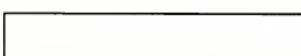
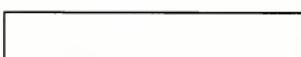
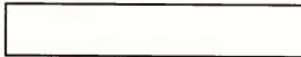


Market
Analysis
Program
(MAP)



**Industry Sector
Markets
1991-1996**

**Transportation
Sector**

Forecast Update

INPUT®

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



F E B R U A R Y 1 9 9 2

INDUSTRY SECTOR MARKETS 1991-1996

TRANSPORTATION SECTOR

FORECAST UPDATE



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1280 Villa Street
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Market Analysis Program (MAP)

***Industry Sector Markets, 1991-1996
Transportation Sector
Forecast Update***

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- Chapter III—Information Services Market Forecast—presents information services expenditures by delivery mode for the transportation market.
- Chapter IV—Competitive Environment—provides a review of recent competitive events, and vendor profiles.
- Appendix B—Forecast Data Base—gives a detailed forecast by delivery mode for the transportation industry. It contains a reconciliation to the previous year's forecast.

Related to this transportation sector report are two additional sector reports:

- Business Services
- State and Local Government

A collection of all 15 INPUT market sector or industry reports and seven cross-industry reports constitutes INPUT's 1991 Market Analysis Program. These reports provide a complete overview of the U.S. information services industry.





Purpose and Organization

The purpose of this Forecast Update is to provide the 1991 INPUT forecasts for the transportation sector and a discussion of recent market issues and competitive factors influencing the use of information services in this industry. More comprehensive analysis of the components of the transportation sector was presented in the 1990 report, and should be used as a reference if necessary.

The transportation sector is composed of establishments in the following SIC groups:

SIC Group	Description
40xx	Railroad transportation including freight operations, switching and terminal establishments
41xx	Local transportation
42xx	Motor freight transportation, including for-hire and common carriers
44xx	Water transportation, including freight and passenger
45xx	Air transportation, freight and passenger
47xx	Transportation services, including travel agencies, freight forwarding and custom brokerage

This chapter of the report describes its purpose and organization. The remaining chapters of the report are organized as follows:

- Chapter II—Trends, Events, and Issues—describes the current transportation industry and factors that can have an impact on the use of information services.



II

Trends, Events, and Issues

A

Environment and Market Changes

The performance of the transportation industry has been seriously affected by the performance of the air transportation subsector.

- Three well-known airlines in the U.S. ceased to operate during 1991: Eastern, Pan American and Midway.
- Officials of the Air Transport Association have estimated that U.S. airlines will lose \$1.8 billion in 1991 in addition to the loss of \$3.9 billion in 1990. In 1992, there may be a small profit of about \$300 million, which will be insufficient to finance the investment needed in airports and other capabilities.

Forecasts of air transportation do not suggest that it will return to the rapid growth of the mid-1980s in the near future. The continuing recession and aggregate change in vacation planning will continue to have an effect on air travel through at least the next three to four years.

However, investments in capabilities, including IS to serve increased international travel, will be required by most international carriers, including the major U.S. airlines.

Cargo service revenues have not suffered as much as passenger revenues. The economic downturn and the Gulf War with its attendant threats of terrorist activity have had more effect on personal—including business—traveling.

Other areas of the transportation industry have performed better than air transportation. Trucking has been depressed since deregulation, but is not experiencing the losses that are occurring in the airlines.

- The trucking market is a mature industry with as many as 34,000 competitors who are struggling for market share.



- The major shakeout that occurred in trucking after deregulation in the early 1980s is over, but earnings have remained low, on the average.
- Cost-cutting moves are taking place in trucking. Comcar Industries is using downsizing of IS to reduce costs.

Investments are also taking place in trucking to gain market share. CSX has added new terminal capacity recently. Comcar has developed new scheduling applications software products to gain business from competitors.

The railroad industry has managed to hold its own in freight competition with trucking because of deregulation of prices and the use of containers or intermodal transport. Passenger traffic should also contribute more to railroad stability through slow but steady growth in the early 1990s that will aid revenues if not earnings.

Water transport has continued to show a positive impact from container traffic and the growth of international shipping. Companies such as American President Lines expect to see further growth through the use of IS.

The travel services segment of the transportation industry is suffering from the continuing slowdown in business and pleasure travel that has resulted from the recession.

- By the end of 1991, conditions for business seemed to have improved somewhat but were still not as good as those in the mid-1980s. The U.S. Travel Data Center's annual report estimated that business trips would be down about 6.8% in 1991 after a drop of 8.3% in 1990.
- In its annual report on car rental in November 1991, *Business Travel News* concluded that the reduced level of business travel was continuing to have an impact on car rental companies.



Key business issues identified by respondents from the transportation industry at this time are shown in Exhibit II-1.

EXHIBIT II-1

Key Business Issues in the Transportation Industry

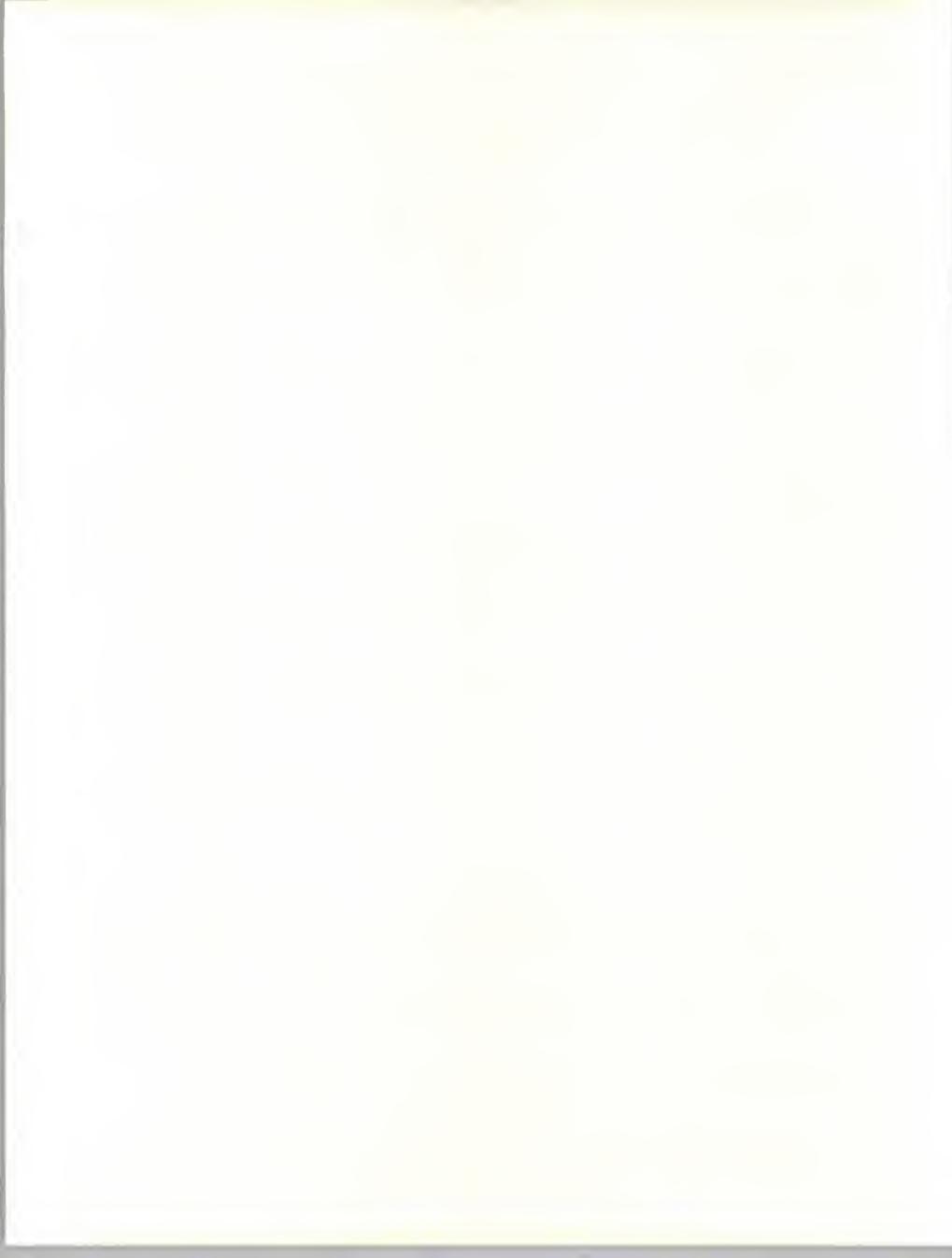
- Slow business as the result of the recession
- Downsizing functions and engaging in other means of reducing costs
- Using IS to aid competitiveness
- Providing faster information supply to customers
- Implementing IS solutions more rapidly

In order of importance to respondents

The transportation industry as defined in Chapter I of this report employs about 2.7 million people and is composed of firms engaged in the land, air and water transport of people and cargo as well as firms classified as travel agents. The use of pipelines to transport material, which has an SIC in the transportation group (SIC 46), is excluded from transportation in this report.

An analysis of opportunities for information systems vendors in the transportation industry has to be conducted by examining the subsectors of the market separately. According to respondents, the following application areas offer opportunities:

- In the airline industry, the expansion of on-board computing applications; further use of expert systems in sales, maintenance, and service planning; new and expanded financial analysis and control systems to reduce costs and plan expenditures; and greater use of network systems to improve service and communication with customers are areas of opportunity.
- The use of computerized reservation systems (CRS) by an airline, other vendor, or group of airlines such as Covia to handle reservations and other processing work for airlines and other transportation firms is another opportunity.



- In air freight, there are opportunities to improve scheduling, tracking, order entry, accounting, financial analysis and service systems.
- In the trucking segment, which spends about 60% more on information services than do airlines, there are opportunities in scheduling, tracking (particularly of intermodal shipments), transaction processing, accounting and financial analysis, and network applications, including the use of electronic information in place of paper.
- Established processing services that provide funds transfer capabilities to truckers or handle freight rating, billing and payment processing may also provide an additional opportunity through upgrading or enhancing of services for information services vendors in the trucking subsector.
- The railroad industry—with half the expenditures of the airline subsector—has some opportunity for information services in upgrades of reservation systems, equipment control, railcar tracking and management, financial analysis and auditing, network support that provides information and services for customers, and greater use of electronic information.
- Opportunities in water transportation—which spends slightly less than railroads do for information services—involve survey, cargo booking, tracking, cost control and vessel performance.
- Travel agencies have many of their needs met by the airlines that they serve, but contacts in this subsector report that they are interested in upgraded systems to maintain information on their clients and prospects, and improved accounting and administrative systems.

The key technology trends mentioned by vendors and users in the transportation industry are listed in Exhibit II-2.

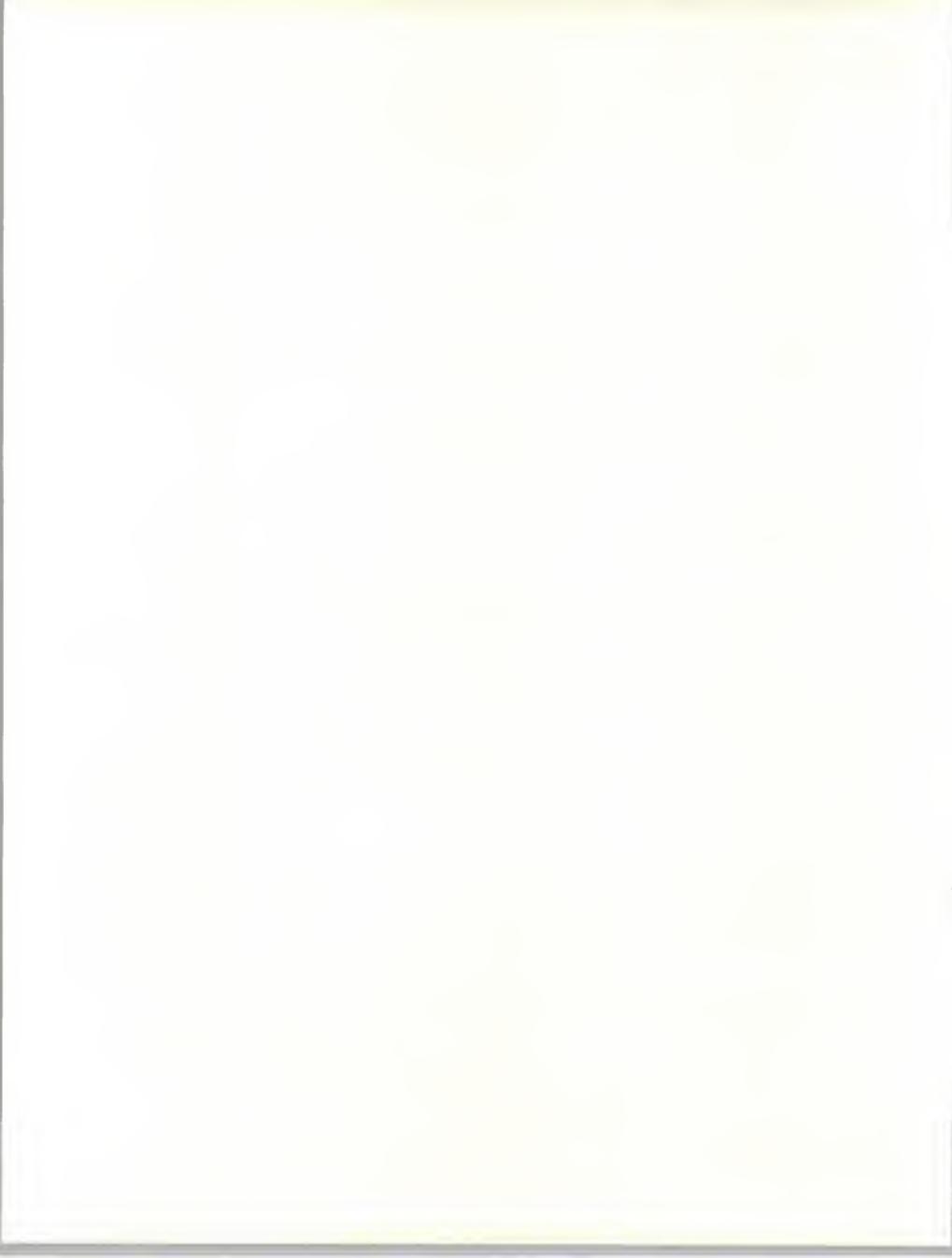


EXHIBIT II-2

Key Technology Trends Identified by Vendors and Users in Transportation

- Door-to-door electronic tracking of freight
- Greater use of downsizing and client/server technology
- Expert systems for planning maintenance, use of equipment, and loading and unloading cargo
- Use of outsourcing to address complexity of use of information systems in industry
- Ability to use and process electronic images of forms

Technology trends mentioned by respondents

B**Current Transportation Industry Events**

One of the current topics of interest is the expansion of major airlines in foreign markets. U.S. airlines have been making arrangements to expand their penetration of foreign markets during the past two years and foreign airlines have also been active, investing in carriers in the U.S. and other countries and making arrangements to expand their routes throughout the world.

- Foreign carriers such as Lufthansa are now using American promotional techniques for expanding business in the U.S. At the end of 1991, Lufthansa announced its promotional deals to expand business in the U.S.
- In the fourth quarter of 1991, Japanese and Chinese airlines announced major expansions of overseas flights, illustrating that the expansion of global travel is not limited to U.S. and European airlines.

As a result of the expansion of routes and competition, airlines have been adding planes. Northwest announced the addition of 20 aircraft at the end of 1991.



However, U.S. carriers are continuing to suffer from the recession, and there are periodic announcements of moves to save costs such as the announcement by AMR (American Airlines) that 1,250 ground jobs will be cut in the beginning of 1992.

Major moves are being made to upgrade the capabilities of many firms involved in handling the transportation of freight:

- In 1991, Sea-Land added to its fleet of ships; expanded arrangements with other water carriers and overseas rail organizations; and also implemented a computer network that will track cargo around the world.
- Crowley Maritime Corporation has recently enlarged its information systems capabilities to provide more support to the business services supporting its cargo-line services.
- An automated dispatching system that handles 3,000 vehicles operating out of eight offices is being implemented for Comcar Industries.
- CMX, a subsidiary of CSX, announced the opening of a new truck terminal in Houston.

The *Business Week* forecasts for 1992 earnings show increases for trucking and rail and water transportation of cargo, but continuing declines in airline earnings.



III

Information Services Market Forecast

A

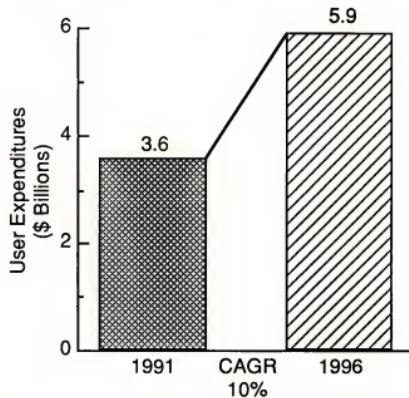
Total Market Forecast, 1990-1996

Information services expenditures in the transportation industry grew at a slower rate (6%) in the U.S. between 1990 and 1991 than they did in all other industry segments except the federal government as a result of the effects of the Gulf War and the recession on airline travel.

The growth rate (CAGR) will increase to 10% for the period from 1991 to 1996, as shown in Exhibit III-1, although growth will still be low compared to other industries. Only two industries, business services and miscellaneous services, will have lower rates.

EXHIBIT III-1

Transportation Sector Information Services Market, 1991-1996





- Expenditures will increase at a rate of 6% from \$3.4 billion in 1990 to \$3.6 billion in 1991.
- Expenditures will grow at a CAGR of 10% from \$3.6 billion in 1991 to \$5.9 billion in 1996.

Although the growth rates for expenditures on information services in transportation are below average, there is expectation that business will be present in some modes of this industry for vendors.

- Downsizing and the use of client/server applications will provide opportunities for vendors selling applications software products for workstation/PCs.
- Systems integration and systems operations vendors will find opportunities in the expansion and upgrading of maintenance, customer services and reservation systems for passenger and freight business.
- Increasing use of specialized electronic information systems and network applications, including electronic mail, VANs and EDI will drive the use of network services.

B

Forecast by Delivery Mode

Exhibit III-2 presents the INPUT forecast for the transportation sector by delivery mode.

1. Processing Services

Processing services showed only a 2% increase in expenditures in the transportation industry between 1990 and 1991, growing from \$2 billion to \$2.1 billion.

Processing services had the lowest growth rate for information services delivery modes in transportation in 1991, and is projected to have the next lowest growth rate, 8%, for information services modes in this industry between 1991 and 1996.

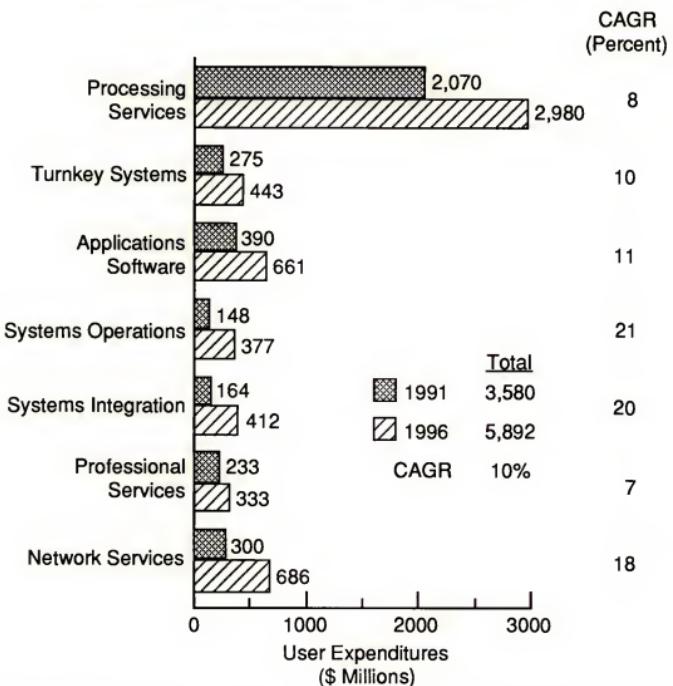
- Expenditures amounted to \$2.1 billion in 1991 and are projected to grow to \$3 billion in 1996.
- The absolute amount of the growth between 1991 and 1996 will be \$910 million—over two times as large as the growth in dollars of any other mode—indicating that processing services should be examined as an opportunity by vendors interested in information services in transportation. The chief application system contributing to this revenue is reservation systems.



However, the low rate of processing services growth reflects the fact that a number of transportation companies, particularly smaller ones, are selecting workstation/PC solutions rather than processing alternatives for accounting, inventory, and other problems.

EXHIBIT III-2

**Transportation Sector—Information Services Market
by Delivery Mode, 1991-1996**



2. Turnkey Systems

User expenditures for turnkey systems grew at a rate of 10% between 1990 and 1991, rising from \$250 million to \$275 million in 1991.



Expenditures will continue to grow at a CAGR of 10% between 1991 and 1996, rising to \$443 million in 1996.

Expenditures for turnkey systems are not forecast to decrease, because there are many needs in vehicle and maintenance management, crew and route control, trip tracking and accounting, management of business for small firms in trucking and bus transportation, and other applications that use turnkey systems.

- Many vendors with S3/X and AS/400 turnkeys, such as Sentry Data Systems, have been meeting specific needs in transportation.
- Users are turning more now to workstation/PC turnkey and software products to meet needs because these alternatives offer more economy. This change is driving the cost of solutions down and holding the growth of turnkeys to 10%, despite the continuing use of this mode.

3. Applications Software Products

Expenditures for applications software products will grow at a rate of 11% between 1990 and 1991, increasing from \$351 million to \$390 million. The growth rate (CAGR) will stay at 11% between 1991 and 1996, and expenditures will grow to \$661 million in 1996.

- The growth of expenditures is forecast to be much higher, at 18%, for workstation/PC software products.
- The growth rates for mainframe and mini applications software products will be 5% and 8%, respectively, between 1991 and 1996.
- Forecast expenditures will be highest at \$323 million for workstation/PC applications software products in 1996. This number will be slightly less than the sum of the software product expenditures for minis (\$182 million) and mainframes (\$156 million).

The high forecast for the use of applications software products for workstation/PCs is due to the interest of many small establishments in trucking, bus transportation and other transportation submarkets in downsized solutions, as well as the interest of larger firms in client/server applications that allow functions to be interconnected.

4. Systems Operations

In 1991, systems operations was the fastest growing delivery mode, at 19%. Over the planning period from 1991 to 1996 it will remain the fastest growing delivery mode in transportation as its CAGR increases to 21%.



- However, systems operations ranked as the smallest delivery mode in terms of expenditures in 1990 at \$124 million and in 1991 at \$148 million. By 1996, it will rank as the next smallest delivery mode at \$377 million.
- At this size, it will provide an interesting opportunity to a group of vendors, including EDS and Litton.

5. Systems Integration

In 1991, expenditures for systems integration will grow at a rate of 12% and increase from \$146 million in 1990 to \$164 million in 1991. Expenditures will grow at a higher rate, a CAGR of 20%, between 1991 and 1996 and reach \$412 million in 1996.

- Because of the impact of the recession on funding—particularly for large projects—as well as interest in downsized solutions, expenditures were below previous forecasts in 1991.
- Transportation will offer more opportunities for systems integration services between 1991 and 1996, and a number of large systems integration firms—including EDS, IBM, Andersen, Unisys, AT&T/NCR, and CSC—are showing interest in the business.

The rapid growth of systems integration and systems operations indicates the high level of user interest in information services that provide support and interaction on the complex problems that can be encountered in the transportation industry.

6. Professional Services

Professional services grew at a rate of 9% in 1991 as user expenditures increased from \$213 million to \$233 million. The CAGR is forecast to drop to 7% between 1991 and 1996 while user expenditures grow to \$333 million.

Professional services will be the smallest and the slowest growing delivery mode by 1996. Users will tend to be attracted to SO and SI firms for large, complex systems needs, and turnkey systems and workstation/PC applications software products for other solutions.

Professional services will generally be provided to modify turnkey and software product solutions by SI, SO, turnkey, and software product vendors. Some large-scale development will also make use of professional services aid, but much in-house work will be done without the aid of vendors, according to companies in this industry.



7. Network Services

Network services will become the second largest service mode by 1996.

- Growing from a level of \$270 million in user expenditures in 1990, network services will increase at a rate of 11% in 1991 to reach \$300 million in 1991.
- Between 1991 and 1996, expenditures are forecast to increase at a CAGR of 18% to reach \$686 million in 1996.

The growth of network services is being driven by its fastest growing submode, network applications, which will have a CAGR of 22% between 1991 and 1996.

The rising use of EDI and electronic commerce to support ordering and payment to suppliers and from customers is due to the need for faster means of initiating service.

- The use of VANs and electronic mail to provide information to customers and suppliers will also drive the use of network applications.
- The use of on-line data bases (EIS) with route and plane information as well as technical information for maintenance and route planning and economic and financial information for business planning are also growing rapidly in transportation.





Competitive Environment

A

Recent Information Services Events

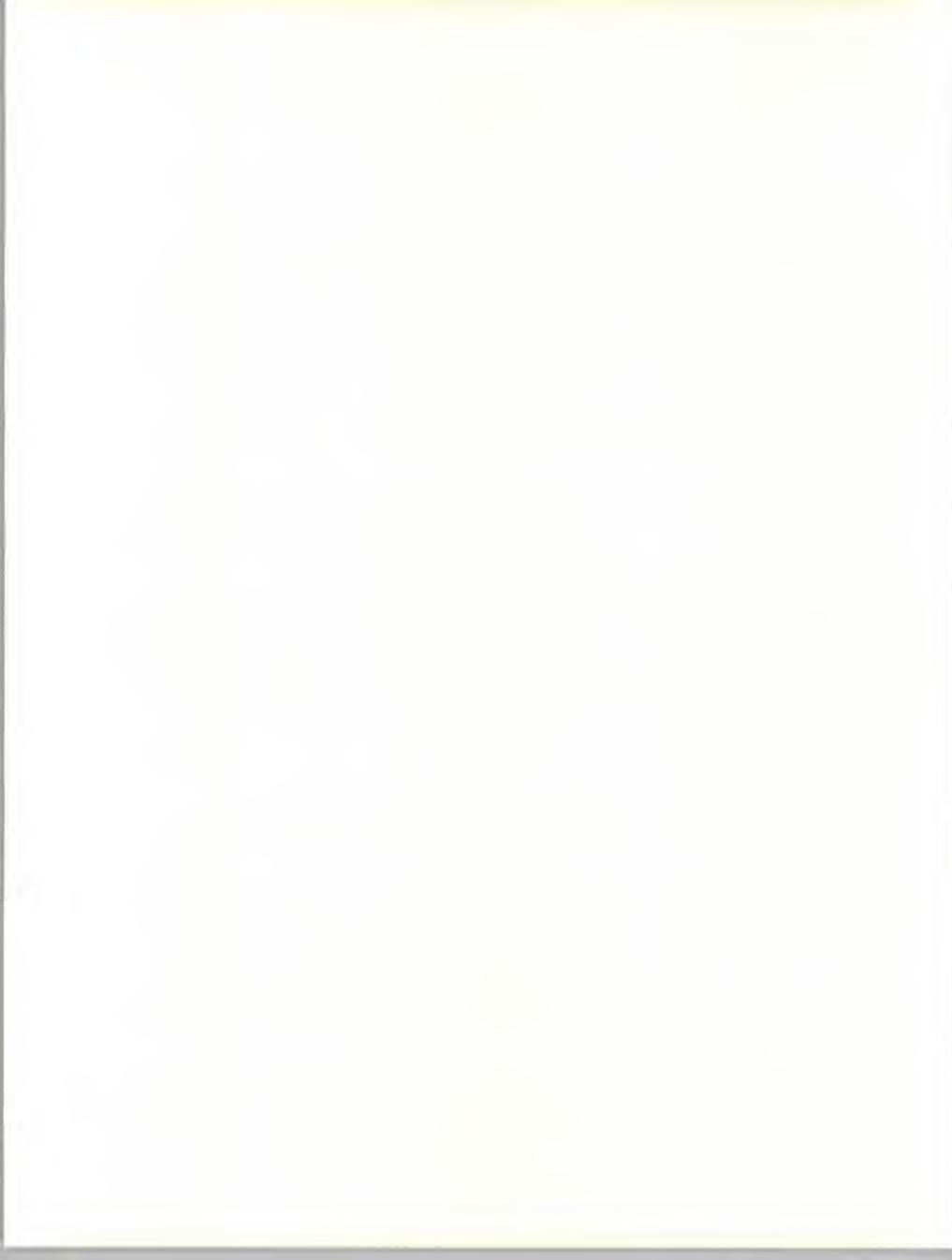
Despite the bad economic news in the airline and travel industry and the impact on freight business from the continuing recession, there have been a number of moves to upgrade the information systems capabilities of firms in the industry. Events that characterize the investments being made in the transportation industry market are included in this section.

Transportation is an industry in which information systems are needed to compete, as executives in major airlines have pointed out. The CEO of a shipping firm, American President Lines, feels that this is also true of shipping, in which foreign firms that have dominated the Pacific routes have used information systems to achieve their success.

The large, complex systems that have been developed in the transportation industry to aid in competition have increased interest in SI and SO vendors who have experience with complex projects. The number of projects being handled by these vendors has been increasing:

- EDS is implementing a very large project for Continental Holdings that includes reservations and other applications systems.
- Litton is implementing an automated materials handling and control system for American Holdings at Fort Worth.
- Oracle has an SI contract for a ship management system.
- AT&T has an SI contract for a ticket application system for the American Airlines terminal facility at Fort Worth.

These contracts illustrate the fact that many large projects will be implemented through arrangements with vendors rather than with in-house managed-development. Many improvements in capabilities are also being achieved with a minimal amount of development by upgrading processing power with compatible systems.



- Royal Caribbean Cruises upgraded its communications capabilities through an upgrade of its AS/400 computer installation.
- Crowley Maritime upgraded the processing of its mainframe applications through the installation of a Hitachi Data Systems computer.

Many application solutions are also currently being implemented using available software products or other means of reducing development work and cost.

- Comcar recently initiated a plan to downsize its computer applications from a mainframe to a distributed group of UNIX computers. The scheduling, tracking and automated dispatching system that will be automated on this distributed system will be implemented by using applications software products from Concepts Dynamics and the Informix data base and 4GL.
- Texas Instruments used its CASE tools and a template of a frequent flier application system developed for TWA to develop an application for Canadian Airlines.

B

Vendor Profiles

Various types of information services vendors active in the transportation industry are profiled in this section. Strategies, background information, and products and services of these vendors are reviewed to explore the range of competition in the industry.

Some vendors concentrate on limited sets of capabilities in one or a few functional areas or service modes in transportation.

- Sentry Data Systems has concentrated mainly on software products for the bus transportation market.
- GEIS provides EDI and VAN network applications services to transportation companies.

Other vendors are more interested in marketing a group of information services products and services that can meet a wide range of needs for customers and prospects. EDS, IBM, Unisys, Coopers and Lybrand, and other Big Six firms, as well as other vendors in the information services industry, are attempting to meet a wide range of needs in many types of transportation companies.

In addition to the companies profiled, many other information services vendors serve the transportation market, including IBM, AT&T/NCR, DEC, and GEIS.



Companies profiled are:

- American Software, Inc.
- Andersen Consulting
- Bluebird Systems, Inc.
- Concepts Dynamics, Inc.
- Comdata Holdings, Inc.
- Dun & Bradstreet Software
- Sentry Data Systems, Inc.
- Sterling Software, Inc., - EDI Group

Additional information about these companies or other vendors active in the transportation industry can be found in INPUT's VAP Program.

1. American Software, Inc., 470 East Paces Ferry Rd., Atlanta, GA 30305, (404) 261-4381

a. Company Strategy

American Software has developed an integrated line of standard applications software products for IBM mainframe and AS/400 platforms. These products run singly or in combination to meet unique customer requirements.

- These products have been supplemented to meet the needs of installations in certain industries, particularly manufacturing. They are also utilized effectively in industries in which there is a high level of repair/maintenance work, such as transportation.
- American Software will perform professional services work to customize its software products to solve customer problems in process or discrete areas or in other industries.

In addition to a set of manufacturing modules, American Software can offer a full MRP II system for IBM mainframes and minis.

b. Company Background

American Software was founded in 1970. The company grew to around 750 full-time employees in 1990, and its calendar-year revenues for 1990 reached almost \$100 million. The company provides applications software products and professional services to manufacturing, distribution, utilities, banking and finance, health care, education, transportation, and government clients.



c. Products and Services

About 37% of American Software's revenues are provided by professional services and 13% by maintenance of software products, which could be included as part of professional services. The rest is mostly from applications software products.

- As shown above, about half of the company's revenue is from professional services.
- American Software is one of the most successful software product vendors in marketing professional services.

The applications software products that are sold can be divided into two groups:

- Forecasting and inventory management software that accounts for about 8% of revenue
- Purchasing, materials control, and financial software that accounts for about 38% of revenue

Specific manufacturing modules include master scheduling, materials requirement planning, bill of material, capacity planning, production work status, shop floor control and cost management and tracking. These products can also be utilized in other industries.

2. Andersen Consulting, Arthur Andersen & Co., 69 West Washington Street, Chicago, IL 60602

a. Company Strategy

Andersen utilizes its reputation and knowledge of a group of industries as well as demonstrations of working solutions to industry problems as a means of appealing to and closing business with prospects. Andersen focuses more attention on manufacturing than on other markets, but has extended its capabilities to retail and wholesale distribution as well as to banking, utilities, and transportation.

Andersen Consulting provides professional services and systems integration services to a number of transportation industry segments, including motor carriers, ocean carriers, airlines, airport facilities, railroads, and intercity bus companies.

Some of the services supplied to transportation involve the use of Andersen's manufacturing expertise and software products for maintenance and repair work, and the electronic exchange of data with engine and airframe manufacturers.



Andersen emphasizes its knowledge of industries and applications to make presentations and conduct consulting studies that can lead to large SI and professional services contracts. By studying the performance and problems of companies in its areas of interest, Andersen has been able to suggest opportunities to gain revenues and improve earnings at companies that it contacts. The firm uses acquisitions and alliances to gain additional resources and knowledge to address its areas of interest.

b. Company Background

Andersen Consulting was set up by Arthur Andersen & Co. as a separate firm in 1988 to address its rapidly growing and large volume of information services business. Estimated worldwide revenues in 1990 for Andersen Consulting were \$2,120 million, 30% above revenue for 1989. U.S. revenues increased by about 21% to \$1,230 million in 1990.

c. Key Products and Services

Over half of 1990 revenue derived from systems integration and about 25% from professional services. Systems operations revenue increased to about 8% of revenue in 1990, and revenue was also obtained from applications and systems software products and network services.

Application areas in transportation in which Andersen specializes are focused principally on airline needs, as shown below:

- Maintenance engineering
- Revenue accounting
- Reservations
- Change management
- Ground services
- Cargo operations
- Catering

Andersen also provides distribution and logistics solutions for single-mode and intermodal freight shipments.

3. Bluebird Systems, Inc., 5900 LaPlace Ct., Carlsbad, CA 92008, (619) 438-2220

a. Company Strategy

Bluebird offers a set of microcomputer systems software and application products for manufacturing, transportation, distribution and other industries that can be sold through VARs. Applications software products make use of its systems software capabilities.



One set of applications software products, TRANSPRO/2, is a vehicle management system that addresses the total needs of a common carrier freight company.

b. Company Background

Bluebird Systems was founded in 1982 to develop microcomputer systems and applications software products that could be sold on a nationwide basis through VARs.

c. Products and Services

One of Bluebird's key systems software products is SuperDOS, a version of DOS that provides a multiuser, multitask environment. Application products make use of SuperDOS, so it is an added advantage to customers as well as an added source of revenue to Bluebird and its VARs.

Compilers for COBOL, Pascal and Databus are also marketed.

Applications software products include systems for manufacturing and vehicle management. The latter, TRANSPRO/2, includes the following capabilities:

- Freight billing, accounting, and settlement
- Freight manifesting
- Fuel and mileage reporting
- Interline payables
- EDI
- Vehicle investment analyzing
- Vehicle maintenance reporting

4. Comdata Holdings Corp., 5301 Maryland Way, Brentwood, TN 37027, (615) 370-7000

a. Company Strategy

Comdata provides services to the trucking industry that are focused on the use of network capabilities to service and manage truck drivers and trucks. The development of these services provided opportunities and ideas for the extension of services to leisure, gaming and retail industries.

Using a specialized credit card, truck drivers can use the services of Comdata to obtain fuel, pay for repairs and fuel bills, and obtain travel cash and other services at participating truck stops, with dollar amounts and controls set by the trucking company.



- Reports of all activities are prepared for truck companies.
- Fuel use can be monitored and fuel tax recorded as part of Comdata's services.

Directions for drivers, including the pick-up of loads to make use of available capacity after a drop-off is made, and the use of transceivers to supply many types of regulatory permits are also provided by Comdata.

b. Company Background

Comdata was restructured in 1987 through a leveraged recapitalization initiated by Welsh, Carson, Anderson & Stowe. Comdata Network and a number of other activities, including funds transfer and permit issuing capabilities, have been acquired since the recapitalization.

c. Products and Services

In addition to the services described above for the trucking industry, Comdata provides credit card cash advance services for individuals at leisure and resort locations, and check verification, check guarantee and collection services for various retailers.

5. Concepts Dynamics, Inc., 1821 Walden Office Square, Ste. 585, Schaumburg, IL 60173

a. Company Strategy

Concepts Dynamics has developed and marketed a set of accounting and marketing software products that can be easily modified to meet the needs of particular market segments. Products being sold to transportation companies are programmed in UNIX/C and are well suited to distributed operations.

b. Company Background

Concepts Dynamics was established in 1981 to market a set of cross industry business applications software products that would be implemented in UNIX.

c. Key Products and Services

Concepts Dynamics has accounting, management and marketing systems programmed in UNIX/C. Some of the applications include accounts payable, credit management, general ledger, and job control systems. These modules can be linked together and customized for various industries such as transportation.

**6. Dun & Bradstreet Software Services, Inc., 550 Cochituate Rd.,
Framingham, MA 01701**

a. Company Strategy

The company develops, markets, and supports a wide range of industry and cross-industry software products on multiple vendor platforms that provide it the opportunity to market to a number of industries.

- Applications software products are available for financial and accounting, human resources, administrative, purchasing, inventory, manufacturing, education, and health industry functions. Software products for these functions are utilized in the transportation and other industries. Its distribution resource planning system (DRP) is heavily used in transportation.
- The AMAPS systems support discrete and process manufacturing, and maintenance environments in other industries—including transportation—on multiple vendor platforms. A program is available to develop interfaces with the manufacturing software products of other vendors.

In addition to AMAPS systems, companies use Dun & Bradstreet software products for inventory control, human resources, accounting, financial reporting, and other standalone applications. Dun & Bradstreet also provides professional services aid in planning, using, and customizing software products.

Through its CIM Partners program, D&B has relations with Vocam Systems, a company that specializes in distribution and has software products that can be used by trucking and other transportation companies.

D&B's software products utilize a number of hardware platforms, including IBM, Unisys, DEC, HP, and Bull mainframe and midrange equipment.

b. Company Background

This company is a subsidiary of the Dun & Bradstreet Corporation. It was formed in 1990 as a result of the merger of Management Science America, acquired in 1990, and McCormack & Dodge, acquired in 1983. The former had been founded in 1963 and had over 24,500 product installations. The latter, founded in 1969, had over 10,000 product installations.



c. Products and Services

D&B's software addresses a number of functions, as described in the following:

- The Millennium Series supports human resource, accounting and support functions, chiefly on IBM and compatible mainframes, but some products are also available for DEC VAX computers.
- The PLUS series offers accounting and a micro-to-mini link for IBM AS/400s and System /38s.
- Human resources products are available for IBM and compatible PCs.
- The BrightView Series, which allows the use of intelligent workstations and addresses accounting, inventory and budgeting functions, uses IBM mainframe and 9370 computers.
- The AMAPS manufacturing software products, which also can use intelligent workstations, are available for IBM mainframe and minis and HP computers.
- Software products are also available for education, factory operations, and other functions.

7. Sentry Data Systems, Inc., 100 Jericho Quadrangle, Jericho, NY 11754, (516) 935-5950**a. Company Strategy**

Sentry is a small applications software products vendor attempting to penetrate and develop strength in a small group of vertical industries, including bus transportation.

b. Company Background

Sentry was established in 1973 to pursue opportunities in the software products industry. It is one of many small companies that serve the transportation industry.

c. Products and Services

The products that Sentry offers for bus transportation include crew and route control, business office, and payroll/personnel systems.

Sentry also offers a fleet maintenance and inventory management system for the trucking industry.



Sentry has software products for organizations and for business services.

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

a. Company Strategy

Sterling's EDI Group has developed and acquired a comprehensive set of EDI services and related software and services that have established the company as a major competitor and source of expertise in EDI.

As part of its strategy, the EDI Group focuses on maintaining a close relationship with clients and supplying their needs as their use of EDI expands. This strategy is supported with education and participation in the largest user group in the EDI market.

Markets that the EDI Group has penetrated include wholesale and retail distribution—including grocery, hardware and housewares, trucking, and pharmaceutical, medical/surgical distribution and service merchandising.

b. Company History

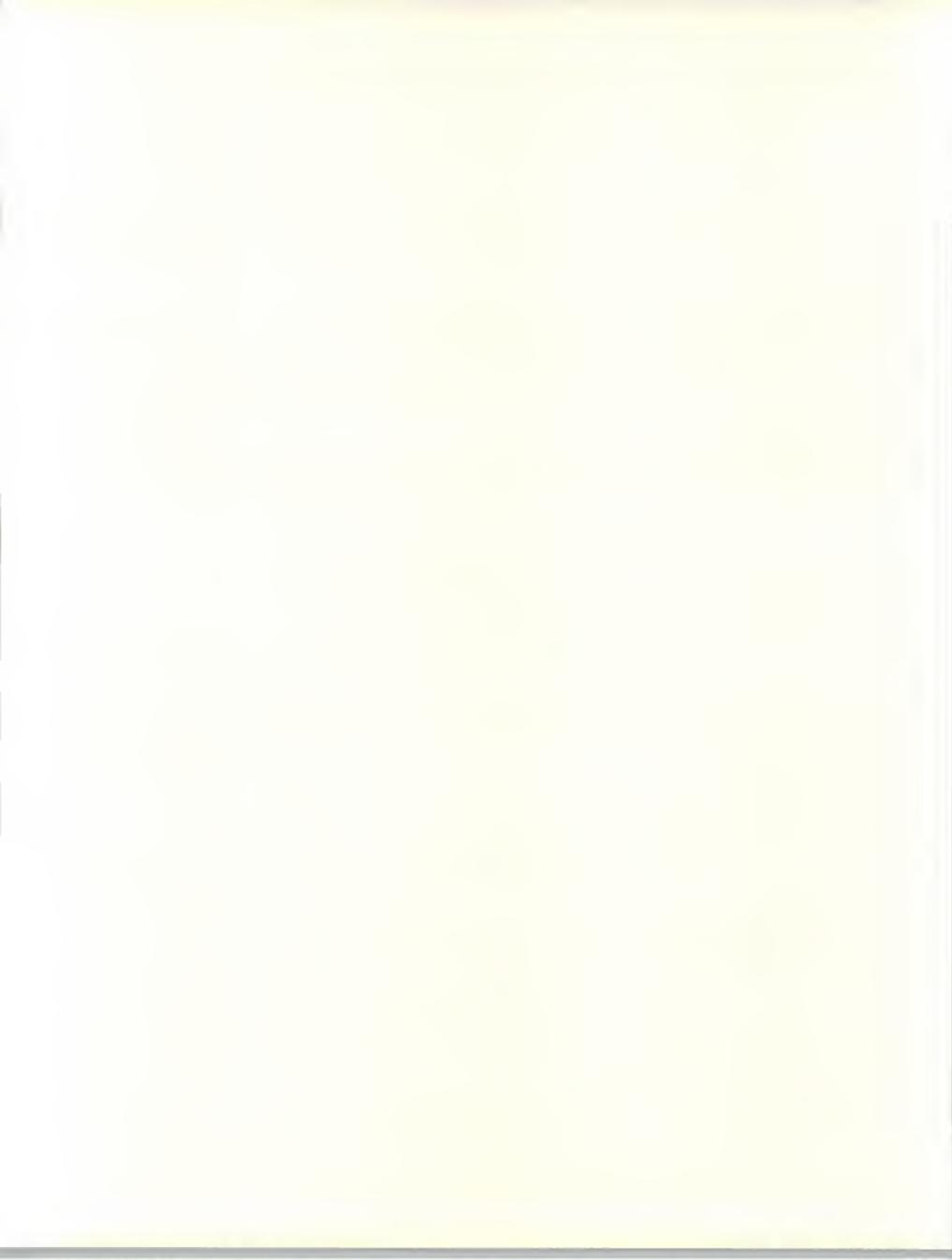
The EDI Group was created in October, 1990 and includes the ORDERNET Services Division, the EDI Labs Division, and an EDI International Division, headquartered in London. The REDINET Services Division of CDC was acquired in 1991 and folded into the ORDERNET Division. Fiscal-year 1990 revenues were over \$23 million, with 85% of revenues coming from the U.S.

c. Products and Services

About 55% of the EDI Group's revenue comes from software products and 45% from network services. Software products and network services are offered through the ORDERNET division to over 2,700 customers in the pharmaceutical, grocery, hardware and housewares, retail, medical distribution, mass merchandising, warehousing, transportation and automotive industries.

ORDERNET provides an on-line network to manage and control the flow of standardized business documents among over 2,000 trading partners.

Services to certain industries are provided through vendors active in those industries. ORDERNET services are made available to hospitals through GTE Health Systems. Services including a data base on drug usage are made available to the medical industry through International Health Applications. Internetwork traffic for the grocery industry is supported through BT Tymnet.

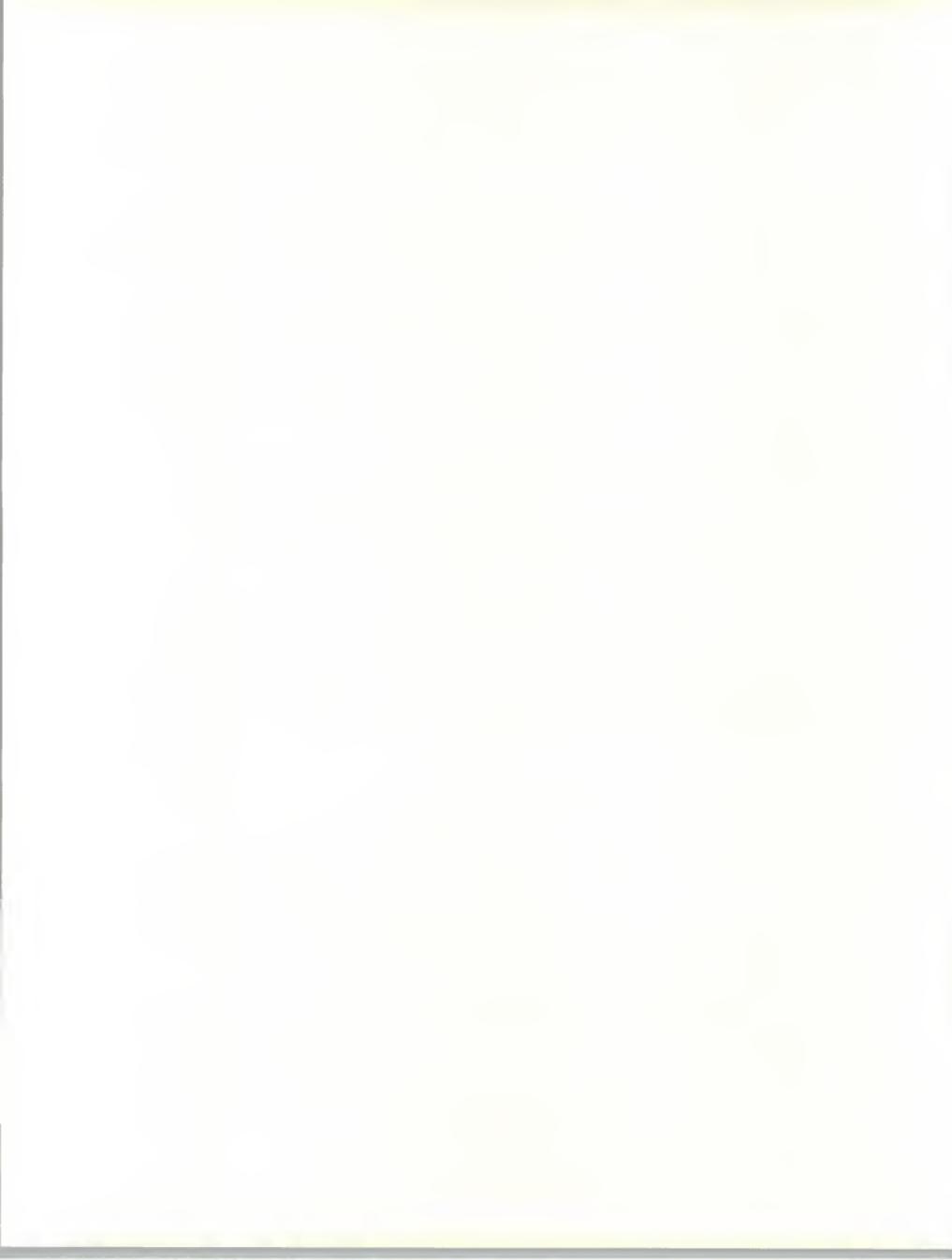


Electronic transmission of charge-back information between wholesalers and pharmaceutical manufacturers is provided in three formats established by national druggists' associations.

Translation between established standards for EDI and other standards in use and between a variety of record formats, as well as support of existing protocols on different hardware platforms, are provided with software from the EDI Group.

A data base service is available to build on EDI documents such as purchase orders and invoices that trading partners use during business.

Security services, education, and software maintenance are also offered in support of EDI products and services.







Definitions

No industry-specific definitions have been used in this report.

See the separate volume, INPUT's *Definition of Terms*, for general definitions of industry structure and delivery modes used throughout INPUT reports.







Forecast Data Base

A

Forecast Data Base

Exhibit B-1 presents INPUT's detailed 1990-1996 forecast for the transportation sector.

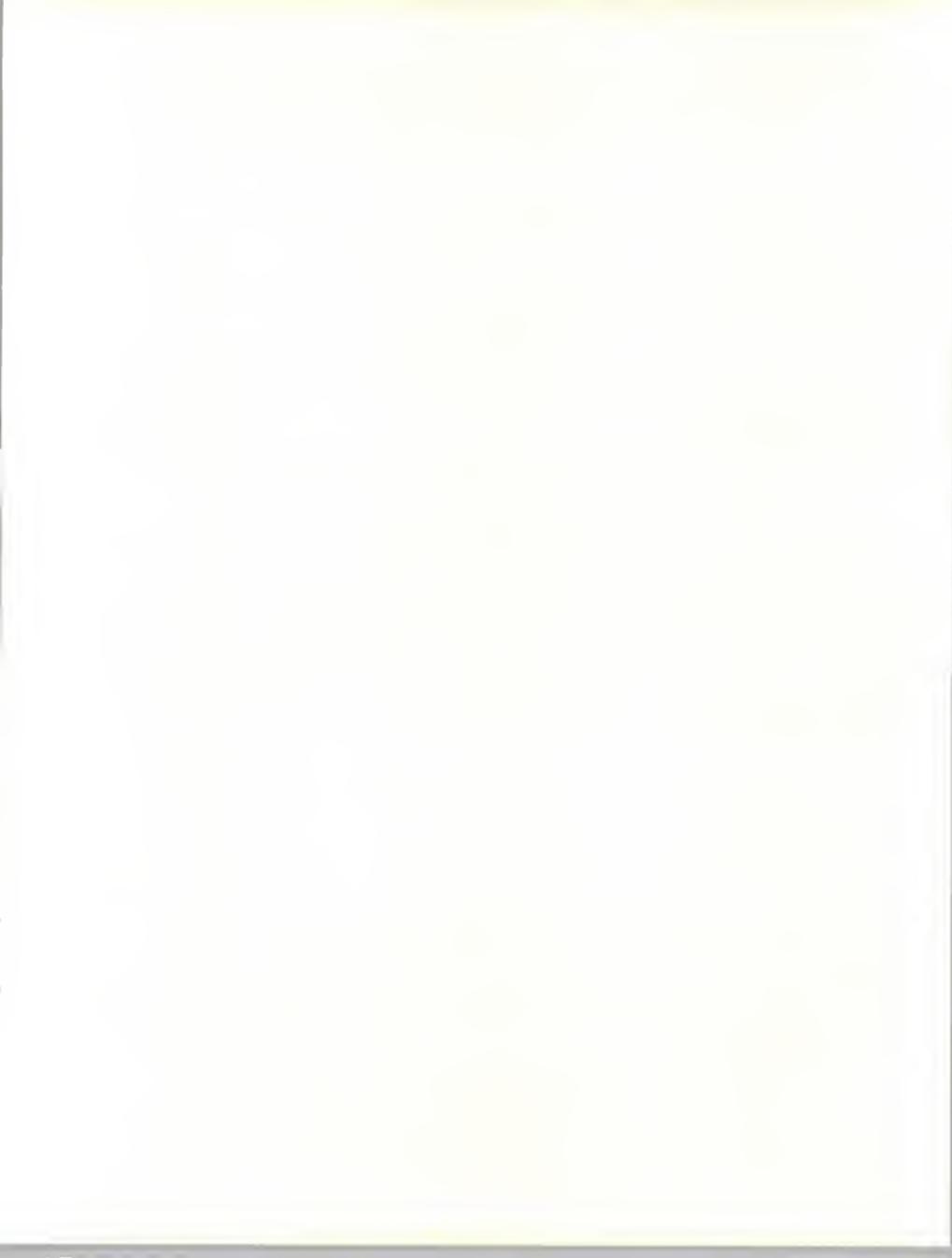


EXHIBIT B-1

Transportation Sector
User Expenditure Forecast by Delivery Mode, 1990-1996
(\$ Millions)

Delivery Modes	1990 (\$M)	Growth 90-91 (%)	1991 (\$M)	1992 (\$M)	1993 (\$M)	1994 (\$M)	1995 (M)	1996 (\$M)	CAGR 91-96 (%)
Sector Total	3,384	6	3,580	3,892	4,311	4,804	5,302	5,892	10
Processing Services	2,030	2	2,070	2,183	2,360	2,552	2,758	2,980	8
- Transaction Processing	2,030	2	2,070	2,183	2,360	2,552	2,758	2,980	8
Turnkey Systems	250	10	275	302	332	366	402	443	10
- Equipment	120	10	132	145	159	176	193	213	10
- Software Products	90	10	99	109	120	132	145	159	10
- Applications	78	10	85	94	103	113	125	137	10
- Systems	13	10	14	15	17	18	20	22	10
- Professional Services	40	10	44	48	53	59	64	71	10
Applications Software Products	351	11	390	431	478	538	596	661	11
- Mainframe	135	6	143	149	155	169	175	182	5
- Minicomputer	97	8	105	114	124	135	147	156	8
- Workstation/PC	119	19	142	168	199	234	274	323	18
Systems Operations	124	19	148	181	226	269	318	377	21
- Platform Sys. Ops.	91	19	108	132	164	193	224	260	19
- Applications Sys. Ops.	33	21	40	49	62	76	94	117	24
Systems Integration	146	12	164	191	228	277	336	412	20
- Equipment	54	12	61	71	84	102	124	152	20
- Software Products	9	12	10	11	14	17	20	25	20
- Applications	6	12	7	8	9	11	13	16	20
- Systems	3	12	3	4	5	6	7	8	20
- Professional Services	79	12	89	103	123	150	181	222	20
- Other	4	12	5	6	7	8	10	12	20
Professional Services	213	9	233	250	269	309	310	333	7
- Consulting	49	12	55	61	67	74	81	88	10
- Software Development	135	8	146	154	163	193	184	196	6
- Education & Training	29	10	32	35	39	42	45	49	9
Network Services	270	11	300	354	418	493	582	686	18
- Electronic Info. Svcs.	210	8	226	265	308	358	418	486	17
- Network Applications	60	23	74	89	110	135	164	200	22



B**Forecast Reconciliation**

Exhibit B-2 presents the reconciliation of INPUT's 1991 transportation sector forecast with the 1990 forecast.

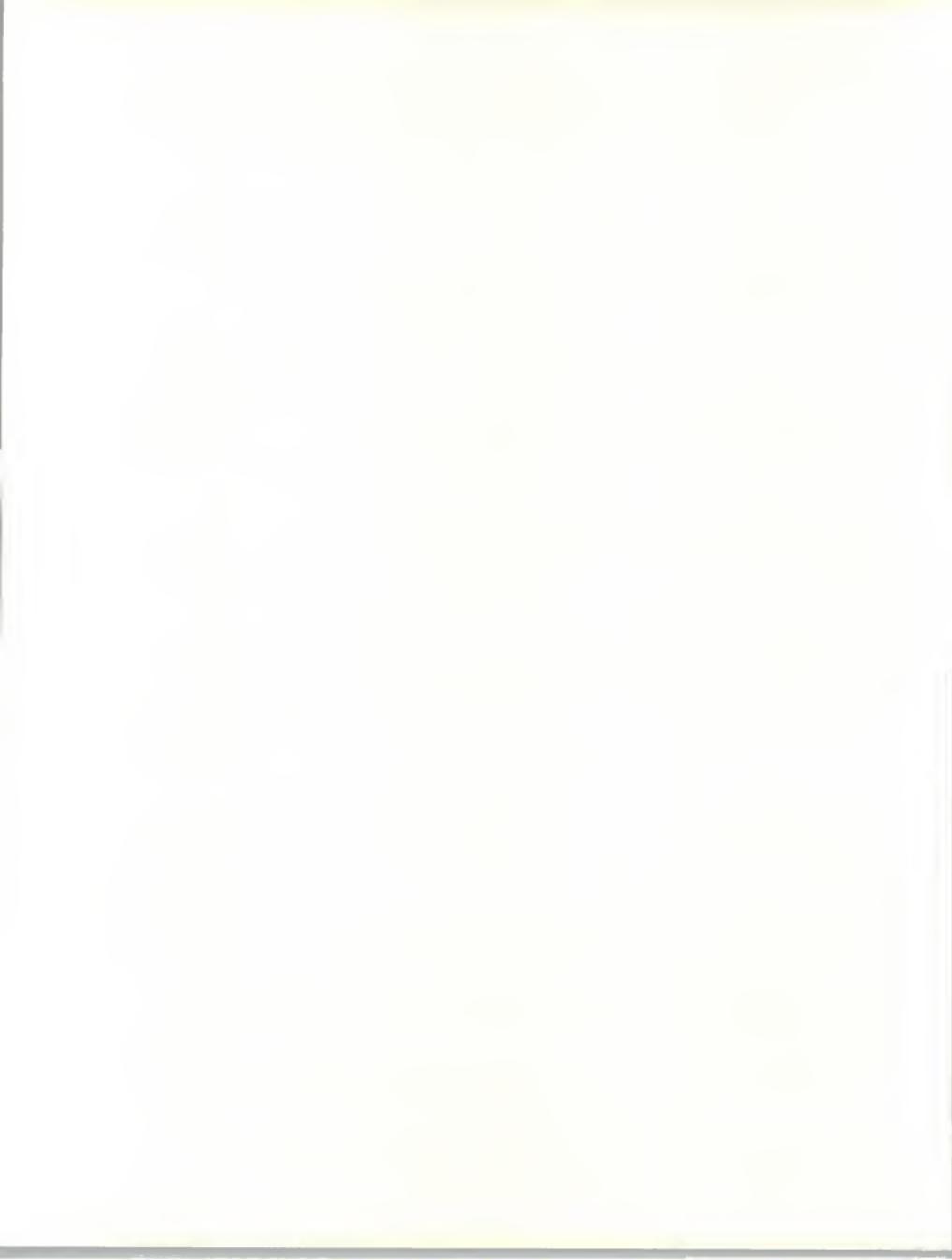
EXHIBIT B-2

**Transportation Sector
1991 MAP Data Base Reconciliation
(\$ Millions)**

Delivery Modes	1990 Market				1995 Market				90-95 CAGR per data 90 Rpt (%)	90-95 CAGR per data 91 Rpt (%)		
	1990 Report (Fcst) (\$M)	1991 Report (Actual) (\$M)	Variance from 1990 Report		1990 Report (Fcst) (\$M)	1991 Report (Fcst) (\$M)	Variance from 1990 Report					
			(\$M)	(%)			(\$M)	(%)				
Total Transportation Sector	1,822	3,384	1,562	86	3,328	5,302	1,974	59	13	9		
Processing Services	621	2,030	1,409	127	1,054	2,758	1,704	62	11	6		
- Transaction Processing	621	2,030	1,409	127	1,054	2,758	1,704	62	11	6		
Turnkey Systems	250	250	0	—	402	402	0	—	10	10		
Applications Software	359	351	-8	-3	603	596	-7	-1	11	11		
Systems Operations	52	124	72	138	108	318	210	94	16	21		
Systems Integration	157	146	-11	-7	371	336	-35	-9	19	18		
Professional Services	213	213	0	—	395	310	-85	-22	13	8		
Network Services	170	270	100	59	395	582	187	47	18	17		

The notable difference in estimated user expenditures for 1990 versus the previous forecast is due to the fact that the consumer services sector was eliminated in 1990 and expenditures projected for it were absorbed into the transportation and business services industries.

- The chief effect of this was to raise the estimated expenditures for processing services, systems operations and network services.
- The movement of expenditures to transportation masked the impact that the recession and the Persian Gulf conflict had on this industry in 1990.



The 7% drop in SI expenditures versus the previous forecast, and the small drop in expenditures for applications software products in 1990 show some effect of the recession, however.

By 1995, the impact of the recession and fall-off in the airline and travel businesses were more evident in the reduction of forecast professional services expenditures by 22%.

- Forecast systems integration expenditures also showed a drop of 9% but were continuing to grow at a CAGR of 18% between 1990 and 1995, indicating much more inclination to use this mode than professional services.
- Companies in the transportation sector will divert many projects that would have been accomplished with the aid of professional services vendors to solutions that involve the use of SI, SO, or applications software products.

The use of SO is forecast to be up 94% by 1995.

- Part of that increase is due to the transfer of expenditures to the transportation industry, but the growth rate of 21% forecast for 1990-1995 illustrates that this is the healthiest mode in the industry.
- SO is a desirable choice for companies in the industry because ongoing investment in technology is needed to meet needs and competition in transportation, and companies in the industry suffer from strains on their resources.

Although the forecast for the use of applications software products in total is down by 1%, its growth rate will be above that of professional services.

- In fact, the growth rate for the use of workstation/PC software products will be about the same as the use of SI (18%), because of the increasing use of workstation solutions.
- Workstation/PC software products will be used to implement client/server solutions, downsize many existing applications and move some work from processing services in-house.

The forecast reduction in growth rate for processing services from 11% to 6% for the period from 1990 to 1995 indicates that work is moving to other modes of service including SO, workstation software products, and turnkey systems.

Expenditures for turnkey systems will continue to grow at a CAGR of 10% between 1990 and 1995 despite the fact that more of these systems will be based on workstations and will cost less. This is due to the facts



that some processing services work will be moved to turnkey systems and that turnkey systems will be used to meet some needs rather than in-house resources and/or professional services.





About INPUT

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

Subscription services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services. INPUT specializes in the software and services industry which includes software products, systems operations, processing services, network services, systems integration, professional services, turnkey systems, and customer services. Particular areas of expertise include CASE analysis, information systems planning, and outsourcing.

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

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

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