NORTH AMERICAN EDI SERVICE MARKET ANALYSIS 1988 - 1993

INPUT

About INPUT®

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

Continuous-information advisory services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services (software, processing services, turnkey systems, systems integration, professional services, communications, systems/software maintenance and support).

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

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

INPUT OFFICES

North America

Headquarters
1280 Villa Street
Mountain View, CA 94041
(415) 961-3300
Telex 171407 Fax (415) 961-3966

New York
Parsippany Place Corp. Center
Suite 201
959 Route 46 East
Parsippany, NJ 07054
(201) 299-6999
Telex 134630 Fax (201) 263-8341

Washington, D.C.
8298 C, Old Courthouse Rd.
Vienna, VA 22180
(703) 847-6870 Fax (703) 847-6872

International

Europe
INPUT LTD.
41 Dover Street
London W1X 3RB, England
01-493-9335
Telex 27113 Fax 01-629-0179

INPUT s.a.r.l.
29, Leningrad
Paris 8, France
42-93-60-50
Telex 2064 70 Fax 45-22-62-23

Japan
FKI, Future Knowledge Institute
Saida Building,
4-6, Kanda Sakuma-cho
Chiyoda-ku,
Tokyo 101, Japan
03-864-4026 Fax 001-03-864-4114

AUGUST 1988

NORTH AMERICAN EDI SERVICE MARKET ANALYSIS 1988-1993

INPUT®

1280 Villa Street, Mountain View, California 94041-1194 (415) 961-3300

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

Electronic Data Interchange Program (EDIP)

North American EDI Service Market Analysis 1988-1993

ESV1 • 295 • 1988

Abstract

In 1988, prospective users' awareness of Electronic Data Interchange (EDI) enjoyed a substantial leap. EDI is the electronic transfer of business information between organizations in a structured application.

This study is a substantial update of earlier INPUT reports on the subject. Based on over 300 end-user and vendor interviews, the study examines the issues affecting acceptance of EDI and projects future developments. Market forecasts and recommendations to industry participants and users are included. The study also reports on vendor-related concerns, such as sales compensation, optimizing profit margins, interconnection, and full-service market positions.

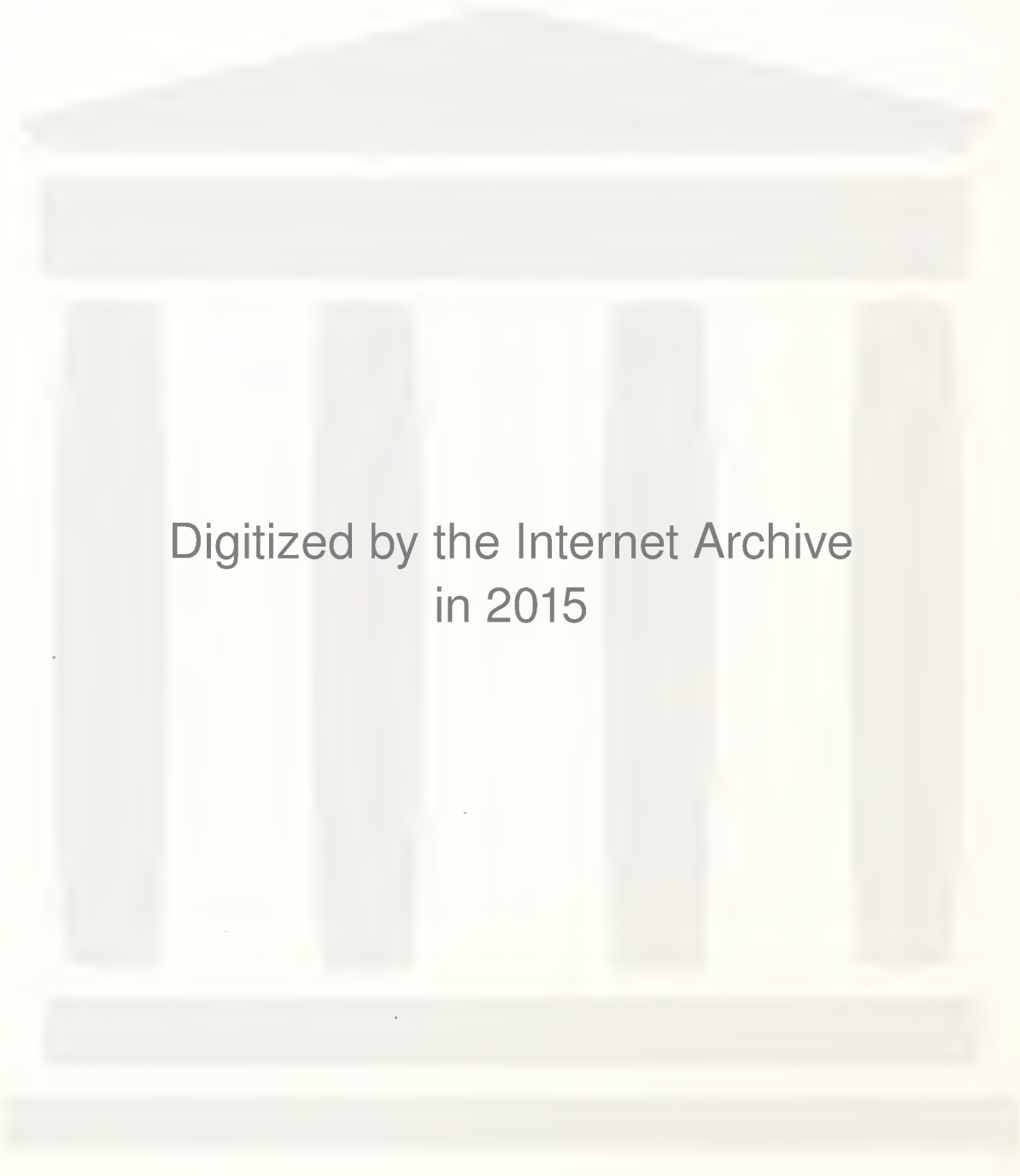


Table of Contents

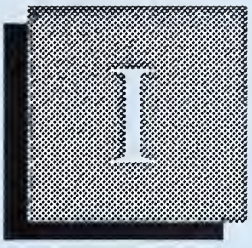
Table of Contents (Continued)

Table of Contents (Continued)

Table of Contents (Continued)

Exhibits

Exhibits (Continued)



Introduction

I

Introduction

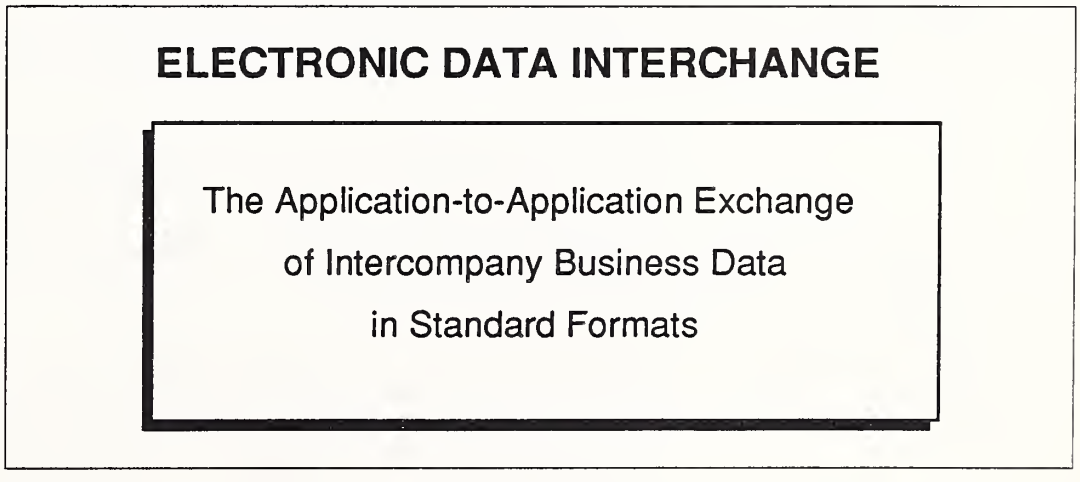
A

Background

This report, produced by INPUT's Electronic Data Interchange Planning Service (EDIPS), examines the Electronic Data Interchange (EDI) network services market, updating the findings of a 1987 INPUT study.

INPUT defines EDI as the intercompany electronic transfer of business information between applications in a structured application conforming to a public or de facto standard (Exhibit I-1). The information represents standard business documents, such as invoices, purchase orders, and logistical information. EDI techniques are also used for other applications, such as health insurance claims.

EXHIBIT I-1



For market analysis purposes, this study focuses on third-party EDI services, but also considers private EDI network implementations that use a third-party's facilities for data transmission.

Excluded from the analysis are "dedicated" applications, such as electronic shopping, automatic teller machine (ATM) networks, point of sales (POS) terminals, and airline reservation systems. Arguably, these systems use electronic "forms" to transfer information; however, these applications generally use specialized terminal devices to communicate

with dedicated computers and are not generalized computer-to-computer, application-to-application implementations. They also tend to use proprietary data formats.

EDI commonly involves the transmission of data in one of several standard formats, with the American National Standard Institute's (ANSI) X12 the emerging dominant standard. It may be necessary for data to be translated to a standard either prior to transmission or by a third-party service acting as an intermediary in the transaction. It may also be necessary for the data to be translated again into formats recognized by a trading partner's computer.

In the past, EDI efforts have been implemented using private standards.

- Commonly agreed standards, such as ANSI X12, are now being used, with adaptations, by many industries.

- The use of standards allows communications across industry lines, thus paving the way for additional information interchange applications.

The largest users of EDI are in the discrete manufacturing, distribution, and transportation industries, with other users in the auto industry, grocery and consumer goods, warehousing, electronics, chemicals, metals, paper, office supplies, and drugs. As this study reports, many users are just getting started with EDI; others are adding transactions to those they now handle electronically, and still others are looking to integrate EDI functionality to optimize its usefulness and benefits.

The reasons for using EDI include increasing the speed of information transfer, avoiding costs, better inventory control, and other benefits from integrating EDI data and corporate information processing.

EDI can be done in several ways: point-to-point directly between trading partners; on private networks; or through third parties—Remote Computer Services (RCS) or Value Added Networks (VANs) that may provide translations between dissimilar processing systems and formats. VANs and RCS firms also serve as collection and switching services.

EDI is providing new lines of business for VANs, RCS firms, software vendors, and professional services companies. The principal participants have aggressively pursued EDI accounts and promoted EDI within industry segments, making for a competitive market environment. Through opportunities remain to be exploited, profitability has been elusive for many because of increasing competition.

However, users ultimately benefit from industry competition because it leads to a variety of choices, competitive pricing, and improved services.

B

Scope

The study addresses the following topics:

- Electronic Data Interchange—the reasons for using the method, its relationship to related applications, and other types of EDI (Chapter III)
- User concerns regarding standards, vendor viability, needs for interconnection, and integration requirements (Chapter IV)
- Vendor-related concerns, such as sales compensation levels, optimizing profit margins, interconnection, and "full service" market positions (Chapter V)
- Market forecasts and recommendations concerning EDI services for VANs, RCS firms, and users (Chapter VI)

Chapter II is an Executive Overview of the entire study.

Definitions of EDI-related terms are found in Appendix A.

C

Methodology

The research for this report consisted of:

- Corporate Interviews
  - A structured questionnaire on general Information Systems and Services issues was administered to 210 Information Systems (IS) managers in 14 industries between March and May, 1988. This survey collected data on EDI awareness levels and EDI states of readiness in a broad, representative sample of users.
  - In addition, 85 in-depth telephone interviews were conducted with EDI managers identified in the EDI Yellow Pages, and with users of the Electronic Medical Claims and Insurance Interface varieties of EDI. This survey was designed to probe EDI-related issues and intentions among companies already involved with the application. The questionnaire used is in Appendix B.
  - Exhibit I-2 shows the sample distribution for these two surveys.
- Vendor Interviews
  - Interviews were conducted with senior-level management of VANs, RCS firms, software providers, and professional service firms involved in EDI.

EXHIBIT I-2

INTERVIEW SAMPLE DISTRIBUTION

	IS MANAGERS	EDI PROJECT MANAGERS	TOTAL
Discrete Manufacturing	41	32	73
Process Manufacturing	22	19	41
Transportation	15	7	22
Medical	3	2	5
Services	14	-	14
Utilities	17	2	19
Retail	10	7	17
Banking	18	-	18
Wholesale	3	10	13
Insurance	16	4	20
Federal/State Government	28	2	30
Education	16	-	16
Telecommunications	[illegible]	-	4
Other	[illegible]	-	3
Total	210	85	295

- Industry Representatives
  - Interviews were conducted with industry association representatives and academic observers of EDI developments.

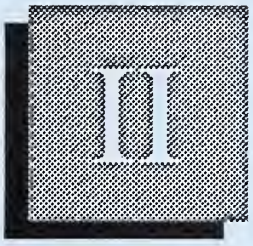
- Product and Service Analysis
  - INPUT collected and analyzed information on EDI services and vendors planning EDI services and reviewed secondary research sources.
- Custom Research Projects
  - INPUT has been engaged for several consulting projects bearing on EDI. Though no proprietary information is revealed, the general industry knowledge gained is represented in this report.

D

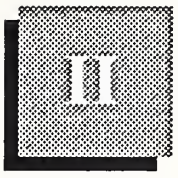
Related INPUT Reports

This study is one of a continuing series focused on EDI. Other reports published or planned for the series include:

- *EDI Service Provider Profiles—Update*
- *Vertical Industry EDI Directions and Potentials*, examining unique issues and market potential in approximately 30 industry sectors.
- *Value Added Data Service in Western Europe*, focusing on EDI and EFT applications
- *EDI Software Markets and Issues, 1988-1993*
- *EDI Software Product Provider Profiles*
- *X.400 and EDI*
- *EDI in Professional Services*
- *EDI Implementation Case Studies*
- *International EDI Services*
- *Federal Government EDI Initiatives*



Executive Overview



Executive Overview

A

EDI Usage Is Quickly Expanding

Electronic Data Interchange is the electronic transfer of structured business data between computer applications in different organizations. It is process-to-process communication in machine-readable formats and overcomes organizational differences in computers, protocols, and data formats.

Although typically used for the transfer of electronic purchase orders, invoices, bills of lading and data representing other documents, EDI exchanges are also used for electronic health-care insurance claims, in property/casualty insurance, and in other areas.

As Exhibit II-1 shows, INPUT's survey research of Fortune-1000 public and private companies, large universities, and government agencies found 34% of the respondents reporting EDI usage now, with an additional 20% actively planning and implementing EDI applications. Twenty-four percent of the respondents reported they were considering EDI, and the balance said they had no plans to implement EDI.

EDI users expect their transaction volumes to grow 156% between 1987 and 1988, in part due to adopting additional transaction types, and they anticipate a 66% increase in the number of EDI trading partners this year.

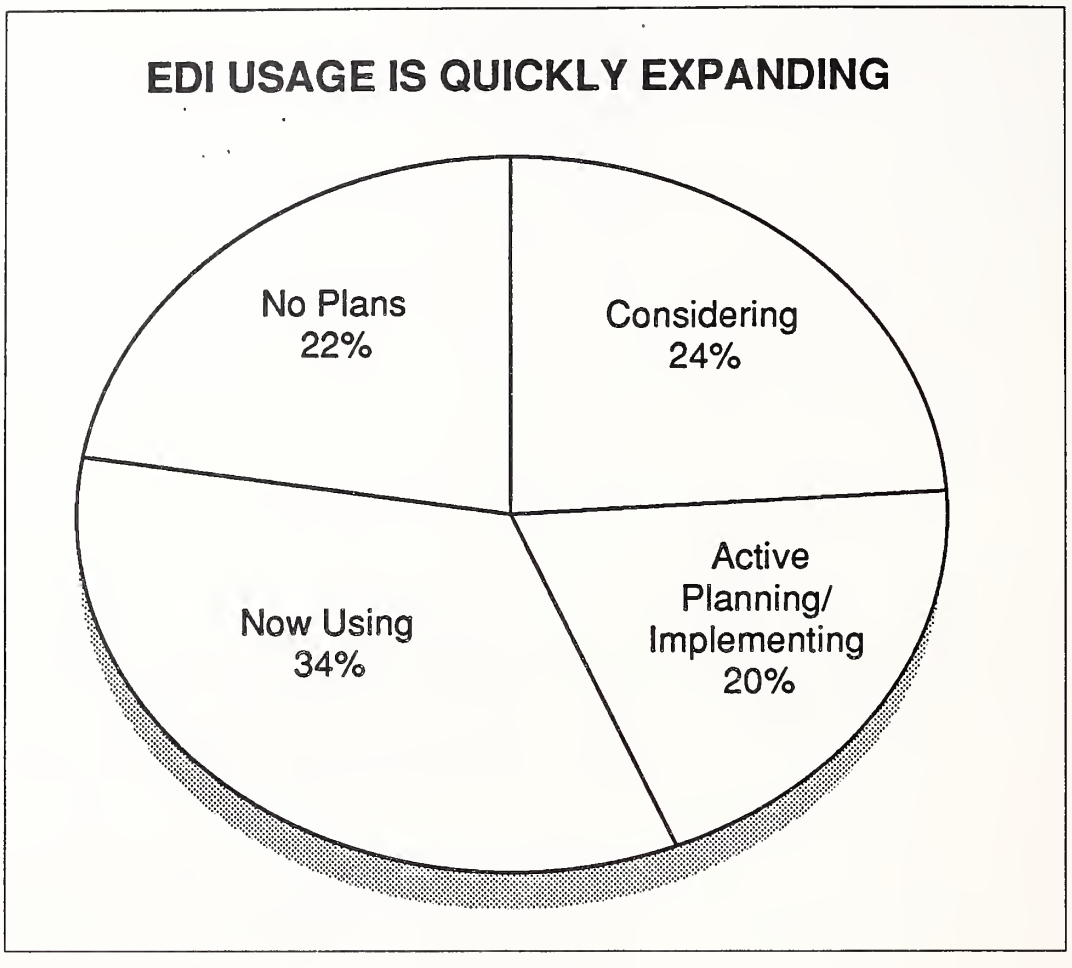
B

EDI Cost Benefits Can Be Substantial

Businesses have been electronically transferring standard business documents between trading partners for nearly 20 years. Large companies have often required their dependent suppliers to accept their defined formats.

Now, large and small companies are using EDI in both purchasing and selling operations, with new standardized data formats facilitating communications between dissimilar systems and across traditional industry boundaries.

EXHIBIT II-1

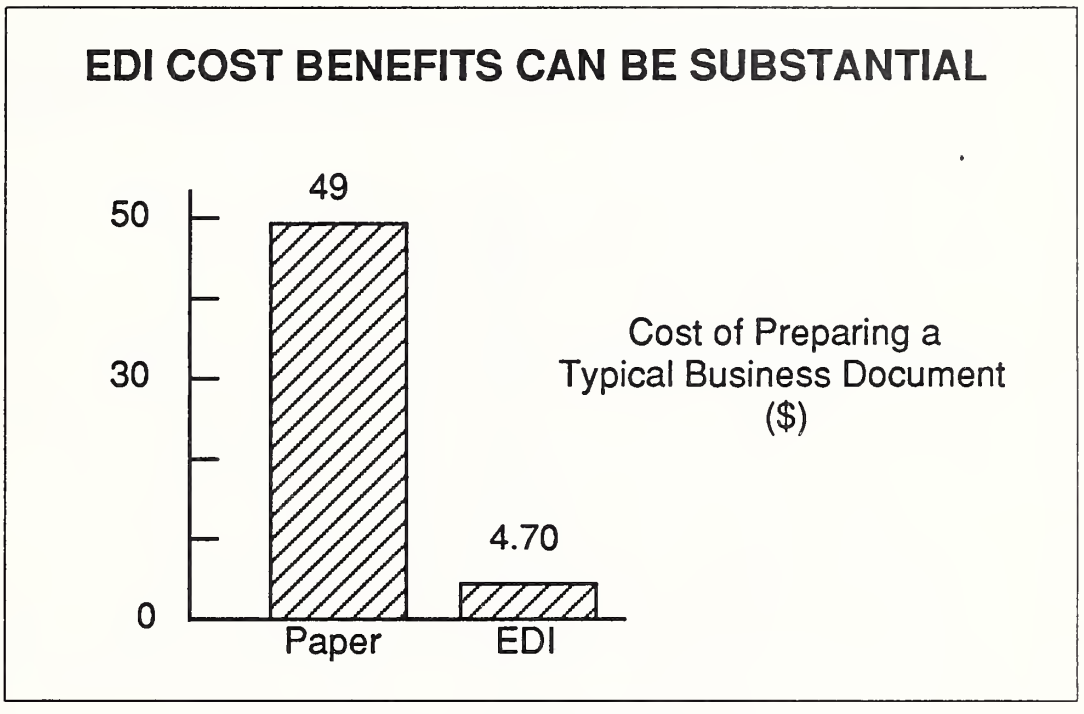


EDI can lead to substantial cost savings. According to INPUT's survey of EDI managers, a manually prepared paper document costs $49 to prepare and transfer. With EDI, the cost is $4.70. This is a better than 10-to-1 ratio (see Exhibit II-2).

Other EDI benefits are:

- Fewer errors due to verbal misunderstandings or rekeyed data
- Faster responses due to nearly instantaneous electronic communications
- Better customer service due to integration with order processing and other applications
- Enhanced control through integration with management report generators and forecast and statistical analysis applications
- Competitive advantage

EXHIBIT II-2



C

The EDI Service Market Is Getting Crowded

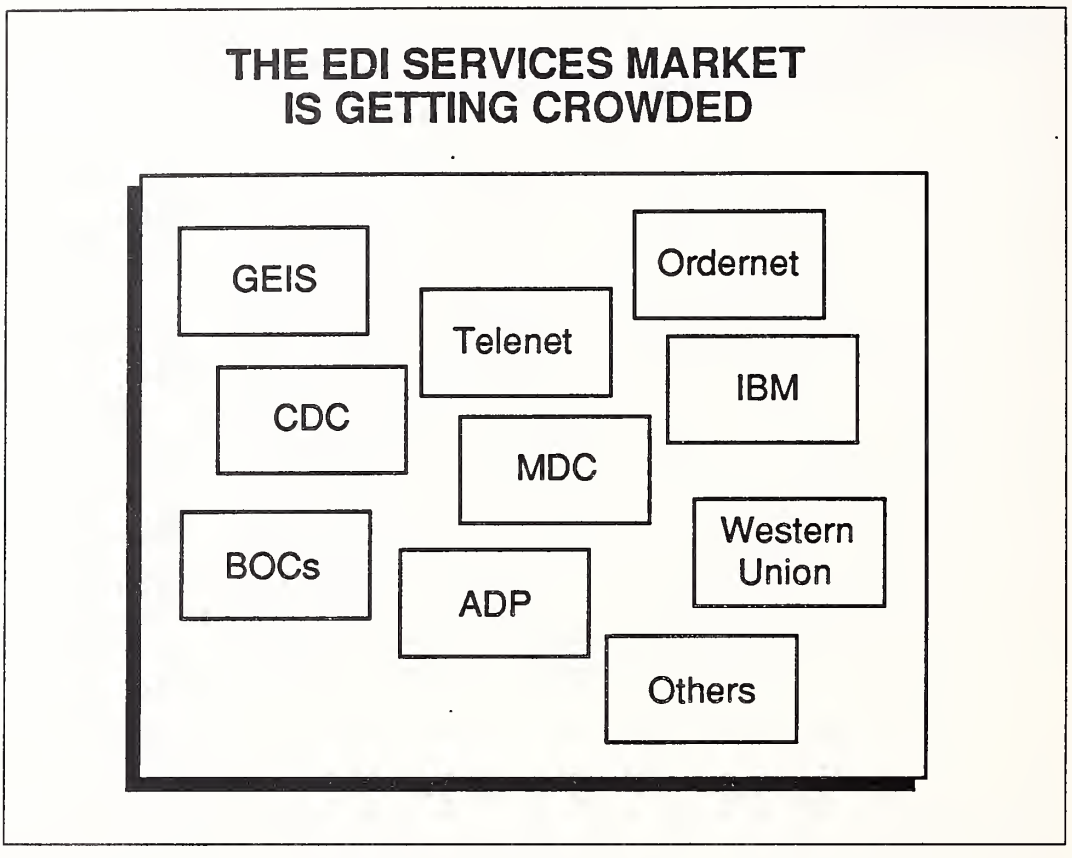
Third-party service providers offer EDI network management services, protocol/speed conversion, error correction, data validation, format translation, and store and forward services.

EDI service participants include Value Added Networks (VANs) and Remote Computing Services (RCS), such as GE Information Services, Sterling Software's Ordernet Division, McDonnell Douglas, Telenet, Control Data, IBM's Information Network, TranSettlements, RailInc, and Kleinschmidt.

Joining the market in 1987-1988 are AT&T (which is actually re-entering), ADP, Compuserve, Martin-Marietta Data Systems, and Western Union, as shown in Exhibit II-3. INPUT expects several Bell Operating Companies and other networking/processing firms to address the EDI opportunity within the next two years.

Additionally, several industry associations operate or manage EDI services for their members, and several banks are starting to offer EDI in association with Electronic Funds Transfer services.

EXHIBIT II-3



D

Users' Concerns Are Largely Addressable

As shown in Exhibit II-4, users interviewed by INPUT reported that standards and compatibility were their most important concern relative to EDI. This largely reflects uncertainty about:

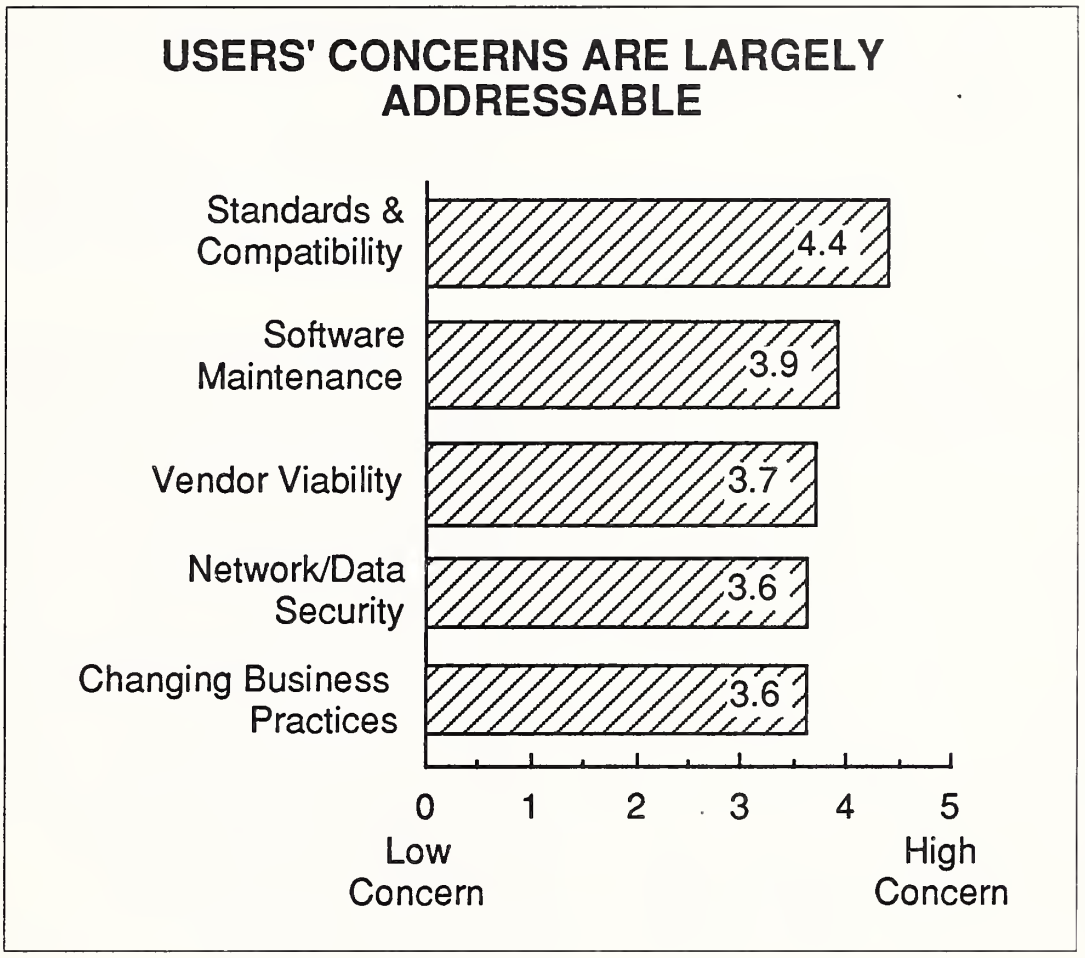
- The future of existing, industry-specific standards
- A planned "migration" from the dominant American National Standards Institute's X12 EDI standard to an emerging international standard called EDIFACT
- The appropriate role of several standards-making bodies

INPUT believes that once users understand the relationships between existing and developing standards, their concerns will be diminished

The second most important concern—software maintenance— relates to the first. With standards *appearing* to be unsettled, users wonder about the expense and effort of staying up-to-date.

Users are also concerned about vendor viability, that the effort and investment incurred evaluating service and software providers and encouraging trading partners to use a specific vendor will not have been in vain.

EXHIBIT II-4



Other highly rated concerns voiced by users were security (both internal and network) and managing the business changes required to take advantage of EDI's benefits. Since EDI systems are at least as secure as any other data communications, and since increasing numbers of users have successfully addressed the internal organizational changes required by EDI, these concerns can also be resolved.

E

The EDI Market Will Far Exceed the Forecast

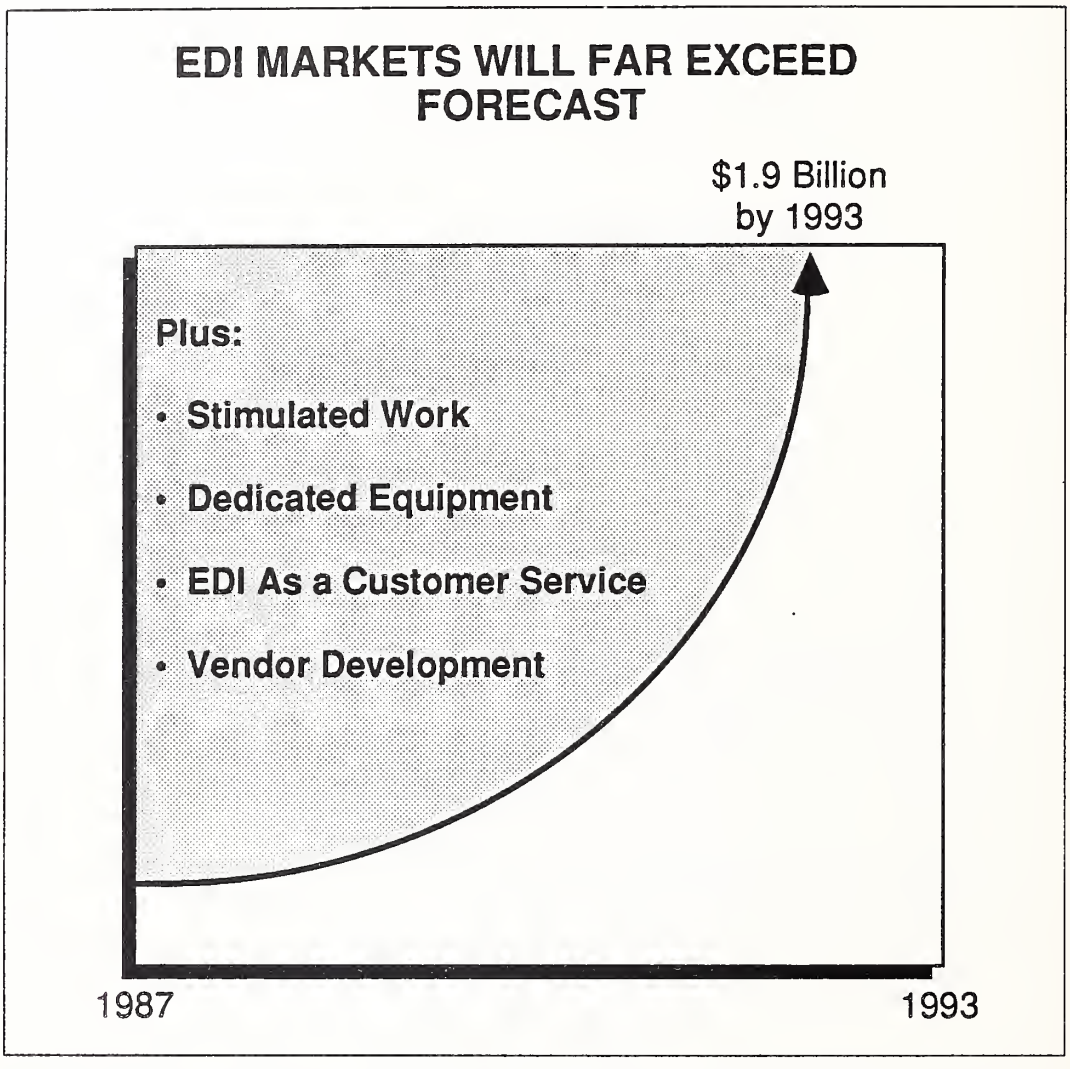
The commercial and federal EDI markets consist of network and processing services and software and professional services. Although computer and communications equipment may be dedicated to EDI functionality, INPUT does not include equipment in the presented market sizing.

INPUT projects that user expenditures for EDI network services *alone* will grow from $68 million in 1987 to over $1.7 billion by 1993, representing an average annual growth rate (AAGR) of nearly 70%. This forecast includes the electronic medical claims and batch insurance interface varieties of EDI, and federal EDI.

With software and professional services included, both the commercial and federal EDI market reached nearly $131 million in 1987 and will grow to nearly $2 billion by 1993, for a 56% AAGR.

However, the EDI market is substantially larger than these figures indicate, as illustrated in Exhibit II-5.

EXHIBIT II-5



- Users have reported considerable internal expenses to upgrade systems in support of EDI functionality. INPUT calls this "EDI-stimulated" development work. Though it is not EDI, it is closely aligned with EDI and may surpass EDI-specific expenses several fold.

- Computer and communications equipment, now excluded from the market sizing, may be dedicated to EDI or share EDI functionality with related applications. For example, INPUT's Federal Information Systems and Services Program forecasts equipment dedicated to EDI in the federal market at $80 million in 1988, growing to $163 million by 1993.

- Many companies, particularly in transportation services, offer EDI as a customer service. These systems, developed internally or by professional service firms, are not included in the market sizing.

- Network and processing service firms and software companies often contract for the EDI product development. Such vendor-to-vendor contracts, for professional services or commercial systems integration work, are not in the market sizing.

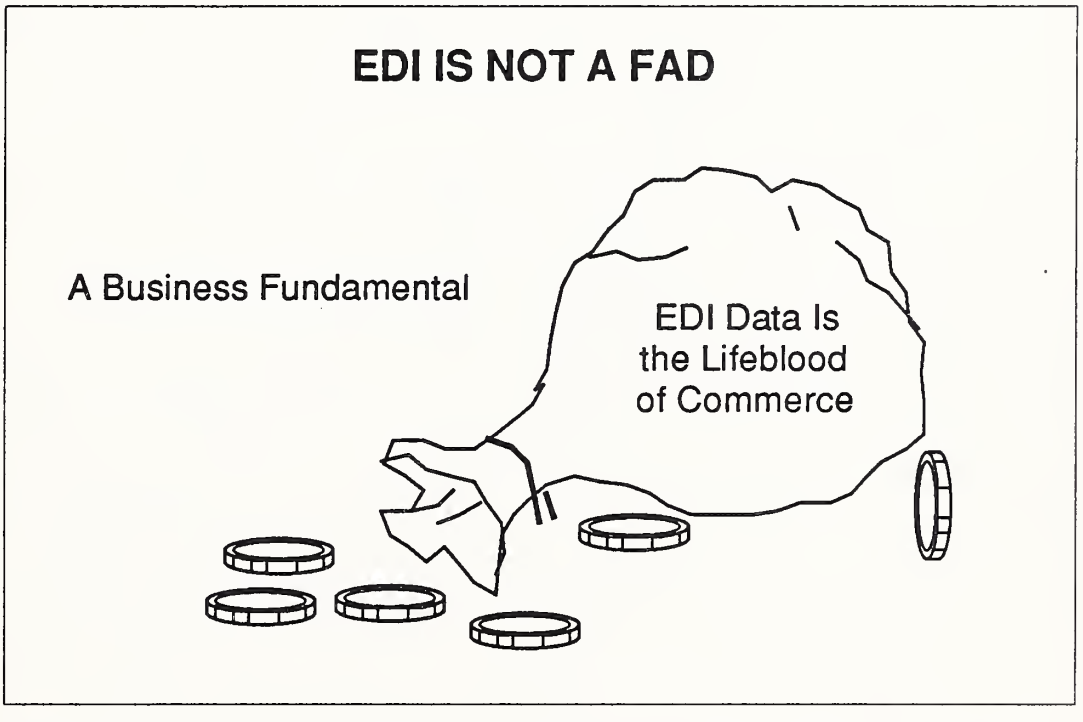
Accordingly, the EDI market is probably three or more times as large as forecast here when considering these aspects.

F

EDI Is Not a Fad

EDI addresses a business fundamental: the buying and selling process. As Exhibit II-6 indicates, the data EDI carries represents the lifeblood of commerce. Accordingly, INPUT sees the application as more than the latest buzz word.

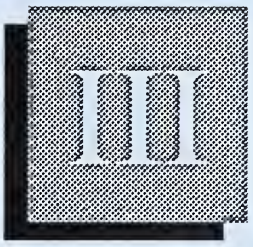
EXHIBIT II-6



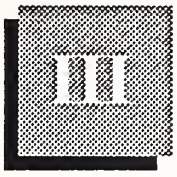
Participants in EDI standards-making bodies are exhibiting something unique in Information Services: competitors are setting aside their differences to work toward consensus. The volunteers in standards groups are showing a near religious zeal for what they are doing and report a sense of satisfaction often missing in their regular positions.

EDI is an application of appropriate technology.

Users and vendors are now coming to terms with the complexity that EDI potentially represents. In and of itself, EDI does little but replace paperwork. However, through its integration with other applications and other data services, the benefits and opportunities of EDI can be substantial.



Electronic Data Interchange: Background, Varieties, and Relationships



Electronic Data Interchange: Background, Varieties, and Relationships

A Background

1. Before EDI

Most large and many smaller companies have installed computerized systems to support routine business operations.

Typically, a business will use its computers to prepare business documents, such as purchase orders, invoices, shipping instructions, and payment authorizations, that are then printed and mailed to suppliers, customers, and banks. Alternately, the telephone may be used to take orders or relay information such as status reports and shipment tracing inquiries.

Exhibit III-1 shows the situation without EDI.

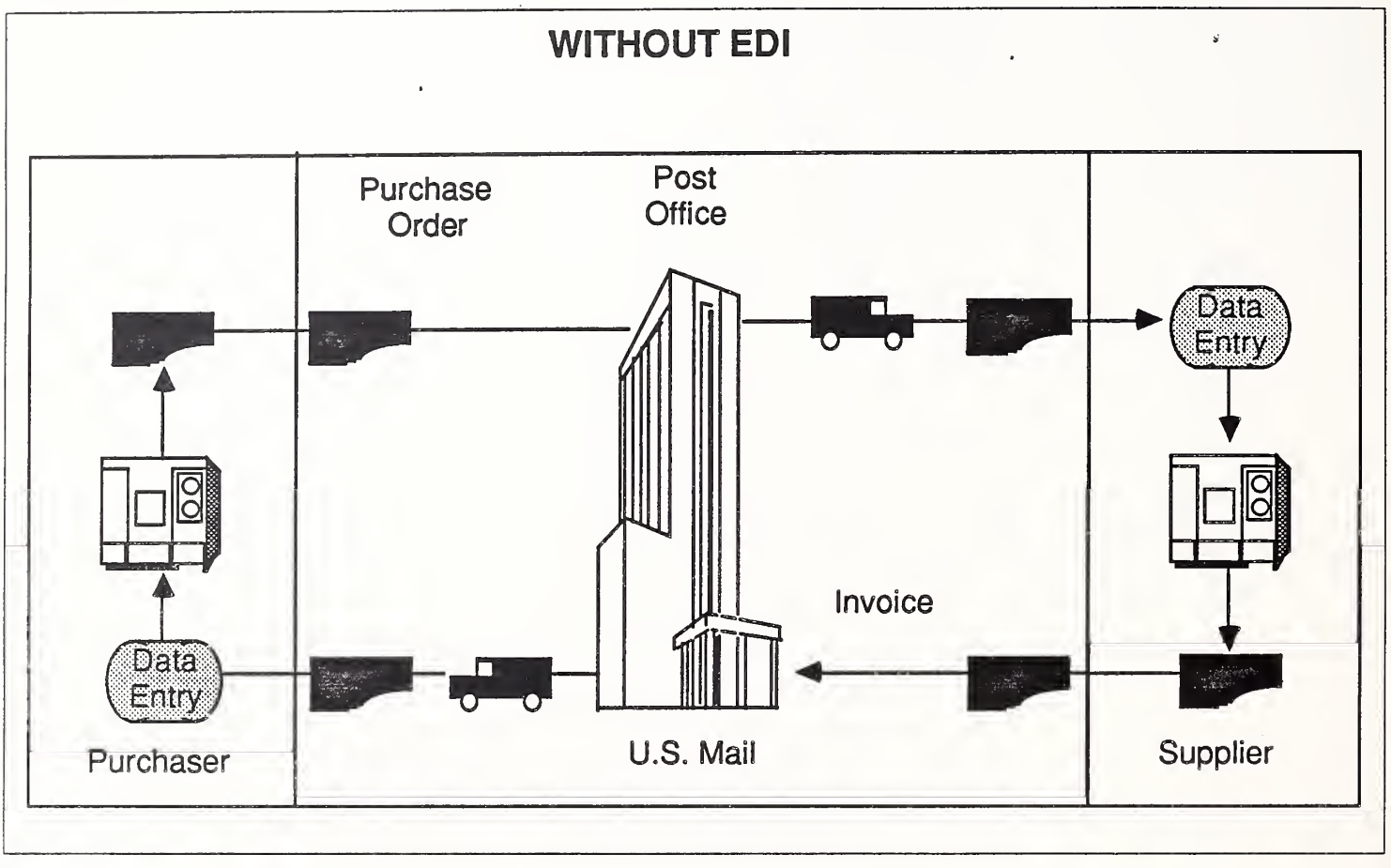
Many large companies use electronic means to transfer data to dependent suppliers. This is sometimes handled by physically shipping computer tapes or diskettes. Increasingly, communications networks are being used.

- Data transfers between dominant companies and their dependent suppliers often requires the trading partner to accept whatever format the large company provides, forcing the supplier to accept a proprietary standard, with the penalty being the potential loss of business.

- A supplier with many customers may be required to adapt to as many formats.

Computer-prepared information forms a data base that can be used in a variety of corporate management reports, including budgets, accounting reports, forecasts, and government reports, creating benefits for many corporate departments beyond the buying and selling functions. This avenue to optimization provides another reason for looking to the EDI solution.

EXHIBIT III-1



2. Reasons for Using EDI

The traditional ways of preparing and managing business documents have inherent problems:

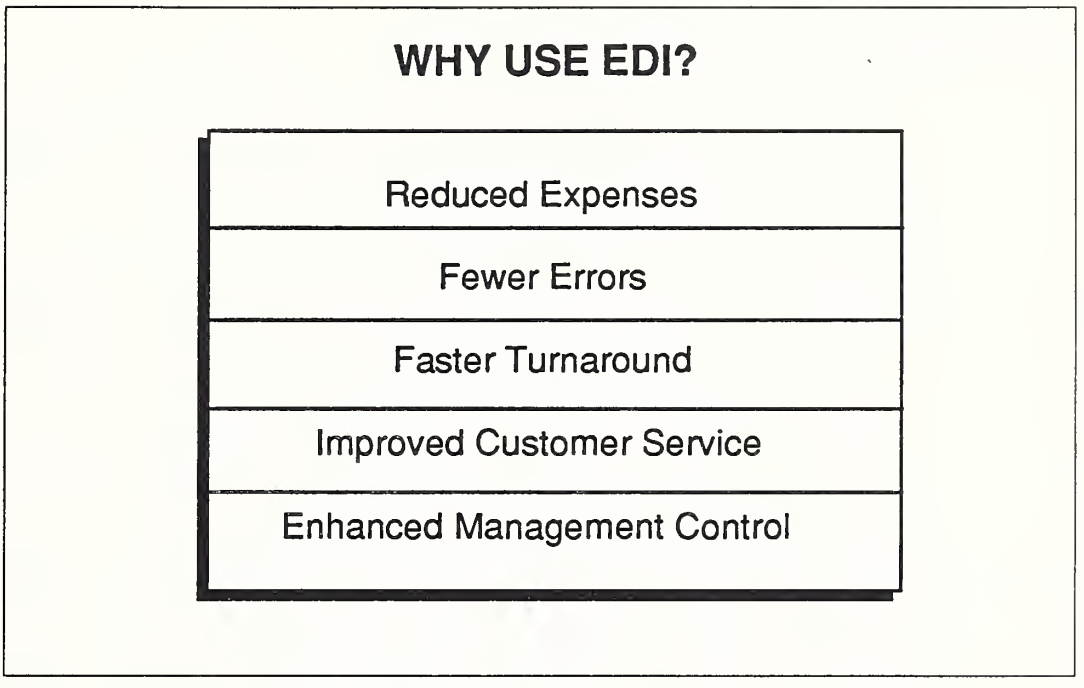
- Paper or verbal information is not directly usable by computers.
- Telephone ordering and order taking is labor intensive and error prone.
- Reliance on the mail slows turnaround time.

Further, many companies hold safety stock to meet unanticipated needs. Although this improves customer service, the company may be unable to quickly turn over assets, in which case it will lose profits.

The reasons for using EDI are summarized in Exhibit III-2.

Due to the inefficiencies cited above, EDI is being investigated by increasing numbers of businesses.

EXHIBIT III-2



There are also other factors calling for the EDI alternative, including:

- Increasing appreciation that information management can be a competitive tool
- Awareness that new technologies can be used both economically and profitably
- Requirements for increased productivity and reduced storage, transportation, and administration costs

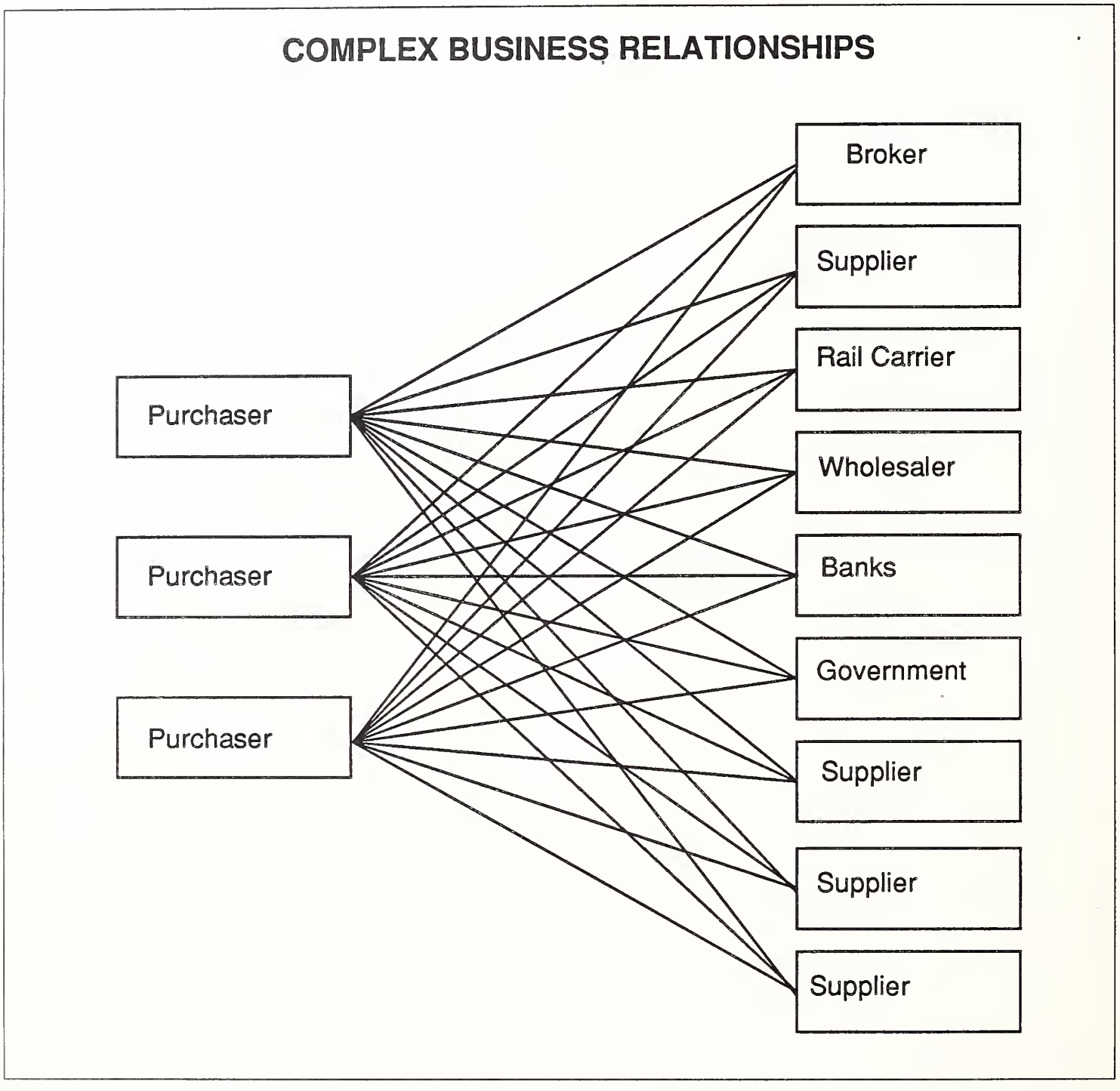
A company's computer system could directly link to another's. However, there are some basic problems with this direct, one-to-one solution.

- The computers may not be compatible.
- Information may be formatted in different ways.
- Direct links can be inefficient and costly, with scheduling, contention, and other network management problems.

Adding to these problems are complex business relationships. Companies do business with multiple business associates, often across industry segments.

These problems are illustrated by Exhibits III-3 and III-4.

EXHIBIT III-3



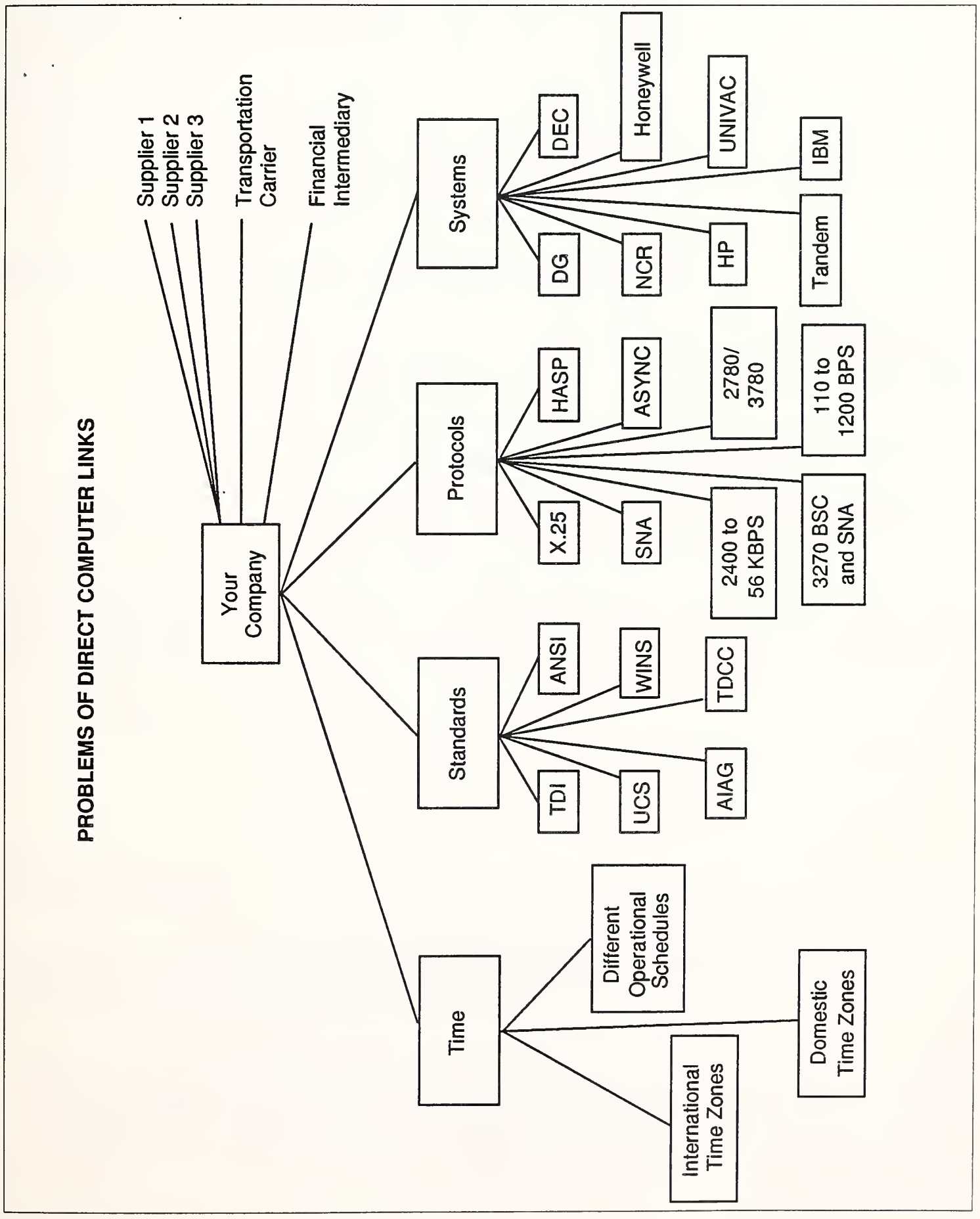
3. Three Approaches to EDI

EDI works to overcome many of these problems by providing standards for direct or indirect linkages between corporate computers.

Several alternatives are available:

- A company may implement a private EDI network system.

EXHIBIT III-4

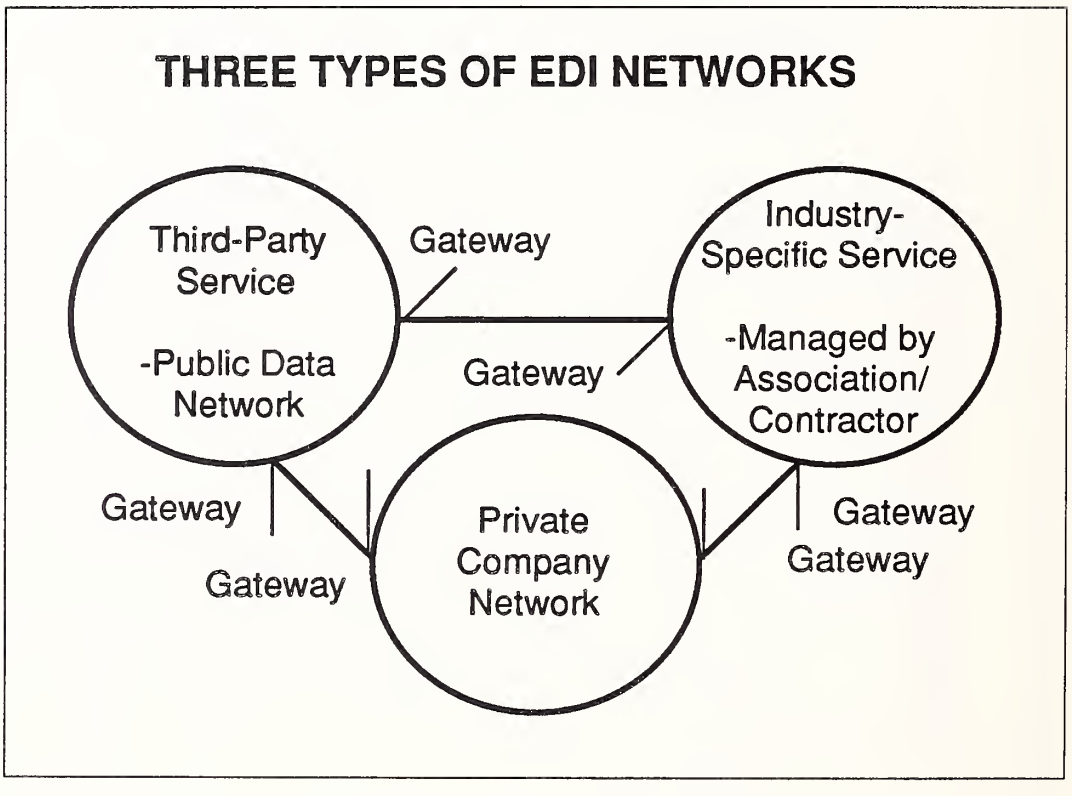


- Third parties, such as a Value-Added Network (VAN) or a Remote Computer Service bureau (RCS), can provide mailbox store and forward service and can also provide conversion services for different formats or communications protocols.

- A third alternative is an industry association network. Transnet (automotive parts), IVANS (insurance), and Specification 2000 (aircraft parts and services) are examples of this approach. These are described in INPUT's *EDI Service Provider Profiles—Update* report.

These three approaches are not necessarily mutually exclusive. Increasingly, linkages between these three domains are being built as illustrated in Exhibit III-5.

EXHIBIT III-5



4. Closed Versus Open EDI Systems

Closed, point-to-point EDI systems are often inconvenient since sending and receiving information may conflict with other data processing. Also, many firms do not wish to open their mainframe computers to possible security breaches.

Private EDI networks can serve companies with a few trading partners, but they constrict communications to those with a traditional business relationship. Some suppliers view this as desirable since it helps to build long-term trading dependencies and can represent a competitive advantage—at least for a while.

Open, third-party service options are most suitable for industries and companies with many trading partners and a high volume of transactions crossing industry lines.

B

VAN Services

Value Added Networks have three primary roles in EDI:

- VANs provide the communications links, for data transmission on a dial-up basis or a dedicated basis, or by providing private networks.
- VANs provide format, protocol, and speed conversions.
- VANs offer store and forward mailboxing.

The major VANs currently providing EDI services are McDonnell Douglas' Applied Communications Systems Company, GE Information Services Company, Western Union, CompuServe, Telenet, and IBM's Information Network.

- With regulatory changes, several Regional Bell Operating Companies (RBOC) are expected to offer EDI services through Local Area Data Transport (LADT) services. In some cases, this will be through resale agreements, while in others RBOCs will likely participate as equity partners in independent companies.

C

Remote Computer Service Solutions

RCS firms have a role similar to VANs except they usually do not operate their own network. Instead, customers use a VAN, direct dial-in, or an 800 number. Alternately, customers can supply computer tapes for processing.

Some RCS EDI participants are Control Data Corporation's Business Information Services, Sterling Software's Ordernet Division, Kleinschmidt Computer, TranSettlements, and Railinc.

Exhibit III-6 shows VAN and RCS roles in EDI services.

D

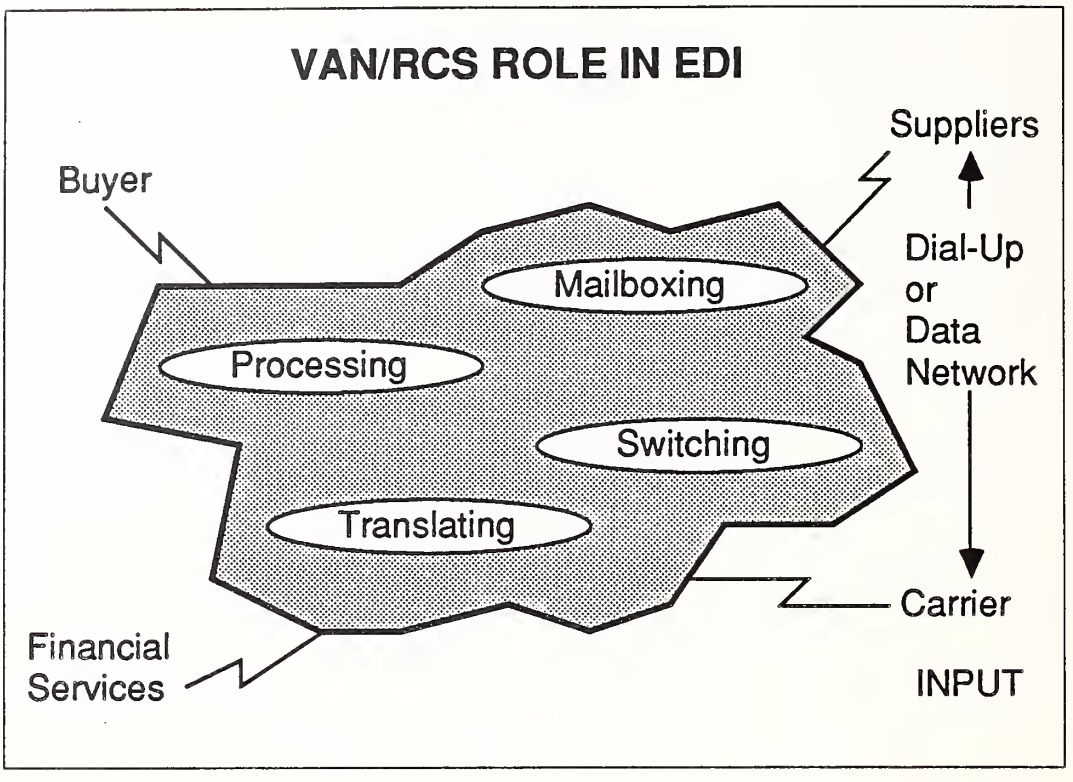
Software Solutions

Users subscribing to VAN or RCS services may rely on software hosted on the vendor's processors to perform format conversions, or users may internally convert private or application specific formats to industry standard formats prior to transmission. This later approach is less expensive and is the dominant trend.

Users can write their own EDI software or purchase it.

- If EDI software is purchased, customization and interfacing to internal applications by the software vendor, a professional service vendor, consultants, or the user's own development staff is usually required.

EXHIBIT III-6



- EDI software should be closely linked to existing applications for management reporting and other functions to optimize its usefulness.

EDI software is analyzed and described in companion INPUT reports.

E

Relationship between Electronic Mail (E-Mail) and EDI

E-mail is defined as person-to-person communications, usually in text. It can be computer based, facsimile, or telex. Some consider voice store and forward (VSF or voice mail) as E-mail.

EDI is application-to-application communications in machine-readable form.

Although E-mail can be used to transfer machine-readable binary files, such as spreadsheet data, INPUT does not consider this usage as EDI since the transfer is not in a public or de facto standard.

Like routine paper-based mail, E-mail is used for transferring business documents.

E-mail can be used for EDI-like applications with form creation options supporting order entry, inquiries, and other documents. However, these documents are not in machine-readable form.

E-mail and EDI do complement each other. For example, E-mail is often used to negotiate purchases prior to the EDI exchange.

E-mail forms systems can serve as low volume EDI-like networks ("Poor Man's EDI"). They provide users with a starting point for EDI as volume grows, and create a migration path for users and E-mail service providers.

F

Relationship between EDI and On-Line Order Entry Systems

To support telemarketing functions, many companies have installed automated systems allowing sales agents to query a data base regarding product availability, shipping status, and the like, and to allow sales personnel to electronically enter orders.

Often these systems are enhanced to allow customers direct access to the information, either from their own terminals or from terminals provided by the supplier.

- Such systems transfer the data entry effort from supplier to customer.
- Although a PC may be used to access the supplier's computer, it is often in terminal emulation.
- Some suppliers provide software to facilitate this activity.

G

Relationship between EDI and Electronic Funds Transfer

Buying and selling relationships involve inquiring, ordering, bidding, shipping, and similar activities. The process culminates with a financial exchange.

While EDI is the transfer of *information* regarding the first set of functions, Electronic Funds Transfer (EFT) is the transfer of monetary *value*.

Financial institutions have several mechanisms for transferring value. One of these methods (called Cash Trade Exchange or CTX) has been standardized to integrate payment information with the dominant ANSI X12 EDI standard.

Several third-party service providers have, or are adding, financial capabilities to their EDI offerings to enhance the value of EDI transactions and to bring the buy/sell relationship full cycle with payment services.

H

Relationship between EDI and Logistics

Logistics information refers to the location of materials in transit to or through the manufacturing and distribution process.

Three third-party services provide logistics information to shippers to help plan and optimize their production schedules: Railinc, Kleinschmidt, and McDonnell Douglas.

This information is usually provided as railroad car location messages (CLMs) and Shipper's Administrative Messages (SAMs) for several modes of transportation.

Several transportation carriers also provide this variety of EDI on a customer-service basis.

Optimally, this form of EDI, known as logistics data interchange (LDI), links into just-in-time (JIT) inventory management, material resource planning (MRP II), and similar applications.

INPUT calls purchasing, EFT/EDI, and logistics EDI "Mainline" EDI.

"Other" Forms of EDI

EDI is also being used in health care insurance, and in property and casualty insurance. Other variants are being explored.

1. Electronic Medical Claims Submissions (EMCS)

Several companies are now providing EMCS network services. Among these are National Electronic Information Corporation (NEIC, Secaucus, NJ), which serves as a clearinghouse for multiple insurance carriers, and GE Information Services with its EMC*Express service. Working with other processing firms, two telephone companies (BellSouth and Southern New England Telephone) are providing EMCS network services.

NEIC and the activities of several participants in EMCS are described in INPUT's study *EDI Service Provider Profiles—Update*.

2. Insurance Interface

EDI in the insurance industry is called Interface. The best known example is that provided by the Insurance Value Added Network Service (IVANS) over IBM's Information Network.

Insurance Interface is used for communications between agents and their insurance carriers. Several insurance companies have their own captive systems. However, the IVANS network is useful for independent agents communicating with multiple insurance carriers.

The formats used for Insurance Interface are called IIR/ACORD for Insurance Institute for Research/Agent Company for Research and Development, two industry groups that merged and developed electronic and paper document formats.

More detail about EMCS and Insurance Interface will be found in INPUT's report *EDI Vertical Market Potentials*.

Profiles of IVANS and a discussion of a similar service planned by Western Union can be found in INPUT's report *EDI Service Provider Profiles—Update*.

Exhibit III-7 compares "Mainline" EDI, Logistics Data Interchange, Electronic Medical Claims Submissions, and Insurance Interface.

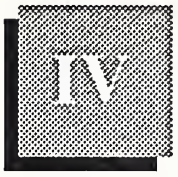
The next chapter discusses users' concerns regarding EDI and the market's driving and inhibiting forces.

EXHIBIT III-7

VARIETIES OF EDI

	"MAINLINE" EDI	EMCS	INTERFACE
Transactions	Purchase Orders, Invoices, Car Location Messages, EDT/EDI, etc.	Medical Claims	Policies, RFQs, Claims
Dominant Public Formats	X12, UCS, TDCC	HCFA 1500, UB 82	IIR/ACORD
Trading Partners	Buyers and Suppliers; Shippers and Carriers	Hospitals, Physicians Services, and Insurance Carriers	Insurance Agents and Carriers
Third-Party Services	Most VANs, Many RCS Firms	GEIS, NEIC, and Regional Processors	IVANS, Western Union

Users' EDI Concerns, Market Inhibitors and Activators



Users' EDI Concerns, Market Inhibitors and Activators

This chapter presents the results of INPUT's user interviews regarding EDI concerns relative to network service. It also provides an overview of market factors driving and inhibiting EDI acceptance. In another INPUT report, *Vertical Market EDI Potentials and Directions*, individual market sector activity is reported, with an analysis of unique industry needs and issues. User issues relative to software are described in INPUT's study *EDI Software Product Markets and Issues*.

A EDI Issues and Concerns

EDI involves several issues, including standards, control and financial responsibilities, business practices, cost issues, and security.

These concerns can influence market acceptance and the success of users' EDI implementations.

1. EDI Standards and Compatibility

This year, standards and compatibility has replaced security as the primary user concern.

Users appear aware of pressure on proprietary or industry-specific formats to conform to public standards and are uncertain about the migration plan of X12 to international standards called EDIFACT. There is also uncertainty about the appropriate roles of various EDI standards-making organizations.

a. Multiple "Standards" Revolve around X12

The "generic" and dominant EDI standards are the ANSI X12 and Transportation Data Coordinating Council (TDCC) standards. The TDCC is now known as the EDI Association (EDIA). These standards cover most common business transactions. Greater coordination between these organizations is expected.

- Standard "transaction sets" define data formats representing electronic equivalents of business documents.

- They can be used with virtually all computer types.

One of the problems facing those developing "public" standards is that multiple parties have needs that must be accommodated and decisions are made in a committee and consensus-seeking environment. This leads to a protracted process. Sometimes lowest-common-denominator standards and duplicate transaction sets are created covering the same type of electronic documents, but with different formats.

Industry standards, such as those used in the pharmaceutical industry, are generally developed and revised more quickly since the user community is more closely knit.

X12 has been adapted by several industry groups such as automotive (AIAG), chemical (CIDX), electrical supplies (EDX), electronics (EIDX), office products (ICOPS) and others.

- Each industry often has unique nuances that must be considered; accordingly, there are subtle variations, but all X12-based standards use the same syntax.

- These variations take into account various product attributes, industry specific measurements, and special billing requirements and/or shipping instructions.

- Certain industries, such as grocery concerns (UCS), drug wholesaling (Ordernet), aircraft maintenance (Spec 2000), and automotive parts (Transnet) maintain industry-specific standards that were developed prior to the creation of the ANSI X12 formats. Health-care insurance claims submissions use standards established by an agency of the U.S. government, and Insurance Interface uses formats developed by an industry association.

- Additionally, so-called "private" EDI standards have been established by dominant companies in several industries. Private standards, carrying the names of the company authoring them (GM, Ford, Chrysler, K-Mart, etc.), are typically fixed length, while the public formats are variable length.

There is movement toward compatibility between industry-specific, private EDI standards and X12 transaction sets. For example, the AIAG standards, several private EDI networks, and at least one industry association clearinghouse are now supporting X12 to facilitate cross-industry trading.

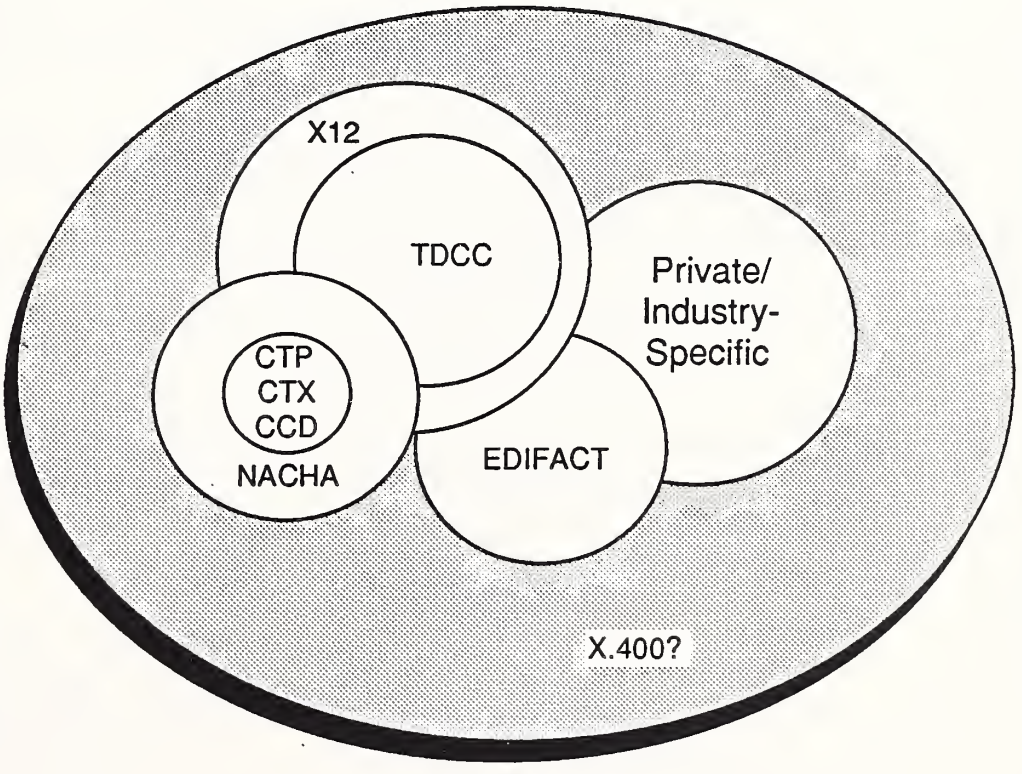
International standards are called EDIFACT (EDI for Administration, Commerce, and Transportation), which evolved from an earlier standard called GTDI, or General Trade Document Interchange. The GTDI standard is derived from the United Kingdom trade facilitation agency called SITPRO (for Simplification of International Trade Procedures), which lobbied for U.N. acceptance of the still earlier TDI standard.

- Work is progressing on migration from X12 to EDIFACT. The first approved transaction sets are now available, and the EDIFACT syntax has been approved by the International Standards Organization (ISO).

Exhibit IV-1 shows EDI standards and their relationships, with the shaded intersections implying a degree of compatibility.

EXHIBIT IV-1

EDI STANDARDS RELATIONSHIPS



- The NACHA standards shown on the exhibit refer to the National Association of Clearing Houses responsible for electronic funds transfer (EFT). Other formats used in banking include various American Banking Institute (ABI) formats for EFT.

- Of the three standards shown within the NACHA grouping, CTX is most closely aligned with X12 since it carries information about a funds transaction as well as monetary value.

b. Electronic Messaging Standards May Envelop EDI

Note the outer circle representing the X.400 standard in Exhibit IV-1. This electronic messaging standard may eventually encompass the subspheres of EDI, permitting data in any subformat to be carried within an X.400 "envelope."

- Adoption of X.400 will facilitate network interconnections and international messaging of all types.

- X.400 will eventually be applied to all forms of messaging: text, graphics, video, and voice.

The latest proposed enhancements to X.400 (called X.400/88) contain features such as broadcast messages that directly address EDI functionality.

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

c. Software Maintenance Is Partially a Standards Issue

Software maintenance involves several aspects: upgrades, fixes, and maintaining standards.

Networks providing on-network EDI translation services typically adopt the latest standard version while supporting earlier releases for companies in transition.

d. Survey Findings

Users averaged their concerns on standards and compatibility at the highest rating (4.4 on a scale of 5), with many professing confusion about the status of standards today, particularly regarding the migration of X12 to EDIFACT.

These users are often dealing with partial information, but nevertheless, the perceived unsettled status of EDI standards is inhibiting the market, while the acceptance of cross-industry standards is having a countervailing effect, encouraging cross-industry trading and the overall growth of EDI.

- Users averaged their concerns on software maintenance at a slightly lower rating, with this issue rated second on the list of concerns.

EXHIBIT IV-2

AGENCIES AND ASSOCIATIONS INVOLVED IN EDI STANDARDS (Partial Listing)

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

American Paper Institute
260 Madison Avenue
New York, NY 10016
(212) 340-0600

American Trucking Association
2200 Mill Road
Alexandria, VA 22314
(703) 838-1926

Association of American Railroads
50 F Street NW
Washington, DC 20001
(202) 639-2325

Automotive Industry Action Group
North Park Plaza Suite 830
17117 West Nine Mile Road
Southfield, MI 48075
(313) 569-6262

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

EDI Association/Transportation
Data Coordinating Committee
1101 17th Street, NW
Washington, DC 20036-4775
(202) 293-5514

EDI Council of Canada
5401 Eglinton Avenue West
Suite 103
Etobicoke, Ontario M9C 5K6
(416) 621-7160

Graphics Communications and
Computers Association
1730 North Lynn Street
Suite 604
Arlington, VA 22209
(703) 841-8160

Health Industry Business
Communications Council
5110 N. 40th Street, Suite 120
Phoenix, AZ 85018
(602) 381-1091

Continued

EXHIBIT IV-2 Cont.

AGENCIES AND ASSOCIATIONS INVOLVED IN EDI STANDARDS (Partial Listing)

National Association of
Refrigerated Warehouses
7315 Wisconsin Avenue
Bethesda, MD 20814

National Trade Facilitation Council/
National Commission on International
Trade Documentation
350 Broadway Suite 205
New York, NY 10013
(212) 925-1400

National Office Products Association
3166 Des Plaines Avenue Suite 223
DesPlaines, IL 60018
(312) 297-6882

Paper Trade Association
420 Lexington Avenue
New York, NY 10017
(212) 682-2570

Telecommunications Industry Forum
c/o Exchange Carriers Standards
Association
5430 Grosvenor Lane Suite 200
Bethesda, MD 20814-2122
(301) 564-4505

Technical Association of the Pulp
and Paper Industry
One Durwoody Park
Atlanta, GA 30338
(404) 446-1400

Steel Service Center Institute
1600 Terminal Tower
Cleveland, OH 44113
(216) 694-3630

Uniform Code Council
8163 Old Yankee Road
Suite J
Dayton, OH 45459
(513) 435-3870

Although some users feel EDI standards are unstable, others acknowledge that software and standards maintenance are likely to be ongoing chores but count on software vendors to provide updates.

The use of standards by major corporations, particularly those with cross-industry trading relationships, is having a major impact by turning previously "academic" standards into standards applied to real needs.

2. Security

a. Confidentiality Is Critical

Sensitivity to security has been heightened with the much-publicized phenomenon of computer viruses, which can take a benign form such as a "peace message" or a Christmas card. Far more destructive are "Trojan Horse" programs, which can erase or scramble data and programs. The Iran-Contra affair, during which archived, and presumably erased, electronic mail files were widely publicized is another recent event heightening security awareness.

Information about a company, its customers, and its sales is generally held to be confidential, and other companies are granted access to this information only to perform needed services in support of the trading function.

- Each company and third-party service provider is responsible for keeping its data from unauthorized parties.

- The data elements that may be transmitted to authorized parties are specified in EDI standards.

b. Survey Findings

Users interviewed by INPUT rated security at a relatively high 3.6 (on a scale of 5), but below standards-related issues and vendor viability.

Many companies are reluctant to talk about security concerns; however, at least one large potential user company has assigned its security chief to devote attention to EDI security.

Some companies have higher security requirements than others. In certain industries, such as petroleum, individual transactions are large and errors can be particularly damaging, whether caused by misplaced decimals or by delay.

Security concerns relate to a number of issues. In addition to potential leaks of competitive information are concerns over potential exposure in lawsuits.

- Companies don't want to be accused of having viewed or altered a competitor's or another company's data.

- One user describing this concern noted that in litigation, subpoenas have been issued for archived data and memos, data that could have been altered.

A common concern is the vulnerability of information passing through third parties.

- Users are reluctant to allow others access to their mainframes, and many isolate them from networks.

- Using a microcomputer (or other processor) as an EDI front end would appear to address the issue, and many users have taken this approach.

- Third-party EDI offers a layer of security since trading partners do not directly access each other's computers.

There are also concerns about data being properly translated between formats and validated.

Vendors are equally concerned about security. A breach of trust could have dire consequences on their business. In fact, one network was threatened with a user-enforced shutdown due to an unauthorized Christmas message showing up on users' screens. Because security is of such concern, EDI service providers take the issue seriously.

- EDI systems are designed to provide as high a level of security as mail or telephone service; in fact EDI is more secure due to multilevel password capabilities, call-back sequences, and other safeguards.

- System design prevents the commingling of information. Users control trading relationships, by defining valid transaction types and formats. Exceptions are flagged and resubmitted for correction or system administrator review.

- Attempted accesses by unauthorized parties are not acknowledged, but the record is generally maintained for action by security and operations managers.

- Storage techniques distribute file information, making it difficult to assemble information without authorization.

- Prior to responding to inquires, senders validate communications through control headers and confirm requestor's codes against the master record.

Many third-party vendors commission security audits covering physical as well as data security. These audits are available for customer review.

Security concerns may be hindering development of value-added EDI-generated data bases for market research, government reporting, sales planning, and other functions. Service providers have been reluctant to propose that EDI data be used for such purposes because it may lead to the perception of security and trust violations.

c. Encryption vs. Authentication

It is beyond the scope of this study to fully examine how security can be addressed through technological means. Briefly, two methods are used.

- Encryption "scrambles" data, requiring a key to reassemble data into its original form. This method has been difficult to manage, since an error will leave all data in the transaction unusable.

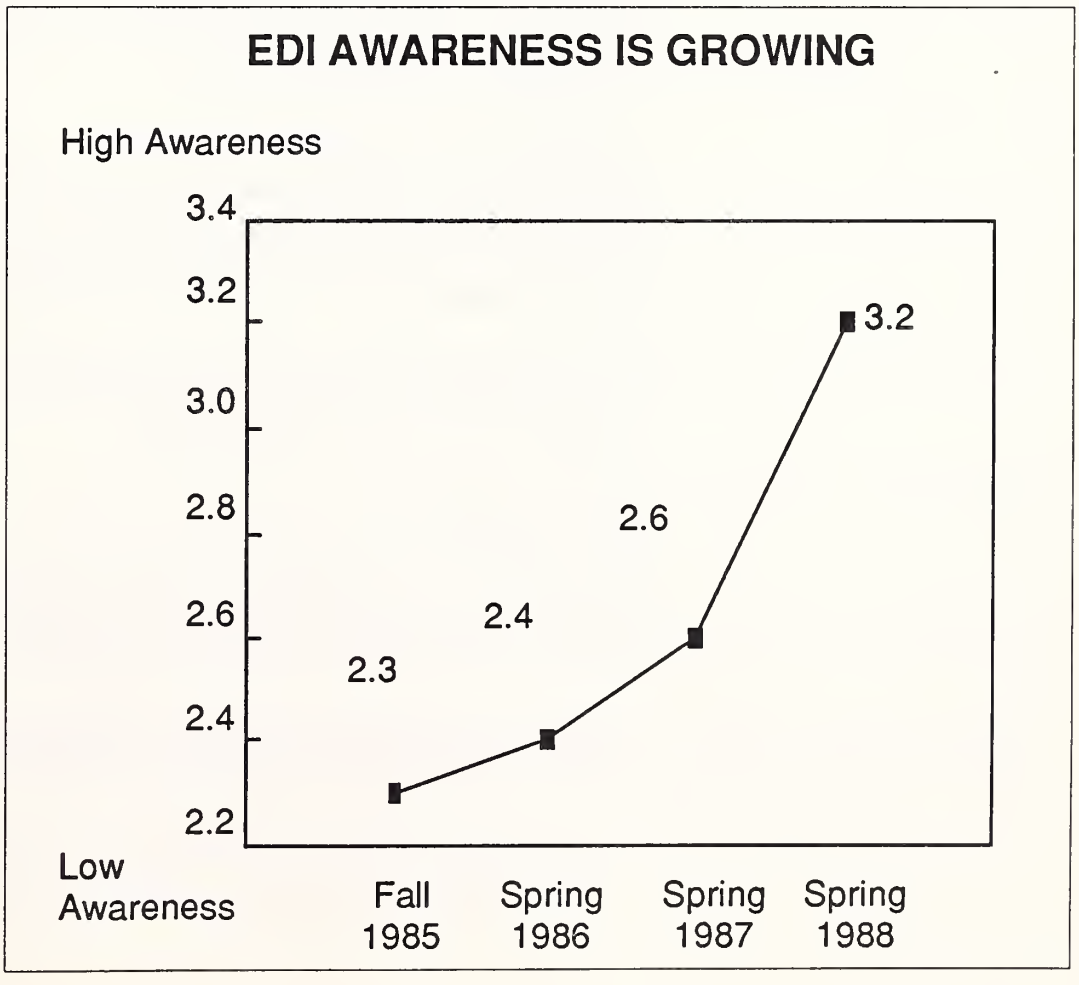
- Authentication uses a method that verifies that the contents of a message or transaction remain as they were originally, and that the individual authorized to send the transmission did in fact do so.

Users are concerned about internal breaches of security as well. A company maintaining parallel paper and electronic systems may fear an unscrupulous employee issuing duplicate transactions and, through collusion with a trading partner, gaining from a redundant purchase order or other transaction.

3. Awareness

INPUT has tracked users' self-rated awareness quotients in several surveys since 1985. Exhibit IV-3 shows how this rating has changed, based on a survey of 200 IS and Telecommunications managers.

EXHIBIT IV-3



As the exhibit shows, awareness of EDI is clearly increasing, with a substantial jump in the past 12 months.

More critical than IS/Telecom awareness of EDI is upper management awareness, since EDI potentially impacts multiple departments within the corporate environment.

- In a study commissioned by the American Electronics Association, 44% of the senior managers and executives surveyed confessed not knowing anything about EDI, a finding that INPUT believes may be consistently applied to many other industries.

- Additional marketing and promotional efforts are needed since EDI is a corporate, rather than an IS, issue.

4. Cost Savings

a. About Data Entry

The Data Entry Management Association reports that nearly 30% of an IS budget is derived from data entry, with 80% of data-entry costs attributed to labor.

Technology is addressing this basic IS element with optical character recognition, voice data entry, and other methods. Regardless of the methodology used, most information needed for processing comes from documents.

In recent years, data-entry functions have moved from a centralized, IS-based service to the end-user level. Among advantages of this decentralized approach are faster data input from source documents and fewer errors, since end users are more familiar with the data and more inclined to accurately enter the information needed in their functions.

With EDI, core data is entered once by the document originator and incremental information may be added as the transaction moves between companies and internal departments.

b. Survey Results

Interviewed users expect EDI to lead to substantial cost savings in their buying and selling relationships, but the majority of respondents (53%) failed to examine their costs per paper-based transaction.

- INPUT has found that new technology cost justifications are often done on a soft dollar, qualitative basis rather than on a quantified basis.

- It is sometimes difficult to separate out EDI from related systems, and many managers rely on the intuitive or the obvious when evaluating

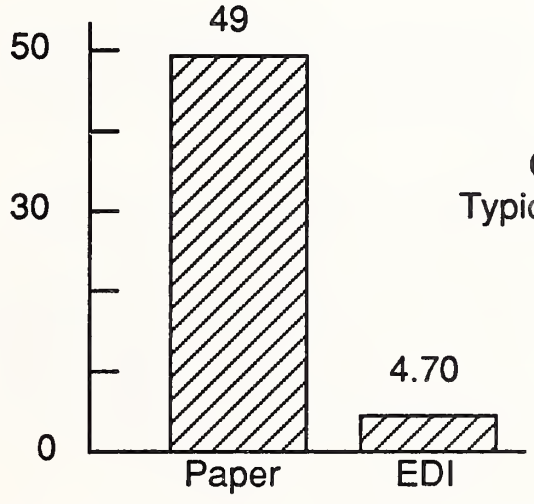
EDI's benefits. This may inhibit market acceptance since it permits objections to be raised for which there is little or no data available in response.

Those doing an analysis of their paper-based transaction costs and able or willing to report their results (25% of survey respondents) said that on average, their per-transaction costs for paper documents were $48.54, while their costs per EDI transaction averaged $4.70, or one-tenth the cost.

These findings are illustrated in Exhibit IV-4.

EXHIBIT IV-4

PAPER VERSUS ELECTRONIC TRANSACTIONS



Other respondents reported savings in other terms:

- "We used to have five more people in the office to handle paperwork. We've saved $100,000 in salaries."
- "It used to take us four days to process the paperwork. Now it takes us less than an hour to process the same orders."
- "We didn't do it to save money. We did it as part of our competitive tactics."

However, a few users reported no savings, one saying, "You don't get any savings if you have only one or two customers using EDI."

c. Network Costs

EDI network costs can become relatively inconsequential when compared to costs of paper transactions.

Most third-party services charge $.50-$1.00 per 1000 characters. Volume discounts reduce these fees to $.15 per 1000 characters in some cases, and through preprocessing, perhaps even lower. Some also levy monthly minimum service charges, initiation fees, and connect-time charges.

5. Implementation Time Frames

According to EDI users surveyed, the average time needed to implement an EDI solution was just short of six months. The individual experiences ranged from one month to several years, with one respondent reporting the EDI system "evolved" and is still "evolving."

Integration of EDI into mainframe production environments has been the most costly element based on internal allocation of resources. Links to applications, many of which were developed internally, need to be written.

6. EDI-Stimulated Development

Beyond EDI capabilities, users may find that the efficiencies EDI offers can only be optimized by upgrading related systems, such as accounting, inventory management, and marketing. INPUT plans to report the findings of its survey research examining EDI-stimulated application development in an upcoming study, *EDI and Professional Services.*

7. Who Pays?

Most EDI third-party services permit billing to be allocated between trading partners.

Vendors are starting to offer detailed billing statements and electronic reports on the transactions processed by the network, showing who transmitted what, and when.

Systems can be designed to allocate costs to the most appropriate party. For example, the costs of transmitting a purchase order may rightly belong to the issuer, while electronic invoicing can be borne by the supplier.

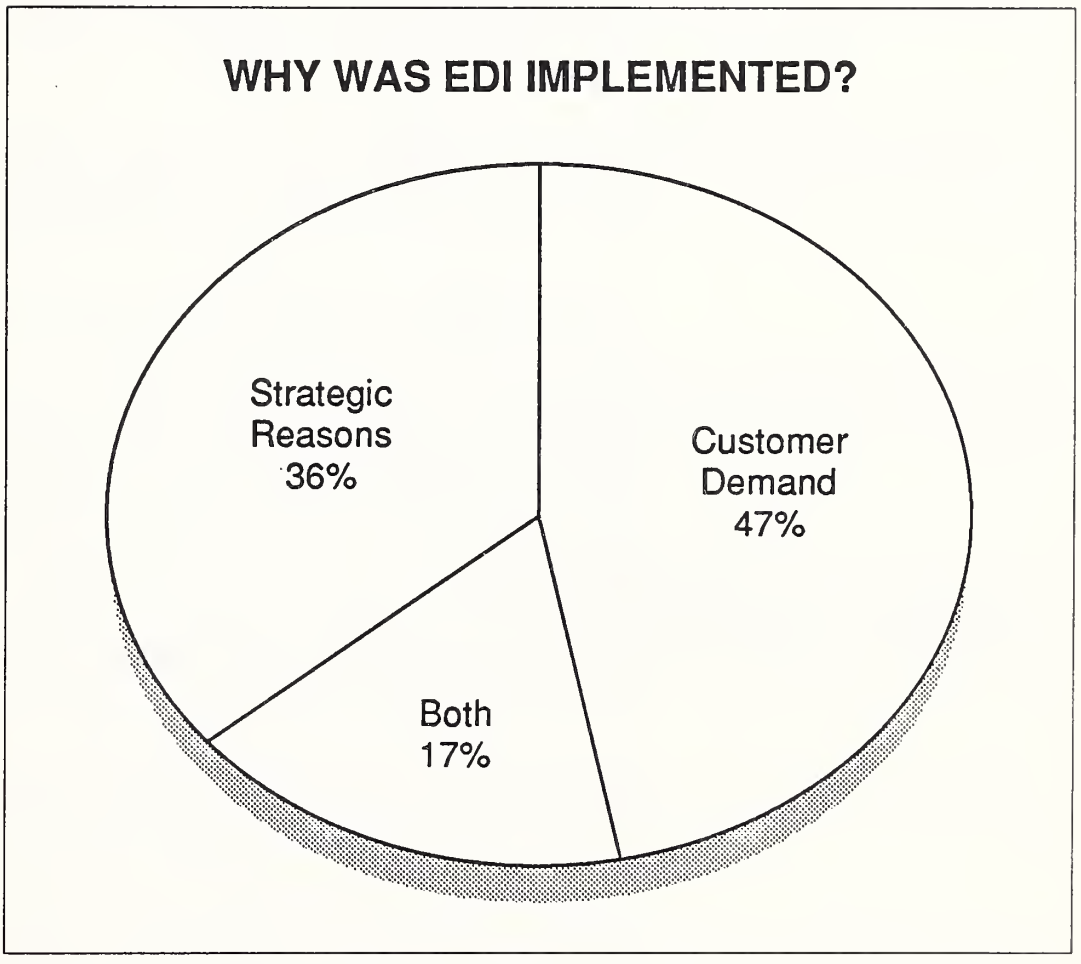
Larger companies may subsidize smaller customers' EDI expenses.

Internally, chargeback systems are being adopted to bill end-user departments for EDI transactions.

8. Reasons for Implementing

As shown in Exhibit IV-5, most current EDI users (47%) implemented the application in response to their customers, while one-third adopted EDI for their own reasons, with the balance (17%) citing both motivations.

EXHIBIT IV-5



Specific corporate reasons cited were to reduce inventories and improve cost effectiveness, to cement relationships with suppliers, to gain strategic advantage, and to improve customer service.

9. Competitive Concerns

Several users reported they were investigating or implementing EDI because of competitive reasons: either their direct competitors were believed to be implementing EDI, or their major customers indicated (sometimes rather strongly) that future business would be dependent on the supplier's ability to handle electronic transactions.

The average rating given regarding a company's competitors' actions in EDI was a mid-range 3.3 on the scale of 5.

10. Internal Changes

On average, users rated their concerns about the changes required to convert paper forms to electronic methods above midrange at 3.6 on the scale of 5.

Usually, the change from manual to electronic systems will involve parallel systems as the changeover is implemented. This does add costs due to maintaining dual systems.

However, users converting to EDI that wish to trade with others maintaining paper-based systems can do so without operating a parallel system. Several network services will convert EDI data to mail-delivered paper documents, E-mail, or facsimile-delivered documents.

Users usually test one or a few documents at a time to allow for gradual system adoption with minimal disruption or "surprises."

Users have sometimes gotten "stuck" in pilots, primarily because EDI may have been implemented under IS' direction without a corporate mandate or functional department champion. These pilots may have been considered demonstration projects by the IS department.

11. Legality

The acceptance of EDI-transmitted documents as binding contracts is left to the marketplace and negotiation between individual buyers and sellers.

Trading partners usually agree prior to electronic trading that EDI documents will have the same status as their paper-based equivalents, carrying the same terms and conditions as previously used methods.

A survey of several EDI-active firms found that no industry-wide contracts exist, nor was one advocated; that legal issues are best addressed by each individual trading partner in a relationship; and that standardized legal agreements are not possible.

Legal issues commonly addressed by contracts between trading partners cover definitions or standards, how to share the costs of network services, and responsibilities for advising of changes in networks. Such contracts usually reference existing contracts as incorporated in the EDI trading agreement.

A committee of the American Bar Association and a European academic study group are evaluating the legal issues involved in electronic trading.

Assuming the EDI system verifies receipt of data with a functional acknowledgement, EDI transmissions have the same legal force as Telex, which uses an answer-back code to verify message receipt.

12. Vendor-Related Concerns

a. Vendor Viability

Vendor viability was the highest rated vendor-related concern.

Users need assurances that any investment or effort incurred evaluating vendors and encouraging their trading partners to use a specific vendor will not be in vain.

Vendors rumored to be acquisition candidates, or facing unfavorable financial news (which may be unrelated to their EDI business), need to overcome users' perceptions of vendor instability. This becomes a public-relations task.

b. Reliance on One Vendor or Service

Users rated this concern slightly below midrange on the scale of 5, and it trailed all other concerns. Since several vendors now offer EDI services, most users have options; in fact, approximately 30% of interviewed EDI users are using multiple networks.

Service providers are reinforcing their relationships with customers through user groups, newsletters, and professional services. It is obviously in their interest to maintain long-term relationships in order to gain market share and to recover sales and product development expenses.

13. Human and Business Factors

There are a number of human and business factors to be considered by those promoting EDI systems.

a. Human Relationships

Relationships developed over time can hinder acceptance of EDI. People like personal contact with business associates.

One proprietary EDI system developer reported on how people factors become important.

- The system was initially perceived as a threat by both internal and external users. The project director worked to allay those fears through internal marketing and by designing the system with input from the external merchants who would use it.

- The system was designed to be flexible; a rigid system would cause frustration leading to disuse.

- The company found that the system supplements human interactions and that personalities remain important.

b. Sales Staff Concerns

When EDI is implemented for marketing purposes, concerns are heard from the sales staff. These concerns typically regard compensation and commission issues. Management is wise to avoid any changes in the commission plan, recruiting the sales staff to sell EDI to the customer base for the benefit of all, but making known its expectations for improved customer service and market development.

One way of addressing sales staff concerns is a proactive management approach in co-developing (with sales) an EDI-related sales policy covering compensation issues and management expectations for additional personal customer service.

- The EDI system should be implemented in such a way as to route a copy (electronic or hard copy) of a sales order or order confirmation to the account manager, or to allow access to monthly summary reports by salespeople, product line, and customer.

- EDI does not lead to bypassing salespeople or brokers, or to impeding personal relationships in the sales channel.

- Rather, because less time is spent by sales staff correcting errors and handling routine paperwork, sales calls are more productive and sales staff can work in a close, consultative role with customers on new product development. Further, marketing strategies and customer service programs can be improved.

EDI generally reduces the number of routine phone calls, and the remaining calls become more precise and productive; users have more background information and know how they want to resolve issues.

EDI can also help mitigate the problems of high personnel turnovers in order processing and similar clerical functions. Less experienced operators become more efficient due to the intelligence of the EDI system and can better represent their company.

c. Attitude and "Turf" Factors

IS managers are overcoming their "protective" postures regarding the facilities in their charge. There is growing recognition that IS serves the company and is not an entity unto itself.

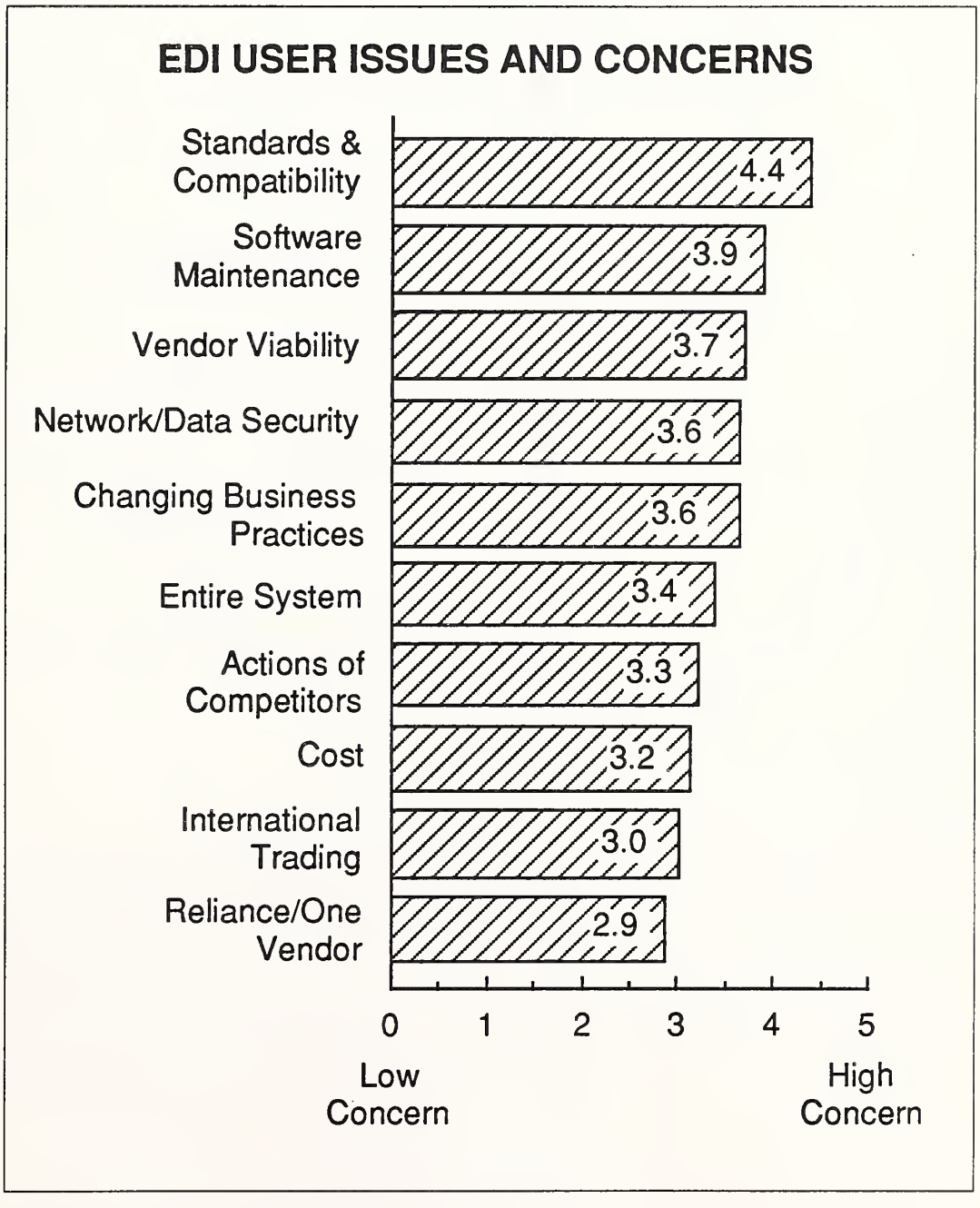
Since EDI replaces current methods, functional managers have often developed protective attitudes toward their units and are sometimes resistant to change.

These problems point to the need for EDI to become a corporate-wide project.

- Not only does EDI benefit individual departments, it benefits the entire corporation.
- However, top-down mandates for EDI need to be approached cautiously. Without functional and IS managers involved in the decision-planning process, resistance can result.
- INPUT recommends a task force approach in implementing EDI.

Users' ratings of EDI concerns are shown in Exhibit IV-6.

EXHIBIT IV-6

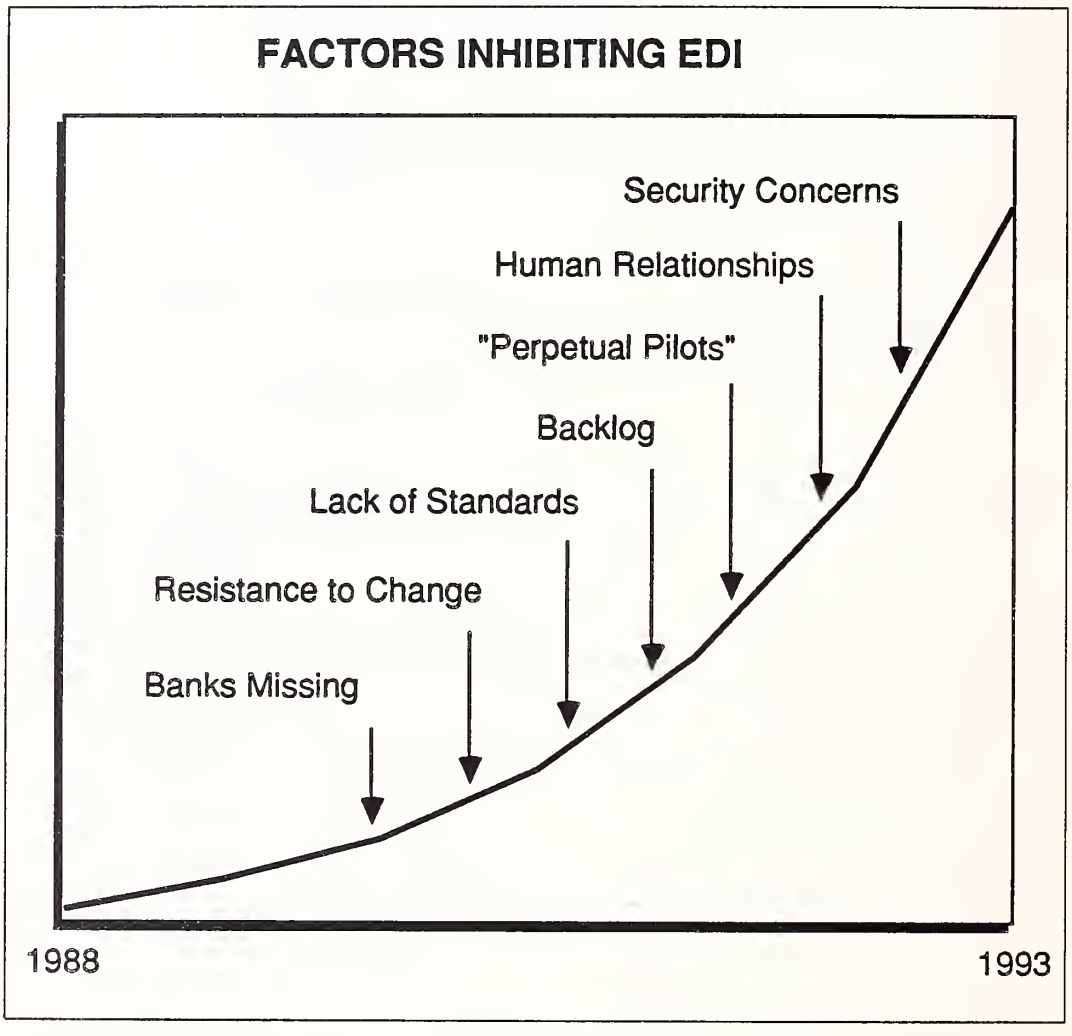


B

Inhibiting Forces

It is necessary to acknowledge and address factors that will inhibit EDI's development. See Exhibit IV-7. Most of these inhibiting factors are self-descriptive, but some discussion will help clarify users' concerns.

EXHIBIT IV-7



1. Resistance to Change

Without management directives to implement EDI, many corporate end-user departments are static, handling business as they always have. The press of daily activities and "turf" factors often prevent advanced planning and inhibit planning across department lines.

Since EDI can reduce headcounts, management should be aware of labor-relations issues and should use attrition and reassignment to adjust department loading.

2. Perpetual Pilots

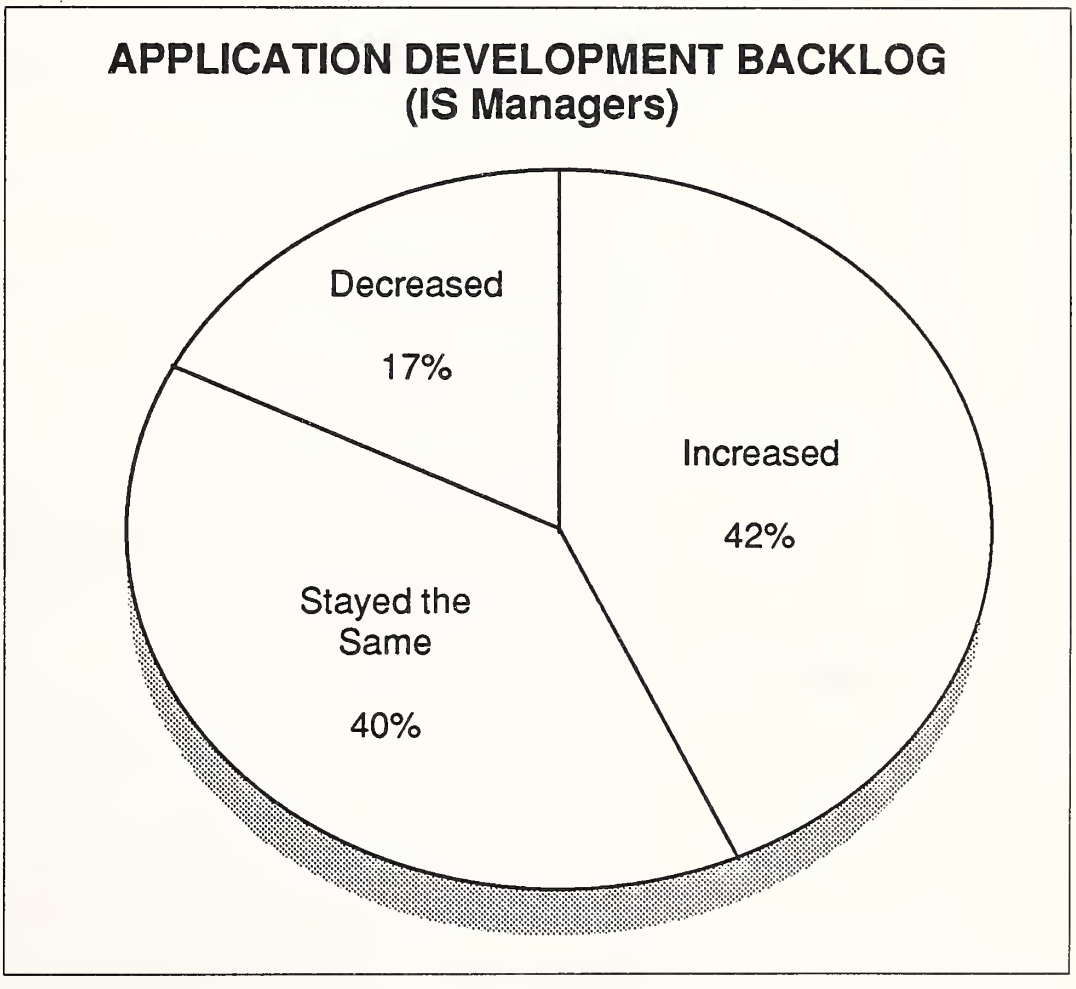
IS departments have often launched EDI pilots to gain experience with the technique. However, end-user departments may not be aware of the

available opportunity due to poor internal marketing, and may be unwilling to participate without a corporate commitment and department involvement in system development.

3. Backlogs

INPUT's surveys have found that for 42% of the users questioned, the applications backlog has increased, as shown in Exhibit IV-8.

EXHIBIT IV-8



An applications backlog may prevent IS departments from implementing EDI without an additional resource allocation and a priority impetus from corporate management.

As the scope of EDI implementation, with the implied integration requirements, becomes clearer, IS will find it is not dealing with just one new application. Entire systems may need adjusting to respond to the change.

4. Perceived Lack of Standards

Although there are an ample number of transaction sets covered by EDI standards, including those developed to conform to industry-specific needs, many users perceive standards as unsettled. This is illustrated in

the survey findings that place standards and compatibility at the top of the concerns list.

For companies believing that standards are deficient, an appropriate response is to become involved in developing the standards for unique industry, or corporate, requirements, and to develop an understanding of the standards and their relationships.

5. Security Concerns

Although vendors work to ensure data security, many companies are reluctant to allow links to their production mainframes for fear of security breaches.

Some companies are concerned about internal authorizations and duplicate paper and electronic transactions.

Encryption and authentication techniques are available if desired for users requiring secure transactions.

6. Banking Services Missing

As a group, banks have been hesitant about becoming EDI service providers. First, there are questions about their appropriate role: should they be service providers in their own right, or should they be working with other providers to complete the cycle in a buy/sell transaction with an electronic funds transfer (EFT) accompanied by EDI information about the payment?

Secondly, banks have been concerned about the ability of their existing EFT networks to carry the volumes of data traffic possible with EDI.

With the exception of the institutions involved in General Motors' electronic payments program, banks are largely waiting for other banks to get involved in EDI. If banks are to provide EDI payment services, they must develop electronic relationships with other institutions ready, willing, and able to accept EDI/EFT transactions.

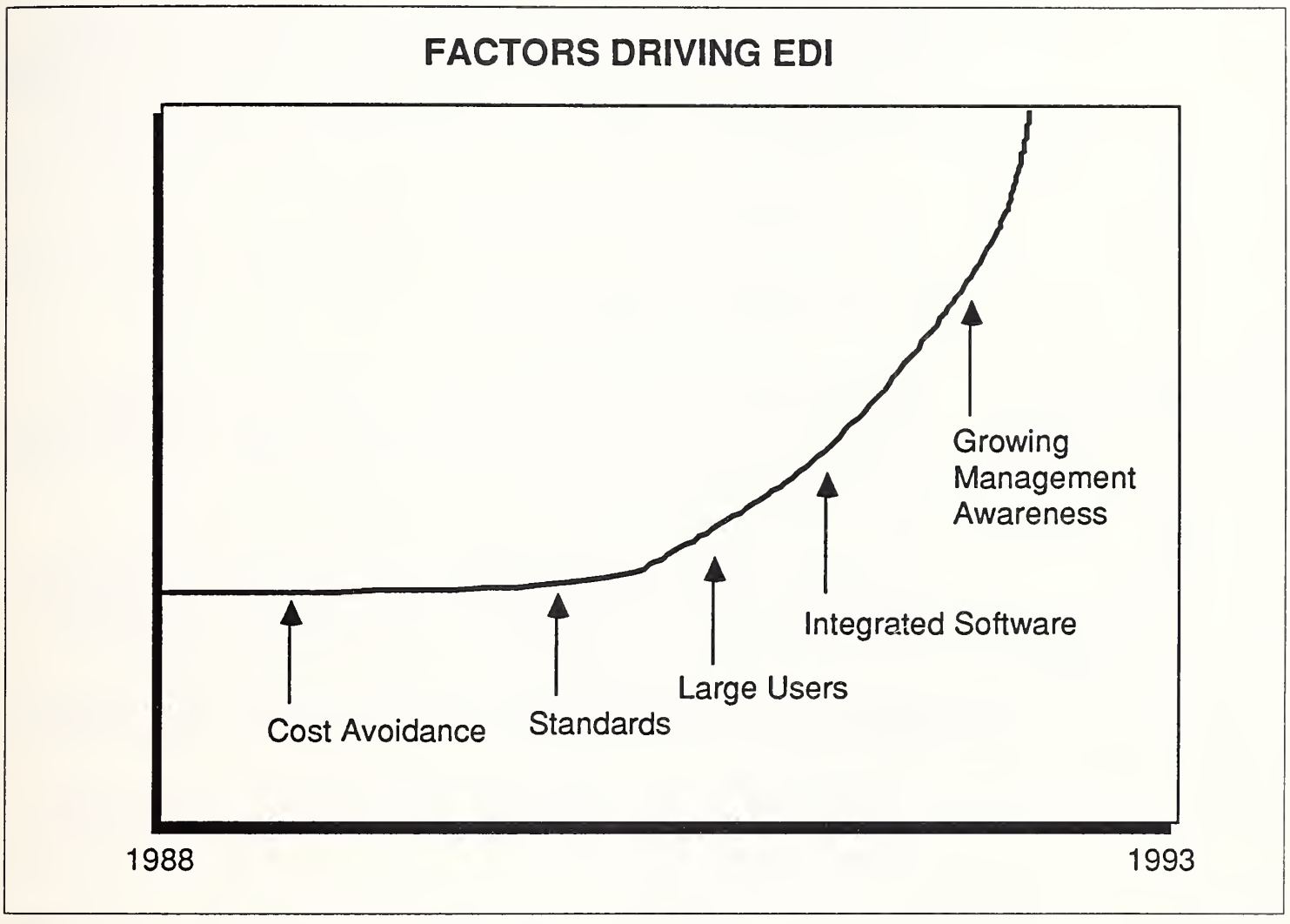
INPUT believes that the uncertainty of the banking industry regarding its appropriate role in the EDI market is inhibiting users from optimizing, and in some cases adopting, the technique. There will be greater recognition of EDI's benefits when a purchasing transaction can be culminated in an electronic payment, meaning the banks need to participate and help develop EDI services.

C

Driving Forces

INPUT believes market activators will overcome existing inhibitors. There is clearly a convergence of technological and business factors that are driving EDI usage, as shown in Exhibit IV-9.

EXHIBIT IV-9



1. Cost Avoidance

Many companies have looked to EDI as a means of reducing expenses. This is especially critical in manufacturing industries such as automobile, heavy equipment, and apparel, where offshore suppliers have put severe price pressures on "made in U.S.A." products. However, cost avoidance is usually not the sole reason for adopting EDI. Corporations are increasingly pursuing EDI for strategic or competitive reasons.

2. Large Users

Companies dominating their industries have forced dependent suppliers to use EDI as a condition for doing business. Others have offered discount prices as an incentive to use electronic channels for trading. Regardless, the result is what has been termed "a domino effect" that affects an entire distribution and manufacturing chain.

3. Integrated Software

Although few packages are currently available "off the shelf," major software providers are starting to provide EDI modules to manufacturing, inventory management, and financial applications to expand the utility of their products, improve add-on sales, and satisfy customer demands.

An integrated EDI solution can generally be installed more easily than one requiring data mapping and customization.

Of the "major" software companies, MSA, McCormick & Dodge, Pansophic, and ASK have embraced EDI.

D

Who Implements EDI?

EDI managers interviewed by INPUT report that in most instances (90%), the IS department was solely or partially responsible for the EDI implementation. Since EDI is an application of computing and communications, this is to be expected.

However, IS did not necessarily go it alone. Eighteen percent of the respondents reported that IS and a functional department managed EDI implementation jointly. The other partner was sometimes marketing, material planning, purchasing, or a combination of departments.

In 10% of the cases, the functional department managed EDI implementation alone.

These findings, shown in Exhibit IV-10, are expected to shift toward more joint implementation, with IS and functional departments sharing development responsibilities.

Several third-party services provide professional services in training and education, software customization, systems integration, and project management to assist users developing EDI systems. Since it has been in their interest to encourage usage to seed market development, these services have, in the past, been provided at no charge—but no longer. Vendors are beginning to charge for such services.

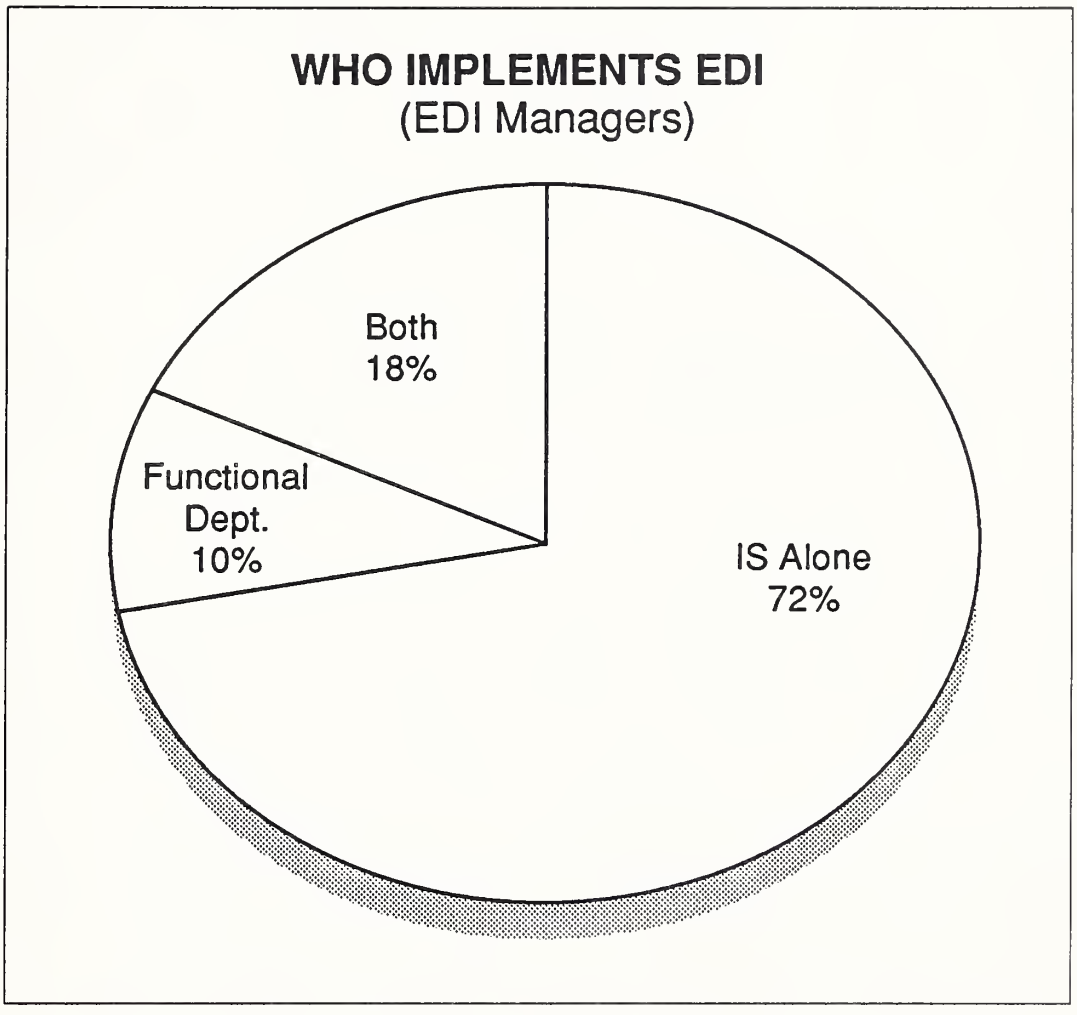
E

How Is EDI Internally Sold?

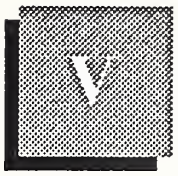
Many companies have developed sophisticated internal marketing programs to encourage EDI usage within a company, and within the trading cluster. Often, a full-time EDI coordinator/marketeer is assigned this responsibility. Marketing brochures, videotapes, and trading partner conferences are produced to encourage usage.

The next chapter examines EDI Service Providers' internal issues relative to approaching and addressing the market.

EXHIBIT IV-10



Service Provider Issues



Service Provider Issues

Vendors of EDI services have several internal and market-oriented issues that need to be addressed, regardless of whether they are new entrants or have been in the EDI business for some time. Late joiners have some special issues that are also discussed in this chapter.

A Churn

Churn refers to users' changes from one network service to another for a variety of reasons.

In earlier surveys, INPUT found that Value Added Network users were price sensitive, viewing VANs as commodity services and exhibiting low levels of "brand loyalty" to a specific VAN. However, the current research suggests that in general, EDI users are largely satisfied with their networks.

- The average rating given by those rating the likelihood they would change their choice of network services was 1.9 on a scale with "5" being highly likely.
- The majority of responses were a 1 rating.
- Reasons given for this low rating include the fact that the respondent was now using multiple networks and may add but not change networks. Others said they might change if their customers required it.

Complaints about EDI network services generally revolved around pricing, with some discontent over customer service voiced by several respondents.

Given the embryonic state of EDI, INPUT feels that high-volume users may start considering lower-priced services. Additionally, those using direct EDI linkages may view low-priced services from new entrants as an alternative to existing third parties.

B

Customer Satisfaction—Customer Service Is Key

Exhibit V-1 shows users' average satisfaction ratings regarding their current EDI network service providers.

EXHIBIT V-1

USER RATINGS OF THIRD-PARTY NETWORKS
Averages—All Networks

It is not the purpose of this study to rate individual network services. However, one pattern does emerge: Customer service is a critical area, and several respondents voiced dissatisfaction with their networks on this issue.

For example:

- "It's hard to get a good response from the networks to any problems. The service stinks. We never get our questions answered or our billing problems solved."
- "We have trouble finding out how to do things from them. We get very little support."
- "For new users, the documentation is 'cloudy'. There's not enough instruction for users to help them get up the learning curve."
- "Their customer support staff should be increased."

GE Information Services (GEIS), though not alone in bearing the brunt of users' customer service complaints, did receive a substantial number of negative comments.

- The company has the largest number of users and has grown the fastest. This has led to difficulties in keeping up with users' expectations.

- GEIS has sold EDI in a "hub and spoke" approach, with the large hub company encouraging its suppliers to participate. The "spoke" suppliers may be less-than-willing participants and may be less familiar with computerized techniques, leading to increasing needs for support.

- GEIS officials say they are working to improve their customer service while noting that bringing EDI into a company's computer systems highlights existing problems that users may not have anticipated.

C

Interconnection Is Needed

A surprising number of interviewed users (30% of those using third-party networks) are accessing their trading partners through more than one network service, or are using a combination of direct interchanges and third-party mailboxing.

This finding suggests that users' needs for interconnected services are high and are not now being adequately addressed.

On average, users rated the importance of internetworking at 4.1, with a "5" rating being highly important. The majority of responses were at the highest rating, with those giving a low rating generally communicating directly with their trading partners or trading within a limited community that uses one network exclusively.

Respondent comments illustrate their perspectives on internetworking:

- "Interconnectivity is important, but I resent being charged double from each vendor. Also, when there are problems, both vendors claim 'he did it, it's all x's fault.'"

- "They'd better interconnect or we won't use them. We go through three networks already."

- "We feel it's important that they all talk to each other. It minimizes the people we have to deal with. Every time I sign up with a trading partner, I have to sign up with their network. I'd prefer to use just one."

- "I can't dictate to my customers what networks they should use. Exclusive networking hinders trading potential. We should be using it as an electronic mailing system; therefore, we should be able to send data to anyone."

- "We're inundated with requests to support other networks. We'd rather interconnect. It's a strategic direction they have to take. Protocol conversions should be their problem, not ours."

From the user's perspective, network interconnection makes eminent sense. Rather than being required to maintain multiple equipment settings for several networks and track which trading partners use which

networks, a user's EDI transactions should be transmittable in one session through one network for distribution to partners regardless of their network of choice.

Although some interconnection capabilities are now available, in most cases additional charges result.

From the vendor's perspective, interconnection is a difficult issue. Although vendors want to serve customer needs, linking to other networks means handing off business and responsibility for the transaction.

In the long term, a solution may be offered by the acceptance and adaptation of the X.400 message-handling standard (MHS), which will facilitate internetwork communications and resolve vendor gateway development issues. Rather than build unique gateways for each network connection, a common X.400-based facility can be used.

Interconnection via X.400 will also lead to improved network management, standardized billing practices, standardized interconnection procedures, and expanded network reach.

Network interconnection will require establishing a clearinghouse, such as used in long-distance telephone services, to manage a settlements process by which networks share revenues for carrying traffic across several networks.

Internetworking capability among private and public networks will also work to increase the total market size by building a critical mass of domestic and international companies that can be reached with EDI. As one respondent said, "To broaden the trading base, we need communications between partners who may not be using the same network."

Interconnection will change the marketing dynamics of the industry, requiring vendors to differentiate through image, position, value-added services, and market specialization rather than network reach.

Also, because of its attributes, the X.400 MHS will make possible compound documents (text, voice, data, image, and ultimately video) for those situations where proven business needs exist for such documents in an EDI application.

EDI and the X.400 standard is the subject of a separate INPUT study.

D

Profitability Has Been Elusive

At the end of 1987, only two of the major EDI service providers were believed profitable: Sterling Software's Ordernet, which has been profitable since inception, and Kleinschmidt Computer.

GEIS is expected to be profitable by the end of 1988.

The other principal networks that have been operating for several years (Control Data, McDonnell Douglas, IBM) are not believed profitable for the following reasons:

- High overhead costs
- Technical research and market development
- User perceptions about provider viability
- Insufficient user base/lack of critical mass

These companies are addressing their difficulties and are expected to enjoy the benefits of an increasingly aware user base. However, internal costs need to be balanced with the often necessary marketing investment, which must be approved by corporate management, who may not be as "sold" on the potential for success as are sales and marketing staffs in the EDI business unit.

For new market entrants, profitability is dependent on managing costs and their ability to transfer messaging clients to EDI, add business from current customers, or sign new customers.

Transferring business from other services may, in some cases, reduce revenues. For example, E-mail used for EDI-like applications is more costly to the user than true EDI, and accordingly, is likely to be more profitable. However, the potential for increased transaction volumes will overcome losses for messaging services and will lead to additional revenues for value-added, premium-priced EDI services.

In general, INPUT believes new market entrants should reach break-even within three to five years from service introduction and should write their business plans accordingly.

E

Maximizing Margins, Minimizing Overhead

Related to the above issue, as more services address the EDI market, price competition increases. Certainly, market participants should have a data communications infrastructure in place to maximize margins. EDI alone will not justify the capital costs of network development, although networking capacity can be leased.

One new vendor is planning a distributed processing EDI approach that places a processor on the customer's location to handle EDI and related tasks. This processor is linked to the vendor's network for monitoring and transmission. Since EDI traffic can be preprocessed and perhaps compressed, the system can be polled or set to transmit in off-peak hours, resulting in lower user costs described as slightly above VAN rates.

Service providers are examining their relationships with software and turnkey vendors that sell EDI services in conjunction with their products. Examples are IBM's Marketing Assistance Program (MAP) and GEIS' EDI Agent program. Although these arrangements have the effect of

increasing market share and expanding market reach, they also require sharing revenues for the term of the contract and therefore may reduce profits.

Sharing sales staff with other divisions of the service provider offers efficiencies and opportunities for cross-selling products and services, but may relegate EDI to a lower priority, depending on the individual sales staffer's perspectives and capabilities.

Maintaining remote sales offices offers the benefits of having sales and support staff close to the customer, but also adds expense.

Attempting to minimize overhead can impact a service provider's "full service" image, as discussed in the next point.

F

Full-Service Positions

1. One-Stop Service

Although large companies may have the staff resources necessary to evaluate, pick, and choose services, software, and equipment best suited for their specific implementation, many companies find one-stop solutions most convenient.

2. Financial Services

The emergence of bank services to handle EFT/EDI is becoming more important. Any vendor positioning to be a full-service provider will need to facilitate these interchanges.

3. Advanced Features

Advanced features may fit a limited number of customers' needs, but will enhance a service provider's image for all customers and differentiate the service. Adding value also provides advantages since private EDI systems generally support only transactions.

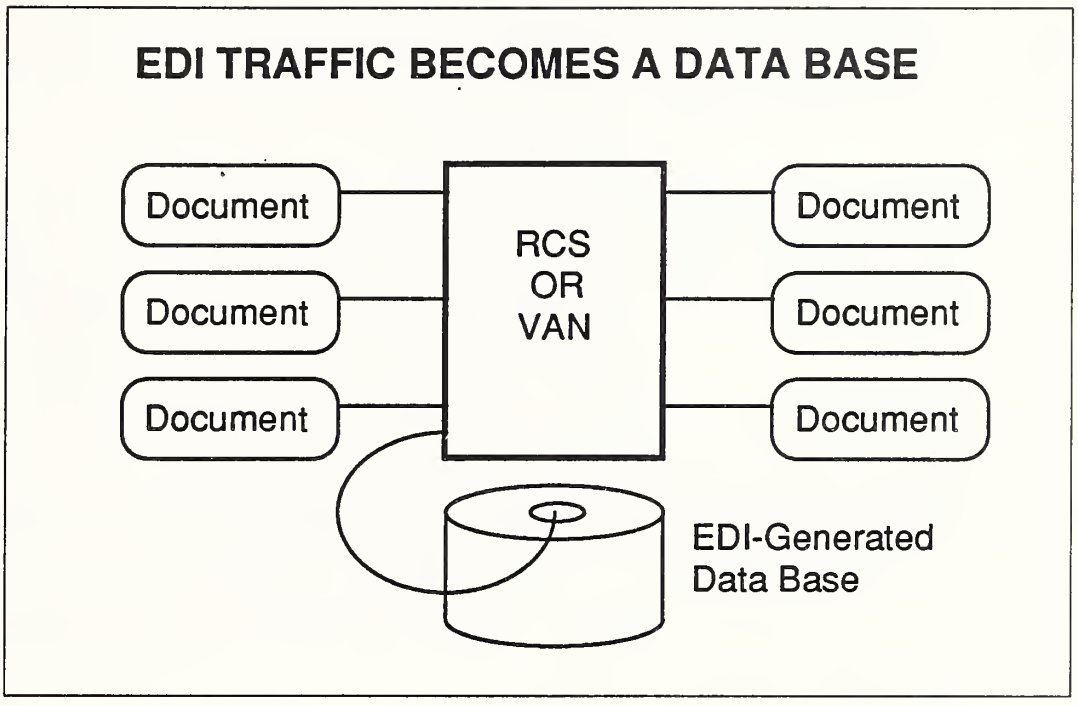
a. Data Bases from EDI Traffic

Sales forecasts and market analysis based on information transmitted through an EDI system is a potential value-added service enhancement. Sterling Software Ordernet's Medimetrick pharmaceutical data base remains the only example of using EDI data to create a data base.

Other service providers have been reluctant to offer such data bases due to customer security concerns. Initiatives in this area will likely come from users' industry groups; however, third parties can, and should, promote the idea.

Exhibit V-2 illustrates how EDI traffic can form a data base.

EXHIBIT V-2



b. Graphics

The merger of images, such as computer-assisted design and manufacturing (CAD/CAM) files, with EDI will support design, specification, and blueprint exchanges between trading partners.

Graphics capabilities in association with EDI will be increasingly relevant in several industries, such as apparel, aerospace, federal government (specifically defense), speciality manufacturing, and electronics.

- GEIS' Design*Express has this capability, using a version of the IGES CAD/CAM standard. The service is being resold by Microdynamics (Dallas, TX), a CAD/CAM company focused on the apparel industry.

- Videolog, Inc. (Norwalk, CT) provides a videotex data base of components to the computer and electronics manufacturing industries, a service used by Schwerber, an electronics distributor. Schwerber, which has recently purchased Videolog, permits on-line ordering through the system. Videolog has been promoting its development experience as an EDI professional service provider.

- CAD CAM, Inc. (Dayton, OH) developed the Wide-Scale Shared Data Operations Management (WSSDOM) system linking manufacturers with suppliers. The system distributes graphics and text data to support purchasing decisions.

  - Suppliers receive bid opportunities through electronic mailboxes.

  - Text and graphics information about the bid may be accessed electronically with zoom and rotate capabilities, or users may print out the information.

- Bids are collected and transmitted to manufacturers in any format needed.

- Negotiations between the manufacturer and winning suppliers follows.

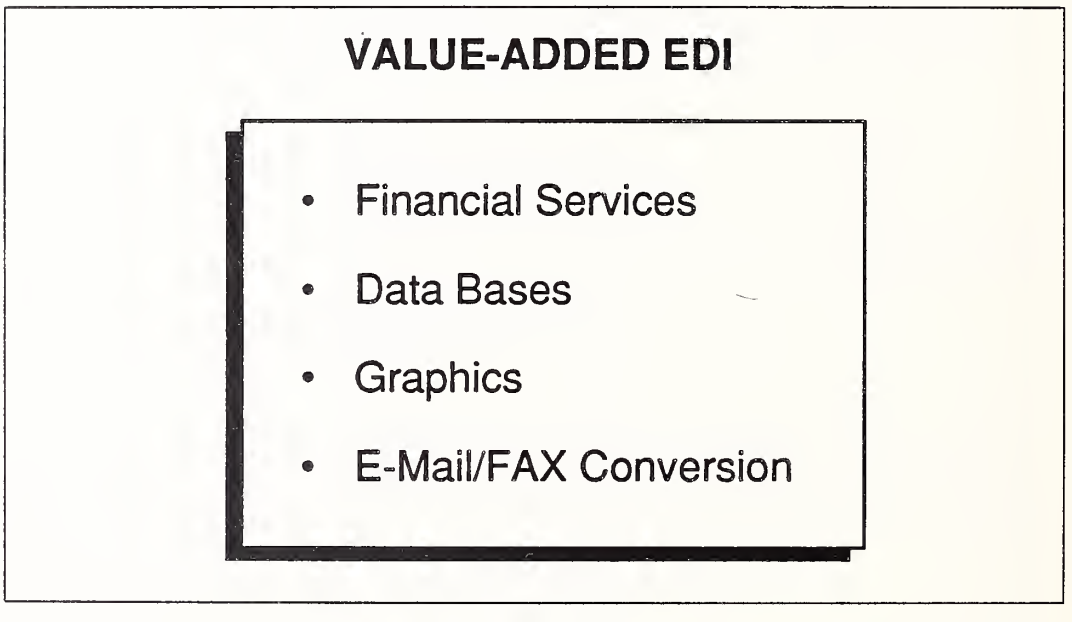
c. Electronic Mail and Facsimile Conversions

The ability to convert EDI traffic to Electronic Mail, hard-copy, or facsimile messages also enhances the "full-service" image by permitting users to communicate with their "not ready for EDI" trading partners without maintaining a dual paper and electronic system.

The value-added enhancements suggested here will provide advantages to third-party EDI service providers over private EDI systems and also will serve to differentiate services.

Exhibit V-3 summarizes these value-added EDI services.

EXHIBIT V-3



4. Interactive EDI Services

EDI is by definition application-to-application processing and therefore batch oriented. However, certain circumstances suggest a need for interactivity between applications.

- In this sense, interactive EDI does not mean a reversion to on-line order entry, but refers to active cooperation between two systems at the time of data interchange.

- The availability of both EDI and terminal-to-host interactive processing through one network service may also be desirable.

Interactive EDI is useful in situations such as querying stock level data bases prior to ordering, gathering multiple quotes for products or services, and in just-in-time environments where shipping errors cannot be tolerated.

The risks of providing interactive EDI as part of a "full-service" offering are confusing users regarding the nature of EDI communications and detracting from the benefits possible from true EDI due to higher costs for interactive service.

5. International Service

INPUT has forecast a substantial annual growth rate for U.S. user expenditures in support of international EDI trading. Multinational corporations will require services that address a number of needs, including the complicated and costly processing of trade documentation.

6. Professional Services

Professional services are needed, not only to introduce EDI to the corporation, but to enhance its interworkings with corporate applications.

As users develop a greater appreciation of the benefits possible with integrated EDI, increased professional service contracts for follow-on work will likely result. This suggests continued account development opportunities for vendors able to address user's needs.

7. On-Network Translation

For the most part, translation between a company's internal formats to a public standard is best accomplished via a modular, add-on EDI software package. This situation will gradually change as new applications with integrated EDI translation, or that create native files in EDI formats, are installed.

However, for translation between public formats (as opposed to between internal and public formats) on an occassional or low-volume basis, on-network translation may be more cost-effective and/or convenient.

- Lesser-used formats would not need to be updated by the user organization; rather, the network would maintain them.

- On-network translation may be less expensive that buying a translator, depending on usage frequency and the number of trading partners requiring such translation.

From the network's viewpoint, supporting on-network translation means being able to install and maintain multiple sets of standards, perform compliance checking to insure adherence to a given standard, and have billing systems able to track translation services. This adds cost but also adds value and an image of "full service."

As the EDI market matures, and as acceptance of centralized standards grows, the need for on-network translation will likely diminish.

G

Sales Staff Compensation

Because the payback from an EDI service sale is based on transactions, it may be a year or more before volume builds to a substantial level.

Accordingly, vendors are increasingly packaging a complete solution, not only to enhance their services in the user's mind, but to give the sales team a substantial and immediate commission and an incentive for continuing interest in the customer as transaction volume increases and enhancements are needed.

H

Market Consolidation

As was the case with long-distance telephone services, several companies are considering or are now involved in reselling EDI services.

For example,

- Telenet resells Ordernet's service under its own label, and Southern New England Telephone was reportedly evaluating this option.
- GEIS' EDI agent plan is in some ways a resale program, with specialized software and turnkey system companies bringing new accounts to the network for a share of the resulting revenues.
- Western Union is expected to apply its electronic messaging agent program to its EDI offerings.

As there has been a history of shake-out and mergers in the long-distance industry, the EDI market may see such events. Canadian Crowntek's sale of its customer list to Ordernet is the first example of this occurring.

As the market advances, and as less successful companies and recent entrants experience difficulties, additional buy-outs are possible.

Further partnering, particularly with independent telephone companies or enhanced service provider agents marketing services through Bell Operating Company (BOC) Local Area Data Transport packet networks, can be expected. Second-tier VANs, and perhaps the international record carriers, may become involved through such agreements.

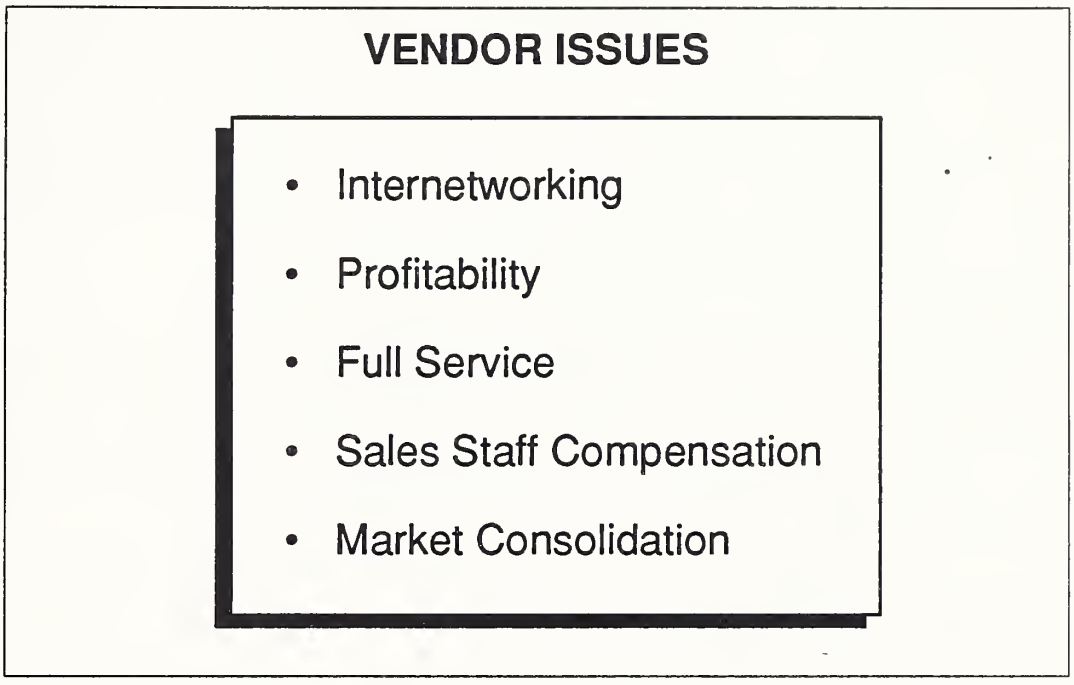
These issues are summarized in Exhibit V-4.

I

Late Joiner Issues

Recent market entrants, such as Western Union, Compuserve, and ADP, are primarily providing EDI services to stem client churn and to target customers within their own specific niches, such as small-medium sized businesses, banks, and/or electronic mail users considering EDI for routine business transactions.

EXHIBIT V-4

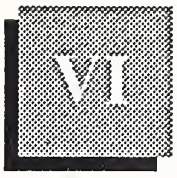


Beyond keeping their current customers, new entrants face competition for new EDI prospects but do benefit from the missionary selling and market awareness campaigns sponsored by existing vendors.

Due to the market lead of existing vendors, new entrants will tend to have a tougher task in selling their EDI services. They must also address interconnection issues: it is unlikely that a prospect's EDI-active traders will be using the new entrant's services. An easy, cost-effective way should be provided to reach all of a prospect's suppliers and customers.

The next chapter presents INPUT's market forecast, recommendations, summary observations, and conclusions about the EDI market.

Forecasts, Observations, Recommendations, and Conclusions



Forecasts, Observations, Recommendations, and Conclusions

A
Market Forecasts

1. Market Growth—Information Service Components

The EDI market can be examined as the sum of its information service components and further broken into the various types of EDI services: "Mainline" (purchasing, logistics, and EDI/EFT), electronic medical claims, and Insurance Interface.

First, a look at the information service components.

a. Network Services

This category, the primary focus of this study, includes access point maintenance, error correction, protocol and speed conversions, switching, internetworking through gateways, outcall services, and store and forward (mailboxing) services.

Processing services provided under the definition "network services" includes data field validation, data format translations, standards conversions, and directing electronic transactions submitted electronically in a batch mode (i.e., messages for many addresses transmitted together) to their individual destinations.

EDI processing services also include management and consolidation reports generated from traffic. These services are provided by value-added networks and remote computing services, although private networks may provide many, if not all, elements.

INPUT is forecasting that the network services portion of the *commercial* EDI market will grow from $63 million in 1987 to $1.7 billion in 1993, for an AAGR of 71%.

b. Software

EDI software translates data between EDI standards and handles communications. When associated communications software is part of an EDI package, it is included in the forecast.

EDI software in the *commercial* market is expected to grow from $10.6 million in 1987 to $105 million in 1993, representing an AAGR of 44%.

It should be noted that the software forecast *excludes* "other" (e.g., EMCS and Insurance Interface) EDI software.

A forthcoming study, *EDI Software Product Markets, 1987-1993*, will analyze this market and update the forecast.

c. Professional Services

Professional services include systems design, software customization, equipment selection and acquisition, systems integration, facilities management, and education and training.

A preliminary forecast is presented here, sizing only EDI-specific professional services; however, INPUT believes that EDI implementations drive additional professional service needs, which will be further described in an upcoming study.

d. Computer Equipment and Peripherals—Not Forecast

Microcomputer workstations for data entry, preprocessing, and translation may be dedicated to EDI, as will modems and other data communications equipment. In the federal market, equipment is budgeted under specific projects, providing easy quantification of hardware used for EDI.

However, with the exception of the federal and systems integration market, INPUT does not track user expenditures for computer equipment. Specifically regarding EDI, INPUT has assumed that computer equipment and peripherals used by commercial companies can not be separately identified as part of the EDI market. EDI functionality often shares such equipment with other applications, making allocations difficult.

It does appear that high-volume users may be dedicating equipment to EDI. Several fault-tolerant, on-line transaction processor minicomputer vendors are positioning products for these environments, and terminal emulation board makers are promoting products for EDI systems.

EDI is being listed on users' requirements lists for new systems. Accordingly, Digital Equipment Corporation, IBM, Prime, Tandem, and other equipment manufacturers are showing signs of EDI-focused marketing activity.

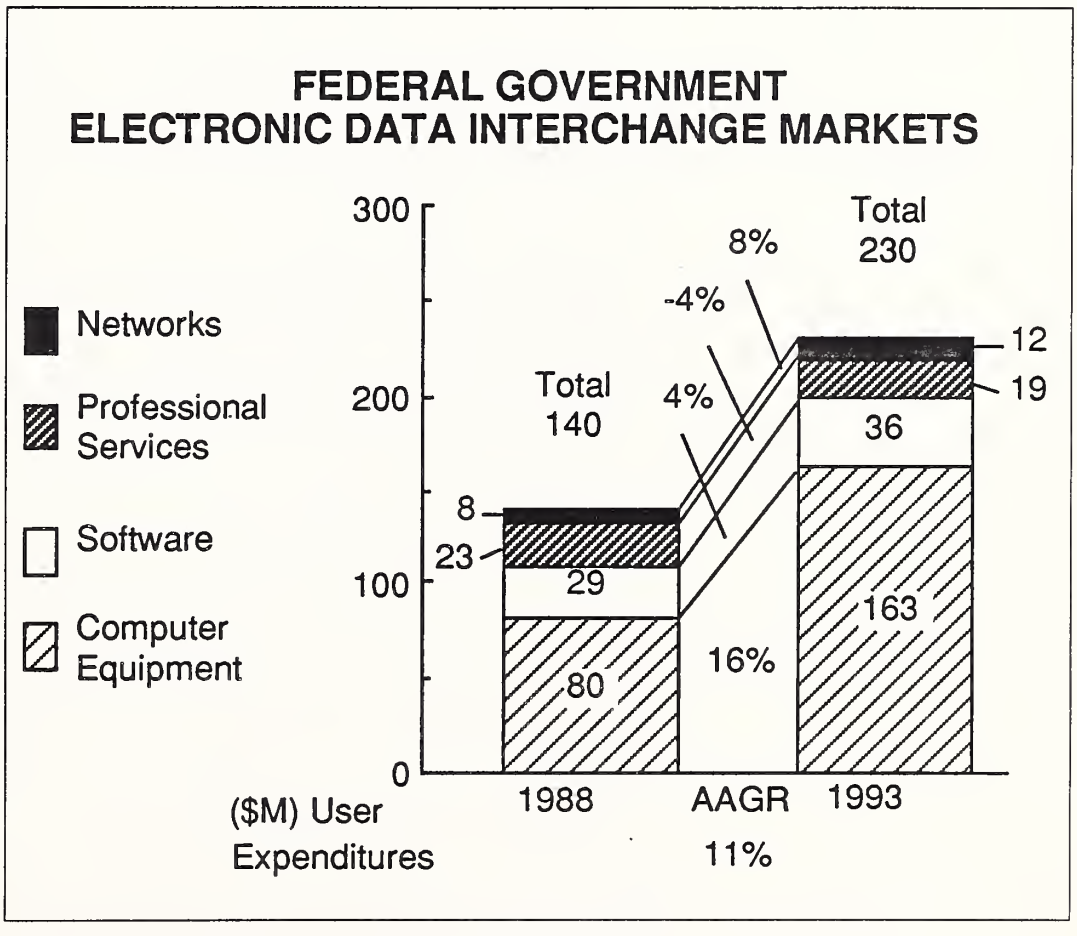
Since INPUT does not forecast commercial market equipment purchases, no sizing is offered. Accordingly, the entire EDI market, including services, software, and equipment, is substantially larger than the aggregated forecast provided below.

2. The Federal EDI Market

The definition of EDI in the federal government is often applied to unique agency needs not found in the commercial marketplace.

INPUT's federal research program has sized the 1987 EDI market at $97 million, growing at 11% AAGR to become a $230 market by 1993. This market includes EDI-related equipment, sized in 1987 at $52 million, growing to $163 million in 1993, for a 16% AAGR, as shown in Exhibit VI-1

EXHIBIT VI-1



3. The Canadian EDI Market

a. Background

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

b. Third-Party Services

The major third parties providing EDI services in Canada are affiliates of U.S. vendors (GEIS, IBM, Sterling Software), US-based Kleinschmidt, and two Canadian firms, Telecom Canada and CNCP Telecommunications.

- Trade Route EDI services have been provided for three years through iNet 2000 network services from Telecom Canada. Trade Route is a domestic service, although Telecom Canada maintains X.400-based gateways to Telenet and AT&T that can support cross-border transmissions. Telecom Canada represents an alliance of virtually all telephone companies, some formed by provincial governments and others by private companies providing regulated monopoly services.

- CNCP Telecommunications, owned by Canada's principal railroads, negotiated an arrangement with EDS-Canada and then announced EDI services for a major Canadian natural resources company. Following its market entry, the company announced cutbacks of 11% of its work force due to telex revenue declines caused by user migration to facsimile. The future of CNCP's nascent EDI service is in question, and the company may be sold to cable television interests.

- Crowntek Communications, which operates the Canadian National Communications Network (CNCN) to deliver services, entered the EDI market in May, 1986 with activities limited to Canada. Due to a management decision to leave the information services arena, Crowntek divested its EDI business, which amounted to approximately 60 network service customers and a professional services/software business.

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

More information about Canadian EDI services can be found in a companion INPUT report profiling North American third-party network providers.

c. Canadian EDI Market Projections

The Canadian economy is anecdotally described as "two years behind and one-tenth the size" of the U.S. economy. In the case of Canadian EDI, this appears true.

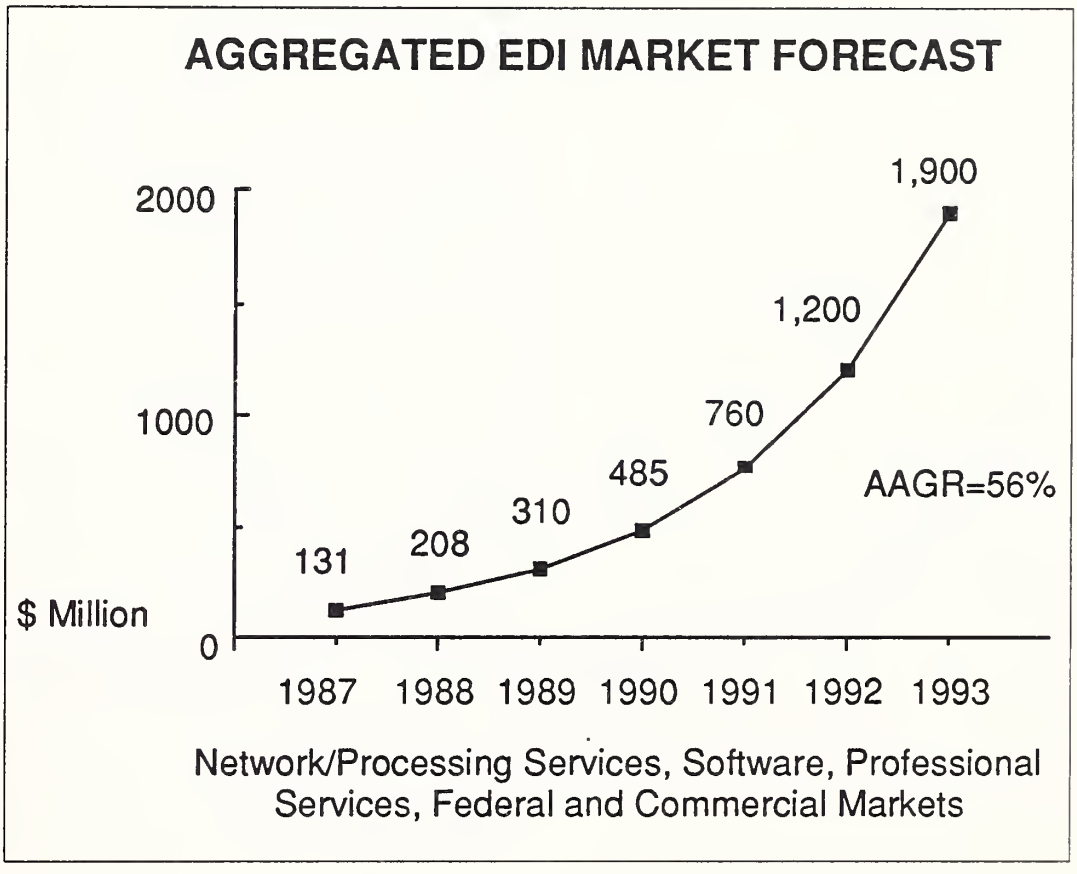
- The Canadian EDI market for network services, software, and professional services has been estimated at $2-3 million (1987).

- INPUT expects the dynamics of the Canadian market to closely follow U.S. market development, particularly as fair trade initiatives phase in. Accordingly, the Canadian market is expected to grow at approximately the same rate as the U.S. market for the forecast period.

4. Aggregated Market—Information Services

Aggregated EDI market growth projections (with the exclusions noted) are shown in Exhibit VI-2 and represent a 56% average annual growth rate (AAGR) through 1993, with EDI services, software, and professional services becoming a nearly $2 billion market by that year.

EXHIBIT VI-2



A breakout of 1987 commercial EDI market components is shown in Exhibit VI-3, and Exhibit VI-4 shows this breakout for 1993. This breakout for the federal market is shown in Exhibit IV-1.

Industry segment market forecasts will be found in the forthcoming study *EDI Vertical Market Potentials and Directions.*

5. Market Growth—Varieties of EDI Network Services

a. Mainline (Purchasing-Oriented) EFT/EDI and Logistics

i. Overview

On average, current users of purchasing-oriented EDI project high growth rates for usage, increasing their number of electronic trading partners and adding transaction types.

Closely aligned with purchasing EDI are EFT/EDI transactions such as remittance advices issued by trading partners' banks. INPUT believes

EXHIBIT VI-3

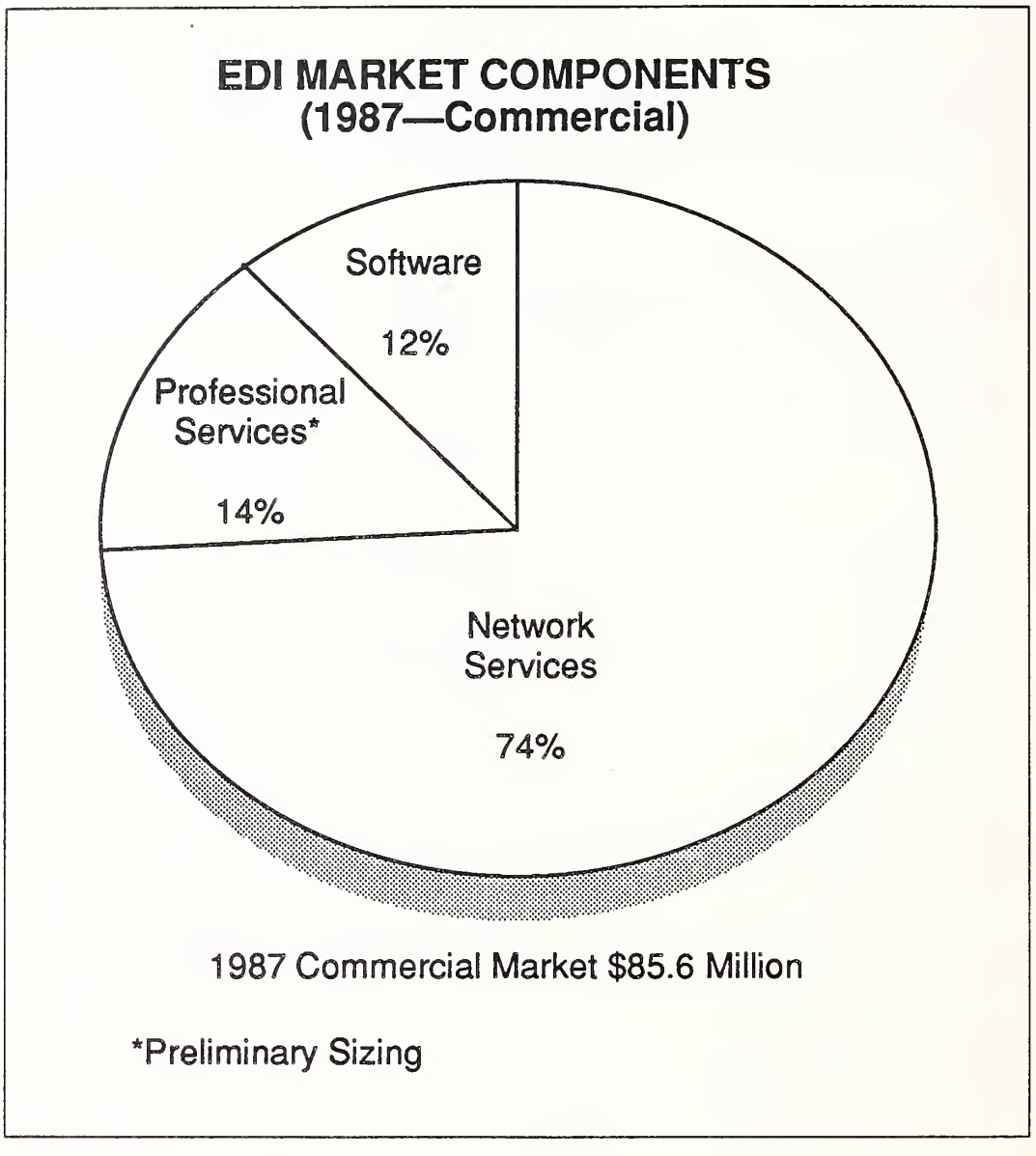
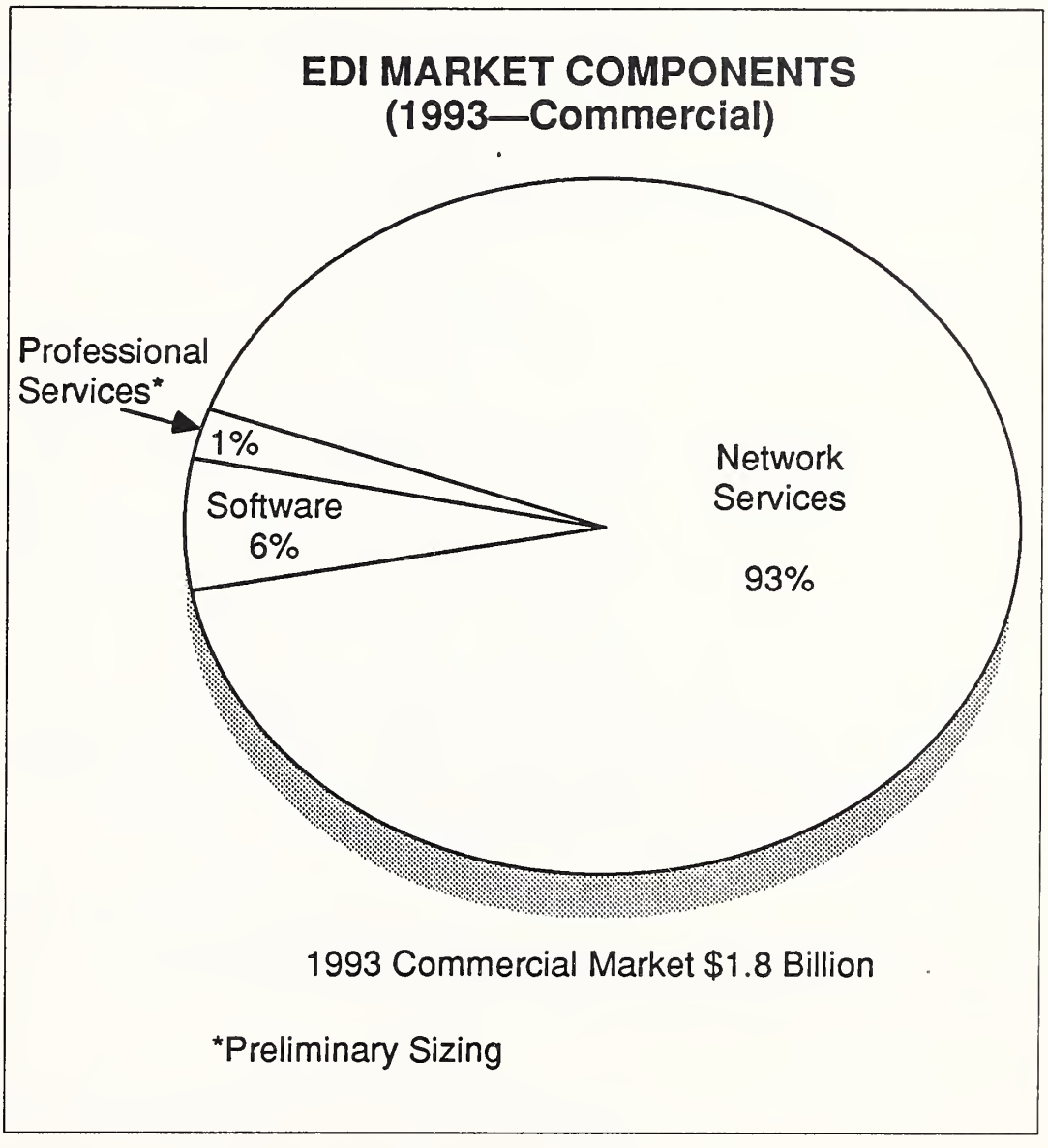


EXHIBIT VI-4



these related transactions will see significant growth over the next five years since these services are now largely missing.

Also, mainline EDI will replace more traditional methods of intercompany communications. Accordingly, INPUT is forecasting substantial growth (as much as 78% on an average annual basis for purchasing EDI, and 121% AAGR for EFT/EDI) for the forecast period. However, the logistics data interchange components are worth examining separately.

ii. Logistics Data Interchange

- Rail LDI

INPUT believes that railroad LDI, primarily covering Car Location Messages, has little growth potential. However, railroad LDI is important as part of a full spectrum of EDI messaging.

Rail LDI services track railcars which may be owned or leased by shippers, rather than tracking the contents within the equipment.

There are three companies now providing these services, each attempting to gain market share by churning customers of the others. Nevertheless, this information is important to shippers. If a railcar of critical materials is hitched to the wrong train, the resulting errors can be extremely harmful to a manufacturing operation.

- Trucking LDI

INPUT believes that in the trucking area, Shipment Status Messages and Shippers Assistance Messages have more growth potential than rail LDI, since there are more motor than rail carriers, and since motor carrier services are generally more closely aligned with implementing just-in-time inventory practices. In contrast, rail services can be generally viewed as commodity/bulk carriers that provide a more or less continuous flow of production materials.

However, growth of LDI within the motor carrier industry may be impeded by a number of factors: the industry's economic distress, and the fact that most truck shipments are under 500 miles, meaning that delays in shipment would tend to be minimum and that tracking information is of moderate value.

Nevertheless, the stronger carriers, such as Ryder Systems, are starting to implement advanced location techniques based on technologies such as GeoPositioning Satellite, or GPS.

- Air Freight LDI

Needs for air freight logistics data interchange are less critical than land-based LDI because of the rapid delivery air transportation services provide. They are much quicker, arguably less prone to error, and therefore shipment status is often less relevant to production control.

LDI services in this segment are provided as a customer service by the carriers themselves, largely obviating needs and opportunities for third-party services.

- Ocean/Port EDI Service Centers

Automated port systems are being developed with links to shippers, brokers, government agencies, and services for passing international trade documentation and service orders. Ocean carriers, like air carriers, are providing LDI services as a customer service.

- LDI Summary

Third-party service providers can obviate the need for customers to collect logistics information from multiple carriers by serving as clearinghouses for this information.

In both rail and trucking logistics data interchange, the linkages used for disseminating this information facilitate growth in other forms of EDI, such as invoices and freight payments.

Multimodal transportation requires a synergistic approach, and opportunities may be found in managing the complex handoffs of shipments between various types of carriers.

Obviously, these services can be (and are) provided by the multimodal carriers, but where various carriers are involved, a clearinghouse approach may meet shippers needs.

Aggregating LDI applications, INPUT believes this variety of EDI will grow at an average annual growth rate of 12% throughout the forecast period.

b. Electronic Medical Claims Submissions (EMCS)

INPUT believes there is significant potential for EMCS services:

- Increases in health insurance and health-care spending as a whole are causing concerns from government and consumer agencies as well as from businesses paying for employee coverage. In 1987, per-employee health insurance costs rose approximately 8% to nearly $2,000 annually. EMCS can help reduce health-care insurance administration costs.

- An estimated 3 billion paper medical claims are issued each year, involving hundreds of thousands of medical practitioners, pharmacies, hospitals, and nursing homes. This represents the potential market for EMCS.

- Medical practice and hospital turnkey management systems, as well as remote computing service vendors are providing software and RCS services that automate linkages for EMCS.

However, there are some problems in EMCS acceptance due to varied electronic formats used by state and company medical insurance programs, and questions on the role of Third Party Administrators (TPAs) that provide services to health-insurance companies.

- TPAs are generally smaller companies that often do not have the resources needed to implement EMCS.

- Further, TPAs may view EMCS as bypassing their own functions.

Although there are impediments to EMCS growth (further discussed in an upcoming study, *EDI Vertical Market Potentials)*, INPUT believes that these impediments are addressable and that there are compelling reasons why EMCS will continue to grow. Accordingly, an AAGR of 36% is forecast for this variety of EDI for network services only. Software and professional services in support of EMCS will be evaluated by INPUT at a future time.

c. Insurance Interface

As with EMCS and EDI in general, there have been problems in acceptance of Insurance Interface. These problems include:

- Independent agents are likely to operate with manual (i.e., noncomputer) processes.
- Procedures and electronic formats in the industry are not standardized.

However, these issues are being addressed by industry associations, and there is evidence of a ground swell of organized support for a standardized approach to batched Insurance Interface, also discussed more fully in a companion INPUT report.

INPUT believes network services in support of Interface will exhibit a moderate growth potential throughout the forecast period.

Among contributors to this growth are the financial health of the industry and the proven viability of the Insurance Value-Added Network Service (IVANS), which has shown that, although a nonprofit organization, it can be operated "profitably."

The growth paths of these varieties of EDI (for network services only) are shown in Exhibit VI-5.

INPUT is planning a more focused look at these "other" forms of EDI in the 1989 EDI research program.

B

Forecast Factors

Growth in the EDI market will come as more companies adopt EDI, as current users add electronic trading partners, and as they start using additional transactions in their EDI functions. Several usage dynamics support INPUT's overall market forecasts.

1. The Cascade and Domino Effects—Impacts on Volume

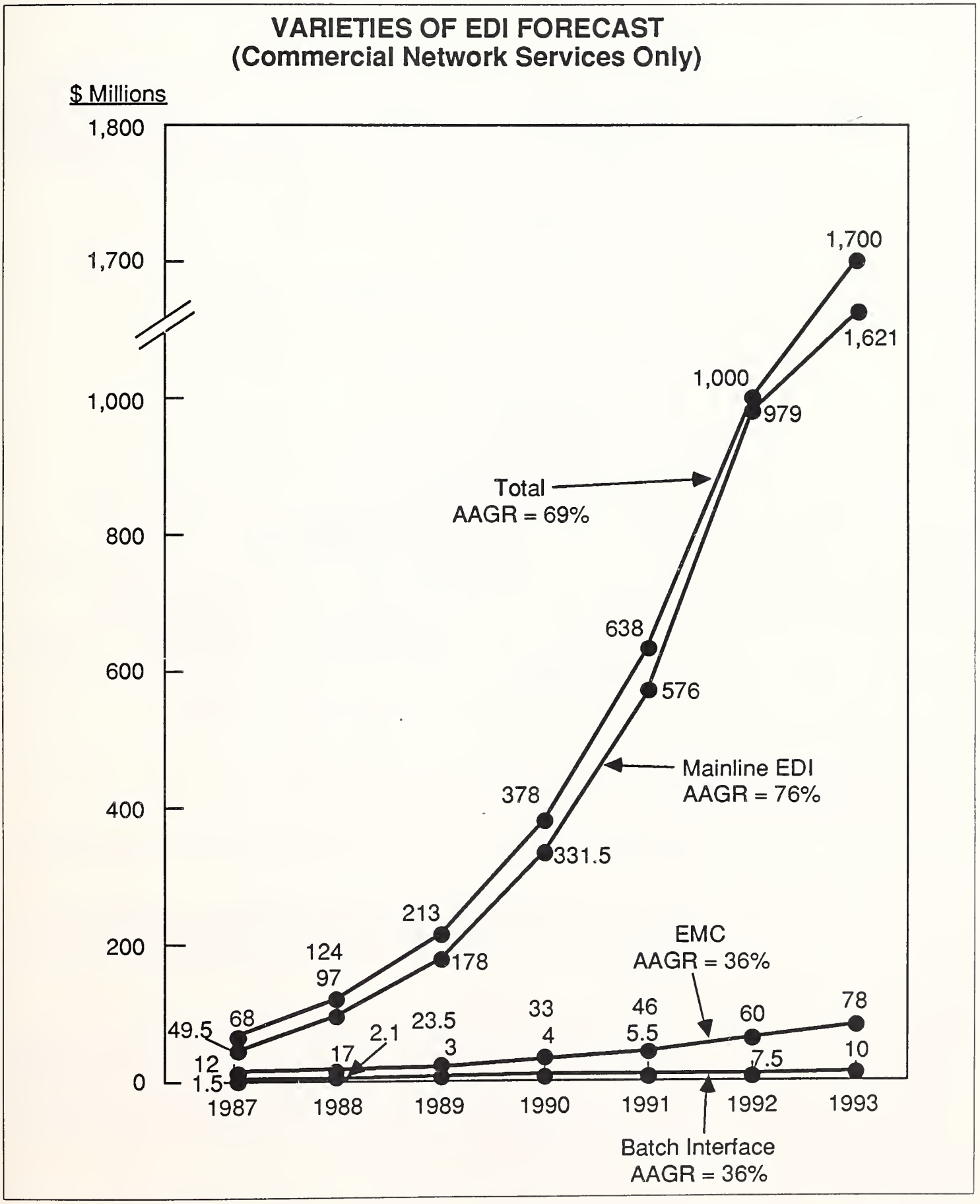
It is estimated that 25 billion business documents are sent through the U.S. mails annually. This represents the potential number of EDI transactions.

Network planners should be aware of a possible "cascade effect" leading to exponential EDI transaction growth within a relatively short period of time.

Currently, EDI system users are using a few transaction sets. When extended, each exchange could require as many as 12, and potentially more, electronic transactions:

- A request for information requires a response.
- A request for a bid leads to a bid, an acknowledgement of the bid, and an award.

EXHIBIT VI-5



- A purchase order leads to a confirmation, which leads to a shipping notice and an invoice.

...and so on.

The cascade effect may be more pronounced in smaller organizations where there is a close bridge between applications. In larger companies, with more diversity and less linkage between departments (and applications), the effect may be delayed since one department may implement EDI, while others do not immediately do so.

Exhibit VI-6 illustrates the "cascade effect."

EXHIBIT VI-6

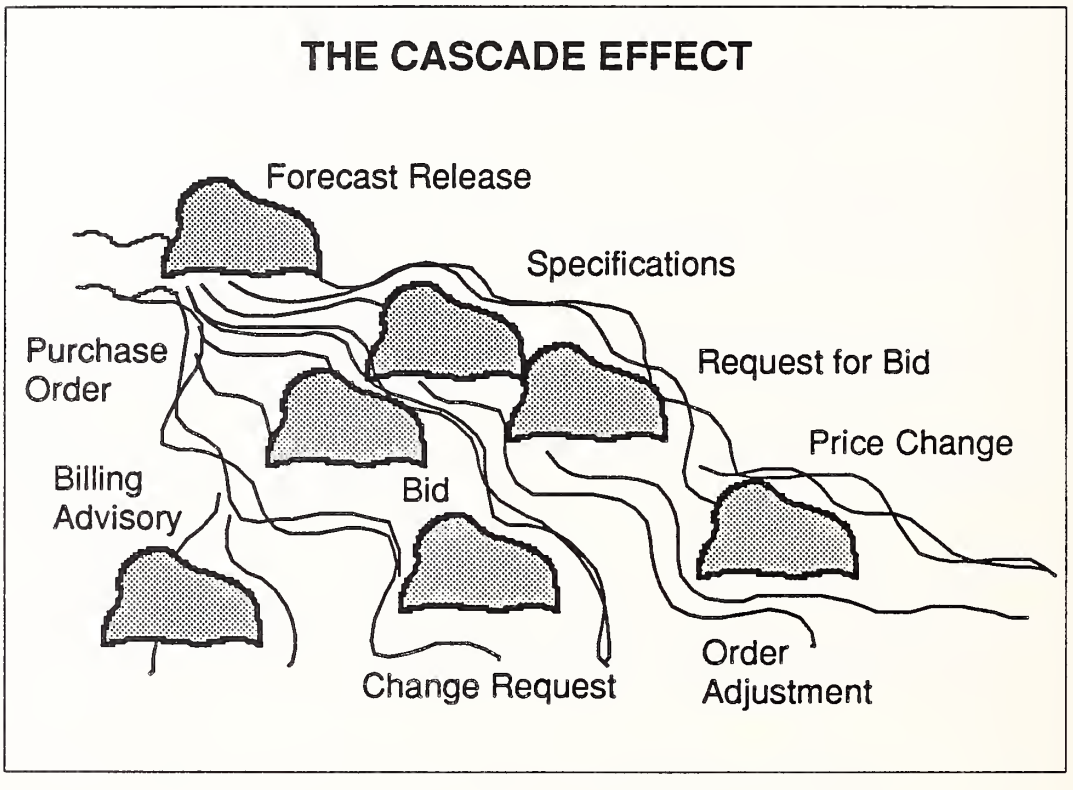
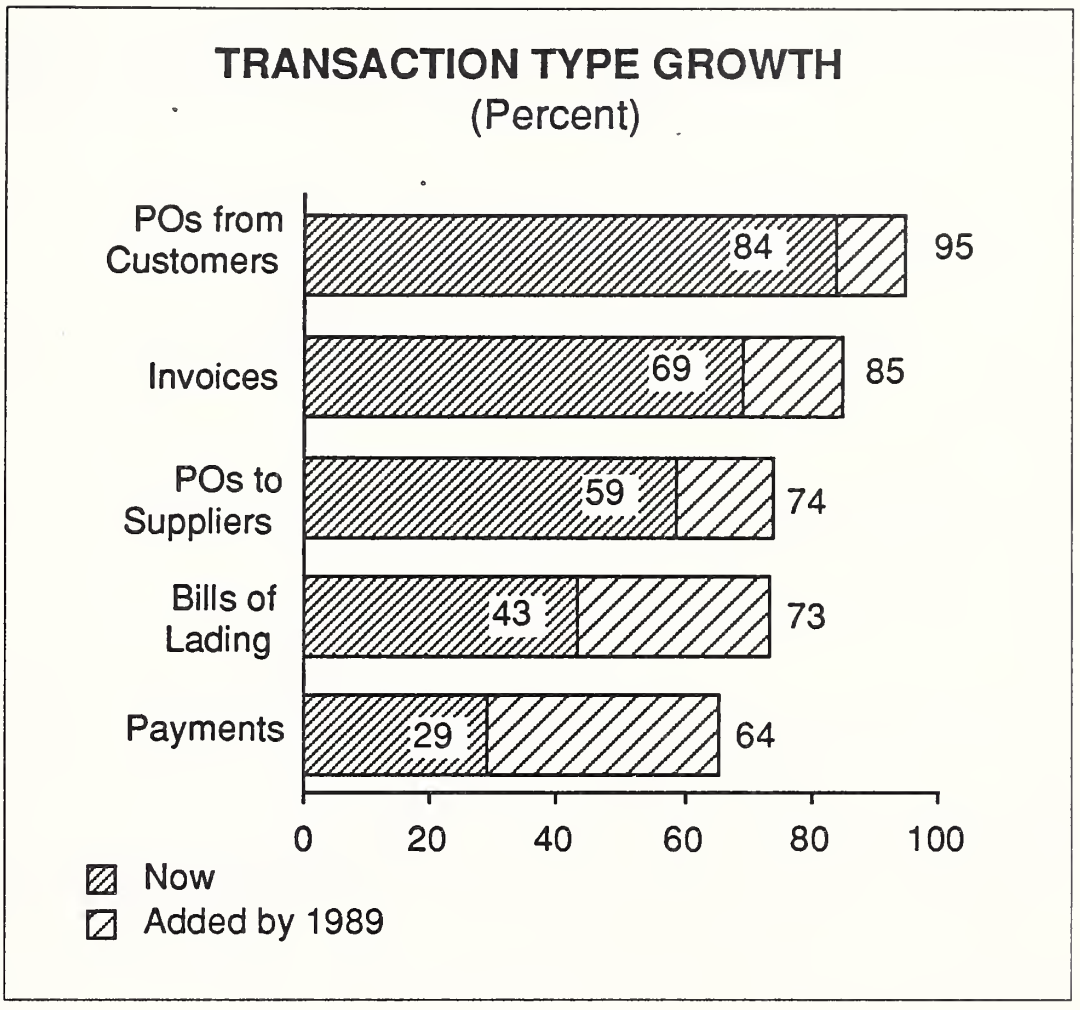


Exhibit VI-7 illustrates the expected growth of transaction types among EDI users.

If the cascade effect occurs, it could lead to network congestion and reduced response times. Accordingly, network planners need to review current capacity and project needs based on the intentions of large network users.

In addition to the cascade effect is the "domino effect." Large users at the center of a trading cluster may coerce their suppliers to adopt EDI as a condition of continued business. These suppliers may also require EDI from companies on the third tier of the distribution chain. This is found most clearly in the auto industry; however, companies in other industries are also mandating EDI.

EXHIBIT VI-7

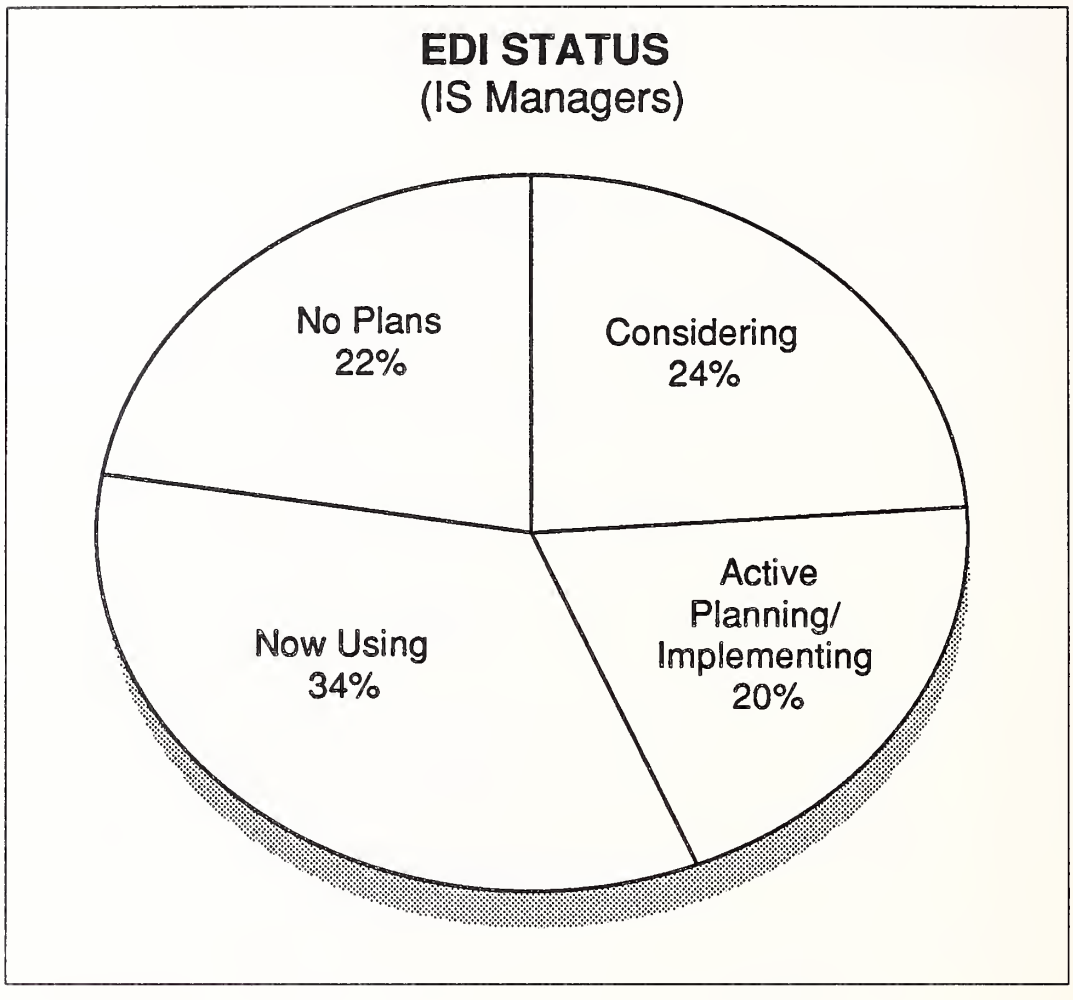


2. EDI Status

Of the nearly 200 IS managers interviewed, approximately one-third (34%) said they are now using some form of EDI. An additional one-fifth (20%) reported active planning and implementation of EDI projects, while nearly one-fourth (24%) said they are considering EDI implementation.

As shown on Exhibit VI-8, 22% of the interview respondents reported no plans to implement EDI.

EXHIBIT VI-8



3. Transaction Growth Rates

EDI users reported EDI transaction growth between 1986 and 1987 of, on average, 181%.

These same users estimate transaction growth of 156% between 1987 and 1988.

These findings are shown in Exhibit VI-9.

EXHIBIT VI-9

TRANSACTION GROWTH
Users' Average Response

1986-1987	1987-1988
181%	156%

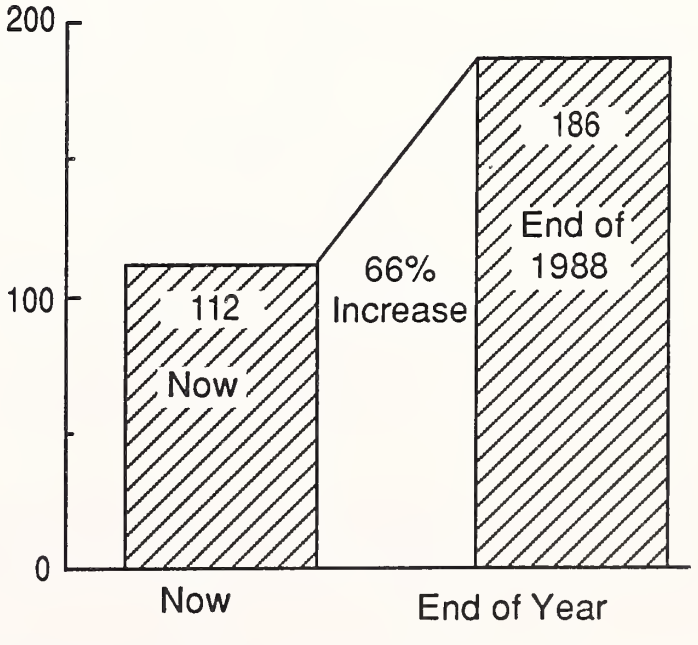
4. Average Trading Partner Additions

Users were asked to provide the number of EDI trading partners they have now, and the number they will be adding this year.

On average, users reported 112 current EDI trading partners and plans to add 74 this coming year, for an increase of 66%, as shown in Exhibit VI-10.

EXHIBIT VI-10

NUMBER OF EDI TRADING PARTNERS



5. EDI-Driven User Expenditures—The "Shadow" Market

Users were asked to provide information on their internal activities and expenses in support of EDI systems, and on their expenditures for "EDI-stimulated" development.

Systems that were impacted by EDI implementation included accounting, order entry, distribution, bar coding, invoicing, and related business systems.

In many cases, EDI-stimulated work surpassed actual EDI project costs. Internal costs, estimated by users in actual expenditures or in man-days of effort, are not directly available as revenue to the marketplace vendors. However, there may be occasions when some of these internal expenditures could be converted by vendors into market-available revenues.

As Exhibit VI-11 shows, users reported an average $44,000 or ten man-months of effort on EDI-stimulated projects, with some reporting up to $250,000 in such activities.

EXHIBIT VI-11

EDI-STIMULATED DEVELOPMENT

Average	Range
$ 44 K	$3,000—$250,000
10 Months	2 Weeks—3 Years

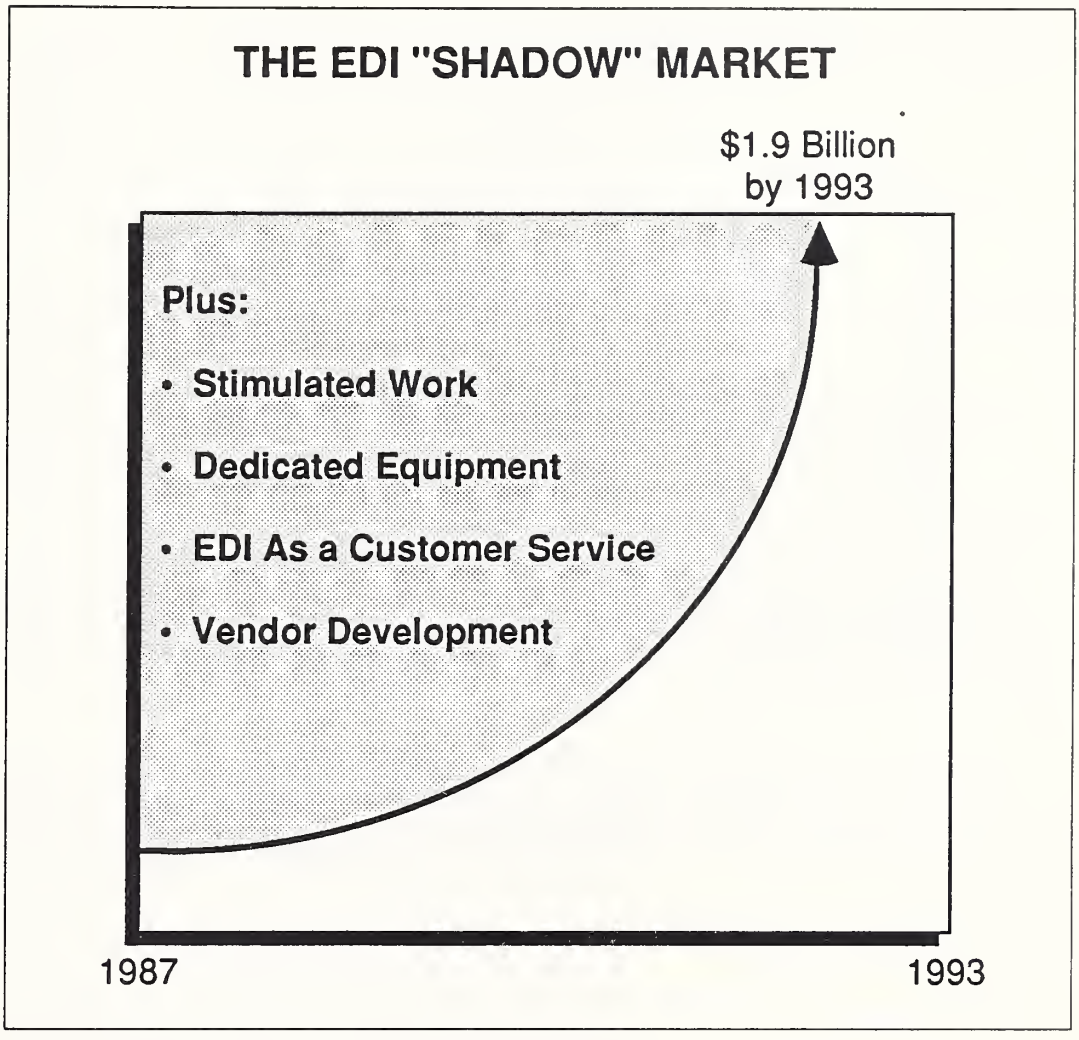
- The professional services component of the market forecast is an estimate of EDI development-related end-user expenditures, but it excludes EDI-stimulated development.

- Also excluded in the market forecast are expenses by EDI service and software providers in developing their offerings and EDI offered as a customer service by firms such as transportation carriers.

Exhibit VI-12 illustrates this "shadow" EDI market and represents internal development costs for both EDI and EDI-stimulated end-user developments, and the other expenditures described.

The relationship between EDI, EDI-stimulated projects, and professional services will be further examined in an upcoming report.

EXHIBIT VI-12



C

Forecast Reconciliation

Exhibit VI-13 shows the differences between the current forecast and INPUT's 1987 EDI forecast.

The current forecast shows a higher present market sizing and maintains a substantial average annual growth rate throughout the forecast period, but at a lower level than previously forecast. There are several reasons for this change:

- The current federal EDI market was previously undersized. However, based on INPUT's analysis of federal agency budget requests, the federal market will exhibit a lower growth rate than the commercial market. This suppresses the overall market's growth pattern.

- A preliminary examination of trends in the electronic medical claims and batch insurance interface varieties of EDI suggest an average annual growth rate of 30-40%. While respectable, this also suppresses the overall market's pattern. Note also that INPUT has not sized EMC or Interface software, nor professional service activities in this area.

EXHIBIT VI-13

EDI FORECAST RECONCILIATION

1987 MARKET			1992 MARKET			1987-1992 AAGR Forecast in 1987 Report	1988-1993 AAGR Forecast in 1988 Report
($ M) 1987 Report	($ M) 1988 Report Sizing of 1987	Variance as Percent of 1987 Forecast	($ B) 1987 Report Forecast	($ B) 1988 Report Forecast	Variance as Percent of 1987 Forecast		
87	131	151	1.9	1.2	-37	88	56

- With respect to EDI professional services, INPUT has included a preliminary market sizing in the current report (which focuses on EDI network services). A future study will provide the opportunity for a fuller examination of EDI professional services.

- Although INPUT believes purchasing and EFT/EDI will show exceptional growth, logistics data interchange services are largely stagnant, and the available market will be retarded by the availability of such service directly from transportation carriers, rather than through third-party services.

D Market Observations

Users are being required to adopt new ways of looking at information flows to recognize the value of information and acknowledge the competitive advantages EDI can provide.

However, private EDI networks may work to retard the market by slowing acceptance of standards, limiting trading relationships, and excluding potential participants.

Direct computer-to-computer EDI between large trading partners is also retarding the market since such implementations handle large volumes of transactions that are not available to the market, except for the intercompany networking provided.

1. VANs Have the Most to Gain

While granting that the distinctions between VANs and RCS firms are not well understood (RCS firms don't own the network), INPUT continues to believe VANs are best positioned to benefit from EDI growth.

- Adding services to the network can replace declining revenue from applications that are being taken in-house by users.
- Additional services do not generally require capital expenditures.
- VAN networks are virtually omnipresent, cost-effective communications links.
- VANs and their processing affiliates serve many of the industries now engaged in EDI.
- VANs generally have mature, widely dispersed marketing organizations.
- VANs can offer international capabilities through their own overseas presence or through arrangements with foreign networks and International Record Carriers (IRCs). As reported in INPUT's *International EDI Services* study, a number of factors will create an average annual growth rate of 147% through 1992 for international EDI from U.S. users to overseas locations.

Categorically, VANs will experience significant EDI growth through 1993. However, late market entrants may find it difficult to create a sufficient customer base to maintain a discrete service, and may opt to hand off their customers to another service.

2. RCS Firms Will Hold Niches

A distinction should be made between VAN and RCS approaches to the EDI market.

VANs have generally pursued a broad market, believing that gathering market share across industry boundaries will ultimately result in wide-scale usage. This strategy can be compared to that of the large telephone interexchange carriers (IXCs) that do not generally target industry segments for their services.

RCS firms, however, have generally focused on a limited number of markets, in part due to their historical development, but also as a result of their marketing limitations. To continue the telephone service analogy, smaller IXCs have targeted geographical areas, or have promoted telephone services to hotel operators for resale to guests.

INPUT believes that RCS firms will continue to hold niche positions in industries currently served, but they may feel pressure from larger competitors, VANs, and private systems.

By aligning with VANs, RCS firms can expand their reach and benefit from a broadly deployed marketing organization, thus leveraging their capabilities in additional industries.

E

Recommendations

1. Take Advantage of Increasing Market Awareness

As shown earlier in Exhibit IV-3, EDI awareness has made a substantial improvement in the past year, fueled by press reports, vendors directing more marketing attention to EDI, industry association informational programs, and other initiatives.

However, improvements can be made through general business press articles and advertising oriented to the EDI solution, particularly by targeting corporate management.

INPUT reiterates its recommendation that industry groups adopt an EDI graphic symbol to identify companies using EDI standards. Such a symbol on letterhead in advertising and marketing literature will enhance corporate imagery and generate EDI awareness.

It is worth noting the continuing role of the British-Department-of-Trade-and-Industry-supported Vanguard program, which promotes value-added data services, including EDI. Information services and users would benefit from a similar approach in the U.S.

This recommendation is shown in Exhibit VI-14.

2. Recommendations to Value-Added Networks

a. Offer EDI and Maintain Current Customers

There is inherently little reason for a VAN not to offer EDI services. The network does need to be certified for EDI messaging, transfers, and mailboxing, and a billing system is needed. In fact, virtually all major national VAN services are now offering EDI.

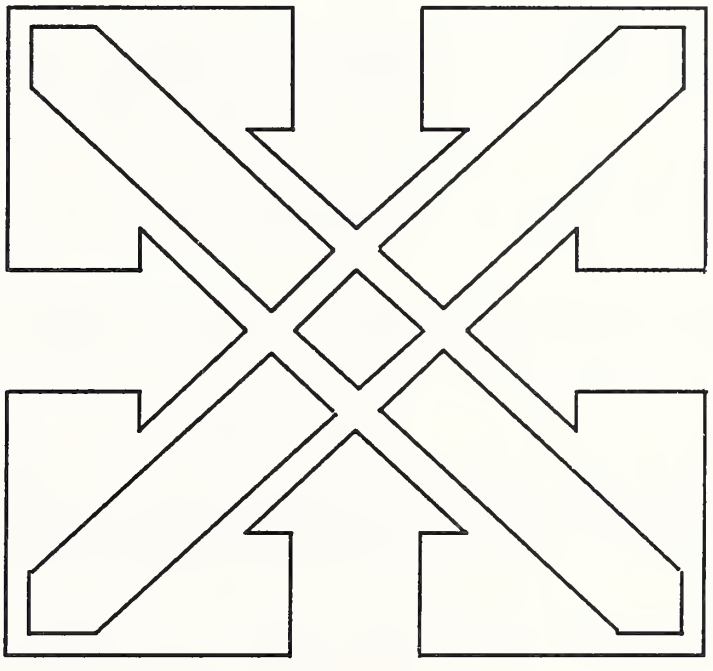
- A vendor failing to provide EDI is missing an opportunity to participate in an area that addresses fundamental business needs.
- EDI will eventually become a utility or commodity service in its own right, and a firm without an offering may lose customers.
- If EDI is currently provided, strategies are needed to maintain the current customer base through training, technical support, newsletters, seminars, and user groups. It may also be desirable to adopt consumer marketing tools—such as bonus plans, premiums, and recognition awards—to encourage volume usage.

b. Target New Markets

Investigate and promote industry association activities, particularly in segments with little or no current EDI activity, and solicit requests for proposals from such associations.

EXHIBIT VI-14

CENTRAL RECOMMENDATION: CREATE AWARENESS



- Promote the EDI Solution
- Adopt an EDI Symbol

There are several successful examples of EDI networks established by associations or by third-party suppliers endorsed by associations.

New systems should be designed with gateways supporting more than industry-specific activities since trading often crosses industry lines and since purchasing activities are similar in many functional areas, regardless of industry.

Hire and train marketing and sales personnel from industries being targeted for EDI services, but exercise caution if EDI services are a new offering. It is difficult enough to develop new services without the burden of learning a new market.

The agent and Marketing Assistant Partner approaches used by GEIS and IBM for EDI services are worth emulating, and resale agreements with existing EDI services can reduce development risks while allowing participation in the market.

- By linking its communications services to the expertise of other qualified processing, messaging, turnkey, or software vendors, a VAN can efficiently expand its market presence.

- Of course, it is important to verify that agent relationships are within the corporate mission and will help meet stated goals.

- Also, such relationships need to be examined to determine their impact on profit margins.

Target marketing efforts to corporate managers responsible for purchasing, manufacturing, and logistics, as well as end-user department managers, IS managers, financial officers, and corporate presidents. This usually means consultative selling to a corporate EDI task force.

c. Migrate E-Mail Users to EDI

Position E-mail and scripted/prompted messaging services for low volume users in an EDI simulation.

- This will help to capture and eventually migrate users to EDI as volume becomes greater.

- System accounting can identify high-volume E-mail users to aid marketing to specific customers requiring an EDI solution.

d. Participate in Standards Migration Plans

Standardize on X12, and participate in planning a migration strategy for any industry-specific or private formats now being used in targeted industries. The service providers maintaining industry-specific formats (e.g., Ordernet's format for drug wholesalers) and the industry associations are moving in this direction.

Plan to participate in X12's migration to the international EDIFACT standard, which will likely become the universal EDI "language."

e. Simplify Pricing

Consider unconventional pricing schemes such as flat rates tied to transaction volume levels instead of measured connect time or character transmissions to differentiate services. Users, particularly smaller ones, are often confused by a complicated pricing formula and may welcome per-transaction pricing without "hidden" connect-time or translation-service fees.

f. Enhance EDI Services

Provide gateways to industry-specific data bases as a value-added service. Examples include market information and tariff/shipping services.

Use EDI network traffic to create commercial or restricted-access data bases, as described earlier.

Evaluate users' needs for graphics/EDI services.

Provide detailed EDI billing, and make available management report summaries and reports by trading partners to enable users to determine their EDI savings and track trading-partner activity levels.

g. Plan International EDI Activities

Value-added networks should enhance their services both domestically and internationally, particularly in countries that are developing EDI services.

- INPUT's report *International EDI Services* describes EDI readiness in many regions of the world and makes specific recommendations to EDI service providers.

- As companies increasingly rely on off-shore sourcing and expand their markets, international electronic business transactions will gain importance.

International trading has some characteristics that make it particularly well suited for EDI: the complexity and cost of international trade documents, the delays caused by document errors, and the development of EDI-related systems and services in international trade.

INPUT's recommendations to VANs are summarized in Exhibit VI-15.

3. Recommendations to Remote Computer Services

a. Focus Your Marketing

Evaluate the need for, and interest in, EDI by the industries now using your services. A strong customer knowledge base can be invaluable and is best acquired by focusing resources on a small number of market segments.

Establish or strengthen local or industry-focused sales and support offices to improve customer response time.

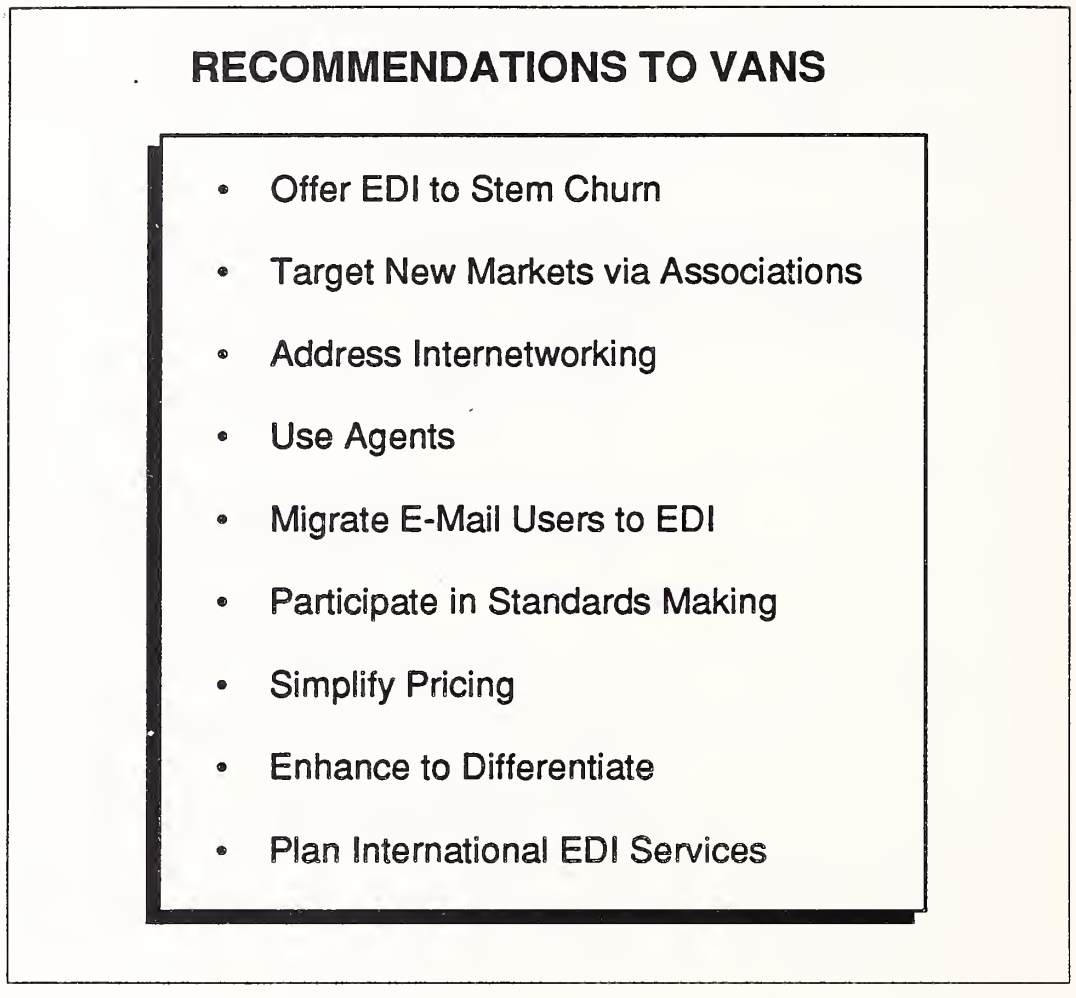
Investigate the feasibility of selling micro-based turnkey systems to support smaller, uncomputerized trading partners in specific industries with needed applications including EDI.

Work to identify industry-specific requirements, and work with large users to address these opportunities. For example, an industry may have unique inventory-handling routines or unusual transactions that are not adequately addressed by the standards.

b. Be Efficient in Service Development

If current resources prohibit cost-effective internal development, license EDI software from others. Opportunities may be lost if in-house development slows entry into a rapidly developing market.

EXHIBIT VI-15



Provide or arrange for customization services to adapt on-line order entry and inventory systems to accept batch entry (required for full EDI implementation) and to handle translations from internal data formats to industry-standard formats.

c. Look to Partnering Opportunities

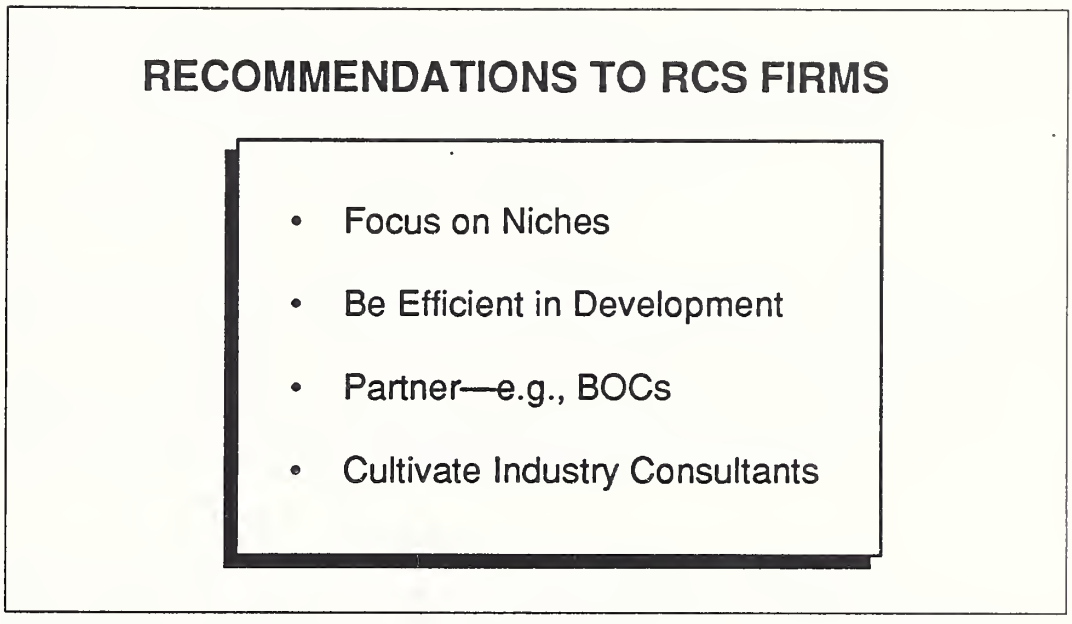
Investigate expansion of marketing and distribution channels through joint ventures with turnkey systems and software companies. Partnering will enable quick and economical market development.

Seek partnering with network service vendors, including but not limited to BOCs, to improve your marketing profile and networking capabilities. The BOCs are very interested in transaction and other information services opportunities as regulations are removed.

Cultivate consultants, which are becoming more important as IS markets and technologies grow in complexity.

INPUT's recommendations to RCS vendors are shown in Exhibit VI-16.

EXHIBIT VI-16



4. Recommendations to Users

a. Sell EDI Internally

Form an EDI task force with broad company representation to work across departmental lines and to avoid internal jurisdictional problems.

Educate corporate management on the benefits of EDI to encourage resource allocation for its development. Use every appropriate means: distribute articles about competitors and EDI in general, enter multiple gift subscriptions to INPUT's *EDI Reporter* newsletter, send E-mail messages, and conduct informational presentations.

b. Think Twice about Proprietary EDI

It may be advantageous, at least in the short term, for large companies to continue developing closed EDI systems. Such systems work to maintain the customer base and provide a competitive edge.

However, unless developed with attention to future needs, proprietary networks may later prove burdensome to enhance.

- The pressures to meet internal needs may deflect attention from standards that can complicate system development.
- INPUT recommends that proprietary EDI systems use X12 standards, and that users/developers monitor standard refinements to maintain compatibility. Most inter-company communications are not confined to a specific industry. Keep expansion options open through standards compliance.
- A hybrid system with gateways to third-party services is the best option for otherwise private EDI systems.

Managing a proprietary EDI network requires committing resources to both implementation and ongoing management. Carefully evaluate your abilities before implementation, and use a third-party service if there is any question about company support.

c. Support and Encourage Your Users

Developers should solicit feedback from system users and implement recommended changes. Otherwise, an inflexible system will create frustration and may fall into disuse.

Consider the advantages of sharing personnel resources with your trading partners for EDI development to encourage acceptance and reduce costs overall.

Industry-dominant companies should consider requiring their suppliers to use EDI as a business condition. Partners not conforming to standards or using manual systems might be levied a surcharge to cover the additional costs involved. Though this may not be advisable for companies dependent on uncomputerized suppliers, with proper marketing, EDI's benefits will be recognized.

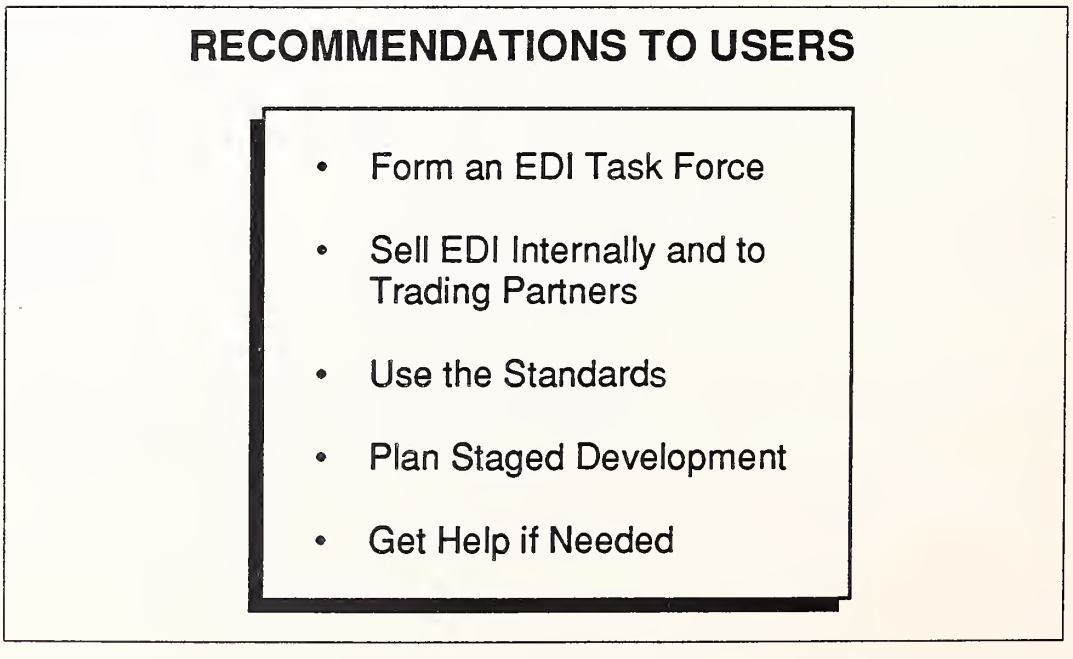
d. Stage Your Development and Get Help if Needed

An EDI development strategy can be based on upgrading existing systems, or it can be part of a planned operational reworking of multiple systems that can be improved by EDI.

Guidance in implementation, programming, transaction sets, data element definitions, and communications standards is available from industry associations and professional services firms.

Recommendations for users are summarized in Exhibit VI-17.

EXHIBIT VI-17



F

Opportunities for EDI Service Providers

Although competing EDI service providers are addressing most segments of the market, INPUT is aware of several areas worth further examination. Some of these areas are suggested here.

1. Reinsurance

Reinsurance companies provide insurance for insurance companies, spreading risks among several firms. The industry's paperwork requirements are weighty, with labor-intensive analysis required to determine individual company exposure in the event of a claim. EDI services adapted to this industry are being examined, principally in Europe with the RINET project, awarded to IBM.

2. Insurance and X12 Links

INPUT has identified two areas where links between the Insurance Interface variety and the X12 variety of EDI can be applied to basic business problems:

- Although most shippers and their carriers hold blanket insurance policies, there may be occasions when the materials being transported require special handling and accordingly, insurance coverage riders. These situations include high-value products or dangerous materials.

- Mortgage bankers are beginning to develop X12-based transaction sets covering Computerized Loan Origination (CLO). Among transactions needed are those for title and other types of real estate insurance.

3. Financial Services

Banks are beginning to offer EDI services through Electronic Funds Transfers carrying information describing the transaction. There are other variants of financial EDI services to be examined:

- Receivables covered by EDI transactions could form the basis of a company's credit rating, making available short-term funds for immediate needs.

- A value-added enhancement to EDI transactions may also be developed by applying a payment guarantee to EDI-based selling. Under this scenario, a supplier would be ensured by an EDI service provider's partner that payment would be received within a predetermined period.

4. Small Business Services

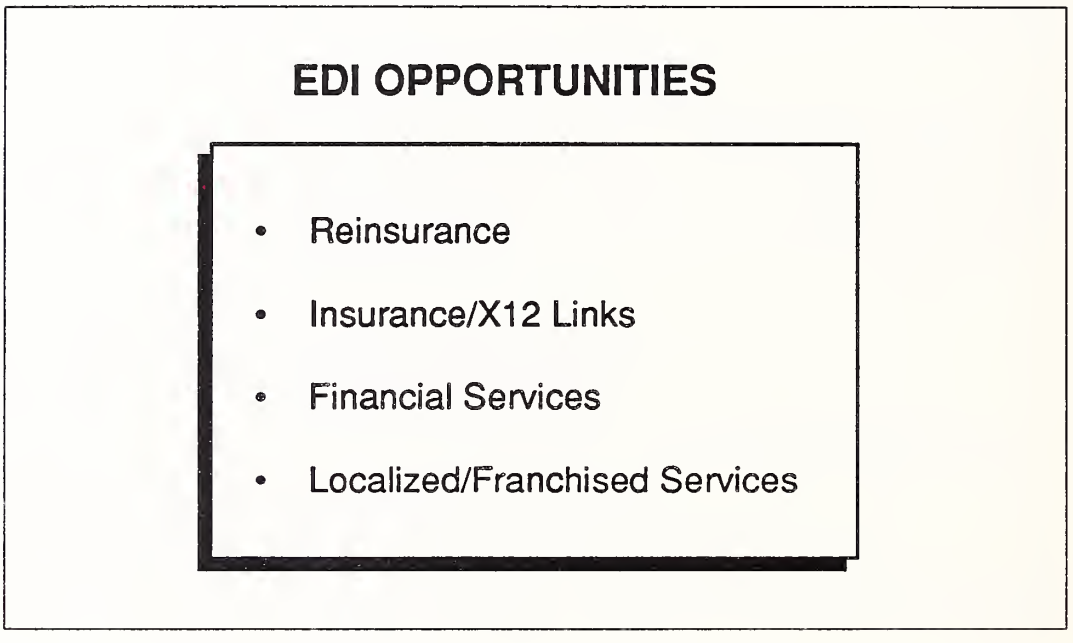
Just as small businesses have available store-front service bureaus supplying telex, facsimile, and parcel services, EDI could be made available through these agents. Firms providing shared tenant services may also be candidates, as are Bell Operating Companies and independent franchised business centers, such as Mailboxes, USA.

5. Localized EDI Services

Since most trading between small companies generally occurs in a localized area, EDI services might be formed within these areas. This too suggests a role for BOCs, either acting through unregulated subsidiaries or, if regulations permit, through their regulated businesses in conjunction with independent service providers, similar to the agent scenario described above.

These EDI opportunities are listed on Exhibit VI-18.

EXHIBIT VI-18



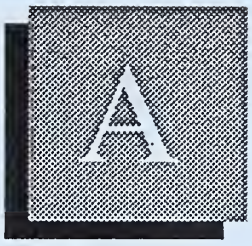
G
Concluding Remarks

Participants in EDI standards-making bodies are exhibiting something unique in Information Services: competitors are setting aside their differences to work side-by-side to come to a consensus approach. The volunteers in these groups are showing a near religious zeal for what they are doing and report a sense of satisfaction that may be missing in their regular positions.

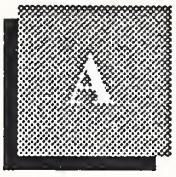
EDI shows every indication of being poised for explosive growth through wide-scale adoption in many (if not most) industry segments. It represents a revolution from millennium-old paper-based operations toward an application of appropriate technologies addressing fundamental business needs. Accordingly, companies with EDI products and services are assuming positions to capitalize on growing demands.

EDI will impact multipart forms companies, file transfer applications, E-mail, facsimile, overnight courier service, and the U.S. Postal Service. Adjustments will need to be made.

Users and vendors are now coming to terms with the complexity that EDI potentially represents. In and of itself, EDI does little but replace paperwork. However, through integration of EDI with other applications and other data services, the benefits, and opportunity, can be substantial.



Appendix: Glossary of EDI Terms



Appendix: Glossary of EDI Terms

ACCS—"Access," the Aluminum Customer Communication System.

ACH—Automated Clearinghouse, a banking industry mechanism for electronic funds transfer. *Also see* NACHA.

AIAG— The Automotive Industry Action Group, a trade association. Also refers to EDI formats developed by the association.

ANA—Article Numbering Association. The U.K. industry group that introduced bar coding to that country and developed the Tradcoms EDI standard.

ANSI—American National Standards Institute.

ASC— Accredited Standards Committee.

Bar Coding—A standardized method of identifying products that facilitates data entry through scanning of coded printed labels.

Batch Processing—A data processing/data communications method that groups transactions. *Compare to* Real-Time Processing.

CAD/CAM—Computer-Assisted Design and Computer-Assisted Manufacturing, a set of applications that use graphics to manage these functions.

CARDIS—Cargo Data Information System, a concept for trade documentation automation promoted by the National Council on International Trade Documentation. Never implemented in its proposed form, "CARDIS Element Systems" have been developed by several vendors serving the international trade community.

CCD— Cash Concentration and Dispursement, an electronic funds transfer format.

CEFIC—The Brussels-based Council of European Chemical Manufacturers, which sponsors an EDI project.

CIDX—Chemical Industry Data Exchange, a standard based on X12.

CLM— Car Location Messages, applied to railcar logistics.

CLO—Computerized Loan Origination. An EDI application being developed by the mortgage banking industry.

Compliance Checking—A function that verifies that document information is received in the right order and in the proper format.

COMPORD—Computerized Ordering, an EDI system developed by the American Iron and Steel Institute.

COPAS—Council of Petroleum Accounting Standards, an industry association developing EDI standards.

CSI—Commercial Systems Integration. A professional service whereby vendors take complete responsibility for designing, planning, implementing, and sometimes managing a complex information system.

CTP—Corporate Trade Payments, an Electronic Funds Transfer application.

CTX—An electronic funds transfer mechanism that is compatible with the EDI X12 standard, and which carries information about a payment as well as transferring value.

DISA—The Data Interchange Standards Association, the ANSI X12 secretariat.

DISH—Data Interchange for Shipping, a project sponsored by a European group of shippers, carriers, and agents.

EDI—Electronic Data Interchange. The computer-to-computer communications based on established business document standards, or using translations by EDI software housed on users computers, located at remote computer service bureaus or on value-added network processors.

EDIA—The Electronic Data Interchange Association, formerly known as the Transportation Data Coordinating Council.

EDICT—Istel's U.K. EDI service.

EDIFACT—EDI for Administration, Commerce, and Transportation, the evolving international EDI standard.

EDX—Electronics Industry Data Exchange, based on the X12 standard.

EFT—Electronic Funds Transfer, the transfer of value.

Electronic Mail—The transmission of text, data, audio, or image messages between terminals using electronic communications channels.

Electronic Mailbox—A store and forward facility for messages maintained by a transmission or processing facility.

EMBARC—An EDI standard being promoted for use in the paper, printing, and publishing industries.

EMEA—Council for Mutual Economic Assistance, an Eastern European bloc EDI association.

FASLINC—The Fabric and Supplier Linkage Council, a textile industry association dedicted to EDI development and other industry needs.

GTDI—General Trade Data Interchange, an international standard, developed from TDI, accommodating compromises of French participants in SITPRO, the agency behind U.N. certification of the standard. Is evolving into EDIFACT.

HCFA—Health-Care Financing Administration, a U.S. government agency responsible for Medicare administration. Also describes a format (HCFA 1500) for health-care insurance claims.

ICOPS—The Industry Committee on Office Products Standards, sponsored by two office products trade associations for EDI applications.

IGES—International Graphics Exchange Standard, by which CAD/CAM graphics can be transferred electronically.

IIR/ACORD—standards for paper and electronic insurance documents, developed by the Insurance Institute for Research and the Agent Company for Research and Development organization, which have merged.

Interface—The insurance industry term for EDI, applied to agent/company communications, ideally using IIR/ACORD formats.

IRC—International Record Carrier, a common carrier providing messaging and network services, no longer limited to international communications.

IVANS—Insurance Value Added Service, provided on IBM's Information Network by an insurance industry association.

JEDI—The Joint Electronic Data Interchange Committee, which consisted of representatives of industry trade associations coordinating development of a reference EDI dictionary for the creation of new EDI transactions, segments, or data elements for international use. Its work has largely been supplanted by UNECE Working Party 4.

JIT—Just-in-time, an inventory management philosophy that plans delivery of needed materials and components immediately prior to final manufacture or assembly.

LDI— Logistics Data Interchange, information about the location of materials in transit through the manufacturing/distribution cycle.

NACHA—National Automated Clearing House Association, a banking services industry group.

ODETTE—Organization for Data Exchange through Teletransmission in Europe, an automaker's association EDI standard.

Ordernet—Sterling Software's EDI service. Also refers to EDI standards developed by the National Wholesale Druggist's Association for use in pharmaceuticals.

Rapporteur—Used to describe an expert appointed by the United National Economic Commission for Europe Working Party 4, the primary group developing the EDIFACT international EDI standards.

RCS—A Remote Computing Service facility that arranges to process some or all of a user's workload. Similar to a VAN (below) but without network services.

Real-Time Processing—A data processing or transmission method with data entered interactively. Response to input is fast enough to affect subsequent input. The results are used to influence a currently occuring process.

SAFLINC—The Sundries and Apparel Findings Linkage Council, an association in the apparel and related industries promoting EDI and other industry needs.

SAM—Shippers Administrative Messages, a logistics service/application.

Secretariat—The administrative organization providing business and coordination services for various EDI standards creating and maintenance bodies.

SITPRO—Simplification of Information Trade Procedures, a European EDI standards and trade facilitation agency that reports to the Department of Trade and Industry.

SMMT—Society of Motor Manufacturers and Traders. An automotive industry association responsible for the ODETTE project.

Store and Forward—The capability of a transmission or processing facility to hold messages or data until requested, or until a prescheduled time.

SUPER—Study for the Utility of Processing Electronic Returns, an Internal Revenue Service test for electronic filing.

SUPERB—The IRS' electronic filing test program for business returns.

TALC—Textile/Apparel Linkage Council, a subcommittee addressing EDI standards.

TAMCS—Textile/Apparel Manufacturer's Communications Standards.

TCIF—Telecommunications Industry Forum, an industry group involved in EDI, bar coding, and similar technologies.

TDCC—The Transportation Data Coordinating Committee, an early advocate for EDI, now known as the Electronic Data Interchange Association. Also refers to U.S. EDI standards.

TDI—Trade Data Interchange, an international shipping standard. *Also see* GTDI.

TEDIS—An EEC program to promote Trade EDI throughout industry and government.

Tradanet—An ICL (U.K.) EDI service.

Translation—Transforming information sent in one format to another format.

UB82—A format for health claims insurance submissions.

UCS—Uniform Communications Standards, the EDI standards used by the grocery industry, based on X12, and coordinated by the Uniform Product Code Council.

UNECE—United Nations Economic Commission for Europe. Despite its name, a broadly based representational body developing the international EDI standards called EDIFACT.

UNJEDI—United Nations Joint EDI committee developing technical and procedural standards on EDI.

VAN—Value-Added Network. A common carrier network transmission facility, usually augmented with computerized packetizing, which may also provide store and forward switching, terminal interfacing, error detection and correction, and host computer interfaces supporting various communications speeds, protocols, and processing requirements.

VANGUARD—A U.K. Department of Trade and Industry sponsored awareness and promotional program for VAN and EDI services.

VICS—Voluntary Interindustry Communications Standards, a committee developing EDI standards between retailers and manufacturers.

WINS—Warehouse Information Network Standards, promoted by two representational associations, the International Association of Refrigerated Warehouses, and the American Warehousemen's Association.

WP4—Working Party 4 of the Economic Commission for Europe, commissioned by the U.N. to develop trade facilitation procedures and international EDI standards.

X.400—An international electronic messaging standard.

X12—A set of generic EDI standards, approved by the American Standards Committee.