company. At this time, Teledis has been operational for six years and has primarily served the Italian retail industry. Over 200 companies in retail, manufacturing, finance and transportation are using the system.

One of the first firms to use Teledis was Simmenthal SpA., a division of the Kraft/General Foods Group that manufactures sliced beef in gelatin and tuna fish in olive oil.

Because Teledis uses a national X.25 packet-switching network, many potential European users have been wary of the service. There have been questions of reliability and the high data transmission failure rate inherent in packet-switching systems.

Nevertheless, Televas and the Soviet Academy of Sciences partnered to test EDI transmission links as an overture to establishing trading links.

Intessa is an IBM and Fiat joint venture that provides EDI network services and software. It directly competes with GEIS, which has traditionally gained one of its largest revenues components in Europe from Italy and still holds around 40% of Italy's network services market.

Fiat's collaboration with IBM in Intessa is a setback to GEIS because Fiat had previously used GEIS for network services with its suppliers. Fiat wants to establish EDI with its top 400 suppliers. The relatively small number of major corporations in Italy, and therefore lack of "hub" companies with lots of supplier "spokes," may impede Italy's widespread use of EDI.

EDIFORUM is an association of companies that are promoting research in the field of legislative change in telecommunications regulation, lobbying for legislative intervention, and promoting widespread use of EDI in Italy.

5. Spain

Telefonica is increasingly investing in Spain's digital infrastructure, which is resulting in the Spanish market's becoming of key interest to both telecommunications equipment and services suppliers. This is reflected in high growth in the Spanish market over and above the rest of Europe.

The automotive industry is the principal base of EDI activity today in Spain. Companies in this industry use the ODETTE data format.

6. The Benelux Countries

a. Netherlands

The Dutch liberalized the telecommunications industry in 1989, allowing private networks to compete with the state-owned PTT Nederland BV.

There are several private videotex networks in the Netherlands, and services such as telebanking and cash management services are also marketed. The EDI sector in particular is extremely active.

Air, land and sea transportation and cargo are the leading areas for EDI. The Port of Rotterdam, along with PTT Telecom PV (the Dutch telephone monopoly), have developed INTIS, an EDI system that functions as a clearinghouse for EDI transmissions between sea shippers using the port. INTIS is also linked to Singapore Network Services. It is part of a joint venture with four other northwest European ports: Antwerp, Felixstowe, Bremen and Hamburg.

Because INTIS is partly owned by the Dutch telephone company, it is able to spread EDI outside the Port of Rotterdam to other Dutch transport industry areas. However, critics have accused INTIS of only organizing external links between its partners and not addressing its own internal communications needs. As of 1992, INTIS has 120 subscribers, and projections called for a 50% subscriber increase in 1992.

Cargonaut is a similar system for air cargo and transport at the Amsterdam Airport, while roadway cargo is overseen by the Uniform Transport Code EDI system.

b. Belgium

Telecommunications services in Belgium are provided by the Regie des Telegraphes et Telephones (RTT), which has a monopoly over basic conveyance of voice data. In the area of network services, an increasing degree of competition is permitted, with several private companies active in the provision of videotex services. Alongside the private competition, the RTT plays an important role in the provision of value-added services with EFT, EFT/POS, teletex and videotex services all quite well developed.

The market for EDI services in Belgium is influenced by its position as a European economic center as well as the headquarters for various government bodies, multinational corporations and financial institutions including SWIFT, the electronic funds transfer network. SWIFT is at the center of discussions for bringing its EFT activities over the next four years into line with the EDIFACT standards.

7. The Scandinavian Countries

GEM, a consortium of Scandinavian shipping lines, commissioned GEIS to develop an Equipment Management System to enable the lines to track the movement of their more than 100,000 containers used to transport goods worldwide as well automate such procedures as contract and billing maintenance and repair scheduling. The system runs on the GEIS global network.

Copenhagen is the focal point for BimCon, an EDI network under development for the Baltic and International Maritime Council (Bimco). Bimco consists of 2,700 shipowners, charterers, shipbuilders, insurers and maritime lawyers in 100 countries in the Baltic region. Under development since May 1989, BimCon is expected to have eight global hubs for the transmission of telex, fax, E-mail, EDI messages and maritime communications.

The Danish PTT and IBM Denmark established an EDI network in 1989 called DanNet. Over 20 industry-specific EDI projects are running on DanNet, including those covering insurance, banking, retail and construction.

The A.P. Moeller Group, a large privately held Danish multinational, has its own EDI network that it uses to connect its many businesses and their trading partners. The company, with properties in oil production services, retail and shipping (it owns Maersk ship lines), is said to control more than half of the GDP of Denmark. Maersk Data Services has operations in Europe, the U.S. and Japan and offers EDI services to companies outside of the Moeller family.

In Finland, EDI is currently being used throughout the forest products industry, where some 15 Finnish supplier companies are trading with 100 international partners.

Sweden is the first country to legalize the acceptance of EDI customs documents without requiring paper back-up. However, potential users have been reluctant to change business practices, and there has been some difficulty translating existing computer standards to EDIFACT. Resistance is most likely to come from bigger Swedish trading firms that have well-established computer systems.

Existing and proposed systems in Sweden include:

Markis, the shipping EDI system developed by Swedish Transocean Lines. Begun in 1986, this system transmits export declarations and is in the process of adopting EDIFACT standards.

Dacom industry standards have been used in food retailing EDI since 1984 for purchase orders and invoices. The industry is in the process of switching to the EANCOM retailing subset of EDIFACT.

Sweden's banking industry uses EDIFACT messages for payments and services while some transport companies do the same for forwarding and shipping.

In construction, DK Bygg is developing a trade and materials administration system.

In February 1991, ScanSped (the international forwarding division of Bilspedition AB) and Sandvik AB (a manufacturing group) entered into a joint venture pilot project to conduct trials on EDI electronic export documents.

As recently as August 1992, the Swedish EDI community announced plans for EDI-92, a proposal that would link 70,000 small and medium-sized Swedish companies in the trading, banking, graphics/communications and customs industries.

8. Other Western Europe

Portugal and Greece are lagging behind the majority of countries in Europe with respect to network infrastructure development. Partially as a result of this, the relative values of these markets will remain low up to 1997.

Switzerland and Ireland have far superior digital infrastructures, but are small markets purely due to their sizes. Both countries will experience a high level of growth over the forecast period, although within this size constraint, which will force the markets to remain comparatively small. One of the main influencing factors on the development of the Swiss market is the banking community, which is waiting to implement EDI through SWIFT. The Swiss banks have not opted to take the individualistic approaches characteristic in particular of the U.K. market.

AustriaPro was founded in November, 1989 to promote EDI use among various Austrian business sectors, both financially and organizationally. ECODEX, a retail store EDI system, has been on-line since 1988.

9. Eastern and Other Europe

a. Russia/Former Soviet Republics

As of November 1991, proposals for EDI applicability included the Russian railway, river shipping and cargo industries. The United Kingdom Simpler Trade Procedures Board has signed a pledge with the Soviet

Paperless Trading Association (PEPI) to support and cooperate on EDI development. The U.K. board has also provided consulting and advice to Poland, Bulgaria and Czechoslovakia.

Cable & Wireless PLC also has a joint venture brewing with Russia's Far East Shipping Company and other partners to provide a digital network to the Eastern ports of Nakhodka and Sakhalin.

In February 1991, International Computers, Ltd. (ICL) (U.K.) sold an EDI system for U.S. \$2 million to the Soviet Association of Information and Automated Data Processing (INFORMVES). INFORMVES is part of the Ministry for Foreign Economic Relations. The purpose of the network is to offer more than 27,000 Soviet firms officially registered to conduct foreign trade the ability to communicate with one another. The system will also allow trading companies a means to transmit and receive messages with 17 regional INFORMVES offices and the central EDI center in Moscow.

Through the Moscow center, government trade officials will be able to access trading information and monitor any illegal trade conducted.

By far the biggest project, some U.S. \$20 million to date, has been developed by the Soviet Ministry of Merchant Marine (Morflot). Case Communications (U.K.) sold Morflot message-switching technology to sort and direct E-mail messages from ships to shipping company, shipping agent and port official's "mail boxes". Nippon Electric Company provided the land-based systems. In 1989, ICL got approval to form a joint venture with Morflot to provide an EDI system called Marine Computer Systems to monitor ship movements.

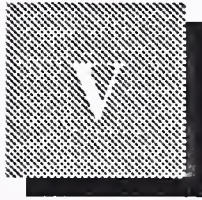
Government deregulation has left trading firms with the legal ability to trade with the West, but they lack the experience with standardized trading procedures or new laws coming into effect. Also, bureaucratic procedures and administrative paperwork bog trade down. Other problems include an antiquated transportation and distribution system, and an outdated telecommunications infrastructure that still uses twisted-pair lines. And due to export controls established by the Coordinating Committee for Multilateral Export Controls, the Soviets are still not allowed to acquire X.25 digital communications lines.

b. Other Eastern Europe

Leading other Eastern European countries in the adoption of EDI are Poland, Czechoslovakia, Hungary, Bulgaria and Yugoslavia. The poor telecommunications infrastructures in these countries, not to mention the serious economic dislocations resulting from the tremendous constitutional changes hitting these countries, are keeping EDI usage to a few

isolated experiments. Academics in these countries are actively studying EDI and have some influence in government policy. Otherwise, principal uses of EDI are by multinational firms. The Bulgarian government sought advice and information from the National Westminster Bank PLC on EDI.

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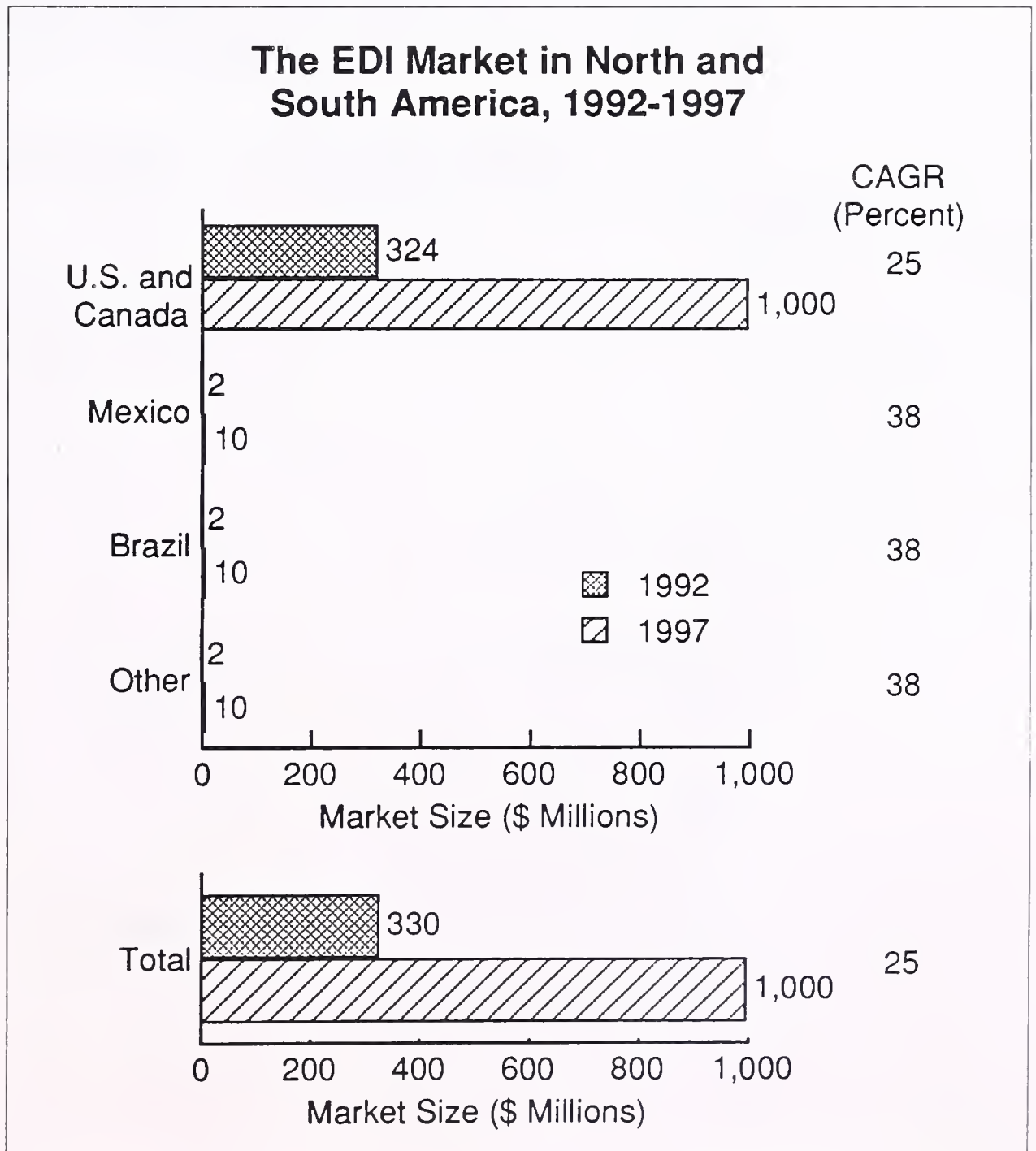
American Region

A

Overview

EDI activity in the American region (including North, Central, and South America) is dominated by the United States, as shown in Exhibit V-1.

EXHIBIT V-1



Canada is also well along in adopting EDI, and it is more advanced than the U.S. in its adoption of financial EDI services, as all major Canadian banks provide EDI/EFT. Outside the U.S. and Canada, EDI activity in other parts of the American continents is sparse: some in Brazil and some in Mexico. Mexico has little activity, but it may be the fastest growing of the whole American region. Exhibit V-1 summarizes spending on EDI software and services throughout the American region.

INPUT examines this market in detail below.

B

Competitive Environment

1. U.S. Vendors

For detailed information about EDI software and service vendors serving the United States EDI market, please refer to INPUT's reports, *The U.S. EDI Market, 1992-1997* and *EDI Vendor Profiles and Competitive Analysis*.

A summary of leading network service, software and professional service vendors are shown in Exhibits V-2, V-3, and V-4.

EXHIBIT V-2

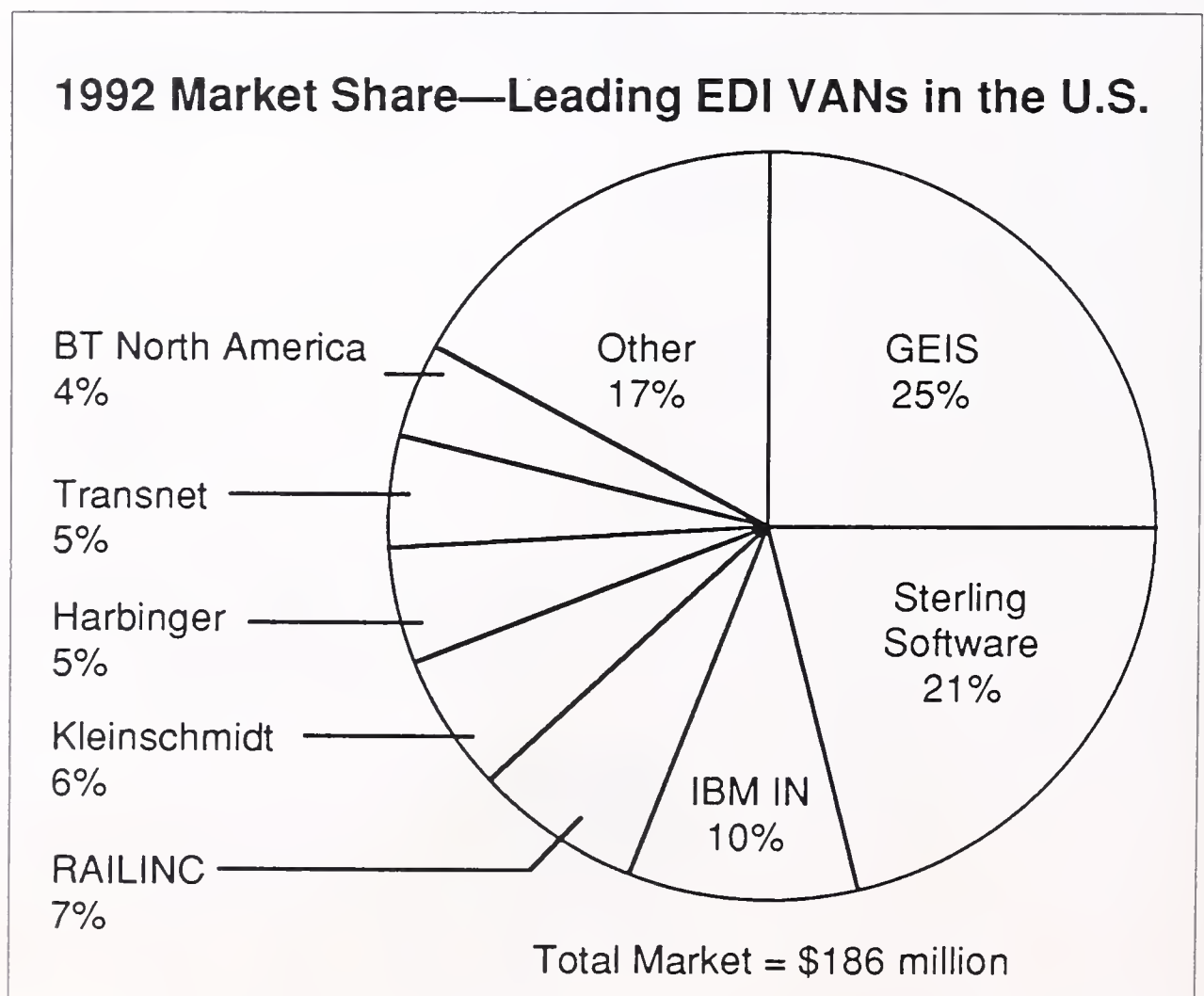


EXHIBIT V-3

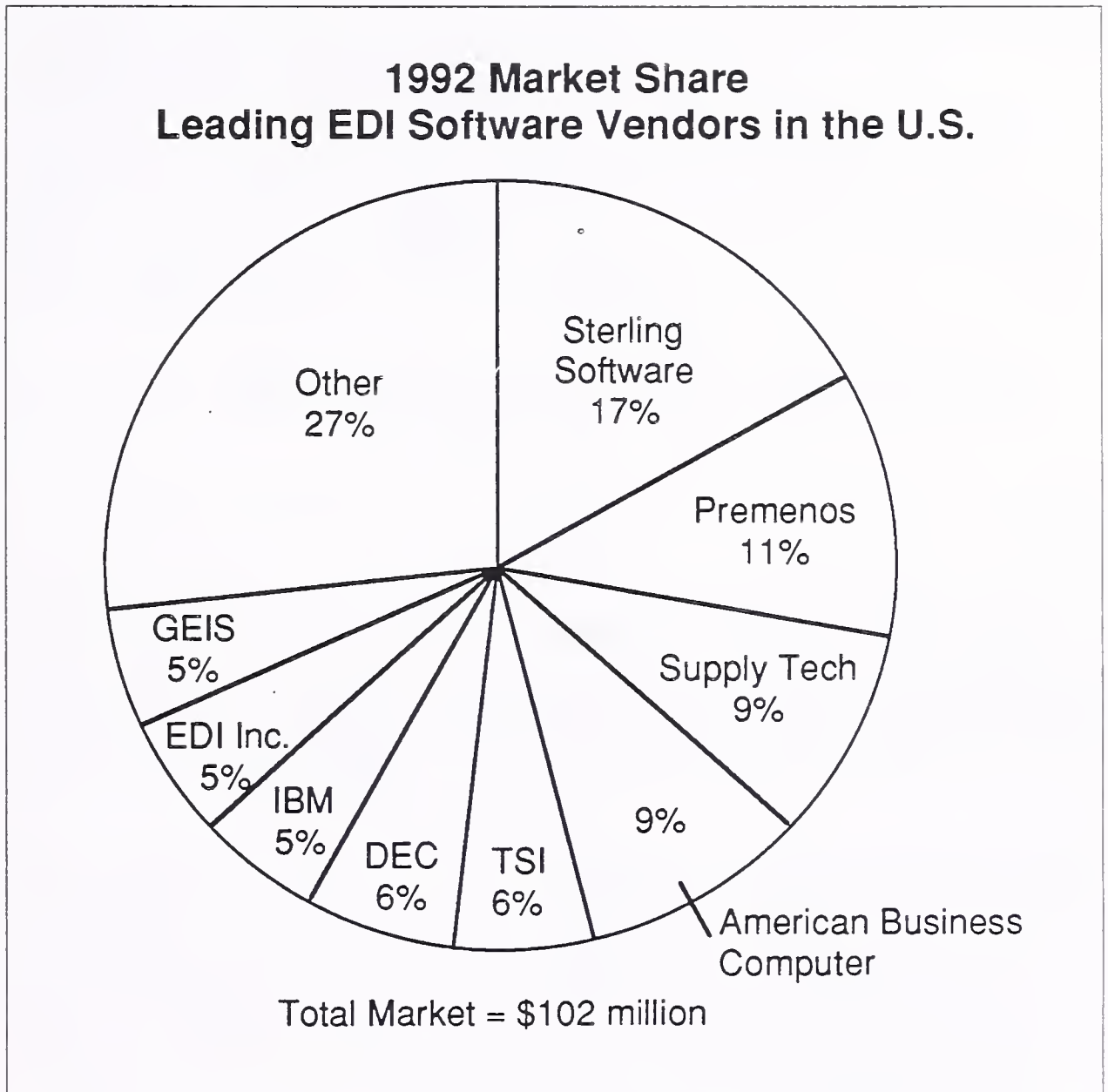


EXHIBIT V-4

Leading EDI Professional Services Firms in the U.S., 1992

Vendor	1992 Revenues (\$M)
EDS	5.0
IBM Information Network	4.0
Price Waterhouse	2.5
Andersen Consulting	2.0
Sterling Software	2.0
Ernst & Young	1.5
Deloitte and Touche	1.0
GE Information Services	1.0
Digital Equipment Corp.	0.5
Other	7.5
Total	27.0

2. Canadian Vendors

Leading network service providers in Canada are EDS, GE Information Services, DEC, IBM, InfoGlobe, Telerate, Telecom Canada, CANAC Telecom and AT&T EasyLink.

CANAC Telcom specializes in voice and data systems integration and network management, and it offers international value-added network services and EDI software. CANAC Telecom's Pro EDI software utility adds EDI capability to any business application. CANAC Telecom and ASTI Ltd. of the U.K. connect to a worldwide packet-switching network with full service mailboxing technology and local dial-up anywhere in the U.S. and in all major cities in Canada and Europe.

IBM Canada Ltd., in addition to providing EDI network services and software, is also a large user of EDI with its suppliers and customers. Approximately 50% of its transactions with trading partners is conducted over its network using EDI. IBM Canada has EDI partnerships with financial institutions, automobile manufacturing, distribution, telecommunications, retail, government, steel, petrochemical and pharmaceutical.

The Transport Data Network International (TDNI) is a joint venture company designed to service the EDI systems integration needs of Canada's multimodal transportation industry. TDNI was formed to continue the services developed by CANSIF Canadian Enterprise Inc., the organization that implemented a pilot program for the air and marine communities in 1989. CANSIF, through the user input of 20 major transportation companies and Canada Customs, designed and implemented the EDI services involving 25 sites across Canada.

EDS Canada is one of the leading EDI translation software vendors in Canada. Most of its customers are in the Canadian automotive supplier industry.

3. Mexican Vendors

The telecommunications and network infrastructure in Mexico is "one of the worst problems in Mexico," according to Gabriela Diaz, director of EDI at Volkswagen Mexico, referring to Tel-Mex, the now privatized but formerly state-run telephone company (PTT). Concurring with Ms. Diaz is Victor Almandoz, president of Comunicaciones Virtuales, an EDI systems integrator based in Mexico City.

In Mexico, Tel-Mex provides the "local loop" connection to more reliable value-added networks. EDI users typically use the phone company just to dial out to the closest network node. The most prominent network service providers in Mexico are IBM Information Network and Electronic Data Systems. INFONET, AT&T and GEIS have network facilities in Mexico, but do not have the profile of IBM or EDS. For example, the Mexican automotive industry has specified IBM and EDS as the preferred VANs.

INFONET has a strong business in providing links between U.S.-based credit card authorization and processing centers and Mexican resort locations, but no EDI services. INFONET is also providing international E-mail to government agencies and multinational companies.

In addition to the commercial networks, private corporate networks are used extensively in Mexico. Retailers Sears and Wal-Mart and most of the U.S. car manufacturers have their Mexican plants sending EDI messages through their own private (often satellite) networks. The Ford EDI program, for example, has its Mexican suppliers communicating with the Mexican Ford plants through Ford's Detroit-based switch.

The two largest banks in Mexico, Banamex and Bancomer, have vast, extremely sophisticated voice/data networks. These banks are considering commercializing their networks. The Mexican equivalent to the FCC gave permission last year for the telecommunications industry to have competi-

tors. Bancomer's network is on par with an advanced telephone network: it handles data and voice; it has 450 nodes throughout Mexico with more nodes in major cities throughout the world; it has fiber optic terrestrial lines, microwave links, and satellite links. It is extensive.

Prospects for Tel-Mex to improve its service appear good; however, many users in Mexico are skeptical. The company was acquired in December 1990 for \$1.76 billion by an international consortium led by the Mexican financier, Carlos Slim. Slim's two partners are France Telecom and Southwestern Bell Corp. While Slim's management has been renovating the system, lawsuits by Mexican businesses are piling up regarding slipshod service.

In addition to the network service providers mentioned above, EDI is being delivered by a handful of key players in Mexico.

The Mexican automotive industry has narrowed its recommendations for EDI software to three vendors: Supply Tech, EDS and IBM. Of course, if one auto industry member has a platform that doesn't fit with these recommended packages, allowances are made. "We don't want the kind of problem (of scores of different software vendors) like in the U.S.," says Volkswagen's EDI director, Gabriela Diaz.

EDI software from Supply Tech is sold through a distributor in Mexico City, Comunicaciones Virtuales. President Victor Almandoz also distributes EDI software of EDI Inc., Premenos, and EDI Solutions, but intends to drop all of them in favor of Supply Tech. Supply Tech, he says, is the only one that gives good support, and IBM is too much to compete with in the midrange market (Premenos' niche).

Also in Mexico are the large professional services firms with EDI practices, particularly Price-Waterhouse and Andersen Consulting.

Exhibits V-5 to V-8 list various EDI product and service providers by delivery mode.

EXHIBIT V-5**Leading EDI VANs in Mexico**

- EDS
- IBM Information Network
- Private networks (Chrysler, Wal-Mart, Ford, etc.)

Source: INPUT

EXHIBIT V-6

**Potential VAN Entrants in
the Mexican EDI Market**

- GE Information Services
- AT&T
- INFONET
- Bancomer
- Banamex

Source: INPUT

EXHIBIT V-7

**Leading EDI Software
Vendors in Mexico**

- Supply Tech
- IBM
- EDS

Source: INPUT

EXHIBIT V-8

**Leading EDI Professional
Services Firms in Mexico**

- Comunicaciones Virtuales
- EDS
- IBM
- Price-Waterhouse
- Andersen Consulting

Source: INPUT

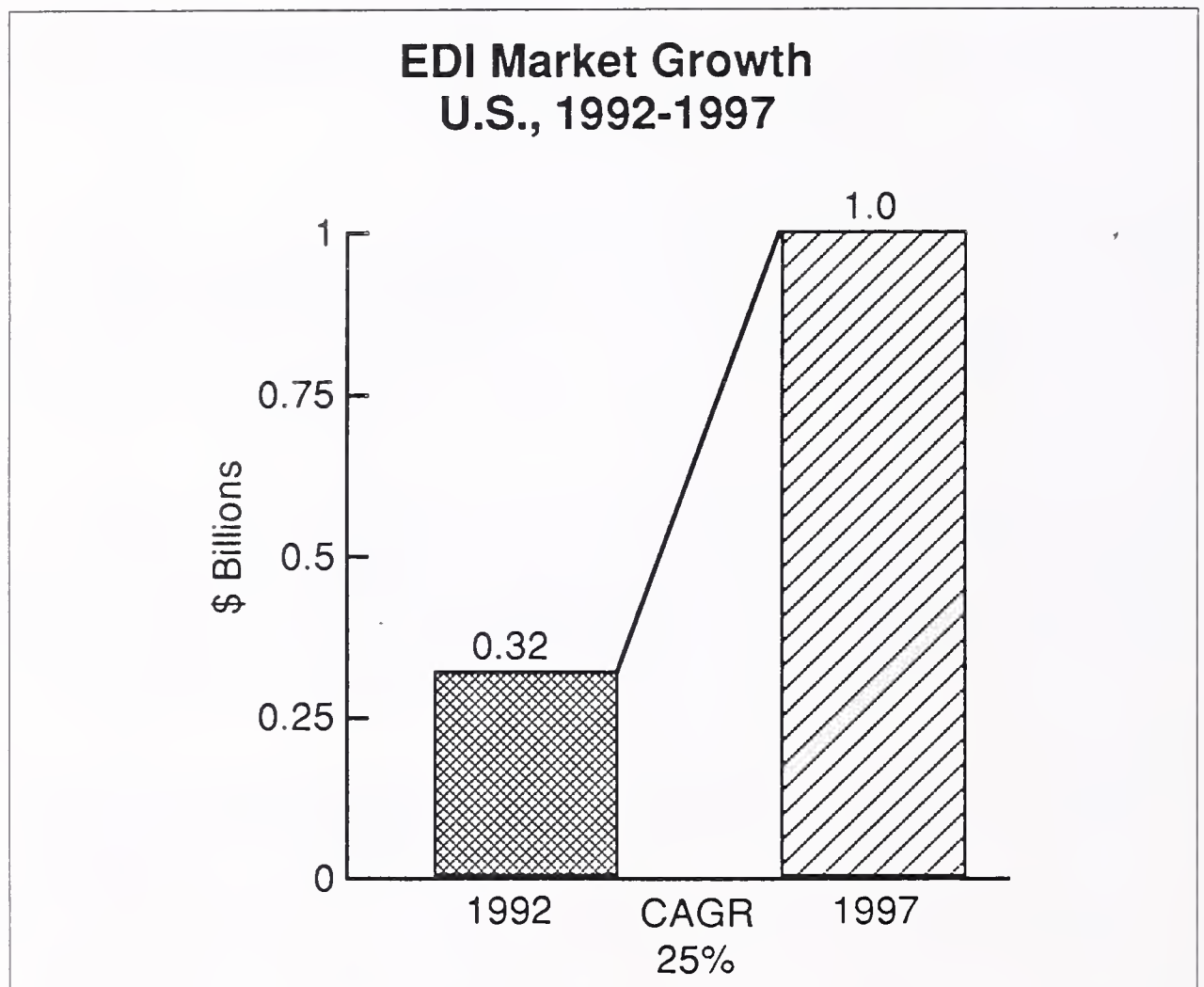
C

Analysis of National Markets

1. United States

The market for EDI software and services in the United States continues to grow at a rate of 20% to 27% per year. INPUT expects it to become a billion-dollar market by 1997 and to grow at a compound annual growth rate of 25% between 1992 and 1997. Exhibit V-9 depicts this growth graphically.

EXHIBIT V-9



Just in the last year—from 1991 to 1992—there has been tremendous growth in the market for EDI translation software that runs on midrange platforms (typically, AS/400s, and the System 3X class of machines).

The growth in the midrange market, INPUT believes, corresponds to more users upgrading their EDI capacities. After a certain number of trading partners has been attained with which EDI is used as a communication channel, the typical EDI user will replace its translation software. In this year's survey of 134 experienced EDI users, more than half (58%) reported that they had replaced their software in this manner.

Last year's introduction of UNIX-based EDI software that is distributable in a client/server fashion fits into this trend of upgrading by users. INPUT expects the UNIX-client/server architecture to be a successful market offering, bringing satisfaction to EDI users, and growing rapidly from its current relatively small market niche.

INPUT expects that consulting and systems integration professional services for EDI will be one of the most rapidly expanding segments of the EDI market over the next five years. Professional services will increasingly be required as workflow is restructured within companies as well as within trading communities. Part of the growth in the professional services segment, however, may be due to a redefinition of what constitutes "EDI consulting." Re-engineering business processes and workflow will be intermixed with EDI projects. An EDI project in 1997 will be as much a re-engineering project as an EDI project. This expansion of the scope of EDI consulting, because it is more inclusive, will cause the market for EDI consulting services to appear larger than it would if a narrow definition of EDI were used.

Despite the relatively solid growth for EDI products and services, the EDI market faces some challenges.

The first challenge is competition among vendors. Entry by software providers into the mainframe and midrange EDI software markets will further erode profit margins in those arenas. The network services market, already subject to falling prices over the past couple of years, will continue to be a price-war battleground, especially as some regional Bell operating companies (RBOCs) increase their EDI offerings. The only way network providers can compete is to move away from offering basic transport services and offer communitywide system support (such as electronic information services, trading partner implementation programs, E-mail and others).

An even greater challenge to EDI than competition is the way EDI is marketed by vendors and understood by users. Today, EDI is a rigidly defined technology looking for a buyer. To be more widely used, EDI must be more flexible (to accommodate many kinds of business relationships and processes), and it must be sold as a part of a larger solution.

Buyers of EDI typically come to EDI because it offers the possibility of streamlining their operations. EDI should be packaged in a solution that addresses this request for streamlining. Today, however, it is largely sold as a standalone technology.

Nevertheless, some vendors are shifting the way they position their products to address this challenge. Making alliances with many other vendors, INPUT believes, is the right approach to take in selling EDI.

Lastly, a third—and perhaps the greatest—challenge facing EDI is integration. Integration is difficult on two levels: for the single EDI user to integrate its internal applications with EDI, and for the trading community of users to integrate their business workflows with each other through EDI.

The reason this is challenging is that so much has to be coordinated and no single person or group can foresee all contingencies. The rigidity of the EDI architecture prevents the user from responding to changing business conditions.

INPUT recommends that users and vendors alike take the position of being “market makers” when it comes to EDI. That is, they should position themselves with their customers and suppliers in such a way that it is in the interest of all parties to build and use an EDI infrastructure.

Effectively implementing EDI requires vendors and users to incrementally build an EDI infrastructure and share the investment costs with as many parties as possible.

2. Canada

Railroads, air transport, ports, automotive, grocery, retail, banking and insurance, dentistry and tire manufacturing are currently where much EDI activity is taking place in Canada.

The automotive industry in Canada largely consists of parts and materials suppliers to the automobile manufacturers located in the U.S. While it is using EDI, the automotive industry in Canada is not using EDI and bar coding to their fullest extent.

Government involvement in EDI is, like most other countries, in the areas of customs, tax and government procurement.

The universities of Canada are using EDI as well as producing a prodigious amount of research on the business impacts of EDI. University of Manitoba is the most advanced EDI user. McGill is doing much research.

Existing EDI projects and entities include:

CDANET, which was developed by National Data Corporation (Atlanta, GA) and the Ontario Blue Cross to process dental records and claim forms.

EDIPOINT Atlantic Inc., formed in 1989, is an organization of port users and service providers that are implementing EDI usage in the operation of the Port of Halifax. EDIPOINT's project managers are DMR, a consultancy, and its network service provider is GEIS. Members of EDIPOINT include Agriculture Canada, Atlantic Container Line, CN North America, Cerescorp Inc., Canada Customs, Halifax Port Corporation, Halterm Ltd., and Zim Container Service.

CN North America, a railroad company, runs an EDI system for tracking shipping and for maintaining location data on locomotives.

EDICOM project is an EDI port system for the port of Montreal.

Telebook is a Toronto-based clearinghouse for electronic purchasing of books by bookstores from publishers in Canada. It is equivalent in function to Pubnet in the U.S. Libraries also participate in Telebook. Currently, 400 companies participate in Telebook. Proprietary data formats are used to send purchase orders and acknowledgments. Telebook members plan to adopt ANSI X12 standards. Telecom Canada's ENVOY 100 network service has been Telebook's network platform since Telebook's founding in 1984. In 1992, Telebook moved to GEIS' network but is not currently planning to merge with Pubnet.

The liquor distribution industry in Canada has begun a widespread effort to adopt EDI. Government liquor boards in Canada have formed a special liquor community of interest to develop EDI systems. A pilot EDI program was started in the province of British Columbia.

The six largest Canadian banks (which control about 90% of all bank-held assets in Canada) all have EDI/EFT and electronic payment services in place. These banks are Bank of Montreal, Bank of Nova Scotia, Banque Nationale, Canadian Imperial Bank of Commerce, Royal Bank of Canada and Toronto Dominion Bank.

The Canadian Customs Service uses the Customs Automated Data Exchange System (CADEX), which is a proprietary system that links Canadian Customs with the United Parcel Service. It allows the two entities to exchange shipping orders and bills of lading and utilizes technology provided by General Electric Communications. Unlike the above systems, CADEX does not use EDIFACT standards currently, but implementing them is a long-term goal.

Also in Vancouver (British Columbia), the EDI Council of Canada and others are developing the Canadian Standard Interchange Facility (CANSIF). CANSIF is a clearinghouse for EDI messages related to the shipping industry. Estimates are that U.S. \$6.3 million will be invested in the project over the next three to five years. The Transport Data Network International is a joint venture that was formed to continue the systems integration needs of the CANSIF project.

Acquisition 2000 is a program that the Canadian government's Ministry of Supply and Services has launched. It is a wide-ranging EDI program aimed at streamlining: (1) interagency communications within various government purchasing bodies; (2) procurement between government bodies and the private sector; and (3) connections between non-procurement groups within the government. Canada's government purchases \$8 billion worth of goods from the private sector per year.

3. Mexico

The North American Free Trade Agreement (NAFTA) and EDI are a natural fit. Both intend to make commerce more efficient. Both lower the barriers between trading parties. Both help to increase the overall volume of trade. It is no surprise, then, to see EDI usage increasing in Mexico (and, already, in Canada) as the free trade agreement begins the ratification process.

Mexico is the U.S.' third largest trading partner behind Canada and Japan. It is the fastest growing export market for American goods. INPUT believes that growth in EDI infrastructure support systems will parallel growth in trade between the U.S. and Mexico. International trade and logistics is one of the most driving forces for electronic data interchange and electronic trading infrastructure development. EDI systems to connect trading partners up and down North America make sense.

The NAFTA positions North America into a powerful equal with the European Community, whose unification is at a standstill anyway.

The Free Trade Agreement is designed to remove regulatory impediments to commercial activity in order to stimulate growth within each of the three countries' economies as well as among the three economies. In general, the greater the trade volumes (domestically or internationally), the greater the need for infrastructure to support the volumes. Since EDI is part of such an infrastructure, the need to establish EDI systems follows the inevitable growth in economic activity.

The areas/industries where EDI is already playing a role and will be immediately boosted by freer trade are examined below.

a. Automobiles

The automobile industry is probably the central industry for EDI activity in Mexico at this time. There are eight major automobile manufacturers with plants in Mexico, with approximately 300 Mexican suppliers serving them and another 100 suppliers based in the U.S. and Canada. The EDI managers from the manufacturers and suppliers are very organized, meet once a month in Mexico City to discuss implementation issues, and have semiauthorized which EDI networks and software vendors the entire

industry should use. They act en masse. Gabriela Diaz, EDI coordinator for Volkswagen (Puebla) is the chief organizer and contact and represents the Mexican automobile industry at the Automotive Industry Action Group (AIAG—based in Detroit, MI).

Mexican car manufacturers include Ford, Chrysler, GM, Volkswagen, Nissan, Dina/Navistar, Honda and Mercedes-Benz

b. Retail

The next biggest EDI user constituency after the automobile industry is the retail industry. Sears has begun doing EDI in Mexico. These are Sears stores in Mexico doing EDI with Mexican suppliers to the Mexican Sears stores. Sears' EDI program utilizes the U.S.-based Sears' network. Sears Mexico wants 100 suppliers on board by the end of the year. Altogether, it wants to have approximately 250. Further spurring the Mexican retail sector's use of EDI will be Wal-Mart, which intends to have 30 Wal-Mart stores open throughout Mexico by the end of 1993. These stores will undoubtedly copy the operational strategy of their U.S. parent company and widely implement EDI.

c. Banking

Another big area for EDI in Mexico is banking because Mexican banks are similar to European and Canadian banking environments in that they are consolidated (the top three control close to 90% of all corporate and consumer banking services), operate nationally and more closely match the "universal bank" model (providing insurance and investment banking services in addition to payment and credit services). Because they are less bound in a regulatory sense and because they are more consolidated, Mexican banks play a central role in commerce in the Mexican economy.

Most large companies and conglomerates in Mexico, but particularly the banks, have built and operate their own private telecommunications networks. Banks and big companies cannot rely on Tel-Mex, the now privatized but formerly state-run telephone company (PTT). These private networks handle voice and data, are fully interconnected to international administrative telecom domains, and, especially in the case of the banks, are quite extensive.

The Mexican equivalent to the U.S. Federal Communications Commission (FCC) gave permission last year for the telecommunications industry to have competitors. Now, the top Mexican banks are vying to become value-added networks and offer limited telecommunications services.

Banamex, Bancomer and Inverlat are three of Mexico's leading banks that are moving to commercialize their extensive networks and offer EDI and networked-based value-added banking services.

Bancomer's network is on par with a telephone network: it handles data and voice; it has 450 nodes throughout Mexico (and in major foreign cities); it has fiber optic terrestrial lines, microwave links and satellite links. It is extensive.

Bancomer wants to commercialize this network. At the heart of Bancomer's VAN offering would be EDI, and not just financial EDI (such as the banks in the United States are considering), but full GEIS-like EDI. Bancomer's service would help companies trade electronically, even if they weren't necessarily conducting funds transfers.

Bancomer wants to offer other services besides EDI as well. They want to know how to take maximum advantage of the network capacity they have and the strategic position they have as one of the foremost banks in the country. With a telecom network and advanced "electronic commerce" services, Bancomer could transform itself into a combination VAN/bank/outsourcer.

The Bank of Nova Scotia, one of Canada's six big banks, has acquired a five-percent interest in Grupo Financiero Inverlat S.A., a Mexican brokerage and banking conglomerate. The agreement will give the Mexican financial group access to leading edge technology in the areas of telecommunications and payments-clearance systems. Says Helen Sinclair, president of the Canadian Bankers Association, Mexican banks "have the same type of nationwide banking system as we do, but they don't have much of the modern-day technology to tie it together."

d. Trucking and Transportation

Some 75% of U.S. trade with Mexico moves by truck. And trucking company executives report shipment volumes to Mexico growing by 15% to 20% per year.

Currently, truck shipments to and from Mexico are handed off at the border where literally the truck-trailer is switched from a U.S. to a Mexican chassis and vice versa. A U.S. carrier hauls in the U.S., a Mexican carrier hauls in Mexico.

The NAFTA will change this in two important ways:

- Trucking companies of both countries will be able to buy equity positions in trucking companies of the other country (subject to several restrictions). This will allow the creation of transnational carrier companies that will be able to move across the border without switching drivers or equipment.

- Trucking companies of both countries will be given relatively unrestricted access to the immediate border states of each country. This will allow U.S. service to the lucrative maquiladora assembly plants (see below) and will allow Mexican carriers' access to Texas and California.

Already active users of EDI in the U.S., large U.S. trucking companies are using EDI in Mexico. Contract Freighters Inc. (CFI) (Joplin, MO) is a \$140 million trucking company specializing in North-South hauling services. It has been building up its business to Canada and to Mexico for the past seven years, a strategy that has proved quite successful (as most long-haul carriers focus on East-West hauling services). Revenues for hauling to and from Mexico grew from \$2.4 million in 1986 to \$17.4 million in 1990. The company has Mexican partners to handle the services inside Mexico. CFI built a bilingual EDI system to integrate its U.S. and Mexican operations. CFI and its Mexican affiliates access the system to retrieve twice-daily updates on shipments. The updates are used by sales representatives to answer phone inquiries by customers.

The three largest freight consolidators in the U.S.—Yellow Freight (Overland Park, KS), Consolidated Freightways (Menlo Park, CA) and Roadway Services Inc. (Akron, OH)—are outfitting freight terminals in the largest Mexican industrial centers (Mexico City, Guadalajara and Monterey), and they are forming alliances with Mexican motor carriers. These giants, all users of EDI in the states, will sooner or later begin to extend EDI communications across the border as their transborder business increases.

Because the majority of trade between the U.S. and Mexico moves by land, NAFTA impacts on maritime transport services may not be so important. However, many deep-sea shipping companies consider Mexico as an important trans-shipment hub for the rest of Latin America.

Furthermore, many transport experts anticipate that the land-based cross-border transport infrastructure (trucking, train and Customs facilities) is not keeping up with the booming trade that it is supposed to support. The rising congestion makes Mexican port and waterborn traffic an increasingly attractive transportation alternative.

Port operations, including terminal operation, stevedoring (loading and unloading ships), warehousing and other services were formerly state-run businesses in Mexico and have recently been privatized (at this time, open for only Mexican-, not foreign-, owned businesses to operate). Nevertheless, leading U.S. shipping lines, Sea-Land Services Inc. (Elizabeth, NJ) and American President Lines Ltd. (Oakland, CA), have sought the right to establish terminal operations in Mexico. Their strategy is to gain better control of the local infrastructure so that they can maintain the level of service that they offer in other parts of the world (which includes EDI services).

Other foreign shipping lines that have established operations in Mexico include Lykes Bros. Steamship Co., Atlantic Container Line, and Australia-New Zealand Direct Line.

Mexico's central port authority, Puertos Mexicanos, is making major infrastructure investments in Mexico's four leading ports: Altamira and Veracruz on the Gulf of Mexico, and Manzanillo and Lazaro Cardenas on the Pacific Ocean. The state-owned railroad system, Ferrocarriles Nacionales de Mexico, anticipating greater port activity, recently launched container-train service to Mexico City from Veracruz. A U.S. consulting company, Preinvest Inc. (Bethesda, MD) is helping Mexico in upgrading its ports.

e. Maquiladoras/Light Manufacturing

Maquiladoras are in-bond production facilities engaged in processing or secondary assembly of imported components for re-export, primarily to the United States. Under the "in-bond" arrangement, imported inputs enter Mexico duty-free, but the importer posts a bond to guarantee that the finished products will indeed be exported rather than sold on the domestic market. Otherwise, appropriate duties are collected from the posted bond.

Mexico's maquiladora program has been phenomenally successful, attracting capital investment from around the world and boosting Mexican employment. Twelve maquiladora plants were established in 1965 when the program was inaugurated. By 1991, more than 1,900 plants were operation.

Exhibit V-10 shows the predominant industries that the maquiladoras fall into.

EXHIBIT V-10

Maquiladora Industries	
Industry	Share of Maquiladora Production (Percent)
Electrical/Electronic	28
Textiles/Apparel	15
Furniture	13
Transport Equipment	8
Other	36
Total	100

Source: U.S. International Trade Commission

While maquiladoras are no longer confined to border regions, and since 1972 have been established throughout Mexico, most are located close to the Mexican-U.S. border. This geographic positioning is not only better for improved transportation access and speed of distribution to the U.S. market (which is almost exclusively the final destination of maquiladora output), but it is best for EDI implementation. Mexican telephone service to U.S. telecommunications and network service lines is relatively reliable as the distance to the U.S. is so small.

While lacking comprehensive statistics, INPUT has spoken to several maquiladora operators (U.S. and Mexican) to discover that EDI is being used by these plants, especially to connect to U.S. customers and foreign owners of the plants.

Maquiladoras account for about 60% of Mexico's nonoil exports to the United States. They are Mexico's second-largest source of foreign exchange behind petroleum. While representing only 5% of Mexican gross domestic product (and only 1% of value-added income), the maquiladoras are an important economic phenomenon that deserves attention by users and vendors of EDI.

INPUT sees the maquiladora as a principal user of EDI in Mexico.

f. Franchises

In just the last few years, franchising has exploded as a new business phenomenon in Mexico. In particular, it is U.S. firms that are being franchised. Exhibit V-11 lists some of the major names.

Franchises in the U.S. have been major users of EDI, especially to control internal distributions of costs and goods among the family of franchised outlets.

There is no reason why the already successful use of EDI by franchised companies in the U.S. should not be duplicated in Mexico.

EXHIBIT V-11

Selected Franchises in Mexico

- Burger King
- McDonald's
- Arby's
- Holiday Inn
- Days Inn
- Alphagraphics
- Century 21
- Blockbuster
- Seven Eleven
- Midas
- Kentucky Fried Chicken
- Computerland
- Embassy Suites
- Domino's Pizza
- Florsheim
- Oshman's
- Bennetton
- Pizza Hut
- Denny's

Source: *Mundo Ejecutivo*

g. Government

While the government of President Salinas is rapidly privatizing, still many of Mexico's core industrial enterprises are state-owned (such as, for example, petrochemicals). These state-owned enterprises, as well as more conventional government administrative enterprises, are revamping themselves with information systems including EDI. Recently, the government turned over the administration of the country's social security system to the private sector. Leading Mexican banks are now providers of the dissemination of social security payments.

The Canadian outsourcer, SHL Systemhouse Inc., was just awarded by the Mexican government a \$500 million project of managing information systems in the tax and customs bureaus.

In these government projects, EDI, EFT and inter-organizational systems are important modernizing technologies that the government is seeking.

4. Brazil

Brazilians currently utilize EDI in automobile manufacturing, supermarket retail and in data and funds transfer for banking.

In 1987, Anfavea, the Brazilian Association of Automakers, set up a project to standardize EDI messages to conform with EDIFACT standards. The Autolatina project went on-line in 1989 and in its first year had 60 of Brazil's 500 automobile part suppliers on a system for purchase orders, deliveries and daily production needs. Estimates said 100 more automobile parts suppliers would be Autolatina users by the end of 1989.

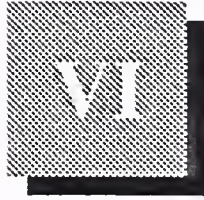
As of 1989, IBM do Brasil was using EDI to link four manufacturing plants in Sao Paulo. Hopes were to expand the system to include 45 suppliers by the end of 1989. Predictions were that all 2,000 suppliers would be on the network by the end of 1992.

5. Other Latin America

There are EDI projects in Chile. A number of Chilean banks have extensive information service capacities, including processing of electronic payments by corporations.

In general, EDI activity in other parts of Latin America is minimal. The poor telecommunications infrastructure is the single most inhibiting obstacle for EDI in Latin America. This may change over the course of the 1990s as telecommunications investments are underway. Also, with the use of wireless, microwave and satellite systems—and the avoidance of terrestrial cable systems—some of the new infrastructure may more quickly lend itself to EDI implementation than the more traditional infrastructure. Multinational companies and/or companies involved in oil, automotive, apparel, pharmaceuticals, transportation and domestic distribution are industries that will first adopt EDI. In many cases they are already adopting it.

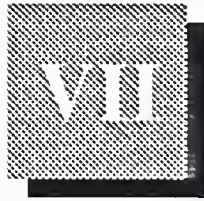
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Other Regions Not Elsewhere Classified

Israel and South Africa are the only two other nations that INPUT is aware of where government bodies and corporations are examining the use of EDI.

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Conclusions and Recommendations

A

Findings

Over the next five years, the number of companies in the world that use electronic data interchange to communicate with trading partners will grow from approximately 38,000 today to about 70,000 in 1997, an annual growth rate of 13%.

Expenditures on EDI translation software, network services and professional services purchased in a market (and not counting salaries and development expenditures internal to the firm) is expected to rise from a little over 0.6 billion dollars today to 2.5 billion dollars by 1997, for a compound annual growth rate of 33%.

Exhibits VII-1 and VII-2 summarize these two essential indicators, growth in users and expenditures.

User expenditures on equipment and internal development (including salaries) related to EDI projects, INPUT estimates to be approximately double the amount spent on software and services purchased from third parties. This is shown in Exhibit VII-3.

EXHIBIT VII-1

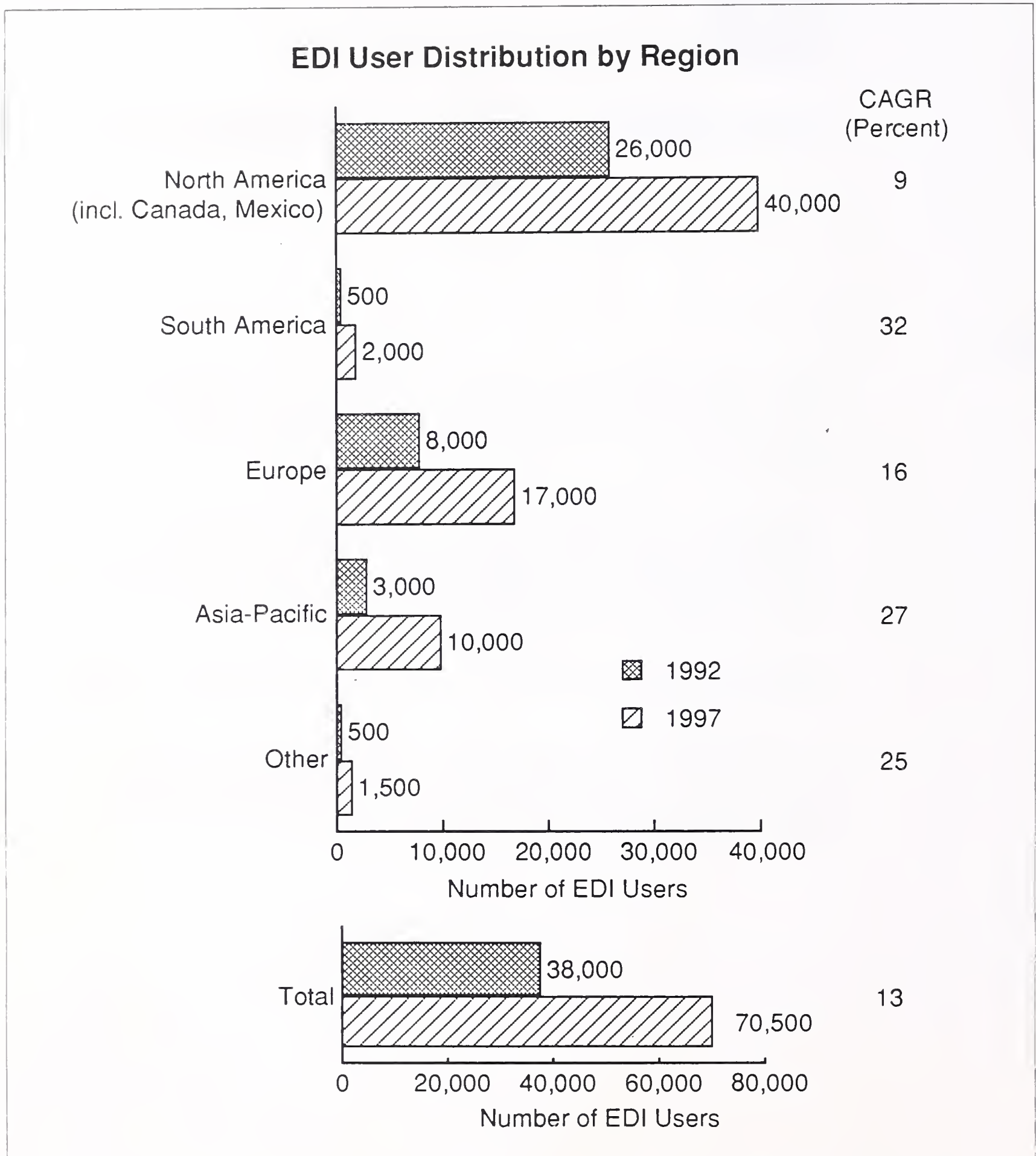


EXHIBIT VII-2

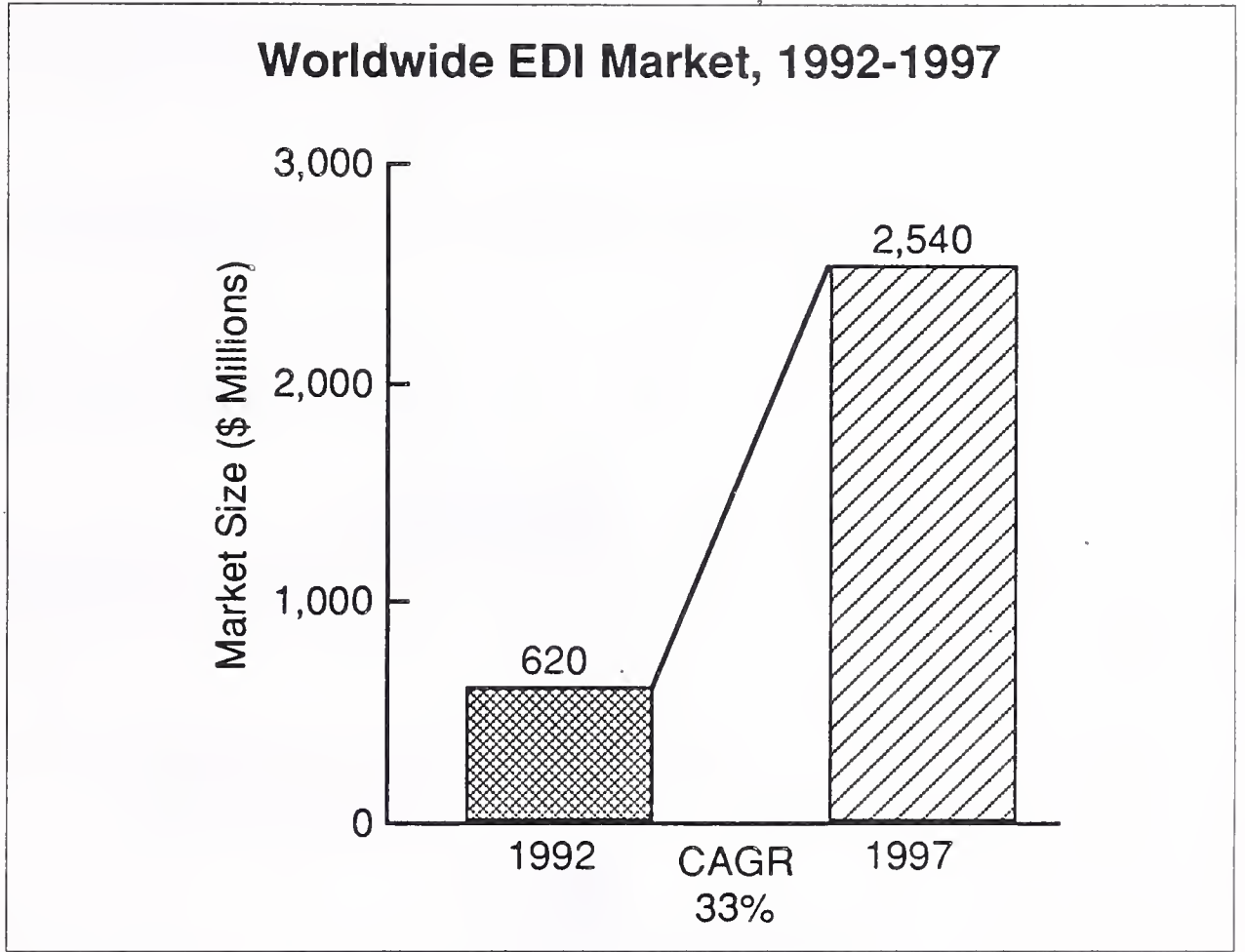
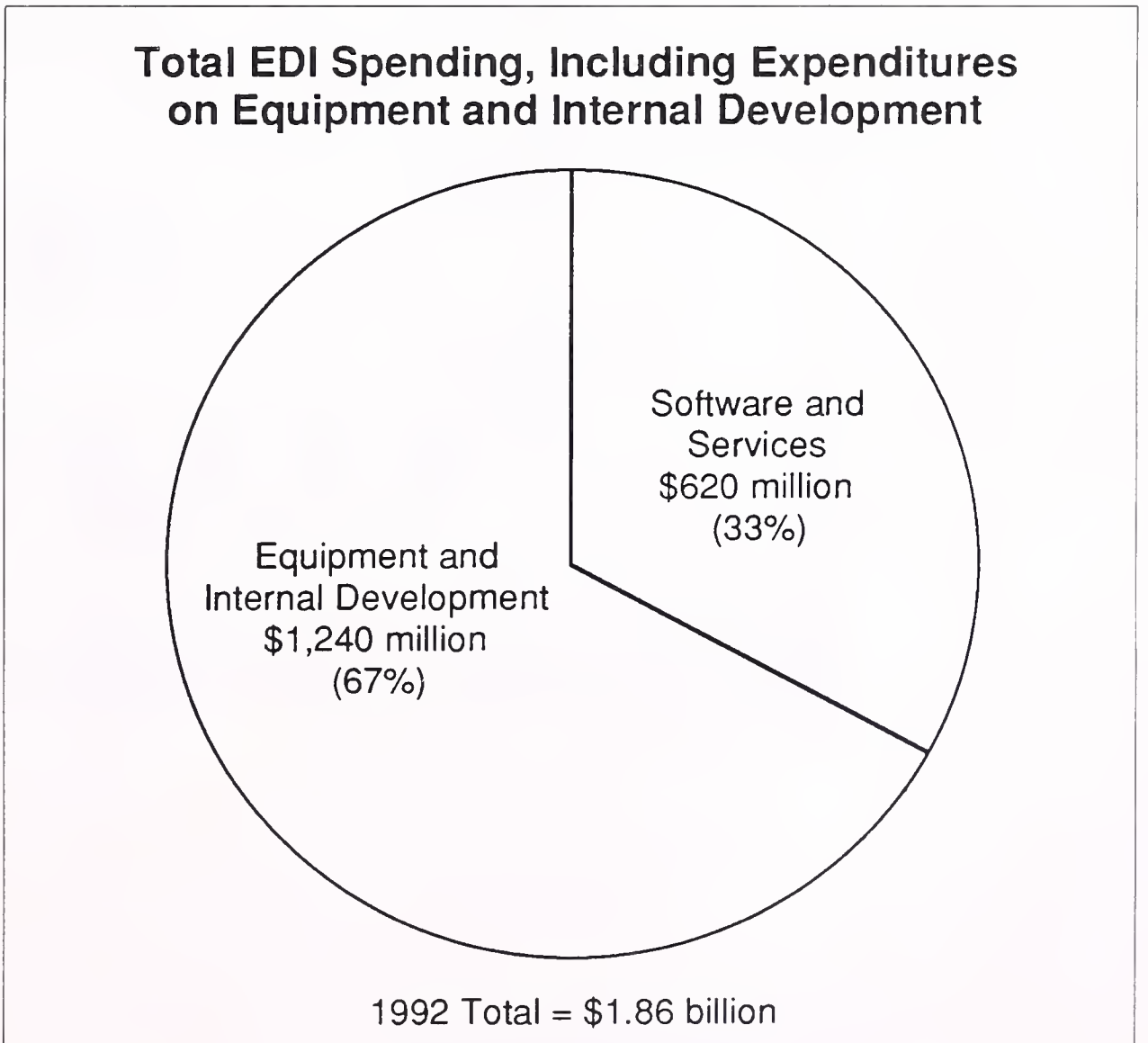


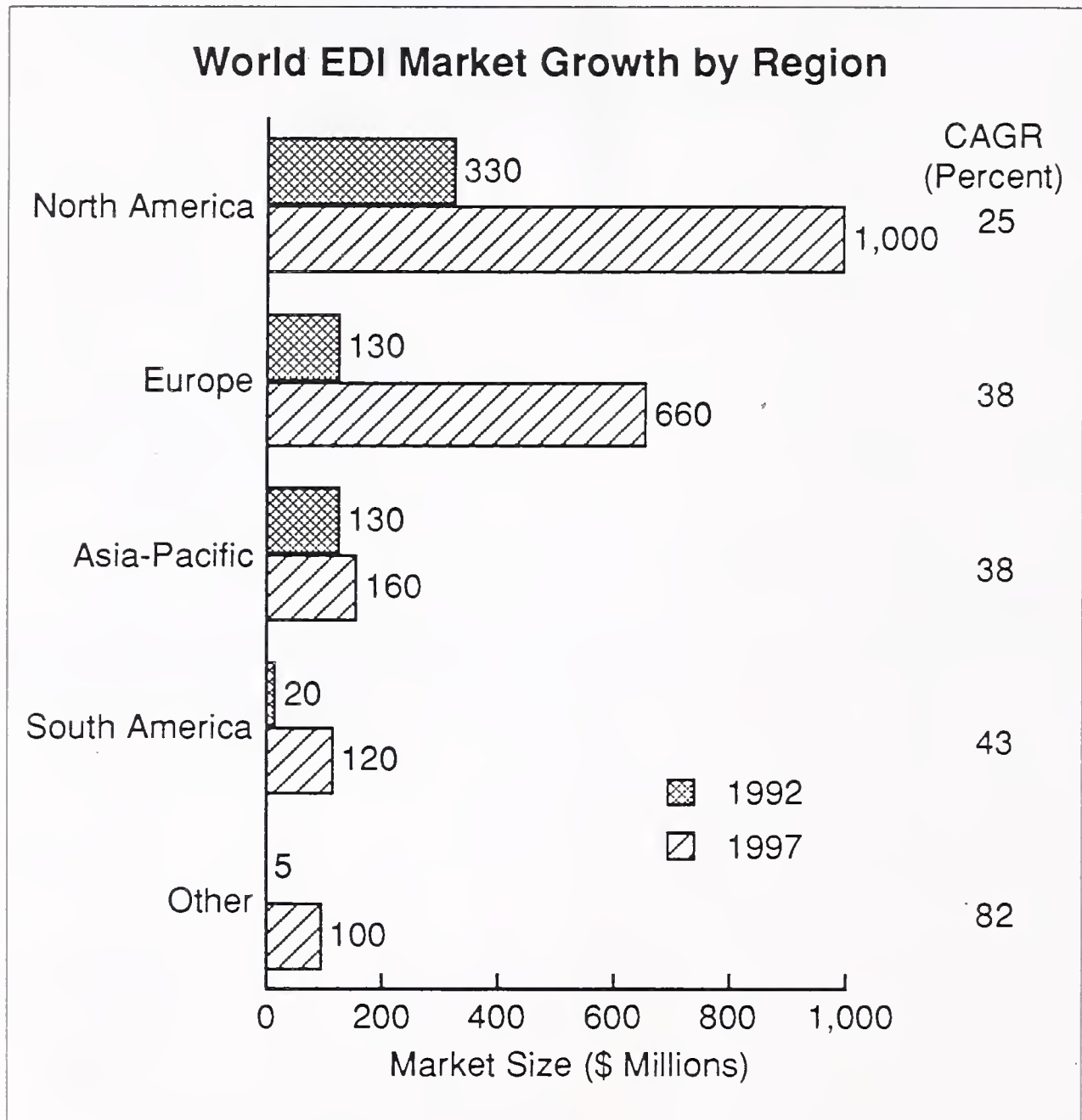
EXHIBIT VII-3



The top three EDI-using countries are the U.S., the U.K. and Japan and together account for 68% of total world spending on EDI software and services purchased on the market.

By region, more than half of the worldwide EDI market expenditures are made in North America, as shown in Exhibit VII-4.

EXHIBIT VII-4



Over the next five years, EDI will grow more rapidly outside North America. The distribution of spending will change as reflected in Exhibits VII-5 and VII-6.

January 19, 1993

Dear Client,

Whoops! We made a typographic error in the report we just sent to you, *International EDI Markets, 1992-1997*.

Two exhibits — exhibit II-3 on page II-3 and exhibit VII-4 on page VII-4, both of them bar charts — show the EDI market for the Asia-Pacific region to grow from \$130 million in 1992 to \$160 million in 1997.

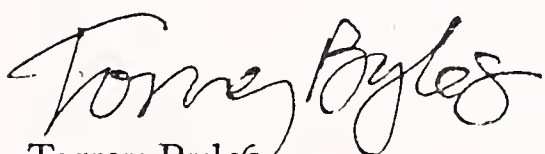
It should show the market to grow from \$130 million to \$660 million over the same period. (See attached page).

The mistake was confined to these two exhibits only, in the report and in the Executive Overview. The text and other exhibits including market totals for the world reflect the \$660-million figure.

We recommend that you correct the error by penciling in an extended bar length followed by the correct dollar figure. The correct bar length should mirror the bar length of the European market forecast, which is right above the Asia-Pacific bar in both exhibits.

We apologize for any inconvenience.

Sincerely,



Torrey Byles
EDI/Electronic Commerce Program Manager

Enclosure

EXHIBIT VII-5

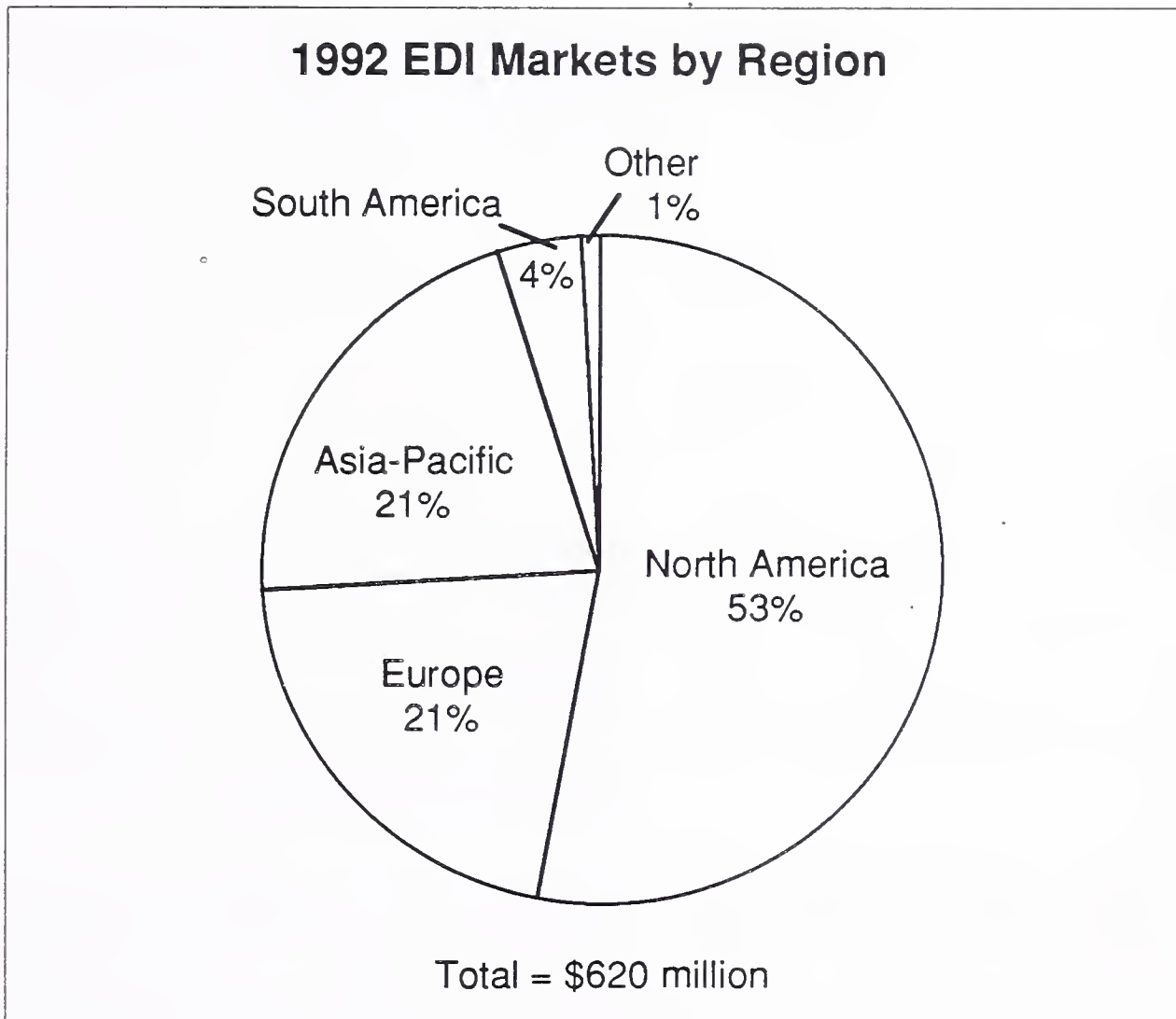
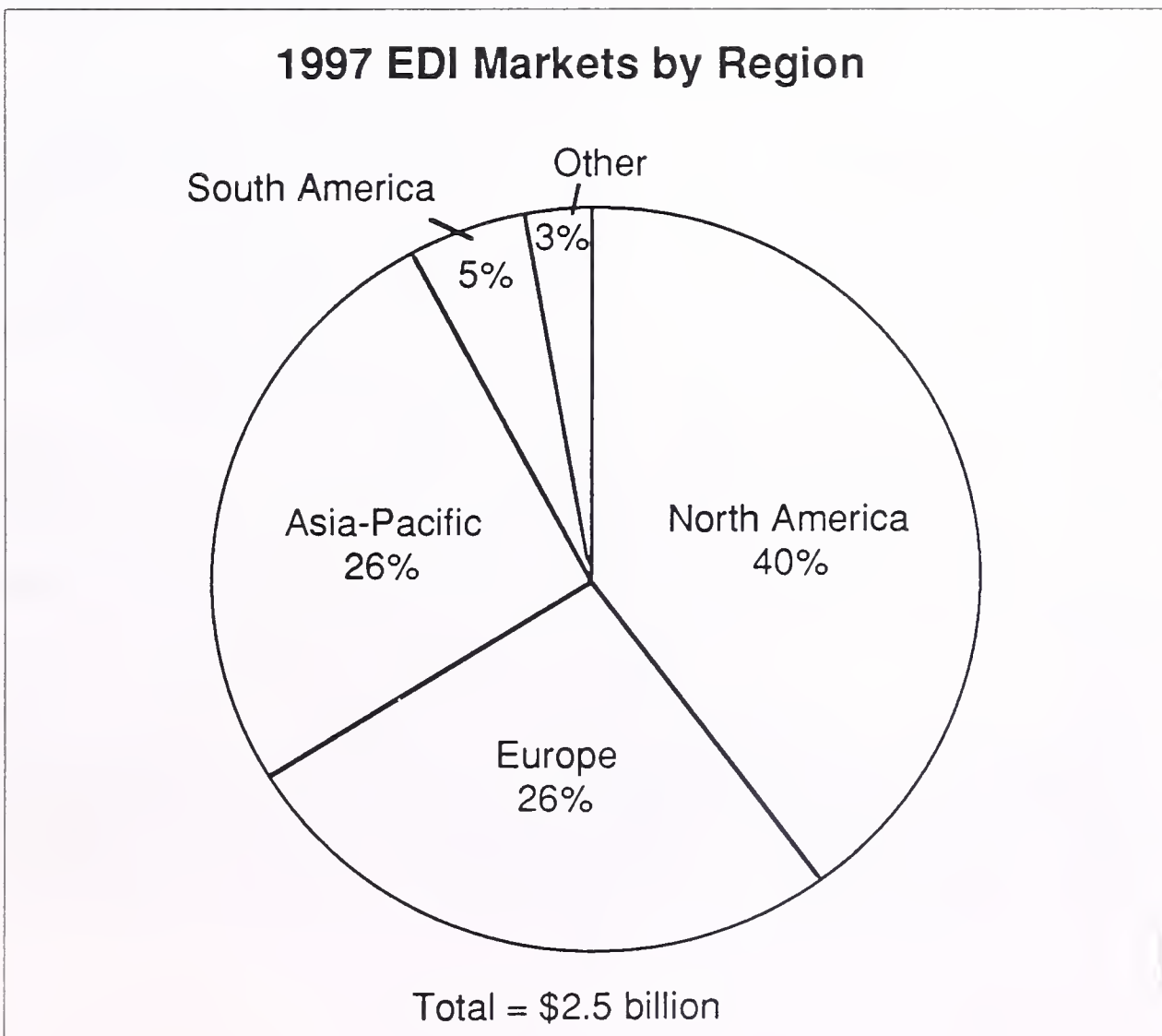


EXHIBIT VII 6



The breakout of expenditures is 60% on network services, 30% on EDI translation software and 10% on professional services. This ratio, INPUT believes, will continue through 1997.

B

Issues

Generalizations about the nature of EDI adoption around the world are listed in Exhibit VII-7.

EXHIBIT VII-7

Trends of Worldwide EDI Market

- There is little international EDI, much domestic EDI.
- EDIFACT is gradually adopted, but local formats always needed.
- National telecommunications infrastructure and policy is the foundation for EDI.
- Telecommunications liberalizations are opening up opportunities for competing EDI network services.
- Government programs—particularly in telecommunications, taxation, customs and health care—are key stimuli to EDI growth.
- Trade and transport EDI systems are top priority in export-driven economies.
- Trade, transportation and retail sectors are showing the fastest EDI growth.
- Financial EDI is relatively unused, but should grow rapidly over the next five to seven years.

While a number of multinational automotive, electronic, apparel and chemical manufacturers, transportation companies and port authorities are conducting truly international EDI, the vast majority of EDI activity is confined within the borders of a nation. Thus, the global EDI market consists of several relatively insulated national and subnational markets.

The “provincial” use of EDI makes sense because EDI typically grows first between a hub company and its most important suppliers, which are typically within the same country. EDI starts local and moves out from there. The plurality of self-contained national EDI markets underscores EDI’s relative infancy as a business communication mode. If it were more widely used (and even in its most advanced markets of the U.S., U.K. and Japan it is not), it would have more of an international application. At this point, however, it is not a common business practice.

The provincial use of EDI also helps explain recent developments in EDI standards. In 1992, the Japanese trade standards body finally sanctioned a data format to be used in Japan for EDI. The format was not EDIFACT, the U.N. standard that, a few years ago, people believed would supplant all earlier EDI formats. Japan’s CII standard is an indigenously developed standard that accommodates the many unique requirements of Japanese domestic trade (one of them being the use of Kanji characters) and is compatible with existing Japanese EDI standards, notably the Japan Chainstore Association, the Electronics Industries Association of Japan and the ZENGIN (banking) standards.

While EDIFACT will probably be used for international trade purposes, national, subnational and industry-specific EDI standards continue to be used by companies and in large numbers. A single “universal” EDI standard, used with a company’s trading partner down the street as well as across the globe, will probably not be realized. Localization of data and business practices will always be a reality.

Worldwide, the most obvious stimuli for EDI activity are two often interconnected political-economic phenomena: the quality level of a country’s telecommunications infrastructure and the national government’s agenda.

These two are obviously closely tied in most countries of the world as the national telephone system is state-run.

Investment in telecommunications is the top priority of many governments of the world today, especially those of East Asia, Southern Europe, Eastern Europe and South America. John Allen, CEO and president of AT&T, foresees more money invested in the world’s telecommunications infrastructure in the next 10 years than was invested since the telephone was invented. A global, fiber optic and wireless telecommunications infrastructure will set the groundwork for global EDI.

The developing, export-driven countries of the world see telecommunications as the key to entering into world commerce and prosperity. EDI is explicitly a part of their telecommunications plans. As a corollary, where telecommunications infrastructures are poor (as in South America, China, India, Spain, Portugal and Greece), there is little EDI activity.

Besides directly investing in telecommunications, governments are also impacting telecommunications, and hence, EDI infrastructure by how they choose to regulate or deregulate telecommunications. In the U.K., the U.S., Japan, Australia, New Zealand, Mexico and Canada, governments have ended (in varying degrees) the monopolies of the respective national telephone companies. This opening up of the telecommunications industry has allowed a myriad of companies to provide EDI network services.

GEIS, AT&T, many of the U.S. regional Bell companies, British Telecom, Cable & Wireless, IBM Information Network (Advantis), EDS, SITA/Scitor (the consortium network of airlines), SWIFT (the international bank settlement network) and even indigenous banks are offering EDI network services around the world in many national markets. NTT, the Japanese telephone company and a logical candidate to offer worldwide EDI network services, seems content at this time to focus its EDI offerings on the domestic Japanese market.

There are other government agendas, besides telecommunications policy, that encourage EDI. In the United States, a crisis in ballooning health care costs and deficiencies has mobilized government and industry consortia to find solutions. The adoption of EDI by hospitals, clinics, physicians' offices, insurers, pharmaceutical and medical supply vendors, corporations and health care service providers is receiving widespread attention and has become in the past three years a torrent of activity.

In the export-driven "mini-dragon" economies of East Asia (Singapore, Hong Kong, Taiwan, South Korea, and now Malaysia, Thailand, the Philippines and Indonesia), governments have targeted the automating of trade and transportation procedures with EDI. These governments see EDI as a strategic objective in maintaining the nation's capacity as an inexpensive, efficient manufacturing locale.

Also, tax filing and payment (by corporations and individuals) is an EDI application that is being promoted by governments in the U.S., Western Europe and East Asia.

While an important one, government is not the only stimuli for EDI development. Streamlining the trade procedures between manufacturer and its suppliers, its distributors and its transportation carriers is the most common objective worldwide for EDI. That is, companies involved in manufacturing, distribution and transportation constitute the core user base of EDI. Other uses of EDI—for example, in universities, real estate and temporary employment agencies—demonstrate the diversity of EDI application.

Financial EDI, or the electronic settlement of payment between trading entities, is still very slow in being adopted worldwide. The U.K., Canada, the U.S. and Australia are the most advanced countries in EDI payments, but the total number of companies conducting some degree of financial EDI is probably less than 1,000. (This is not counting the many other forms of EFT.)

Use of EDI by retailers has been rapidly growing in the past two years in the U.S., Canada, the U.K., France and Australia.

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Recommendations

Recommendations to EDI users are listed in Exhibit VII-8.

EXHIBIT VII-8

User Recommendations

- To do international EDI, global vendors may be better, but are not mandatory
- Use EDIFACT for international transactions, but national or industry-specific data formats for local transactions

To the user or potential user of EDI communication that spans national borders, INPUT recommends finding software and service vendors that already have customers in both your country and the countries that you wish to conduct EDI. These vendors will have some degree of support that you and your trading partner can turn to. This is not mandatory, however, because as long as you and your trading partners can agree as to what data formats to use, your respective translation software should be able to handle it.

The network service providers that have the most extensive international reach are: British Telecom, AT&T EasyLink, GE Information Services and IBM Information Network (Advantis). Electronic Data Systems also has EDI network service facilities around the world, although it doesn't directly sell them separately from a turnkey, systems integration or outsourcing contract. Sterling Software, already in possession of a network node/service in Japan, will shortly open up one in Europe, but it is not, at this point, as widely accessible as the others mentioned.

As far as what EDI standards to use in working with non-domestic trading partners: use EDIFACT, unless your trading partner (possibly a company division or subsidiary) wants to use another kind. The trend and common sense is to use EDIFACT for international trade even while using domestic and industry-specific standards for domestic trade.

In any case, however, standards use is in many respects a nonissue because you will use whatever you and your trading partners find to be most effective and convenient. No standard today is generalized enough to accommodate every industry, every trading procedure and circumstance everywhere in the world, nor should there be. It's your business, use EDI for your and your trading partners' benefit. Don't worry about being "politically correct."

Recommendations to vendors of EDI software and service are summarized in Exhibit VII-9.

EXHIBIT VII-9

Vendor Recommendations

- High-growth opportunities are in Asia, Eastern and Southern Europe, Mexico and South America.
- Critical mass opportunities are in the U.S. and the U.K.
- Vendors should use alliances, distributors or own facilities to penetrate foreign markets.
- Vendors should attempt to serve foreign markets only if they can fully support users there.
- International EDI network services may never be significant compared with domestic services.
- Serving industry and geographic niches is viable; being a global player not (yet) necessary.

Vendors of EDI software and services, if you want to sell your products and services internationally, your options are: sell through agents/distributors, make alliances/joint ventures with vendors already abroad, open an office abroad, or land a large contract abroad and service it. Or you can do a combination of all these. There are opportunities in Asia, Eastern and Southern Europe, Mexico and South America to expand.

Examples of these marketing strategies include GEIS reselling American Business Computer, Control Data Corp. Asia reselling St. Paul Software, AT&T EasyLink making joint ventures and acquisitions in Japan, Australia, Hong Kong and the U.K., British Telecom buying Dialcom and Tymnet.

You most certainly must provide "localization" of your product and services. You must provide excellent support to your customers wherever they are because EDI is a support-intensive application. Supply Tech is probably the best example of an EDI vendor that is successfully selling and providing support around the world. If you can't provide support but try to distribute to distant countries, you risk giving your product a bad name. There are already examples of this happening as well.

Only those companies that want to be recognized as the world's EDI providers should aspire to provide international EDI services. EDI is inherently "provincial" and actual transborder EDI will probably eventually come to have the same proportion to local EDI as international versus domestic voice traffic: 80% to 90% of all calls are domestic; 10% to 20% are international.

Therefore, providing software and services on a local and niche basis is a most viable and respectable business. International EDI will be important in a number of manufacturing and transportation sectors, but otherwise it is a fairly restricted market.

International traffic is mostly found in the trading regions of Western Europe and North America (Canada, the U.S. and Mexico). International EDI among Asian countries appears to be low. The major international connections in Asia link East Asian countries and the U.S.

BT and AT&T have been the most aggressive in pursuing international EDI traffic services. But their respective international EDI customers appear to be less than 500 total. International EDI traffic should be significant by the end of the 1990s. Servicing it may be a second-order type of service, with the principal EDI services still directed at getting companies to speak EDI with each other locally.

Because Japan, the U.S. and the U.K. account for two-thirds of the world's EDI market, if you are already operating in one or more of these markets, you have enough to keep you busy.

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