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U.S. NETWORK SERVICES MARKET

1990-1995

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Market Analysis Program (MAP)

U.S. Network Services Market, 1990-1995

MANST • 506 • 1990

Abstract

This report is the 1990 analysis and forecast for the network services sector of the U.S. information services industry.

The network services sector consists of two submodes: network applications and electronic information services. Network applications includes electronic data interchange, electronic mail, value-added applications and other application-related services. Electronic information services includes on-line data bases and news services.

The report gives an assessment of the issues and trends affecting these segments of the U. S. information services industry, projects the growth rate for user expenditures for these services for 1990 through 1995, and profiles leading vendors and their competitive strategies within this market sector.

The report contains 114 pages and 48 exhibits.

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Exhibits (Continued)

Exhibits (Continued)

B

Introduction

Introduction

This report is part of a series of market analysis reports written each year by INPUT on the key sectors (delivery modes) of the U.S. information services market. The delivery modes analyzed during 1990 are as follows:

1. Applications Software Products
2. Turnkey Systems
3. Processing Services
4. Systems Software Products
5. Network Services
6. Professional Services
7. Systems Integration
8. Systems Operations

The first six delivery modes are covered in reports included as part of INPUT's Market Analysis Program (MAP), a planning service for information services vendors. The other two delivery modes are covered in market analysis reports included in INPUT's systems integration and systems operations programs.

A
Purpose and Organization

1. Purpose

This report analyzes the network services sector of the U.S. information services market. The report assesses trends and events within the U.S. economy, the U.S. information services market, and the network services delivery mode to provide the reader with a comprehensive foundation for understanding this market sector and for anticipating future directions. The report also offers insights into the relation between the network services and systems integration delivery modes.

The report includes five-year forecasts, assessment of market drivers, analysis of competitive trends, and identification of leading vendors.

The report provides readers with insights and information that will help them:

- Review the forces shaping the market
- Develop internal corporate financial projections
- Identify new markets and product and services opportunities
- Assess the competitive trends
- Determine potential market directions
- Assist in prioritizing investments

2. Organization

This report is organized as follows.

- Chapter II - Executive Overview, summarizes of the research analysis, conclusions, and recommendations of the report.

- Chapter III - General Business Climate, provides an overview of the business climate within the U.S. information services market and the professional services delivery mode.

- Chapter IV - Market Forecast, provides a comprehensive look at the specific delivery mode and submodes, the five-year 1990-1995 forecasts, and an assessment of the forces driving this market sector. Where appropriate, the forecasts are presented by vertical and cross-industry markets.

- Chapter V - Issues and Trends, discusses the issues and trends that are most critical to this delivery mode for both the immediate and long term.

- Chapter VI - Competition, identifies the leading vendors and assesses the key competitive trends within this delivery mode. Profiles of vendors which exemplify the competitive trends are also provided.

- Chapter VII - Conclusions and Recommendations, provides conclusions and recommendations and identifies opportunities for the information services vendors active in or considering entering this delivery mode.

- Appendix A - Definitions, defines the terms used throughout INPUT's market analysis work.

- Appendix B - Forecast Data Base, summarizes the forecast for this market sector and reconciles the current forecast with the 1989-1994 forecast.

B

Scope and Methodology

1. Scope

This report addresses the U.S. information services market for the network services sector (delivery mode). It includes user expenditures that are noncaptive (generally available to vendors). Many large organizations have portions of their information services requirements satisfied by internal divisions. The resulting expenditure is not available for competitive bid by the general vendor community and is not included in INPUT's projections. The noncaptive distinction is important and is addressed in more detail in Appendix A.

a. Information Services Industry Structure

Exhibit I-1 defines the structure of the information services industry as used by INPUT in its market analysis and forecasts. The market consists of eight delivery modes, each of which contains a number of submodes.

- INPUT develops a five-year forecast for each of the submodes listed.
- The following delivery modes are forecasted on a vertical industry and cross-industry basis—applications software products, turnkey systems, processing services, professional services, systems integration, and systems operations.
- The systems software products and network services delivery modes are forecasted for the U.S. market as a whole.

For a more complete discussion of INPUT's information services industry structure and terminology please refer to Appendix A, *Definitions*.

EXHIBIT I-1

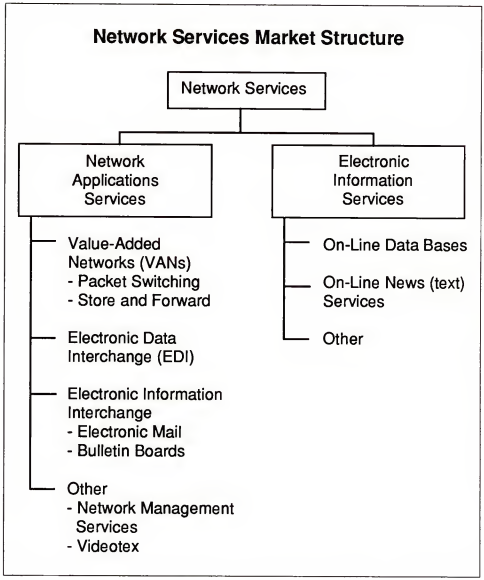
Information Services Industry Structure—1990

Source: INPUT

b. Delivery Mode Description

The structure of the network services market as shown in Exhibit I-2 is composed of network applications services and electronic information services.

EXHIBIT I-2



The network services market is divided into two major segments.

- Network applications, which includes value-added networks, electronic data interchange (EDI), electronic mail, and other network applications services such as network management services.

- Electronic information services, which includes on-line data base services and news services.

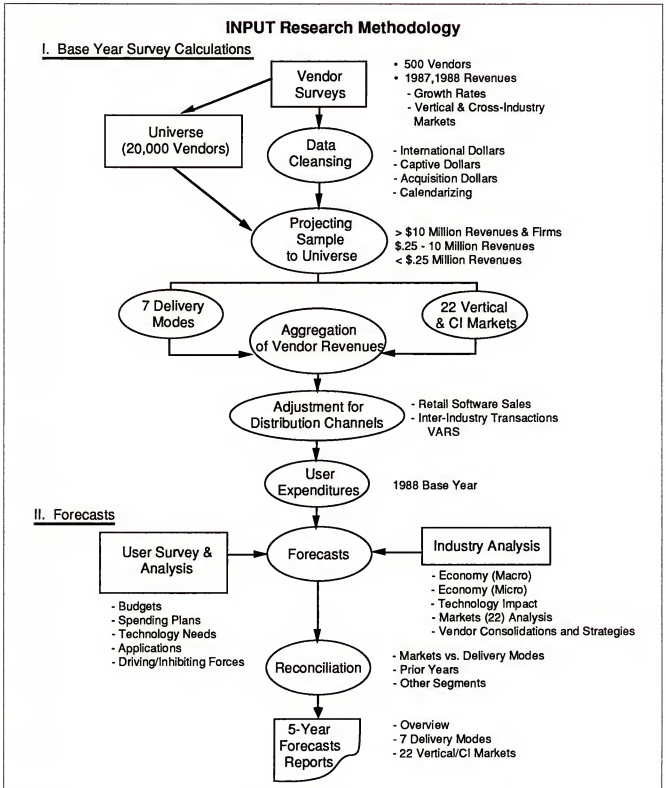
The fundamental criterion for services in this market is that the network itself must play an important enabling function, i.e., without the network the service could not be provided.

2. Methodology

INPUT's methodology for market analysis and forecasting is summarized in Exhibit I-3. As in past years, INPUT has continued the process of surveying information services vendors to determine their U.S. information services revenues and information systems organizations to determine their expenditures and outside services acquisition plans. INPUT also interviews vendors a second time to understand their views of the market opportunities over the short and longer term.

INPUT's annual forecasting process is broken into two major parts—base-year expenditure calculations and market forecasts. Each is briefly described below.

EXHIBIT I-3



a. Base-Year Expenditure Calculations

- INPUT determines previous-year information services revenues for the eight delivery modes and 23 vertical and cross-industry sectors for hundreds of vendors. This is accomplished through interviews, use of public data, and INPUT estimates.
- The initial data is projected to represent the entire information services market.
- Adjustments are made to eliminate duplications due to distribution channel overlap and to assure captive information services expenditures are not included.
- The result is a base-year, 1989, user expenditure for each of the 23 vertical and cross-industry sectors and the 8 delivery modes.

b. Market Forecasts

- In the forecasting step, INPUT surveys information systems executives to determine their projected expenditure levels, both in aggregate and for each of the outside information services categories.
- In addition, a second set of vendor interviews is conducted later in the year to obtain an understanding of how key vendors view the market and its opportunities.
- The result is a five-year forecast for each of the 23 vertical and cross-industry sectors and the 8 delivery modes.

To complete the process, INPUT reconciles its new forecasts with those from the previous year. Differences due to market restructuring and other factors are explained, providing the users of these projections with the ability to track INPUT's forecasts from year to year.

Forecasts are presented in current dollars (i.e., 1995 market sizes are in 1995 dollars). In developing the five-year forecasts, INPUT has incorporated the following economic assumptions regarding the outlook for the U.S. economy as a whole.

C

Economic Assumptions

The GNP and GNP Deflator growth rates used in INPUT's market projections for 1990 are from the CONSENSUS™ forecast, Blue Chip Economic Indicators of Sedona, Arizona. The Blue Chip CONSENSUS forecast is derived from a leading panel of economists representing leading financial, industrial, and research firms across the U.S. and has a 13-year track record of balanced and accurate projections.

Exhibit I-4 provides both the economic assumptions used by INPUT in the 1989-1994 market analysis reports and those being used for the 1990-1995 reports. The 1990-1995 assumptions compared to those used for 1989-1994 indicate:

- Significantly lower Real GNP growth for 1990 and 1991
- Stronger Real GNP growth for 1992 and beyond
- Inflation at somewhat lower levels using the 1990-1995 assumptions.

The resulting Nominal GNP growth used by INPUT is for much lower growth in 1990 (5.4% versus the projected 7.7% in the 1989 reports) and again in 1991 (5.4% versus 7.8%).

- In 1992 and beyond, the Nominal GNP growth rates are quite comparable.
- For the five-year period 1989-1994, the Nominal GNP averages 6.2% versus the previous 7.1%.

In summary, the economic assumptions used by INPUT reflect significantly reduced growth in the near term followed by modest steady growth through 1995.

It should be noted that the U.S. economic environment has worsened for the short term since this CONSENSUS forecast was published in October 1990. There are stronger signs of a recession in the first two to three quarters of 1991. The impact of a recession on the 1991 information services market is discussed in Chapters III and IV.

EXHIBIT I-4

GNP and Inflation Growth Rate Assumptions 1989-1995

1989 Report Assumptions

Overall Economy	1989E	1990E	1991E	1992E	1993E	1994E	1995E	CAGR 89-94 (%)	CAGR 90-95 (%)
Nominal GNP	7.6	7.7	7.8	7.0	6.5	6.5	6.5	7.1	--
GNP Deflator	4.8	5.2	5.5	5.0	4.5	4.5	4.5	4.9	--
Real GNP	2.8	2.5	2.3	2.0	2.0	2.0	2.0	2.2	--

1990 Assumptions (Preliminary Estimate)

Overall Economy	1989A	1990E	1991E	1992E	1993E	1994E	1995E	CAGR 89-94 (%)	CAGR 90-95 (%)
Nominal GNP	6.7	5.4	5.4	6.8	6.8	6.8	6.5	6.2	6.5
GNP Deflator	4.1	4.4	4.6	4.1	4.0	4.0	3.9	4.2	4.1
Real GNP	2.5	1.0	0.8	2.6	2.7	2.7	2.5	1.8	2.2

Note: 1989A based on final figures reported by U.S. Commerce Department

1990 onward from CONSENSUS™ economic forecast reported by Blue Chip Economic Indicators, Sedona, AZ (Vol 15, No 10, October 10, 1990)

D

Related Reports

Related reports of possible interest to the reader include:

1. U.S. Markets

- *U.S. Applications Solutions Market Analysis Report, 1990-1995*
- *U.S. Processing Services Market Analysis Report, 1990-1995*
- *U.S. Systems Software Products Market Analysis Report, 1990-1995*
- *U.S. Professional Services Market Analysis Report, 1990-1995*
- *U.S. Systems Integration Market Analysis Report, 1990-1995*
- *U.S. Systems Operations Market Analysis Report, 1990-1995*
- *U.S. Industry Sector Markets, 1990-1995* (16 reports on all major industry sectors, e.g., insurance)
- *U.S. Cross-Industry Sector Markets, 1990-1995* (7 reports on information services markets that serve all vertical industry sectors, e.g., accounting)

2. European Markets

- *The Western European Market for Computer Software and Services, 1990-1995*
- *Systems Software Products—Western Europe, 1990-1995*
- *Trends in Processing Services—Western Europe, 1990-1995*
- *Systems Integration Market Forecast—Western Europe, 1990-1995*
- *Systems Operations Market Forecast—Western Europe, 1990-1995*
- *Western European Network Services Markets, 1990-1995*

Executive Overview

Executive Overview

A

Key Trends and Issues

As Exhibit II-1 indicates, there is a trend toward increasing use of network services over the forecast period from 1990 to 1995. On-line data bases are being used in more industries to answer questions, evaluate alternatives, make decisions and improve productivity. Present users are seeking information from additional data bases to satisfy their needs.

EXHIBIT II-1

Key Trends and Issues

- Trend: Increasing Use of Network Services
  - Improvement of productivity
  - Replacement of paper-based systems
  - Use of related information services
- Trend: Impact of Economic Downturn
  - Delays, cancellations and reduction of business
  - Heightened concern about uncertainties in regulation and use of technology
  - Reluctance of vendors to expand services
- Issue: Lack of Knowledge about Services
  - Potential users are inhibited
  - Qualified support personnel are scarce

The use of EDI and electronic mail is spreading as organizations look for means of reducing costs, improving services and increasing competitiveness through the replacement of paper-based systems.

The growing use of network services will also provide opportunities to market related information services. Vendors of electronic information services have found opportunities to market transaction processing services. Vendors of EDI have marketed software and professional services. Opportunities to market network integration services, turnkey systems for accessing and manipulating data, and other services can result from the growth of network services.

Steps are also being taken to improve the environment for network services. An alliance of academic and industry leaders is promoting the idea of a national information infrastructure (NII) that would accelerate the use of network services ("Building the Information Highway" in the 1/91 issue of *Technology Review*). Senator Gore has introduced a bill in Congress that would take a step toward this objective.

A shorter-term trend affecting expansion of network services is the current economic downturn. INPUT's research on this subject revealed that 40% of network service vendors have encountered negative impacts from this downturn or recession, including delays and cancellations of projects before completion and decreased business with established accounts. This situation has a greater economic impact on business than vendors of processing services such as payroll or credit card processing have felt, but less than vendors of professional services have encountered. Vendors of network services have imposed budget reductions and constraints in reaction to this, but personnel cutbacks such as those suffered by professional services firms are rare.

As a result of the economic downturn, network service vendors have shown more uncertainty about regulatory matters and the impact of new technology. RBOC activities, international regulatory considerations and LATA rulings continue to cloud the regulatory environment. Vendors are also not certain that actions based on new technology will pay off before additional technical innovation is encountered. The effective use of new technology such as ISDN is also unclear. Consequently, there is a "wait and see" attitude about new products. Vendors of network services reported that they were less likely than vendors of processing or professional services to introduce new products, according to research conducted by INPUT.

The uncertainty of vendors is compounded by the lack of knowledge about network services, which has delayed the use of on-line data bases and network applications by business and home users. Until more experience is gained through college and business use, it is challenging for many users to sign up and use systems and for vendors to find qualified personnel to aid new users or to develop new products.

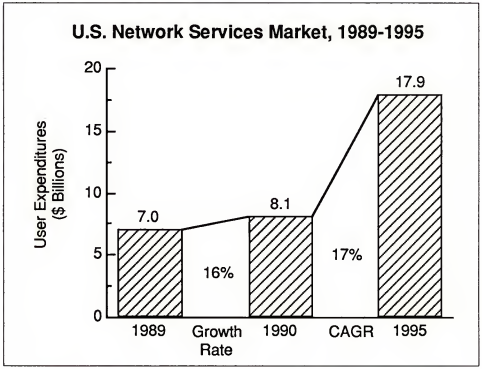
B

Market Outlook for Network Services

Despite the economic downturn, market uncertainties, and lack of knowledgeable personnel, the trend for increased use and planned use ensures healthy growth.

As indicated in Exhibit II-2, the network services market will increase at a CAGR of 17% between 1990 and 1995 and grow to a level of $17.9 billion in user expenditures in 1995.

EXHIBIT II-2



The growth rate of the network services market is not forecast to be as high as was estimated during the last few years. Growth has been delayed by the economic downturn and the uncertainties in regulation and technology. However, network services is the mode second highest in growth rate, and some vertical markets—such as discrete manufacturing, banking and finance, wholesale distribution, state and local government and telecommunications—have CAGRs above 20% for this service mode. Banking and finance will have a CAGR of 22% and grow to $2 billion in user expenditures in 1995. Wholesale distribution will grow at the same rate, to a level of $598 million in 1995. Although the federal government market only has a CAGR of 10%, it will have a total of $1.9 billion in expenditures by 1995 due to present high use of network services.

C

Market Recommendations

The network services market presents a challenge to vendors. It is growing at an attractive rate, and there are good reasons it could offer opportunities to vendors. Business organizations and individuals will find that they need more information, and they will want to substitute electronic payment and communications for other means. Vendors, however, may not be able to predict the scenario for regulatory change, the impact of

successive waves of technical innovation or the ability of users to take advantage of their products. Consequently, INPUT recommends that vendors maintain awareness of opportunities and upgrade marketing capabilities, as indicated in Exhibit II-3.

EXHIBIT II-3

- There can be opportunities to exploit network services in new areas, particularly in a global marketplace where the advantages of electronic access to data and electronic messages are necessary to overcome differences in time zones. IBM and British Telecom are currently planning a set of network services including EDI and electronic mail to take advantage of international opportunities.

- New developments in PC technology and software can encourage and facilitate the use of network services by overcoming the lack of knowledge or hesitancy of users. This will be increasingly important as the market for consumer information grows.

- Opportunities to supply additional services, such as the ability to access multiple sets of data and manipulate data with an EIS or to supply consulting aid, will increase and will provide additional revenue for vendors.

- Upgraded sales and marketing efforts that can bring new services to the attention of users and better inform potential users about what is available also critical to the growth of this market.

General Business Climate

General Business Climate

In this chapter INPUT positions the market for network services within the entire information services industry. The chapter first characterizes the general business climate, then the climate of the information services industry specifically. In the last section, it positions systems software products within the overall business climate for information services.

The reader will find this chapter quite similar to the corresponding Chapter III in the following market analysis reports:

- *U.S. Applications Solutions Market, 1990-1995*
- *U.S. Systems Software Products Market, 1990-1995*
- *U.S. Processing Services Market, 1990-1995*
- *U.S. Professional Services Market, 1990-1995*

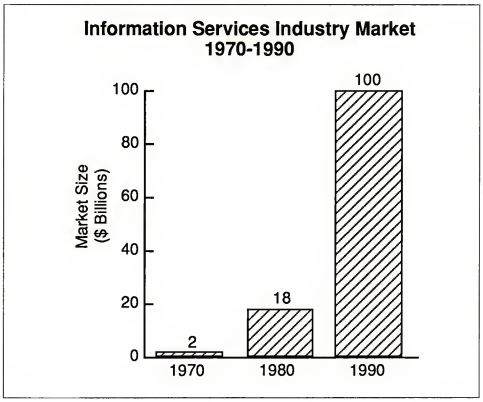
A General Economic Climate

1. A Look at the 1980s

As INPUT publishes its first set of forecasts for the 1990s, the general U.S. economy and the U.S. information services industry, particularly the network services sector, face a new set of business conditions—different from those experienced since the early 1980s when the last downturn occurred. As shown in Exhibit III-1, in 1980 the U.S. information services market was less than 20% of its size 10 years later. Today that market represents approximately $100 billion in user expenditures each year.

The 1980s were marked by continuing strong growth following the formation of the information services industry in the late 1960s and early 1970s. Except for slowed growth during the downturn that started in 1982, the information services market grew at about 20% each year and routinely outperformed the economy as a whole.

EXHIBIT III-1



This overall growth has moderated in the past couple of years. The U.S. information services industry grew about 13% in 1990 as the impacts of the downturn were beginning to be felt. In terms of development, the industry is maturing: in some segments it has reached the top of the "S" curve. Thus, declining growth rates are to be expected, in particular as the market size continues to increase.

The decade ended with much lower growth rates in mainframe and minicomputer shipments and the first signs of maturity in personal computer and workstation sales. While all of the delivery modes included in INPUT's definition of the information services industry have growth rates above that of hardware, the trends for hardware certainly impact each delivery mode.

Therefore, the 1990s began with a maturing market for the products and services of information systems and services companies. Yet it remains a market that can and does outgrow the economy and continues to offer new business opportunities, in particular those that are solutions oriented.

2. Near-Term Impacts

As noted in Chapter I, the U.S. economy is in a recession. While expected to be modest, a recession will directly impact many sectors of the economy which in turn will impact expenditures for information services. Real growth in the overall U.S. economy will be very small in 1990 and could drop to zero in 1991.

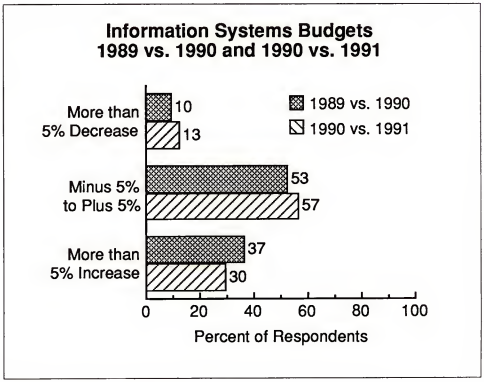
- For the past few years, the information systems budget has reflected tightening spending patterns with increases averaging less than 10% overall. Many organizations indicate essentially no change from year to year, and some organizations are undergoing year-to-year reductions of over 10%.

- During this period, growth in expenditures for information services has exceeded the overall growth in information systems budgets. The hardware and internal staff budgets have absorbed much of the impact of tighter budgets.

a. Information Systems User Impacts

Exhibit III-2 provides an assessment of information systems budget plans for 1989 through 1991. The research for this assessment was done in November, 1990.

EXHIBIT III-2



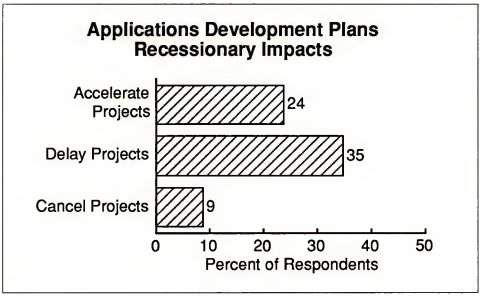
- The findings indicate that only about one in three information systems budgets grew by over 5% in 1990 over 1989 levels and the percentage planning to grow more than 5% in 1991 is even less, three out of ten.

- The research also found that drastic cuts are not planned, as might have been expected in a full recessionary environment.

Many respondents indicated that after a number of years of tightening budgets, 1991 would just be another year of the same. For most organizations, major strategic projects would not be measurably impacted given current general business projections.

Exhibit III-3 helps support that projection. INPUT found a number of organizations that would actually accelerate some projects in a recessionary economy and very few that would cancel projects.

EXHIBIT III-3



- Those projects identified for acceleration were typically of key value to business operations.

- Those projects identified for possible delay or cancellation were typically administrative and were often replacements for existing systems.

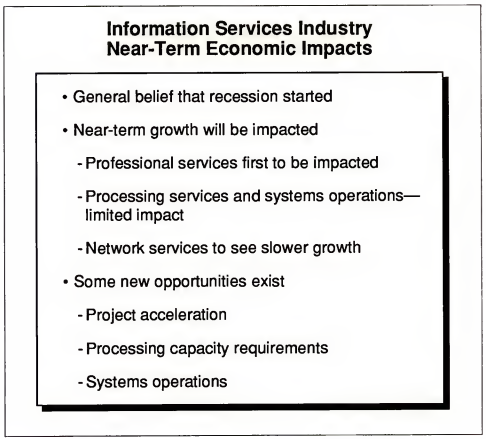
INPUT found that the current economy will impact information systems spending in the near term (through 1991 at least), but not to a significant degree. This will lead to slower growth rates in information services expenditures over the new 12 to 18 months, and it may in turn create pent-up demand for 1992 and beyond. The depth and length of the downturn will be a deciding factor in how much demand is delayed into 1992.

For a complete review of INPUT's recent research into the impacts of the current economy on information systems, see INPUT's report, *The 1990 to 1991 U.S. Economic Slowdown—Impacts on Information Systems Budgets and Spending*.

b. Information Services Vendor Impacts

INPUT found a cautious attitude among information services vendors assessing the impacts of the economic downturn on this business.

EXHIBIT III-4



- There was a general belief, in particular in the professional, processing, and network services firms, that a recession of some level had started as early as the third quarter. A number of vendors indicated that they were applying or considering internal budgetary constraints.
- Projections for near-term growth (1991) are more modest, reflecting 1990 experience.
  - Professional services will be the first to be impacted, with growth expectations dropping perhaps to 11%. Information systems will try to protect internal staff given the reductions experienced over the past few years.

- Processing services and systems operations tend to be long-term decisions. Levels of processing services are tied to client usage agreements and will not experience significant cutbacks. Also, an opportunity exists in the sale of incremental capacity to companies wishing to delay hardware expenditures.

- Network services has been a strong growth area with forecasted growth about 16% per year. Some slowing in growth is expected near term, but this sector will still outperform the information services market as a whole.

• The downturn offers opportunities to aggressive vendors. To find them, it is necessary to stay very close to the current clients and to know the secondary buyers within the prospect companies.

- Critical operational systems may be accelerated and may create opportunities for professional services and software products vendors. Buying a suitable application software solution may become favored over development of a custom solution.

- As noted above, the solution to capacity needs may be a processing services vendor instead of hardware purchases.

- Systems operation will become more attractive to a company looking for capital to invest in newer, more strategic application systems.

The next 12 to 18 months will be characterized by the unexpected—delayed decisions and unique opportunities. Solid growth is possible for the alert vendor.

3. The Mid-1990s

Beyond the 1990 to mid-1992 period, there is a general belief that the economy will return to modest growth like that of the late 1980s. Modest real growth rates combined with inflation and the ability for the information services industry to continue to outgrow the economy as a whole suggest that annual average growth rates in the low to mid teens will continue throughout 1990 to 1995.

Growth after 1992 will be stronger than prior to 1992. A true recession will generate some pent-up demand that could cause a real upturn in 1993 if the full economy returns to the growth rates experienced in the late 1980s.

B

Information Services Industry Issues and Climate

1. Overview

The information services industry ended the decade much different than it entered the decade. Exhibit III-5 lists some of the major differences and the related implications for the early 1990s.

EXHIBIT III-5

Information Services Industry, 1980 versus 1990

Difference	Implication
• Five times as big	• Slowing growth
• Many large vendors	• Consolidation and dominance
• Stronger vendors	• Greater reliance by user
• Willingness to outsource operations	• Processing services shifts to systems operations
• Greater variety of services	• Changing distribution channels
• Many small vendors	• Alliances to succeed
• More technological alternatives	• More services required to integrate

- Markets do not grow at 20% forever. On the average, information services did for the entire 1980 decade. Overall slower growth is predictable for the 1990s.
- In 1980 there was not an independent software supplier that had $100 million in revenues worldwide; in 1990 there are many and $1 billion in revenue has been achieved.
  - For some, growth is being fueled through mergers and acquisitions.
  - For others, diversification and a strong element of professional services is driving growth.
- The same can be said for professional services firms. Today, many exceed $100 million in revenue and serve a worldwide market.

- The leading information services vendors are much stronger than they were in the early 1980s. They are large, have financial strength, and have management that is prepared to take on long-term risks. The result is new market opportunities and a different perspective for the user.

- The end of the 1980s was marked by some significant shifts in the structure of the information services industry.

  - Systems integration emerged as a viable business in the commercial market in the mid-1980s, and systems operations (facilities management) has taken on new importance.

  - Larger vendors are changing the economy of scale in offering information services and, as result, a change in the fundamental channels of distribution. The user can now turn to a single vendor for a complete solution, and the vendors offering these services become customers (distributors) of the other information services vendors.

  - The concept of outsourcing has strengthened considerably recently and will be a trend for the 1990s.

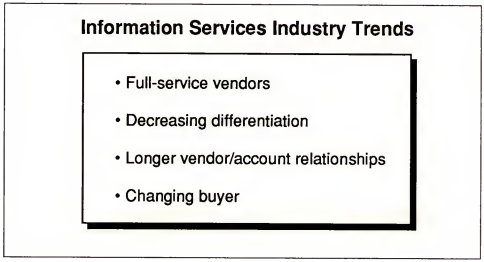
- Information services has been an industry where the initial cost of entry has been modest in many of the subsectors. Software product companies show up over night, professional services firms start with a few experts joining together, and most processing services firms start by large organizations selling surplus time. Although low cost of entry remains a characteristic, the cost of gaining market recognition and presence has changed. Success in the 1990s for the start up company will come through alliances with the larger firms, be they systems integrators, professional services, systems operations, or software product firms.

- Information systems' greatest challenge today, after maintaining current systems, is to choose from the breadth of information technology now available. The alternatives are great and the implications of some are significant. The result is often delayed decisions and implementation. Relational DBMS technology is about ten years old, and much of the implementation effort is still to be done. Object-oriented data base technology is already available. The result is greater professional services opportunities.

2. Information Services Trends

Exhibit III-6 identifies four fundamental trends that will impact the information services industry over the next five to ten years. The overall goal of account/client control will become paramount in the 1990s. It is the primary driving force behind these trends.

EXHIBIT III-6



- *Full services vendors will increase their dominance of the information services market.* They will achieve increased account control and become the channel of distribution for many of the specialized products firms. And they will do this to a significant degree through consolidation. A maturing market typically results in fewer and larger vendors who serve all aspects of the market.

- *Decreasing differentiation* - Professional services is now a factor in essentially each of the delivery modes, whether it is software products, systems operations, systems integration, or even processing and network services. That importance will continue to increase throughout the next five years. The end result will be decreasing differentiation of the leading vendors.

- *Longer vendor/account relationships* - The relationships formed in systems integration and systems operations agreements are multiyear in length and, once made, these become the vendors of choice for the next requirement.

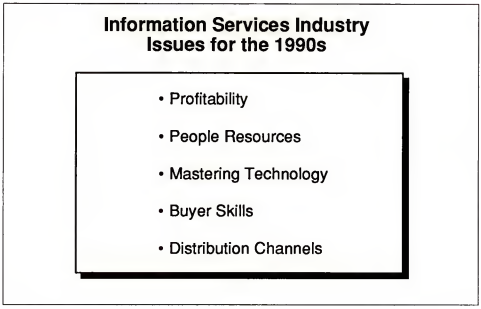
- *Changing buyer* - The buying decision is now commonly made by a partnership of information systems and an operating executive, certainly for major projects. The result is two buyers to be serviced and the opportunity for the vendor to build relationships with multiple parts of the client. This will also lead to increased client control and longer relationships.

In the 1990s, the major vendors have the opportunities to tie up major portions of the market for many years. This results in a number of new issues, but means there is an improved predictability of revenue.

3. Issues for the 1990s

The critical issues for information services vendors in the 1990s are summarized in Exhibit III-7. Many of these issues derive from the leading vendors' current emphasis on account control.

EXHIBIT III-7



- *Profitability* - The shift to long-term relationships with multiyear agreements and the assumption of risk by the vendor raises the exposure for the vendor. There are already some concerns about the impacts of commercial systems integration on the profitability of larger information services firms. And with the push to gain market share in the systems operations area, this concern could grow. Profitability over the next two years will be a key indicator of probable growth in the mid-1990s as the economy improves.

- *People Resources* - The increasing importance of professional services throughout the industry adds to the pressure on vendors to find and train qualified staff.

  - Many of these professionals are being acquired by hiring the staff of companies served under systems integration and systems operations agreements. Reorienting these people from internal to vendor perspectives will be a major test over the next few years.

  - The vendor staffing challenge will also be taxed by the training requirements of new technologies and the decline in college enrollment in computer science. The cost burden for training information systems professionals is shifting, to some degree, from the user to the vendor as greater use of outsourcing services develops.

- *Mastering Technology* - The developers of information technology continue to provide new technologies and products faster than they can be utilized. This is one of the forces behind the growth in the systems integration and professional services delivery modes.

  - The vendor takes on the task of learning the technology and bringing it into the client's environment, and perhaps even operating and maintaining it for some period.

  - Like the general training issues, this is a cost that cannot always be directly recovered by the vendor.

- *End User Skills* - The influence of senior/operating management in the buying decision will continue to increase into the 1990s. The information systems function will become an internal consultant and the skills of the end user will continue to increase more slowly.

- The vendor must become astute at assessing the skills of the buyer at all levels—the end user's skills, not the skills of the information systems function, will control success.

- *Distribution Channels* - The larger vendors are going to gain even more control of the user expenditure process, while smaller and specialized vendors serve as vendors to the larger vendors. The behavior of the larger vendors and their multiple, often overlapping strategic alliances may control the success of many of the smaller vendors.

  - The behavior of the larger vendors and their multiple, often overlapping *strategic alliances* may control the success of many of the smaller vendors.

  - Improper behavior could result in slower growth for the information services industry.

C

Network Services Business Issues and Trends

In this section we briefly position the network services sector against the economic and environmental conditions described above. This sets the stage for INPUT's 1990-1995 forecast for network services presented in Chapter IV.

Two fundamental forces impact the network services sector:

- First, the business environment that permits or inhibits an organization from addressing information systems requirements that are beyond the capacity of the internal information systems organization.

- Second, the requirement to learn, adopt, and implement new information technologies. When the need exists here is always the alternative of turning to an organization that already has the needed specialized skills.

1. Business Environment

The growth in use of network services is closely tied to the business environment of those using the services. In a period of economic slowdown or contraction the growth rate will of necessity drop even though use will often improve productivity and cost effectiveness.

- Services such as electronic data interchange are tied directly to business volume, and the decision to change to EDI is tied to the ability to invest now for later benefit. In the near term some decline in growth in EDI and similar services such as electronic mail seems should be expected.

- The use of on-line data bases and interactive news services are classified as discretionary by many organizations and use is tied to the expansion of PCs/workstations and training of users. In a period of white collar employment reduction or restraint, it is also expected that use of these services will suffer.

2. Impact of New Information Technologies

All aspects of network services are driven by the ability to use a network and information handing technology to improve efficiency of information transfer (e.g., EDI) or information retrieval (e.g., on-line database). The advances in these services have been many over the past five years leading to very strong growth rates (typically over 20% a year).

In the immediate term the new technology coming into the network services market has declined or is in fact negatively impacting revenue opportunities.

- The movement towards CD ROM creates new markets and new users but it removes the usage factor form the charge for the on-line data base service. Unless the expansion of users can grow quickly, there is a resultant negative impact on overall growth rates.

- EDI provides some users with major benefits. The large hub companies that can, require EDI interfaces with all of their trading partners directly impact the growth in network application use. However as these larger companies become penetrated, the market begins to mature. The benefit of the technology for smaller organizations is less.

As this report shows the network services sector continues to outgrow the overall information services market; however, some early signs of maturity are beginning to show. Increases in revenues will continue, but some new types of services appear to be required if the growth rates of the late 1980s are to be achieved again.

Market Forecast

Market Forecast

A

Industry Structure

For forecasting purposes, INPUT segments the information services industry into eight delivery modes serving 16 industry sectors and seven cross-industry sectors. The delivery modes are:

- Processing services
- Network services
- Turnkey systems
- Applications software products
- System software products
- Systems integration
- Professional services
- Systems operations

INPUT divides the network services market into the two segments:

- Electronic information services (EIS)
- Network applications

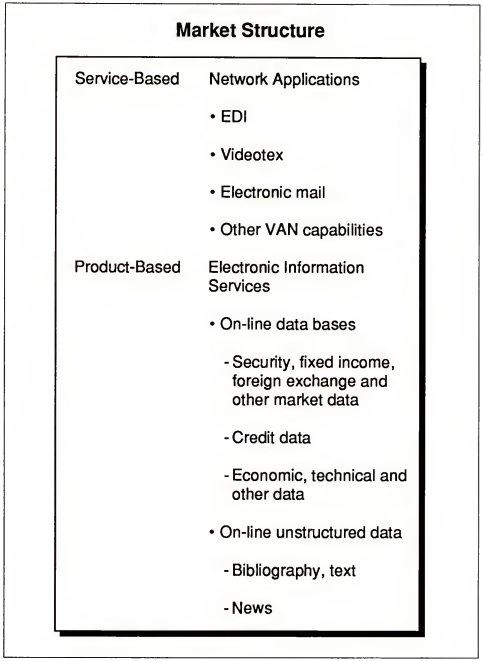
B

Market Structure

The structure of the network services market is derived from the development of network capabilities. When networks were first connected to vendor computing installations in the 1960s by GE and other vendors, payment and electronic message information began to flow on these networks. Vendors continued to enhance the value of their networks for the movement of data and became the backbone of the network application market. In contrast, providers of electronic information services tended to come from organizations that used information or became aware of the value of proprietary data bases.

As shown in Exhibit IV-1, the market can be divided between organizations that provide capabilities for moving data (service-based) and companies that provide proprietary data (product-based). The latter can be subdivided into those that supply structured financial or other data and those that supply unstructured information such as news.

EXHIBIT IV-1



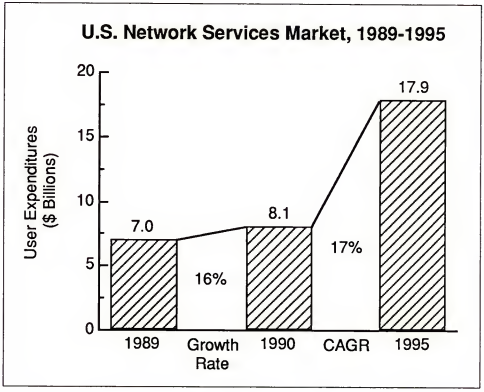
C

Network Services Market

1. Market Overview

The network services market continues to grow from a 1989 user expenditure level of $7 billion to a 1990 level of $8.1 billion, representing an annual growth rate of 18%. Over the five-year forecast period shown in Exhibit IV-2, network services will grow at a 17% CAGR, reaching user expenditures of $17.9 billion in 1995.

EXHIBIT IV-2



INPUT previously forecast a five-year growth rate of 20%. The decrease in growth rate is due primarily to the following:

- Cutbacks or delays in plans resulting from the economic downturn, which has caused a decrease in use of market data and delay in implementation of network applications
- Continuing regulatory situations and introductions of new technology including ISDN that have had an impact on planning
- As penetration of network services grows, a natural slowing of the growth rate will result. After five years of well above average industry growth, some slowing is expected. As penetration has increased, a natural slowing of the growth rate is resulting.

The continued solid growth in network services results from the need to achieve increased productivity through savings in information gathering methods and electronic rather than paper interaction with suppliers, customers and offices within organizations.

Network services vendors provide the means of conducting business in a more automated manner. Information can be sought more easily and supplied more rapidly to meet needs. Market-sensitive information can be supplied on a real-time basis. Messages and instructions, including payment instructions, can be sent electronically rather than by paper.

- Network services reduce the delays inherent in using paper-based information and information exchange, and enhance the productivity of workers.

- Network services also make it feasible to automatically gather, analyze and make decisions based on data without human intervention.

2. User Expenditures by Industry

In 1990, users spent about $7 billion for network services, spread across 16 industry sectors. Exhibit IV-3 segments these expenditures between vertical and cross-industry sectors, and Exhibit IV-4 lists the expenditures by industry, showing a range from a high of $1.0 billion to a low of $25 million.

EXHIBIT IV-3

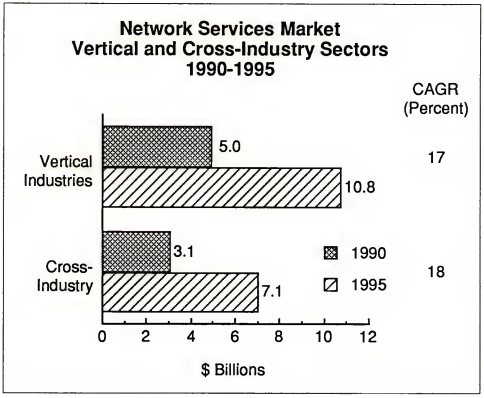


EXHIBIT IV-4

Network Services Market
User Expenditures by Industry
1990-1995

Industry Sector	User Expenditures $ Millions		1990-1995 CAGR Percent
	1990	1995	
Discrete Manufacturing	69	201	24
Process Manufacturing	696	1,608	18
Transportation	170	394	18
Utilities	26	39	8
Telecommunications	91	289	26
Wholesale Distribution	221	598	22
Retail Distribution	152	384	20
Banking and Finance	746	2,019	22
Insurance	208	361	12
Medical	446	964	17
Education	163	362	17
Business Services	515	1,040	15
Consumer Services	133	268	15
Federal Government	1,134	1862	10
State and Local Government	78	212	22
Miscellaneous Industries	110	216	14
Industry-Specific Total	4,957	10,816	17
Cross-Industry	3,118	7,112	18
Total Network Services	8,075	17,927	17

In 1990, spending for network services by the five leading industries accounted for 44% of total user expenditures. The top five industries were, in order:

- Federal Government
- Banking and Finance
- Process Manufacturing
- Business Services
- Medical

In these leading industries, different factors contributed to the current spending levels.

The federal government continues to lead in total revenues, particularly in the use of network applications, since it has built up a large volume of activity to support defense and civilian agencies. Annual growth rates are below market average, however, reflecting the drop in growth of government expenditures. The CAGR for electronic information services, based on expenditures of $315 million, was 5% in 1990. Network applications, at $732 million in federal government expenditures for 1990, had a CAGR of 12% in 1990.

Banking and finance is the leading vertical market for the use of electronic information services which support trading, the valuation of holdings, and decisions on credit, as well as other uses. Growing at a CAGR of 22%, revenue for this product rose to $652 million in 1990. Use of vendor network applications was small in comparison—$75 million in 1990—but internal network use in the industry continues to rise for payment and electronic mail applications. Some financial institutions are evaluating the use of external networks more seriously, due to economic conditions.

Process manufacturing is also a large user of electronic information services, but in contrast to information used by banking and finance, the on-line data bases used in process manufacturing support the industrial process. Use of EIS in this vertical market amounted to $610 million in 1990, but is growing at a CAGR of 15%, slightly less than the overall average of 16% for EIS use.

The use of electronic information services is also growing at a CAGR of 15% in business services, and reached a level of $501 million in that vertical market in 1990. Business services make use of financial, technical, credit and other information for accounting, tax preparation, credit examination, travel, research and other purposes. Network applications are substantially smaller in this vertical market.

The health or medical vertical market is a large user of EIS ($274 million in 1990) and network applications ($172 million in 1990). Both technical and financial data bases are in use, but use of EIS is mature in the market and was growing at a CAGR of only 10% in 1990. Network applications, including electronic mail and EDI, grew more rapidly, at a CAGR of 15% in 1990, but still less than the average growth of 17% for network applications.

3. Electronic Information Services Market

As shown in Exhibit IV-5, user expenditures for electronic information services rose at a CAGR of 16% in 1990 from a level of $5.5 billion in 1989 to $6.4 billion in 1990. Between 1990 and 1995, expenditures will rise at a CAGR of 17% to a total of $14 billion in 1995.

EXHIBIT IV-5

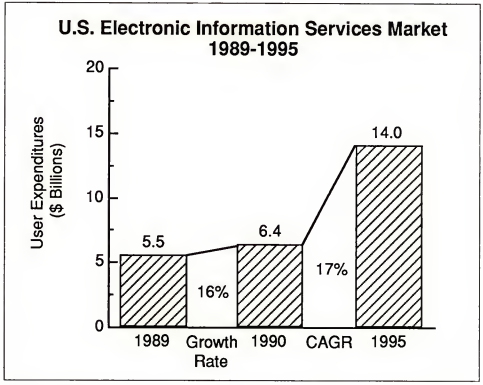


Exhibit IV-6 provides a comparison of the vertical and cross-industry segments.

Exhibit IV-7 provides the submode breakout of on-line data bases and news services. On-line data bases continue to dominate the EIS market; however, news services are growing at a faster rate.

EXHIBIT IV-6

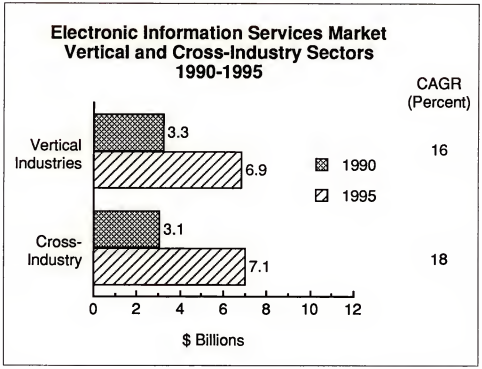
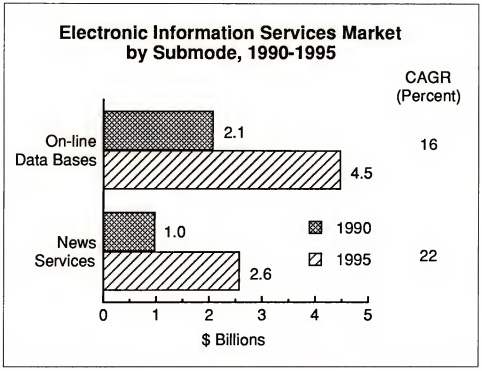


EXHIBIT IV-7



In general, the use of electronic information services is driven by improvements in communication and computing technology that can reduce the cost of use, provide more timely data, and provide better means for utilizing data.

These improvements include easier means of gaining access to data, such as the use of voice messaging, graphical interfaces and other techniques for guiding users in the collection and organization of the data they are looking for. Without such developments, the increasing volume of data and lack of literacy in the use of on-line data bases can inhibit potential users in business—and, to a greater extent, in the home—from making use of on-line information.

These improvements also include expanded use of PCs to take over part of the work of accessing data and developing the requests and criteria that will obtain the information needed. Programs on PCs can facilitate access to multiple on-line data bases that have different characteristics and organizations. The programs can also follow schedules for receiving changes in data content in relation to market pricing, new product developments, or other topics of interest to users.

In addition, PCs can provide the ability to manipulate data that is accessed with spreadsheets or EIS, or to combine data from various sources in reports.

Generic markets accounted for 48.6% of the revenues of electronic information services products in 1990. Revenues for this subsegment grew at a CAGR of 17% in 1990, slightly faster than the rate of 16% that EIS as a whole exhibited. The generic market will continue to grow at a slightly faster CAGR (18% versus 17%) between 1990 and 1995, since some vendors will find that the on-line data bases that they are selling to one vertical market can be of use in other markets. User expenditures for electronic information services by industry are shown in Exhibit IV-8.

EXHIBIT IV-8

Electronic Information Services Market
User Expenditures by Industry, 1990-1995

Industry Sector	User Expenditures $ Millions 1990	1995	1990-1995 CAGR Percent
Discrete Manufacturing	36	86	19
Process Manufacturing	610	1,205	15
Transportation	128	283	17
Utilities	23	34	8
Telecommunications	77	253	27
Wholesale Distribution	106	243	18
Retail Distribution	55	97	12
Banking and Finance	652	1,783	22
Insurance	154	281	13
Medical	274	493	12
Education	102	235	18
Business Services	501	1,001	15
Consumer Services	114	230	15
Federal Government	315	419	6
State and Local Government	39	81	16
Miscellaneous Industries	104	200	14
Industry-Specific Total	3,290	6,924	16
Cross-Industry	3,118	7,112	18
Total Network Services	6,408	14,036	17

4. Network Applications Market

User expenditures in the network applications market grew from $1,428 million in 1989 to $1,669 million in 1990 at a CAGR of 17%, as Exhibit IV-9 illustrates. The CAGR will climb to 18% between 1990 and 1995 and network applications will amount to $3,871 by 1995.

EXHIBIT IV-9

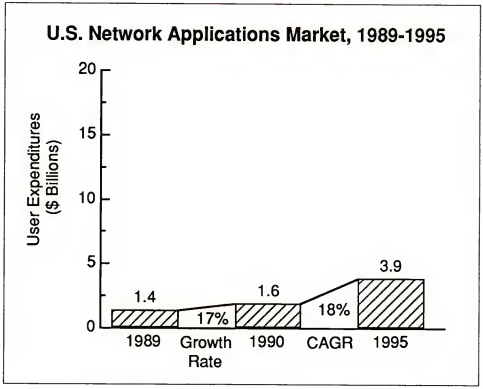


Exhibit IV-10 provides the breakout of network applications by industry sector. The largest sectors are federal government, insurance, and wholesale distribution. The fastest growth will be in the process manufacturing sector.

- Network applications amounted to 20.5% of network services expenditures in 1989 and will grow to 21.6% of expenditures in 1995.

- Just as with electronic information services, network applications are driven by developments in communications and computing, but increases in costs of alternative means are also a driving force.

- Increases in costs of postage, office labor, and other ingredients of paper-based payment and communication encourage more use of EDI and electronic mail.

Developments that improve network quality, service breadth and customer service can also increase the use of EDI, electronic mail and other network applications. The ability to handle messages across multiple networks (internetworking) gives impetus to network applications.

In addition to reducing costs and saving time, EDI provides large organizations with means of improving their competitive position and better organizing relations with suppliers and customers.

EXHIBIT IV-10

Network Applications Market
User Expenditures by Industry, 1990-1995

Industry Sector	User Expenditures $ Millions 1990	User Expenditures $ Millions 1995	1990-1995 CAGR Percent
Discrete Manufacturing	34	114	28
Process Manufacturing	86	403	36
Transportation	42	111	22
Utilities	3	5	10
Telecommunications	14	36	20
Wholesale Distribution	46	140	25
Retail Distribution	166	501	25
Banking and Finance	94	236	20
Insurance	53	80	8
Medical	172	471	22
Education	61	127	16
Business Services	14	39	22
Consumer Services	19	38	15
Federal Government	819	1,443	12
State and Local Government	39	131	27
Miscellaneous Industries	6	15	21
Industry-Specific Total	1,667	3,891	18
Cross-Industry	NA	NA	NA
Total Network Services	1,667	3,891	18

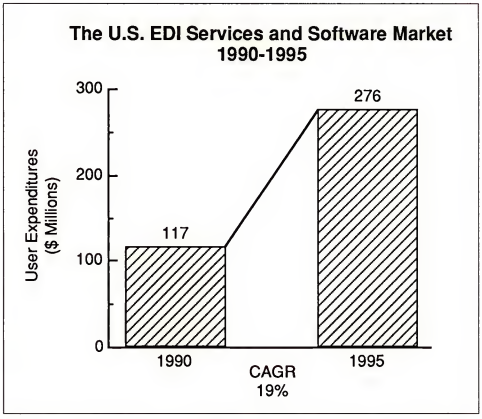
5. EDI Market

INPUT's annual assessment of the U.S. EDI market determined that the market is smaller, and is growing somewhat slower than was previously thought. It is entering a stage of consolidation and new frontiers.

Although EDI applications are proliferating into all sectors of the economy, absolute growth in the number of EDI-using companies has slowed. At the same time, new industries (such as services, construction, education, and entertainment) are adopting EDI and industries that had some form of electronic data exchange (such as airlines, health care, and insurance) are revamping systems to fit in with the newly stabilizing X12 and EDIFACT standards environment.

User expenditures in the U.S. marketplace for EDI network services, software products, and professional services were $117 million in 1990. INPUT projects that the EDI market will rise to $276 million by 1995, at a compound annual growth rate of 19%, as shown in Exhibit IV-11.

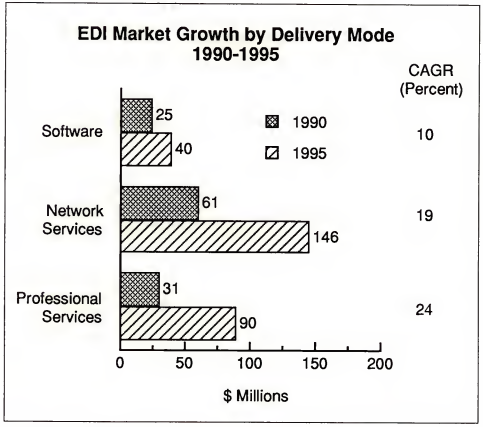
EXHIBIT IV-11



The reason the market is smaller than in previous estimates is partly due to INPUT's adoption of a more stringent definition of EDI than that used in the past. For example, only X12, UCS, TDCC, WINS, EDIFACT, and large proprietary systems such as Sterling Software's hardlines and pharmaceutical formats, Wal-Mart's system, and Sears' Senden are counted. EDI-like systems such as Transnet, IVANS, and medical claims—or semi-EDI systems such as the Securities and Exchange Commission's EDGAR system—are not included. The refined definition follows from INPUT's conclusion that the EDI market has reached a reasonable level of maturity. In addition, EDI exchanges via private networks and magnetic tapes and diskettes are not counted in INPUT's market sizing, just as they are excluded from other market projections.

Exhibit IV-12 provides INPUT's projections for the 1990-1995 period by EDI delivery mode. These forecasts depict significant differences in the relative growth rates for the three delivery modes: software products, network services and professional services.

EXHIBIT IV-12



- Software products will experience a declining growth rate over the next five years, resulting in a modest 10% CAGR for the period. The EDI software market is populated by numerous small vendors and will experience consolidation and shakeout. Software products at approximately 20% is the smallest segment of the EDI information services market in the US.

- Network services, the largest segment, will experience relative steady growth with a 19% CAGR, as the number of trading relationships expand, standards continue to consolidate, and traffic between major EDI users grows.

- Professional services will experience an accelerating growth rate and a 24% CAGR during the next five years, as larger EDI users work to more tightly integrate EDI into internal systems and the general movement towards interenterprise systems expands.

This forecast reflects INPUT's belief that the EDI market has reached a first level of maturity, that products and services that were previously bundled (software plus processing) are now unbundled and that the user community has begun to shift its emphasis towards the challenge of integrating EDI backwards into its internal applications.

For a complete analysis of the EDI market, please refer to INPUT's report, *The U.S. Electronic Data Interchange Market, 1990-1995*.

Issues and Trends

Issues and Trends

A Introduction

Although the market for network services is different from others in the information services market, it is useful to identify and discuss key issues and trends in the information systems business as a whole before analyzing issues and trends in the network services market.

Certain issues and trends discussed below are oriented to the overall IS market; others relate more specifically to the U.S. network services market.

B Major Issues in Information Systems

In response to reduced sales and competitive business activity or both, corporate management and information systems buyers are most concerned with steps that can improve the ability to market, sell and support products and services, including improvement of the content and quality of products and services.

As shown in Exhibit V-1, the importance of sales and competition—particularly foreign competition—has given executives in certain user areas more influence in the determination of information system expenditures. These buyers are interested in improving systems that handle ordering and customer service systems and in upgrading operational systems.

As a result, new administrative, human resource systems, and other applications are being delayed at some companies in order to provide support or funding for ordering, customer service, and operational improvements.

Corporate management and influential buyers are interested in achieving results that address current situations, but they are sensitive to the complexity of systems solutions and to the economic climate.

EXHIBIT V-1

Information Systems Major Buyer Issues

- Reduced sales for some buyers
- Market penetration by competitors, particularly foreign competitors
- Sensitivity to the economic climate
- Complexity of systems solutions
- Allocation of IS expenditures
- Selection of information services
- Coordinating the use of technology
- Shortages of technical expertise

This situation has created interesting challenges for informations systems executives and vendors in the information services industry. Buyers are willing to talk to IS personnel or outside firms that understand their needs and have ideas about solutions, according to user executives and IS personnel at publishing and manufacturing firms using network and other information services. However, the buyers and corporate executives are seeking cost-effective solutions that may require complex steps such as the integration of data bases or networks. The complexity of the steps necessary to achieve solutions is currently an issue, as noted in Exhibit V-1.

According to an information systems executive assigned to a user department at a large investment firm and a systems planning official at a manufacturing company, current economic uncertainty and the complexity of needed solutions will lead to phased solutions in many circumstances. New or changed applications must be implemented that will meet current needs to improve sales or product within a short time, but do it in accordance with a plan or guidelines that will facilitate future network or application/data base integration plans.

The information systems executive assigned to the user department selected equipment, software packages, and network services products that a professional services firm and the corporate information systems group agreed would be compatible with the range of possibilities under consideration for the longer-range plan.

The professional services firm chosen to perform the consulting services was chosen for its expertise in systems planning. A separate professional services firm was chosen to implement the short-term solution, based on its experience with the computing equipment and open systems platform that had been chosen for the short-term solution. During the process of evaluating alternatives to meet the current sales problems, professional service firms, systems integrators, vendors offering outsourcing solutions, network service firms and application software vendors called upon the company and offered ideas.

The difficulty of evaluating information services alternatives and selecting vendors illustrated a major issue confronting information systems buyers, as indicated in Exhibit V-1. The IS executive noted that IS has to be proactive in these situations and select information services firms that can help get the job done, or the user might choose to go to an SI or outsourcing vendor that could take care of all problems, but might not consult the IS department to the desirable extent.

Coordinating the use of technology is also a major problem for information system users, as illustrated by the above examples. A user at a major energy company noted that his division has just discovered that its open systems development of a new application is not compatible with open systems work in other divisions. Internal developers did not have sufficient expertise with open systems to anticipate this problem.

A vendor consultant who worked with brokerages and banks on the integration of information from electronic information vendors and in-house sources pointed out that this type of project required significant technical expertise to coordinate the use of workstation and mainframe capabilities, as well as the use of multiple networks. He noted that internal shortages of expertise provided an opportunity for his firm.

Shortages of expertise are reported by many companies in areas ranging from open systems to the use of new network capabilities, integration of data bases or imaging techniques. New network applications may be delayed while internal personnel are trained or vendor personnel are evaluated.

C

Major Issues for Network Services Vendors

The market for network services is not affected in the same way by economic conditions as other sectors of the information services business. Many processing services such as medical claim or payroll processing are insulated from all but major economic downturns. On the other hand, professional service vendors who provide mainly contract programming services can experience cutbacks for non-critical projects.

The market for network services may not be as insulated as processing services are from the current economic downturn, but network services cannot be cut in the same way that professional services can. The use of financial and pricing data can be reduced if there are fewer divisions or offices using the data, but this electronic information service will continue to be used by the offices conducting business. The use of improved electronic information services could also be a major factor in future growth or even survival of brokerage firms.

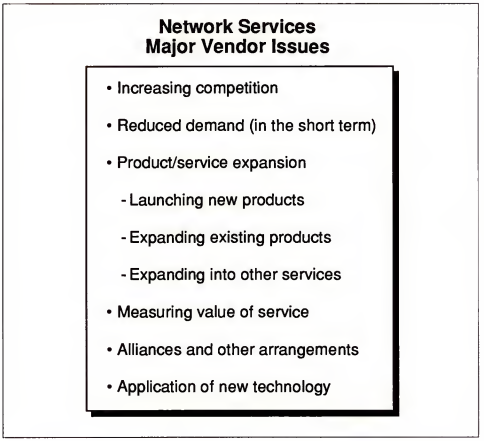
The use of proprietary data bases of economic or technical data or of textual material such as Lexis or Nexis may also be reduced somewhat, but it cannot be eliminated in most cases since the procedures or activities of business groups have been based upon the use of the data and productivity would be lost with its elimination.

Network applications cannot be reduced in the short term either. Firms that have developed links with suppliers and customers to provide EDI or electronic mail for business information could find it costly and injurious to business to attempt to revert to other alternatives.

As indicated in Exhibit V-2, competition and the reduction of demand are paramount vendor issues. Reuters and Dow Jones are becoming increasingly competitive in the supply of financial information as Reuters adds to its U.S. bureaus. Reuters is also planning or launching services to take on other vendors of electronic information, such as the Equitron system to compete with Quotron and a bond market system to compete with Bloomberg Financial Markets. Quotron and banks and brokerage firms are evaluating foreign exchange and other systems to take business from Reuters.

The competition has become more intense, as the demand for financial information has decreased due to the drop in trading that has occurred on major exchanges recently.

EXHIBIT V-2



In the market for network applications, competition has been growing as well, although the competition has differences. Carriers, vendors of processing and other information services, and users have all been competing for business. Some large users have introduced EDI or electronic mail as a customer service to improve business. Other users have introduced EDI to gain revenue or offset the investment that was necessary for the use of EDI in their own organizations.

According to vendors that were interviewed, some potential users have delayed plans for network applications as a result of the economic downturn, but these were generally in cases where users had not experienced the benefits that could be achieved with EDI or other network applications. Where vendors had realized savings and/or productivity gains, plans for expanded use were much less likely to be delayed.

It might seem possible that the economic downturn would encourage some competitors to offer text, technical, economic and other data which did not require real-time updates on CD ROM. Users could reduce accesses to on-line data bases by this means, and develop a plan for obtaining some data on-line and some from CD ROM. This approach may be further developed in the future, but no efforts of any magnitude that tried to accomplish this have succeeded. The problem is in develop-

ing linkages between the data being accessed from the on-line source and the data from CD ROM. Much of the capability of the proprietary data base is its ability to search for and relate a large amount of data.

The launching of new network services products is a major market issue, as noted in Exhibit V-2. Such launchings have been a risky venture for companies with significant experience and resources. IBM and Merrill Lynch launched a product in 1984 to compete with Quotron that combined market knowledge and new technology, but it fizzled in three years. McGraw-Hill and Merrill Lynch launched a product in 1985 aimed at trading in oil markets that did not achieve sufficient sales.

Telerate and Reuters have had some success in adding capabilities to existing systems. Telerate had marked success with the introduction of a scoreboard of quotes from multiple sources that helped it gain market share in foreign exchange; this feature has been copied by Reuters. Reuters has been active in introducing new features and new services, such as upgraded foreign exchange information and trading systems, and Globex, which was developed jointly with the Chicago Mercantile Exchange. The introduction of Globex and the latest foreign exchange system of Reuters slowed down during 1990, however.

The joint arrangements and alliances to introduce new products or features noted above are another of the major market issues listed in Exhibit V-2. One feature recently introduced by Telerate was touch-screen technology, developed jointly with AT&T. This development is designed to encourage traders to use Telerate for trading. It points out how electronic information services vendors are expanding capabilities as they learn to package newer personal computer technology with the information data bases they provide.

By offering on-line trading services through terminals for electronic information, vendors may improve business for customers while gaining a portion of the services that its customers offer. Reuters did this with the Dealing service in 1981, and has enhanced its capability to execute foreign exchange trades significantly since that time. Reuters would like to expand into other markets as well, but brokers and banks as well as other competitors may launch serious competitive challenges if Reuters and others expand this type of service.

Network applications have also expanded in volume due to new technology and software, and have experienced growing competition based on the use of expanded features. One major user of EDI noted that multipoint capabilities and X.400 transmission are necessary for vendors interested in their business. One large carrier feels that the improvement of technology can have a greater impact in network applications than in most other areas of information services.

As Exhibit V-2 notes, the introduction of new technology is a major issue in the network services market. It can aid some competitors, as described above for EDI, but it may also add to costs without gaining sufficient additional revenue when introduced by other vendors. The use of PCs in place of terminals has made it possible for users to create access programs that will, for instance, obtain data about companies from Dow Jones whenever new products are introduced. This technique can also be used to obtain data from various data bases and transfer it to an EIS such as the ones provided by CompuServe or Pilot.

Technology can also enable vendors to convert the financial data to a digital form that they supply to terminals in analog representation. This can enable vendors to add new services to their supply of market data, but does not guarantee that the new combination of technology and services will be attractive to prospects. An analysis of market needs is needed. Even Merrill Lynch and IBM have found that it was difficult to forecast trading needs when they tried to introduce a new product into the financial EIS market, as previously mentioned.

Particular vendors may be able to evaluate the use of new technology and take advantage of it for their products. Others may find, however, that the new technology incorporated into their product offerings does not result in sufficient new customers or new revenue to justify expenditures.

D

Key Information System Trends for the 1990s

1. Background

Information services multiplied during the last decade. System integration grew rapidly as a segment of professional services, and then received recognition as a separate mode. By the end of the decade, systems operations was recognized as a separate mode that pulls together the facility management components of processing and professional services. Application and systems software modes of service were both divided into submodes that separated mainframe, minicomputer and workstation/PC revenue. During the decade, network applications also became recognized as a service mode separate from processing.

Network services had begun to be offered shortly after remote processing services were introduced. Some were originally offered by the companies providing remote processing, such as SBC, IDC, Rapidata and GEISCO. Others were developed by companies that knew the importance of certain types of information, such as DRI, Maritime Data Network and Numerax. Some of these vendors used remote processing vendors to deliver their services, and others developed their own delivery systems.

2. Information Systems Market Structure

Exhibits V-3 and V-4 depict INPUT's view of the changing information services market. This market in the 1980s, portrayed in Exhibit V-3, had software products at its center. Software products integrate the other four information services delivery modes.

EXHIBIT V-3

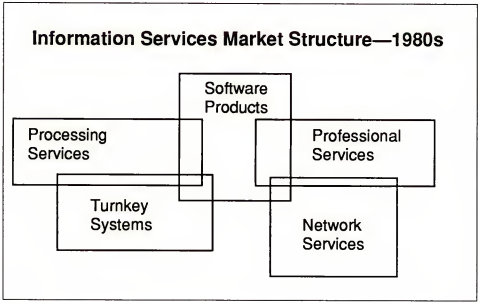
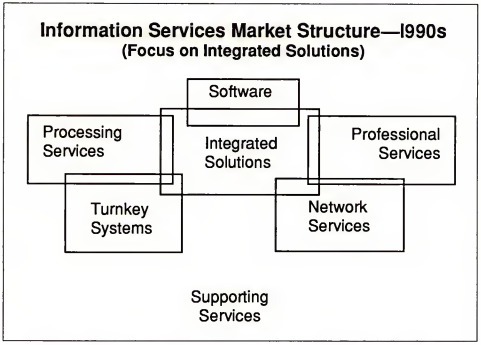


EXHIBIT V-4



More recently, users' needs have been fulfilled through the offering of integrated solutions, often provided by a single vendor. As the 1990s unfold, the longer-term view, as shown in Exhibit V-4, is that the real unifying force in the industry will be support services. When a customer

buys computer systems or application software, processing or professional or network services, or turnkey systems from one or more vendors, one vendor will act as the primary integrator through its support services infrastructure.

- The moves by vendors such as Dow Jones News Services and Sterling to provide well-integrated software products that leverage the corresponding network service are solid examples of the direction required in the 1990s.

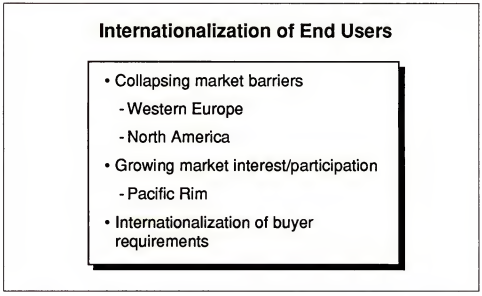
- All on-line data base providers must strengthen the software front ends to their services (both on-line and CD ROM) if they are to broaden use beyond the current levels.

3. Information Services Market Internationalization

The information services market—like the manufacturing and financial services markets—is broadening its scope of products and services on an international basis because of legal considerations and actions by vendors and buyers.

As indicated in Exhibit V-5, market barriers will soften in two key markets—Western Europe and North America. The 1992 agreement between the European Economic Community (EEC) member states will ease movement of goods, services, and capital across Europe. In North America, trade barriers between Canada, Mexico, and the U.S. are rapidly diminishing.

EXHIBIT V-5



Customers buying information systems products and services are including some form of international capabilities in their specifications. These requirements include support for certain international communications

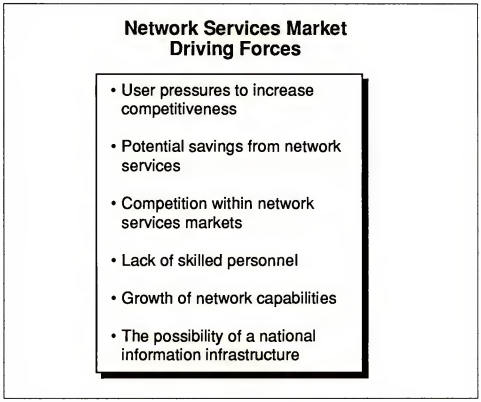
protocols and distributed processing environment and, most importantly, postsale service and support in Western Europe, the Far East, and potentially Eastern Europe.

E

Network Services Market—Driving Forces

Increasing user and corporate attention to the need to increase competitiveness and productivity creates more interest in the use of electronic information to answer questions, help analyze work or alternatives, and to make decisions, and in the use of electronic exchanges of information to speed information and payment between organizations. These are major driving forces in the network services market, as noted in Exhibit V-6.

EXHIBIT V-6



The competition within network services markets is also a driving force. If one vendor can substantially improve its supply of electronic information, EDI or other network application, market share may quickly be improved. In addition, if gaps appear in network services offerings that users are interested in, the users may not only fill the gap but offer the resulting product themselves.

The lack of personnel skilled enough to develop capabilities within user organizations is another factor that drives the use of network services. Some organizations are willing to develop these capabilities, but many encourage vendors serving their companies to improve their services or add new ones to meet the needs they have identified.

The growth of network capabilities makes it easier to promote network services business. It can become faster and more cost effective to provide access to information or support electronic delivery of information. The National Information Infrastructure or NII supported by a group of scientists and companies and discussed in the January, 1991 issue of the *Technology Review* ("Building the Information Marketplace") could provide a stimulus. A bill for a step in this direction is being introduced in congress by Senator Gore.

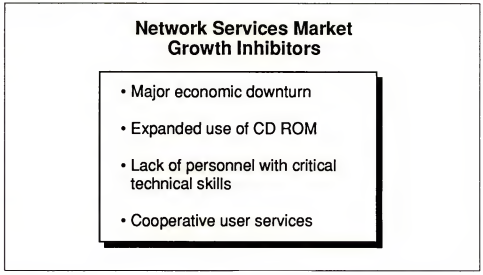
F

Network Services Market—Growth Inhibitors

The network services market may be affected by various inhibitors, including the current economic downturn, as indicated in Exhibit V-7.

The greatest inhibitor would probably be a significant economic downturn, since users would reduce the number of vendors used or the volume of service used if trading volume slipped to a great extent. This has not happened yet, but some economists feel that the war or lack of recovery during 1991 could lead to a major downturn.

EXHIBIT V-7



The use of CD ROM to replace some of the access that customers of electronic information have today could certainly be a growth inhibitor. Vendors might begin to supply information that does not require short-term update on CD ROM.

Since the use of new technology is critical to the growth of network services vendors, the lack of personnel with necessary skills can be an inhibitor to growth, as noted in Exhibit V-7. It can become quite critical to vendors that don't have a background in information services. Consultants or partners may need to become accustomed to taking advantage of new opportunities, as Telerate has recently done in an arrangement with AT&T to develop a new terminal.

The organization of users to provide their own network applications or electronic information could also inhibit the growth of vendors. Some users have launched services based on their own internal developments. The most common situation for this is where the user becomes a vendor. However, it is possible that users may establish more joint activities in the future to reduce costs or share capabilities.

Competition

Competition

A

Introduction

The leading vendors in the network services market and segments of it are identified in this chapter. The two segments of the market that make up network services are:

- Electronic information systems (EIS), data bases of electronic data that can be accessed but not changed by a user to support information needs
- Network applications or electronic communication such as EDI, electronic mail, videotex, or computerized switching

B

Market

1. Market Leaders

The top vendors of network services include different types of organizations, as shown in Exhibit VI-1. The list includes publishers of financial information, such as Dow Jones and Dun & Bradstreet; a book publisher, McGraw-Hill; a bank; a newspaper; two value-added networks; IBM, a computer manufacturer that is also the leading information services vendor; two subsidiaries of manufacturing companies; and four vendors that are chiefly in the information services industry. Vendors in this market are divided between those whose main information services product is in the network services area, such as Mead and Equifax, and vendors that have many other products and services and that are larger in revenue, such as CSC, IBM and ADP.

EXHIBIT VI-1

Leading Vendors of Network Services in 1989

Rank	Vendor	Estimated Revenue ($ Millions)	Market Share (Percent)
1	TRW (including Chilton)	528	8
2	Dun & Bradstreet	405	6
3	Dow Jones (Telerate)	403	6
4	Mead Data Central	390	6
5	Equifax	383	5
6	Reuters	360	5
7	McGraw-Hill	320	5
8	Citicorp (Quotron)	245	4
9	ADP	209	3
10	BT Tymnet	192	3
11	Sprint	190	3
12	Knight-Ridder (& Dialog)	155	2
13	IBM	140	2
14	CompuServe	135	2
15	CSC	110	2

The top ten vendors shown in Exhibit VI-1 account for 51% of the 1989 market of $7 billion for network services. The next five vendors add 11%. The market has a group of vendors with large revenues, a relatively small number of vendors in the middle of the market, and many vendors with a small amount of revenue, most of whom provide proprietary data bases. The market leaders are firms that provide financial data bases for credit or investment analysis and review, as shown in Exhibit VI-2. Over half of the products or services have financial uses, and the most common focus is security or other market pricing. However, the vendor with the greatest revenue in this market, TRW, and several other large vendors including Equifax and Dun & Bradstreet, focus on credit uses.

EXHIBIT VI-2

Product/Service Focus of Leading Network Services Vendors

Rank	Vendor	Product Focus
1	TRW	Credit data
2	Dun & Bradstreet	Financial and other corporate data
3	Dow Jones (Telerate)	Financial market prices and news
4	Mead Data Central	Legal and news texts
5	Equifax	Credit data
6	Reuters	Current financial market news and prices
7	McGraw-Hill	Econometric and other industrial data
8	Citicorp (Quotron)	Current security and commodity prices
9	ADP	Current security and commodity prices
10	BT Tymnet	EDI and other network applications
11	Sprint	Network applications for multiple purposes
12	Knight-Ridder (Dialog)	News and bibliographic
13	IBM	Financial and other network services
14	CompuServe	Miscellaneous network services
15	CSC	Cost forecasting and resource data

In addition to financially oriented products, there are a large number of other electronic information products that provide information on chemicals, agriculture, passenger cars, audience ratings, TV viewing, and a variety of other topics. There are so many proprietary data bases available for use that guides have been developed to help in selecting one to meet information needs.

There have been notable acquisitions and alliances in this market, as in other information services markets. Dow Jones completed its acquisition of Telerate; TRW purchased Chilton; and British Telecom acquired the IS Group of McDonnell Douglas, including Tymnet, in 1989. AT&T also obtained a stake in the EDI market in 1989. Past acquisitions of note include the purchase of Quotron by Citicorp and the transfer in ownership of Dialog from Lockheed to Knight-Ridder. Many alliances have taken

place in this market that allow the proprietary data bases of one vendor to be accessed on the networks of another. One of the most notable recent arrangements allowed CSC credit data to be accessed through Equifax.

2. Market Segments

The list of leading vendors of electronic information shown in Exhibit VI-3 is similar to the list in Exhibit VI-l, since electronic information is the only or dominant offering of larger providers of network services. ADP is the only one of the top 10 vendors that has noticeable amounts of both electronic information and network applications revenue.

EXHIBIT VI-3

Leading Vendors of Electronic Information in 1989

Rank	Vendor	Estimated Revenue ($ Millions)	Market Share (Percent)
1	TRW (including Chilton)	528	10
2	Dun & Bradstreet	405	7
3	Dow Jones (Telerate)	403	7
4	Mead Data Central	390	7
5	Equifax	383	7
6	Reuters	360	7
7	McGraw-Hill	320	6
8	Citicorp (Quotron)	245	5
9	Knight-Ridder (& Dialog)	155	3
9	ADP	150	3
10	BT Tymnet	192	3
11	CSC	67	1
12	CompuServe	65	1
13	PMS	59	1

It appears that vendors of network services concentrate on providing either electronic information or network services, since less than a third of the vendors shown in Exhibit VI-3 offer both. However, there are vendors with network capabilities that offer both, including CompuServe and ADP. Exhibit VI-4 shows the focus of the leading vendors in the on-line data base sector of network services.

EXHIBIT VI-4

Leading On-Line Data Base Vendor Market Focus

Company	Credit Information	Securities Prices	Vertical Specialty	Business Information
Dun & Bradstreet	X	-	-	X
Equifax	X	-	X	-
TRW	X	-	-	-
Reuters	-	X	-	-
ADP	-	X	-	-
Citicorp (Quotron)	-	X	-	-
McGraw-Hill	-	X	X	X
Dow Jones (Telerate)	-	X	-	-
Mead Data Central	-	-	X	-
Trans Union	X	-	-	-
Chilton	X	-	-	-
Computer Sciences Corp.	X	-	-	-
CompuServe	-	-	-	X
Knight-Ridder (Dialog)	-	-	-	X

The markets for electronic information and network applications are different, as indicated in Exhibit VI-5. For instance, there are a large number of small vendors of electronic information services that offer such services based on their business knowledge. There are few small providers of network applications. In contrast, there are large companies that have started to market services for a network application—EDI—after they started to use EDI themselves, as a means of recovering investment or gaining revenue based on their experience and investment.

EXHIBIT VI-5

Comparison of Electronic Information Services and Network Application Vendors

Characteristic	EIS	Network Application
Largest Vendors	Publishers. Subsidiaries of large companies interested in revenue potential of EIS	Communication vendors. IS vendors exploiting network capabilities
Midsized and Smaller Vendors	Chiefly companies who offer EIS products related to their businesses. There are many small vendors.	IS vendors and users gaining revenue from their investments in network applications. Few small vendors.
Other Vendors	More than half of large vendors and a higher percentage of smaller specialize in EIS.	Larger venders offer multiple information services. A number of EDI providers also market EDI software.
Revenue of Vendors	There are nine vendors earning over $200 million.	Three vendors earn over $100 million.

Leading vendors of network applications are shown in Exhibit VI-6. Six of them are companies with large network capabilities. In fact, three are providers of value-added network services. These vendors found ways of using network capabilities that they originally developed for other purposes to serve the market for network applications.

EXHIBIT VI-6

Leading Vendors of Network Applications in 1989

Rank	Vendor	Estimated Revenue ($ Millions)	Market Share (Percent)
1	BT Tymnet	192	12
2	Sprint	190	12
3	IBM	140	9
4	MCI	90	6
5	CompuServe	65	4
6	ADP	59	4
7	EIS	30	2

In addition to vendors with network capabilities, there are vendors who have entered the market because they have seen the future potential of network applications.

- Sterling Software has developed software and network capability for EDI based on its future potential.
- Sears and other users have become vendors of EDI for the same reason. They developed internal capabilities and then helped to underwrite the costs by selling the services to other users needing EDI network services.

C

Vendor Profiles

The information provided in this section focuses on the relation of a vendor's set of network services and products to its other business. Each vendor is profiled relative to company background, network services, and other information services. Additional information on these and other network services vendors can be found in INPUT's Vendor Analysis Program.

The network services sector, more than others, is populated with a diverse set of vendors.

The vendors profiled in this report are:

- BT Tymnet
- CompuServe
- Equifax
- Quotron (Citicorp)
- RAILINC
- Sterling
- Telerate

1. BT Tymnet, Inc. 2560 North First Street, San Jose, CA 95131, (408) 922-0250

a. Company Background

BT Tymnet Inc., is an international value-added network provider and one of the world's largest suppliers of shared, dedicated, and hybrid network solutions. The company operates the TYMNET® public packet data communications network, which offers protocol conversion, error protection, enhanced security features, electronic messaging, card services, and electronic data interchange (EDI).

INPUT estimates that BT Tymnet's 1989 pro forma revenue reached nearly $300 million, including about $30 million in revenue from Dialcom.

- The TYMNET data network originated in 1969 to deliver remote computing services to a widely dispersed population of Tymshare clients. In 1977, the company —then called Tymnet, Inc.—became an FCC-regulated specialized common carrier, and two years later, installed its first private network. Tymnet was acquired by McDonnell Douglas in 1984 and was subsequently renamed McDonnell Douglas Network Systems Company (MDNSC).

- Effective November 20, 1989, British Telecom plc purchased MDNSC and certain other McDonnell Douglas network services for $355 million in cash. The purchase included Tymnet's interest in Network Information Service, Ltd. (NIS), a valued-added service provider in Japan. The acquired operations now operate as BT Tymnet, a wholly owned subsidiary of British Telecom.

BT Tymnet's operations support all of the TYMNET network products and services for shared, hybrid, and dedicated customer applications, including Dialcom (acquired by British Telecom during 1986) electronic mail services, Payment Systems card authorization services, and EDI*Net®. Overseas, the operations of BT Tymnet and British Telecom will be integrated to maximize regional strategies.

b. Network Services

INPUT estimates BT Tymnet's 1989 revenue as follows:

Network Services	
Value-added network	55%
Electronic mail	14%
EDI	2%
	71%
Other Business	
Transaction Processing	13%
Private Networks	16%
	100%

TYMNET® is BT Tymnet's public packet data communications network that consists of intelligent communications processors connected by a network of leased telephone lines, microwave links, and satellite channels to provide interconnection between remote terminals, microcomputers, and host computers worldwide. TYMNET provides value-added services such as error protection, protocol conversion, and data security.

- The number of companies supported on the network has grown from 30 in 1972 to over 2,500 today.
- Local dial-up access is available from over 800 U.S. locations and from over 80 countries. The network serves over 23,050 local exchanges via 3,243 communications processors and supports over 10,000 simultaneous users during peak hours.
- The network supports various protocols, including asynchronous, X.25, X.75, 3270 bisync, 3270 SDLC, RJE HASP, Burroughs Poled-Select, and UTS. For interfacing personal computers to networks, the X.PC and MNP asychronous error-protection protocols are used.
- The Outdial™ service allows mainframes, minicomputers, and microcomputers and terminals connected to the network to dial out to attended or unattended terminals from the nearest TYMNET Outdial port, saving users 30% of comparable WATS charges.
- Most major public data bases and information services are accessible on the network, including TRW Information Services, Delphi, Dow Jones & Company, and the National Computer Network of Chicago.

The principal EDI service, EDI*Net®, is a third-party, value-added communications service for computer-to-computer exchange of such business documents as purchase orders, invoices, and bills of lading.

- EDI*Net supports all public exchange standards and offers asynchronous, bisynchronous, and leased-line access.

- EDI*Net clients are predominantly in the transportation, grocery, electronics, telecommunications, aerospace, oil, and warehousing industries. There are currently over 1,000 EDI*Net clients.

c. Other Information Services and Related Business

Card services provided by BT Tymnet include credit card authorization and related services at electronic point-of-sale terminals across the U.S. These services generated an estimated $40 million in 1989 revenue.

- Authorization services are provided for all major credit cards, including VISA, MasterCard, American Express, Discover, Diners Club, Carte Blanche, and private label card programs.

- A related service, electronic draft capture, electronically captures credit card transactions for later transmission to the merchant's bank and enables the bank to process card sales electronically, rather than with paper drafts.

BT Tymnet also provides private and hybrid data networks and associated support services. These services contributed an estimated 16% to 1989 revenue.

- Private network customers may choose from various hardware and service options, including a range of packet switches (called Tymnet Engines), and network management provided by BT Tymnet or their own staff

- The company has supplied 42 private networks with a total of over 3,000 nodes worldwide to clients in banking, petrochemical, data base services, publishing, electronics, postal telephone and telegraph (PTTs), and Regional Bell Operating Companies (RBOCs).

- Hybrid networks combine shared and dedicated equipment. In August 1989, the company announced a $2 million hybrid agreement with Ford Motor Company that is in addition to an existing contract for $8.5 million in TYMNET VAN services. Ford purchased various TYMNET packet switches, software, network management services, facilities management, and hardware and software maintenance.

2. CompuServe Incorporated 5000 Arlington Centre Blvd. Columbus, OH 43220 (614) 457-8600

a. Company Background

CompuServe Incorporated, founded in 1969, provides remote computing, electronic mail, data base access, internal communications, value-added network services, and application and systems software products to major U.S. corporations and government agencies. CompuServe also provides communication and information processing services to owners of microcomputers. CompuServe has operated as a wholly owned subsidiary of H&R Block since it was acquired in May 1980.

CompuServe's information service for individual personal computer owners currently has more than 548,000 members around the world, making it the largest on-line information service for microcomputer users. CompuServe also provides electronic mail, software, and value-added packet data network services to more than 2,000 major U.S. corporations and government agencies.

CompuServe's fiscal 1989 revenue reached $173.1 million, a 16% increase over fiscal 1988 revenue of nearly $149.2 million. Pretax earnings rose 22%, from $25.2 million in fiscal 1988 to over $30.6 million in fiscal 1989. In the three-year summary that follows, financials prior to fiscal 1989 have been restated to reflect the pooling-of-interests acquisition of Access Technology, Inc. in October 1988:

Acquisitions made by CompuServe include the following:

- In June 1989, CompuServe acquired Source Telecomputing Corporation of McLean (VA) from Readers Digest. Source Telecomputing operated The Source, an on-line information service.

- In May 1989, CompuServe completed the acquisition of Applied Computing of Sydney (Australia). Applied Computing is the major distributor of CompuServe's 20/20 integrated spreadsheet software package, which is produced by CompuServe's Access Technology subsidiary. Applied Computing also represents three other software products and employs 23 people.

- In October 1988, CompuServe acquired Access Technology, Inc. of Natick (MA) for approximately $36.8 million in H&R Block common stock. Access Technology provides spreadsheet modeling software for various hardware platforms. Its principal product is 20/20™.

CompuServe currently is organized into four divisions as follows:

- The Information Services Division provides microcomputer users with access to a range of general information data bases in the areas of

business, research, demographics, and news, as well as electronic mail, interactive conferencing, home shopping, financial transaction services, and travel planning services.

- The Business Services Division offers access to application programs, financial data bases, and communications services to a wide range of businesses. Electronic mail, electronic data interchange, private videotex, and packet data network services are also provided.

- The Software Products Division provides data base management, spreadsheet modeling, and financial, human resources, and newspaper management software products through several wholly owned subsidiaries.

- The Support Services Division provides systems engineering, product development, computer operations, and associated support services to CompuServe's other units.

b. Network Services and Related Products

INPUT estimates that approximately 75% of CompuServe's fiscal 1989 revenue was derived from network/electronic information services (50% from network application services and 50% from electronic information services) and 25% from its various systems and application software products.

Through the CompuServe Information Service, the company provides members who own a microcomputer and a modem with on-line access to a range of information and communications services.

- The service offers a selection of more than 1,400 subject areas in the following categories:

  - Communications & Bulletin Boards
  - News, Weather & Sports
  - Travel
  - The Electronic Mall/Shopping
  - Money Matters & Markets
  - Entertainment and Games
  - Home, Health & Family
  - Education and Reference
  - Personal Computing Services

- In collaboration with Ziff-Davis Publishing, during fiscal 1989 CompuServe introduced *PCMagNet,* an on-line service that allows *PC Magazine* subscribers to interact with the magazine's editors and columnists. The service also provides an on-line library of over 1,000 productivity-enhancing software programs that can be downloaded directly into the user's computer.

- In an effort to expand its on-line information services to international markets, CompuServe entered into a partnership with Radio Schweiz, a Swiss electronic information company. The CompuServe Information Service will be introduced, locally marketed, and supported in the U.K., Switzerland, and other European countries. During 1990, local services were to have been developed for European countries based on the CompuServe model.

- During fiscal 1989, CompuServe concluded agreements with several companies, including major manufacturers of computer modems, to bundle CompuServe memberships with their microcomputer products. Membership kit sales are also available through retail outlets, including Sears Business Centers and Waldenbooks.

Through CompuServe's Business Services Division, the company provides corporate and business clients with access to electronic communications products, data bases, and value-added packet-switched network services. Communications services include the following:

- The CompuServe Electronic Data Interchange (EDI) service

- Interchange™ integrates the following electronic communication and information delivery products into a single compatible environment:

  - CompuServe Mail electronic mail communication system
  - DISPLAY electronic publishing system
  - FORUM electronic conferencing system
  - ACCESS data library

- Professional Connection Plus™ is communications software for IBM and compatible microcomputers.

Information services include access to the following data bases and software tools:

- Financial Analysis Data Bases:

  - 10K Plus™ integrates screening, sorting, and ad hoc reporting of fundamental financial data bases for access and analysis of historical and current financial data. Data bases currently available as part of the system include WorldScope, COMPUSTAT II, Disclosure II, Banking Data Services (BDS), Value Line Data Base II, Institutional Brokers' Estimate System (I/B/E/S), and Standard & Poor's Register Online.

  - Securities Market Data is an interactive securities system of pricing data bases and software for data retrieval and analysis, including North American Securities (VALUE), International Securities data base, Quick Quote™, and Commodities Database.

- Demographic Services Data Bases:

  - SUPERSITE demographic data base
  - DORIS (Demographic Online Retrieval Information System)
  - CITIBASE time-series economic data base

- News Retrieval Services:

  - Executive News Service SM, developed by CompuServe, monitors and scans the AP and UPI news wires, Reuters Financial Report, OTC NewsAlert, McGraw-Hill Business Report, and the Washington Post for topic areas based on user criteria.

  - IQuest™ provides access to reference resources stored in over 900 keyword searchable data bases, including newspapers, newsletters, news magazines, and industry and trade journals.

- Value-added network services, one of the fastest-growing segments of CompuServe's business, supports clients in various business information, communications exchange, and transaction management environments.

- CompuServe is the primary service provider for VISA USA's nationwide point-of-sale credit card authorizations.

- Business services are provided to a range of clients including investment and commercial banking institutions, insurance companies, pharmaceutical companies, publishers, retail marketers, lodging industry members, major airlines, automotive industry members, credit card companies, and government agencies.

3. Equifax Inc. 1600 Peachtree Street, N.W., Atlanta, GA 30309, (404) 885-8000

a. Company Background

Equifax was founded in 1899 as a credit reporting agency under the name Retail Credit Company. The company was renamed Equifax in 1976 and now operates as the parent company for its affiliates that provide a range of services related to credit reporting, insurance underwriting, and product marketing.

In December 1990, Equifax finalized the acquisition of Telecredit, Inc. of Los Angeles (CA). Telecredit operated as a public company until December 28, 1990, when Equifax, Inc. acquired it through a tax-free exchange of stock. Telecredit now operates as a wholly owned subsidiary.

The company provides information services and other services through five business units:

- Credit Information Services is a national credit bureau network providing information for consumer and commercial credit reports, services for the management and collection of accounts receivable, and the detection and prevention of fraud. Information services include credit reporting via batch processing or electronic information services.

- Insurance and Special Services provides risk management, automated claims information exchange, motor vehicle reports, and rate/price management electronic information services to the property and casualty insurance industry, and mortgage loan reporting processing services to mortgage lenders.

- Marketing Services provides market research, market data analysis, statistical modeling, and target marketing information to various clients, including direct response marketers, manufacturers, and advertising agencies.

  - In April 1990, Equifax entered into a long-term relationship with Lotus Development Corporation to provide the consumer marketing data base for Lotus Market Place: Households, a CD ROM product for the Macintosh.

- Equifax Canada was formed in June 1989 with the reorganization of Equifax's Canadian operations into one operating company. This was accomplished through the acquisition of the remaining 53% of Toronto Credits, Ltd. This unit provides consumer credit reports, automated business credit reports, account collections, credit promotion, fraud prevention services, property inspections, life and health underwriting reports, claim investigations, motor vehicle records, and insurance claims information exchange services.

- Equifax Europe, headquartered in the U.K., supports the company's clients outside North America. In January 1990, Equifax entered into a joint venture with Next plc, a British retailing and financial services firm, to provide a range of information services, including consumer credit reporting, credit scoring, marketing, and insurance information services throughout the U.K.

Equifax has continued to expand its operations in the credit reporting and insurance information services areas with strategic acquisitions in the U.S. and Canada.

Equifax's total 1989 revenue reached $840.3 million, a 13% increase over 1988 revenue of $743.1 million. Net income declined 9%, from $39.4 million in 1988 to $35.7 million in 1989.

Revenue for the six months ending June 30, 1990 reached $451.6 million, a 15% increase over $407.6 million for the same period in 1989. Net income reached $23.5 million, compared to $20.5 million for the same period a year previously.

b. Network Services

INPUT estimates approximately 90% of Equifax's information services revenue was derived from electronic information services provided for credit reporting and insurance, 5% was derived from credit and mortgage account management processing services, and 5% from mortgage management software.

The Credit Information Services Sector provides electronic information services for consumer credit reporting, collection services, and credit promotion primarily to the banking and finance, retail, and credit brokerage industries. Examples include:

- DTEC is a service used to locate people whom a company may need to contact.
- A Utility Information Services division assists utility companies in controlling bad debts by providing a service that allows these companies to share customer nonpayment information.
- In August 1988, Equifax signed a ten-year agreement with Computer Sciences Corporation (CSC) under which 31 CSC-owned credit bureaus would convert to Equifax's credit reporting system and use Equifax's credit data base service.

The Insurance and Special Services sector primarily provides information (including health data) for insurance underwriting through Equifax Services Inc.

- Equifax provides all major life and health insurance companies in the U.S. with various informational services for help in determining the classification of applicants as risks for life and health insurance and for assistance in settling claims. Also, health data is provided to these companies for their use in underwriting the health aspects of their risks.
- Equifax also provides similar information services to major property and casualty insurance companies in the U.S.
  - The Motor Vehicle Record (MVR) Information System provides current driver record information to insurance companies.

- The Rate/Price Management System (RPM) provides current rate and classification information on a company's book of personal auto business. RPM enables the underwriters to rate and price new and renewal policies based on current information.

- The Comprehensive Loss Underwriting Exchange (C.L.U.E.) is a data base exchange between property and casualty insurance companies to provide and have access to prior claim history on individuals, vehicles, or property involving auto accidents and property losses.

c. Other Information Services

Premium Audits/EPIC (Electronic Processing Information Collection) provides an automated procedure using a lap-top computer to examine an insured's operation, including financial and accounting records, to determine the actual earned premium for a given period. Audits are conducted according to ISO standards or as specified by the customer.

Information services provided by Equifax's Special Services unit include commercial mortgage servicing, inventory finance and control services information, and hospital bill audits.

4. Quotron Systems, Inc. 12731 West Jefferson Boulevard, Los Angeles, CA 90066, (213) 827-4600

a. Company Background

Quotron, a component of the Information Services Business of Citicorp, was founded in 1957. It provides on-line financial information services via its international network to more than 100,000 terminals in 23 countries.

- In addition to real-time market data services, the company provides news services, branch office automation services, broker support software tools, analytics, financial data base services, network services, and a software development library. Quotron also provides and supports terminals, printers, and proprietary computer systems to its clients.

- Through Securities Industry Software Corporation (Golden, CO), a subsidiary acquired in mid-1986, Quotron also provides processing services and turnkey systems for order management, brokerage accounting, and trading applications to brokerages.

Quotron operated as a public company until June 1986, when it was acquired by Citicorp for $19 per share, or a total purchase price of approximately $680 million. Quotron now operates as a subsidiary within Citicorp's Information Business unit.

According to Citicorp's 1988 Annual Report, Quotron's revenue (net of interest expenses) reached $305 million in 1988, a 16% increase over $262 million in 1987. INPUT estimates that Quotron's revenue before interest expenses was approximately $350 million in 1988, compared to $305 million in 1987.

b. Network Services

INPUT estimates that over 95% of Quotron's 1988 revenue was derived from processing/network services and associated equipment rentals. The remainder of revenue was derived from application software products and professional services consulting.

Quotron supplies a range of on-line, real-time market data and support services to more than 100,000 terminals supported by more than 7,000 branch office computers and network processors.

- On an average day, Quotron's network handles about 15 million quotation requests and does another 40 million automatic quote updates for its various monitor services.
- The network also daily handles more than 1.7 million proprietary messages between brokers, and nearly one million requests for news and information from third-party data bases.

Quotron's network offerings include the following:

- Market Data Services provide instant access to a range of market data, news, and statistics, including real-time transaction data on stock, bonds, options, mutual funds, financial futures, and commodities on exchanges around the world.
- Trading and Decision Support Services provide real-time analytical tools for evaluating trading activity.
- Branch Office Services provide applications for prospecting, portfolio analysis, and a family of office automation products.
- Financial Data Base Services provide a continuously expanding library of on-line research, including company reports, financial analyses, statistical data, and historical trends.

c. Other Information Services

The Research Distribution Service (RDS) distributes highlights of morning equity research meetings at Goldman Sachs, Merrill Lynch, and Salomon Brothers, and dynamically displays continuous updates

throughout the day. RDS is targeted to portfolio managers, analysts, and traders who use Quotron terminals and microcomputers at institutional firms worldwide.

Quotron offers the following hardware to its clients:

- Quotron's systems architecture centers on the QUOTRON 1000™, a multiuser UNIX branch office system with extensive networking capabilities based on the Motorola 68020 microprocessor.

- The QUOTRON 800 Branch Office System, the predecessor to the QUOTRON 1000, has a proprietary architecture and supports the Quotron BOS operating system. There are currently over 7,000 QUOTRON 800 systems installed.

Quotron provides the Quotron Open Windows family of software applications that operate in the Microsoft Windows environment. The products offer Quotron's microcomputer customers the ability to integrate Quotron financial information services with off-the-shelf applications, such as the Microsoft Excel spreadsheet. These products demonstrate the company's commitment to support open computing environments by delivering real-time financial data to third-party hardware and software. The products are available individually or as an integrated package.

Securities Industry Software Corporation (SIS), Quotron's wholly owned subsidiary, provides transaction processing services for order management, brokerage accounting, and trading to brokerage firms.

- SIS systems include the SIS Order Management System, an order entry system with administrative messaging capabilities. The SIS Brokerage Accounting System fulfills all the accounting requirements of a full-service brokerage firm. Optional systems that can be added include a Cash Management System, a Self Directed IRA System, and a Portfolio Management System. The SIS Trader is an on-line trading system tailored to specific trading areas, including equities, municipal bonds, government bonds, mortgage-backed instruments, and corporate bonds.

5. RAILINC Corporation 50 F Street, N.W., Washington, D.C. 20001, (202) 639-5580

a. Company Background

RAILINC®, founded in 1982, provides network services—including electronic data interchange (EDI) and industry data bases—and software products to the transportation industry. Clients include rail, ocean, and motor carriers; manufacturers; and distributors.

RAILINC is the data processing subsidiary of the Association of American Railroads (AAR). RAILINC's 1989 revenue of $14.2 million includes approximately $8 million from AAR and its members.

b. Network Services

Approximately 80% of RAILINC's 1989 revenue was derived from network services and 20% from software products.

RAILINC's network services include the following:

- The CLM Collection Service electronically collects Car Location Messages (CLMs) from most major rail carriers in North America and provides shippers with a single source of CLM information. The service is targeted to rail shippers with owned or leased fleets of any size, consignees, shippers' agents, and trucking companies.

- The Data Exchange System consolidates car hire or car repair bills from over 95 railroads and provides them to rail car owners in computer-processable form. Over 90% of all car hire allowances and car repair bills are reported to RAILINC's Data Exchange System.

- RAILINC's telecommunications network is currently used for EDI transmissions by over 300 clients, including rail carriers, manufacturers, ocean carriers, and trucking companies.

- Data bases maintained by RAILINC include the following:

  - TRAIN II® (Telerail Automated Information Network) is an international freight car data base. TRAIN II collects information on freight car, trailer, and container movements across the U.S., Canada, and Mexico. Processing over 850,000 records per day, TRAIN II serves as the official source of interchange information for car hire calculation. There are currently over 100 subscribers to this service.

  - UMLER® is a computerized version of the Official Railroad Equipment Register. This data base contain information on the physical characteristics of more than 3 million registered freight cars, trailers, and containers.

- The Reload Fleet Management service is a computerized railcar tracing and pool management service that automatically collects CLMs and TRAIN II data and locates the appropriate rail car for the next load using the shortest possible distance. There are currently seven clients using this service.

c. Other Information Services

RAILINC offers several microcomputer software products for use with its network services. The products are available for IBM PC/XT, AT, PS/2 and compatible microcomputers and include the following:

- CLM/PC Tracing Software assists shippers in tracing rail shipments. CLM/PC collects CLMs through RAILINC's network and sorts and stores the information based on the requirements of the user. There are currently 20 installations of the software.

- CRB/PC, introduced in 1988, provides mechanized car repair billing procedures and electronic access to RAILINC's Data Exchange. There are currently five installations of the software.

- EDI/SYNAPSE® provides for the entry, transmission, receipt, and processing of data using ANSI, X12, TDCC, WINS, UCS, and most other EDI standards. There are currently 70 EDI/SYNAPSE installations.

- TRUMPS® offers electronic access to RAILINC's TRAIN II and UMLER data bases. Optional EDI capabilities permit the exchange of bills of lading, waybills, and administrative messages. There are currently 100 TRUMPS users.

6. Sterling Software, Inc., EDI Group 4600 Lakehurst Court, P.O. Box 7160, Dublin, OH 43017-0760 (614) 793-7000,

a. Company Background

Sterling Software's EDI Group specializes in EDI services and proprietary software products. Sterling has been offering third-party EDI network services since 1978 and has over 2,500 U.S. and Canadian network service clients representing a variety of industries.

- The EDI Group's strategy focuses on maintaining a close relationship with customers. The company claims to host the largest user group meeting offered by any EDI service provider, with a wide variety of workshops and industry participants.

The EDI Group was created in October 1990, and includes the following divisions:

- Sterling's existing ORDERNET Services Division, headquartered in Dublin (OH), provides EDI network services, communications and translation software products, and education services.

- The EDI International Division, headquartered in London, is a newly formed division created to expand Sterling's EDI business overseas.

- The EDI Labs Division is a newly formed division that provides technical support for the ORDERNET Services and EDI International Divisions. The division is also responsible for the development and support of all software products and systems for Sterling's EDI network services and for EDI software users. The EDI Labs Division will focus on the development of the next generation of EDI software and systems.

In March 1990, Sterling acquired Metro-Mark Integrated Systems, Inc. of Rosyln Heights (NY). Metro-Mark is one of the original suppliers of TRANSLATOR EDI translation software for micro, midrange, and mainframe platforms. Its affiliate, Lakestone Systems, supplies TRANSLATOR software, consulting, and education services to Canadian clients.

The EDI Group's fiscal 1990 revenue reached $23.4 million, a 79% increase over fiscal 1989 revenue of $13.1 million. Operating profit (before corporate expenditures) reached $5.0 million, compared to $3.2 million for fiscal 1989.

Revenue growth during fiscal 1990 was attributed to a 49% increase in EDI network services revenue as well as increased sales of the Group's software products, including those obtained in the Metro-Mark acquisition. Maintenance revenue also increased 100% over fiscal 1989.

Fiscal 1989 revenue growth was attributed to a 53% increase in EDI network services revenue and increased sales of software products.

b. Network Services

Using Sterling's data center in Dublin (OH), ORDERNET provides an on-line network to manage and control the flow of standardized business documents between trading partners that regularly transmit electronic documents to one another.

- ORDERNET traces its EDI involvement to 1975, when Informatics General began COMM-NET EDI services to the wholesale pharmaceutical industry. Currently, ORDERNET serves a variety of industries using both industry-specific formats and ANSI X12 standards.

- In September 1990, ORDERNET Services announced that GTE Health Systems would make ORDERNET's network services available to hospitals using GTE Health Systems' MedSeries 4 software. GTE is providing the communications interface through a new network product called GATEWAY*EXPRESS.

- Sterling developed Medimetrik, the initial service offering for International Health Information Applications, Inc., which provides information on pharmaceuticals, and creates a data base of drug usage through data capture and retrieval procedures applied to EDI traffic, as well as from data submitted by the participating companies.

- Electronic transmission of hospital chargebacks (rebates) between wholesalers and pharmaceutical manufacturers is available, using the three National Wholesale Druggists' Association formats: Bid Award Notification to Wholesaler; Chargeback Debit Memo to Manufacturer; and Chargeback Reconciliation to Wholesaler.

- The EDI-UCS service is for the grocery industry. ORDERNET supports internetwork traffic with BT Tymnet's EDI-NET at no additional user cost. Other internetwork agreements have been established with Kleinschmidt, GE Information Services, and Control Data.

- ORDERNET offers a media conversion service that permits electronic documents to be converted to hardcopy (EDI/LaserMail™ for mailing) or to facsimile transmissions (EDI/Fax™ for delivery to any trading partner's fax machine).

ORDERNET Services offers DOCULINK, a series of communications software packages that are built to emulate the communications protocols used most commonly in micro, mini, and mainframe computers and will, with the appropriate internal or external modem, transmit and receive data with the ORDERNET network.

MarketQuest™, is a data base service that builds on EDI documents, such as purchase orders and invoices, that trading partners send during the normal course of business.

c. Other Information Services and Software Products

With the acquisition of Metro-Mark, ORDERNET Services has expanded its EDI translation software to support the following platforms:

- IBM 30XX, 42xx, 9370 under MVS and DOS/VSE
- DEC VAX under VMS
- IBM S/34, S/36, S/38, and AS/400
- IBM PC and PS2 families and compatibles
- Data General

The company has announced it will perpetuate both the popular GENTRAN and TRANSLATOR product lines and cross-build upon the respective strengths of each. It is anticipated that the two will ultimately converge into a "super product." Followers of the mainframe marketplace know that GENTRAN and TRANSLATOR had been pacing each other in new functionality.

GENTRAN Plus for IBM mainframes builds on the strengths of GENTRAN Plus and SUPERTRACS (Sterling's communications engine) to integrate translation, communications, mailboxing, and mapping into a fully automated EDI operation.

- GENTRAN Plus supports its own telecommunication lines (2780/3780 and SNA), performs autodial on a scheduled basis, and provides operator screens for controlling communications, restoring transmitted interchanges, viewing EDI data, etc.

- Sterling Software claims that, although it is relatively new, GENTRAN Plus is the only product on the market that addresses the needs of large-scale IBM mainframe EDI operations.

7. Telerate, Inc., One, World Trade Center, New York, NY 10048, (212) 938-5200

a. Company Background

Telerate Systems, Inc. was founded in 1969. In 1980, Telerate, Inc., a holding company, was organized with Telerate Systems as its major operating subsidiary. The company provides on-line financial market data to banks, other financial institutions, corporations, government agencies, brokers, and private investors worldwide.

On November 3, 1989 Telerate and Dow Jones approved a definitive merger agreement in which Dow Jones would acquire all the outstanding shares of Telerate common stock it did not currently own for $21 per share in cash.

During 1988, Telerate and AT&T formed Global Transactions Services Company (GTS), a joint venture owned by Telerate and AT&T. The venture was established to develop and market electronic transaction services for global financial markets. The first of GTS' transaction services, The Trading Service (TTS), became commercially available during mid-1989. TTS is an electronic transaction system for foreign exchange trading.

In June 1989, Telerate announced the signing of a five-year contract with Intex Holdings Ltd. for the development, marketing, and distribution of automated market systems for exchanges and exchange members.

- The contract makes formal a joint effort started by Telerate and Intex in 1988. The two companies already had agreements to provide the Chicago Board of Trade and the London International Financial Futures Exchange with electronic order routing service to their trading floors.

During 1989, Telerate acquired FX Development Group, Inc. of Mountain View (CA), a supplier of trading room software products and systems integration services, for an undisclosed amount. The company now operates as FXD/Telerate.

b. Network Services

Virtually all of Telerate's 1989 revenue was derived from its electronic information services and associated terminal rentals. The remainder was derived from software analysis tools.

The Telerate Financial Information Network is an on-line system that provides current financial market data to banks, other financial institutions, corporations, government agencies, brokers, and private investors through video display screens located at subscribers' premises throughout the world.

Telerate offers subscribers access to more than 60,000 video pages of prices, rates, market data, and news covering major financial markets, including the following:

- U.S. Treasury and federal agency securities
- Money market instruments
- Foreign exchange
- U.S. mortgage market securities
- Precious metals
- Financial futures and energy
- Quotes for publicly traded equity securities
- Financial news services
- Market commentary and analysis

- The Telerate International Quotations service (TIQ), introduced in 1988, offers real-time quotes on more than 90,000 exchange-trade financial instruments, including stocks, options, futures, commodities, bonds, and mutual funds from all North American, London, and other major international exchanges.

- Telerate's Optional Services offer commentary and analysis by various Wall Street experts, as well as money market forecasts, trend information, and fundamental and technical analyses of key markets.

c. Other Information Services

Telerate also offers the following analysis/training tools:

- Tactician™, a microcomputer software-based product for fixed-income investors developed and marketed in conjunction with Giltnet, Ltd. of Australia, is a fundamental analysis system that combines live market data from Telerate's information network with analytics and a five-year historical data base.

- Compu Trac™ is a microcomputer software product for technical analysis. A library of preprogrammed analysis routines allows the user to test trading ideas for profitability using current and historical data.

- TeleTrac® is a microcomputer-based technical analysis system that captures live price information and transforms it into high-resolution graphic displays.

- Telerate Expert, developed by Financial Courseware, uses CD ROM technology to provide financial training programs for novices and professionals.

Telerate data is available via various delivery systems, from standard Telerate terminals to portable, hand-held receivers.

- The Telerate Access Service (TAS) enables subscribers with an IBM or compatible microcomputer to access Telerate information at home, on the road, or in the office. TAS also provides access to the Dow Jones News/Retrieval® service and numerous third-party information data bases.

- QuickQuote® software enables subscribers with an IBM or compatible microcomputer to access an X.25-based service providing live quotations on 75,000 North American trading instruments via dial-up or dedicated circuits.

- Telerate's Matrix Service (formerly Telerate's Broadcast Service) enables subscribers to receive Telerate information via a satellite dish antenna or leased lines and to create "cut and paste" composite pages of information of their own choosing. The service also includes several market-focused data packages (i.e., energy or mortgage data). Matrix is currently available in the U.S. and Europe.

- PDQ (Pocket Display Quotes) and TIPS (Telerate Information Pager Service) are two lightweight, portable, hand-held terminals that receive current prices, rates, and other data. Subscribers living in the New York or Chicago metropolitan areas can use the PDQ to receive Telerate information.

- The Telerate Digital Page Feed, designed for multiterminal users, sends information directly from the Telerate network to a subscriber's in-house computer for redistribution.

- MarketFeed, a consolidated data stream designed to support heavy trading volumes, gives subscribers live information from major international exchanges. The feed includes dynamic updated quotes, trade reports, index levels, market statistics, and market indicators.

VII

Conclusions and Recommendations

Conclusions and Recommendations

A

Opportunities in Network Services

The network services market offers appealing opportunities as well as challenges to vendors. A major category of opportunities relates to the expanding use and manipulation of data in business, as shown in Exhibit VII-1.

EXHIBIT VII-1

Opportunities in Network Services

- Expanding use and manipulation of data in business
- Productivity and time savings possible with network services
- Use of information by individuals
- New technology and techniques
- Related information services

The use of proprietary data bases is expanding in a number of ways:

- More users in vertical markets are finding that on-line data can be used to save time in research and planning. Small numbers of users in certain areas of engineering and construction are starting to use the F.W. Dodge data bases of McGraw-Hill.

- Organizations familiar with the use of on-line data are interested in additional information. Companies that use data from Dow Jones and Dun & Bradstreet to evaluate investment opportunities are interested in more information about industry developments or new activities of corporations in specific industries.

- Organizations interested in proprietary data bases are implementing techniques to automatically look through and manipulate data from a multitude of sources. This may be done by using PCs instead of terminals for accessing data, so that criteria for looking up data can be programmed for the PCs and run on a regular basis. Software can also be developed to access data from a number of sources and manipulate it with decision support systems, EIS or graphics packages.

Productivity and time savings are also becoming more apparent as an opportunity for vendors providing network services, as Exhibit VII-1 emphasizes. The use of on-line data bases can be shown to save time and money in many endeavors, and in addition they have become indispensable in financial market trading and credit decisions.

Network applications such as EDI and electronic mail have also demonstrated savings in time and money versus paper-based alternatives. An IS executive in a major clothing manufacturer and distributor claims that EDI organizes relations between distributors and clients so that considerable time is saved in intercompany contact and discussion as well as in the use of EDI transactions.

The use of information by individuals is another area of opportunity for network services vendors. The number of individuals who make airline reservations, handle payment functions, and order merchandise from home PCs is constantly increasing.

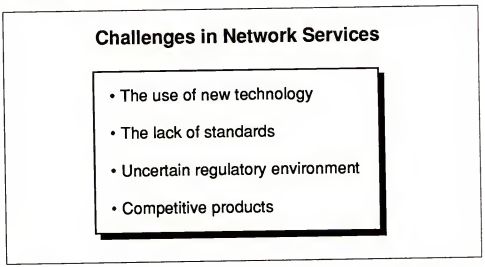
One area of opportunity, noted in Exhibit VII-1, that has been partially taken advantage of is offering related information services products with network services. Reuters for example, offers trading capabilities (transaction processing) together with electronic information. Vendors such as Sterling Software that offer EDI network applications also sell EDI software. There are additional areas where software for the access and manipulation of data, consulting and other professional services, or SI for network integration might be offered in conjunction with network services products.

New technology and techniques will reduce network and access costs and result in less expensive PCs, which will make network services more attractive. This should lead to greater success of videotex offerings, such as the Prodigy service of Sears and IBM, as well as of EDI and other

network services. In the January issue of the *Technology Review*, M. Dertouzos promotes government aid for a national information infrastructure (NII) to help network services spread the business and personal productivity they can provide.

Technology, however, also provides the leading challenge for network services vendors at present, as Exhibit VII-2 indicates. Vendors can see that significant investment may be required to provide the unique products and services that can guarantee a share of the marketplace. Vendors also have questions about the advantages of new technology such as ISDN and wonder if a wave of new technology will arrive before investments have been recovered from preceding waves. In addition, some new technology such as CD ROM may cut into the network services market by offering a competitive means of obtaining information that does not have to be updated frequently.

EXHIBIT VII-2



Since technology is changing, standards issues have not been fully addressed, and there are regulatory issues such as LATA (Local Area Transport Authority) rulings to address. Many vendors have been waiting or trying to pick the right time to introduce new network services products.

In addition to these challenges, network services providers must keep track of the competitive environment and decide what services of a competitor should be duplicated or improved upon, as noted in Exhibit VII-2.

The market for on-line data bases for financial trading is so sensitive that developments like the "score card" of multiple prices offered by Telerate was met immediately by Reuters in its foreign exchange product. Features like the ability to use multipoint transmission or X.400 are of sufficient interest for large EDI users that some vendors have felt it necessary to respond to competitive offerings of these capabilities by other vendors.

B

Recommendations

As noted in Exhibit VII-3, vendors of network services should be looking for opportunities in vertical markets other than the areas in which they already offer products, in global markets where timely data is even more critical, in services that could be offered with their products, in new technology, and in alliances and merges.

EXHIBIT VII-3

Vendors that offer data bases of technical, market or financial data for certain vertical industries may find that brokers can make use of the data to identify opportunities or analyze industry trends. Many vendors have not really explored opportunities in all vertical markets or in the global marketplace for their products.

Network application products such as EDI can provide vendors with the opportunity to offer software, professional services or network operation. These opportunities might be exploited through alliances with vendors of other information services.

In addition to recommending that network services vendors expend more effort in exploring the opportunities for expanding product revenues, INPUT also recommends that efforts be made to upgrade marketing and sales. Some of the difficulty in expanding the use of network services is due to the fact that prospects have not been informed of all the advantages, according to a large clothing manufacturer and wholesale distributor. According to a Vice President of M.I.S. at this manufacturer, all the advantages of EDI did not become apparent until the service was put in use.

Appendixes

Definition of Terms

A

Overall Definitions and Analytical Framework

Information Services - Computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called **Processing Services**)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called **Turnkey Systems**)
- Packaged software (called **Software Products**)
- People services that support users in developing and operating their own information systems (called **Professional Services**)
- Bundled combinations of products and services where the vendor assumes responsibility for the development of a custom solution to an information system problem (called **Systems Integration**)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called **Systems Operations**)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, videotex, etc. (called **Network Services**)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the **Information Services Industry** consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels, and competitive issues.

All **Information Services Market** forecasts are estimates of **User Expenditures** for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)
- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

Market Sectors or markets, are groupings or categories of the users who purchase information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc.
- *Functional Application* markets, such as Human Resources, Accounting, etc. These are also called "Cross-Industry" markets.
- *Generic* markets, which are neither industry- nor application-specific, such as the market for systems software.

Specific market sectors used by INPUT are defined in Section D, below.

Captive Information Services User Expenditures are expenditures for products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Non-captive Information Services User Expenditures are expenditures that go to vendors which have a different parent corporation than the user. It is these expenditures which constitute the information services market.

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*
- *Applications Software Products*
- *Systems Software Products*

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section B describes the delivery modes and their structure in more detail.

Outsourcing is defined as the contracting of information systems (IS) functions to outside vendors. Outsourcing should be viewed as the opposite of *insourcing*: anything that IS management has considered feasible to do internally (e.g., data center operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

IS has always bought systems software, as it is infeasible for companies to develop it internally. However, all other delivery modes represent functions or products that IS management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a make-or-buy decision, and the outsourcing market covers any product or service where the vendor must compete against the client firm's own internal resources.

B

Industry Structure and Delivery Modes

1. Service Categories

The following exhibit presents the structure of the information services industry. Several of the delivery modes can be grouped into higher-level **Service Categories**, based on the kind of problem the user needs to solve. These categories are:

- **Business Application Solutions (BAS)** - prepackaged or standard solutions to common business applications. These applications can be either industry-specific (e.g., mortgage loan processing for a bank), cross-industry (e.g., payroll processing), or generic (e.g., utility timesharing). In general, BAS services involve minimal customization by the vendor, and allow the user to handle a specific business application without having to develop or acquire a custom system or system resources. The following delivery modes are included under BAS:

  - *Processing Services*
  - *Applications Software Products*
  - *Turnkey Systems*

- **Systems Management Services (SMS)** - services which assist users in developing systems or operating/managing the information systems function. Two key elements of SMS are the customization of the service to each individual user and/or project, and the potential for the vendor to assume significant responsibility for management of at least a portion of the user's information systems function. The following delivery modes are included under SMS:

  - *Systems Operations*
  - *Systems Integration*

Each of the remaining three delivery modes represents a separate service category:

- *Professional Services*
- *Network Services*
- *System Software Products*

Note: These service categories are a new concept introduced in the 1990 MAP Program. They are purely an aggregation of lower level delivery mode data. They do not change the underlying delivery modes or industry structure.

Information Services Industry Structure—1990

Source: INPUT

2. Software Products

There are many similarities between the applications and systems software delivery modes. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

- **Systems Software Products**

  Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. These products include:

  - *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.

  - *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.

  - *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

- **Application Software Products**

  - *Industry-Specific Application Software Products* - Software products that perform functions related to solving business or organizational needs unique to a specific vertical market and sold to that market

only. Examples include demand deposit accounting, MRPII, medical recordkeeping, automobile dealer parts inventory, etc.

- *Cross-Industry Application Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

3. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single system developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually application software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems are divided into two categories.

- *Industry-Specific Systems* - systems that serve a specific function for a given industry sector, such as automobile dealer parts inventory, medical recordkeeping, or discrete manufacturing control systems.

- *Cross-Industry Systems* - systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems, or personnel management systems.

4. Processing Services

This category includes transaction processing, utility processing, and other processing services.

- *Transaction Processing:* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at vendor site or customer site, to process transactions and update client data bases. Transactions may be entered in one of four modes:

  - *Interactive* - Characterized by the interaction of the user with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor's system.

  - *Remote Batch* - Where the user transmits batches of transaction data to the vendor's system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.

  - *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.

  - *Carry-in Batch* - Where users physically deliver work to a processing services vendor.

- *Utility Processing*: Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and or data bases, enabling clients to develop their own programs or process data on vendor's system.

- *Other Processing Services*: Vendor provides services—usually at vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

5. Systems Operations

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes:

- *Professional Services:* The vendor provides personnel to operate client-supplied equipment. Prior to 1990, this was a submode of the Professional Services delivery mode.

- *Processing Services:* The vendor provides personnel, equipment and (optionally) facilities. Prior to 1990, this was a submode of the Processing Services delivery mode.

In the federal government market the processing services submode is called "COCO" (Contractor-Owned, Contractor-Operated), and the professional services mode is referred to as "GOCO" (Government-Owned, Contractor-Operated).

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management."

There are two general levels of systems operations:

- *Platform/network operations* - where the vendor operates the computer system and/or network without taking responsibility for the applications
- *Application operations* - where the vendor takes responsibility for the complete system, including equipment, associated telecommunications networks, and applications software

Note: Systems Operations is a new delivery mode introduced in the 1990 MAP Program. It was created by taking the Systems Operations submode out of both Processing Services and Professional Services. No other change has been made to the delivery mode definitions, and the total forecast expenditures for these three delivery modes are identical to the total forecast expenditures of the two original modes before the breakout of Systems Operations.

6. Systems Integration (SI)

Systems Integration is a business offering that provides a complete solution to an information system, networking or automation requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning
- Life cycle support, including
  - System documentation and user training
  - Systems operations during development
  - Systems maintenance
- Financing

7. Professional Services

This category includes consulting, education and training, and software development.

- *Consulting:* Services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of information systems, including equipment, software, networks and systems operations.

- *Education and Training:* Products and services related to information systems and services for the professional and end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.

- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

8. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two major segments: *Electronic Information Services,* which involve selling information to the user, and *Network Applications,* which involve providing some form of enhanced transport service in support of a user's information processing needs.

- *Electronic Information Services*

  Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

  The two kinds of electronic information services are:

  - *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.

  - *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

  While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

- *Network Applications*

  - *Value-Added Network Services (VAN Services)* - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

    While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Mean-

while, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards; this software may be provided as part of the VAN service, or may be resident on the organization's own computers.

- *Electronic Information Exchange (EIE)* - Also known as Electronic Mail (E-Mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.

- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

  Network management services included here must involve the vendor's network and network management systems as well as people. People-only services, or services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in Systems Operations.

C

Vendor Revenue and User Expenditure Conversion

The size of the information services market may be viewed from two perspectives: vendor (producer) revenues, and user expenditures. While the primary data for INPUT's research is vendor interviews, INPUT defines and forecasts the information services market in terms of end-user expenditures. End-user expenditures reflect the markup in producer sales when a product such as software is delivered through indirect distribution channels, such as original equipment manufacturers (OEMs), retailers and distributors. The focus on end-user expenditure also eliminates the double counting of revenues which would occur if sales were tabulated for both producer (e.g., Lotus) and distributor (e.g., BusinessLand).

For most delivery modes, vendor revenues and user expenditures are fairly close. However, there are some significant areas of difference. Many microcomputer software products, for example, are marketed through indirect distribution channels. To capture the valued added through these indirect distribution channels, adjustment factors which incorporate industry discount ratios are used to convert estimated information services vendor revenues to end-user expenditures.

For some delivery modes, including software products, systems integration and turnkey systems, there is a significant volume of intra-industry sales. For example, systems integrators purchase software and subcontract the services of other professional services vendors. And turnkey vendors incorporate purchased software into the systems which they sell to end users.

To account for such intra-industry transactions, INPUT uses other conversion ratios to derive the estimate of end-user expenditures.

The following table summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to end-user expenditure (market size) figures for each delivery mode:

Delivery Mode	Vendor Revenue Multiplier
Application Software Products	1.18
Systems Software Products	1.10
Systems Operations	1.00
Systems Integration	0.99
Professional Services	0.99
Network Services	0.99
Processing Services	0.99
Turnkey Systems	0.95

D

Sector Definitions and Delivery Mode Reporting

1. Industry Sector Definitions (Vertical Markets)

INPUT has structured the information services market into 16 generic industry sectors, such as process manufacturing, insurance, transportation, etc. The definitions of these sectors are based on the 1987 revision of the Standard Industrial Classification (SIC) Code system. The specific industries (and their SIC Codes) included under these generic industry sectors are detailed in the attached table.

EXHIBIT A-2

Industry Sector Definitions

Industry Sector	SIC Code	Description
Discrete Manufacturing	23xx	Apparel and other finished products
	25xx	Furniture and fixtures
	27xx	Printing, publishing and allied industries
	31xx	Leather and leather products
	34xx	Fabricated metal products, except machinery and transportation equipment
	35xx	Industrial and commercial machinery and computer equipment
	36xx	Electronic and other electrical equipment and components, except computer equipment
	37xx	Transportation equipment
	38xx	Instruments; photo/med/optical goods; watches/clocks
	39xx	Miscellaneous manufacturing industry
Process Manufacturing	10xx	Metal mining
	12xx	Coal mining
	13xx	Oil and gas extraction
	14xx	Mining/quarrying nonmetalic minerals
	20xx	Food and kindred products
	21xx	Tobacco products
	22xx	Textile mill products
	24xx	Lumber and wood products, except furniture
	26xx	Paper and allied products
	28xx	Chemicals and allied products
	29xx	Petroleum refining and related industries
	30xx	Rubber and miscellaneous plastic products
	32xx	Stone, clay, glass and concrete products
	33xx	Primary metal industries
Transportation Services	40xx	Railroad transport
	41xx	Public transit/transport
	42xx	Motor freight transport/warehousing
	43xx	U.S. Postal Service
	44xx	Water transportation
	45xx	Air transportation (except airline reservation services in 4512)
	46xx	Pipelines, except natural gas
	47xx	Transportation services (except 472x, arrangement of passenger transportation)

EXHIBIT A-2 (Cont.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Utilities	49xx	Electric, gas and sanitary services
Telecommunications	48xx	Communications
Retail Distribution	52xx	Building materials
	53xx	General merchandise stores
	54xx	Food stores
	55xx	Automotive dealers, gas stations
	56xx	Apparel and accessory stores
	57xx	Home furniture, furnishings and accessory stores
	58xx	Eating and drinking places
	59xx	Miscellaneous retail
Wholesale Distribution	50xx	Wholesale trade - durable goods
	51xx	Wholesale trade - nondurable goods
Banking and Finance	60xx	Depositary institutions
	61xx	Nondepositary institutions
	62xx	Security and commodity brokers, dealers, exchanges and services
	67xx	Holding and other investment offices
Insurance	63xx	Insurance carriers
	64xx	Insurance agents, brokers and services
Health Services	80xx	Health services
Education	82xx	Educational services

EXHIBIT A-2 (Cont.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Business and Technical Services	65xx	Real estate
	73xx	Business services (except hotel reservation services in 7389)
	81xx	Legal services
	87xx	Engineering, accounting, research, management, and related services
	89xx	Miscellaneous services
Federal Government	9xxx	
State and Local Government	9xxx	
Miscellaneous Industries	01xx	Agricultural production - crops
	02xx	Agricultural production - livestock/animals
	07xx	Agricultural services
	08xx	Forestry
	09xx	Fishing, hunting and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors
Personal/Consumer Services	4512x	Airline reservation services
	472x	Arrangement of passenger transportation (travel agencies)
	70xx	Hotels, rooming houses, camps, and other lodging places
	72xx	Personal services
	7389x	Hotel reservation services
	75xx	Automotive repair, services and parking
	76xx	Miscellaneous repair services
	78xx	Motion pictures
	79xx	Amusement and recreation services
	83xx	Social services
	84xx	Museums, art galleries, and botanical/zoological gardens
	86xx	Membership organizations
	88xx	Private households

2. Cross-Industry Sector Definitions (Horizontal Markets)

In addition to these vertical industry sectors, INPUT has also identified seven cross-industry or horizontal market sectors. These sectors or markets involve multi-industry applications such as human resource systems, accounting systems, etc. In order to be included in an industry sector, the service or product delivered must be specific to that sector only. If a service or product is used in more than one industry sector, it is counted as cross-industry. The seven cross-industry markets are:

- *Human Resource Systems*
- *Education and Training*
- *Office Systems*
- *Accounting Systems*
- *Engineering and Scientific Applications*
- *Planning and Analysis Systems*
- *Other Applications (including telemarketing, sales management and electronic publishing)*

3. Delivery Mode Reporting by Sector

The tables below show how market forecasts for individual delivery modes are related to specific market sectors.

Vertical Market Sectors Only

The following delivery modes are reported by industry sector (vertical market) only:

Delivery Mode	Applicable Submodes
• Network Services:	Network Applications
• Systems Operations:	All
• Systems Integration:	All
• Professional Services:	All

This reporting structure is intended to provide expenditures by industry sector. However, it is recognized that many of the services provided are not necessarily specific or unique to any of the individual sectors.

Vertical and Cross-Industry Market Sectors

The following delivery modes are reported by industry sector and cross-industry sector (vertical and horizontal markets):

Delivery Mode	Applicable Submodes
• Processing Services:	Transaction Processing
• Software	Applications
• Turnkey Systems	All

All of these delivery modes represent specific business application solutions.

Vertical and Generic Market Sectors

The following submode is reported both by industry sector (vertical market), and the generic market:

Delivery Mode	Applicable Submodes
• Network Services	Electronic Information Services

While some electronic information is industry-specific (e.g., farm crop reports), much of it is relevant to or may be used by any industry (e.g., data base services such as Dialog).

Generic Market Sector Only

The following delivery modes are so generic that they are not reported by industry or cross-industry sector (vertical or horizontal market):

Delivery Mode	Applicable Submodes
• Processing Services:	Utility Processing Other Processing
• Software	Systems (All)

Forecast Data Base

1. Forecast Data Base

Exhibit B-1 presents the overall 1990-1995 forecast for the network services market. Forecasts for the network applications and electronic information services submodes are presented in Exhibits B-2 and B-3.

2. Forecast Reconciliation

Exhibits B-4, B-5 and B-6 present reconciliations for the three corresponding network services market forecasts. Overall, the network services growth rate has been reduced to 17% from the previously forecast 20% CAGR.

A major change introduced by INPUT in 1990 was the definition of a new market sector and the restructuring of several old ones. INPUT's previous industry-oriented market definitions were based on the 1977 U.S. Department of Commerce *Standard Industrial Classification (SIC) Code* structure. Under this structure, consumer-oriented services — including travel reservation systems — were split among the *Services, Transportation* and *Other Industry* sectors. In addition to some consumer-oriented services, the old *Other* sector also contained several miscellaneous industries such as agriculture and construction.

In 1987, the Commerce Department issued a major revision of the SIC Code structure. Among the areas most heavily affected were the finance and service markets. For the sake of historical consistency, most market and census statistics have continued to be reported under the old SIC Code structure, and the new 1987 classifications are just starting to be widely used in research. INPUT decided to restructure its market definitions starting with the 1990 research program. Among the key changes, the old *Services* sector has been renamed *Business Services,* and there is now a separate *Personal/Consumer Services* sector included in the 1990 report series. The new market structure, including the SIC Codes associated with each sector, is outlined in Appendix A.

From the standpoint of network services, the major impact of these changes was to identify some additional user expenditures associated with home-use services such as Prodigy and CompuServe, and a number of other expenditures associated with consumer-focused service firms. These additional expenditures, combined with increases in the 1989 market estimates for telecommunications and miscellaneous industries, were enough to offset the large reductions in utilities and medical, making the 1989 baseline market size nearly the same as last year's forecast.

Reduction in the previously estimated use of electronic information services (data base access) accounts for part of the cut in utilities and medical. Continued use of private networks and leased circuits instead of VANs, combined with slower than projected growth of EDI, accounts for the reduction in network applications seen in the utilities, medical, banking and finance, and miscellaneous industries groups.

Growth rates for network usage have been lowered across the board for nearly all industries, as a result of the following factors:

- Impact of the 1990-1991 recession
- Shift of some on-line data base access to less expensive CD ROMs
- Across-the-board reductions in forecast growth rates for EDI

On a percentage basis, the greatest reductions in growth appear in the utilities and insurance sectors.

EXHIBIT B-1

Network Services
User Expenditure Forecast by Market Sector, 1989-1995
($ Millions)

Delivery Modes	1989 ($)	Growth 89-90 (%)	1990 ($)	1991 ($)	1992 ($)	1993 ($)	1994 ($)	1995 ($)	CAGR 90-95 (%)
Delivery Mode Total	6,954	16	8,075	9,383	10,998	12,882	15,172	17,927	17
Vertical Industry Markets	4,289	16	4,957	5,734	6,670	7,793	9,158	10,816	16
Discrete Manufacturing	55	26	69	84	104	129	161	201	24
Process Manufacturing	595	17	696	814	956	1,129	1,342	1,608	18
Transportation	145	17	170	200	237	280	332	394	18
Utilities	25	5	26	28	31	33	36	39	8
Telecommunications	71	29	91	115	144	181	229	289	26
Retail Distribution	125	22	152	183	220	264	318	384	20
Wholesale Distribution	178	24	221	268	326	398	488	598	22
Banking and Finance	611	22	746	904	1,102	1,342	1,646	2,019	22
Insurance	190	9	208	228	252	281	317	361	12
Medical	400	11	446	504	578	675	800	964	17
Education	140	17	163	191	224	263	309	362	17
Business Services	448	15	515	592	681	784	902	1,040	15
Consumer Services	115	16	133	153	176	202	233	268	15
Federal Government	1,032	10	1,134	1,250	1,380	1,524	1,684	1,862	10
State and Local Government	64	23	78	95	115	141	172	212	22
Miscellaneous Industries	96	14	110	125	143	164	188	216	14
Generic Markets	2,665	17	3,118	3,649	4,308	5,089	6,014	7,112	18
On-Line Data Bases	1,855	16	2,146	2,483	2,885	3,353	3,896	4,528	16
- Securities	760	15	874	1,005	1,166	1,352	1,569	1,820	16
- Credit	910	16	1,056	1,224	1,420	1,648	1,911	2,217	16
- Economic/Other	185	17	216	253	299	353	416	491	18
On-Line News Services	810	20	972	1,166	1,423	1,736	2,118	2,584	22
- Bibliography/Text	250	20	300	360	439	536	654	798	22
- News	560	20	672	806	984	1,200	1,464	1,786	22

Numbers may not add due to rounding.

EXHIBIT B-2

Network Applications
User Expenditure Forecast by Market Sector, 1989-1995
($ Millions)

Delivery Modes	1989 ($)	Growth 89-90 (%)	1990 ($)	1991 ($)	1992 ($)	1993 ($)	1994 ($)	1995 ($)	CAGR 90-95 (%)
Delivery Mode Total	1,428	17	1,667	1,946	2,288	2,709	3,233	3,891	18
Vertical Industry Markets	1,428	17	1,667	1,946	2,288	2,709	3,233	3,891	18
Discrete Manufacturing	25	35	34	42	54	69	89	114	28
Process Manufacturing	64	34	86	115	155	211	291	403	36
Transportation	35	20	42	50	61	74	91	111	22
Utilities	3	5	3	3	4	4	5	5	10
Telecommunications	12	20	14	17	21	25	30	36	20
Retail Distribution	40	15	46	57	72	90	112	140	25
Wholesale Distribution	130	28	166	207	258	322	401	501	25
Banking and Finance	75	26	94	114	137	164	197	236	20
Insurance	50	7	53	57	61	66	72	80	8
Medical	150	14	172	200	240	294	369	471	22
Education	51	19	61	71	82	95	109	127	16
Business Services	12	22	14	17	21	26	32	39	22
Consumer Services	15	25	19	22	25	28	33	38	15
Federal Government	732	12	819	917	1,027	1,150	1,288	1,443	12
State and Local Government	31	29	39	50	63	81	103	131	27
Miscellaneous Industries	5	19	6	7	9	10	13	15	21

Numbers may not add due to rounding.

EXHIBIT B-3

Electronic Information Services
User Expenditure Forecast by Market Sector, 1989-1995
($ Millions)

Delivery Modes	1989 ($)	Growth 89-90 (%)	1990 ($)	1991 ($)	1992 ($)	1993 ($)	1994 ($)	1995 ($)	CAGR 90-95 (%)
Delivery Mode Total	5,526	16	6,408	7,437	8,690	10,173	11,940	14,036	17
Vertical Industry Markets	2,861	15	3,290	3,788	4,382	5,084	5,925	6,924	16
Discrete Manufacturing	30	19	36	42	50	60	72	86	19
Process Manufacturing	531	15	610	699	801	918	1,051	1,205	15
Transportation	110	16	128	150	176	206	242	283	17
Utilities	22	5	23	26	27	29	31	34	8
Telecommunications	59	30	77	97	123	157	199	253	27
Retail Distribution	85	25	106	125	148	175	206	243	18
Wholesale Distribution	48	15	55	61	68	77	86	97	12
Banking and Finance	536	22	652	790	965	1,179	1,450	1,783	22
Insurance	140	10	154	171	191	216	245	281	13
Medical	250	10	274	303	338	380	431	493	12
Education	89	15	102	120	142	169	200	230	18
Business Services	437	15	501	575	660	758	871	1,001	15
Consumer Services	100	14	114	132	151	174	200	230	15
Federal Government	300	5	315	334	353	374	396	419	6
State and Local Government	33	17	39	45	52	60	70	81	16
Miscellaneous Industries	91	14	104	118	135	154	176	200	14
Generic Markets	2,665	17	3,118	3,649	4,308	5,089	6,014	7,112	18
On-Line Data Bases	1,855	16	2,146	2,483	2,885	3,353	3,896	4,528	16
- Securities	760	15	874	1,005	1,166	1,352	1,569	1,820	16
- Credit	910	16	1,056	1,224	1,420	1,648	1,911	2,217	16
- Economic/Other	185	17	216	253	299	353	416	491	18
On-Line News Services	810	20	972	1,166	1,423	1,736	2,118	2,584	22
- Bibliography/Text	250	20	300	360	439	536	654	798	22
- News	560	20	672	806	984	1,200	1,464	1,786	22

Numbers may not add due to rounding.

EXHIBIT B-4

Network Services Market
1990 MAP Data Base Reconciliation
($ Millions)

Delivery Modes	1989 Market				1994 Market				89-94 CAGR per data 89 rpt (%)	89-94 CAGR per data 90 rpt (%)
	1989 Report (Fcst) ($)	1990 Report (Actual) ($)	Variance from 1989 Report ($)	Variance from 1989 Report (%)	1989 Report (Fcst) ($)	1990 Report (Fcst) ($)	Variance from 1989 Report ($)	Variance from 1989 Report (%)		
Total Network Services Market	6,974	6,954	-20	0	17,449	15,172	-2,277	-13	20	17
Vertical Industry Markets	4,279	4,289	10	0	10,514	9,158	-1,356	-13	20	16
Discrete Manufacturing	55	55	0	0	191	161	-30	-16	28	24
Process Manufacturing	595	595	0	0	1,355	1,342	-13	-1	18	18
Transportation	141	145	4	3	470	332	-138	-29	27	18
Utilities	85	25	-60	-71	217	36	-181	-83	21	8
Telecommunications	51	71	20	39	181	229	48	26	29	26
Retail Distribution	125	125	0	0	358	318	-40	-11	23	21
Wholesale Distribution	178	178	0	0	641	488	-153	-24	29	22
Banking and Finance	627	611	-16	-3	1,938	1,646	-292	-15	25	22
Insurance	190	190	0	0	434	317	-117	-27	18	11
Medical	489	400	-89	-18	1,172	800	-372	-32	19	15
Education	132	140	8	6	291	309	18	6	17	17
Business Services	448	448	0	0	1,185	902	-283	-24	21	15
Consumer Services	--	115	115	--	--	233	233	--	--	15
Federal Government	1,032	1,032	0	0	1,673	1,684	11	1	10	10
State and Local Government	64	64	-1	-1	186	172	-14	-7	24	22
Miscellaneous Industries	67	96	29	43	222	188	-34	-15	27	14
Generic Markets	2,695	2,665	-30	-1	6,935	6,014	-921	-13	21	18
On-Line Data Bases	1,935	1,855	-80	-4	4,660	3,896	-764	-16	19	16
- Securities	760	760	0	0	1,740	1,569	-171	-10	18	16
- Credit	985	910	-75	-8	2,450	1,911	-539	-22	20	16
- Economic/Other	190	185	-5	-3	470	416	-54	-11	20	18
On-Line News Services	760	810	50	7	2,275	2,118	-157	-7	25	21
- Bibliography/Text	200	250	50	25	565	654	89	16	23	21
- News	560	560	0	0	1,710	1,464	-246	-14	25	21

EXHIBIT B-5

Network Applications Market
1990 MAP Data Base Reconciliation
($ Millions)

Delivery Modes	1989 Market				1994 Market				89-94 CAGR per data 89 rpt (%)	89-94 CAGR per data 90 rpt (%)
	1989 Report (Fcst) ($)	1990 Report (Actual) ($)	Variance from 1989 Report ($)	Variance from 1989 Report (%)	1989 Report (Fcst) ($)	1990 Report (Fcst) ($)	Variance from 1989 Report ($)	Variance from 1989 Report (%)		
Total Network Applications Market	1,516	1,428	-88	-6	4,263	3,233	-1,030	-24	23	18
Discrete Manufacturing	25	25	0	0	116	89	-28	-24	36	29
Process Manufacturing	64	64	0	0	287	291	4	1	35	35
Transportation	27	35	8	30	107	91	-16	-15	32	21
Utilities	37	3	-34	-92	107	5	-103	-96	24	9
Telecommunications	12	12	0	0	37	30	-7	-18	25	20
Retail Distribution	30	40	10	33	111	112	1	1	30	23
Wholesale Distribution	130	130	0	0	541	401	-140	-26	33	25
Banking and Finance	91	75	-16	-18	489	197	-293	-60	40	21
Insurance	50	50	0	0	151	72	-79	-52	25	8
Medical	181	150	-31	-17	553	369	-184	-33	25	20
Education	52	51	-1	-1	129	109	-19	-15	20	16
Business Services	12	12	0	0	52	32	-21	-39	35	22
Consumer Services	--	15	15	--	--	33	33	--	--	17
Federal Government	732	732	0	0	1,290	1,288	-2	-0	12	12
State and Local Government	31	31	0	0	113	103	-10	-9	30	28
Miscellaneous Industries	44	5	-39	-89	178	13	-165	-93	32	20

EXHIBIT B-6

Electronic Information Services Market
1990 MAP Data Base Reconciliation
($ Millions)

Delivery Modes	1989 Market				1994 Market				89-94 CAGR per data 89 rpt (%)	89-94 CAGR per data 90 rpt (%)
	1989 Report (Fcst) ($)	1990 Report (Actual) ($)	Variance from 1989 Report ($)	Variance from 1989 Report (%)	1989 Report (Fcst) ($)	1990 Report (Fcst) ($)	Variance from 1989 Report ($)	Variance from 1989 Report (%)		
Total Electronic Information Services Market	5,457	5,526	69	1	13,186	11,940	-1,246	-9	19	17
Vertical Industry Markets	2,762	2,861	99	4	6,251	5,925	-325	-5	18	16
Discrete Manufacturing	30	30	0	0	75	72	-3	-3	20	19
Process Manufacturing	531	531	0	0	1,068	1,051	-17	-2	15	15
Transportation	114	110	-4	-4	363	242	-121	-33	26	17
Utilities	48	22	-26	-54	110	31	-78	-71	18	7
Telecommunications	39	59	20	51	145	199	54	37	30	28
Retail Distribution	95	85	-10	-11	247	206	-41	-17	21	19
Wholesale Distribution	48	48	0	0	100	86	-14	-14	16	13
Banking and Finance	536	536	0	0	1,449	1,450	1	0	22	22
Insurance	140	140	0	0	282	245	-37	-13	15	12
Medical	308	250	-58	-19	618	431	-187	-30	15	12
Education	81	89	9	11	162	200	38	23	15	18
Business Services	437	437	0	0	1,132	871	-262	-23	21	15
Consumer Services	--	100	100	--	--	200	200	--	--	15
Federal Government	300	300	0	0	383	396	13	3	5	6
State and Local Government	33	33	0	0	72	70	-3	-4	17	16
Miscellaneous Industries	23	91	68	296	44	176	131	296	14	14
Generic Markets	2,695	2,665	-30	-1	6,935	6,014	-921	-13	21	18
On-Line Data Bases	1,935	1,855	-80	-4	4,660	3,896	-764	-16	19	16
- Securities	760	760	0	0	1,740	1,569	-171	-10	18	16
- Credit	985	910	-75	-8	2,450	1,911	-539	-22	20	16
- Economic/Other	190	185	-5	-3	470	416	-54	-11	20	18
On-Line News Services	760	810	50	7	2,275	2,118	-157	-7	25	21
- Bibliography/Text	200	250	50	25	565	654	89	16	23	21
- News	560	560	0	0	1,710	1,464	-246	-14	25	21