INPUT

STRATEGIC MARKET PERSPECTIVE

Electronic Commerce Markets and Forecast, 1995-2000

Electronic Commerce Program

MARCH 1996

Electronic Commerce Markets and Forecast

1995 - 2000

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Abstract

This report defines and sizes the U.S. market for electronic commerce products and services from 1995 to the year 2000. Revenues of electronic commerce providers will grow from $3.8 billion per year in 1995 to $11.4 billion in 2000. About half of the $11.4 billion in 2000 will result from Internet commerce. The report identifies the many different aspects of the electronic commerce market, including EDI software, network services, Internet/EDI, World Wide Web commerce, E-mail, fax and professional services.

The large sample size for the research has allowed INPUT to develop the most comprehensive profile available to date as to how electronic commerce is being conducted today. Twenty-four different usage patterns have been identified and graphed, ranging from the market impact of U.S. government initiatives for electronic trade with its suppliers to the extent of deployment of "commerce-ready" World Wide Web sites. Thirteen distinct industry trends have been identified as a result of the research. Vendors will find this to be invaluable information for targeting their marketing programs or defining new products. Users will be able to benchmark themselves against the best practices of the industry.

The report contains 73 pages and 68 exhibits.

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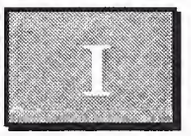

Introduction

A
Purpose

The purpose of this report is to quantify the market for electronic commerce (EC) products and services and to forecast the direction of the market over the five-year period from 1996 to the year 2000.

In addition, the report characterizes the current usage patterns of electronic commerce to enable vendors to understand how best to target their products and to help in the definition of new products. The report also identifies the trends and issues in the market to help users and vendors keep current with overall industry dynamics.

B
Organization

The report is organized into three main chapters covering, respectively, the market quantification, the profile of electronic commerce usage patterns, and the identification of the trends and issues. Although this necessitates the discussion of a given topic in each chapter, this organization enables the reader to use any one of the chapters alone, depending on the reader's interest.

C
Methodology

This report is based on primary market research. INPUT interviewed 290 users of electronic commerce and all the major electronic commerce vendors. Most user interviews were by telephone. The questionnaire used contained 59 queries. Many of the vendor interviews were face to face at the vendor's site.

Additionally, the report benefits from on-line and secondary research using INPUT's library. The resources in this library include on-line periodical databases and the most up-to-date U.S. Department of Commerce publications on industry statistics.

D
Scope

The scope of this report is the U.S. market for electronic commerce. INPUT includes in this market the following technologies as they apply to commerce:

- Electronic commerce software
  - Electronic data interchange (EDI) software for use over value-added networks (VANs) and the Internet
  - E-Fax
  - E-Mail
  - Financial EDI (FEDI)
  - World Wide Web software
- Network services
  - EDI
  - E-Mail
  - Fax
  - On-line services
  - Internet access services
  - Electronic credit data services
  - Marketing/sales information services
  - Product and pricing catalogs
  - CD ROM catalogs

- Professional services
  - Consulting and systems integration
  - Software maintenance and support

Note that credit card processing, payroll processing and other kinds of bill processing are not included in the electronic commerce marketplace, as they are separate industries. Furthermore, although these services are derived from business transactions, they are not direct market exchange functions.

Also note that, for some expenditures, particularly E-mail and fax, only a part of what users spend can be attributed to intercompany consummation of commercial transactions. INPUT measures the extent of usage for commercial transactions and calculates the appropriate apportionment of the expenditures.

INPUT measures software and service expenditure, and does not count hardware costs.

E
Related Reports

Much of the information and analysis included in this report is based on user and vendor surveys conducted as part of INPUT's ongoing electronic commerce and Internet market analysis programs. For more information on these topics, the reader is referred to these INPUT reports:

- *Electronic Catalogs, Web Storefronts and Internet Malls*
- *Electronic Commerce in Government*
- *Electronic Commerce on the Internet*
- *Sales and Marketing on the Internet*
- *The Future of Web Browsers and Servers*
- *Using the Internet for Business Operations*

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Executive Overview

1995 was the year in which the promise of the Internet for electronic commerce (EC) began to overtake the promise of traditional technologies such as electronic data interchange (EDI).

Although Internet commerce is still in its infancy, a number of developments during 1995 have set a course that will lead to very high growth over the forecast period of 1996 to 2000. The most important is the adoption of the Internet by U.S. business as a valid business tool. The is seen most clearly in the usage of the World Wide Web (WWW), but does not end there, as familiarity and comfort with the WWW is encouraging business to take advantage of the wider application set on the Internet, especially messaging. The EDI value-added networks (VANs) have been quick to recognize the potential threat to their business that the Internet represents and many have recently proactively introduced Internet strategies. INPUT believes this has been a very good move that will enable them to retain control of their traditional customers, even as they move some of their traffic to the Internet.

INPUT forecasts that, in the year 2000, Internet access network revenue for commerce will reach $860 million, approaching EDI network revenue which will reach $930 million, and vastly exceeding it in 2001. Software sales related to Internet commerce (specifically the WWW) will reach $284 million in the year 2000, approaching conventional EDI software sales of $342 million, and exceeding it in 2001.

INPUT interviewed 290 electronic commerce users and all major electronic commerce vendors in the preparation of this report. As a result, the report captures the market size and forecast through the year 2000 for all forms of electronic commerce, including EDI, E-mail, fax, WWW, Internet commerce, on-line services and information services. Additionally, the report offers a glimpse of how electronic commerce today enables vendors to target markets,

and users to benchmark their practices. Finally, the report details trends and issues in the electronic commerce market.

A
Market Summary

The market and forecast for electronic commerce software is shown in Exhibit II-1. EDI software is growing at a healthy rate of 21%. However, with growth rates of over 400% for WWW commerce software, these two segments attain a comparable magnitude by the year 2000. The vendors for WWW software (Netscape, Spyglass, etc.) are a very different group of companies from the EDI vendors (Sterling, Supply Tech, etc.), so it is clear that there will be significant dislocations in the market in future years. There are opportunities for the EDI companies to participate in the WWW growth by, for example, the provision of back-end software for Web servers to allow communication with legacy ordering systems for fulfillment of orders captured by the server.

Each of these market segments is analyzed in detail in the report.

Exhibit II-1

Electronic Commerce Software Markets and Forecast

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
EDI Software	113	134	19%	340	20%
E-Fax Software	10	22	120%	80	29%
E-Mail Software	97	126	30%	410	27%
FEDI/EFT Software	10	12	20%	20	11%
WWW Software for Commerce	3	15	400%	280	80%
TOTAL	233	309	33%	1,130	30%

Source: INPUT

The market and forecast for electronic commerce services is summarized in Exhibit II-2. EDI continues steady and healthy growth. Some of this revenue is for VAN-enabled Internet communication. Financial EDI (FEDI) will continue to fall short of many people's expectations, and probably will be overtaken by other payment technologies. Commerce over the WWW shows the greatest growth potential, and also creates new opportunities for professional services in the form of systems integration and consulting.

Each of these market segments is analyzed in detail in the report.

Exhibit II-2

Electronic Commerce Services Markets and Forecast

MARKETS	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
NETWORK APPLICATION SERVICES					
EDI	270	341	26%	930	22%
E-Mail	141	165	17%	375	18%
Fax	71	88	24%	300	28%
FEDI/EFT	19	22	16%	35	10%
On-Line Services	2.0	4.6	130%	20	34%
Internet Access	0.6	1.4	133%	860	261%
Other	20	25	25%	60	19%
TOTAL NET. APPL. SVCS.	**524**	**647**	**23%**	**2,580**	**32%**
ELECTRONIC INFORMATION SERVICES					
Credit Data	1,216	1,370	13%	2,100	9%
Marketing/Sales Info.	724	811	12%	1,700	16%
Product Pricing Data	227	295	30%	580	14%
CD ROM Catalogs	3	8	167%	95	64%
Other	100	220	120%	800	29%
TOTAL ELEC. INFO. SVCS.	**2,270**	**2,704**	**19%**	**5,275**	**14%**
Professional Services	840	1,000	19%	2,450	20%
TOTAL SERVICES	**3,634**	**4,351**	**20%**	**10,305**	**19%**

Source: INPUT

B
Usage Profiling

The biggest obstacle facing users in their EDI implementation is the lack of consistent standards. Users often have to agree on a per-case basis how to interpret the specifications, and then have to configure their interfaces or legacy systems accordingly. This is the main reason why EDI has not become ubiquitous for intercompany communication. Another major obstacle is the difficulty of integrating EDI into legacy application packages. As a result, EDI is often used with a human in the loop, rather than computer to computer as intended.

EDI usage is frequently imposed upon small supplier companies by a large customer. INPUT measures 70% of companies entering the technology by this route. This has important implications for the marketing of EDI services and products, since the hub company will often "pull through" its suppliers. Government initiatives to improve the efficiency of communication with suppliers is also having a measurable effect on the market for EDI systems, especially at the low end. Some vendors are capitalizing on this opportunity.

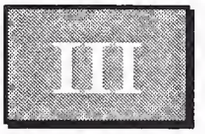
While E-mail is being widely embraced as an intercompany communication medium, its direct use for official commercial documents is limited today by audit and security considerations. Users are enthusiastic about the possibility of letting E-mail play a larger role in the consummation of transactions and would like to get away from the paper orientation of fax technology, but in the short term are resigned to faster growth of EDI and fax than E-mail in the EC arena.

As many as 4% of user companies report activity associated with EDI over the Internet. Nearly all are in the experimental stage, but there is a great deal of interest in this configuration. Twenty-three percent of companies have a Web site for their customers to access, but more importantly, the percentage of sites that are commerce-ready is increasing at a rate of 33% per year.

C
Trends and Issues Summary

The most striking trend in EC today is the growth of Internet commerce, specifically through Web sites, but also including EDI over the Internet. Most of the VANs have declared Internet strategies, and others plan to announce in 1996. Users expect a 300% increase of sales through Web sites such strategies in 1996. Currently, 14% of Web sites permit the ordering of goods and services and payment on-line, and the availability of this feature is growing at 56% per year.

EDI vendors are responding to user frustrations regarding integration of EDI with application packages, but there are so many packages on the market, and the client/server market is so dynamic, that a large backlog will always be apparent. Client/server architectures for EDI systems are forthcoming from most vendors, to fit in with the similar trend in the application architectures of the user companies. Partly as a result, the market for UNIX-based EDI software is the most dynamic segment of the EDI software market.



Market Size and Forecast

This chapter gives the market size for 1995 and forecast for 1996 - 2000 for the electronic commerce (EC) services and products that constitute the U.S. market.

As electronic commerce becomes more common in our business environment, new forms of EC are evolving and gaining enough market share to merit inclusion in this market forecast. This has been happening for the last two years and INPUT has added components beyond the basic electronic data interchange (EDI) technology that its Electronic Commerce Program had traditionally covered. 1995 has been the year in which the U.S. business community has embraced the Internet. Although the value of products being sold over the Internet is still relatively small, it is growing at a very rapid rate, thus meriting inclusion of Internet commerce in the forecast this year.

The specific products and services assessed are:

- Software Products
  - EDI software
  - E-mail software
  - Fax software
  - FEDI software
  - Internet Web server software

- Network Services
  - EDI
  - E-mail
  - Fax
  - FEDI/EFT
  - Credit data
  - Marketing/sales information
  - Product and price catalogs
  - Proprietary on-line services
  - Internet access services for commerce
- Professional Services

A Consolidated Forecast for Electronic Commerce

Exhibit III-1 shows the market size and forecast growth for the elements of electronic commerce included by INPUT in its definition of the market.

Exhibit III-1

Consolidated Forecast for Electronic Commerce

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
EC Software Products	233	308	32%	1,150	30%
Network Application Services	524	647	23%	2,600	32%
Electronic Information Services	2,270	2,704	19%	5,300	14%
Professional Services	840	1,000	19%	2,450	20%
TOTAL	3,867	4,659	20%	11,500	20%

Source: INPUT

Network application services shows the strongest growth, due largely to Internet-related services. Each of these segments is analyzed further in this chapter.

B
Electronic Commerce Software

- Electronic Commerce involves a transaction between the computers of two parties—typically a buyer and a seller. The software that performs the transaction can include a communication module and be directly connected to the other machine (as is typical in a fax situation). Alternatively, it can interface with a value-added network (VAN), which will perform a communication and store-and-forward function (as often happens with EDI). The market for electronic commerce software is thriving. The market size and growth are shown in Exhibit III-2.

Exhibit III-2

Electronic Commerce Software Markets

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
EDI Software	113	134	19%	340	20%
E-Fax Software	10	22	120%	80	29%
E-Mail Software	97	126	30%	410	27%
FEDI/EFT Software	10	12	20%	20	11%
WWW Software for Commerce	3	15	400%	280	80%
TOTAL	233	309	33%	1,130	30%

Source: INPUT

Note the high growth rate for commerce-related WWW software, which approaches the revenue for EDI software in 2000, and will exceed it in 2001.

1. EDI Software

EDI has been the traditional EC technology, and still forms the backbone of the industry.

EDI software performs the following functions:

- File translation: converting data that is arranged in a given file format into the arrangement of another file format
- Mapping: a development tool with which the user maps data fields of one format to the desired data fields of a target format
- Communication: the control of telecommunications transmission sessions via a modem

- Application program interface: software that integrates EDI translation software with specific application software. It is sometimes given as a preformatted map or template along with translation software.

- Store and forward ("mailboxing" or "switching") of messages: This clearing-house function is often performed by a VAN with which the software is communicating. However, the function is contained within some of the more expensive EDI software packages, allowing a direct connection from trading partner to trading partner, without using a VAN.

INPUT categorizes these EDI software packages according to the computer platform they run on. The categories, and relative count of installed base of each category, are shown in Exhibit III-3.

Exhibit III-3

EDI Software Categories and Unit Installed Base

Category	Percent of Installed Base (Units)
PC	58%
UNIX	6%
Midrange (including AS/400)	17%
Mainframe	19%

Source: INPUT

Growth of EDI software products continues at a steady and healthy rate, as Exhibit III-4 shows. However, new forms of EC delivery, most notably the World Wide Web (see section III-B-5), while still small, are growing at much faster rates and will overtake EDI, both in sales of EC products and value of goods sold through the respective media, within about six years.

Exhibit III-4

EDI Software Markets

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
PC Software	45	52	16%	130	20%
UNIX Software	18	25	38%	120	37%
Midrange Software	24	29	23%	56	14%
Mainframe Software	27	28	4%	36	5%
TOTAL	114	134	18%	342	21%

Source: INPUT

a. PC EDI Software

The market for PC EDI software has slowed somewhat in the last two years and is now growing at 18% per year. Exhibit III-5 shows the market share of some of the leading vendors. Some vendors are reporting increasing sales as a result of the federal government's ECAT initiative, wherein suppliers to the government are encouraged and incented to use electronic commerce. See section IV-G of this report for more details.

Exhibit III-5

PC EDI Software Market

Vendor	1994 Sales ($M)	1995 Sales ($M)	Growth (%)
Supply Tech	7.0	8.1	16%
TSI	5.6	7.8	39%
Sterling	6.5	7.5	15%
EDS	3.8	4.0	5%
GEIS	2.6	3.0	15%
Harbinger	2.3	3.0	30%
IBM/Advantis	1.7	2.0	18%
The APL Group	1.4	2.0	43%
St. Paul	1.2	1.2	0%
DNS Worldwide	1.0	1.1	6%
Other	11.6	12.0	3%
TOTAL	44.7	51.7	16%

Source INPUT

b. UNIX EDI Software

UNIX EDI software continues to grow at a very healthy 43% per year, although this is down from the 70% rate found in 1993. The major reasons for the high growth are the trend toward client/server computing in the IS departments of users and the desire to integrate EDI with these client/server

applications. Additionally, companies that started EDI on a PC platform and need to grow will commonly upgrade to UNIX.

As will be discussed in section V-C of this report, UNIX is frequently used for EDI servers within a company. In this configuration, a centralized UNIX machine will be the translation and communication hub, and connected to it will be PC-based clients providing the user department interface.

Exhibit III-6

UNIX EDI Software Market

Vendor	1994 Sales ($M)	1995 Sales ($M)	Growth (%)
Sterling	4.2	6.0	43%
St. Paul	2.7	3.8	41%
EDS	2.5	3.0	20%
Harbinger (TI)	0.9	1.2	41%
GEIS	1.5	2.0	33%
Premenos	0.0	1.0	N/A
St. Paul	2.7	3.8	41%
Trinary	0.8	1.1	38%
Other	2.2	3.0	36%
TOTAL	17.5	24.9	43%

Source INPUT

c. Midrange EDI Software

The midrange segment consists of IBM AS/400 and equivalent computers. They are commonly used for the business software that is the source or destination of the EDI transaction, so represent a natural market for EDI software. Growth in this segment is about 24% per year. Premenos, with its EDI/400 product, continues to lead this segment. St. Paul has entered the market through its acquisition of EDI Solutions.

Exhibit III-7

Mid-Range EDI Software Market

Vendor	1994 Sales ($M)	1995 Sales ($M)	Growth (%)
Premenos	12.8	16.6	30%
Sterling	5.2	6.5	25%
GEIS	1.8	2.0	11%
Trinary	1.0	1.1	16%
St. Paul (EDIS)	1.1	1.2	5%
Other	1.9	2.0	5%
TOTAL	23.8	29.4	24%

Source INPUT

d. Mainframe EDI Software

Mainframe EDI software is used primarily by the big EDI hub companies that need this power for their large transaction volume. The market for this software is slowing from the 25% growth rates reported in recent years, to a current 3.6% per year rate, as exhibit III-8 shows. The main reason for this is the general trend in the IT marketplace towards client/server architectures.

Exhibit III-8

Mainframe EDI Software Market

Vendor	1994 Sales ($M)	1995 Sales ($M)	Growth (%)
Sterling	11.4	12.0	5%
IBM	4.9	5.0	2%
DEC	4.9	5.0	3%
TSI	2.8	2.8	0%
St. Paul (EDIS)	0.9	0.9	3%
Harbinger	1.2	1.2	4%
GEIS	1.0	1.0	3%
TOTAL	26.9	27.9	4%

Source INPUT

2. E-Mail Software

E-mail has been used on an intracompany basis quite extensively for a number of years. Recently, however, with the advent of the Internet (and, to a lesser extent, X.400 networks), the use of E-mail between companies has grown dramatically.

INPUT considers E-mail a component of electronic commerce whereby intercompany messages are exchanged for the purpose of conducting a

commercial transaction. Often, these messages are in support of an EDI exchange and are essential to the smooth running of the EDI system. INPUT calculates the EC E-mail software forecast based on the proportion of intercompany messages going through LAN and host E-mail and workflow packages such as cc:Mail, Notes, PROFS, etc. This proportion was measured in INPUT's user survey. INPUT also includes software packages aimed directly at intercompany E-mail, such as Commerce:Connection from Sterling Software and Business Talk from GEIS. The market and forecast is shown in Exhibit III-9.

Exhibit III-9

Electronic Commerce E-Mail Software Market

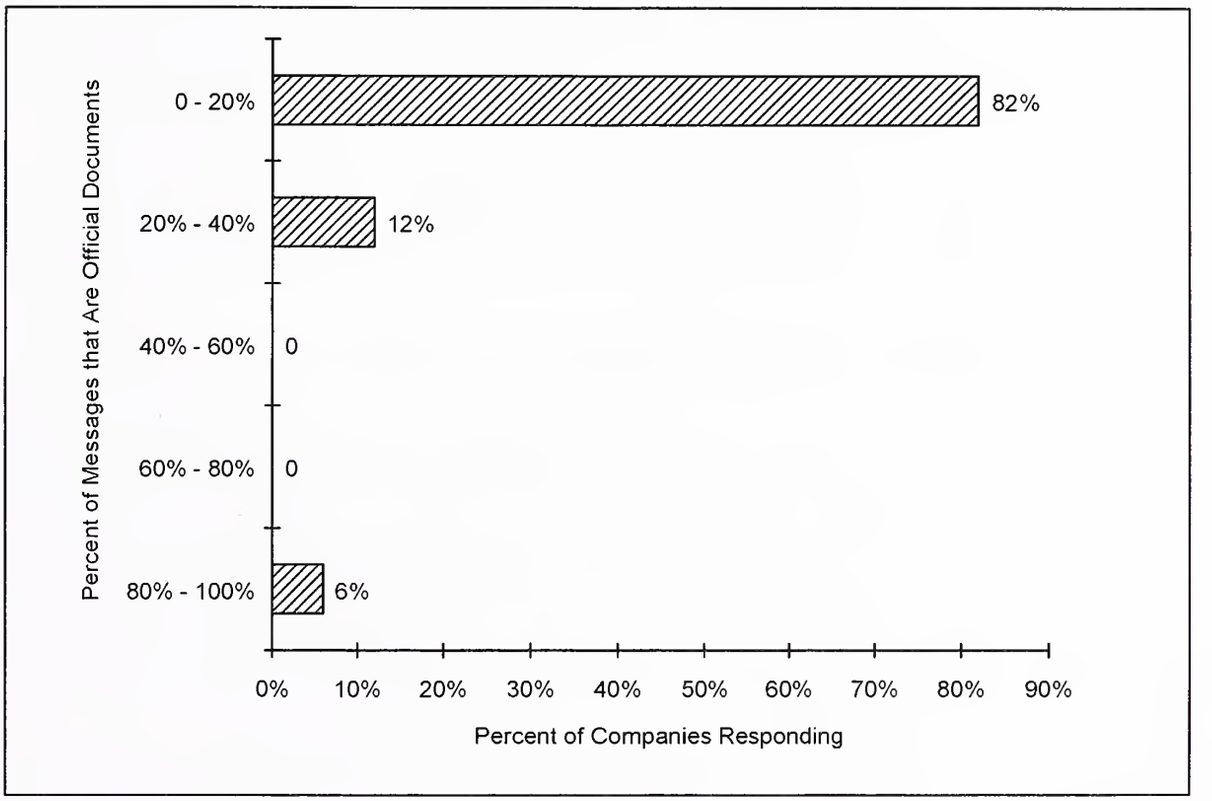
	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
U.S. E-mail S/W Market	695	840	21%	2,050	20%
Percent of Messages Intercompany	14%	15%		20%	
EC E-mail S/W Market	97	126	29%	410	27%

Source: INPUT

In some companies, an E-mail message is accepted as an official company document. For example, an E-mail message that orders goods will be considered an official order, and goods will be shipped on the strength of it. To measure the market for this usage of E-mail, INPUT measured the percent of companies permitting E-mail as official documents at 15% (see section IV-H for more details), and within such companies, INPUT measured a distribution of E-mails that are official documents, as summarized in Exhibit III-10.

Exhibit III-10

Distribution of E-Mail Messages that Are Official Commercial Documents



Source: INPUT

As a result of the detail behind the exhibit above, INPUT forecasts the software market attributable to the use of E-mail as an official document in Exhibit III-11.

Exhibit III-11

Software Expenditures Attributable to E-Mail as Official Documents

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
U.S. E-mail S/W Market	695	840	21%	2,050	20%
Percent of Messages Intercompany	0.3%	0.5%		1.0%	
EC E-mail S/W Market	2.1	4.2	101.4%	20.5	37.3%

Source: INPUT

As Exhibit III-11 shows, the number of messages that are official documents is small today due to legal and audit implications and fear of the lack of security. Security techniques such as Privacy Enhanced Mail (PEM) and Pretty Good Privacy (PGP) will alleviate the fear of lack of security as they become accepted, but the legal and audit issues may take longer to diminish. Nevertheless, the growth rates are high, and the INPUT survey uncovered a

great deal of interest in using E-mail more in the future. This is covered in more detail in section V-G of this report.

Many small companies are using EDI-to-E-mail services provided by service bureaus such as St. Paul and others. In such a case, the company need not have any EDI capability at all. It formats its documents as E-mail messages and sends them to the service bureau. The bureau will reformat the message as an EDI message and send it on to the trading partner. In this type of operation, the E-mail message to the bureau is counted in the figures in Exhibit III-11, and the EDI transmission to the trading partner is counted in Exhibit III-22.

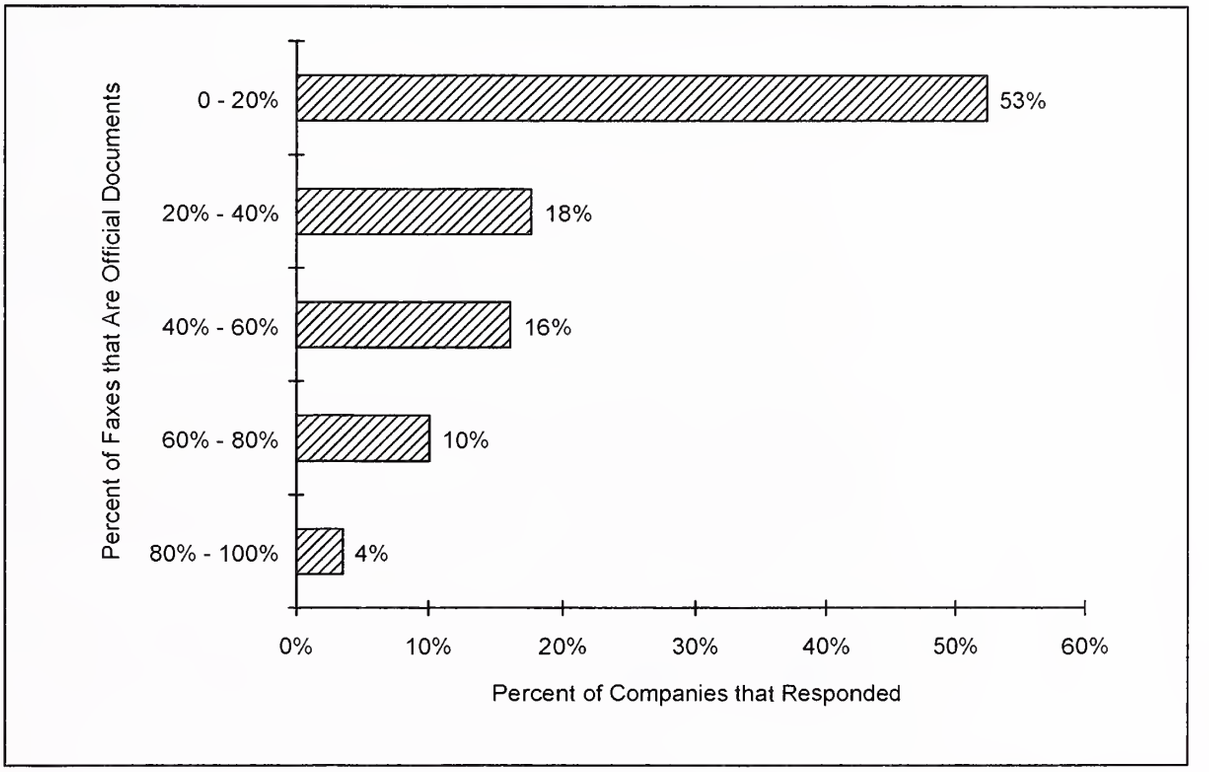
3. E-Fax Software

INPUT counts software and services revenue in its forecasts, and does not include hardware. Standalone fax machines (even though they may be internally controlled by software) are considered hardware devices, and are therefore not counted. However, there is a considerable—and growing—market for enhanced fax devices and fax servers wherein software controls the fax function for enhanced services such as fax store and forward, fax broadcast, etc. These devices will accept incoming fax, and attach the fax image to an
E-mail message, thereby routing it to the recipient without there ever being a need for a printed copy. Similarly, faxes composed on a sender's PC can be routed to the server for transmission without ever being put on paper at the sending end. It is this market that INPUT counts in the E-fax category, where the faxes are sent in the specific conduct of electronic commerce business.

In contrast to the situation for E-mail, where only 15% of companies permitted E-mail as official documents, the INPUT survey found that 77% of companies were willing to accept a fax as an official document (see section IV-I for more details). Furthermore, within such companies, there is a high percentage of total faxes sent or received that are such official documents, as Exhibit III-12 shows.

Exhibit III-12

Faxes that are Official Commercial Documents



Source: INPUT

The detail behind these figures leads to the INPUT forecast for fax software as a component of electronic commerce, shown in Exhibit III-13.

Exhibit III-13

Forecast for Fax Software as a Component of Electronic Commerce

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
U.S. Fax S/W Market	40.0	80.0	100%	320.0	32%
Percent of Faxes Official Intercompany Documents	25%	27%		25%	
EC Fax S/W Market Attributed to Official Company Documents	10.0	21.6	116%	80.0	30%

Source: INPUT

The INPUT survey revealed that the growth of fax for the transmission of official intercompany documents will be higher than the growth for E-mail, though not as high as EDI. This is discussed further in section V-G and Exhibit V-5 of this report.

4. FEDI/EFT Software

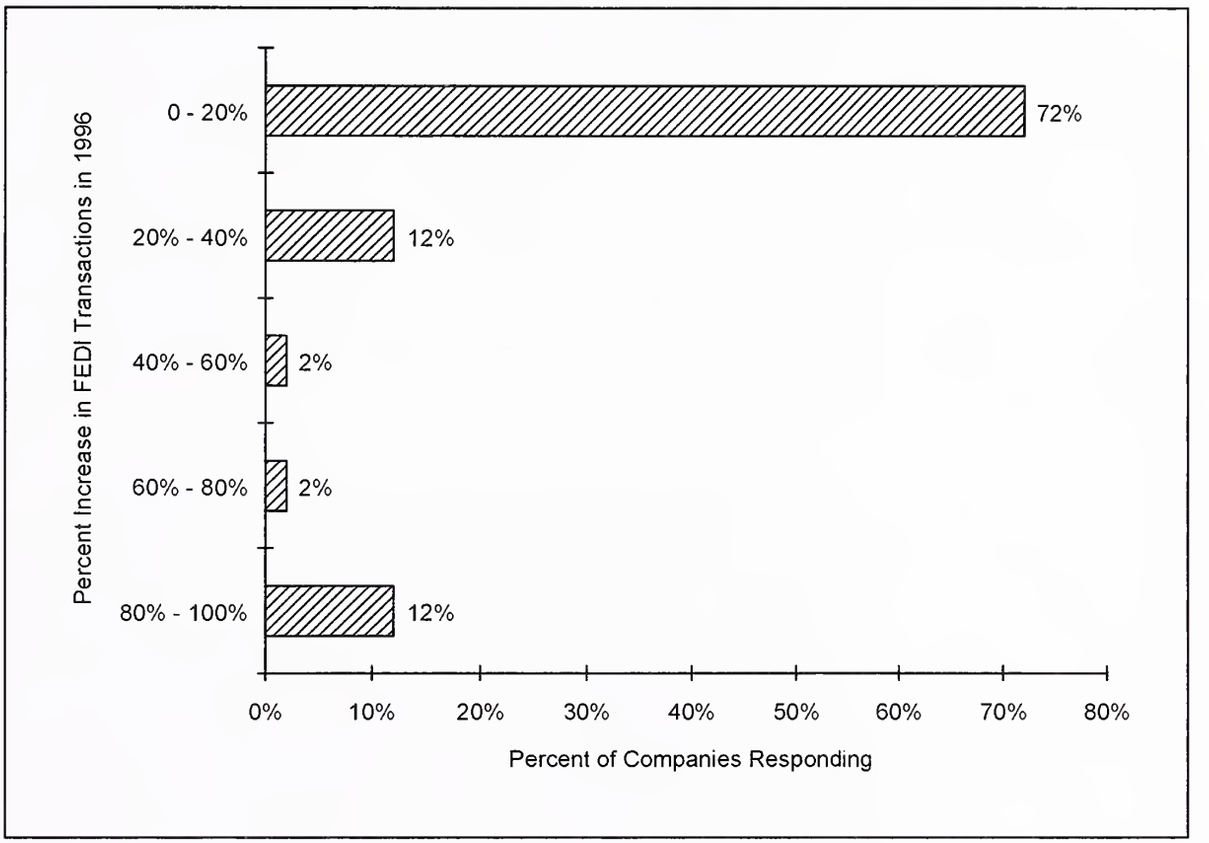
Traditional EDI involves the direct company-to-company transfer of electronic messages for such functions as RFQs, orders, invoices, etc. However, the actual payment for goods or services purchased cannot be executed on a company-to-company basis, but, by law, must be done through the companies' banks. The two banks can execute the payment electronically using the Automated Clearing House (ACH) network, and to do that they will communicate with each other (through ACH) using a set of National Automated Clearing House Association (NACHA)-defined messages. For a company to communicate with its bank to tell it which transaction it wants the bank to execute, the company will use financial EDI (FEDI). The bank will map the FEDI commands to the ACH commands.

FEDI has not been well accepted in the market, and INPUT measured only 23% of companies using it. Even among this 23%, the quantity of business transacted this way is small, with 78% of such companies reporting less than 20% of their total business being paid for by FEDI. Section IV-1 and Exhibits IV-13 and IV-14 show more detail on this.

INPUT measured the expected increase in transactions in 1996, and the results are shown in Exhibit III-14.

Exhibit III-14

Expected Increase in Transactions Using FEDI in 1996



Source: INPUT

INPUT has forecast the market for FEDI software sales through 2000, shown in Exhibit III-15.

Exhibit III-15

Financial EDI Software Market

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
U.S. FEDI S/W Market	10.0	11.5	15%	17.0	8%

Source: INPUT

Note that in spite of the great benefits to be potentially obtained from the implementation of FEDI, INPUT is projecting that the growth of FEDI software sales will be rather slow. This is because of the continued logistical difficulties of engaging in FEDI (need to co-ordinate four entities: two trading partners and two banks) and the relatively non-user-friendly nature of the offerings of the banks due to the inability of most banks to forward a remittance notice together with the funds payment. However, toward the end of the forecast period, the rate of growth will increase a little due to pressure on the banking system from Microsoft's initiatives to enter this business.

During 1995, Microsoft attempted to purchase Intuit, the leader in personal finance software, with the stated intent of entering the payments business in the consumer market. Although that purchase fell through due to anti-trust considerations, Microsoft and Intuit are separately pursuing these initiatives, and INPUT expects that banks will be pressured to respond with new programs to attract consumer and business customers to their FEDI-like offerings. It is not clear, however, that these programs will necessarily be recognizable as using FEDI as we know it today, or if new and easier to use schemes, perhaps involving the Internet, will predominate. Note that during 1995/1996, MCI will introduce a new payment alternative called RapidEDI, developed in conjunction with NACHA, that will permit remittance notices to be delivered with payments, thereby overcoming an Achilles heel of the current system.

5. World Wide Web Software for Commerce

When browsers and servers for the WWW were first introduced in 1994, they contained no security mechanisms that would make them suitable for electronic commerce. As security mechanisms became available, they were bundled into special versions of software, positioned as "secure for commercial purposes." As the market has developed, the need for security has been seen as ubiquitous. This even includes the market for servers used for internal communications within a company (the Intranet, as it has become known), where confidential information is passed at an even higher rate than on the Internet. This leads to the situation today: the market is moving toward security being a standard, bundled feature of servers and browsers, not an extra cost item.

In counting the portion of Web software that should be included as electronic commerce, INPUT uses the ratio of external (i.e. non-Intranet) Web servers that are used for transacting intercompany business to the total Web servers sold, and applies this ratio to the total Web server market as determined in the INPUT Internet Program. This is then multiplied by the percentage of companies that are "commerce ready" (i.e., have a catalog of goods and services on the Web site). Exhibit III-16 shows the resulting market for EC Web software.

Exhibit III-16

Market for Electronic Commerce Web Software

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
U.S. Web S/W Market	15	88	487%	1,950	86
% of Web sites that Are External (vs. Intranet)	81%	41%		15%	
% of Companies Ready to Conduct Commerce over WWW Site	25%	42%		97%	
EC Web S/W Market	3.0	15.2	399%	284	80

Source: INPUT

Because the market for electronic commerce over the World Wide Web is so new (this being the first year INPUT has included it in its electronic commerce forecasts), INPUT surveyed users extensively as to their current use of this technology. Results are contained in section IV-K of this report.

The INPUT survey found that 23% of EDI-capable companies currently have a Web site available to the public, and 30.5% of those that do not have a site indicate that they plan to put one up in 1996. This leads to the forecast of companies that will have a publicly available Web site through 2000, as shown in Exhibit III-17.

Exhibit III-17

Forecast for Companies with a Publicly Available WWW Site

	1994 (%)	1995 (%)	1994-1995 Growth (%)	2000 (%)	1995-2000 CAGR (%)
% of Companies With External WWW Site	12%	23%	92%	87%	30%

Source: INPUT

To have its WWW site used for electronic commerce, a company must put up a catalog of its products and services on the site. Companies not doing this are presumably using their WWW site as a PR tool for the general dissemination of information about the company, and not as a trading vehicle. The INPUT survey found that 42% of companies with Web sites have a catalog of products on their site, and of those that did not, a further 47% planned to put one up in 1996. (See sections IV-K-2 and V-I-2 of this report for more details of these measurements.) This leads to the forecast of companies that will have catalogs of their products and services on a WWW site, and are therefore ready to do commerce over the site, as shown in Exhibit III-18.

Exhibit III-18

Companies Ready to do Commerce over their WWW Sites

	1994 (%)	1995 (%)	1994-1995 Growth (%)	2000 (%)	1995-2000 CAGR (%)
% of Companies With External WWW Site	10%	23%	130%	87%	30%
% of Companies above with Catalog of Products on Site	22%	42%		92%	
% of Companies Ready to conduct Commerce over WWW Site	2%	10%	339%	80%	53%

Source: INPUT

Among those companies conducting commerce over their WWW sites, there are a variety of techniques used for consummating the sale and making payment. These range from the introduction of human sales agents into the loop to the use of on-line payment technology. This is discussed further in section IV-K-3 of this report. Based on measurement of the extent of the various techniques in use today, and anticipated improvements in technology, INPUT forecasts the percent of companies operating WWW sites with on-line purchase and payment options in Exhibit III-19. INPUT also examined the percentage of a company's sales made through Web sites, and the anticipated increase in 1996. This data is displayed in section IV-K-4 of this report.

Exhibit III-19

Companies Operating WWW Sites with On-Line Purchase and Payment

	1994 (%)	1995 (%)	1994-1995 Growth (%)	2000 (%)	1995-2000 CAGR (%)
% of WWW sites with On-Line Purchase/Payment	9%	14%	56%	82%	42%

Source: INPUT

C
Network Services

INPUT divides network services into network application services, which involve the processing of application messages from user to user, and electronic information services, wherein data, or information, is sold electronically.

1. Electronic Commerce Network Application Services

Exhibit III-20 shows the market for electronic commerce network application services.

Exhibit III-20

EC Network Application Services Market

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
EDI	270	341	26%	930	22%
E-Mail	141	165	17%	375	18%
Fax	71	88	24%	300	28%
FEDI/EFT	19	22	16%	35	10%
On-Line Services	2.0	4.6	130%	20	34%
Internet Access	0.6	1.4	133%	860	261%
Other	20	25	25%	60	19%
TOTAL	524	647	23%	2,580	32%

Source: INPUT

a. EDI Network Services

EDI network services is the "traditional" or base-line electronic commerce activity. It counts the service revenue of the value-added networks (VANs) in accepting EDI messages from one trading partner (TP) and putting them into the mailbox of the other TP. Bundled with the charges for this basic message transport are a variety of other value-added services that support the TPs. These include trading partner implementation, taking responsibility for delivery, and keeping audit trails, etc. The manner in which the services are offered also characterizes the message exchange as follows:

- Privacy - The VAN guarantees that the message will not be viewed by anyone but the intended recipient.

- Integrity - The VAN guarantees that the message will not be altered in its transit from sender to recipient.

- Non-repudiation - By keeping an audit trail, the VAN assures that the sender cannot deny that he sent the message, and the recipient cannot deny that he received it.

- Authentication - The VAN guarantees that the message comes from the TP that claims to have sent it. In other words, the message is not forged.

Alternatives to the use of VANs include direct connect and Internet connectivity. INPUT has measured the usage of these approaches, and the results are shown in Exhibit III-21. This topic is discussed in detail in section V-J of this report.

Exhibit III-21

Use of VAN Direct Connect and Internet Connectivity

Connectivity	Percent of Companies Using
VAN	87%
Direct Connect	19%
Internet	4%

Note: totals do not add to 100% because some companies use more than one connectivity approach.

Source: INPUT

Exhibit III-22 shows the EDI network service market in more detail. The market is growing at a very healthy 26%. Although the growth in traffic will continue at a similar rate through 2000, the revenue will grow a little more slowly, at 22%. This is because the existence of the Internet as a competing alternative will put downward price pressure on the VANs. (At the same time, Internet pricing will increase, and the Internet will no longer be perceived as a "free" alternative.)

Exhibit III-22

EDI Network Services Market

Vendor	1994 Revenues ($M)	1995 Revenues ($M)	1994 - 1995 Growth (%)
GEIS	95	118	24%
Sterling S/W	56	72	29%
Advantis	46	65	41%
Kleinschmidt	19	24	24%
Railinc	15	19	25%
Harbinger	12	15	25%
MCI	9	11	21%
EDS	5	6	15%
Other	13	11	-14%
TOTAL	270	341	26%

Source: INPUT

b. E-Mail, Fax and FEDI Network Services

Market figures for these EC network services are shown in Exhibit III-20 above. For our EC E-mail forecast, we only include the portion of the market that is inter-company and in support of commerce. This is calculated as shown in Exhibit III-23.

Exhibit III-23

Market for Electronic Commerce E-Mail Services

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
U.S. E-mail Service Market	565	610	8%	1,500	20%
% of E-mails Intercompany in Support of Commerce	25%	27%		25%	
EC E-mail Service Market Attributed to Commerce	141	165	17%	375	18%

Source: INPUT

As regards fax, INPUT counts only fax transmissions that are official commercial documents, such as purchase orders, etc. INPUT's forecast is shown in Exhibit III-24.

Exhibit III-24

Market for Electronic Commerce Fax Services

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
U.S. Fax Service Market	285	325	14	1,200	30
% of Faxes Official Intercompany Documents	25%	27%		25%	
EC Fax Service Market Attributed to Official Intercompany Documents	71	88	23	300	28

Source: INPUT

c. Proprietary On-Line Services

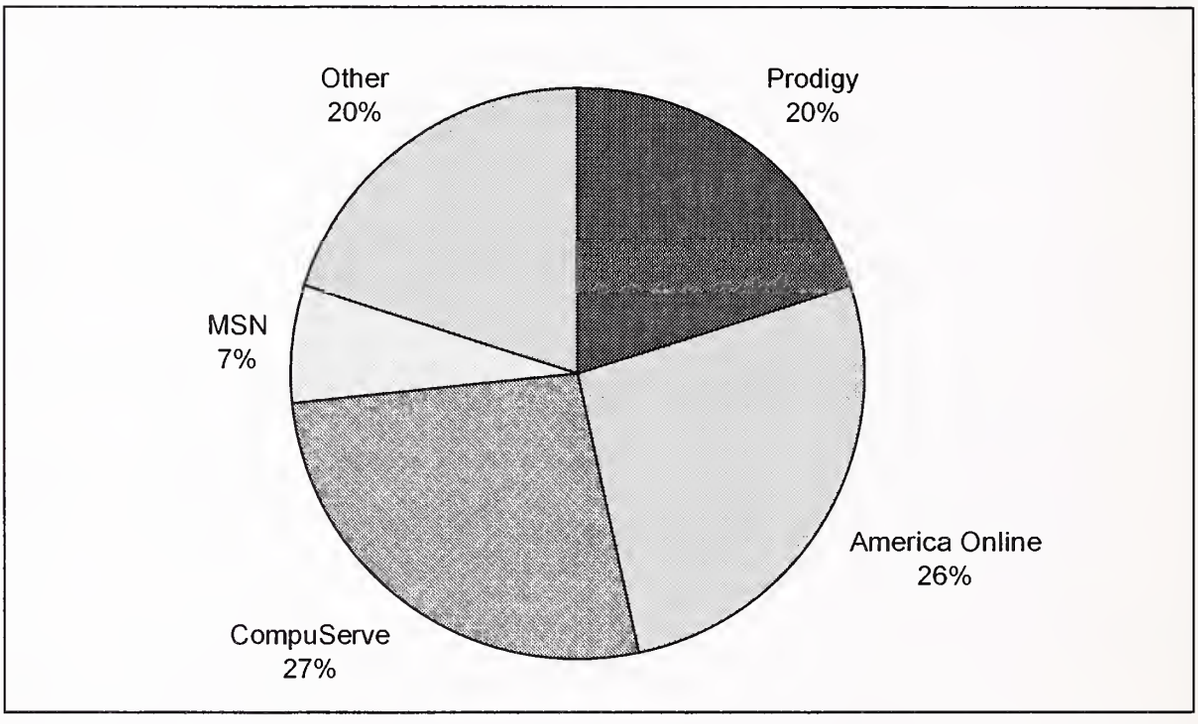
The proprietary on-line services such as Prodigy, CompuServe, etc., have electronic malls in which electronic commerce is conducted by companies that exhibit their goods and services and solicit purchases from the services' subscribers. This market is covered in detail in INPUT's report, *Electronic Catalogs, Web Storefronts and Internet Malls*. INPUT's survey measured the

usage of this new electronic commerce medium. The survey found 12% of companies using the on-line services as a sales channel.

Exhibit III-25 shows the on-line services companies' market share as measured by number of trading companies using their shopping areas to promote their goods.

Exhibit III-25

Electronic Commerce Market Share of On-Line Services



Source: INPUT

Participants in the survey were also asked how much of their total business was conducted by sales through the on-line services. In all cases, the answer was less than 10%, showing the relative immaturity of this channel. Additionally, INPUT asked for the percentage of the total sales price held as a commission by the on-line service; this information is used to calculate the revenue of the on-line services as a result of electronic commerce, as shown in Exhibit III-26. As will be seen, the total revenue from this source is still small, at $4.6 million.

Exhibit III-26

Electronic Commerce Market for On-Line Services

On-Line Service	1995 Sales Through Shopping Area ($M)	1995 Revenue from EC ($M)
Prodigy	70	0.9
AOL	91	1.2
CompuServe	98	1.3
MSN	24	0.3
Other	67	0.9
TOTAL	350	4.6

Source: INPUT

d. Internet Access Services for Commerce

In the INPUT report, *Electronic Catalogs, Web Storefronts and Internet Malls*, INPUT forecasts that $165 billion of goods and services will be sold over the WWW in 2000. This will result in significant revenues to the providers of the Internet access. INPUT forecasts that the telephone companies will gain major market share in Internet access, at the expense of the current set of ISPs. INPUT also believes that the on-line services will effectively become value-added ISPs. INPUT also forecasts that the EDI VANs, through the provision of Internet services that they are just now introducing, will also offer value-added Internet access. The INPUT forecast for Internet access revenue for commerce in shown in Exhibit III-27.

Exhibit III-27

Internet Access Revenue for Commerce

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
Internet Service Providers (ISPs)	0.1	0.2	100%	200	298%
Telephone Companies (RBOCS and IXC)	0.1	0.2	100%	350	345%
On-Line Service Providers	0.4	1.0	150%	180	183%
Value-Added Networks (VANs)	0	0	N/A	130	N/A
TOTAL	0.6	1.4	133%	860	261%

Source: INPUT

2. EC Electronic Information Services

Electronic information services, as the name implies, are services related to the sale of information, rather than to the value-added transmission of a customer's data.

Exhibit III-27 shows the size of this market, and the forecast through the year 2000. Though the market is growing, the rate of growth is not as great as in the network application services segment.

Exhibit III-28

Electronic Information Services Market and Forecast

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
Credit Data	1,216	1,370	13%	2,100	9%
Marketing/Sales Info.	724	811	12%	1,700	16%
Product and UPC Catalogs	227	295	30%	580	14%
CD ROM Catalogs	3	8	167%	95	64%
Other	100	220	120%	800	29%
TOTAL	2,270	2,704	19%	5,275	14%

Source: INPUT

a. Electronic Credit Data Services

This segment relates to the provision of electronic credit check information before a transaction is confirmed. The biggest companies are TRW and Equifax. Growth in this segment was very small in prior years (reported by INPUT to be only 4% between 1992 and 1993), but has now picked up to double-digit rates. The reason is the provision of new services by the industry. TRW, for example, has introduced programs for pre-approving consumer credit, and programs that extend down to the small business level, rather than focusing on large business only. The companies are looking at the provision of credit data over the WWW, and will doubtless introduce this capability soon, although not until security concerns are resolved (for more information, see INPUT's report, *Electronic Commerce Over the Internet*). The electronic credit information market is shown in Exhibit III-28.

Exhibit III-29

Electronic Credit Information Market

Vendor	1994 Electronic Credit Data Revenues ($M)	1995 Electronic Credit Data Revenues ($M)	Growth (%)
TRW	405	450	11%
Equifax	496	580	17%
TransUnion	260	280	8%
Other	55	60	9%
TOTAL	1,216	1,370	13%

Source: INPUT

b. Marketing/Sales Information

This segment involves the capture, processing and sale of data relating to product sales. Typically, the data is automatically collected at the point of sale. After processing, the information is used to detect sales patterns and for other marketing purposes. The technology used for processing is referred to as "data mining." The largest companies participating in this market are IRI/LogicNet and Nielsen. The market for this segment was shown in Exhibit III-27.

c. Product and UPC Catalogs

This is a relatively new market segment pioneered by Quick Response Systems (QRS), and quickly followed by Sterling and GEIS, among others.

The need for it arises from the fact that manufacturers have such a proliferation of products, and their product mixes change so frequently, that purchasers have a difficult time knowing which products are available for order at any given time. For example, in the retail garment industry where QRS has a major market share, fashion changes dictate short product life cycles, and size, color, pattern and fabric diversity lead to a great number of similar, but slightly different, products.

To help purchasers know what is orderable, the vendors will upload their data of UPC codes and associated specifications to a QRS database, which QRS will make available to the purchasers. Purchasers find this service so valuable that they sometimes mandate that all their suppliers have their data in the database. For example, Dillards and Federated have done this to the benefit of QRS. The databases can be very substantial. QRS's has over 40 million entries from 4,000 product vendors and is accessed by over 150 retailers.

The product and UPC information vendors are able to leverage a sale of this database service in to a sale of VAN service to actually consummate the transaction. QRS resells Advantis for this purpose, and GEIS and Sterling use their own networks.

The market for product and UPC information was shown in Exhibit III-28.

d. CD ROM Catalogs

The use of CD ROM catalogs for commerce is a relatively new trend. It is associated with catalogs on the on-line services and on the WWW, and is discussed in detail in INPUT's companion report, *Electronic Catalogs, Web Storefronts and Internet Malls*.

Use of the technology is growing very rapidly at the current time because of the capacity available on a CD ROM, and the fact that it can store very rich content to market to the catalog user. For example, a video clip of a product in use can be stored on the disk. However, a disadvantage of the medium is the fact that as soon as a ROM has been made and shipped, it starts to get out of date as changes are made to the product line. Some companies are overcoming this by posting updates to the CD ROM on an on-line service, but users find that it is inconvenient to swap between the two media. As a result, INPUT projects that the growth rate of CD ROMs will decrease over the latter years of the five-year forecast period, and the use of Internet marketplaces will take up much of the market growth.

INPUT measured the use of CD ROM catalogs and found that 13% of companies surveyed are using them to promote their goods. Of the respondents currently using CD ROM catalogs, all except one reported less than 5% of total company business being transacted via this medium.

Exhibit III-28 shows the market for CD ROM catalogs to the year 2000. This revenue accrues to the producers of the CD ROMs and to the vendors of services and tools that turn a company's product information into a suitable format. There is a trend in the industry to use tools that convert company product data into a form suitable for either CD ROM or on-line (including WWW) formats.

D
Professional Services

Professional services for electronic commerce include consulting and systems integration for the development of electronic commerce systems, and maintenance and support revenue associated with sales of electronic commerce software.

Vendors of the consulting and systems integration services include the Big Six companies, EDS, and smaller consulting firms such as TSC that are establishing specific practices in electronic commerce. One small company selling PC EDI software—The APL Group—is experiencing very rapid growth—67% per year—and attributes this growth to the synergy of its professional services practice with its software sales. The market for electronic commerce professional services is shown in Exhibit III-30.

Exhibit III-30

Electronic Commerce Professional Services Market

	1994 ($M)	1995 ($M)	1994-1995 Growth (%)	2000 ($M)	1995-2000 CAGR (%)
Consulting and Systems Integration	600	700	17%	1,600	18%
Software Maintenance and Support	240	300	25%	850	23%
TOTAL	840	1,000	19%	2,450	20%

Source: INPUT

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Electronic Commerce User Profiling

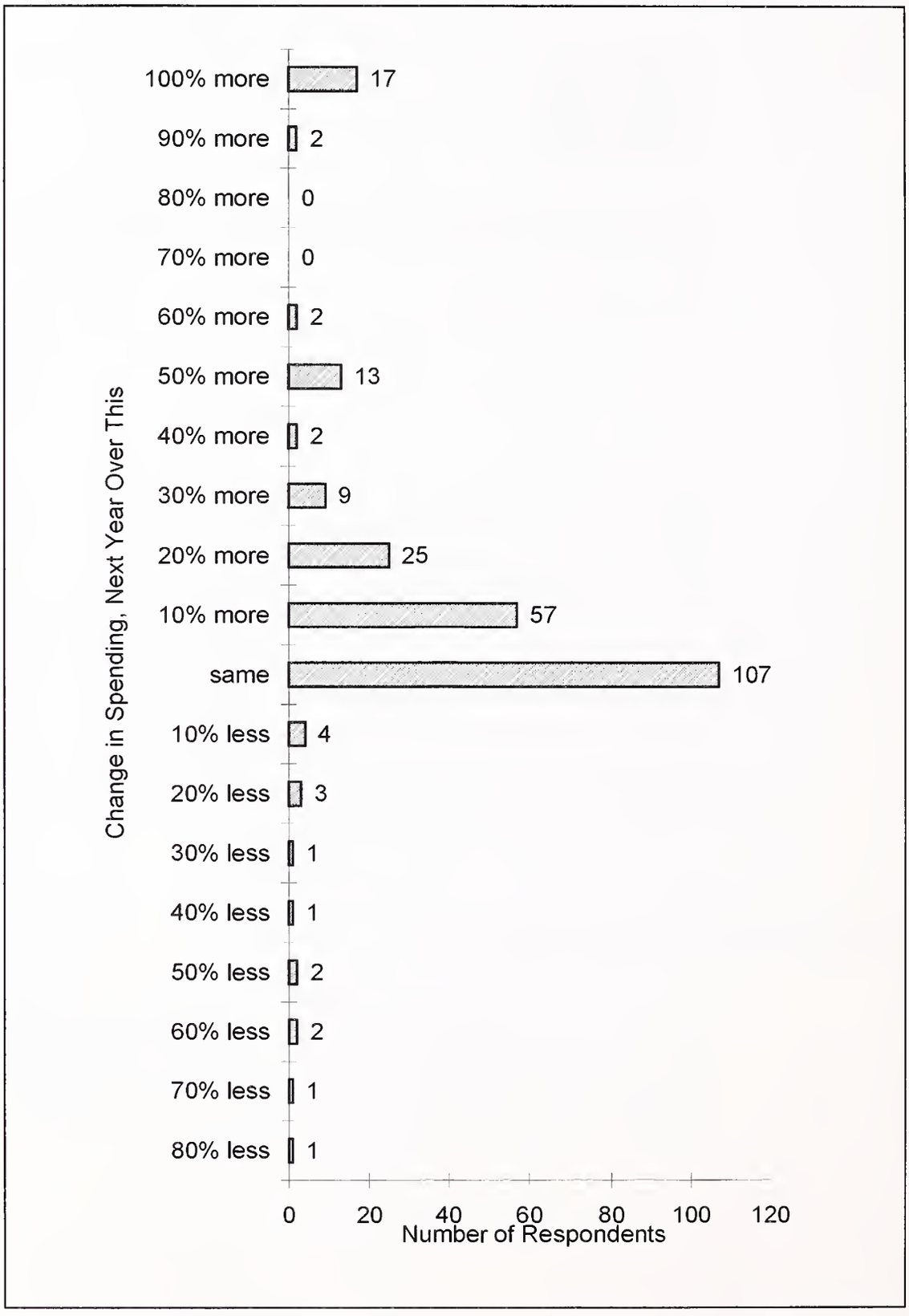
INPUT research for this report included detailed interviews with all major EC vendors, and over 290 companies using electronic commerce in the normal conduct of their business. The questions in the interviews were designed, in part, to uncover the market size of the various segments of the electronic commerce industry, as presented in Chapter III of this report. The questions were also designed to reveal how electronic commerce is being used today among EDI-capable companies. This information is compiled into this chapter. Vendors will be able to use this information to better target their marketing strategies and offerings. Users will also be able to benchmark themselves against industry norms and look for areas in which they could expand their EC usage to good benefit.

A
Spending on Electronic Commerce

Respondents were asked what their spending plans were for electronic commerce in the immediate future. As will be seen in Exhibit IV-1, there is a very distinct bias toward increased spending for the next 12 months, as compared to the last 12 months. This data is used in the calculations of market size presented in Chapter III.

Exhibit IV-1

User Company Spending Changes on Electronic Commerce



Source: INPUT

B

Computer Category Used for EDI

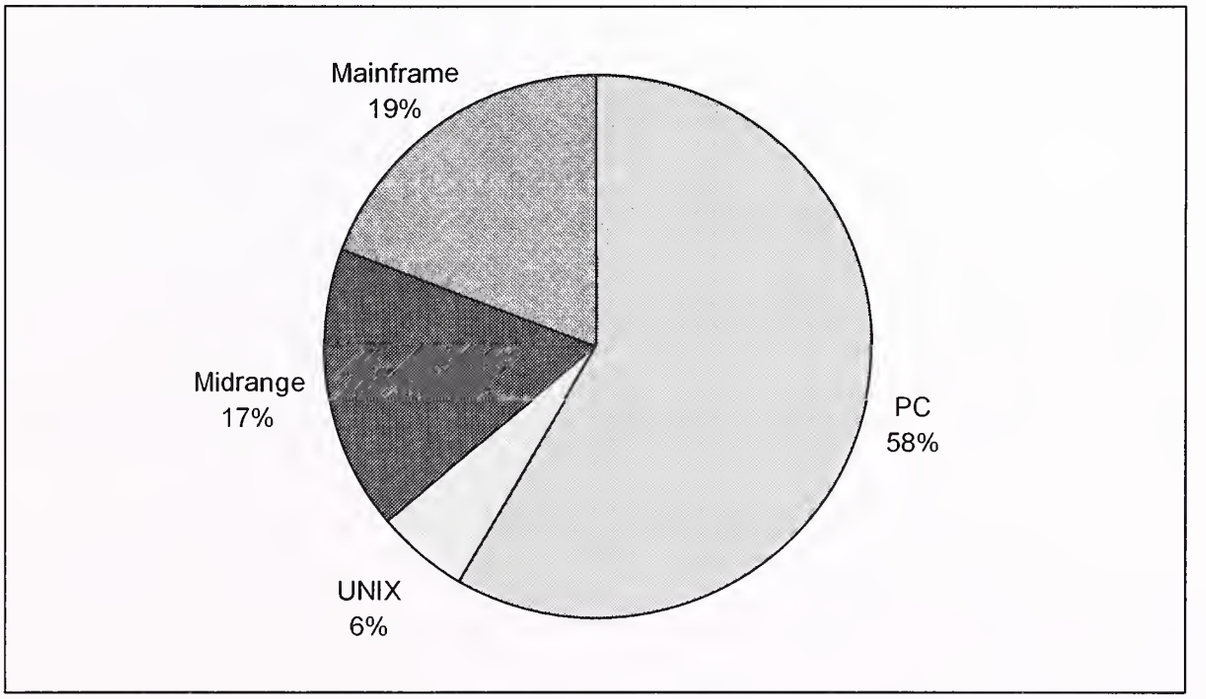
The computers used for running the EDI software, and therefore the software itself, can be categorized into one of four segments:

- PCs and PC clones
- UNIX-controlled workstations
- Midrange computers (including IBM AS/400)
- Mainframes

Exhibit IV-2 shows the distribution of the installed base of EDI software packages across these categories, as measured by the INPUT survey. This information will be of interest to vendors planning software products for these various segments. Note that the trend for the future is for much more growth in UNIX platforms. This is discussed in more detail in sections III-B-1-b and section V-C.

Exhibit IV-2

Distribution of EDI Software Categories across the Installed Base (Units)



Source: INPUT

C

EDI Usage of VANs, Direct Connect and Internet

Most companies use a VAN to interconnect with their trading partners, but there is much interest and activity, at the current time, concerning the potential for EDI messages to be carried on the Internet instead of through the VANs. In a companion report, *Electronic Commerce Over the Internet*, INPUT studies this topic in detail.

Another alternative to use of a VAN is for trading partners to connect to each other directly using leased lines or packet-switching networks such as MCI's. This approach is favored by some large hub companies anxious to save VAN charges. It can be shown that the business case for doing direct connect is very compelling when an organization is spending more than $1 million a year on VANs. However, many companies are opting to stay with the VANs in spite of this, because they are generally satisfied with the service offered (see INPUT's report, *Electronic Commerce Over the Internet),* and because they do not want to hire in-house staff to administer the direct connect situation. Exhibit IV-3 shows the distribution of companies using VANs, direct connect and the Internet, respectively. Many companies responded that they used multiple modes of communication. Note that, although as many as 4% of the companies responded that they are using the Internet, in all cases Internet usage was in test or pilot mode.

Exhibit IV-3

Use of VAN, Direct Connect and Internet Connectivity

Connectivity	Percent Of Use
VAN	87%
Direct Connect	19%
Internet	4%

Note: totals do not add to 100% because companies may use more than one connectivity approach

Source: INPUT

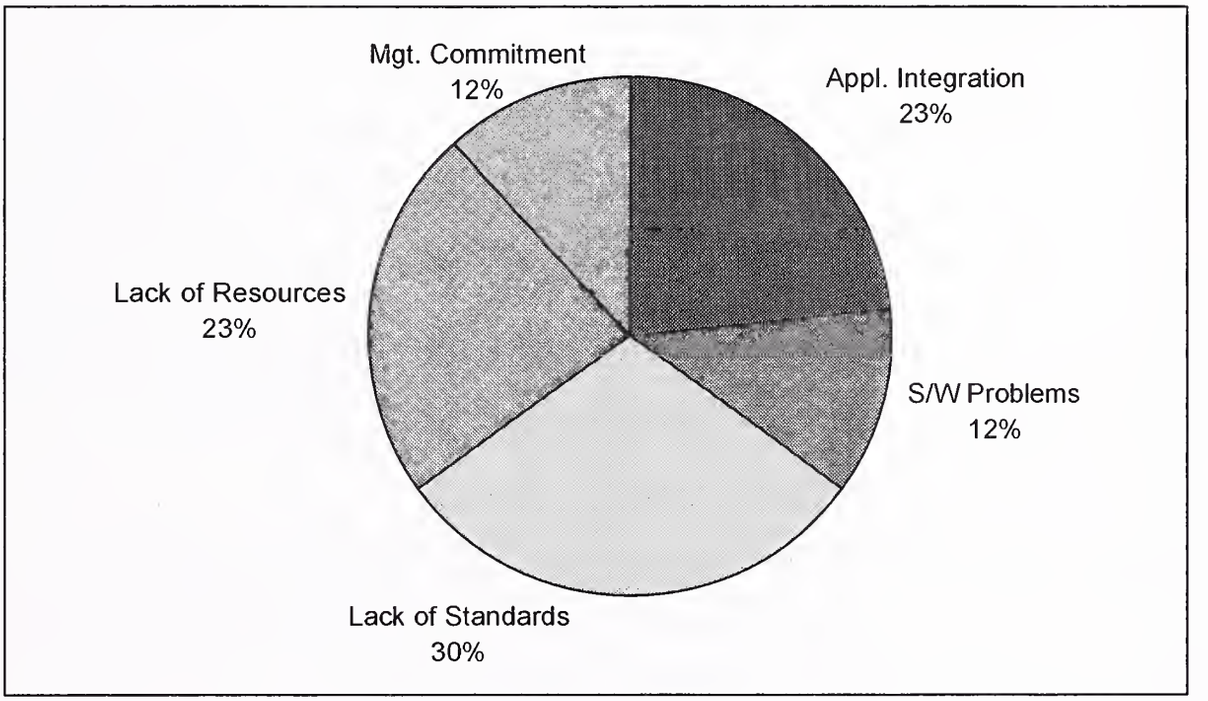
D

Perceived Obstacles to a Well-Functioning EDI Program

In the INPUT survey, users were asked what their biggest problems were that prevented them from having a well-functioning EDI program. Exhibit IV-4 shows the results.

Exhibit IV-4

Problems Preventing a Well-Functioning EDI Program



Source: INPUT

1. Lack of Standards

The most frequently mentioned problem is a lack of standards in the EDI environment. This is surprising to some, who think of EDI as a standard, but not to those practitioned in the field, who are aware that the EDI "standards" are really loose guidelines, and there are many ways of implementing them. In some industries there are more or less common industry practices, but often trading partners need to agree on a one-on-one basis as to how to interpret the standards. Each new agreement, of course, must be implemented either by configuring the EDI software or by changing the application to which it is connected. In INPUT's view, this problem is the main reason that EDI has never lived up to its ever-present promise of ubiquitous adoption.

Various initiatives to make an EDI-like process more robust are under way, under names like "new EDI" and "open EDI," but they do not have strong support, and are not being driven by the EDI vendors.

2. Support and Resources

The second and fourth most mentioned problems are "lack of resources (time and dollars)" and "lack of management support." These are linked inasmuch as lack of support will often manifest itself in lack of resources. They highlight the fact that many companies are operating contrary to a fundamental INPUT recommendation: that an EDI implementation only be undertaken as part of a company operating strategy, and not as a standalone cost-saving measure.

3. Integration to Applications

EDI, in its proper form, is application-to-application communication of transactions between remote computers. This means that the application and the EDI software in each computer must be integrated together. EDI software normally includes an Application Program Interface (API), but this is not standard. Consequently, users must modify their legacy applications to interface with the EDI package. If the application is a purchased product, then the application vendor must allow for the integration. Either way, this is a source of difficulty in implementing EDI, and often results in failure to achieve true application-to-application connection.

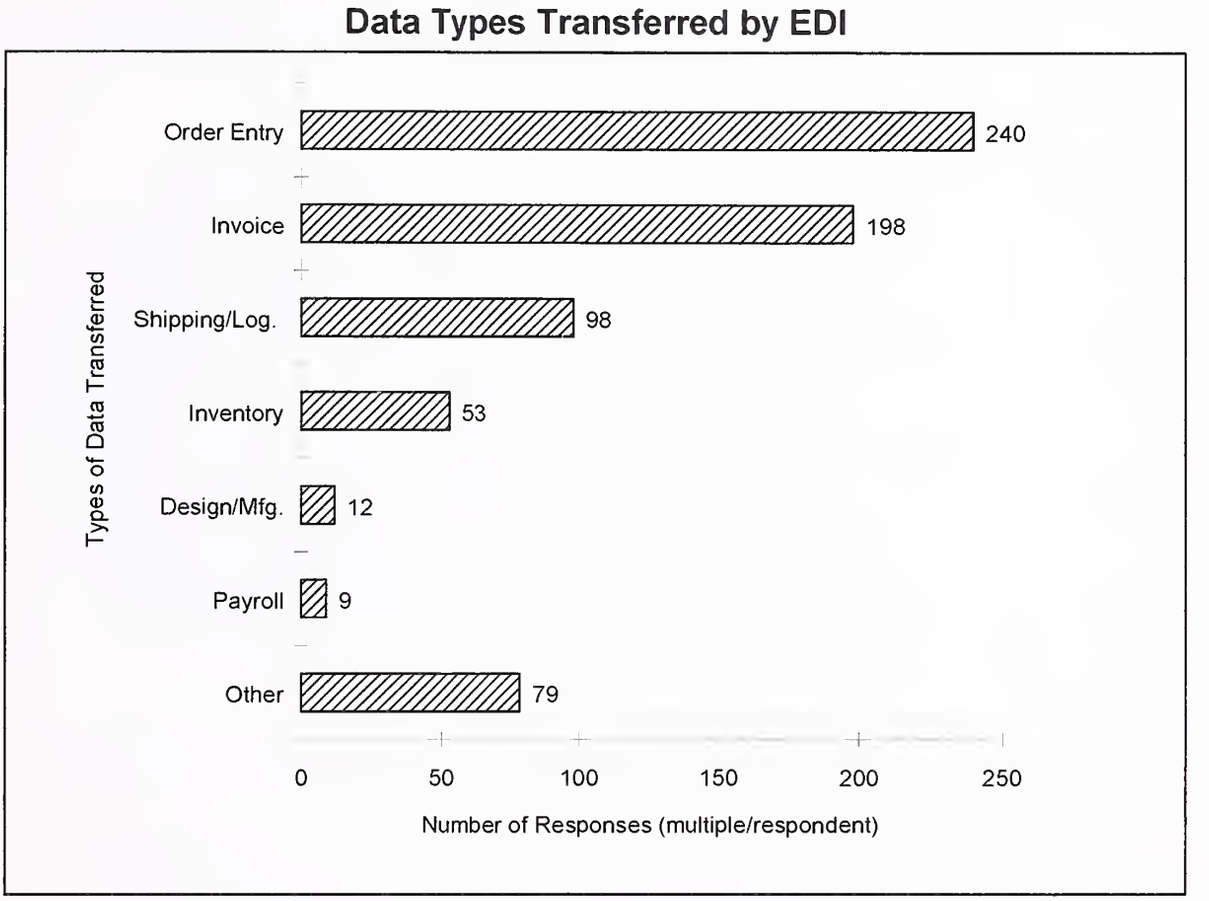
4. Software Stability

EDI packaged software problems were reported as only 12% of the difficulties. The fact that this percentage is relatively small indicates that the functionality and reliability of the EDI package is not seen as a gating problem in system implementation.

E
Data Types Transferred by EDI

Exhibit IV-5 shows the distribution of data types that are transferred most commonly using EDI. Note that the most used applications are related to sales/purchase and shipping. Although all EDI software packages have the ability to handle all of these transaction types, this chart indicates that some types are little used. INPUT recommends that the focus on removing the obstacles to using the existing transaction sets should be a higher priority than developing new ones.

Exhibit IV-5



Source: INPUT

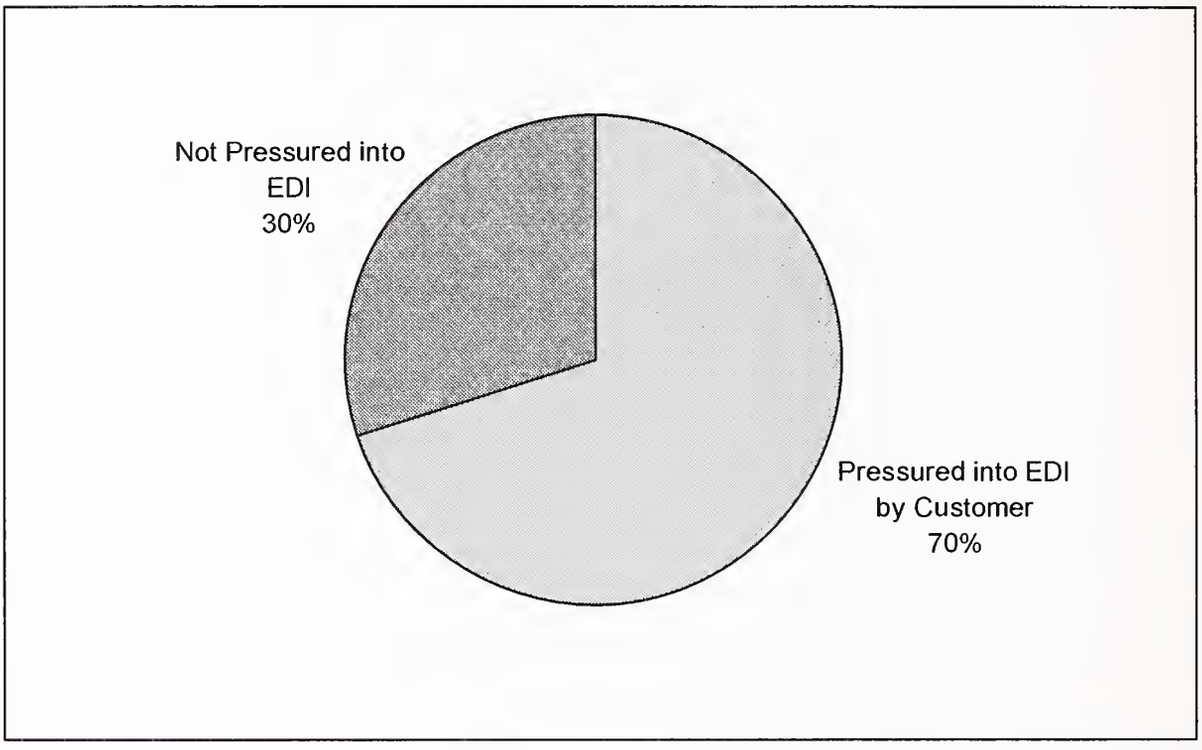
F

EDI Driven by Hubs

Many large companies (hubs) understand the efficiency that EDI offers to their communication with their trading partners (spokes), and encourage or pressure their smaller suppliers to become EDI capable. Exhibit IV-6 shows the percentage of companies that were pressured into the technology by a large customer. Marketers of EDI products and services will need to understand this phenomonem because it indicates that their efforts should be directed at the hub companies who will then help them sell (at least the requirement, if not the product) to the larger number of spokes.

Exhibit IV-6

Companies Pressured into EDI by a Large Customer



Source: INPUT

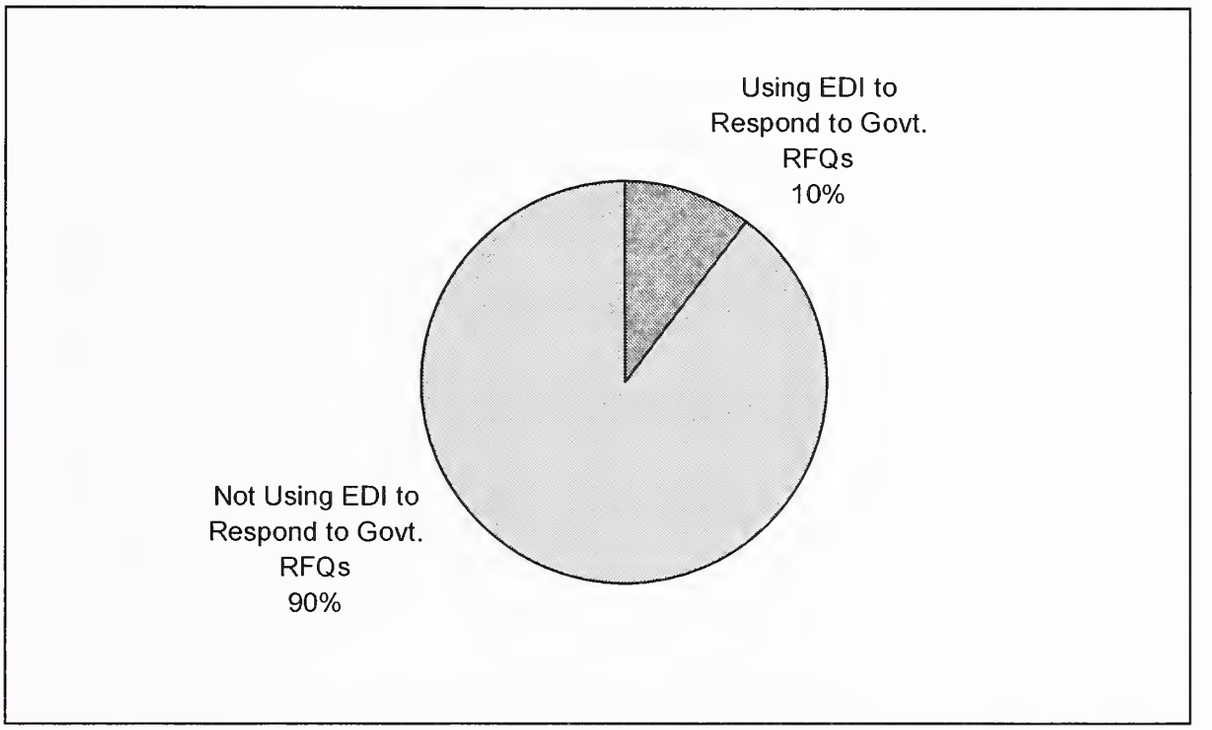
G

EDI Driven by Government

The U.S. federal government is operating under a major initiative to improve its efficiency in its dealing with its suppliers, and has mandated that all transactions will be electronic by 1997. Whether or not this happens in this timeframe, the initiative is being felt in the industry. INPUT has measured the increase in demand that this initiative is causing in EDI product and service sales. Exhibit IV-7 shows the percentage of companies using EDI to receive and respond to government RFQs.

Exhibit IV-7

Companies using EDI to Respond to Government RFQs

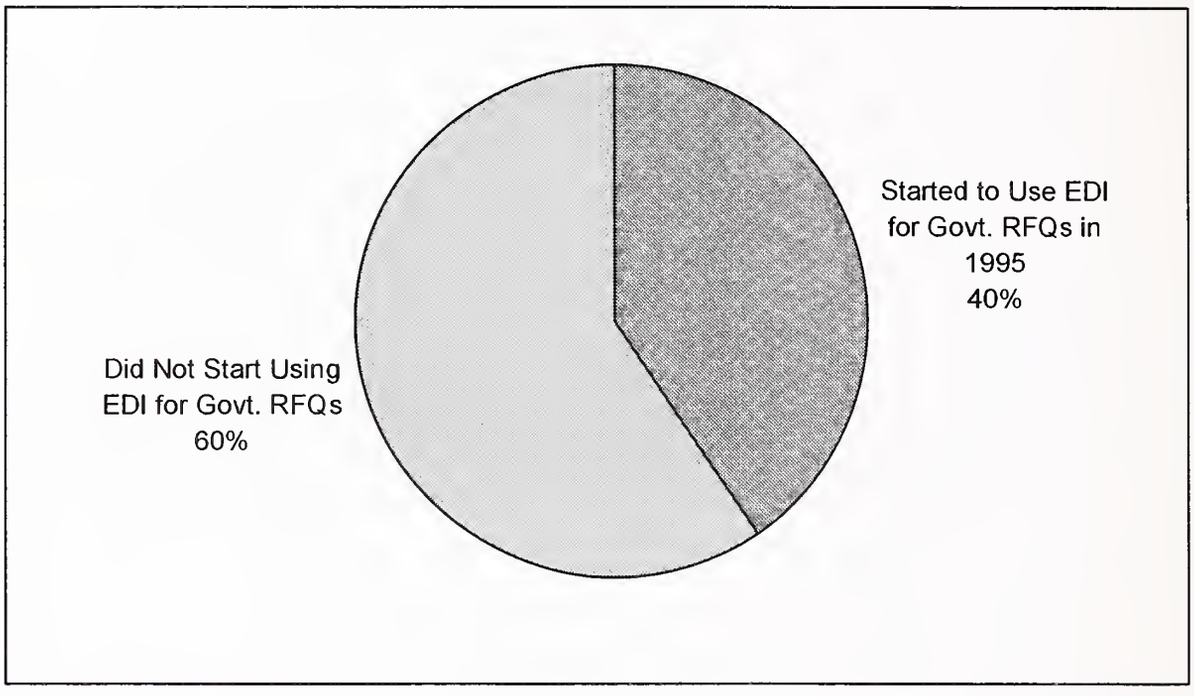


Source: INPUT

Although the 10% figure of companies using EDI to respond to government RFQs is not large, the percentage of these companies that have just started using EDI for this purpose is, as shown in Exhibit IV-8, about 40%. This indicates that about 4% of the total market growth (units, not dollar value) is attributable to government initiatives. This is primarily in the PC market segment. This information is used in the calculation of the market and forecast in Chapter III of this report.

Exhibit IV-8

Companies Using EDI for Government RFQs for the First Time in 1995



Source: INPUT

H

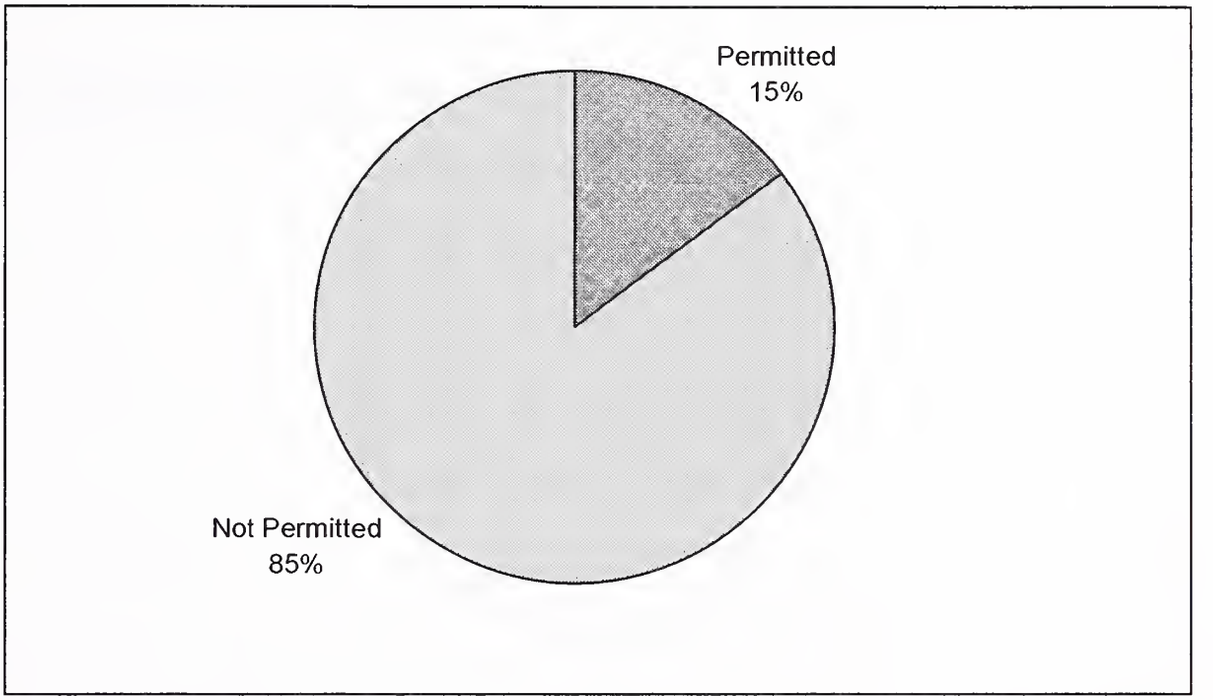
Usage of E-Mail for Electronic Commerce

E-mail has been used on an intracompany basis for a number of years. Recently, however, with the advent of the Internet, the use of E-mail between companies has grown significantly.

The electronic commerce market for E-mail is discussed and quantified in Chapter III of this report. In this section, we look at the way E-mail is being used by companies today. A specialized use of E-mail as an EC medium is the transmission of actual official documents as E-mail messages—for example, sending a purchase order that is an E-mail message. INPUT surveyed users as to whether E-mail was permitted as official communication in their company. Legal and audit implications and fear of the lack of security are factors that drive most companies to disallow E-mail as official documents, as Exhibit IV-9 shows.

Exhibit IV-9

Companies Permitting/Not-Permitting E-Mail as Official Documents

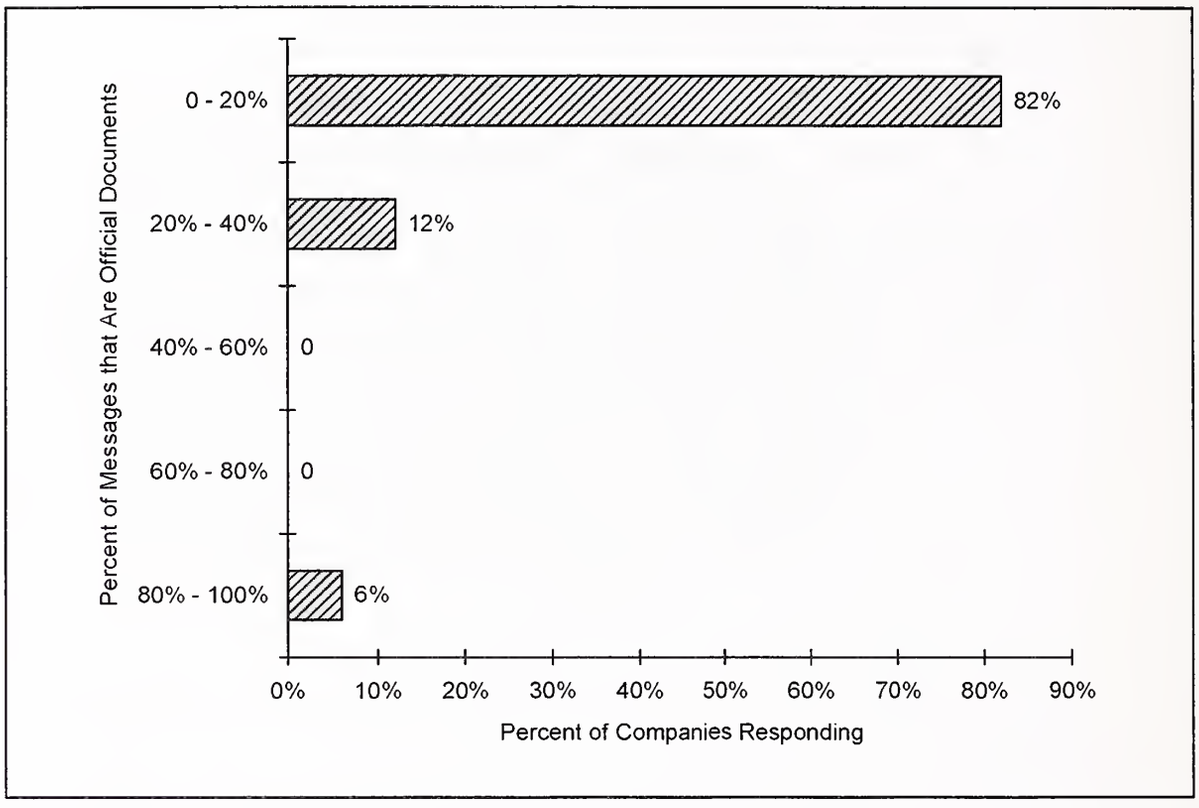


Source: INPUT

Within the 15% of the companies that permit E-mail to be used as official documents, the percent of messages that are such documents is rather small, as shown in Exhibit IV-10.

Exhibit IV-10

Distribution of Messages that are Official Company Documents



Source: INPUT

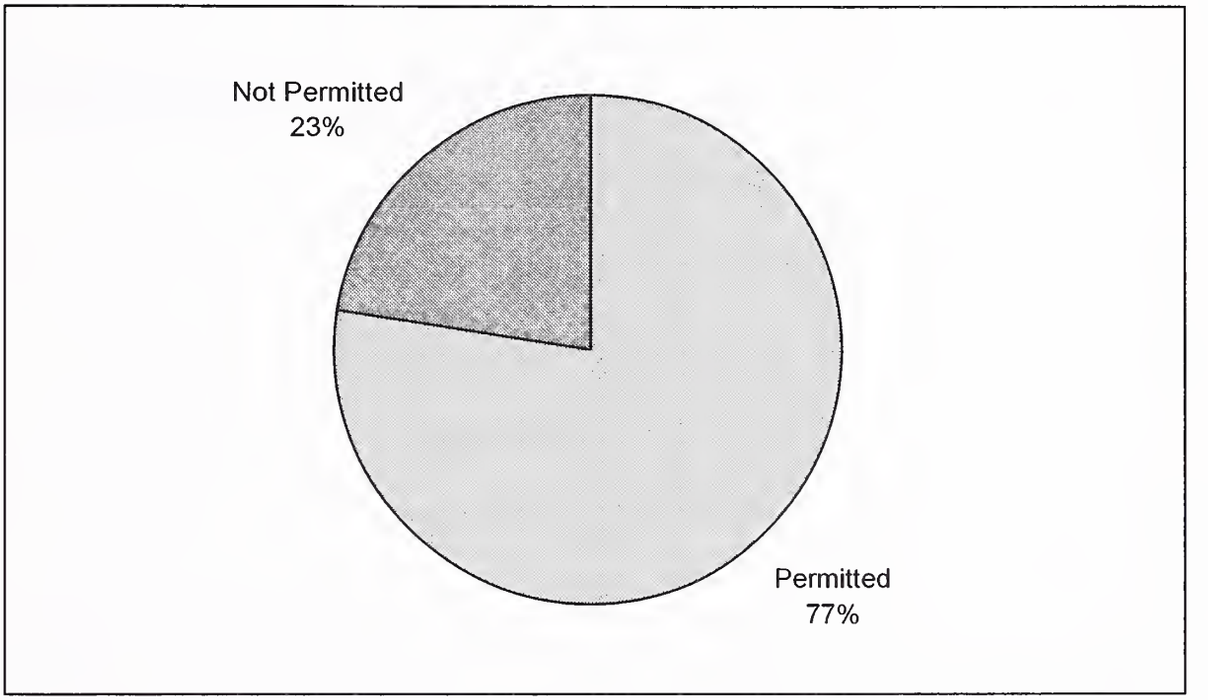
I

Usage of Fax for Electronic Commerce

Companies are inclined to allow fax documents as official company documents, as Exhibit IV-11 shows. This is in stark contrast to the situation for E-mail, where only 15% of companies permitted E-mail as official documents. In part, this is because a fax can include an exact replica of a signature, whereas E-mail has no such capability. Frequently, companies will require that the fax be backed up by an "original" sent through the mail (for audit purposes), but the fax will be acted on, and commitments made on the strength of it, before the "original" arrives.

Exhibit IV-11

Companies Permitting/Not-Permitting Fax as Official Company Documents

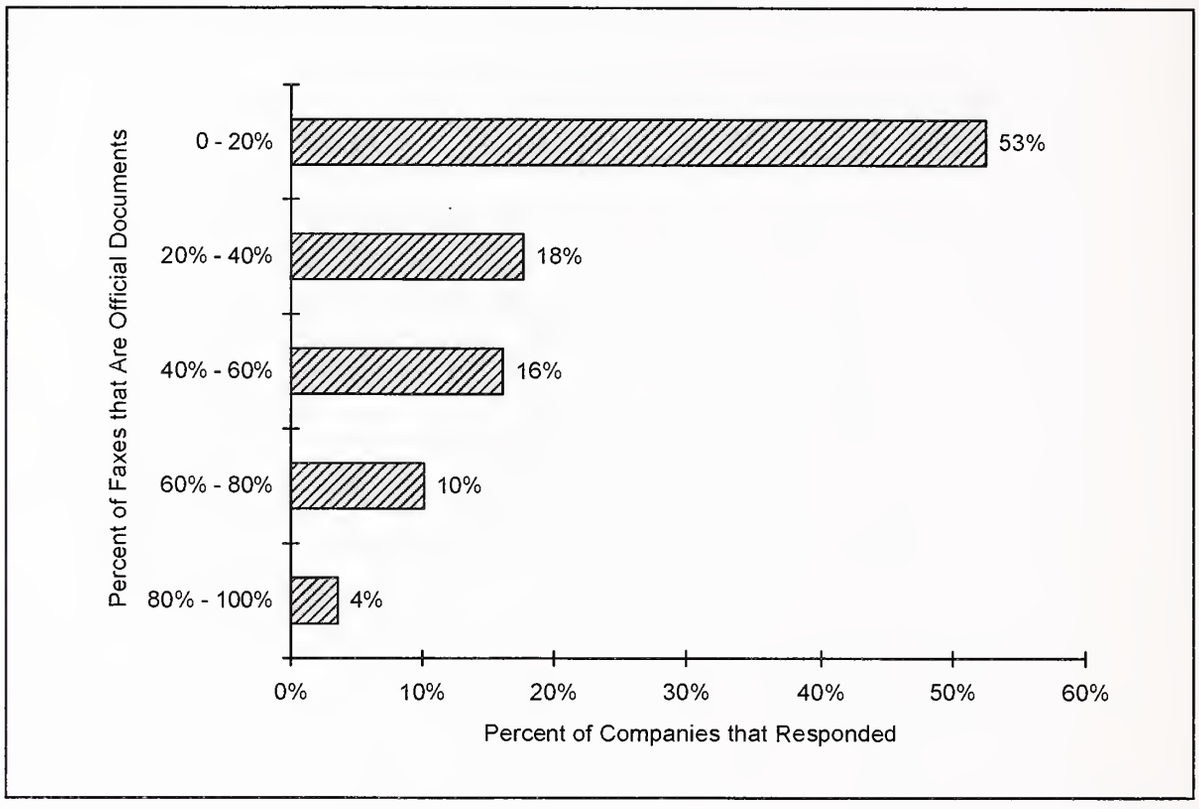


Source: INPUT

Among those companies that permit fax, INPUT found that the utilization of fax for commercial purposes was rather high, as Exhibit IV-12 shows.

Exhibit IV-12

Distribution of Faxes that Are Official Company Documents



Source: INPUT

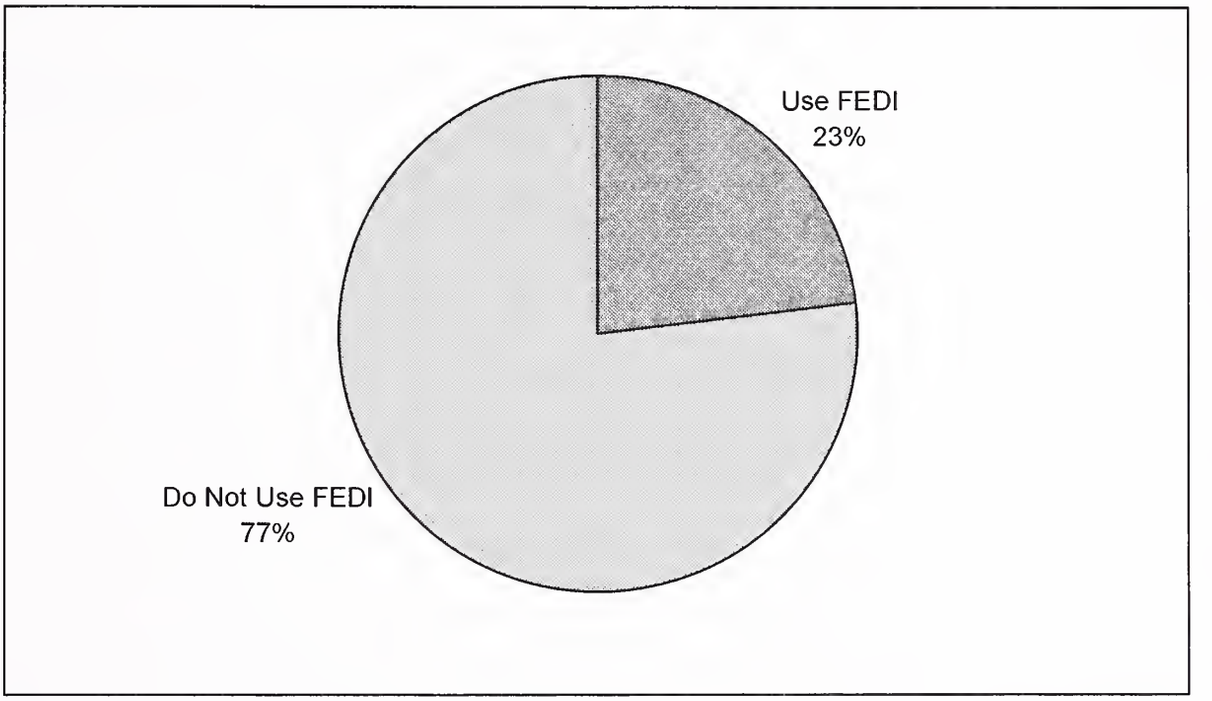
Even though the current acceptance of fax as a valid medium for official intercompany documents is rather high, especially when compared to E-mail, INPUT's survey revealed that the growth of fax for this purpose will be higher than E-mail, though not as high as EDI. This is discussed further in Chapter V.

J
Use of Financial EDI (FEDI)

FEDI "completes the loop" of automated business transactions by carrying automation through to the payment for the transaction. This is a desirable goal for those wanting to improve business efficiency. A major difficulty in implementing FEDI, however, is the fact that four organizations must be co-ordinated in its implementation: two trading partners and their two banks. As a result, FEDI has not had the penetration that would otherwise have been expected. As Exhibit IV-13 shows, only 23% of companies surveyed are using FEDI to "complete the loop."

Exhibit IV-13

Companies Using FEDI

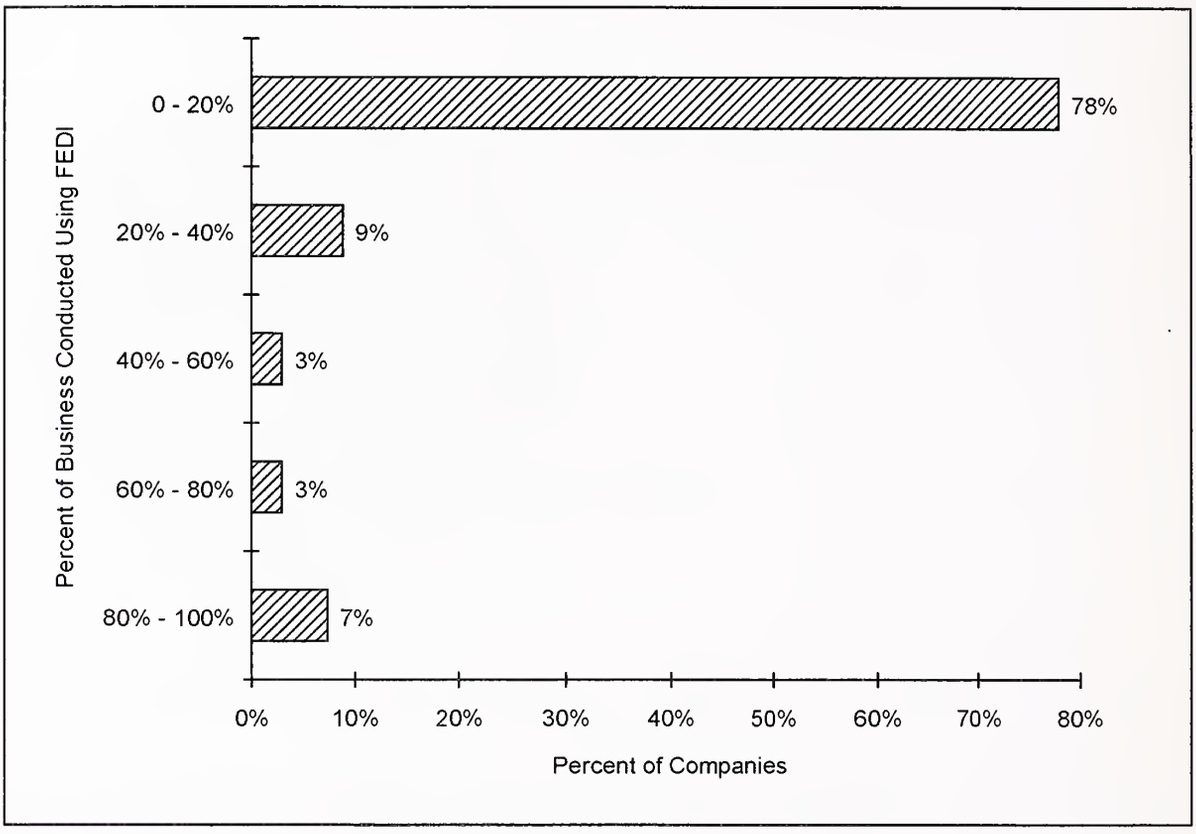


Source: INPUT

Among those companies using FEDI, the majority are using it only for a small number of their total transactions, as Exhibit IV-14 shows. However, there are also a significant number of these companies (7%) that are proactive in persuading the majority of their trading partners to use FEDI, and, as a result, conduct the majority of their business using FEDI.

Exhibit IV-14

Percentage of Business Conducted Using FEDI



Source: INPUT

K

Use of the World Wide Web for Commerce

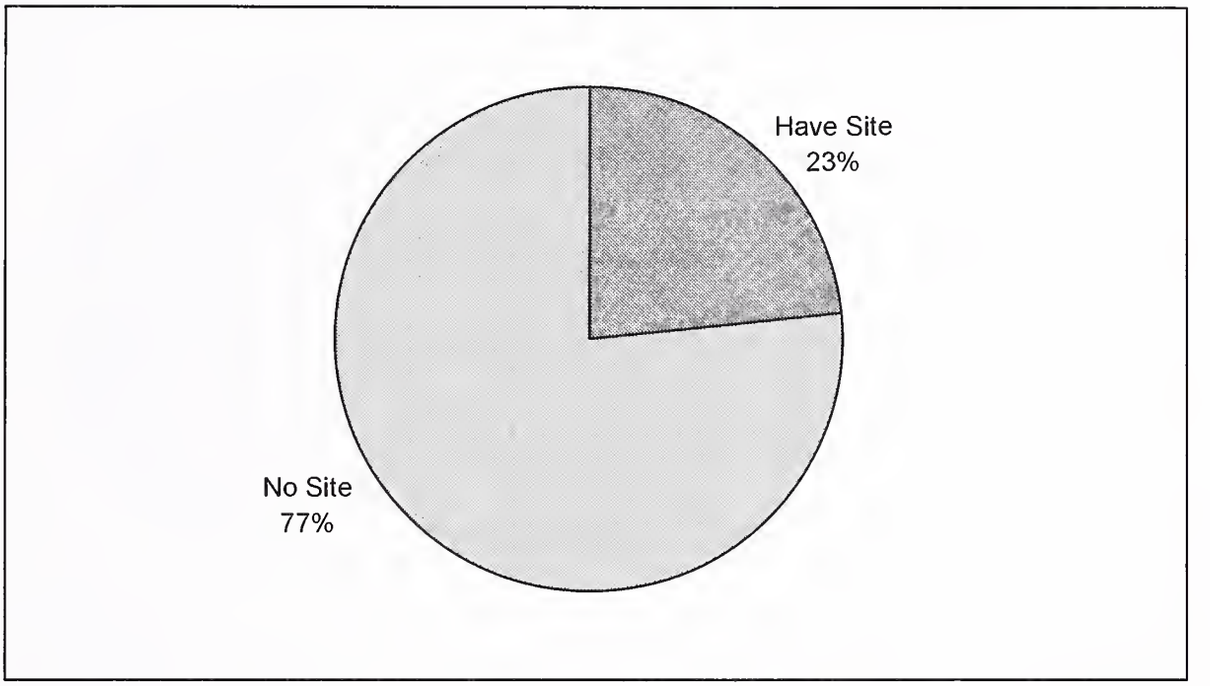
Because the market for electronic commerce over the World Wide Web is so new (this being the first year INPUT has included it in its Electronic Commerce Program forecasts), INPUT surveyed users about their current use of this technology.

1. Companies with WWW Sites

INPUT surveyed companies active in the use of EDI technology. Exhibit IV-15 shows the percentage of such companies that have a World Wide Web site intended for access by the public or customers.

Exhibit IV-15

Companies that Have Publicly Available WWW Site

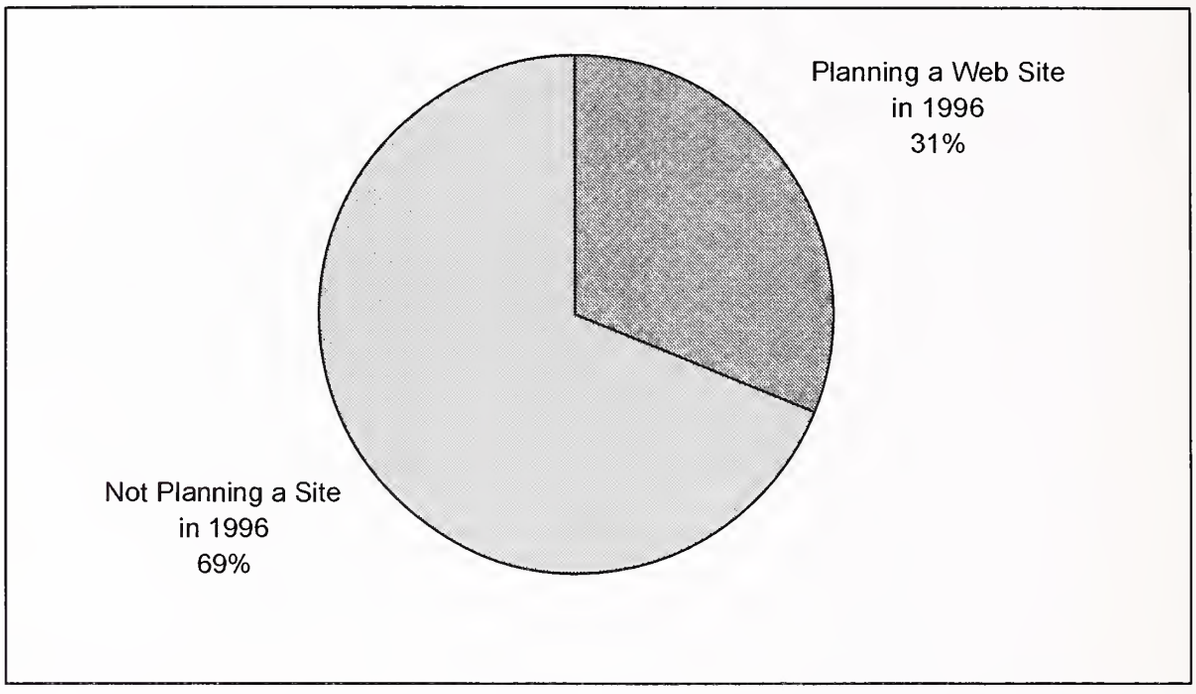


Source: INPUT

Of those 77% of companies that did not have a publicly available Web site, Exhibit IV-16 shows the percentage that indicate that they plan to put one up in 1996. Thus we see that 31% of the 77% of companies are planning Web sites in 1996—an enormous growth rate that leads to the forecast in Chapter III of this report.

Exhibit IV-16

Companies Planning a Web Site in 1996



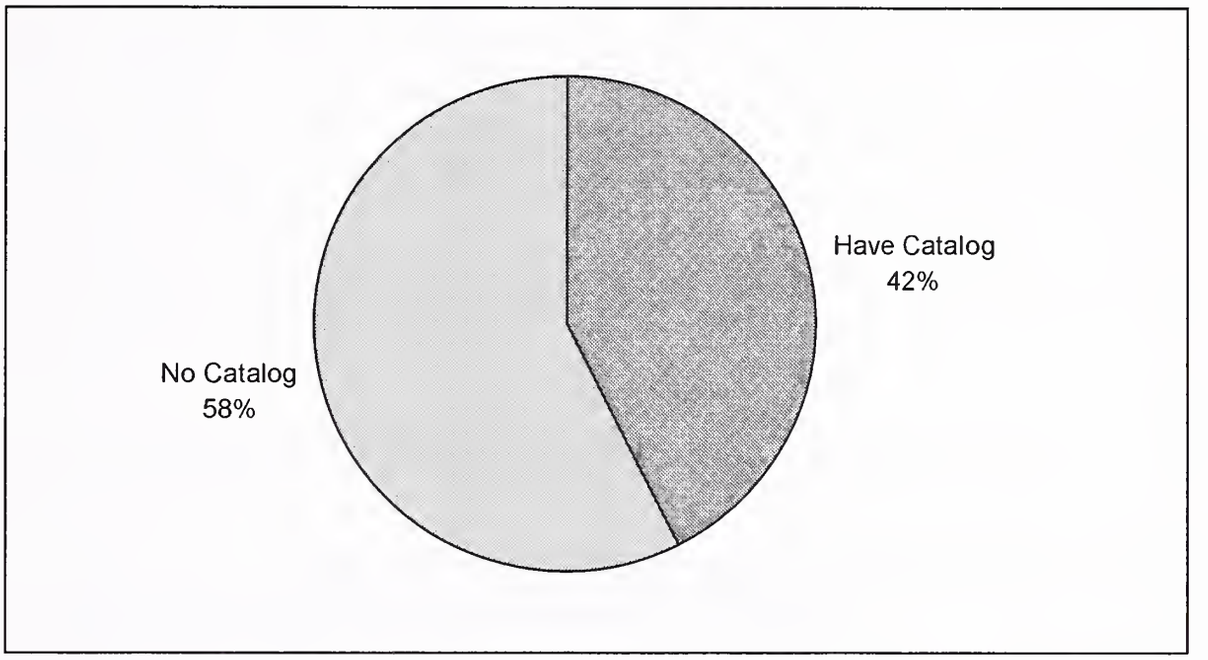
Source: INPUT

2. Product Catalogs on Web Sites

To have its WWW site used for electronic commerce, a company must put up a catalog of products and services on the site. Companies not doing this are presumably using their WWW sites as PR tools for the general dissemination of company information and not as trading vehicles. Exhibit IV-17 shows the percentage of companies with Web sites that currently have a catalog of products on the Web site.

Exhibit IV-17

Companies Exhibiting a Catalog of Products on Their Web Site



Source: INPUT

The survey found that, of those companies that did not have a catalog of products on their Web site, 47% were planning to put one up in 1996. This also is enormous growth that leads to the forecasts in Chapter III of this report.

3. Ordering and Payment Methodology

INPUT also surveyed users as to their method of conducting commerce over their Web sites. The most basic is that the Web site lists the products and services for sale, together with a telephone number (often an 800 number) that purchasers can call to place an order.

The next level of electronic commerce will have a form at the Web site which the purchaser can fill in his/her name and telephone/fax number. Sales staff from the company operating the site will then call back the purchaser, and take the order in the conventional way.

At the third level, the Web site presents an order form to the purchaser, who fills it in using a browser. In this option, the purchaser will also provide details that complete the payment for the goods or services offered. Commonly, today, the payment will be made by entering the number of a credit card (for consumer purchases) or purchasing card (for business purchases). In the future, payment according to this scenario may also be made with digital cash. (This is the subject of an upcoming report in INPUT's Electronic Commerce Program in 1996.) Where payment is made as part of the order, it is necessary to use security techniques to prevent eavesdropping

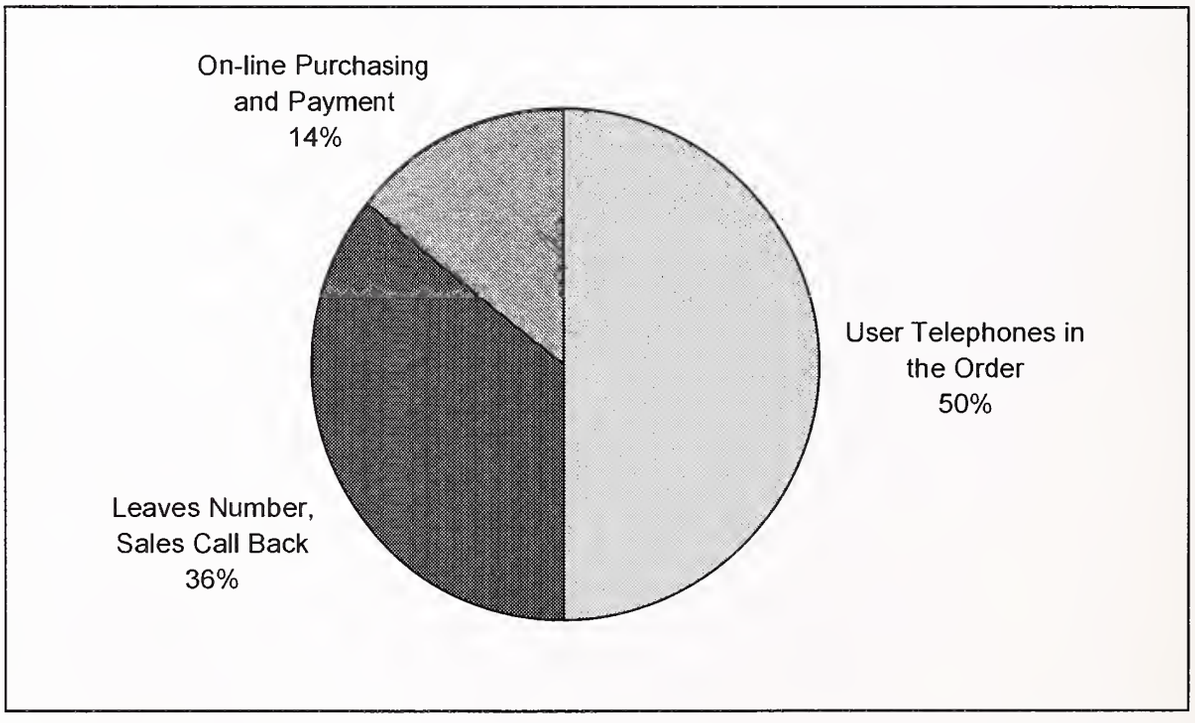
upon or modification of sensitive information. This is typically done using a secure server/browser combination, such as Netscape's Commerce server.

The industry is moving toward bundling security into all browsers. The exception at this time is Netscape, the market leader in browser and server sales. Currently, Netscape charges $495 for its "non-secure" NT Communications Server and $1295 for its secure Commerce Server, which includes public key encryption technology licensed from RSA Data Security, Inc. Equivalent UNIX prices are $1295 and $2295, respectively. As mentioned earlier, INPUT expects all servers to be sold with security in the near future. Today, all Netscape Navigator browsers are sold with capabilities to interwork with secure servers.

Exhibit IV-18 shows the distribution of companies offering the various levels of electronic commerce on their Web sites.

Exhibit IV-18

WWW Electronic Commerce Payment Methodologies in Use Today



Source: INPUT

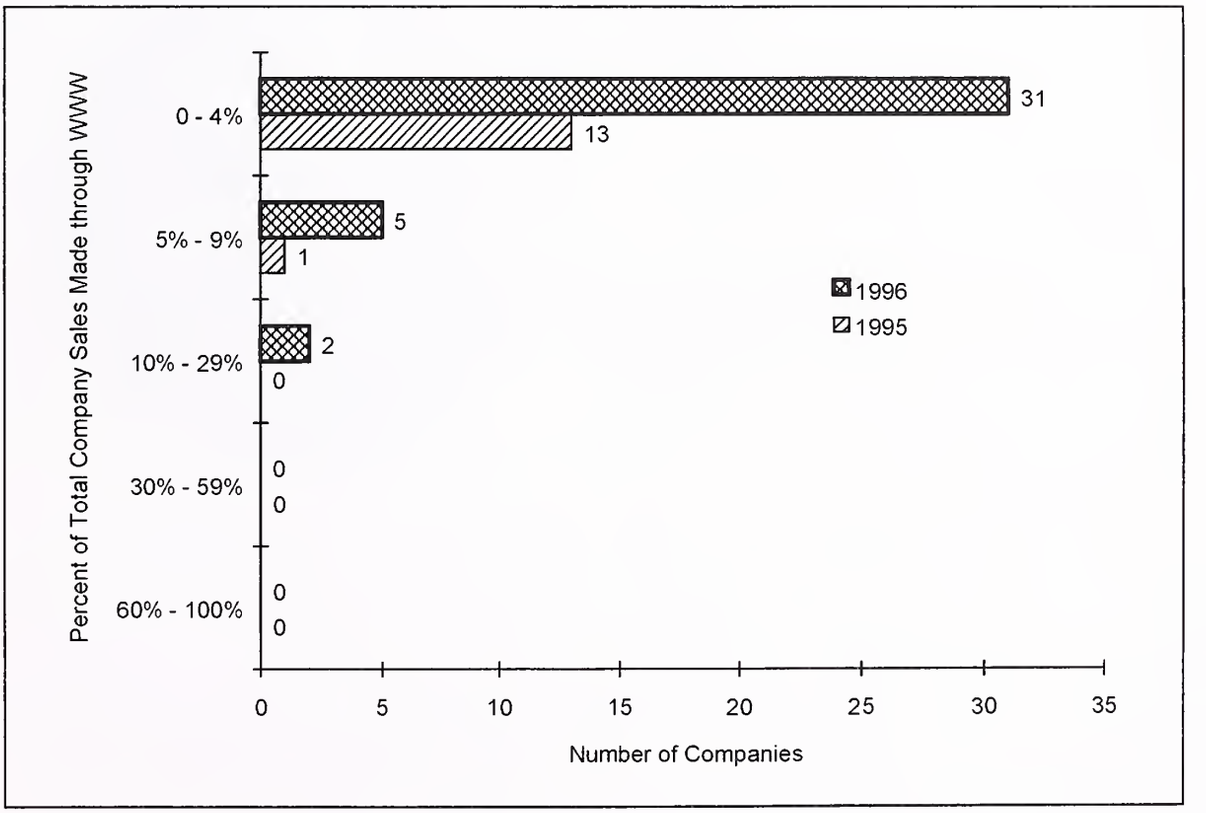
Based on indications from companies operating WWW sites for electronic commerce, and their plans for the future, INPUT forecasts the increase in companies accepting on-line payment as shown in Exhibit III-19 of this report.

4. Sales through Web Sites

The total sales made through WWW sites is still rather small. In INPUT's companion report, *Electronic Catalogs, Web Storefronts and Internet Malls,* the total amount of business transacted worldwide over the World Wide Web is estimated at $70 million in 1995, with business-to-business transactions accounting for $40 million. In the survey for this report, INPUT asked companies to indicate the percentage of total sales made through their Web sites, and the results, as shown in Exhibit IV-19, are highly consistent.

Exhibit IV-19

Percent of Sales, by Company, Made through Web Site



Source: INPUT

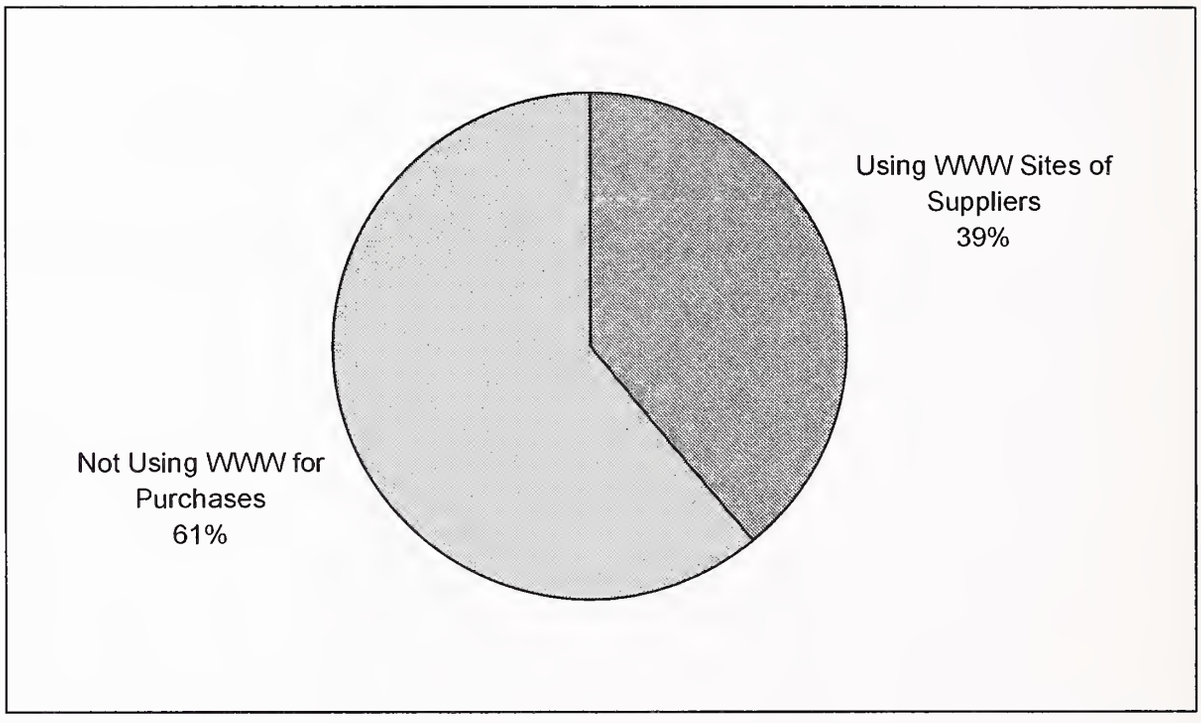
Note that even with a non-linear scale on the X-axis of Exhibit IV-19, we still see that almost all companies selling over a Web site in 1995 are doing only a small part of their business this way today. Respondents expect their volume of sales through the WWW to increase over 300% in 1996, as shown in the exhibit, with two companies expecting between 10% and 30% of their total business to be transacted over the Web. This, too, is consistent with the findings of the INPUT report *Electronic Catalogs, Web Storefronts and Internet Malls,* which forecasts a CAGR of business through the WWW of over 300% through 2000, at which time over $165 billion will be transacted in this way.

5. Usage of Web Sites of Others

INPUT wanted to check that companies operating WWW sites for electronic commerce actually believe in the technology, and are not just putting up the sites because it is the trendy thing to do. INPUT therefore surveyed users who have Web sites now, or are planning on putting up Web sites in 1996, as to whether their own staff consult the Web sites of their own supplier companies to make purchases. Exhibit IV-20 shows the results.

Exhibit IV-20

Companies Using the WWW Sites of Others



Source: INPUT

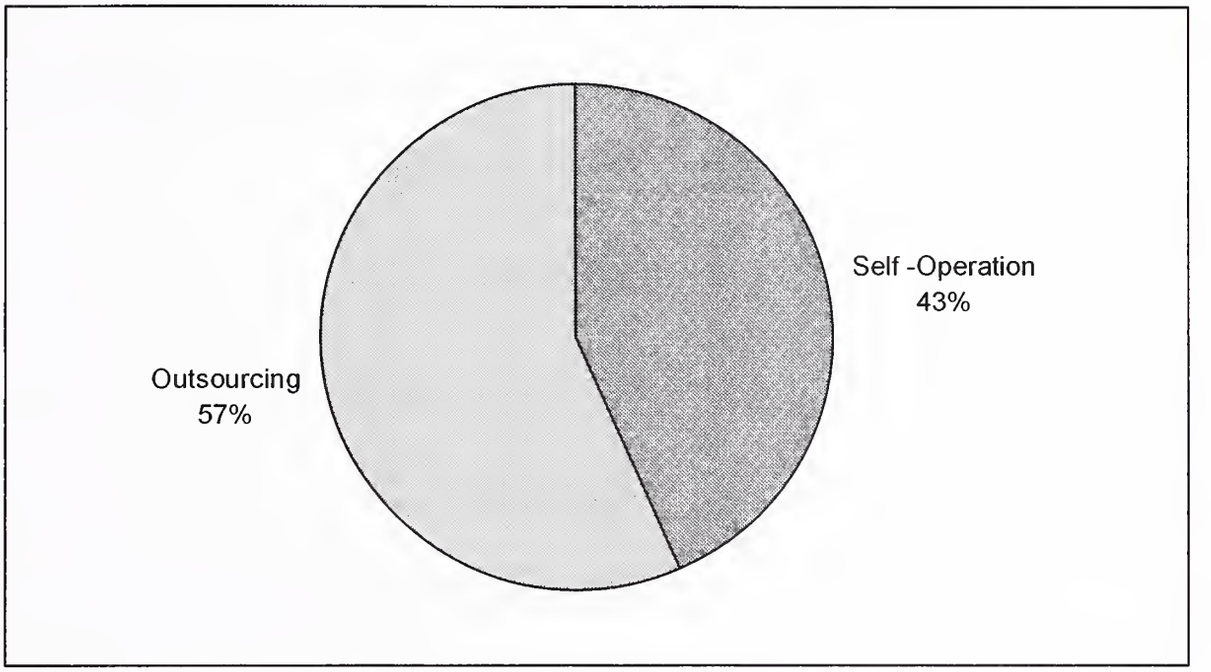
We see that 39% of companies surveyed use the Web sites of their potential supplier companies to make purchase decisions. This should be compared with Exhibit IV-17, where it was shown that 42% of the same companies had a catalog of their goods and services on the Web, ready for electronic commerce. Since these two figures are somewhat similar, we conclude that there is about as much interest in using the Web for selling as there is for buying, and that sellers' expectations of buyers buying are reasonable.

6. Use of Web Hosting Services

INPUT wanted to understand whether companies were operating their own Web sites, or if they were using Web hosting services to outsource the server operation. As Exhibit IV-21 shows, 57% of companies with Web sites are outsourcing the operation to Web hosting services. This does not imply, however, that they are establishing their presence in an Internet mall as opposed to having their own individual storefront.

Exhibit IV-21

Self-Operation or Outsourcing of Web Site

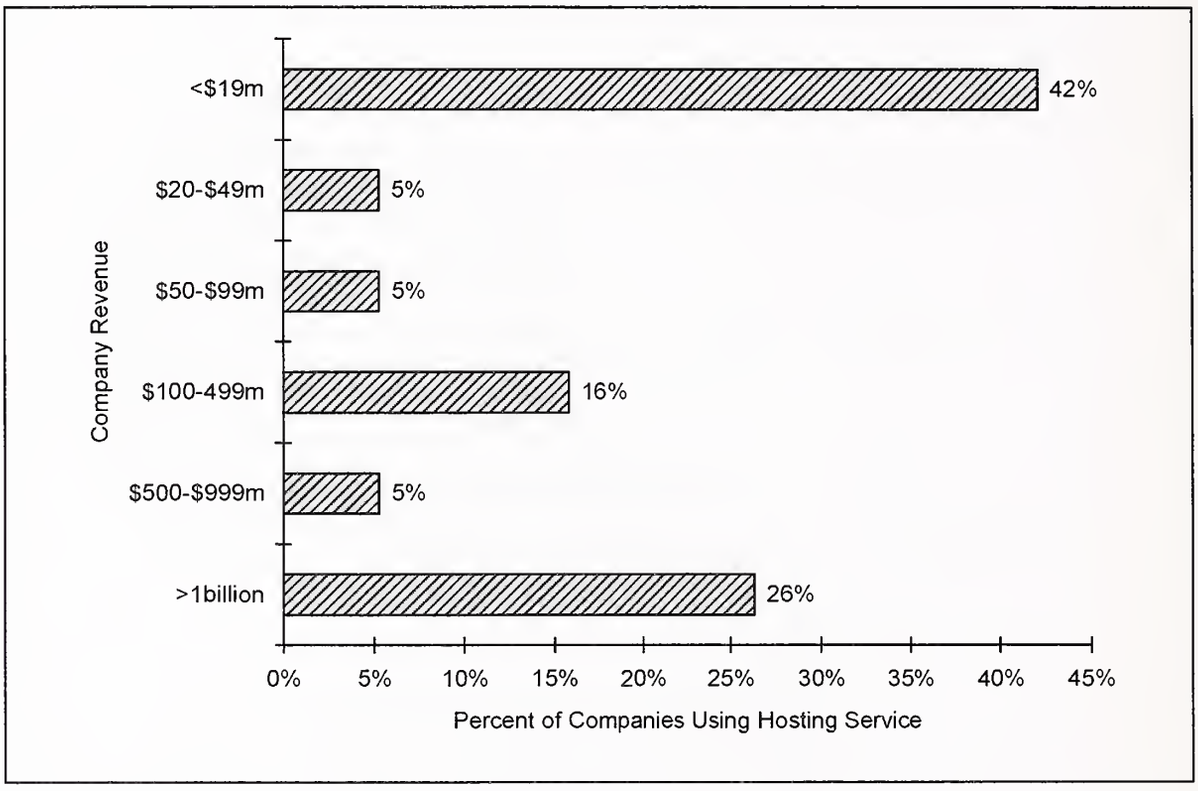


Source: INPUT

There does not appear to be any strong correlation between the size of a company and its choice of a Web hosting service to operate its Web site, as shown in Exhibit IV-22.

Exhibit IV-22

Use of Web Hosting Services by Company Size



Source: INPUT

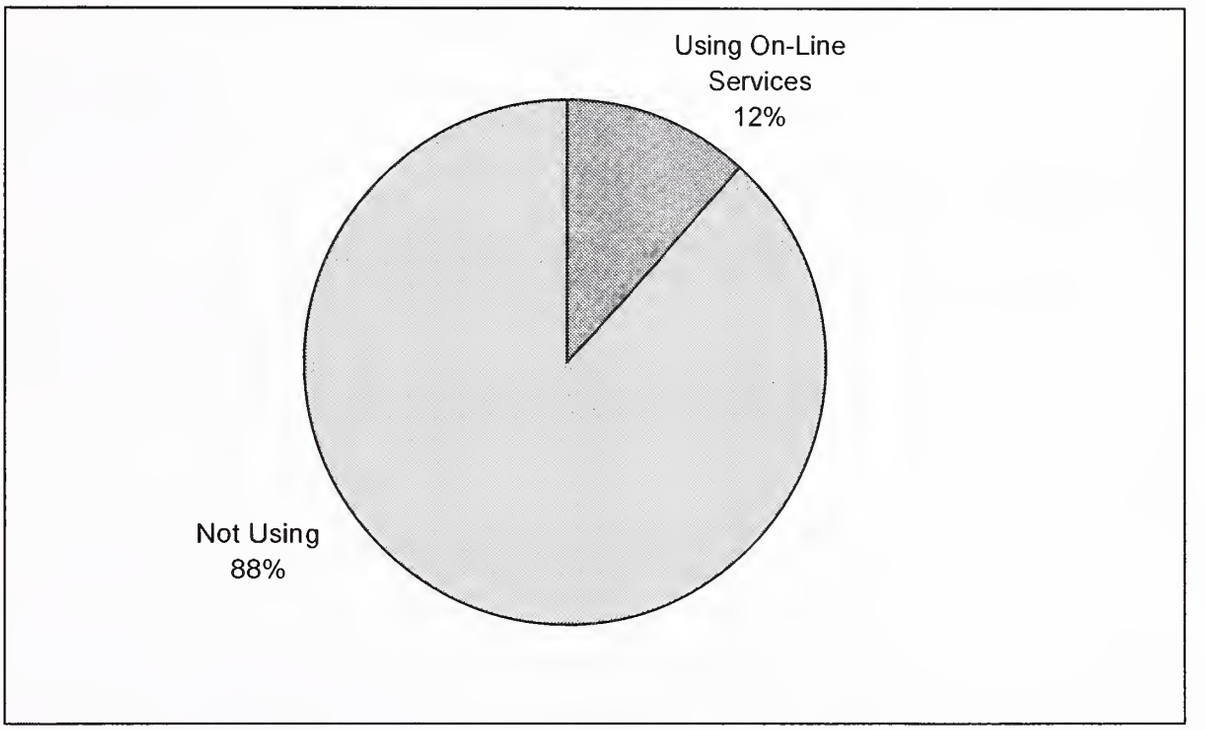
L

Use of Proprietary On-Line Services for Electronic Commerce

Proprietary on-line services such as Prodigy, CompuServe, etc., have electronic malls where electronic commerce is conducted by companies who exhibit their goods and services and solicit purchases from the services' subscribers. This market is covered in detail in INPUT's report *Electronic Catalogs, Web Storefronts and Internet Malls*. INPUT surveyed companies to understand their usage of this new electronic commerce medium. Exhibit IV-23 shows the percentage of EDI-capable companies that are using the on-line services as a sales channel.

Exhibit IV-23

Companies Using On-Line Services as a Sales Channel

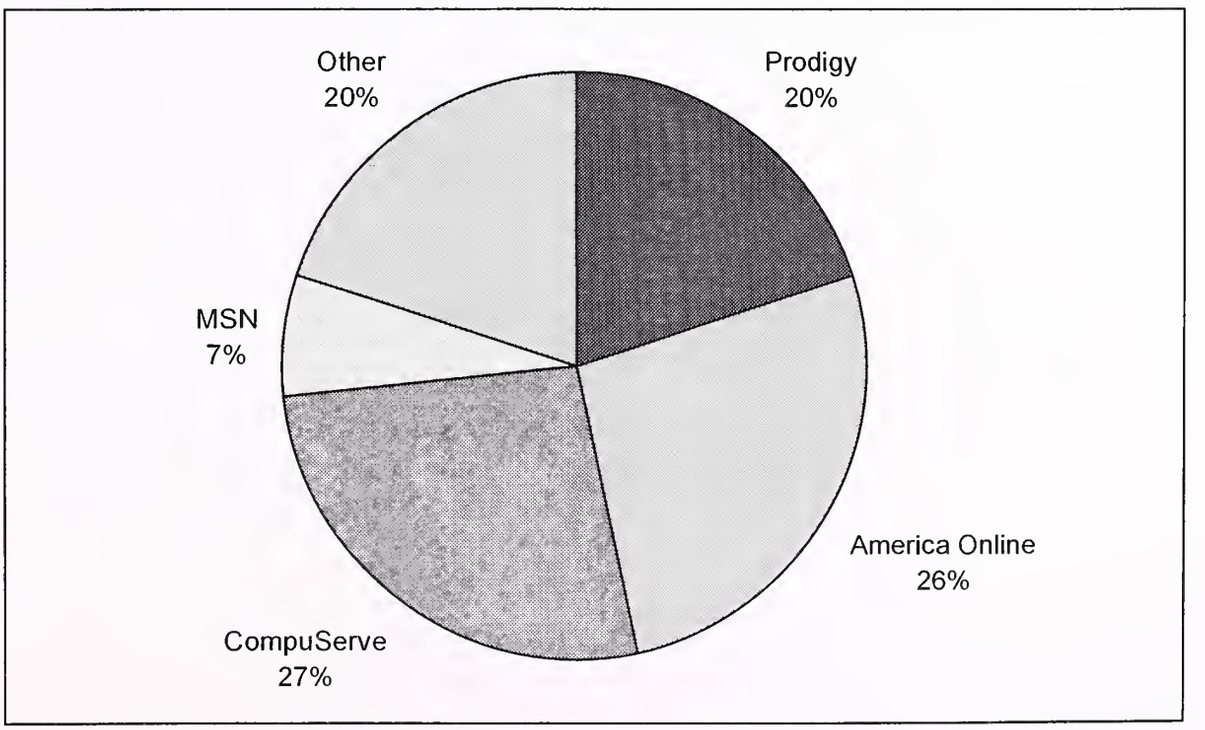


Source: INPUT

Exhibit IV-24 shows the market share for electronic commerce of on-line services companies, as measured by number of customers.

Exhibit IV-24

Electronic Commerce Market Share of On-Line Services



Source: INPUT

Participants in the survey were also asked what percentage of their total sales were made through the on-line services. In all cases, the answer was less than 10%, showing the relative immaturity of this type of electronic commerce.

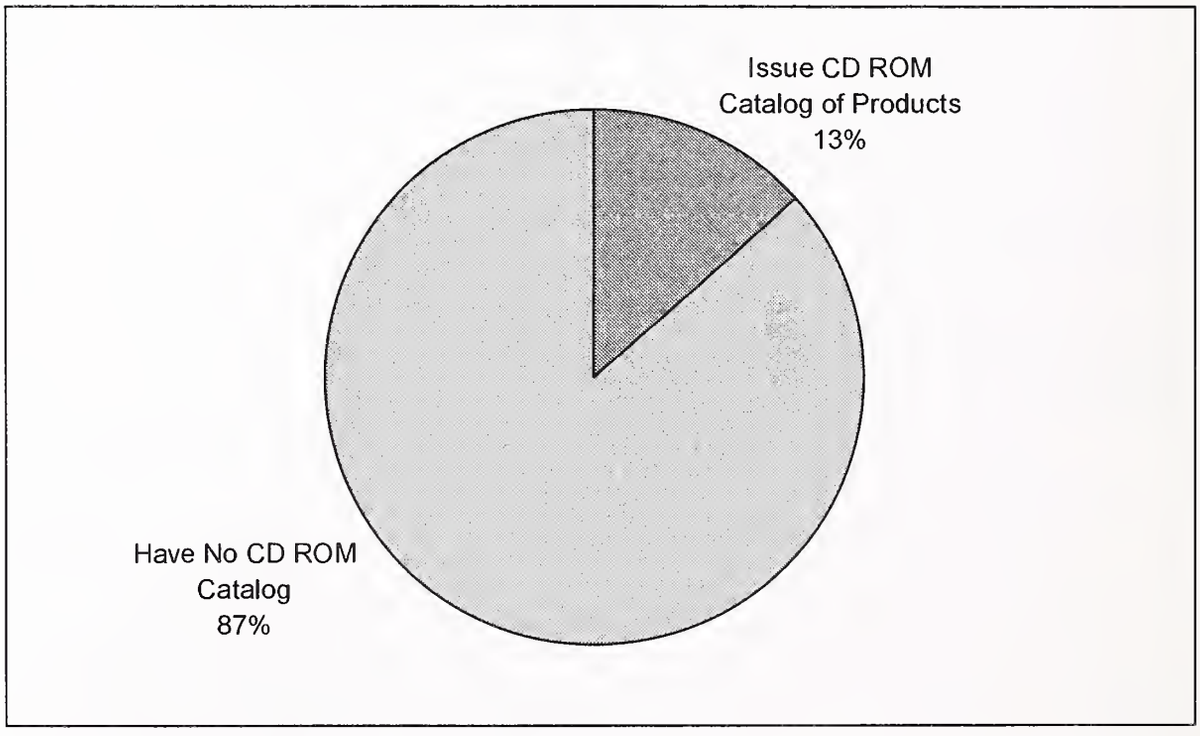
M

Use of CD ROM Catalogs

INPUT polled companies on their use of CD ROM catalogs, and the result is shown in Exhibit IV-25. Of the respondents currently using CD ROM catalogs, all except one reported less than 5% of total company business being transacted via this medium.

Exhibit IV-25

Use of CD ROM Catalogs



Source: INPUT

Trends and Issues in Electronic Commerce

The INPUT research leading to this report was targeted, in part, at obtaining quantitative information on the electronic commerce market, and developing a profile of current usage of electronic commerce. In addition, it was aimed at understanding issues and trends in the industry, the topic of this chapter.

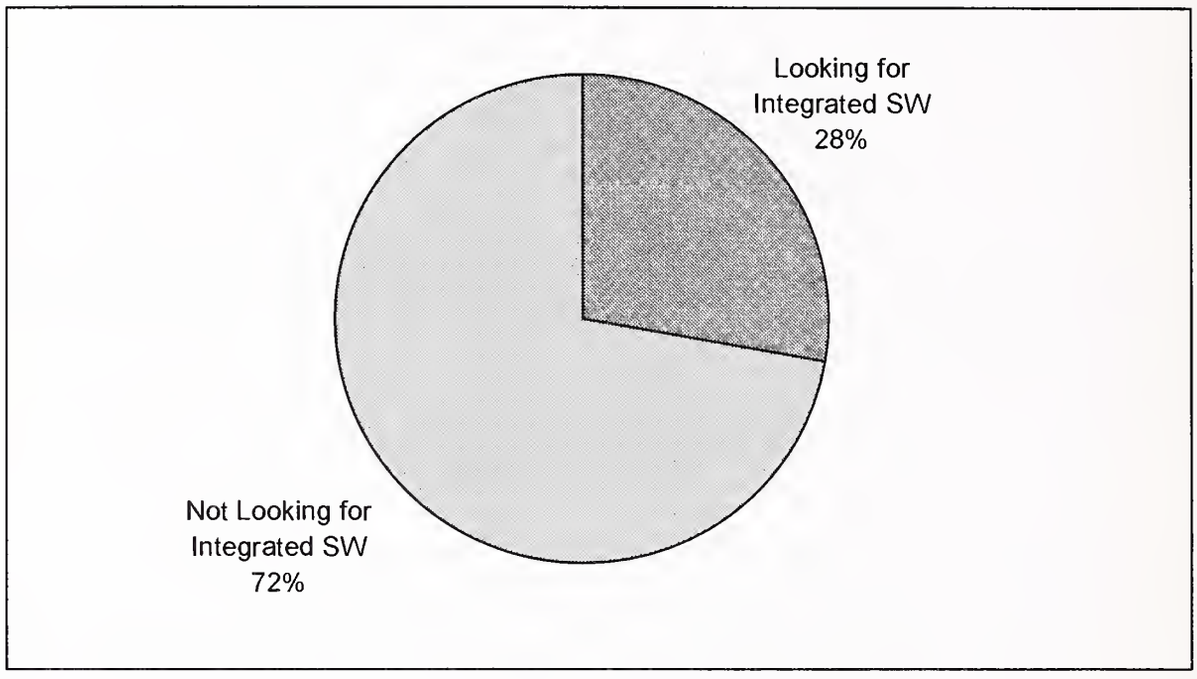
A
Integration of EDI with Applications

EDI is strictly defined as the application-to-application communication of remote computers on an intercompany basis for the purpose of exchanging business documents. However, the reality is that much of the activity that is called EDI today does not go automatically from computer to computer, but involves manual steps. For example, a buying company's computer will print out a purchase order in its own format. This will then be rekeyed into an EDI system that will transform the data into an industry standard EDI format, and send it via a VAN to the selling company. These manual operations often wipe out the two intended benefits of EDI, cost saving and data accuracy.

As explained in Chapter IV, user companies have identified lack of standards as one of the biggest issues they face in developing a more efficient EDI program. This belief is underscored by the results noted in Exhibit V-1, where 28% of users surveyed are looking to acquire EDI software that is integrated into their business applications.

Exhibit V-1

Companies Wishing to Acquire EDI Integrated into Applications



Source: INPUT

Clearly, 28% of the installed base looking to purchase new or upgraded software represents an enormous market opportunity for software vendors, and not surprisingly, most EDI software vendors indicate that the provision of such integrated capability is a priority.

When asked which application software the users would require connectivity with, the most frequently mentioned application vendors were SAP and Oracle; however, the responses were wide ranging. This, of course, is why application integration is still a largely unresolved issue, because of the variety of packages with which integration is required.

Nevertheless, increased integration of EDI with applications is both an EDI customer need and an EDI vendor priority.

B
Client/Server Architectures

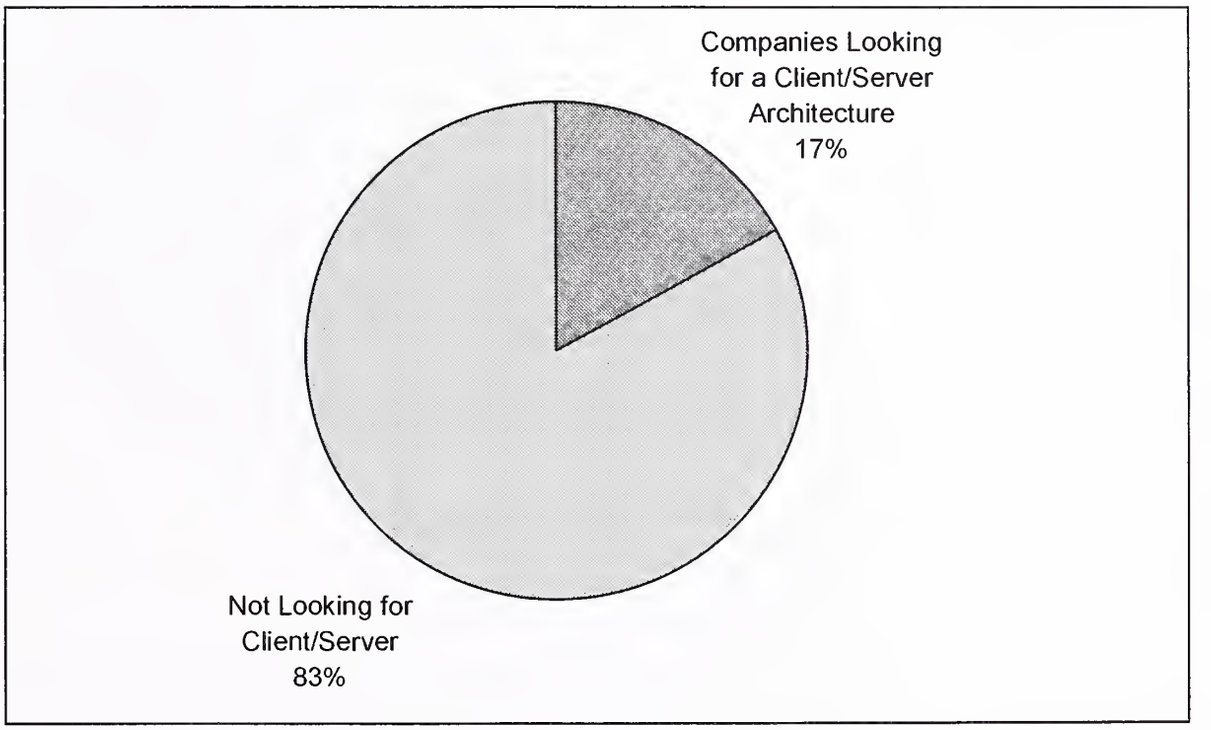
As client/server technology spreads into the application computing environment, so is that trend being felt in the electronic commerce systems that support the applications. One reason for this is that the EDI capability needs to co-exist in the application computers for good integration. Another is that it is seen to be more efficient to aggregate the EDI standard translation and communication functions, which are relatively compute-intensive and need strong operating system support, into server-type vehicles that offer

these capabilities. This leaves the application integration or user interface to be done on a distributed basis by smaller clients.

Exhibit V-2 shows the percentage of the EC installed base that are actively seeking to move to a client/server architecture, and most of the EDI software vendors report that they are developing this capability. It is anticipated that the percentage of new installations using a client/server architecture will be significantly higher than the 17% interest rate expressed by the installed base.

Exhibit V-2

EC Capable Companies Looking for a Client/Server Architecture



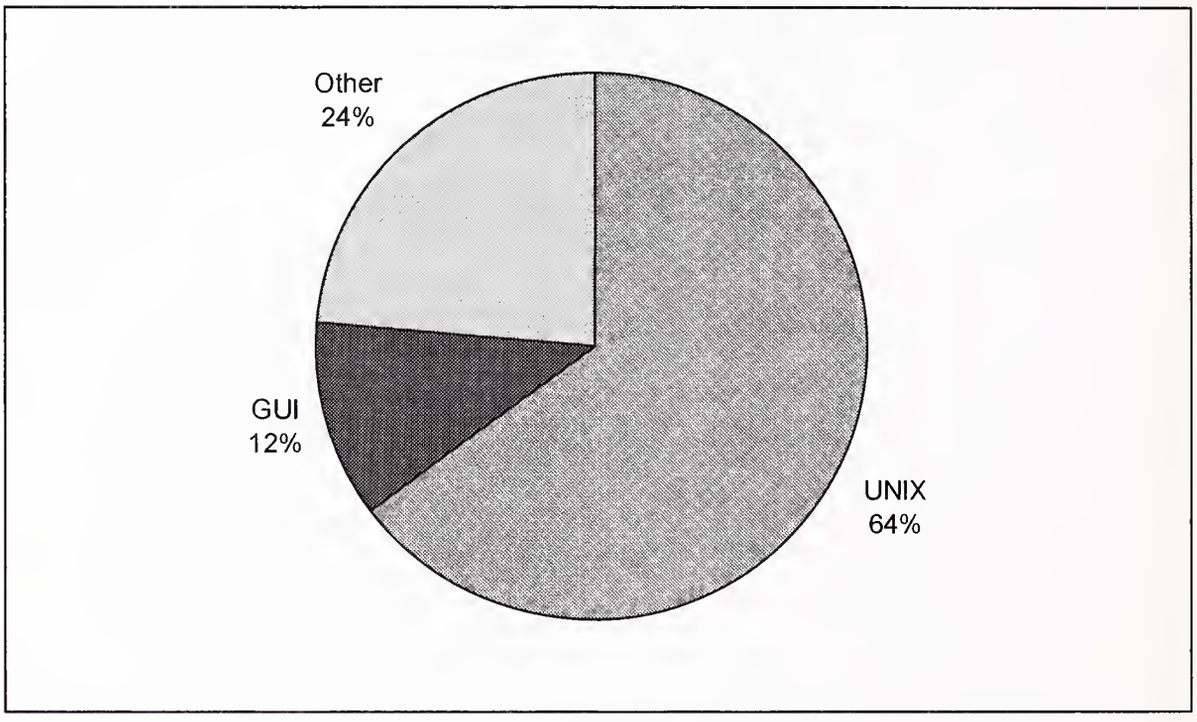
Source: INPUT

C
Technology Trends

The INPUT survey asked which new technologies have allowed users to better utilize EDI. The results are shown in Exhibit V-3.

Exhibit V-3

Technologies Enabling Better Usage of EDI



Source: INPUT

A move to UNIX technology was cited overwhelmingly as the most satisfactory technology to improve effectiveness. This is because of the large number of users migrating to a client/server architecture, and needing their EDI to operate with their client/server applications. Additionally, there are a number of current PC users wishing for greater capacity.

The "other" technologies cited include paper-to-EDI, fax-to-EDI, and bar coding capability, and on-line UPC catalogs (such as are operated by QRS, etc.).

D
Real-Time and Interactive EDI

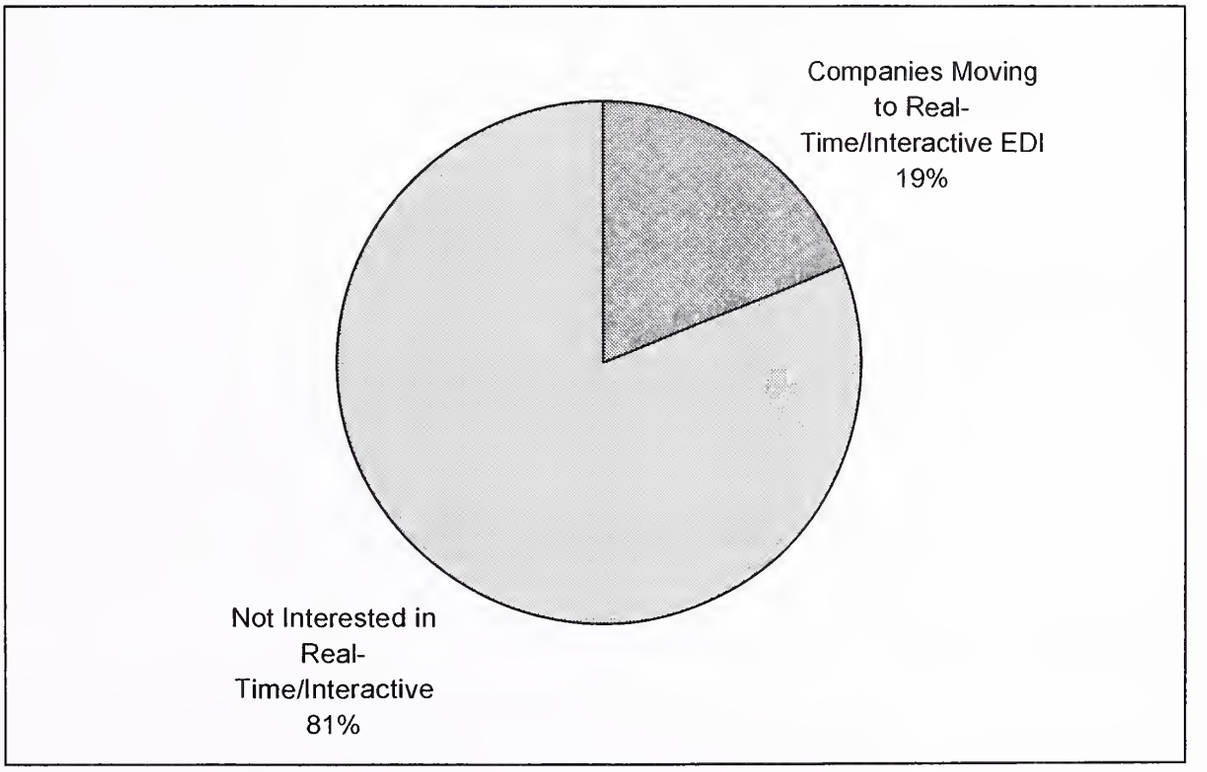
Traditional EDI is essentially a batch process. Messages that are sent to the VAN during the day are processed and put into the recipients' mailboxes overnight, for pick-up the next morning. Increased attention to the time value of money, and especially just-in-time (JIT) manufacturing techniques, are

putting increased pressure on performing EDI more rapidly. At least one VAN, Kleinschmidt, is now offering immediate processing of messages into recipient mailboxes as a standard feature, and cites that as a reason for its growth over the past few years. In research for a related INPUT report, *Electronic Commerce Over the Internet*, INPUT found that a significant motivating factor for companies to use the Internet for electronic commerce is the faster response time typically available on the Internet compared to VANs.

As Exhibit V-4 shows, 19% of users showed an intention to move to real-time or interactive EDI.

Exhibit V-4

Companies Desiring to Engage in Real-Time/Interactive EDI



Source: INPUT

E
Software Vendor Changes—Gainers and Losers

In order to measure the level of satisfaction that EDI software vendors are experiencing among their installed base, INPUT asked users if they had recently changed software vendors, and why. Exhibit V-5 shows those vendors that have gained the most users as a result of changes, and those that have lost the most users.

Exhibit V-5 only contains entries for those users that changed software because of expected improvements in service from the new vendor, or

functionality in the new product. Additionally, vendors who had only one gain or loss are not included.

From the results, it is clear that Sterling and Harbinger are the vendors who gain the most when users change vendors. Because these users are already experienced with EDI, one might expect that they are making an informed decision, and that this represents a significant endorsement.

Exhibit V-5

Software Vendor Changes—Gainers and Losers

Software Vendor	Users Gained	Software Vendor	Users Lost
Sterling	13	Sterling	5
Harbinger	6	GEIS	3
Premenos	3	Premenos	2

Source: INPUT

F
VAN Changes—Gainers and Losers

INPUT also asked users if they have changed their EDI VAN in the past year, and if so, why. Exhibit V-6 shows which VANs gained or lost the most customers. Anticipated service improvements were the most often quoted reason for changing. Only VANs that lost or gained more than one customer from the sample are included in the table.

Exhibit V-6

VAN Changes—Gainers and Losers

VAN	Users Gained	VAN	Users Lost
Sterling	2	GEIS	5
Harbinger	2	Sterling	3
Advantis	2		
GEIS	2		

Source: INPUT

From the exhibit, it is not clear that there are any major trends in movement to or from VANs. This data is factored into the forecast in Chapter III of this report.

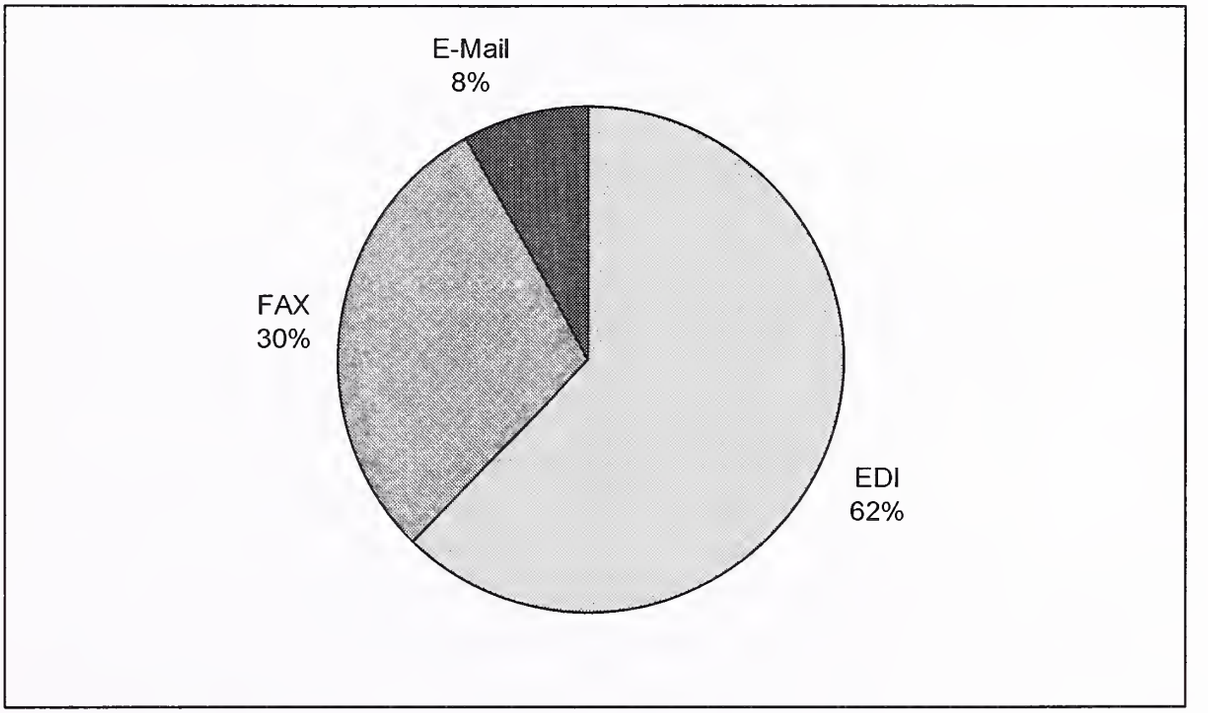
G

EDI, E-Mail and Fax for Electronic Commerce

Historically, EDI has been the main medium used for electronic commerce, but in recent years, fax—and more recently still, E-mail—have seen increasing usage. INPUT asked respondents which of the media is growing most quickly in their organization for the conduct of business transactions. The results are shown in Exhibit V-7.

Exhibit V-7

Medium Growing Most Rapidly for Electronic Commerce



Source: INPUT

In spite of the recent gains of fax and E-mail technology, it is clear that the issues of audibility and need for computer-to-computer connectivity make EDI still the fastest growing medium for electronic commerce.

However, asked to comment on trends in their company for electronic commerce, respondents answered with enthusiasm for E-mail technology and disdain for fax and EDI. It appears that the complexities of EDI and the paper orientation of fax leave companies searching for ways to do electronic commerce with E-mail - like simplicity.

H
FEDI Trends

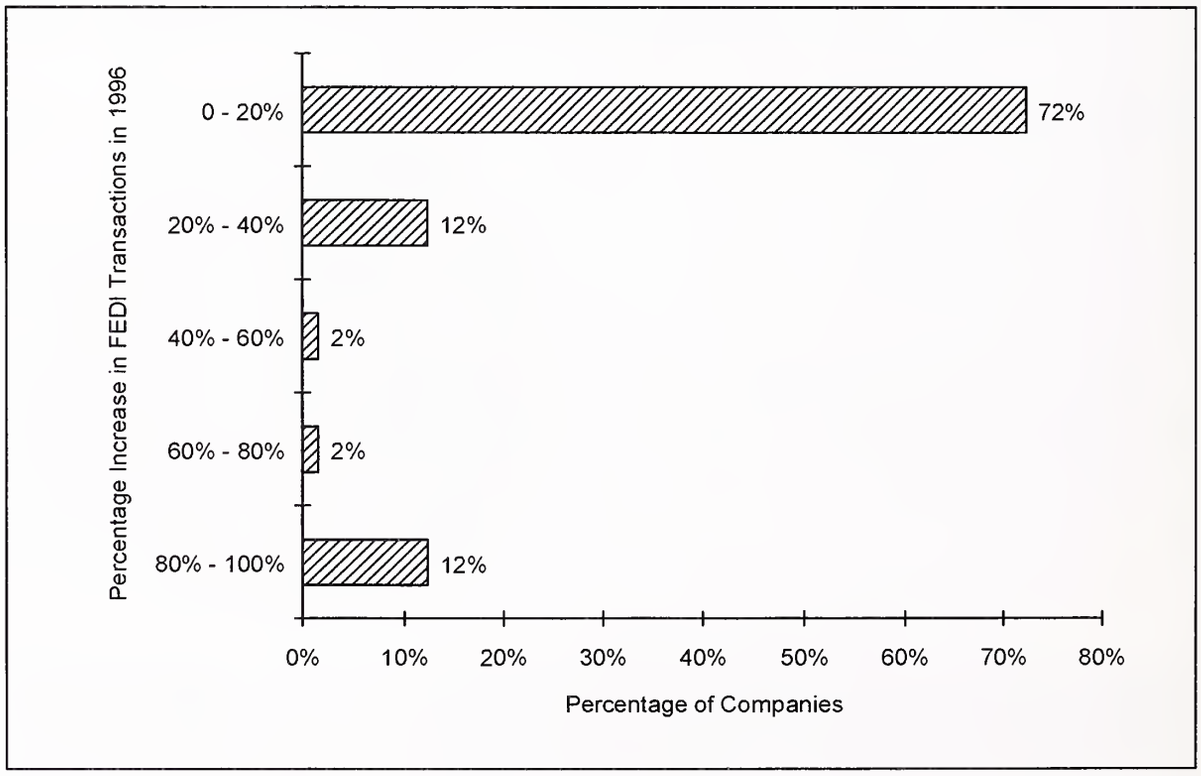
We saw in Chapter IV that FEDI is not a very well utilized technology.

INPUT also found that the growth expected in FEDI transaction volume is not large, as exhibit V-8 shows. Again note, however, that there are a group of determined companies counted in the right hand bar that plan to ramp up their FEDI usage significantly.

It is quite likely that other payment technologies will overtake FEDI in the five year forecast period ahead.

Exhibit V-8

Expected Increase in Transactions using FEDI in 1996



Source: INPUT

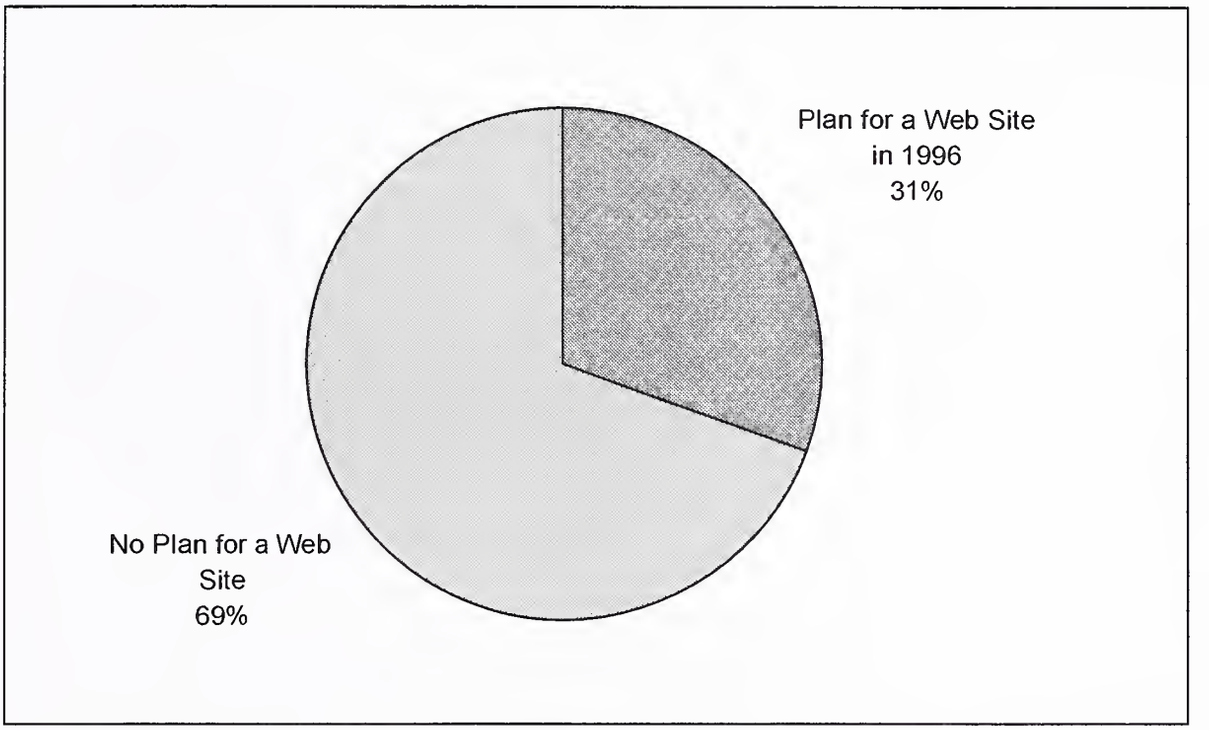
I
World Wide Web Trends for Electronic Commerce

1. Growth in Web Sites

As discussed in Chapter IV, INPUT found that 23% of EDI capable companies have publicly available Web sites in operation. INPUT asked companies that did not have Web sites if they planned to make one available to their customers in 1996. The results are shown in Exhibit V-9.

Exhibit V-9

Companies Planning to Offer a Web Site in 1996



Source: INPUT

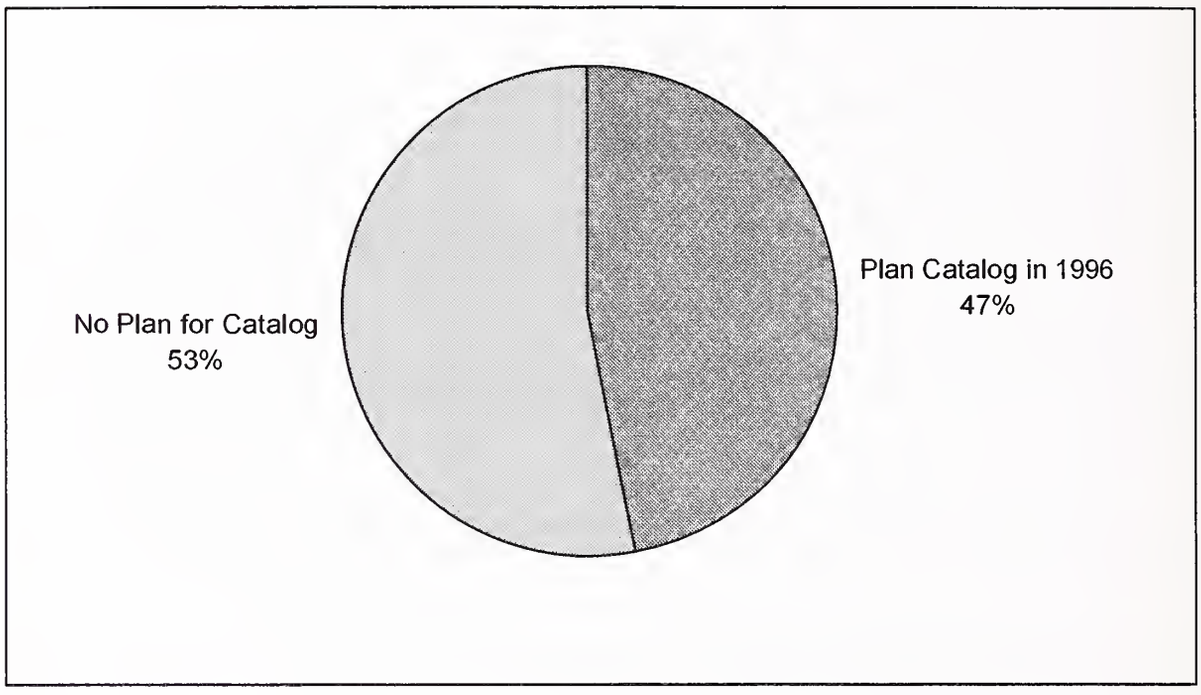
As the exhibit shows, 31% of the 77% of companies that do not already have a Web site plan one for 1996. This is to be compared with the 23% of companies that have Web sites today, and INPUT sees a 100% growth rate in this segment. This trend leads to the forecasts for Web sites in Chapter III.

2. Growth in Sites Ready for Commerce

To have its WWW site used for electronic commerce, a company must put up a catalog of its products and services on the site. We saw in Chapter IV that 42% of companies with Web sites have a catalog on that site. We also polled those companies that do not have a catalog, asking whether they planned to put one up in 1996. Exhibit V-10 shows the results of this.

Exhibit V-10

Companies Planning Catalogs on Their Web Site in 1996



Source: INPUT

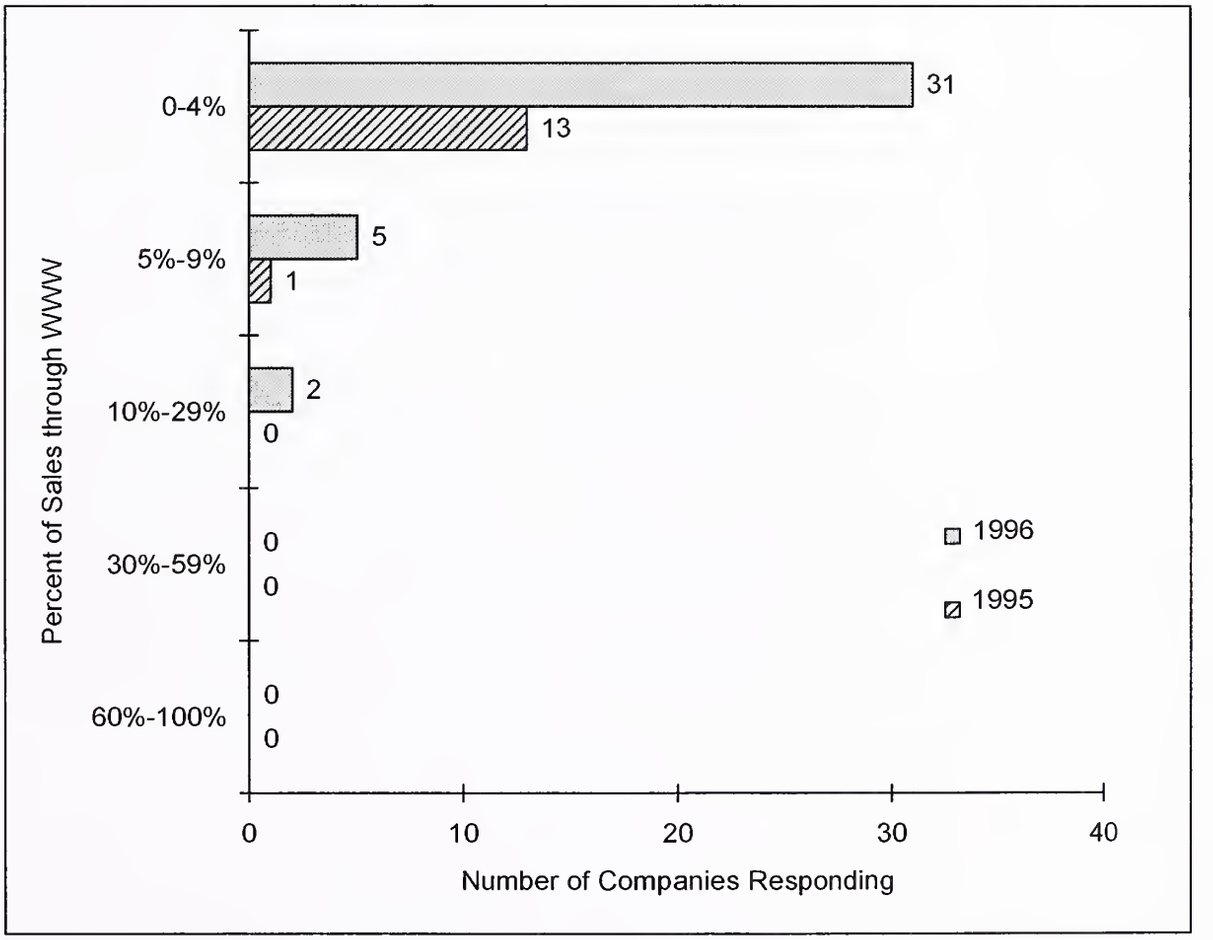
As the exhibit shows, 47% of the 58% of companies that are not ready for commerce on their Web site today will be ready in 1996. This represents a 33% increase in the percentage of Web sites that will be commerce-ready in 1996, and is one of the factors leading to high growth rates for WWW commerce in Chapter III of this report.

3. Sales through WWW Sites

1995 sales made through WWW sites are measured by INPUT to be $70 million, with business-to-business transactions accounting for $40 million. In the survey for this report, INPUT asked companies to indicate their 1995 sales through the Web, and the growth in sales that they anticipated for 1996. The results are shown in Exhibit V-11.

Exhibit V-11

Sales, by Company, Made through Web Sites



Source: INPUT

Companies expect their sales through the WWW to increase over 300% in 1996, as shown in the exhibit. In 1996, there will be a significant number of companies doing between 10% and 30% of their total business over the Web. This is consistent with the findings of INPUT's report *Electronic Catalogs, Web Storefronts and Internet Malls,* which forecasts a CAGR of business through the WWW of over 300% through 2000, at which time over $165 billion will be transacted in this way.

J
Internet Trends for EDI

In Chapter IV we discussed the fact that 4% of polled companies indicate that they are using the Internet for EDI purposes today. This figure includes all companies participating in the trials of Internet commerce that are being conducted by the VANs (see INPUT's companion report, *Electronic Commerce Over the Internet*), and those companies experimenting with their own software, or with Premenos' Templar software. It also includes a number of companies that are sending messages to trading partners over the Internet without the help of security methods—an apparently risky activity, but one that INPUT has found a number of companies performing to their satisfaction (see *Electronic Commerce Over the Internet*).

The trend that INPUT has documented in *Electronic Commerce Over the Internet* is for VANs to roll out Internet strategies that will capture the major share of Internet EDI traffic. This traffic will grow very rapidly to about 25% of total EDI traffic by the year 2000.

Part of the appeal of the Internet today is the apparent cost saving as compared to VAN usage. However, the Internet will only save the raw transport part of the VAN charges, which is not a large part. Where the Internet is used, the user will still have to pay for the other "value-added" services that VANs offer, or do them himself. Further, the availability of Internet alternatives will put downward pressure on VAN prices. At the same time, charges for the Internet itself will increase, dispelling the impression that it is "free."

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