U.S. SYSTEMS OPERATIONS MARKET

1990 - 1995

INPUT

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FEBRUARY 1991

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INPUT®
1953 Gallows Road, Suite 560, Vienna, VA 22182
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Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

Systems Operations Program (SOP)

U.S. Systems Operations Market, 1990-1995

SOSP4 • 491 • 1990

Abstract

This report analyzes the systems operations market as it existed in 1989 and 1990, forecasts the growth for the market through 1995, and examines the issues and trends that affect the market. The analysis includes identification of those forces affecting the market in general, as well as within each vertical industry market.

The analysis is further subdivided into both delivery options: processing services, using vendor-owned equipment, and professional services, using client-owned equipment. To better characterize the market, the data is also classified by two modes of processing: platform operations, where responsibility for the applications software remains with the client, and applications operations, where the vendor provides applications software development and maintenance as well as processing support.

A discussion of the leading vendors and their evolving strategies is included. The issues of vendor alliances and partnerships with the clients are explored. A review of buyer motivations leads to suggestions about what constitutes good systems operations prospects.

This report contains 141 pages and 88 exhibits and was prepared as part of INPUT's Systems Operations Program.

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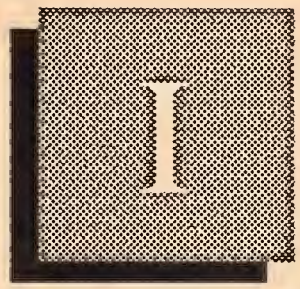
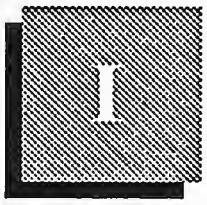


Introduction



Introduction

This report has been prepared by INPUT as an update and revision of *Systems Operations—Growth for the 1990s*. It analyzes the market for vendor-provided systems operations services in the U.S. commercial and federal markets. A forecast for the systems operations market for the period 1990-1995, including the prospects in each of 16 vertical markets, is presented.

Forecasts are also presented for the processing services versus professional services submodes of systems operations. Market revenue projections are also provided for applications versus platform operations. Marketing recommendations are developed for vendors based on user surveys conducted during 1990.

A Scope

This report includes federal and commercial systems operations markets for 1990 to 1995 in the United States. The market prospects for each of 16 vertical markets are examined, and the leading vendors in each of those sectors are identified. Market structure is analyzed to clarify the delivery submodes and types of systems operations that commise the market. Exhibit I-1 identifies the two delivery submodes and types of operations. User attitudes are studied to identify market trends and develop recommendations for vendors to market successfully to systems operations prospects.

EXHIBIT I-1

Systems Operations Definitions

- Delivery Modes
  - Processing services—performed on vendor-owned equipment
  - Professional services—performed on client-owned equipment
- Types of systems operations
  - Platform operations—vendor operates computer system/network only
  - Application operations—vendor has responsibility for system/network and applications software

B

Report Organization

This report, *U.S. Systems Operations Market, 1990-1995*, is organized as follows:

- Section II, Executive Summary, provides an overview of the report and highlights the significant information that follows.

- Section III, Market Analysis and Forecast, identifies the general market characteristics and defines market sectors while differentiating between commercial and federal markets. It forecasts growth for the next five years by vertical industry as well as by delivery mode and type of systems operation. It concludes by identifying key marketplace factors and describing the competitive environment that currently exists.

- Section IV, Vertical Industry Markets, details the penetration of systems operations in the 16 vertical markets identified by INPUT. The forecast in each market sector is complemented by an analysis of the information services environment in that sector, and the potential for systems operations as a result of that environment.

- Section V, Market Strategies and Recommendations, crystalizes the data developed in the earlier sections into a set of marketing and sales strategies. Attention is focused on the new partnership relationship that is evolving between client and vendor in the systems operations market.

The report is complemented by a set of Appendixes:

- Appendix A includes pertinent INPUT definitions to provide a common base of terminology.
- Appendix B provides the INPUT definitions of vertical industry markets and relates these to Standard Industrial Classification codes.
- Appendix C contains the forecast data base used by INPUT for this analysis.
- Appendix D contains the reconciliations of the current forecast data base with that used in the previous year.

C

Methodology

INPUT used two research sources for this report. The first was a survey of vendors and current and potential users of systems operations, and the second was INPUT's annual survey of information services vendors. The first source was used to identify and compile data regarding current vendor and user views about systems operations. The second source was used to assist in establishing user expenditures for systems operations. This provided the base-year data for INPUT's forecast for systems operations.

Exhibit I-2 provides a summary of the respondents to the systems operations survey administered as part of this study. The 56 vendor respondents represented approximately 60% of the market revenue. Fourteen of these also completed in-depth interview questionnaires that probed market issues and management practices. The 55 firms surveyed on the user side were distributed among existing users and firms that had evaluated systems operations but rejected it, and firms that had not yet considered it.

EXHIBIT I-2

Systems Operations Survey Respondents

- 56 vendors
- 55 users or potential users
  - 31 current SO users
  - 3 former SO users
  - 10 had evaluated and rejected SO
  - 11 had not considered SO

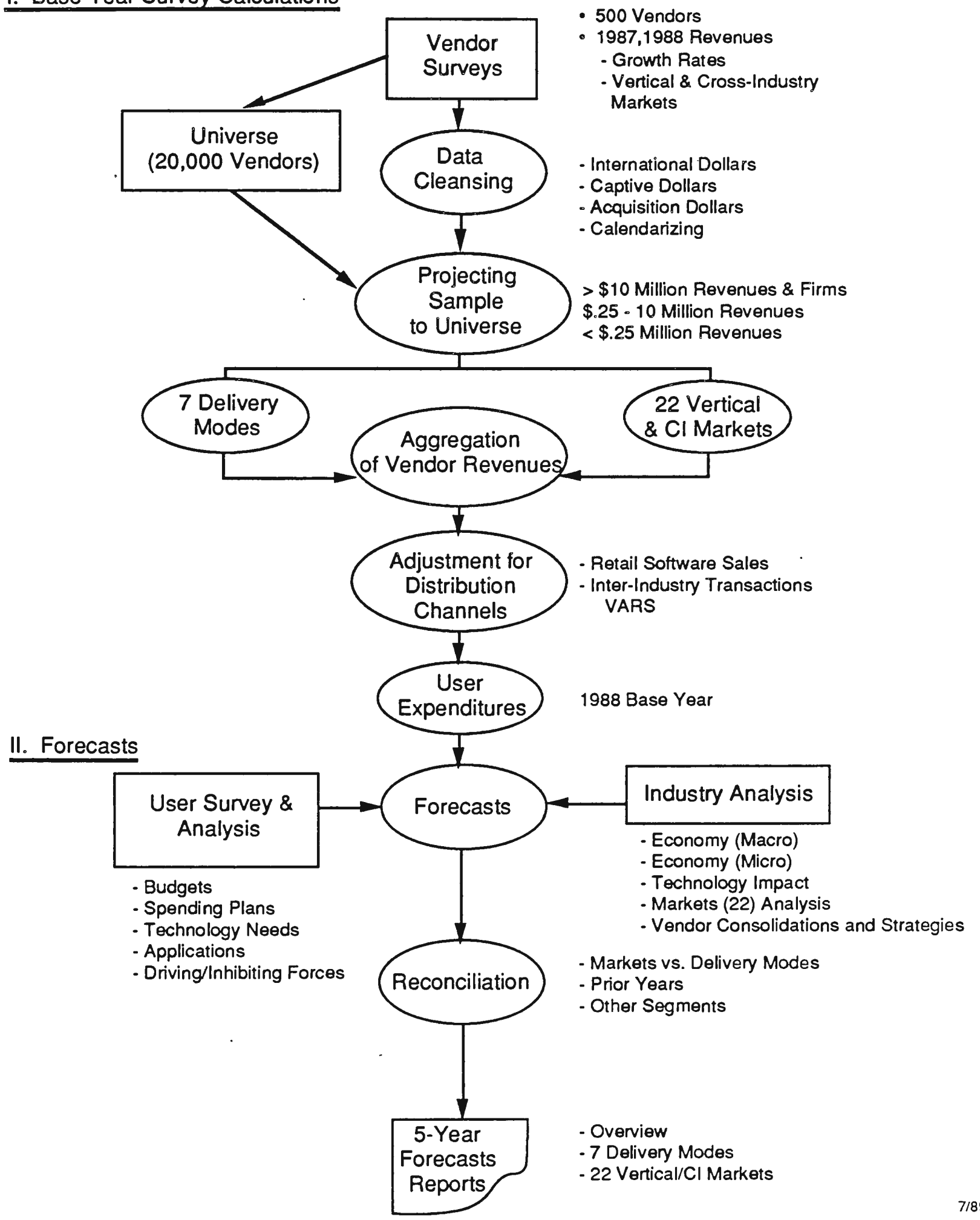
The user sample was intentionally spread over all the vertical industry markets to try to identify general market characteristics but still recognize industry-specific issues.

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, information systems organizations to determine their expenditures, and outside services acquisition plans. Vendors were interviewed a second time to understand their views of the market opportunities over the short and long terms.

INPUT's annual research process consists of two major parts: (1) base-year expenditure calculations, and (2) market forecasts. Each is briefly described below.

EXHIBIT I-3

INPUT Research Methodology



7/89

1. 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, including the thousands of active vendors and thousands of active customers.

- Adjustments are made to eliminate duplications due to distribution channel overlap and to assure that captive information services expenditures are not included.

- The end result is a base-year, 1989, user expenditure for each of the 23 vertical and cross-industry sectors and the eight delivery modes.

2. 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 end result is a five-year forecast for each of the 23 vertical and cross-industry sectors and the 8 delivery modes.

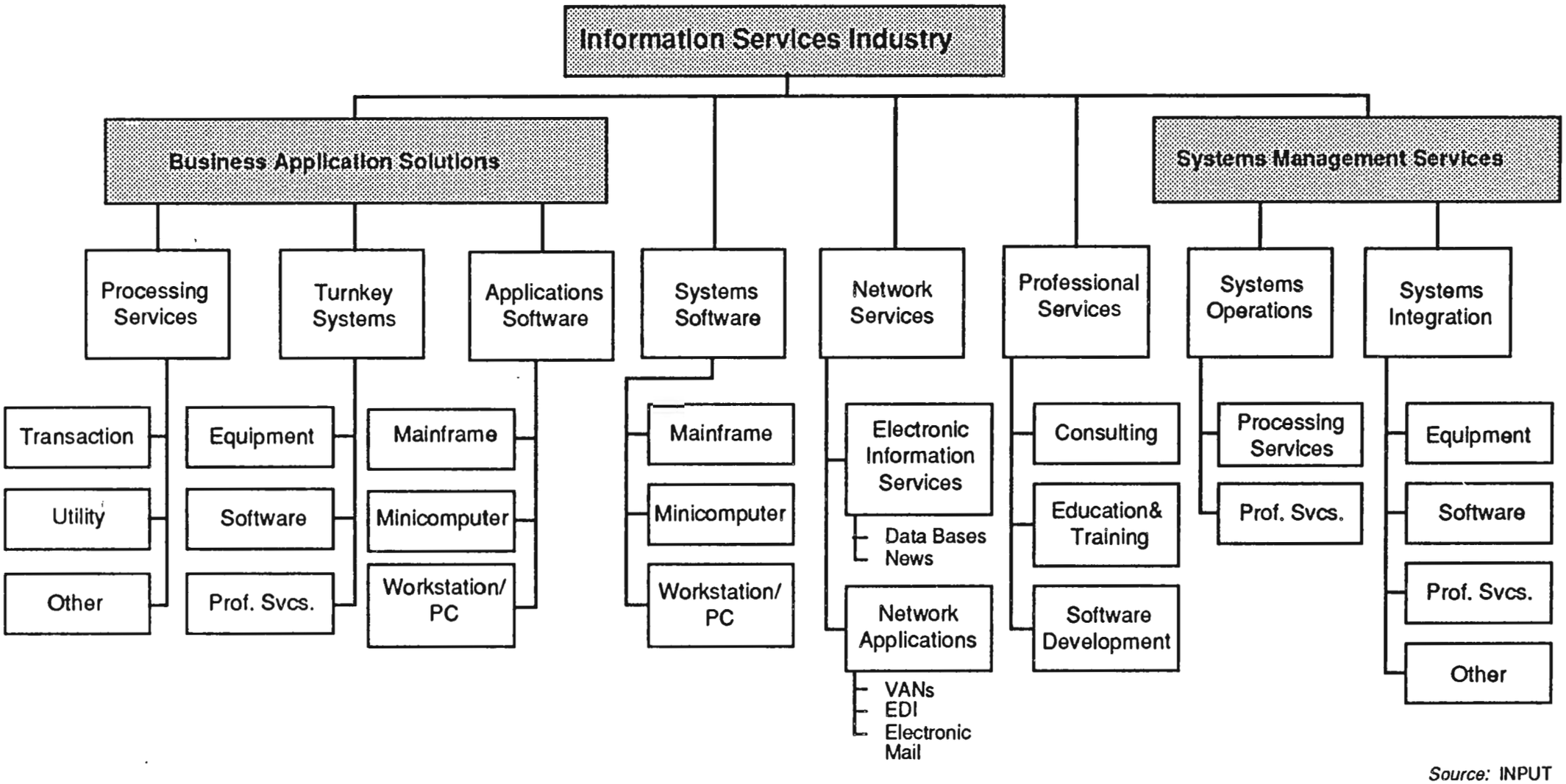
To complete the process, INPUT reconciles its new forecasts with those from the previous year. Differences due to market restructuring and other causes are explained, providing the users of these projections with the ability to track INPUT's forecasts from year to year.

D

Information Services Industry Structure

Exhibit I-4 defines the structure of the information services industry as used by INPUT in its market analyses and forecasts. The market consists of eight delivery modes, each of which contains a number of submodes.

Information Services Industry Structure—1990



Source: INPUT

- 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*.

E

Economic Assumptions

Forecast numbers are presented in current dollars (i.e., 1995 market sizes are in 1995 dollars). In developing the five-year forecast, INPUT has incorporated the following economic assumptions regarding the outlook for the total U.S. economy.

As shown in Exhibit I-5, real GNP growth is currently projected to decrease from an actual 2.5% annual rate in 1989, ranging from 1.0% to 2.7% over the next five years. In addition, the inflation rate, as measured by the GNP deflator, is expected to decrease modestly from an annual rate of 4.4% in 1990 to 3.9% in 1995.

EXHIBIT I-5

Inflation/GNP Economic Assumptions (Percent)

	1989 A	1990 E	1991 E	1992 E	1993 E	1994 E	1995 E
Real GNP	2.5	1.0	0.8	2.6	2.7	2.7	2.5
GNP Deflator	4.1	4.4	4.6	4.1	4.0	4.0	3.9
Nominal GNP	6.7	5.4	5.4	6.8	6.8	6.8	6.5

A = Actual
E = Estimated

F

Related INPUT Reports

For a view of the information services market, readers are encouraged to review the following INPUT reports:

Information Services Industry Report (1990)

Information Services Industry-Specific and Cross-Industry Markets (1990)

Systems Operations—Growth for the 1990s (1989)

Federal Processing Services/Systems Operations Market, 1989-1994 (1988)

Systems Integration Forecast and Trends, 1990-1995 (1990)

Systems Operations Management Issues and Practices (1990)

Network Operations Management (1990)

Executive Overview

II

Executive Overview

A

Major Buyer Issues

The buyer issues listed in Exhibit II-1 have been identified by executives in user firms as the motivators for growth in systems operations. Many information services executives are finding that outsourcing to systems operations vendors is a viable alternative to operating information processing with internal personnel resources.

EXHIBIT II-1

Major Buyer Issues
1990

- Information systems key to business success
- Need to reduce operating costs/preserve capital
- Challenge to keep abreast of technology
- Lack of skilled personnel
- Concern about dependency on vendor

Management realizes that information services are the key to success in most industries. They emphasize that they need to have information on markets, sales, and production status to compete in today's marketplace.

Firms are constantly seeking to reduce operating costs under tightening economic conditions. They also need to preserve capital and delay major investments.

Internal information systems organizations are unable, in many cases, to keep abreast of rapidly evolving technology and are finding it more difficult to acquire individuals highly skilled in new technologies.

Some industries are finding it difficult to compete for skilled resources. Systems operations offers an alternative that addresses most of these problems but introduces a new one in its place.

Outsourcing of systems operations requires turning over all data processing operations to a third party. It leaves the buying firm dependent on an outside vendor for information it has already judged to be crucial to its continued successful operation, which causes great concerns. If systems operations is to be selected as an alternative, vendors need to address these concerns.

B

Systems Operations Trends

Several trends are developing in the systems operations market that are outlined in Exhibit II-2. The concept of a partnership is becoming accepted as vendors and users negotiate how contracts will be implemented. As vendors invest in equipment and facilities for the client, and assume responsibility for staff over an extended contract period, mutual respect and trust will be required.

EXHIBIT II-2

Systems Operations Trends 1990

- Client/vendor relationship=partnership
- Vendors assume risk
  - Acquire client hardware
  - Assimilate client staff
- Long-term relationships increasing

The partnership concept will solidify as more vendors assume responsibility for client staff and client-owned hardware that is resident on client premises .

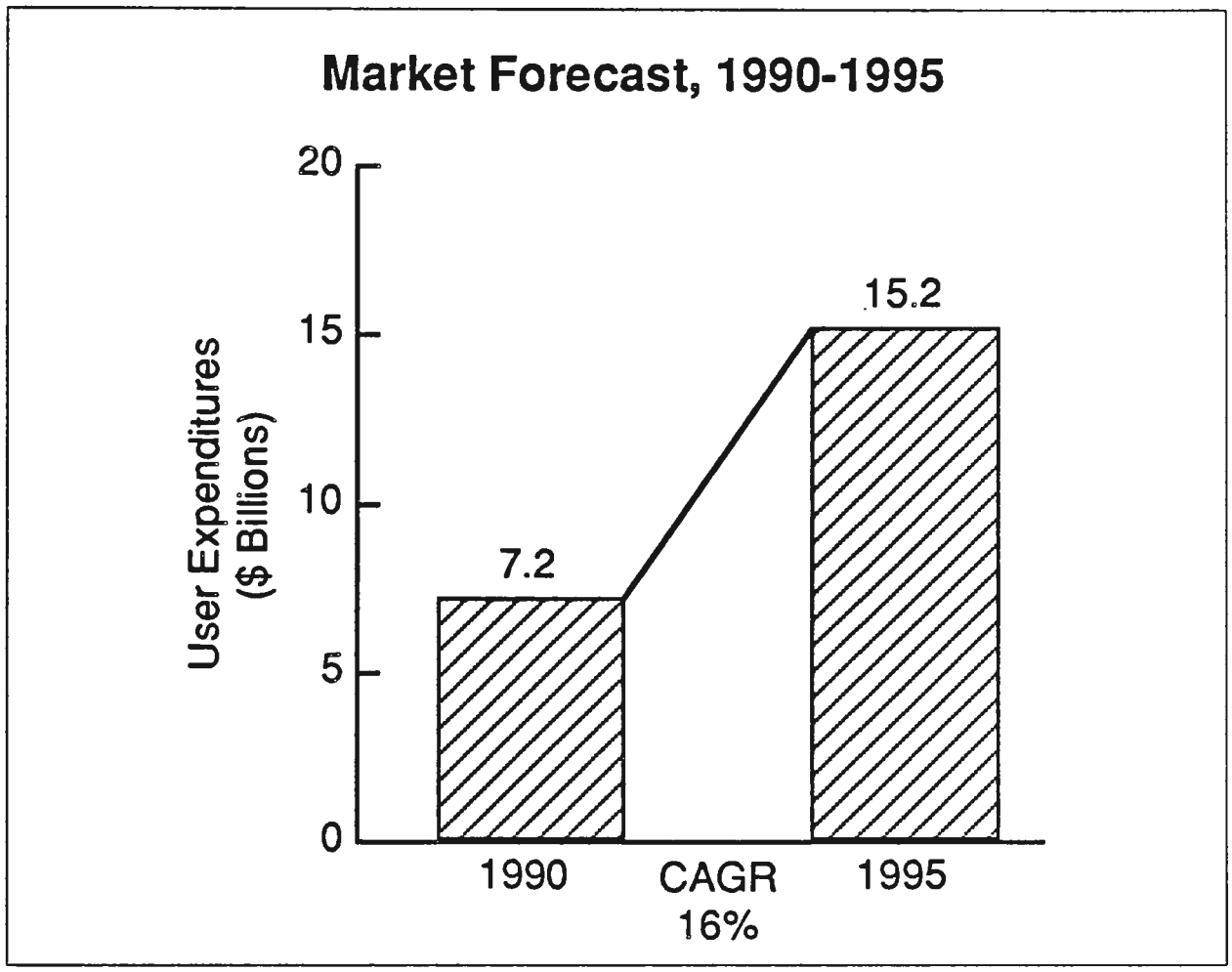
The relationship between vendor and client is becoming long term. Contracts for more than five years are common already, and ten years is becoming an accepted duration in larger contracts.

C

Market Forecast, 1990-1995

INPUT forecasts U.S. user expenditures for systems operations for the commercial and federal markets to reach $7.2 billion in 1990. Growing at a compound annual rate of 16%, expenditures will reach $15.2 billion in 1995, as illustrated in Exhibit II-3. While growth rate is similar to last year's growth rate, there have been significant changes in the individual vertical industry sectors.

EXHIBIT II-3



D

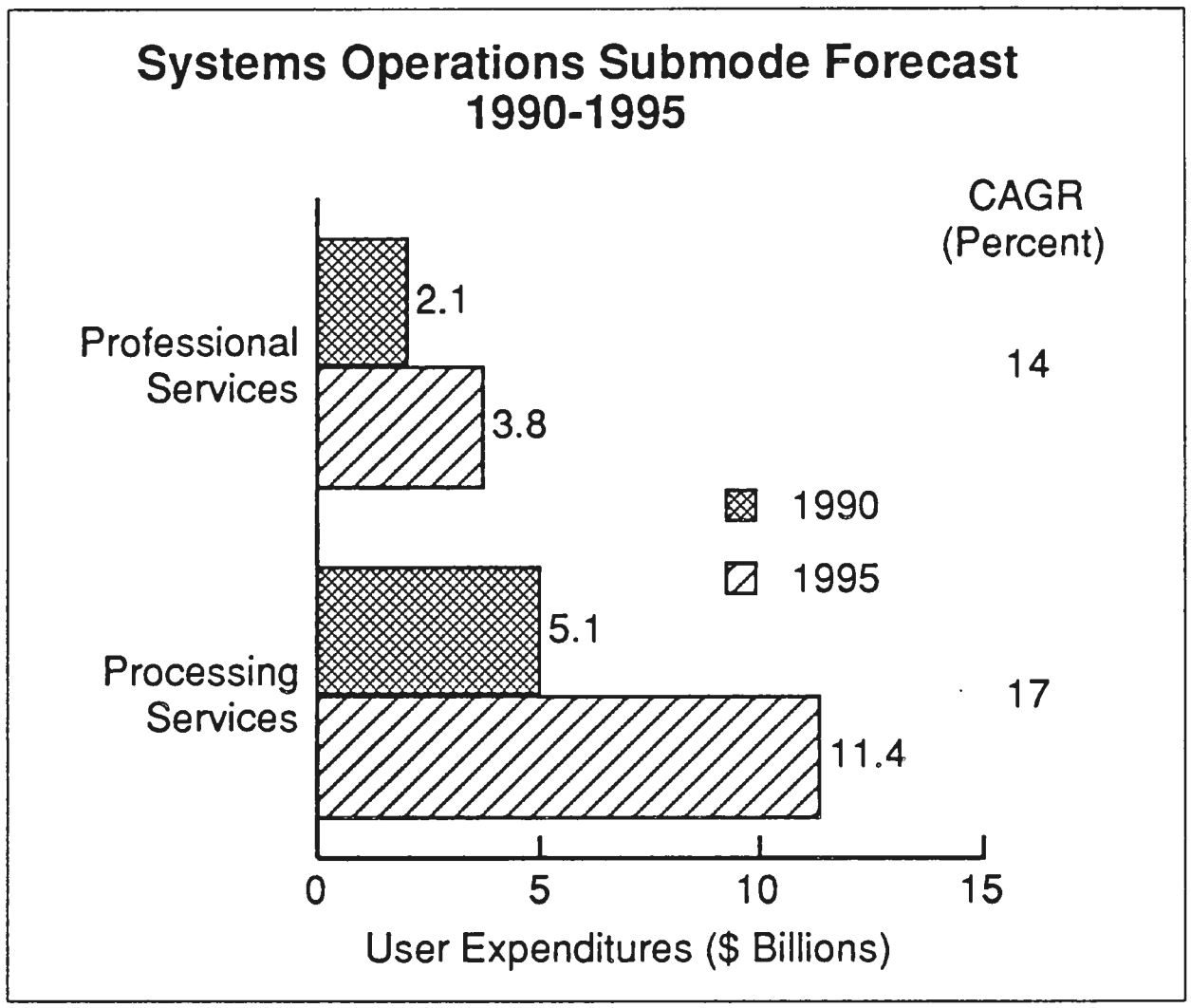
Systems Operations Submode Forecast, 1990-1995

Systems operations can be defined as either of two submodes: processing services- or professional services-based. Under processing services, the vendor owns the equipment and provides personnel and, at times, facilities. Under professional services, by contrast, the vendor provides the personnel that operates client-owned equipment.

Exhibit II-4 demonstrates the differences in size and growth rates between the processing and professional services systems operations delivery submodes. Systems operations professional services, the market where vendors provide professional services to operate client-owned equipment, reached $2.1 billion in 1990. Growing at a compound annual rate of 14%, this market will reach $3.8 billion in 1995.

The processing services systems operations market, where operations are provided on vendor-owned equipment, was more than double the professional services market in 1990 at $5.1 billion. Growing at a CAGR of 17%, the processing services market will approach three times the professional services market in 1995, at $11.4 billion.

EXHIBIT II-4



E

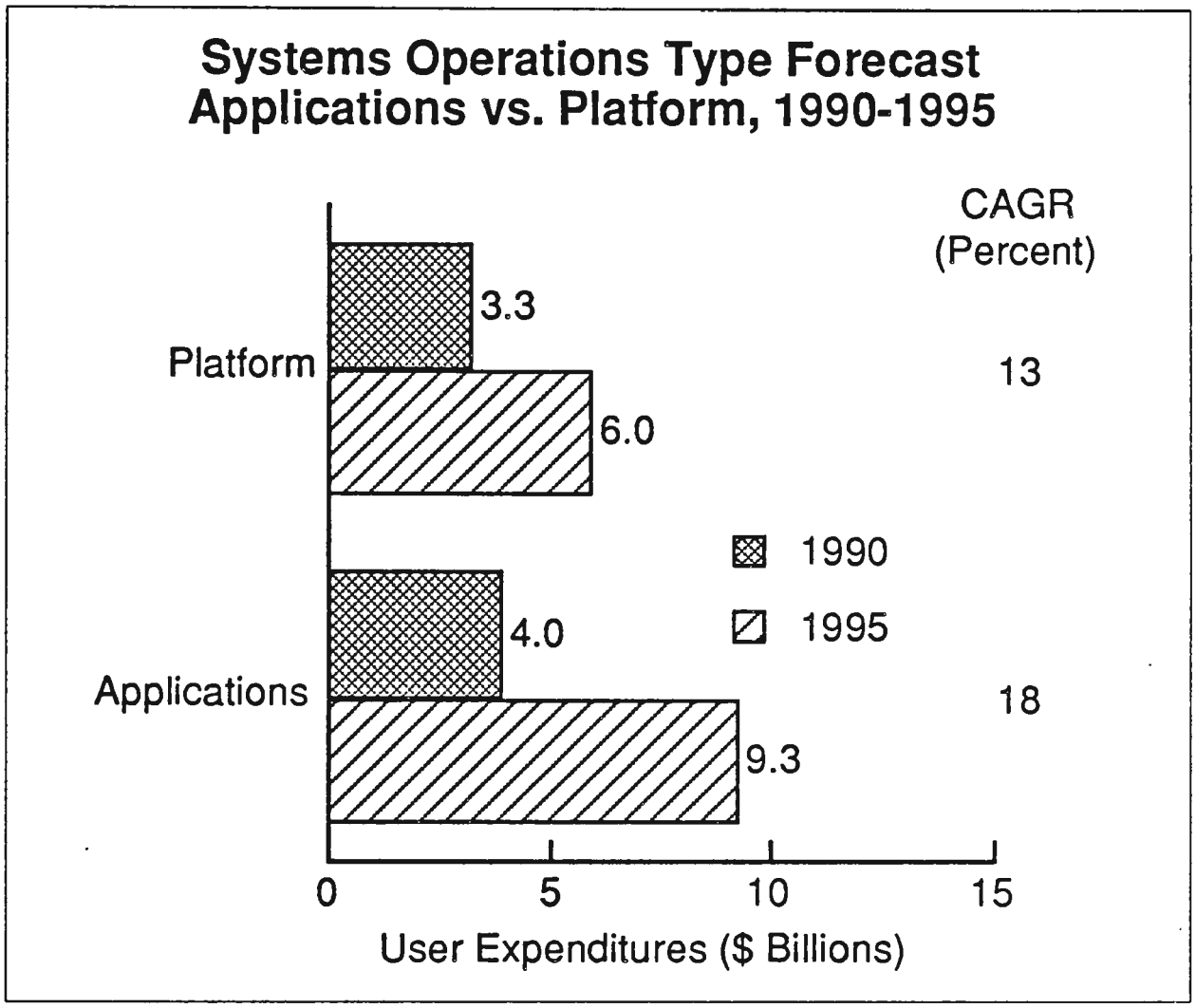
Systems Operations—Type Forecast, 1990-1995

Exhibit II-5 identifies the forecast for platform and applications systems operations. Another look at how services are provided classifies systems operations as either platform or applications operations. Platform operations means the vendor operates the equipment without responsibility for the applications. In applications operations, the vendor takes full responsibility for the complete system, including equipment, applications software, and associated communications. There are many variations on these themes.

INPUT projects that platform systems operations will grow at a compound annual rate of 13%, with revenues increasing from $3.3 billion in 1990 to $6.0 billion in 1995. The platform systems operations growth rate varies significantly within each vertical industry market, however, because of forces in each sector.

Applications systems operations will grow at a compound annual rate of 18%, from $4.0 billion in 1990 to $9.3 billion in 1995. The accelerated growth in the applications sector reflects an increasing desire by users to off-load application development and maintenance, and industry specialization by many of the systems operations vendors to meet users needs. As a result, vendors are developing proprietary software to apply to specific industry problems.

EXHIBIT II-5



Leading Vertical Industry Market Forecasts, 1990-1995

The annual expenditures for systems operations services from 1990 through 1995 for the four leading industry market sectors are included in the table in Exhibit II-6. The industries are ranked based on projected 1995 user expenditures.

EXHIBIT II-6

Leading Vertical Industry Markets, 1990-1995

Industry	User Expenditures ($ Millions)		CAGR (Percent)
	1990	1995	
Banking and finance	1,930	4,055	16
State and local government	955	2,495	21
Federal government	1,270	2,090	10
Health	830	1,825	17
Totals	4,985	10,465	17

Ranked by 1995 user expenditures

As seen in the exhibit, the top four industries—banking and finance, state and local government, federal government, and health—represent 68% of the expenditures in both 1990 and 1995.

G

Leading Systems Operations Vendors, 1989

Vendors who participate in systems operations usually follow one of two strategies. They either focus on a single vertical industry market or provide services to a number of industry markets.

A look at the vendor market share is presented in Exhibit II-7. To be a dominant vendor, it helps to be a multi-industry vendor; but there is opportunity for an industry specialist to capture a significant share of revenue. Both Electronic Data Services (EDS) and Computer Sciences Corporation (CSC) are active across several industries. Boeing Computer Services (BCS) obtains most of its revenues from the federal market, but EDS is much more widely dispersed.

EXHIBIT II-7

Leading Systems Operations Vendors 1989

Vendor	Market Share (Percent)
Electronic Data Services	16
Computer Sciences Corporation	5
Systematics	3
Affiliated Computer Services	3
Shared Medical Systems	2
Securities Industry Automation Corporation	2
Boeing Computer Services	2

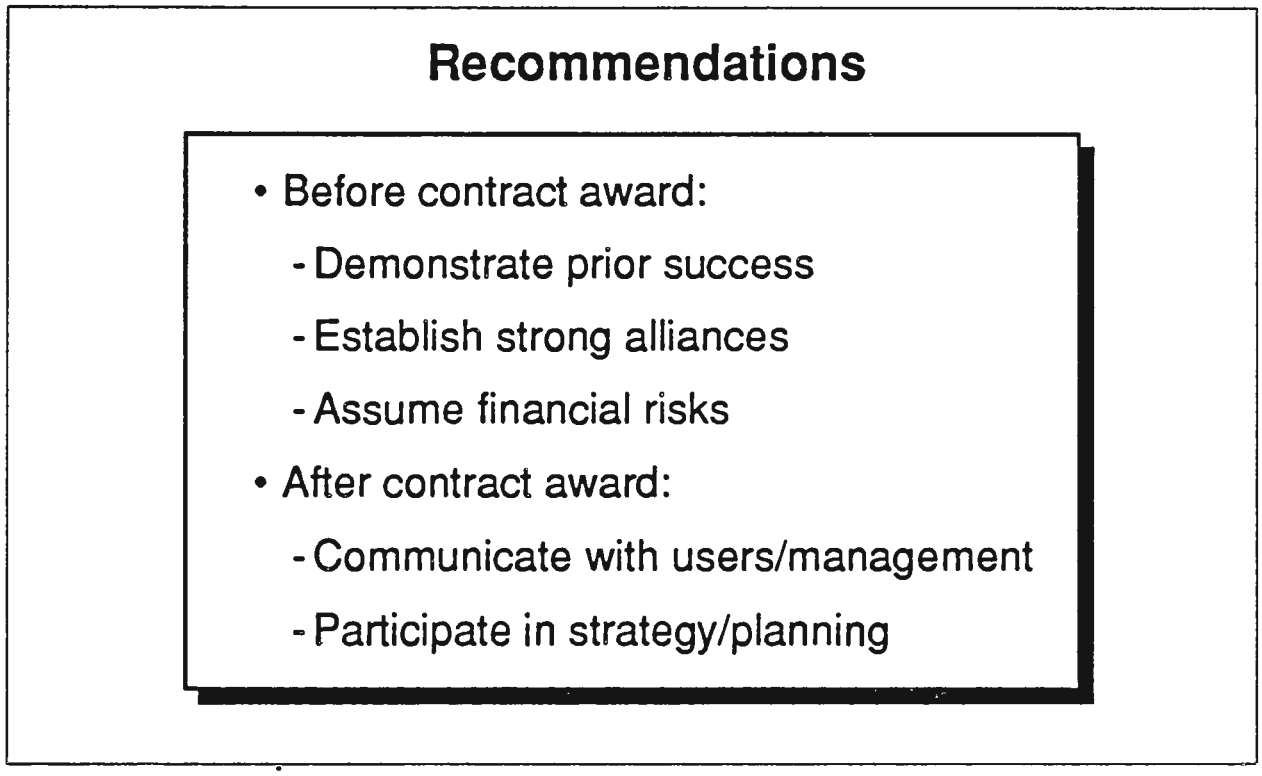
The other firms on the list specialize in one or two industries only and have demonstrated good stability within those markets. The market is populated by a large number of other firms either specializing in one or two industries or with systems operations as a minor activity.

H

Recommendations

The systems operations marketplace is characterized by long-term contracts and a new kind of client-vendor relationship. For these relationships to be successful, vendors need to begin to build relationships prior to contract award and continue growing the partnership through the life of the contract. Exhibit II-8 summarizes recommendations that foster this new partnership.

EXHIBIT II-8



The key points to be made in the presales period are:

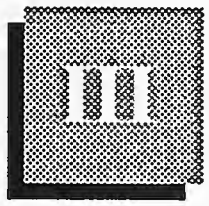
- Enhance credibility by demonstrating prior success, either with that prospect or within the prospect's industry.
- Establish strong alliances with partners that can both supplement industry expertise and provide additional cost-effective resources.
- Understand that the business will be won by the one who is willing to assume some financial risk, usually involving a capital investment or assumption of some of the client's assets.

The key elements of the post-sale period need to be considered from the onset of the sales cycle, also. They are:

- Communicate with both the users and the client firm's senior management, on a daily basis, if necessary.
- The vendor and client must have joint strategy sessions at which important issues can be discussed and key information shared by both parties.

Those vendors who successfully master the development of partnerships will be the major systems operations providers by 1995.

Market Analysis and Forecast



Market Analysis and Forecast

Systems operations has received increased attention in the past two years. More companies have decided to contract with systems operations vendors for the planning, management, and operations of their data centers. Many of these companies have also turned over the software development task to these same vendors. The information services vendors have become more willing to assume some financial risks by assimilating the client's hardware and staff. New potential major competitors are entering the market, while other current vendors are expanding their offerings through acquisitions.

In this chapter, the market will be characterized, and a forecast will be presented by vertical industry, delivery mode, and type of service. The vendor characteristics will be reviewed to identify their presence in specific markets. Finally, the key driving factors affecting growth in the market will be examined.

A

Market Structure

Systems operations is defined by INPUT as the operation and management of all or a significant part of a client's information systems operations under a long-term contract.

1. General Market Characteristics

Information services buyers no longer think of systems operations vendors as providing basic day-to-day processing services. The facilities management contracts and the traditional GOCO and COCO arrangements in the federal government sector have been expanded. The systems operations vendors now offer a full range of services, from planning and upgrading a client's systems and software, to providing for the maintenance of equipment resident at all client sites. The service can include the management of all the information systems activities for a company, or at least all the activities for a functional area.

Some of the arrangements between the client and the vendor now include an equity investment on the part of the vendor. This investment usually involves the takeover of facilities, hardware, and IS staff by the vendor. It is not uncommon for all the IS staff of the client to transfer to the vendor upon implementation of the contract. The object is to establish a working partnership between the vendor and the client in which both parties benefit.

2. Systems Operations—Options

Exhibit III-1 lists a number of the options provided by systems operations vendors. This list is not meant to be all-inclusive but to illustrate the wide range of vendor-provided services available. The fact that, in the health industry and the federal government industry, the vendor even serves as a fiscal agent for the client indicates how wide-ranging the options are. INPUT believes that vendors will be active in more application areas as companies look outside to off-load non-strategic activities.

EXHIBIT III-1

Systems Operations Options

- Client or vendor premises
- Client- or vendor-owned equipment
- Dedicated or shared equipment
- Applications development
- Systems and applications software maintenance
- Equipment maintenance
- User training
- Disaster recovery and backup facilities
- Vendor or client staff
- Management of communications networks
- Participation in IS strategy
- Function as "fiscal agent" for client

3. Systems Operations—Business Environmental Factors

Systems operations service is one of eight information service delivery modes tracked by INPUT. It is also an important segment of the larger outsourcing market that has received much attention over the last two years. This approach to meeting the information processing needs of a firm has gained favor as a number of business environmental factors have caused industry to change.

The term outsourcing has recently been redefined as systems management by an external vendor. It includes both a development (system integration) and operational (systems operations) component. In fact, many systems operations contracts are the outgrowth of an earlier systems integration project by a vendor.

The forces listed in Exhibit III-2 are causing prospects to look to systems operations vendors for innovative solutions to complex problems. As the global business community becomes smaller, more demands are placed on a corporation's processing and communications infrastructure. Eventually, it becomes more cost-effective to seek an external solution to these burgeoning demands.

EXHIBIT III-2

Systems Operations Environmental Factors

- Global market growth
- Rapidly changing technology
- Corporate restructuring/merging
- Economic adjustments leading to downsizing

Some firms are becoming more and more troubled by the fast changes in technology they must assimilate. This is another area that management wants to turn over to experts to minimize the time devoted to tracking technology. They prefer to rely on vendors to keep current with the state of technology. Management reasons that vendors have a strong incentive to improve their own operating efficiencies and, therefore, be more profitable.

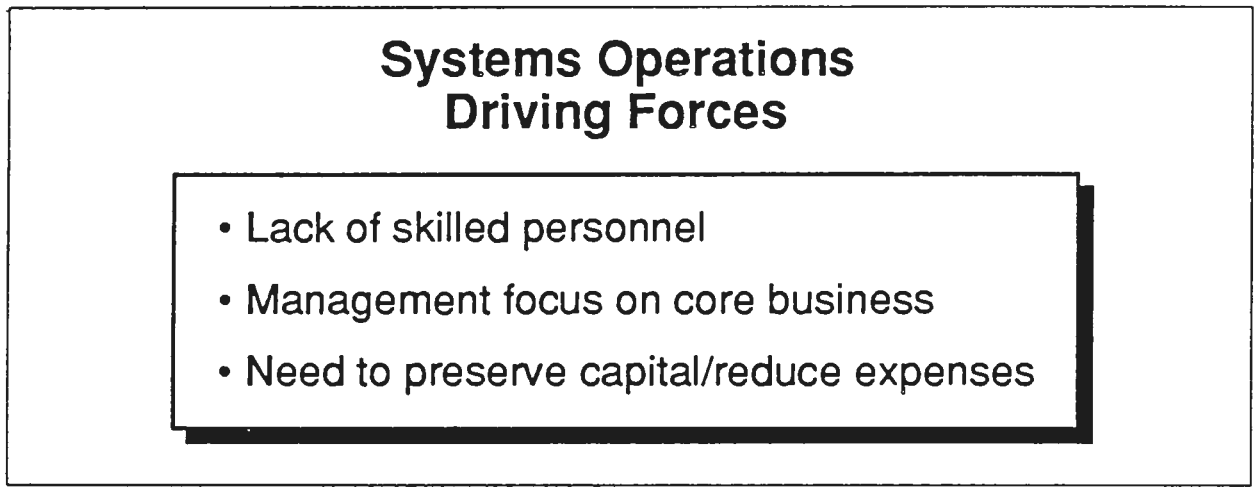
As business conditions change, companies need to change rapidly. An example is the rapid constriction of the oil drilling industry and the subsequent effect on staff and budgets. Many firms in that sector turned to systems operations firms to help eliminate large data centers no longer

needed. These same firms merged and downsized, and found they needed to preserve capital or improve cash flow rapidly.

4. Systems Operations—Driving Forces

There are several driving forces within a corporation that are contributing to the growth in the systems operations market, as shown in Exhibit III-3.

EXHIBIT III-3



Skilled information services personnel are becoming harder to acquire and more difficult to retain. Certain industries, because of their depressed wage structures, are finding it difficult to attract personnel. Others are finding experts in certain disciplines in short supply, particularly in communications technology. By using outside vendors, existing expertise can be leveraged across several clients.

Corporate management is becoming concerned that much of its attention and energy is being diverted to information systems problems when they should be focused on more fundamental operational issues. It's a dilemma because most executives recognize the importance of information systems to the health of their business, yet they don't understand the technology or how to manage their information systems. INPUT believes more will decide to entrust systems operations to outside experts as information technology continues to increase in complexity.

Coupled with the demands of rapidly changing technology, management is increasingly under pressure to preserve capital and reduce operating costs. Shrinking margins in many industries, a change in the demand pattern for goods, and a slowdown in the economy all are affecting the availability of funds. The restrictions on new spending only add to the pressures to do more with existing resources. Once again, the economies of scale and the leverage of resources offered by systems operations vendors become even more attractive.

5. Systems Operations—Delivery Modes

Systems operations can also be classified by one of two delivery submodes—professional services or processing services.

- In the professional services submode, the vendor provides the personnel to operate client-owned equipment. In most industries, this mode is the least common delivery mode.

- In the processing submode, the vendor owns the equipment and provides operating personnel, and often facilities. This is the most common mode, particularly in the commercial sector.

Both modes can operate on equipment dedicated to one user or shared by multiple clients. Exhibits III-4 and III-5 present these options and identify the dominant modes for different options.

EXHIBIT III-4

Equipment Ownership Options

Location of Computer	Ownership of Equipment	
	Vendor	Customer
Vendor Site	Processing Services	Professional Services
Customer Site	Processing Services	Professional Services

Dominant modes

EXHIBIT III-5

Equipment Dedication Options

Location of Computer	Ownership of Equipment	
	Shared	Single Customer
Vendor Site	Processing Services	Professional Services
Customer Site	Processing Services	Professional Services

Dominant modes

6. Systems Operations Types

Another useful distinction is to distinguish between platform operations and applications operations.

- In platform operations, the vendor provides the computer processing capacity and/or network without taking responsibility for the applications that the client develops and maintains.

- In applications operations, the vendor is responsible for the complete systems function, including equipment, telecommunications requirements, and applications software. This usually involves maintenance, development, and upgrade functions.

Exhibit III-6 represents these two options and also identifies a third and emerging alternative where application software is developed and maintained by a third party. There are as many variations on the above themes as there are unique customer problems, yet the classification does allow better examination of how the market functions.

EXHIBIT III-6

Systems Operations Types

Application Provider	Systems Operations Type	
	Platform	Application
Customer	X	
Systems operations vendor		X
Third-party		X

7. Commercial versus Federal Markets

The federal market for systems operations is much more mature than the commercial market. Federal agencies have sought outside vendors to perform information services functions for almost 40 years. These contracts generally were three to five years in duration, with more recent ones extending to 10 years. The climate was right. Skilled personnel were difficult to attract, much of the in-house hardware was obsolete, and the federal government encouraged the use of private-sector vendors through the A-76 initiative.

The ticket for entry to the federal marketplace is usually a response to an RFP (request for proposal). Most meaningful federal procurements include a lengthy response and evaluation procedure that often seems

very strange to vendors in the commercial sector. In fact, a major investment of time and resources is necessary to bid in this market, yet the rewards are generally worth the effort.

Commercial vendors can operate on a much more personal basis with the buyers and users and generally have more opportunity for developing a good understanding of the users' motivations. The proposal process is usually less formal, but then, in many cases, the total contract value may be lower.

There are some vendors who operate successfully in both marketplaces. There is room to apply the lessons learned in one market sector to the other market sector. It is usually the larger systems operations generalists, i.e., those operating over a range of vertical markets, that thrive in the federal market.

8. Vertical Industry Markets

INPUT has identified 16 vertical industry markets for information services. Each has a set of driving forces and characteristics. These will be discussed at some length in Section IV of this report. Exhibit III-7 identifies the 16 vertical industry markets used by INPUT to segment the information services market.

EXHIBIT III-7

Sixteen Industry-Specific Markets

Discrete Manufacturing	Insurance
Process Manufacturing	Health Services
Transportation	State & Local Governments
Utilities	Federal Government
Telecommunications	Personal/Consumer Services
Wholesale Distribution	Business & Technical Services
Retail Distribution	Education
Banking & Finance	Miscellaneous Industries

The 16 vertical industry markets represent a change from the 1989 forecast. INPUT now identifies 16 instead of 14 markets. The services component has been split into personal/consumer services and business and technical services, as a recognition of the increasing diversity in this growing marketplace. The category previously labeled "other" has been split into education and miscellaneous industries. Miscellaneous industries now consists of agricultural and forest products and includes the construction industry. Exhibit III-8 illustrates these changes.

EXHIBIT III-8

New INPUT Industry 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
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
Education	82xx	Educational services
Miscellaneous Industries	01xx	Agriculture production - crops
	02xx	Agriculture production - livestock/animals
	07xx	Agriculture services
	08xx	Forestry
	09xx	Fishing, hunting, and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors

9. Vendor Classification

To better understand the market and its mechanics, INPUT classifies the vendors in the market into categories that reflect their origins.

Many of the vendors have their roots in the processing services and facilities management business. These vendors have years of experience in servicing the processing needs of clients. Such technical tasks as processor sharing, telecommunications management, load balancing, and transaction processing have given them the experience required to efficiently manage processing operations for remote users. Such firms include EDS, CSC (the Infonet division), Boeing Computer Services, and GEIS. A number of processing services firms have specialized in single industries. Examples are Affiliated Computer Systems and Sabre Group in the retail distribution market, Genix Group in the manufacturing area, and Power Computing in the engineering areas of manufacturing.

Others have their roots in the professional services sector. Generally these companies have a large consulting and professional services component. Andersen Consulting, Systemhouse, and SAIC represent this type of vendor. CSC also qualifies here because its origins include both a processing component (Infonet) and a large professional services component.

If a firm knows a specific industry intimately, it requires only one more step to provide full service to that market. Systematics' activity in the banking community and SCT's success in the education sector are based on their early presence in those fields as software providers. They often entered the systems operations business when a consulting engagement required the management of a processing center as a deliverable. Today they recognize it as a necessary service offering and important source of revenue.

Equipment vendors are becoming more active in the systems operations market as they realize it is a way to protect their equipment base. Systems operations also has been identified as a good channel for hardware distribution. IBM has formed a separate division—the Systems Services Division—to concentrate on the systems operations market. CDC, DEC, and Unisys have won systems operations contracts also.

Software vendors have also evolved into systems operations service providers. This development was often more opportunistic, since it was usually predicated on an acquired expertise in a given industry.

Even in the case of the large processors and equipment vendors that entered the market, a knowledge of that particular market and its unique needs was a prerequisite. Exhibit III-9 categorizes some of the vendors.

EXHIBIT III-9

Vendor Categories

Type	Examples	
Processing services firms	EDS	Affiliated Computer
	Sabre Group	
	Genix	Boeing Computer Services
Professional services firms	Andersen Consulting	Systematics
	SAIC	Systems Computing & Technology
	Systemhouse	CSC
Equipment vendors	IBM	Unisys
	DEC	CDC
Software vendors	Sterling Software	American Management Systems
Others	Mellon Bank	Citicorp
	Covia	

10. Recent Vendor Activity

There has been continued interest in systems operations from both user and vendor perspectives. Major U.S. corporations have, over the last year, increasingly made the decision to outsource their information processing operations.

- IBM, which had not previously participated to any extent in this market, has not only announced its intent to participate, but has already signed contracts with significant customers and recently created a division to manage systems operations activities.

- EDS, an established systems operations vendor, has been negotiating for equity positions with its clients and prospects to acquire industry-specific knowledge and skills it can apply to future prospects.

- DEC recently reorganized its Corporate Enterprise Integration Services and its Customer Services reporting structures to provide a more integrated focus for prospects and clients. Now both the SI and SO resources will be directed by the same management.

Other vendors have been acquiring firms in their industry to round out their capabilities. Systematics and Affiliated Computer Systems are good examples of this trend.

Major contracts have been signed recently that help identify trends in the market:

- Andersen Consulting recently assumed all responsibility for systems operations at Sun Refining and Marketing. In this case, they acquired Sun's Dallas data center and the staff of that data center.

- Perot Systems recently signed a contract with American Medical International, Inc. to operate all its systems operations and all its hospital subsidiaries.

- Genix Group scored in the discrete manufacturing vertical market with systems operations contracts at Bailey Controls, AM General, and National Steel Corporation.

- EDS has had success in the process manufacturing vertical market with SO contracts at Westmoreland Coal, Permian Associates, and Enron Corporation.

Most of these were strongly contested by other SO vendors and represented increased attempts at penetration by market leaders. The competition is very likely to get more intense as the cost effectiveness of the systems operations approach becomes recognized.

B

Market Forecasts, 1990-1995

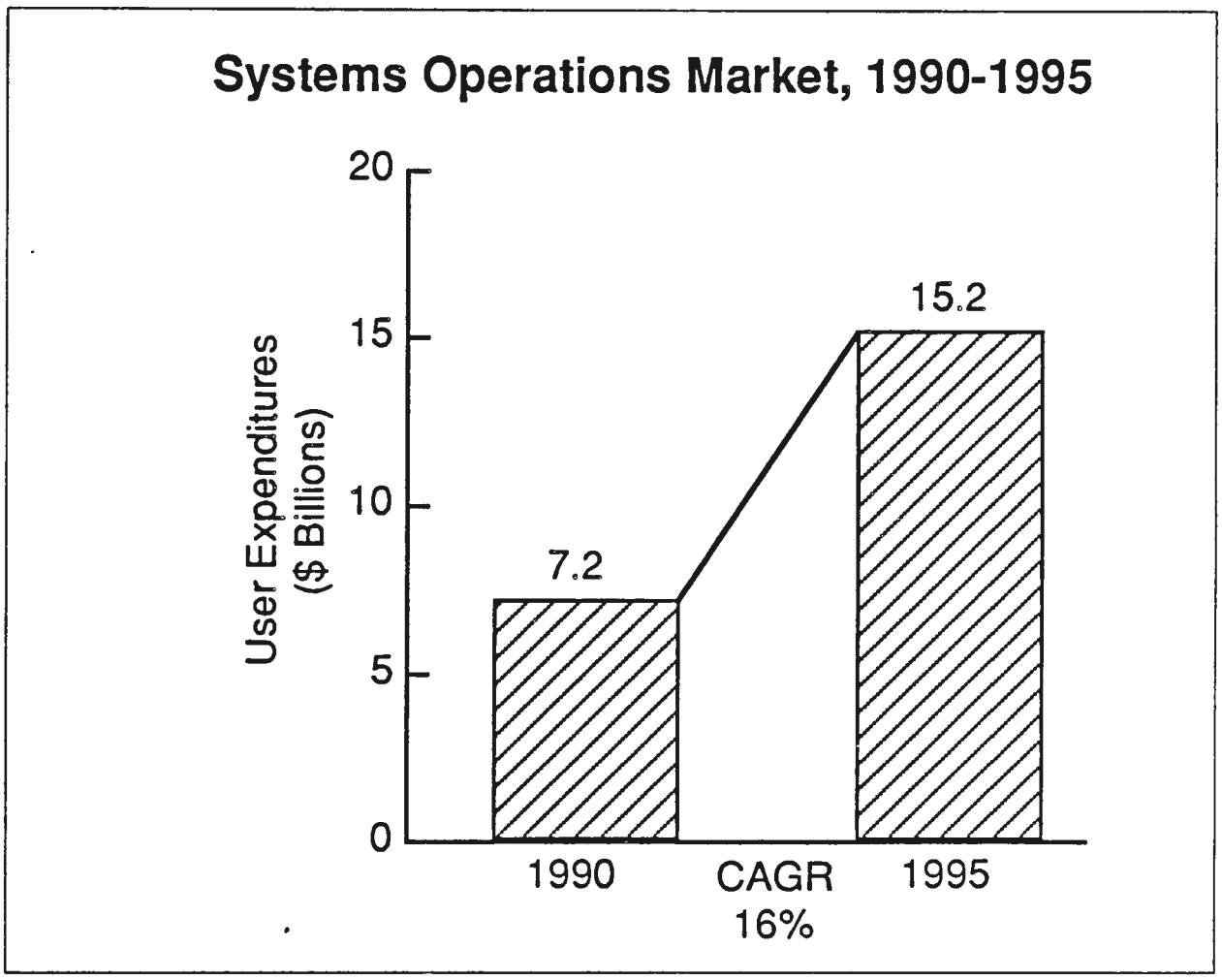
The forecast of the systems operations market is provided in annual user expenditures. The forecast is limited to actual user expenditures for systems operations contracts. The user expenditures for services provided within these contracts to plan, manage, operate, fix, and enhance the clients' applications and to operate and repair the information and telecommunications equipment are included. Client expenditures to purchase equipment that it will own but that is operated by an SO vendor are not included.

Systems operations activities that are included in systems integration contracts are included in INPUT's systems integration forecast and excluded from the systems operations forecast. Follow-on systems operations contracts, awarded after the initial systems integration contract has been completed, are included in this forecast.

1. Systems Operations Market, 1990-1995

INPUT's forecasting methodology and research for this study are described in Chapter I of this report. Based on this research, INPUT expects U.S. user expenditures for systems operations for the commercial and federal markets to be $7.2 billion in 1990. Growing at a compound annual rate of 16%, expenditures will reach $15.2 billion in 1995, as illustrated in Exhibit III-10. While the growth rate is similar to last year's growth rate, there have been significant changes in the individual vertical industry sectors.

EXHIBIT III-10



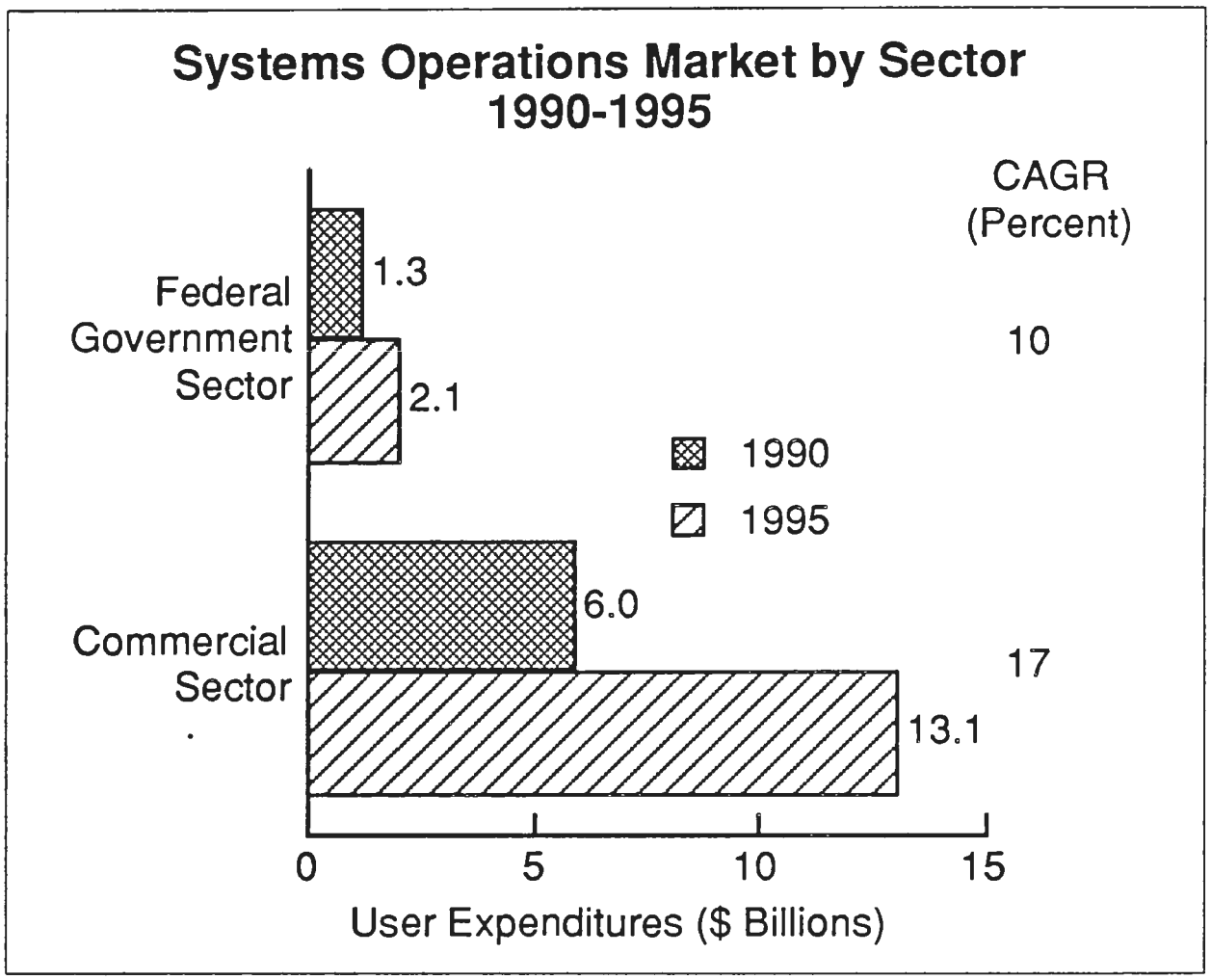
The recession, which began in the third quarter of 1990, has delayed the outsourcing decision in many companies. These companies may need the services of a systems operations vendor even more now but have delayed the evaluation in many cases because the short-term problems are even more urgent. The net effect has been to shift the SO expenditures to the future.

2. Federal versus Commercial Systems Operations Markets

A number of changes have occurred in both the federal and commercial systems operations market since 1989. Heightened interest in the commercial sector, which was mentioned earlier, has set the compound annual growth rate there at 17%. Systems operations spending in the

commercial market will be $6.0 billion in 1990, growing to $13.1 billion in 1995. This growth is illustrated in Exhibit III-11. The slowdown in the economy has actually had a positive effect on the growth in opportunities in the commercial sector. Companies now see systems operations as a way to preserve capital and reduce operating expenses. It also provides an attractive way to deal with acquisitions and mergers.

EXHIBIT III-11



In the federal market, similar economic factors have had a different impact on the market for systems operations. The increasing federal budget deficit and rigid budgetary constraints have made it difficult, if not impossible, for agencies and departments to acquire new resources, and to hire and retain the necessary skills to operate the new systems that Congress mandated in the last few years.

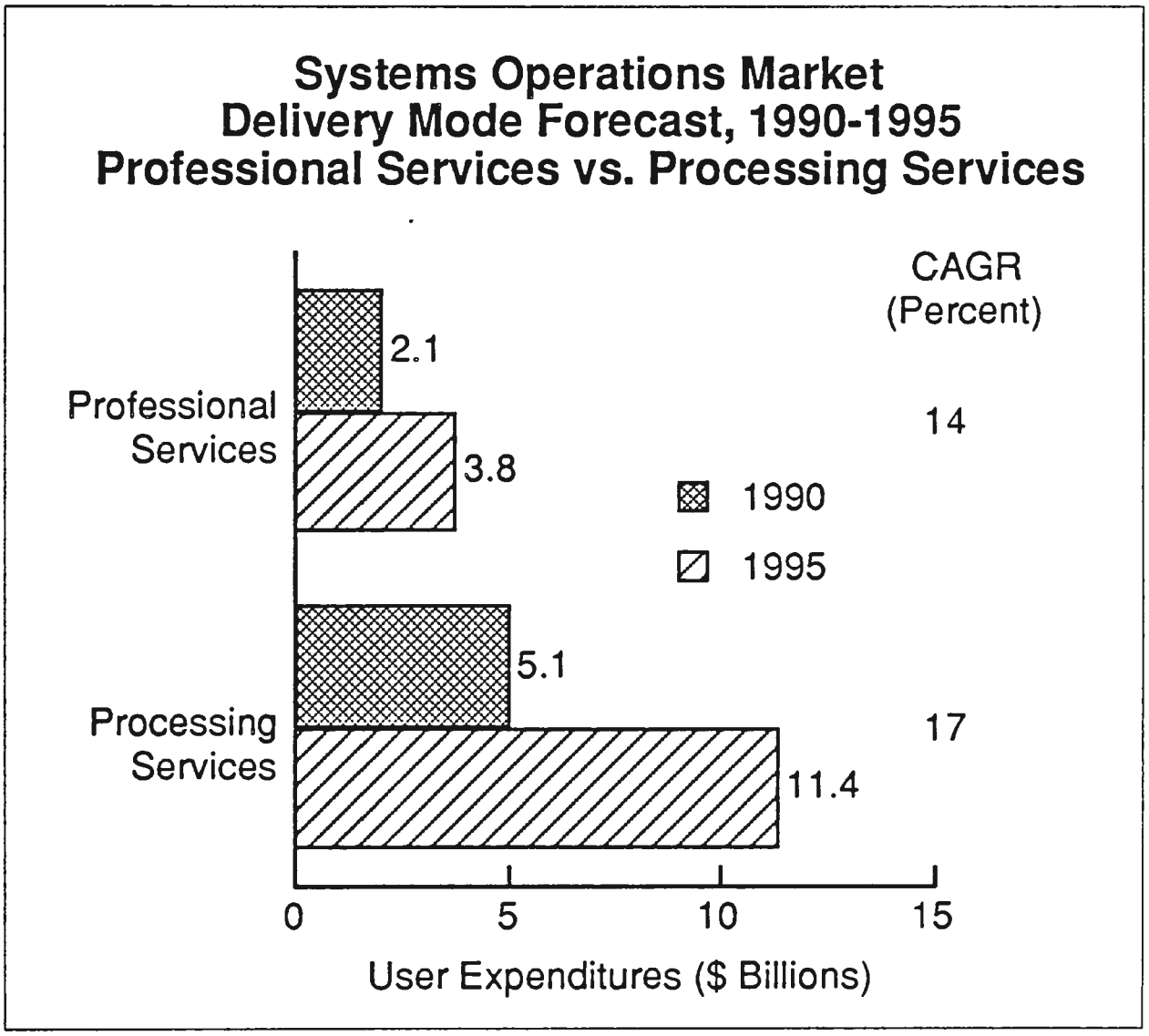
Systems operations was recognized as a solution to this dilemma, yet the planned spending for these services has declined significantly. Some projects have been suspended, while others have been delayed in the procurement process for periods sometimes exceeding a year. The HIIPS procurement at HUD and the DOSTON procurement at the Department of State faced significant delays. The CORN project at the FAA was just reinitiated after having been suspended altogether. As a group, these three projects alone represented $1.7 billion in expenditures over the next 12 years.

The 1990 federal expenditures are now estimated to be $1.3 billion, growing to $2.1 billion in 1995 at a compound annual growth rate of 10%. This represents a significant change from the government spending plans in 1989, when INPUT projected a CAGR of 15%.

3. Delivery Mode Forecast

Exhibit III-12 demonstrates the differences in size and growth rates between the two systems operations delivery submodes. Systems operations professional services, the market where vendors provide professional services to operate client-owned equipment, will reach $2.1 billion in 1990. Growing at a compound annual rate of 14%, this market will reach $3.8 billion in 1995.

EXHIBIT III-12

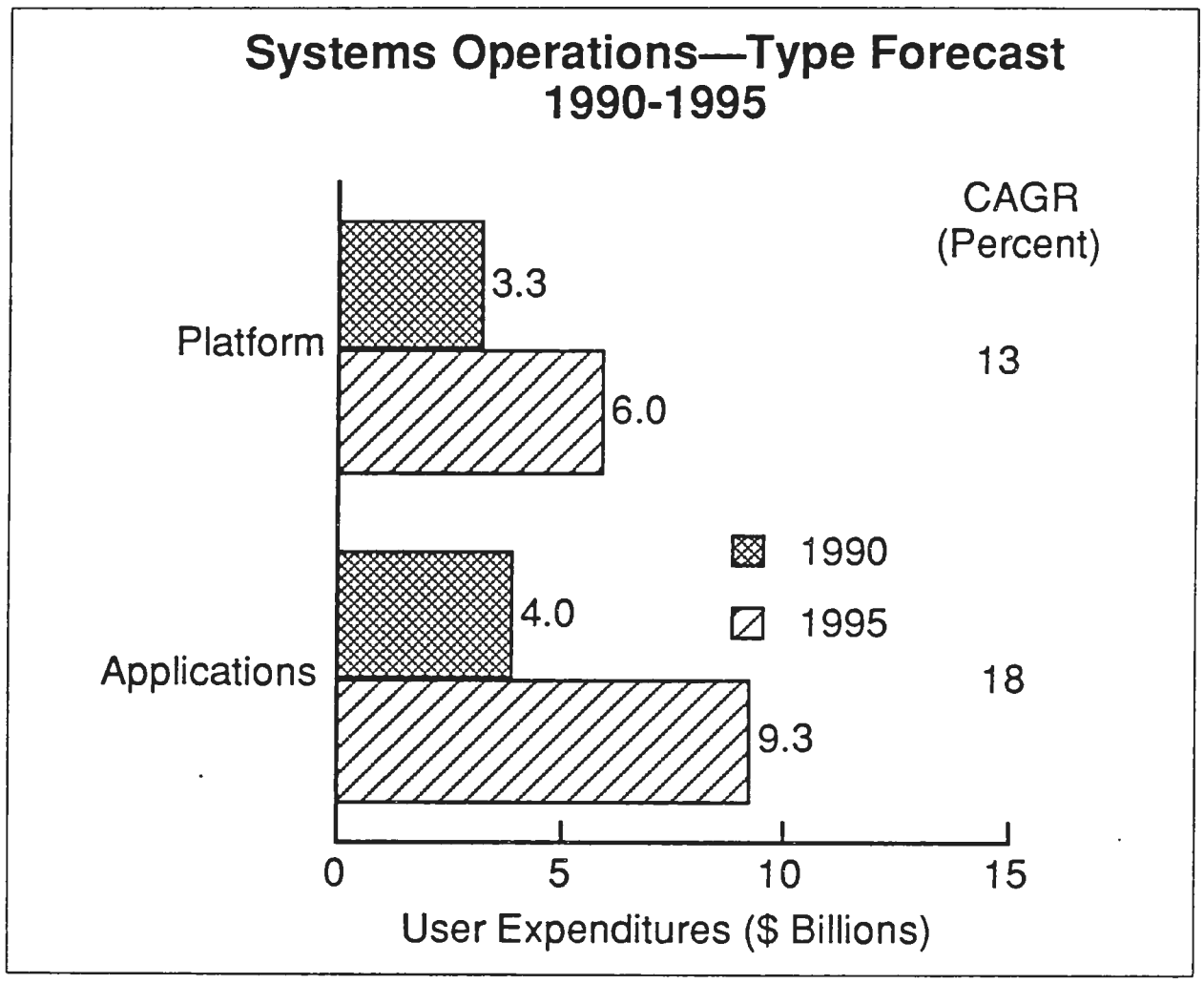


The processing services systems operations market, where operations are provided on vendor-owned equipment, will more than double the professional services market in 1990 at $5.1 billion. Growing at a CAGR of 17%, the processing services market will reach almost three times the professional services market in 1995, at $11.4 billion. Thus, the difference in growth rate will further widen the differential between the two delivery submodes in the five-year period.

4. Forecast by Systems Operations Type

The distinction was made earlier between two types of systems operations—platform and applications. In platform operations, the vendor operates applications software developed and maintained by the client. In applications operations, the application software is developed or owned and maintained by the vendor or a third party. If the applications software is third-party-developed, the application systems operations vendor has responsibility for managing its maintenance. The growth in expenditures for each type is presented in Exhibit III-13.

EXHIBIT III-13



INPUT projects that platform operations will grow at a compound annual rate of 13%. Expenditures will increase from $3.3 billion in 1990 to $6.0 billion in 1995. The applications operations will grow at a CAGR of 18%, from $4.0 billion in 1990 to $9.3 billion in 1995.

5. Applications versus Platform Expenditures, 1990

Though the split between applications and platform expenditures distribution is relatively even in 1990 for the industry total, there is much variation in the ratio of application versus platform operations within each vertical industry. Exhibit III-14 presents the 1990 expenditures for all industry markets split between applications and platform operations. The forecast shows that applications operations will become the more

prominent mode of operations by the mid-1990s. This reflects both a vendor emphasis on providing more services—establishing a partnership with the user in many cases—and greater acceptance by the user community of total systems management by vendors.

Further examination of the split between applications and platform expenditures by vertical industry market illustrates that the mix is affected both by vendors that are already a factor in that vertical market and by the business environment in that market. In the two manufacturing vertical markets, there is a large platform systems operations component because those firms generally have many unique software requirements that they will not turn over to vendors. Some of the prominent vendors, such as Genix Group and Power Computing, are essentially providers of platform processing, not applications processing.

The health industry has a very large applications systems operations component because the vendors such as Shared Medical Systems and Cycare can provide both processing and software to their clients.

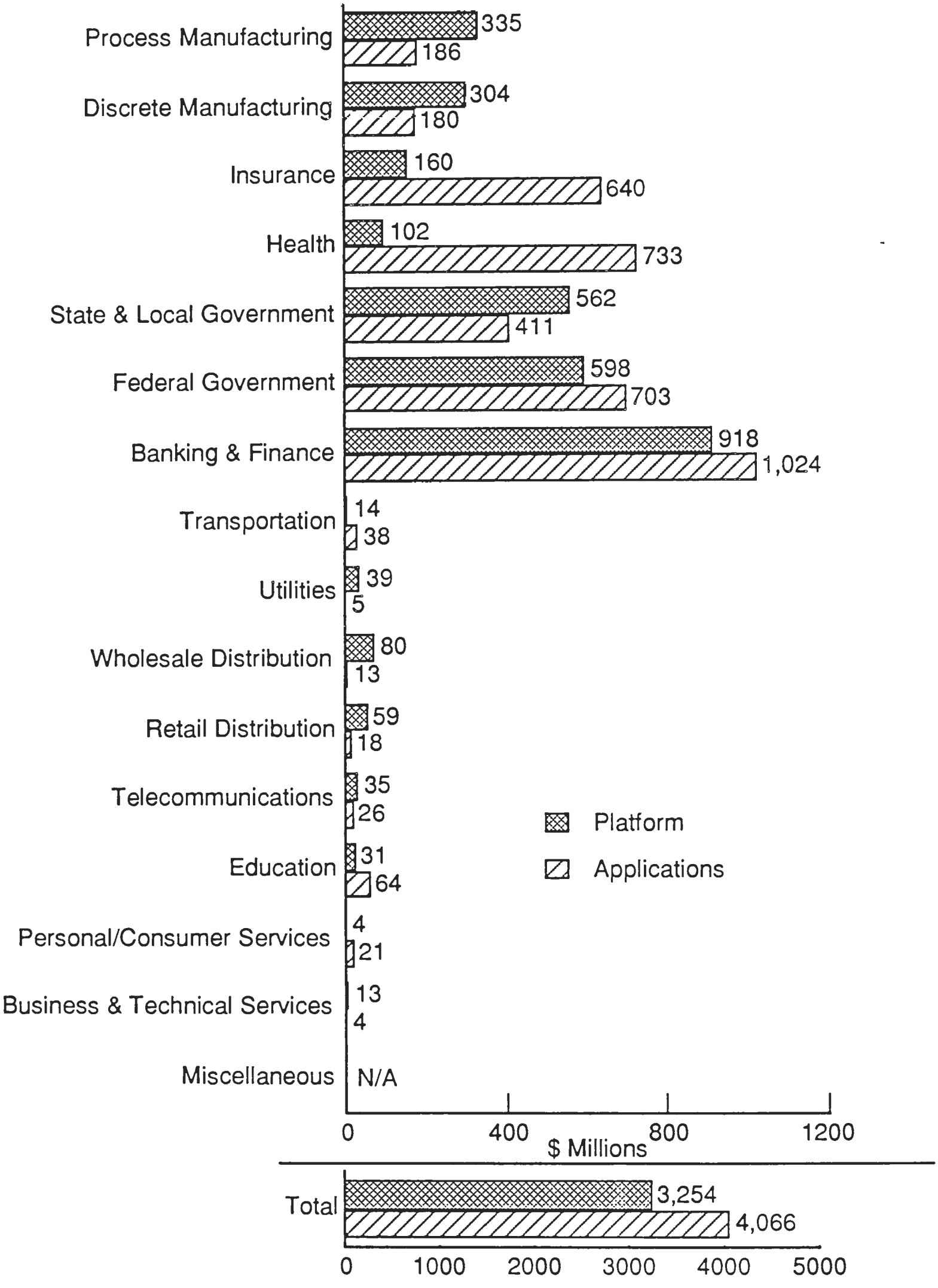
The federal government market has a large applications systems operations component, as expected, because many of the agencies have opted to turn over entire operations to outsourcing vendors. There is increasing pressure for this to continue, so the ratio is likely to shift even more over the next five years. The state and local government market, on the other hand, has a larger platform component, but this is expected to shift as more applications become available that can meet the common problems of all state governments. The state governments will also seek to solve their increasing skills shortage through vendors.

Banking and finance has a larger component of applications systems operations because vendors such as Systematics provide much software to the industry. This is partially balanced by those vendors, such as Citicorp and Mellon Bank, that provide only platform processing to their clients.

Many of the other vertical industry markets are quite small, but it is worth noting two more trends. In the retail distribution vertical market, the preponderance of platform vendors reflects the widely held belief by information services managers in that industry that their applications needs are unique and cannot be easily fulfilled by outside vendors. Finally, in the personal/consumer services vertical industry, the high proportion of applications systems operations is a result of the fact that most of the expenditures in that market currently are for the processing of airline reservations.

EXHIBIT III-14

Applications vs. Platform Expenditures for 1990 Vertical Industry Markets



6. Market Forecast by Vertical Industry, 1990-1995

The annual expenditures for systems operations processing services for 1990 through 1995 for the 15 commercial vertical markets and the federal government are included in Exhibit III-15. The compound annual growth rate for each industry for that time period is shown on the right. The industries in this exhibit are ranked based on projected 1995 user expenditures. As seen in the exhibit, the top four industries—banking and finance, state and local government, federal government, and health—represent the majority of the expenditures.

EXHIBIT III-15

Market Forecast by Vertical Industry
1990-1995

Industry	User Expenditures ($ Millions)		CAGR (Percent)
	1990	1995	
Banking and finance	1,931	4,057	16
State and local government	956	2,495	21
Federal government	1,271	2,090	10
Health	830	1,825	17
Discrete manufacturing	482	1,330	22
Insurance	801	1,301	10
Process manufacturing	521	1,113	16
Retail distribution	76	222	24
Wholesale distribution	92	216	19
Education	94	165	12
Telecommunications	64	134	16
Transportation	51	106	16
Utilities	45	90	15
Personal/consumer services	25	77	25
Business/technical services	17	29	12
Miscellaneous	N/A	N/A	-
Totals	7,260	15,250	15

Ranked by 1995 user expenditures

Other industries expected to experience growth rates well above the average are personal/consumer services (25%), retail distribution (24%), discrete manufacturing (22%), and wholesale distribution (19%). Each of these has well-defined market forces.

Several others are forecasted to grow at well below the average rate for the 1990-1995 period. Besides the federal government (10%), these are insurance (10%), education (12%) and business/technical services (12%). The education and business services sectors represent very small markets, but the federal government and insurance sectors are among the top industries in revenue. Their slow pace has had a dampening effect on the overall growth rate for the industry.

C

Key Marketplace Factors

INPUT surveyed both users and vendors in the systems operations market to identify the factors that most influence the growth and direction of that market. The research identified some important decision factors in the buyer's selection criteria that will influence how the service will evolve. The vendor approaches to acquire systems operations clients are shaped by what the buyer wants, yet the vendor must also find creative approaches to providing the required services in the most cost-effective manner.

1. Buyer Motivations

Many of the potential users for systems operations services are information systems users facing difficult management problems. All of them are motivated by two sets of pressures. The first set is a function of the economic conditions in the industry in which they operate. Examples of these pressures are the rash of mergers occurring in the petroleum services industry and the difficult financial straits that the savings and loan industry is experiencing. The second set of pressures overrides specific industry traits and is related to information processing issues. Rapidly changing technology and the skills shortage are typical of this set of motivating factors. Sometimes one set interacts with the other to become a major driving force for a given industry.

Exhibit III-16 lists the business conditions that were cited by buyers as important to their decision to select a systems operations vendor. They are ranked in decreasing order of importance.

The most frequently cited reason for using a systems operations vendor was that the operations transferred to the vendor were very critical to the success of the company and had to be done right. It should be noted that this was also the most frequently cited reason for not outsourcing systems operations. This apparent contradiction can be reconciled by noting that those who selected outsourcing had done cost-performance studies, while those who did not choose outsourcing had generally not done such cost-performance studies.

EXHIBIT III-16

Buyer Motivations

	Ranking
Information system critical factor	1
Operations cost reduction	2
Capital preservation	3
Security/privacy issues	4
Service level improvement	5
Responsiveness to change	6
Near-term cash flow	7
Internal skills availability	8
Executive time/attention	9

Corporate management recognizes the critical nature of information systems to success in today's business environment. Those respondents who did turn over their processing operations to a vendor were well aware that they were making a decision critical to their business success.

Many respondents cited a reduction in operating costs as a critical decision factor. Systems operations is becoming recognized as a more cost-effective way of providing information services, because the vendor can take advantage of economies of scale and can more easily leverage scarce technical resources.

The next factor, capital preservation, is yet another financial motivator. It was particularly important to those firms facing financial problems and needing to reduce capital expenditures. Some buyers indicated that they received a short-term cash flow improvement from the conversion, but this benefit did not rank high in the decision process.

Security/privacy issues were also frequently mentioned as an important decision factor. The decision maker does not want his organization's data to be compromised. Many respondents indicated that vendors were able to allay their fears on this issue.

The next two issues examine how well systems operations meet user needs. Buyers expect systems operations vendors to provide a higher level of service than the internal IS organization. In addition, buyers expect vendors to provide additional flexibility in a rapidly changing business environment. Buyers felt that they are more able to upgrade or

downsize their processing operations as the needs of the business dictate. With a minimum of investment in hardware and staff, they are able to order less computing power as their scale of business operations decreases.

The outsourcing of systems operations was also viewed as a painless way for a company to keep abreast of rapidly changing technology. The responsibility for staying abreast of current technology rests with the systems operations vendor who must do so to remain cost-effective and competitive.

The scarcity of skilled, technical resources internally represents a different aspect of the technology problem. This is more serious in some industries than in others. For example, the federal government, and often state and local governments, find it hard to attract highly skilled systems operations personnel because they cannot compete with salaries offered in private industry. In other instances, the shortage cuts across industries. It is widely believed that communications experts are at a premium as the business community continues to expand globally. Some buyers viewed the systems operations vendors as a way of leveraging scarce resources.

The last item on the list may surprise avid readers of the computer journals. Many articles have been written on how many corporate executives feel the information systems activity takes up too much of their time. They feel they are more qualified to make decisions on sales, marketing, and financial issues. Executives feel they are wasting time on decisions involving choices of hardware, network architecture, and software development. Many of these articles state that the systems operations vendor offers them a solution to these problems. In fact, few buyers cited this as a strong motivator in their decision to outsource.

2. Vendor Strategies

Successful systems operations vendors have adopted a series of strategies to meet those issues expressed as buyer motivations. INPUT interviewed a number of vendors and analyzed their responses. Exhibit III-17 summarizes them.

EXHIBIT III-17

Vendor Strategies

- Target companies in transition
- Share in financial risk
- Establish vendor/client partnership
- Develop alliances

One of the first observations—based on tracking systems operations contracts for the past year and discussing strategy with vendors—is that companies in transition are most likely to outsource systems operations. Companies in transition can be defined as companies that are experiencing significant change. They may be facing bankruptcy or reorganization; they may have recently been divested or have gone through a leveraged buyout; or they may be in an industry with constricting resources. In short, they need to cut costs and reduce the capital investment in data processing equipment and staff. Systems operations vendors have, in most cases, demonstrated that they can deliver information systems in a more cost-effective manner.

If the buyer needs financial relief, the systems operations vendor needs to provide substantial resources of his own. He often has to assume financial responsibility for the computing hardware and the staff, and often may take over ownership of an entire facility. In the commercial market last year, there were several closely contested awards that were won by the systems operations vendor who was willing to take over the entire data processing operation. In effect, the vendor is sharing the financial risk with the client.

The client's dependency on the systems operations vendor for information systems, coupled with the need of the systems operations vendor to be kept abreast of changing user demands, has led many to think of the relationship between vendor and client as a partnership rather than as a business relationship. In the systems operations arena, INPUT has found that 30% of the systems operations vendors provide full-time staff and another 37% have at least full-time representation on the user's premises. Everyone cites that they are in constant communication with one another.

One user respondent defined the partnership as follows:

> "A partnership means that each company has a business and a personal investment in the success of the relationship. It can be measured and it can be monitored by each party."
>
> "There is direct dialogue at all levels of both companies, and wellness checks are taken regularly."

Any observer of the evolution of the systems operations market has noticed another partnership developing. This is the relationship among several vendors working together to provide full service to a client. One vendor usually acts as the prime vendor, with the other subcontracting to the principal one for vendor-specific skills.

These alliances serve three fundamental purposes. Firstly, they generally supplement a single vendor's industry knowledge or expertise. Why not form an alliance with a software vendor that has the best applications package for the medical claims market, for example? Secondly, many vendors do not have the capability for equipment maintenance within their own organizations. They form alliances to provide this class of service to their clients. Thirdly, alliances are also viewed as an effective means to control operating costs. By forming alliances with professional service firms with a lower cost structure, they can deliver a high level of systems performance at a cost unburdened by the high overhead of the prime vendor. This technique is particularly effective in large federal contracts or when the contract calls for the operations of data centers in geographically dispersed locations, each with its own cost-of-living structure. Alliances will become a major strategy for the systems operations vendor as the market expands.

D

Competitive Environment

The great diversity of clients in the systems operations marketplace is nearly matched by the wide variety of systems operations vendors. All types of service companies and equipment companies with field service departments have entered the market. To better understand the mechanics of the market, INPUT earlier divided them into the categories in Exhibit III-9.

1. Systems Operations Vendor Categories

Another viewpoint is to use the broader classification of multi-industry vendors and industry specialists. Exhibit III-18 groups the leading vendors in these categories.

EXHIBIT III-18

Systems Operations Vendor Categories

• Multi-Industry Vendors:	
- EDS	- Unisys
- CSC	- DEC
- BCS	- Andersen Consulting
- IBM	
• Industry Specialists:	
- Genix Group	Manufacturing
- Power Computing	Manufacturing/Engineering
- SMS	Health
- Systematics	Finance
- Mellon Bank	Finance

Most of the multi-industry vendors entered the systems operations market through their other activities in information technology. The equipment vendors gained experience and contacts across many industries by selling equipment to a wide range of companies; other multi-industry vendors were providing software or professional services to clients in a variety of industries. It was a natural evolution to provide more services to them over time.

In the case of the equipment manufacturers, providing systems operations services has become a way of protecting existing client relationships and ensuring future equipment sales.

All of the multi-industry vendors mentioned above also participate actively in the systems integration market. This participation in the other aspects of the outsourcing market gives them two advantages as systems operations vendors:

- They develop an intimate knowledge of an industry and its needs through integration activities.

- They engender the long-term relations with clients that allow them to gain the confidence of systems operations prospects.

Many industry specialists began as the data processing arms of large clients such as banks, or as software houses serving a large client base in

a given industry. Most of the leaders have a long and varied association with the industry in which they are successful.

2. Leading Systems Operations Vendors, 1989

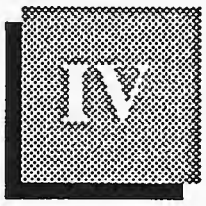
A final look at the vendor mix is presented in Exhibit III-19. To be a dominant vendor, it helps to be a multi-industry vendor; but there is opportunity for an industry specialist to capture a significant share of revenue. Both EDS and CSC (which has a large share of the federal market) are active across several industries. BCS also obtains most of its revenues from the federal market, but EDS is much more widely dispersed. The other firms on the list specialize in one or two industries only and have demonstrated good stability within their markets.

EXHIBIT III-19

Leading Systems Operations Vendors, 1989

Vendor	Market Share (Percent)
EDS	16
CSC	5
Systematics	3
Affiliated Computer	3
SMS	2
SIAC	2
BCS	2

Vertical Industry Markets for Systems Operations



Vertical Industry Markets for Systems Operations

Systems operations vendors adopt marketing strategies that address one or multiple vertical industry markets. This approach capitalizes on expertise acquired by servicing companies in those markets. Each vertical market has characteristics that impact market opportunities and that vendors must understand for effective market penetration. This section discusses the forces at play in each vertical industry, and identifies the key issues in each of them. The discussion leads to an assessment of the potential within each market, followed by a forecast for the vertical industry for the period 1990 to 1995.

A brief description of the types of enterprises that INPUT includes in each vertical market is included at the beginning of each discussion. Often the mix of companies varies greatly both in size and market impact. The discussion about the vertical industry focuses on those companies most prominent in that industry.

The discussion of industry forces reflects research on economic trends identified in that sector. The current economic state, the growth rate of business in that sector, the demographic change in establishments, and the changing demands in the market served may all be factors influencing information technology decisions.

An assessment of the impact of these economic forces on information systems and services redirects focus to the information services executives' viewpoint. A better analysis of the buyer motivators in each vertical market is possible when factors influencing the outsourcing decision are well understood.

The potential in each vertical market is directly influenced by the economic forces at play. For example, an industry in difficult financial straits may be a better target for systems operations vendors because reducing current expenses or preserving capital may be overriding considerations.

In another case, deregulation may have launched intense competition that makes a systems operations vendor's industry expertise attractive for the less well-funded prospects. Still other companies may need to leap-frog to a new technology platform to stay competitive. In reviewing the characteristics of a vertical industry, both the motivators and the inhibitors to entry into that industry will be identified.

The assessment of potential leads directly to a forecast for each vertical industry market. All of the forces discussed above are considered in identifying and evaluating the industry. The short-term effects can cause a change that has a lasting effect on the market. On the other hand, growth patterns may take some time to develop if strong inhibitors exist in a given market.

A complete review of market potential by vertical industry must include an identification of the major vendors in that market. This information allows the prospective systems operations vendor to assess his chances in that particular vertical industry. Is the competition too tough? Is the entry requirement a higher level of industry knowledge than is currently available in the vendor company? Are the risks of providing services unmanageable? Can alliances be used to supplement internal resources?

A Banking and Financial Services Industry

This sector covers four major areas: commercial banks, thrifts, security and commodity brokerages, and other financial services. The latter encompasses credit unions, mortgage banks, cooperatives, and personal and industrial financial institutions. Insurance is discussed as a separate vertical sector. This sector is still the largest single industry opportunity in the systems operations market.

1. Industry Forces

Major changes in the current financial environment created trends that affect the industry's image and methods of doing business. These changes include deregulation, the thrift crisis, and the decline in value of commercial real estate.

One of the largest factors affecting most U.S. banks is the drastic decline of commercial real estate. In 1990, commercial banks increased reserves and restricted their lending in fear of bad loans made on real estate. Money centers also felt the effects of bad real estate loans, as well as loans made to less-developed countries (LDC).

The thrift crisis continued with the Resolution Trust Corporation moving to clean up insolvent S&Ls. The total number of thrift institutions taken on by the Resolution Trust Corporation through 1990 reached roughly half of the 3,200 that existed as solvent institutions in 1988. The reces-

sion of late 1990 may increase this number as real estate investments continue to lose value.

The principal industry reactions include extension into multiple business lines, acquisitions and mergers, and new offerings of individual products and services. The industry goal is full relationship-based banking, with brokerage services, investment advice, money markets and other non-traditional services all available to the customer. All of these directly affect the structure and function of information processing.

2. Information Systems and Services Environment

Consolidation has continued in the banking industry, on one hand motivated by declining profitability of commercial banks and, on the other hand, necessitated by the crisis in the savings and loan industry. These consolidations and the increasing range of services put enormous stress on in-house IS staff. Highly specialized experience, which may not be available in small institutions, is needed for short periods. The average life cycle of current systems is becoming shorter, so that more frequent upgrade or replacement is essential.

Financial managers need more information and supporting analyses to make the decisions that will make their firms competitive. Portfolio and credit services require customer services and account managers to interact with most of the previously independent departments of financial institutions.

Distributed data processing will need to operate with centralized data processing applications, employing standardized network protocols and systems architecture. New systems must provide PC-user interfaces for access to central computer facilities to allow combining of office tasks, financial processing, and service analyses by a single manager. All of this must be done at the lowest possible cost.

Control, integrity, and security of frequently sensitive data continue to be major concerns of banking and financial management. These concerns must be satisfied in an increasingly cost-conscious environment.

The management of security is a critical issue in this industry. Validation/authentication of messages in transaction networks, and prevention of network infiltration and tampering, are now an important aspect of systems development. The on-line requirements of ATM and teller systems require near-perfect availability. These issues also demand backup and disaster recovery facilities.

3. Systems Operations Potential

The potential for systems operations in banking/financial institutions appears to be lower than predicted earlier. Though still the largest single market in prospective out-year expenditures, it has a lower CAGR for the 1990-1995 period than other industries, which is partially a result of its large existing base. The positive and negative external pressures on information systems and services are listed in Exhibit IV-1.

EXHIBIT IV-1

Key Factors in Banking/Finance Industry

- Positive
  - Consolidation of commercial banking operations
  - Savings and loan retrenchment
  - New product/service introduction continues
  - Strong cost pressures emerging
- Negative
  - Strong internal staff in large banks
  - Unique industry knowledge required
  - Complex multihardware environment growing

Demand continues to develop for complex communications solutions and managing the telecommunications networks of individual members of the new corporate entities. Communications technology with lower error rates is particularly important as financial companies extend their electronic transactions across the country and around the world. National networks of ATMs and debit cards are a competitive necessity. Other financial services that require extensive networking are expected to follow. Systems operations services have to fit within this complex environment. While manageable in midsized banks, this can be a serious challenge in the largest banks.

Applications software packages continue to be in demand in this industry. Vendors that have targeted banking/finance as a growth industry for integrated applications have an advantage in this market. The availability of vendor-developed and -maintained products are attractive to midsized banks that are overwhelmed by applications development and maintenance requirements.

The new management of surviving firms frequently inherits sophisticated systems already in place. Like the majority of SO prospects in other sectors, the in-house staffs will be strong competition because they often have a strong desire to continue business as usual.

The banking/finance industry requires highly sophisticated industry-specific knowledge for successful systems management. Those vendors that are able to combine advanced technology with industry-specific applications knowledge will be successful. Vendors targeting the larger banking/financial services institutions must be in a position to demonstrate proven capabilities and to overcome entrenched operations organizations. This is a significant undertaking.

The increased demand for experienced personnel to meet the complex requirements of financial institutions shows no sign of decreasing. More and more institutions are finding it increasingly difficult to recruit this talent. Systems operations vendors can often present themselves as an effective source of, or alternative for, these scarce resources.

4. Systems Operations Forecast

Exhibit IV-2 summarizes the banking and finance industry markets by delivery mode for the period 1990 to 1995. The processing services component continues to represent the major segment of this market. With growth slightly higher than for the professional services mode, this difference will continue through 1995 and beyond. The forecasted growth rate is the same as last year.

Savings and loan problems, consolidations in commercial banking, and a major downturn in real estate activity all served as a brake on the IS banking market in general. The systems operations sector continued to grow at its steady rate, however, because each IS dollar must be more carefully spent. Systems operations provides an avenue to affect cost savings, according to users interviewed, so more financial institutions will be evaluating and contracting for outsourcing even as the entire market slows down.

EXHIBIT IV-2

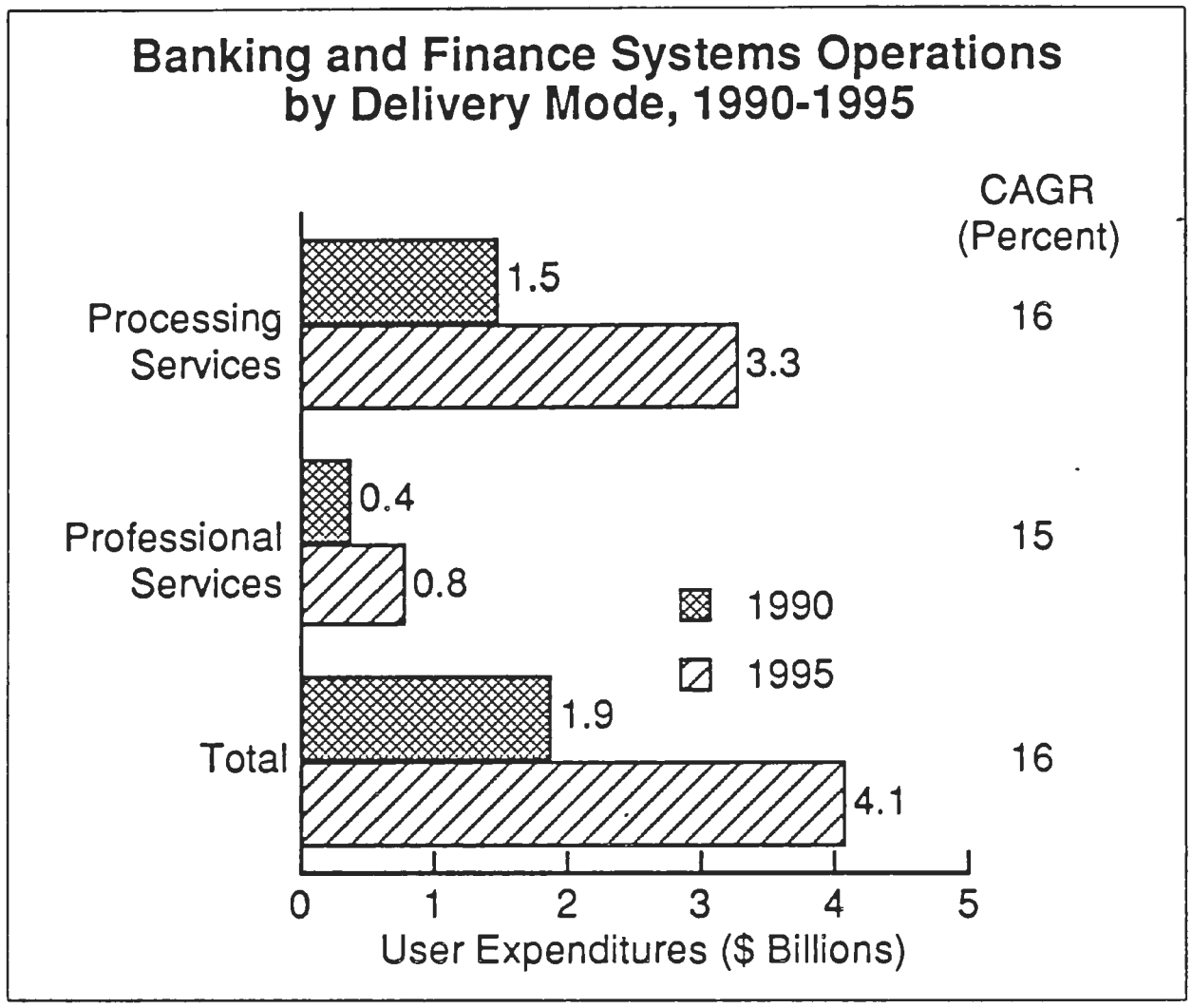
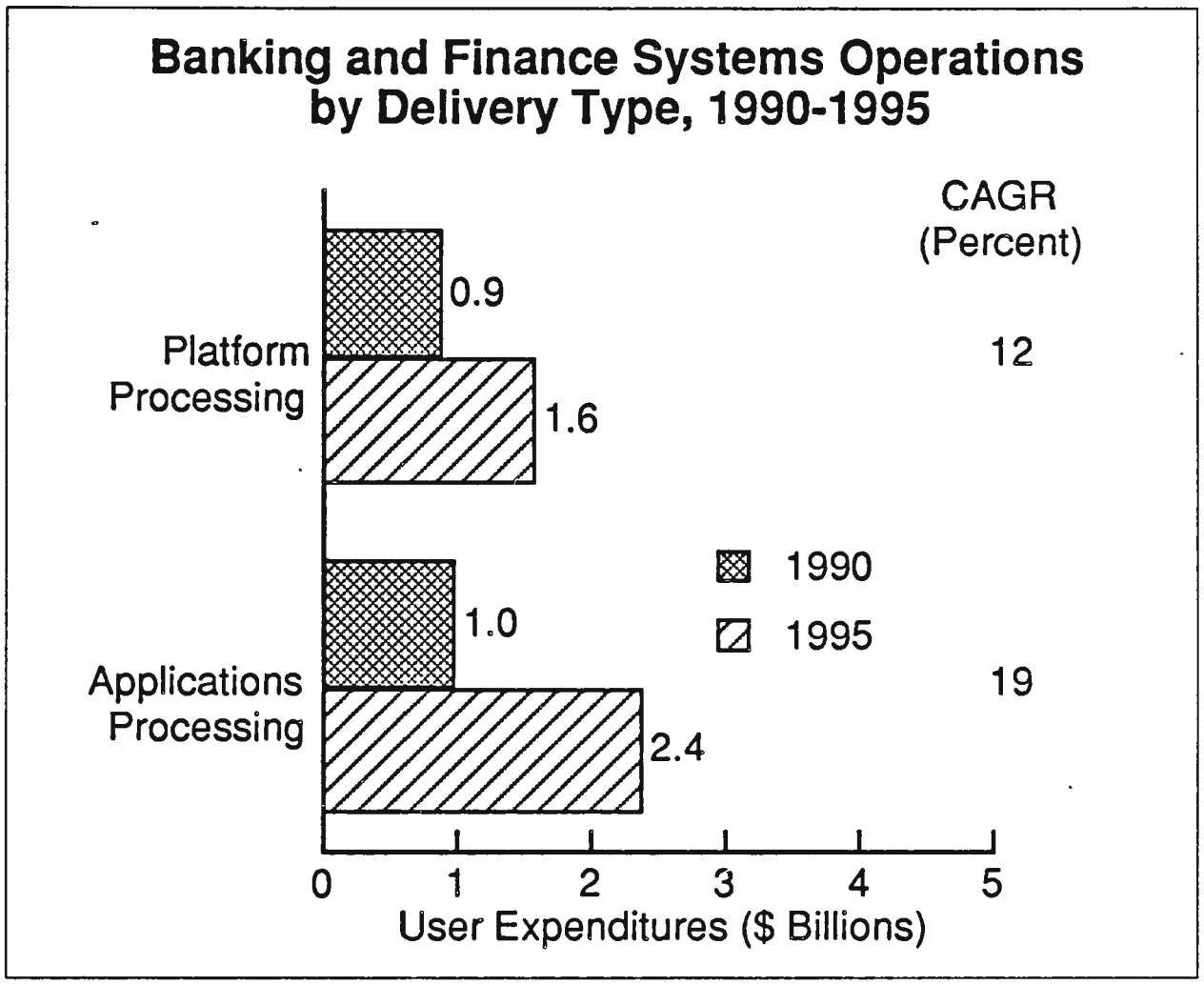


Exhibit IV-3 presents the forecast for the banking and finance industry in terms of applications and platform operations over the 1990-1995 period. Application processing represents more than 52% of this vertical industry's systems operations expenditures in 1990, and this increases to 60% by 1995. INPUT attributes this to an increase in the number of medium-sized banks that will outsource systems operations. They are more likely to include applications in their outsourcing agreements than the larger banks.

The banking and finance sector is serviced by two types of vendors. Broad market players such as IBM, EDS, and Andersen Consulting are mentioned more frequently by bank IS managers as potential system operations vendors. As yet, only EDS and IBM have scored major contract wins in this area, although Andersen has re-engineered the operations of a major Chicago bank. More prominent are the vendors that specialize in this market segment, such as Mellon Bank, Citicorp, Systematics, SEI, Fiserve, FMMC, and SIAC. These specialized vendors should retain a large portion of this market because of their in-depth knowledge of the business and proprietary banking software offerings. The broader-based vendors are positioning themselves to provide the lowest operating costs. They also appeal to their prospects with promises to stay abreast of technology and enhance the operating environment as part of the contractual agreement.

EXHIBIT IV-3



B

Discrete Manufacturing Industry

This sector covers a wide variety of fabrication or assembly-type manufacturing activities, and care must be taken not to view the sector forecasts as referring to a homogeneous market. It is also the most disparate collection of narrowly focused vertical markets, each with its own specific characteristics. To simplify discussions of trends, analysts combine specific products into major industry groups such as aerospace, automotive, metal fabrication, electrical, electronic, telecommunications, textiles, industrial machinery and tools industries.

1. Industry Forces

Foreign competitors' successes in penetrating the U.S. domestic markets have discouraged growth in this sector and caused loss of market share for U.S. companies in several areas. The general slowing of the U.S. economy has also taken its toll on some of the industries in this sector, such as the automotive and the computer industries. However, areas such as aerospace, superconductor-related electrical components, and electrical equipment used in the utility industry have shown stable growth.

Some industry reorganization has occurred, but the primary changes have been advances in manufacturing technologies and the widespread adoption of automation. Manufacturers are implementing flexible manufacturing systems (FMS) to improve the ROI of capital machinery, and are

providing rapid reconfiguration to meet changing fabrication/assembly demands. Manufacturing planning and control systems (MPCS) and material resource planning (MRPII) are being employed, along with practices like just-in-time manufacturing to reduce the costs of carrying inventory. Automation of the shop floor and the efficient utilization of inventory and capacity are viewed as the main productivity goals of the industry.

Application of artificial intelligence, development of expert systems, and continued emphasis on computer-integrated manufacturing (CIM) are additional directions for productivity through technology that is largely in the proposal stage and not yet widely implemented.

INPUT believes that the application of these technologies can contribute to cost control. Real advances in productivity will come, however, only by revising the entire manufacturing process, not by piecemeal automation that produces islands of automation with relatively small improvements. Production experts have postulated the urgency of the need to implement existing and developing technologies for the survival of the majority of discrete manufacturers in the 1990s.

The current recessionary forces may delay some of the capital investment decisions needed to implement these technologies, and further aggravate the cost pressures in less-modern manufacturing sectors.

2. Information Systems and Services Environment

The IS environment in discrete manufacturing seems stable, perhaps even mature. Decreasing hardware costs, better price/performance ratios, and emphasis on purchasing rather than leasing equipment have all served to create a very large base of installed systems, including both hardware and software.

The push to automate manufacturing processes has also created a very large base of mostly incompatible and unconnected process control and automation equipment, ranging from materials handling, CAD/CAE, and process controllers, to assembly robots and automated guidance vehicles for parts retrieval from stores. Most of these systems are resident on minicomputers.

In many of the discrete manufacturing firms, the IS and production organizations function independently of each other, seldom sharing the same data processing platforms. Information systems that process the financial, sales, and administrative aspects usually come under the control of the IS organization. CAD/CAE/CAM/CIM systems tend to be the responsibility of the production/operation departments, often not involving the IS department. However, the newer MRPII and MPCS technologies merge the separate functions, requiring interaction and agreement between the two groups.

The new systems that integrate the sales, purchasing, invoicing, production, and inventory control functions will push IS into interactive, on-line, and real-time or near real-time modes of operation. A substantial number of current financial and administrative systems in this industry do not and have not needed to operate in real time, and are not equipped with hardware and software to support the needs of flexible manufacturing systems (FMSs).

3. Systems Operations Potential

This industry has been at the forefront of IS expenditures for some time, principally from the attention given to computer-integrated manufacturing (CIM) and manufacturing resource planning (MRP). The industry's focus on quality improvement and cost reduction is now moving to information services activities. Exhibit IV-4 summarizes the key industry factors at work in this vertical market.

EXHIBIT IV-4

Key Factors in Discrete Manufacturing Industry

- Positive
  - Increasing pressure on manufacturing quality costs
  - Preference for customized solutions
  - Replacement of batch-oriented systems
- Negative
  - In-place infrastructures
  - Tendency to build rather than buy
  - Industry experience prerequisite

The size of this sector and the expected large expenditures are attractive to SO vendors. The use of outside services is growing faster than inside services.

Rapid reference to buying patterns, material supply schedules, and production capacity is increasing the use of on-line data bases. This is a new method for many firms that have used human judgment in the past. The information industry lacks a comprehensive set of solutions in this area.

The current inventory of batch-oriented systems must be replaced to meet the needs of integrating sales-to-customer factory procedures. Some of the newer hardware may be convertible, but the major share needs to be

replaced. Increasing use of PCs and workstations for sales, design, scheduling and supply/resource control will expedite the conversion while emphasizing use of distributed networks in a difficult environment.

Vendors should be sensitive to the presence of IBM in determining a suitable platform strategy. IBM has short-term products in place (CAD/CAE, industrial robots, shop floor microcomputers, etc.) and an apparent long-term strategy of tying these components together in an architecture based on a mainframe.

Although IS managers frequently cite the absence of project management skills in their staffs, executives note the increasing use of systems specialists for CAD/CAE/CAM and automation projects built in-house as workload and financial conditions permit. The tendency of the larger organizations is to build their own systems rather than buy them from a vendor.

Two notable exceptions to the above rule are General Motors and Kodak. The former acquired outside professional management for its IS operations by buying EDS. Currently, 55% of EDS's revenue is generated by services provided to its parent, GM. The partnership has been beneficial for both parties. GM has been able to apply EDS's experience in systems management to its own operations problems, while EDS has obtained a cadre of manufacturing specialists in the process. In the case of Kodak, the decision was to leave the information systems activities to experts—in this case IBM for systems operations and Digital for network operations—and concentrate on Kodak's success at marketing and developing photographic products.

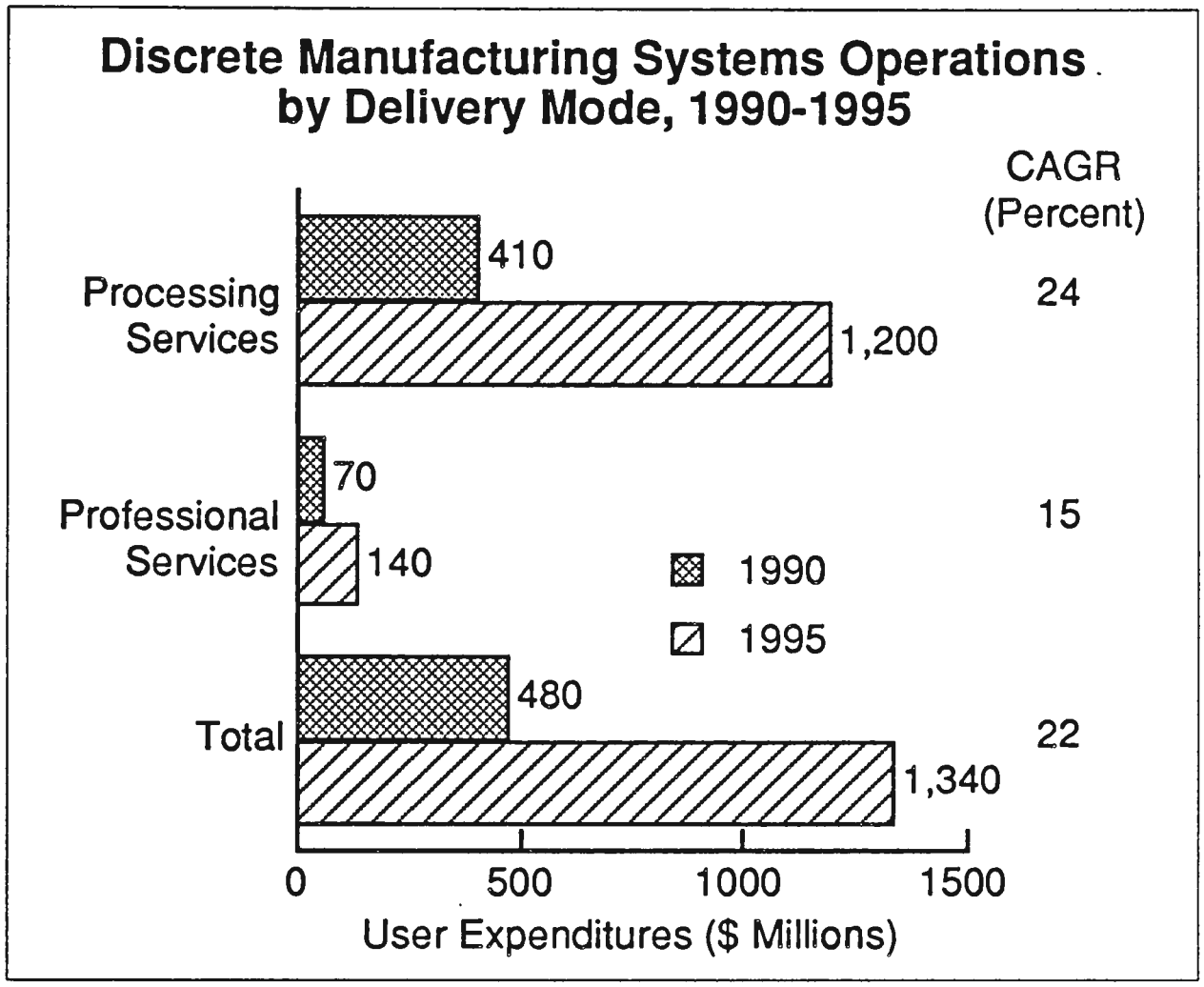
Medium-sized and small companies are usually less inclined to carry the needed specialists in their constrained overhead accounts. They need to implement and operate manufacturing support systems as much as the large companies to remain competitive while maintaining quality. They present a series of good opportunities for SO vendors who can demonstrate that expertise.

Other companies, under pressure to remain competitive, choose to reduce their operations or enter into a merger to accomplish that downsizing. These transition situations are ideal opportunities for SO vendors also, particularly for those willing to assume ownership of hardware and assimilate the operations staff of the IS department.

4. Systems Operations Forecast

The forecast for this sector is illustrated in Exhibit IV-5. It shows an extremely healthy overall growth rate of 22% for the 1990-1995 period. Most of that growth will be in the processing services mode, whose growth rate between 1990 and 1995 is projected at 24%.

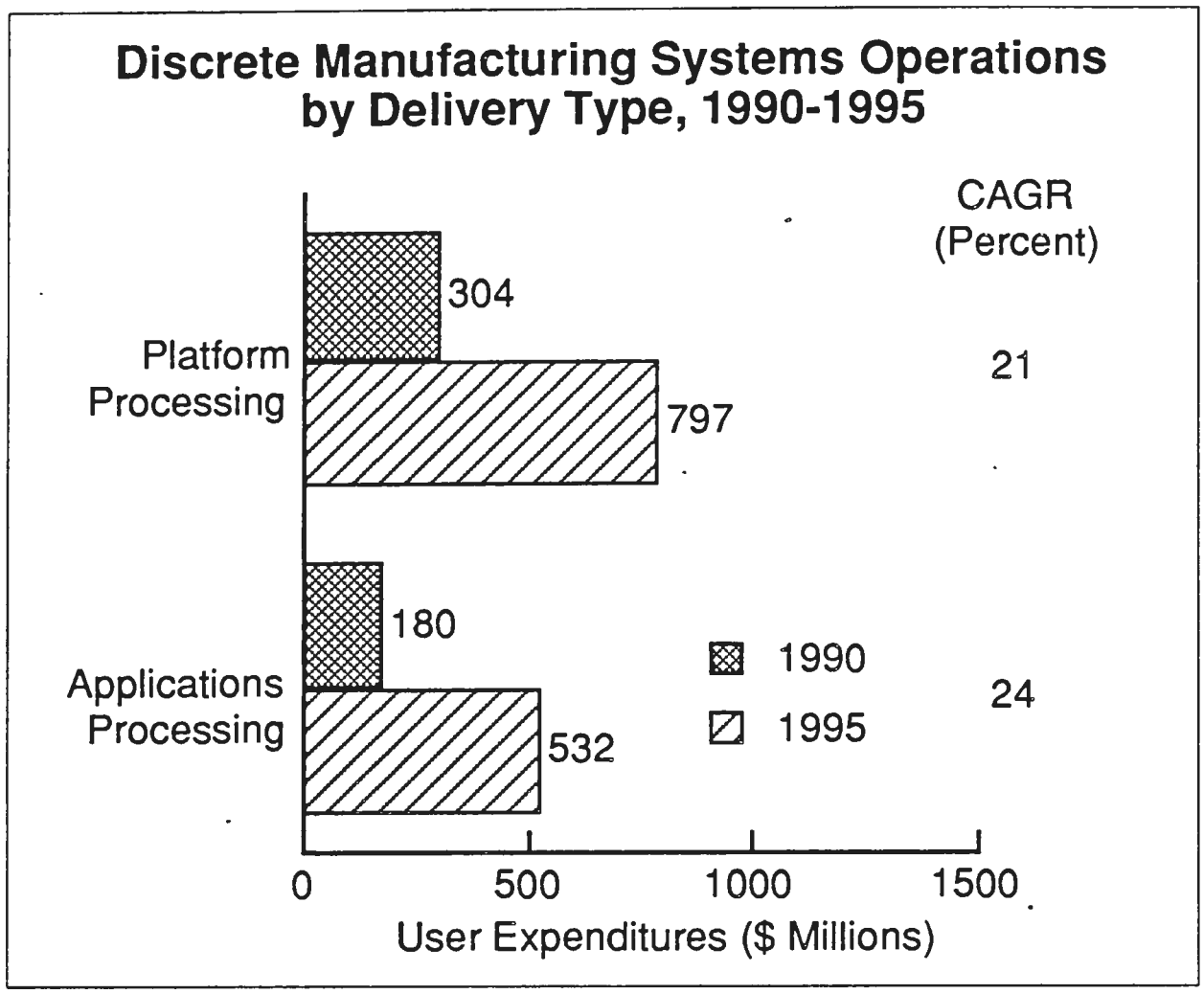
EXHIBIT IV-5



This represents a major increase in the growth rate from 1989 (up from 14%). It reflects increased awareness by manufacturing executives that information services is not their primary business. It also signals that vendors are demonstrating to industry executives they have the requisite expertise to manage systems operations in the manufacturing sector.

Platform processing continues to be the dominant mode in the discrete manufacturing industry from 1990 to 1995, even though the growth rate for applications processing is larger, as shown in Exhibit IV-6. The clients in this market still feel they have unique software requirements they are reluctant to turn over to vendors.

EXHIBIT IV-6



The different requirements of the market are being addressed by several groups of vendors. Equipment vendors competing in this market include IBM and DEC. In addition to Andersen Consulting, other leading industry specialists are Genix Group, Perot Systems, and Power Computing. EDS holds a unique position combining three ingredients that are very attractive to industry executives. They bring extensive communications experience from their own internal network, they have been in the facilities management business for 28 years, and they have acquired extensive manufacturing experience in support of GM's internal needs.

An interesting entry in this market is Information System Incorporated (ISI), which converts smaller manufacturing companies to MSA's manufacturing software. Actual operations support is provided through ISI at a Litton data center.

C

Education Industry

Education is subdivided into academic and industry/commercial segments. The academic segment includes both public and private institutions that provide basic education from kindergarten through 12th grade, vocational schooling, community colleges, and institutions of higher learning for undergraduate and graduate study. Vocational schooling is available at 10th to 12th grade and post-high school business, trade, and technical facilities.

1. Industry Forces

Education continues to receive a great deal of attention as reports comparing test results of U.S. students and those of other countries show that the U.S. is behind. The current administration has placed emphasis on this area and is receiving strong support from industry. This should result in increased focus and spending for systems that will result in improved academic achievement.

There are, however, a number of factors that constrain the use of information services within the educational market. They include the following:

- Flattening enrollment patterns that result from decreasing family size, although there continues to be an emphasis on post-high school education
- Constrained funding sources that result from state and local funding and spending limits
- Reduced federal spending on educational software and research grants

2. Information Systems and Services Environment

Larger educational institutions employ IS staffs to operate academic and business centers. The academic support includes timesharing mainframes and interconnected microcomputers for computer studies, research, and courseware. Administrative functions include class and teacher scheduling, student records, building and equipment maintenance, and the usual range of payroll, finance, and accounting functions. Library functions may be controlled by central staff or separately.

The increased focus on improving the quality of education should begin to loosen spending in areas that will have the most impact on academic results. This loosening should include spending for more microcomputers and courseware in the K-12 arena and networking of capabilities within and among campuses. There is considerable pressure, for example, to link university supercomputers in a network managed jointly by NSF and the Department of Energy.

Industry also appears willing to spend in areas that will better prepare students in technical areas in which it believes the U.S. is trailing. Expenditures for systems to improve computer science skills and to perform research in the advanced applications areas such as artificial intelligence, groupware, and CIM are beginning, though most grants to date are from consortia or government agencies.

Large private colleges and state university systems will be competing for public and private grants to perform research for the government and

industrial companies. This competition will encourage institutions to develop and maintain state-of-the-art information services facilities that can attract industry and research staff.

Most colleges and universities have incorporated microcomputers as important elements in their curricula. On some campuses, students are required to have a PC, and on others a PC must be readily accessible. There is a need to have inter- and intracampus networks tying together student terminals and a variety of computer resources. Only a few institutions, fewer than 200 out of 2200, have stepped up to this requirement and provided campuswide networks. Less than 20 state-level college and university systems have completed statewide intercampus networks. Once these networks are in place, internal staff is hard-pressed to manage them effectively.

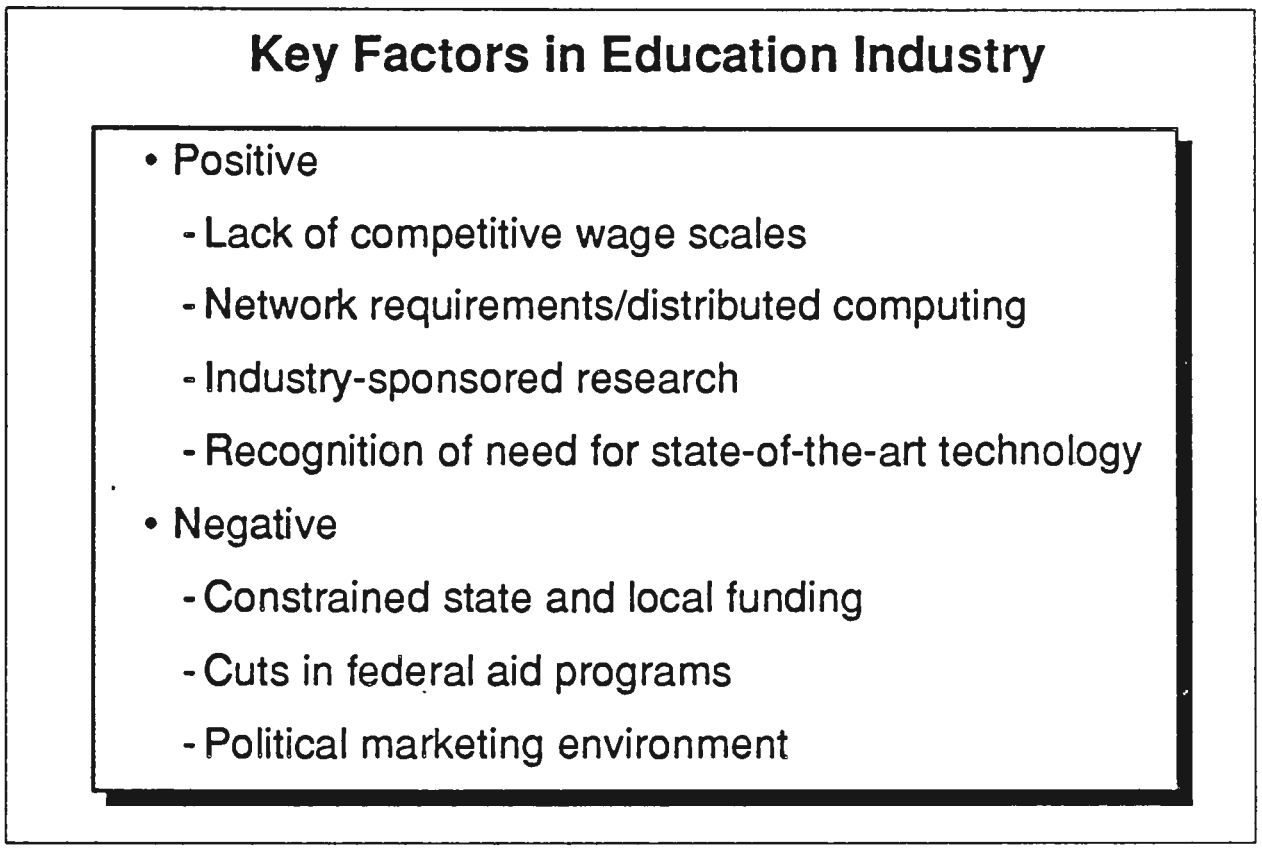
Industry is increasing its grants to education in support of the national emphasis on education and to allay its concerns about competitiveness. These research grants require immense amounts of computer processing capability, again available on a campuswide or statewide basis. These grants drive the demand for skills to build and manage supercomputer complexes and network them throughout the research community.

3. Systems Operations Potential

Though education is not a large component of the systems operations market, the commonality of administrative procedures and requirements, coupled with the inability of academic institutions to be competitive with industry in salaries, make the marketplace a viable one for SO vendors with the required expertise. Exhibit IV-7 illustrates the market factors at work in this sector.

Those schools that have gone outside for help have found it effective. Many others are trying to accomplish the task with internal resources. There are both platform and application opportunities in the education sector. Many IS departments support administrative departments and the research community within the academic environment. Often these services are provided on different platforms. The general-purpose processor used for administrative functions is not what the research community wants for its computation-intensive work. Some schools will benefit from vendors such as SCT that have applications software available to handle student registration, class scheduling, and other administrative functions. Others need to upgrade their computational capacity with supercomputers available from a platform systems operations vendor that provides raw processing power.

EXHIBIT IV-7

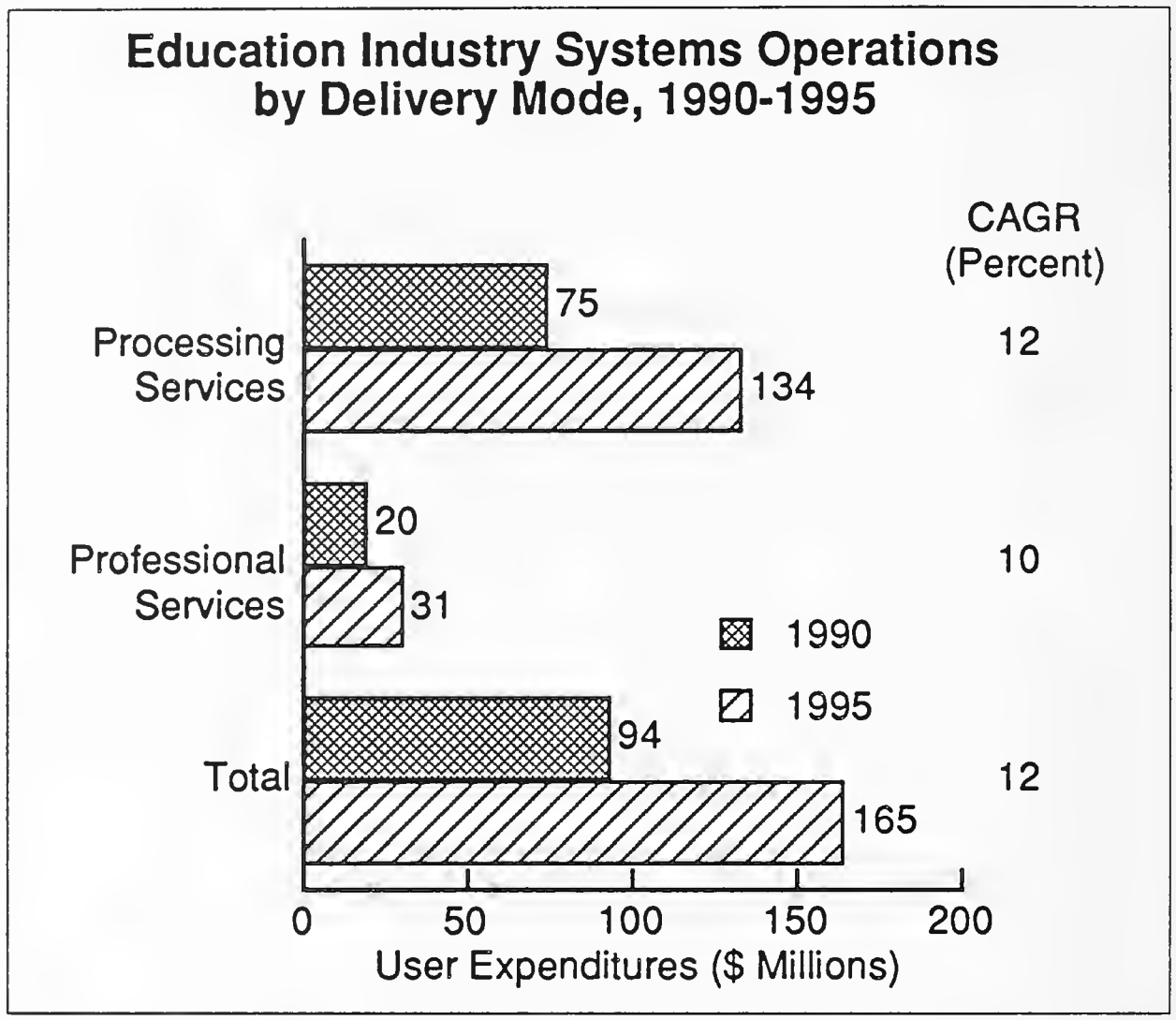


The educational market continues to be constrained by budget limitations. There have been and will continue to be reductions in federal research grants. This could become a positive pressure for outsourcing to systems operations vendors. Sales people who know and understand this market can best take advantage of the unique political environment.

4. Systems Operations Forecast

The forecast for systems operations is illustrated in Exhibit IV-8. The majority of the activity is in the processing services mode since administrative applications are those primarily outsourced. The pattern is expected to continue, in spite of the new focus on supercomputers for academic research, because it is mostly the smaller private colleges or the community colleges that find outsourcing of systems operations attractive. The growth rate of 12% overall is less than the industry average of 16% but slightly up from last year's rate of 10%.

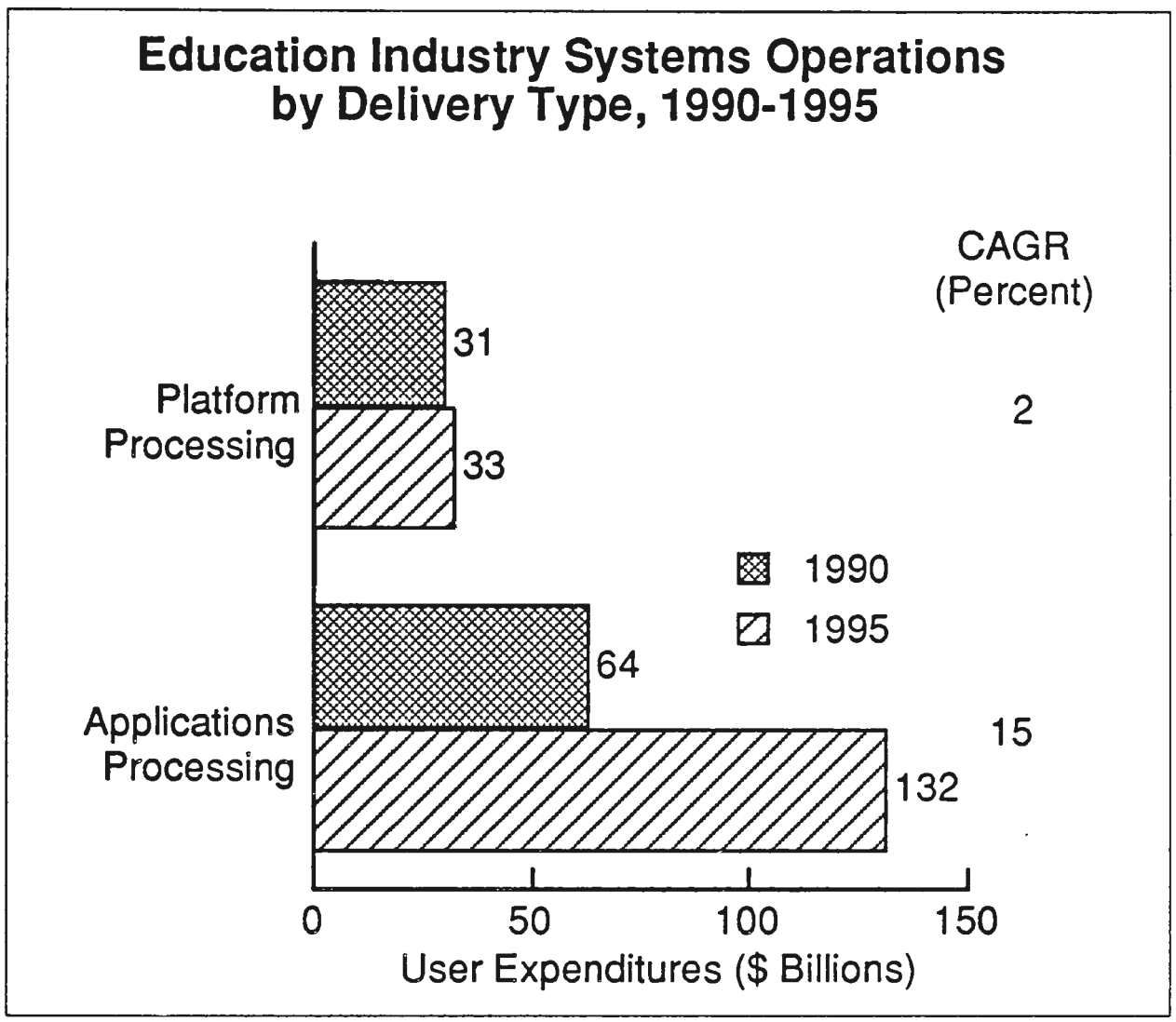
EXHIBIT IV-8



Applications processing continues to be the dominant type of processing in the education industry (see Exhibit IV-9), as the major vendors become still better at providing applications software tailored to the need of the clients. This trend is reinforced by prospects that have more difficulty in recruiting and retaining skilled applications personnel.

System and Computer Technology has been identified as a major supplier of systems operations services to the education market, and American Management Systems also reports activity in this sector.

EXHIBIT IV-9



D

Insurance Industry

This sector is composed of life, property, casualty, and health insurance; the reinsurance segment of agents and brokers; and medical claims processing.

1. Industry Forces

Insurance providers that operate in an already highly competitive environment are now facing further dilution of market shares by the potential entry of banks, hospitals, and foreign competitors into the market. Financial institutions have made their appearance in the insurance market as competitors by offering benefit consultants, financial planners, and full-service business planners. Response to this influx of financial institutions has led to new insurance products with more complex premium calculations, and to diversification into financial areas and interest-sensitive products. Controversial legislation concerning the entrance of banks into this market has appeared in California and Delaware.

Other problems face the industry: increased liabilities from tort actions, a growing elderly population with increasing dollar outpayment levels, the AIDS epidemic, some bad investments in junk bonds and commercial real estate, and consumers' concerns about insurance availability and coverage. Possible opportunities for the industry include the opening of markets in Eastern Europe, Japan, and the rest of the Pacific Rim.

Overall, the industry is relatively stable and looks to remain that way. Opportunity for information services vendors appears to be positive, now that more automation is required and more connectivity is needed between each agency and the home office.

2. Information Systems and Services Environment

Increased competition and lackluster performance in the investment community is causing the insurance business to seek to reduce costs by improving efficiency. Improvement of operations and increased productivity will be accomplished with a stabilization in the workforce, increased capabilities of existing systems, and the automation of additional functions.

A new role of IS management is anticipating the system demands that result from the introduction of new product lines. Systems flexibility is essential to accommodate more products, improve customer services and sales, and permit nationwide system consolidation across all lines of business. Intra- and intercompany businesses will require a level of compatibility among systems on the same order as the banking/finance industry.

Insurance companies need more timely information, especially in claims administration, to write more competitive policies tailored to client needs. Access to mainframe data through enhanced communications capabilities will improve agent efficiency and thus improve responsiveness to clients.

There are requirements for building an infrastructure to support agents in the field, by giving them a sales support system, and by networking among offices. Artificial intelligence and expert systems are expected to play an increasingly important role in applications such as underwriting, risk management, investment planning, policy customization, and medical review analysis.

The health insurance sector of this industry is experiencing growth that requires new and improved systems to support it, as shown in Exhibit IV-10. The life insurance sector has flattened out and has become intensely competitive. These trends are expected to continue in the near term.

Much like the banking/finance industry, the insurance industry reacts to competitive pressure, and it needs to manage not only insurance products but also financial products. Recent industry changes lead insurance companies into the same arena occupied by banks and other financial institutions, and causes insurance companies to offer new products that require additional information services support.

EXHIBIT IV-10

Key Factors in Insurance Industry

- Positive
  - Growth in health insurance requirements
  - New products
  - Need for on-line policyholder/client information
  - Continued pressure for increased efficiency
- Negative
  - Cost controls limit new starts
  - Continued decline in property/casualty strength
  - Industry-specific knowledge/experience
  - Self-sufficiency mentality

Continued scrutiny of health care costs, and the public awareness of the escalation of these costs, have created increased opportunities for vendors skilled at administering these cost-control systems.

Image processing has become an important new application area in this vertical market. Insurance companies are capturing complete client files on optical disk or microfilm that is available almost instantaneously to answer client service inquiries.

Most personnel in insurance company IS departments are assigned to maintenance, resulting in a shortage of capabilities in the more sophisticated technologies currently in demand. IS managers in this industry note the importance of project management skills in design and implementation of networked systems, and the frequent lack of these skills within the in-house staff. Systems operations vendors can provide these skills more effectively.

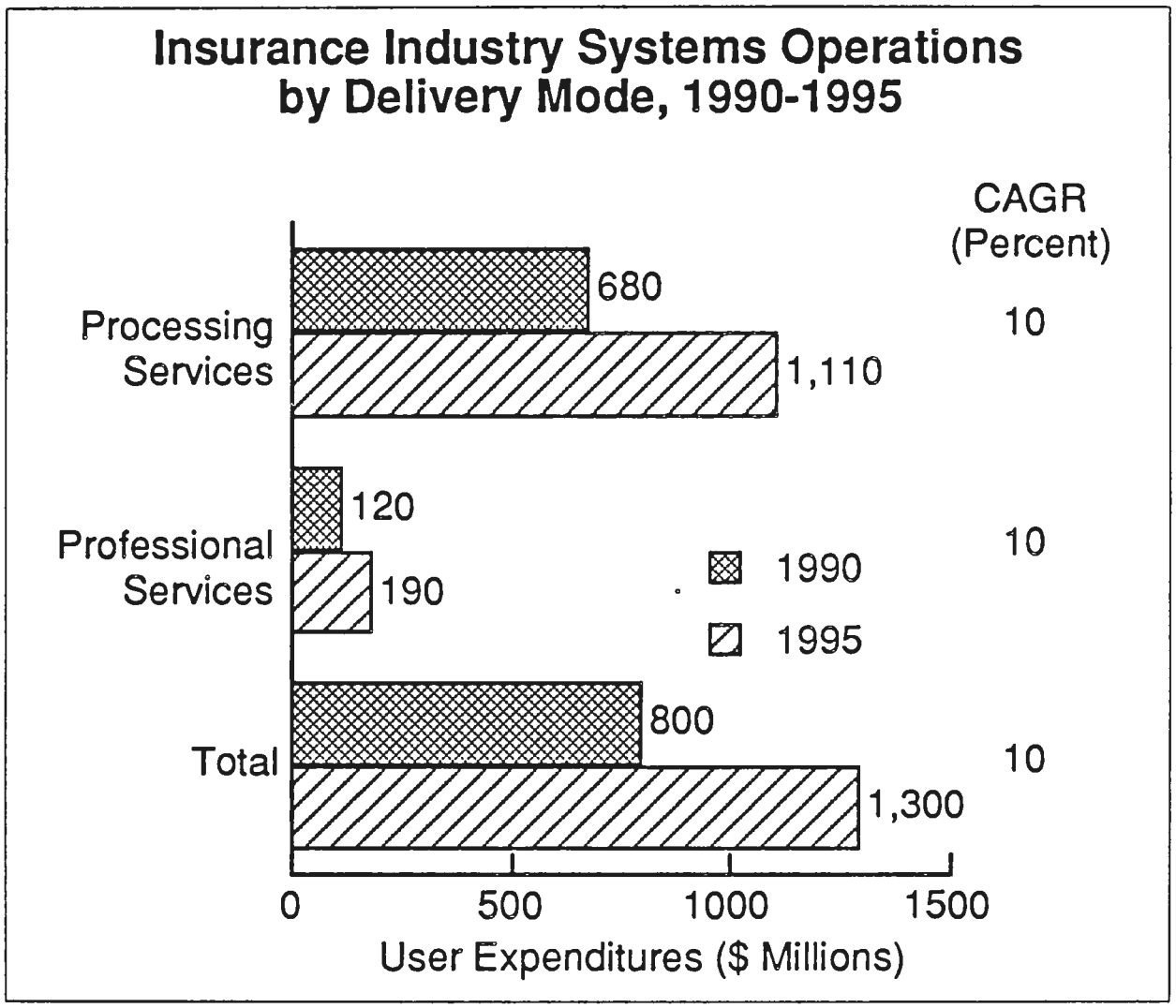
3. Systems Operations Potential

Many of the systems operations opportunities in this industry are in the medical claims processing sector. As in every vertical market, there is a strong preference for demonstrated industry-specific knowledge. This requirement tends to favor SO vendors with extensive insurance and financial systems experience. This sector has had a number of systems integration projects in the past that ran into major problems. Financial and schedule overruns were severe, and a resurgence of the industry's self-sufficiency mentality has resulted.

4. Systems Operations Forecast

There has been a major downturn in the long-term growth rate for this industry. Although INPUT had reported a 1988-1989 growth rate of 13%, with a long-term growth of 22%, the current forecast is a 10% growth rate for the five-year period from 1990 to 1995, as shown in Exhibit IV-11. This reflects downturns in most sectors of the insurance market. The increased emphasis on health care cost containment is not enough to offset the overall slowdown in the insurance industry.

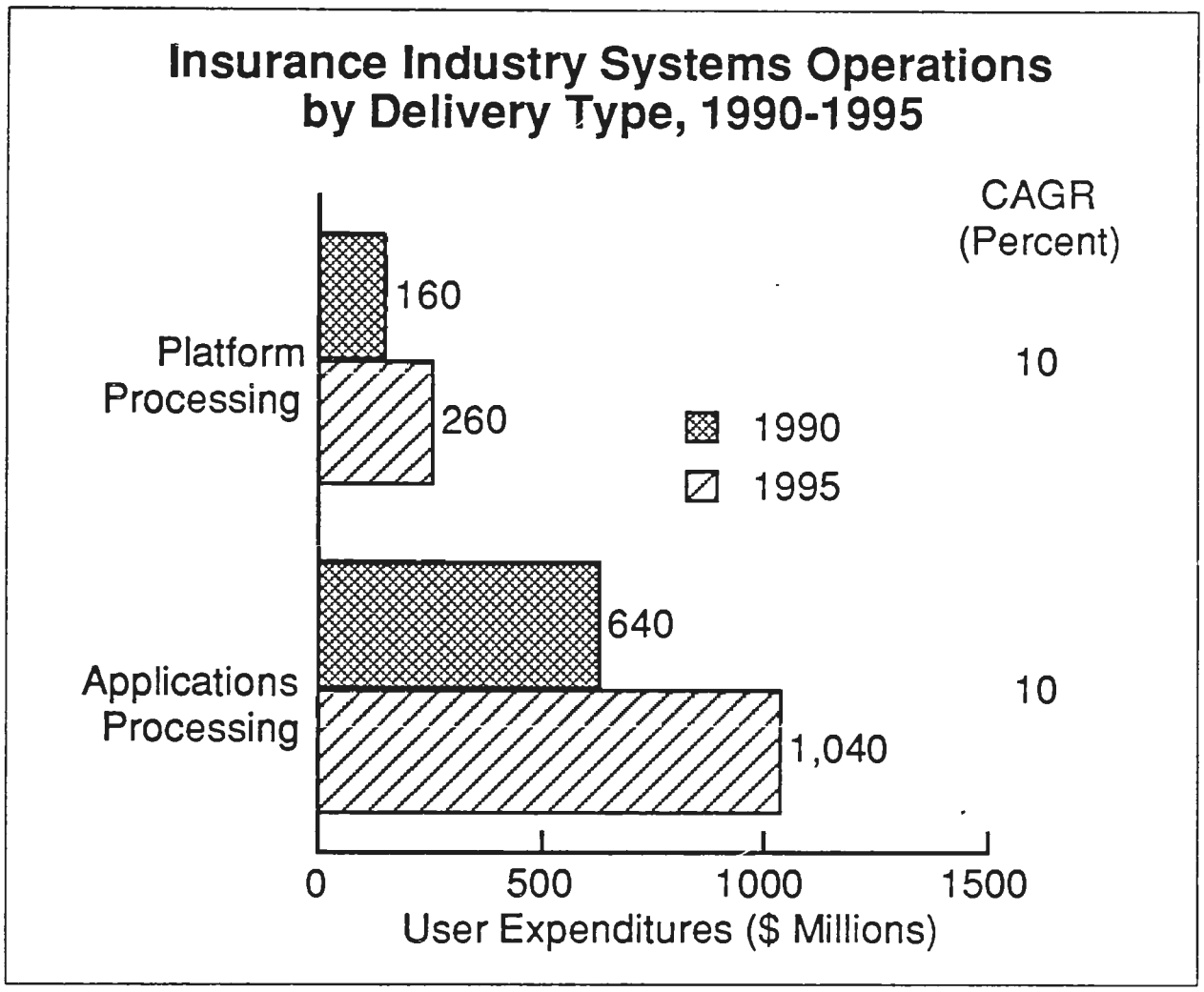
EXHIBIT IV-11



The slowdown in market growth is accentuated by the persistence of the mentality of self-sufficiency within the insurance market IS community. Particularly within larger companies, the feeling is that information services are too critical to let them be performed by an outside vendor. Only in small and medium-sized companies does there appear to be an understanding of the cost effectiveness of SO.

Applications processing continues to be the dominant mode in the insurance industry in 1995, just as it is in 1990. Both operations types are growing at the rate of 10%, as shown in Exhibit IV-12.

EXHIBIT IV-12



Successful SO vendors in the insurance market will need to demonstrate experience in this sector. EDS and CSC, for example, have demonstrated success in medical claims processing, both in federal contracts (CHAMPUS) and as Blue Cross/Blue Shield service providers. Industry specialists such as Continuum, ISI Systems, and Policy Management Systems build upon their prior insurance claims processing experience in this industry. This pattern is expected to continue; the ticket to enter this marketplace is demonstrated experience, which favors the incumbent vendors.

E

Health Industry

This sector includes physicians, dentists, hospitals, medical and dental laboratories, nursing homes, outpatient care facilities, and allied services. It excludes health insurance and medical claims processing covered in the insurance industry sector.

1. Industry Forces

Health care expenditures continued to rise in 1990 along with public concern about how to control the nation's growing health care costs. Competition is already a factor, with the emergence of health maintenance organizations (HMOs), preferred provider organizations (PPO's), and investor-owned hospitals and group practices. Hospital care is the dominant cost category, even in an environment where occupancy rates

continue to fall. To contain costs, the length of hospital stays has been shortened and admissions reduced by shifting to outpatient care and home health agencies (HHA).

The federal government, Blue Cross/Blue Shield and other insurance companies, and even large employers are pressuring health care providers (physicians/dentists, hospitals, laboratories, nursing homes, outpatient care facilities) to reduce costs, which continue to rise faster than the consumer price index (CPI).

The government has established prospective payment systems (PPSs) in diagnostic-related groups (DRGs) and has shifted reimbursements from a cost basis to a DRG basis. Providers forced to compete for a declining number of patients and declining medical reimbursements are seeking to lower operating costs.

2. Information Systems and Services Environment

The pressure on facilities and the rising costs of in-hospital care are shifting many procedures to outpatient services. Most institutions have extended their physical plants to support the move, which is parallel to the growth of HMOs. Information support systems must be improved or developed to provide for these changes in operating procedures.

Outside vendors offer most of the software needed for the administrative and financial tasks such as patient care, nursing management, laboratory management, and bed utilization. Many hospitals are selecting this approach because of their inability to attract development staff.

The DRG-based reimbursement system still demands current, on-line handling of patient information. The pressure for uniform data procedures using proven software has made experienced vendors an attractive alternative to internal growth and development. There is a continuing shift to shorter hospital stays because of reduced Medicaid/Medicare payments. This has required hospital administrators to develop new service modes for their patient base.

Constraints in federally supported health care, particularly Medicaid, will continue, and the need for efficiency in such diverse areas as reimbursement systems, medical records, patient history, pharmacology, and bed occupancy will stimulate demand for proven solutions.

3. Systems Operations Potential

The demand for new product support has come at a time when IS departments are experiencing budget cuts or facing downsizing pressures. The in-house equipment is often older, and no money is available for capital investment to upgrade the equipment. Lacking internal resources to

develop systems, hospitals and other medical organizations are looking to applications systems operations vendors that provide packaged applications software.

Defensive medicine is being practiced by physicians and hospitals to reduce the risks of unfavorable malpractice judgments. Defensive medicine includes duplicate tests, extensive diagnostic procedures, use of consultants, and extensive document creation and retention. The information systems associated with these activities require larger processing capacity than many hospitals currently have. All of the positive factors in Exhibit IV-13 provide opportunities for SO vendors with medical industry experience.

Medical institutions that have recently entered into system operations agreements stressed their requirement that the proposed solution had to contribute immediately to cost savings. Systems operations vendors will need to provide creative financing and to provide a strong case for the cost savings that will result from outsourced operations.

On the negative side, a number of factors are also at work. These are also outlined in Exhibit IV-13.

EXHIBIT IV-13

Key Factors in Health Industry

- Positive
  - Pressure to contain medical services costs
  - Defensive medicine requirement for more data
  - Growth in departmental systems
  - Large number of medium sized hospitals
  - Increasing outpatient services
  - Need for new services
- Negative
  - Industry experience and acceptance required
  - Bottom-line financial limitations
  - Hospital management companies in-house oriented
  - Downsizing of internal hardware

Hospital management is generally reluctant to deal with any new vendors. They prefer to deal with vendors who have demonstrated industry experience and success, either in the processing or applications area. Given the tight financial constraints imposed on hospital management because of escalating costs, the systems operations vendor will have a difficult time convincing systems buyers, unless he knows the industry well.

Hospital management companies such as Sentara, Hospital Corporation of America, and Humana are becoming significant players in the industry, as they continue to take over the management of private hospitals. They have large information systems operations that are very in-house oriented, so even this growing segment of the industry will be hard to penetrate.

Finally, the continued downsizing of many private hospital information processing departments, from mainframes to mini- and microcomputers, is reducing the potential market for systems operations. When a hospital has no mainframe processing to outsource, there is little potential for a sytems operations vendor.

4. Systems Operations Forecast

The market for systems operations in the health vertical industry market is expected to grow at the rate of 17% in the period from 1990 to 1995. INPUT believes growth that does occur will take place in the processing services portion of the market. The professional services component continues to be very small and will grow more slowly.

This projected growth rate, shown in Exhibit IV-14, is somewhat higher than that in INPUT's last report (15%). The continuing pressure to reduce costs, and the need to track patient-related data even more extensively, have stimulated the growth. A countertrend to downsize operations has left many internal information processing organizations with only micros or minis to manage.

Exhibit IV-15 shows that applications processing operations represent a majority of the current base in the health industry. This trend will continue over the five-year period, as systems operations vendors continue to provide both processing and applications expertise to the prospects who, in turn, feel increasing pressure to downsize their staffs.

EXHIBIT IV-14

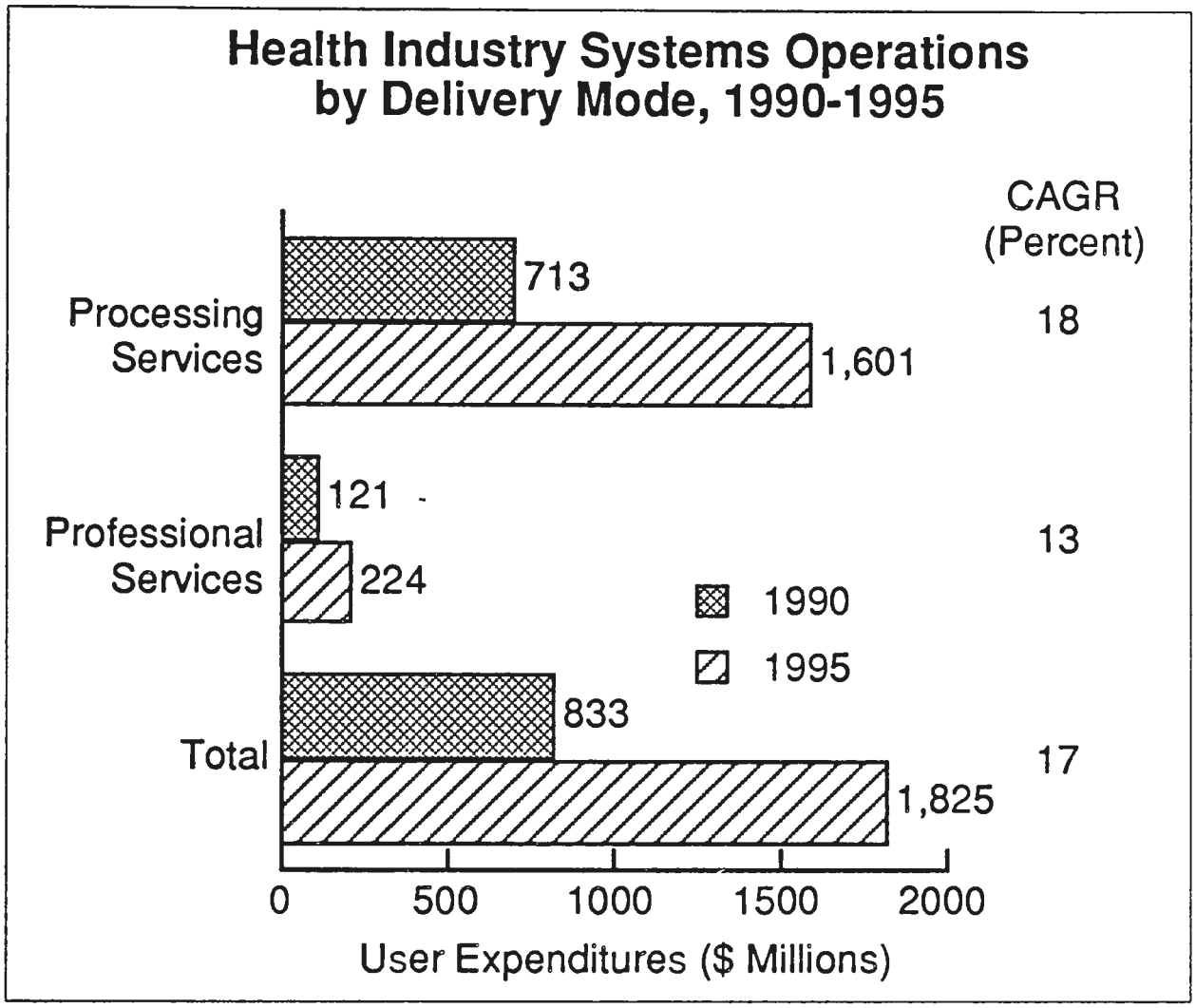
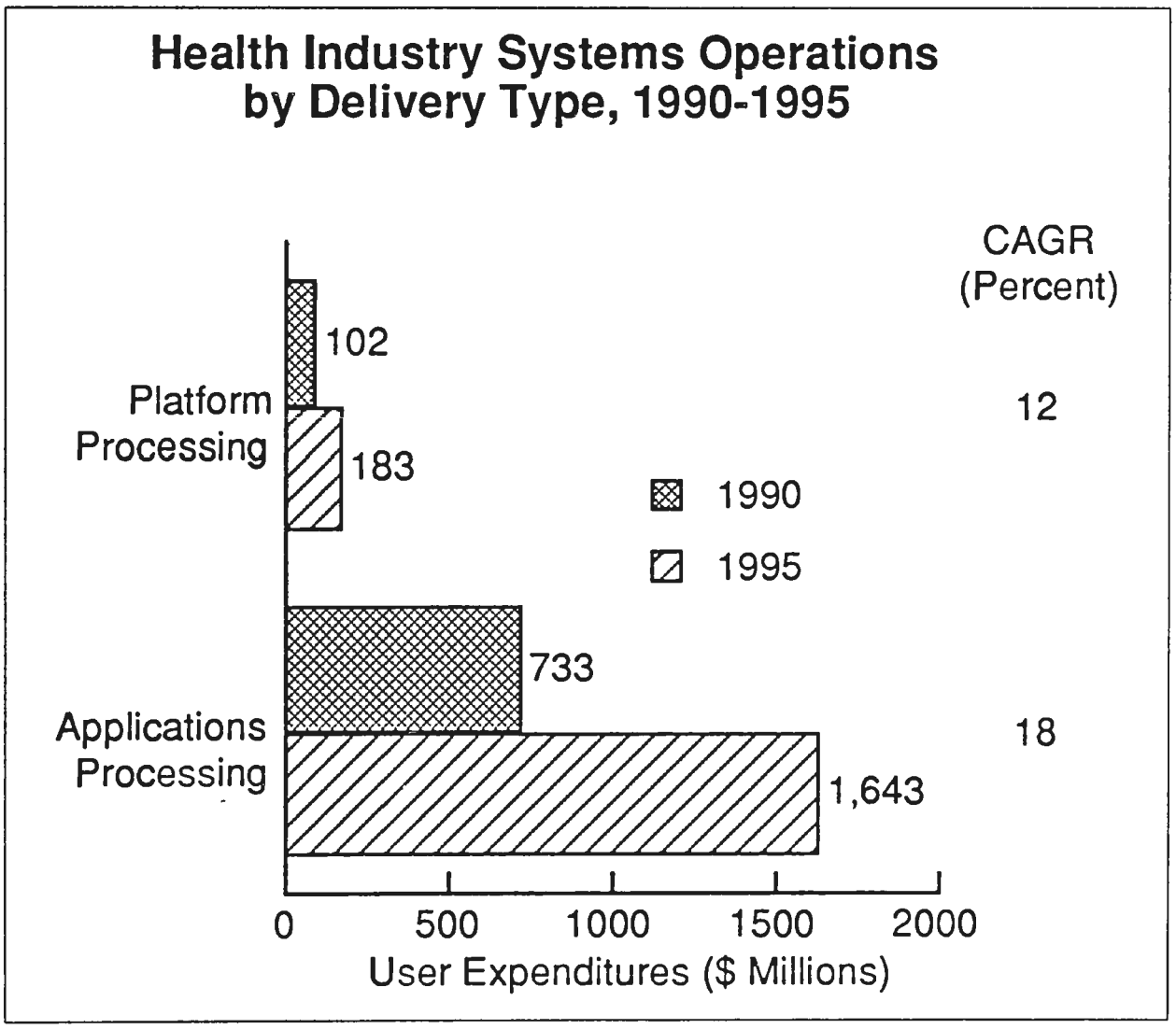


EXHIBIT IV-15



Prominent systems operations vendors in this industry are Shared Medical Systems, Cycare, and American Express Medical Systems (formerly McDonnell Douglas Medical Systems). All are specialists in health care processing. In addition, EDS and Perot Systems have recently obtained large contracts for systems operations from hospital management companies. Yet the two largest hospital management companies, HCA and Humana, themselves do processing for noncaptive hospitals, and therefore must be considered as systems operations vendors. In these cases, the hospitals usually have had an earlier affiliation with HCA or Humana.

F

Process Manufacturing Industry

This sector is a combination of medium and large corporations active in oil and gas, mining, tobacco, chemicals, paper and wood products, food processing, rubber, primary metals, and plastics.

1. Industry Forces

In general, this industry sector has seen an increase in competition brought upon by decreased demand from a slowing economy. Wood products are suffering because of the stagnant domestic construction market. Lower prices and margins for ethylene and plastics are resulting in increased competition for the chemicals and plastics industries. The food processing industry faces a recent trend in restrictive consumer spending that may result in a shift of consumer preference to lower-margin generic brands. The oil industry, on the other hand, has been experiencing higher earnings, greater cash flow, and increased merger activity. However, the oil industry faces both near- and long-term uncertainty because of the Middle East crisis.

The process manufacturing sector is driven in recent years more by the economy and off-shore competition than by manufacturing technologies. Major efforts are focused on reducing costs, improving operating efficiencies, increasing capacity utilization, and reducing capital commitment risks, while maintaining a competitive posture through automation. Mergers, to gain economies of scale, were the solutions to the cost problems of some organizations. Further mergers may be in the offing in response to the recession that is impacting 1990 manufacturing revenues.

2. Information Systems and Services Environment

This diversified market sector was buffeted by different economic winds this past year. Mergers and consolidations in the oil and gas sector created problems of excess capacity, redundant IS staff in some cases, and incompatible processing platforms. Competitive pressure in the chemicals, food processing, and rubber and plastics industries focused attention on cost-reduction programs.

Automation of manufacturing processes, as in discrete manufacturing, was a key initiative. Unlike discrete manufacturers, however, process manufacturers also had extensive needs for management of the communications networks that tie the sources of raw material to the processor and the processor to the seller.

Much of management's attention on information systems in these industries is directed at process control, inventory control, and manufacturing control systems. These systems are traditionally the domain of the minicomputer vendors and the specialty instrumentation suppliers. These systems are less suitable for processing on general-purpose machines.

All of these systems, however, do generate data streams for general business procedures such as scheduling, purchasing, and inventory control. Process industry companies, particularly oil and gas, are quite amenable to having their general business processing managed by a systems operations supplier. The systems operations supplier in this industry has to be able to provide interfaces to these data channels.

3. Systems Operations Potential

Like discrete manufacturing, this industry has a competitive need to meet widely varying market demands. Participants need to unify and coordinate diverse data structures, process systems, and application developments, to support marketing and strategic management. Network management skills will be required to extend these activities to multiplant operations.

IS managers can identify shortcomings of in-house project management and network design skills, but do not, in general, seem particularly inclined to pay a vendor for these capabilities. Interestingly, training and transition management is also highly valued in projects, but internal staffs appear to be inadequately prepared to provide it.

In this market, support for marketing and strategic planning requires more sophisticated tools that are well-suited to computer use, and that will add to a vendor's credibility. Each industry, and even specific companies, employ processes that will need customized solutions from vendors with industry knowledge. Exhibit IV-16 presents some key factors influencing buying decisions in this sector.

The decline in the economy provides a warning of lower profits and an opportunity to promote tactics that preserve capital even though the oil industry may experience short-term profits from the increase in oil prices caused by the Middle East crisis. In this industry, the projects are concentrated on the production side, which must be the focus of the potential systems operations vendor.

EXHIBIT IV-16

Key Factors in Process Manufacturing Industry

- Positive
  - Competitive need to meet market demands
  - Need to improve operating efficiencies
  - Network design/management requirements
  - Slow decline in economy
- Negative
  - Diverse client needs according to industry segment
  - Process concentrated in operations
  - Reluctance to consider outside help

4. Systems Operations Forecast

INPUT projects a 16% CAGR for this industry for the period 1990 to 1995, which is slightly down from its projection of 17% last year (see Exhibit IV-17). There was a sharp increase in 1989 expenditures, as predicted, but this growth, spurred by a series of consolidation and mergers in the troubled oil and gas sector, is not expected to be sustained. Rather, the other negative factors in the market (i.e., diverse client needs and concentration of operations-oriented systems on minicomputers) will cause the growth rate to level off to 16%, still on a par with the entire systems operations marketplace. It is apparent that most of the growth is expected to be in the processing services mode, as companies focus on reducing investment in computing equipment.

The gap between platform and applications processing operations narrows in the period 1990 to 1995, as shown in Exhibit IV-18. Though much of the revenue in 1990 is generated by platform operations, the shift will occur over the next five years because more clients and prospects will choose to outsource their applications development as they feel more comfortable with having outsourced their processing operations. Clients in this vertical industry market are already reporting they are investigating this further step in their outsourcing agreements.

EXHIBIT IV-17

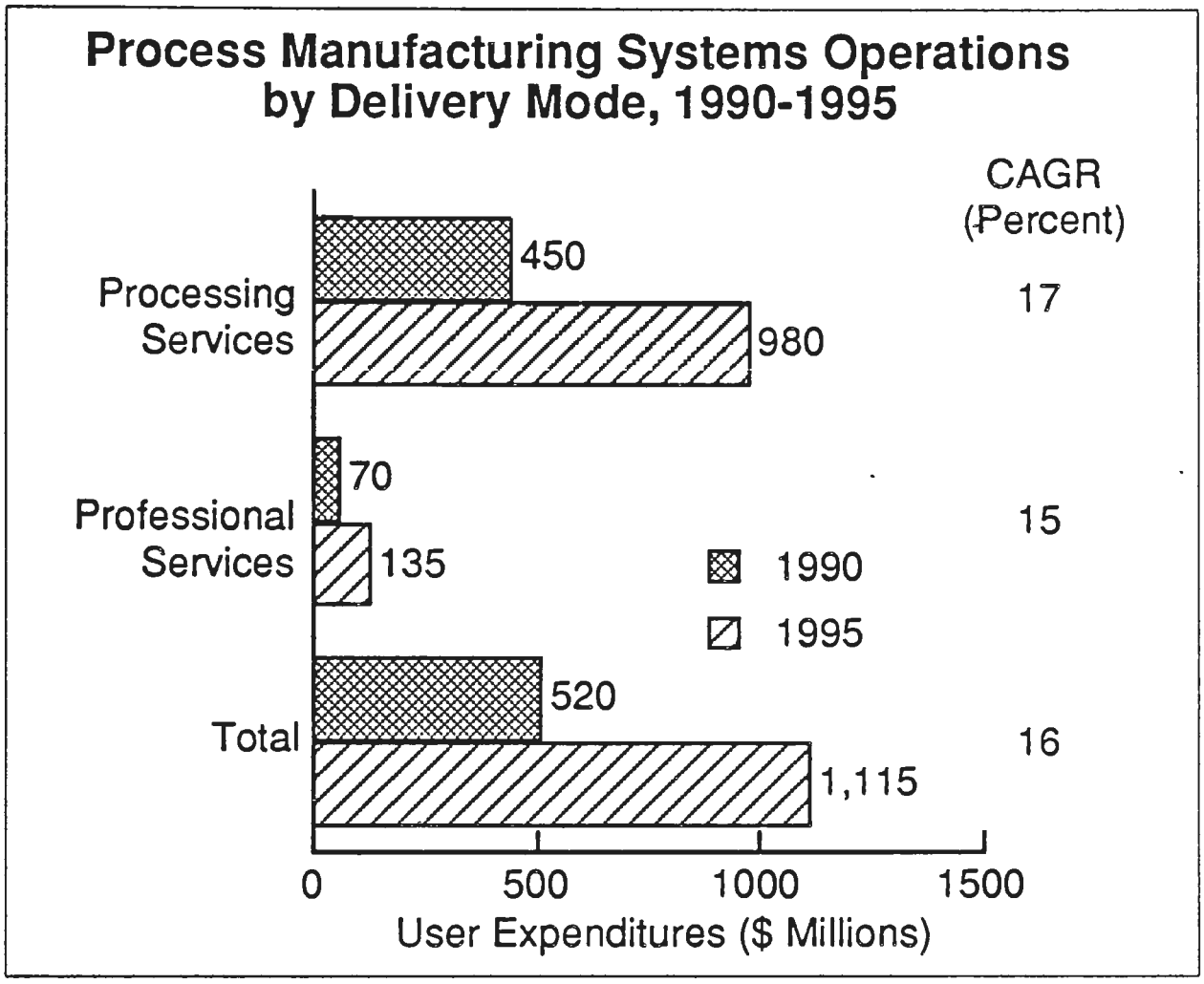
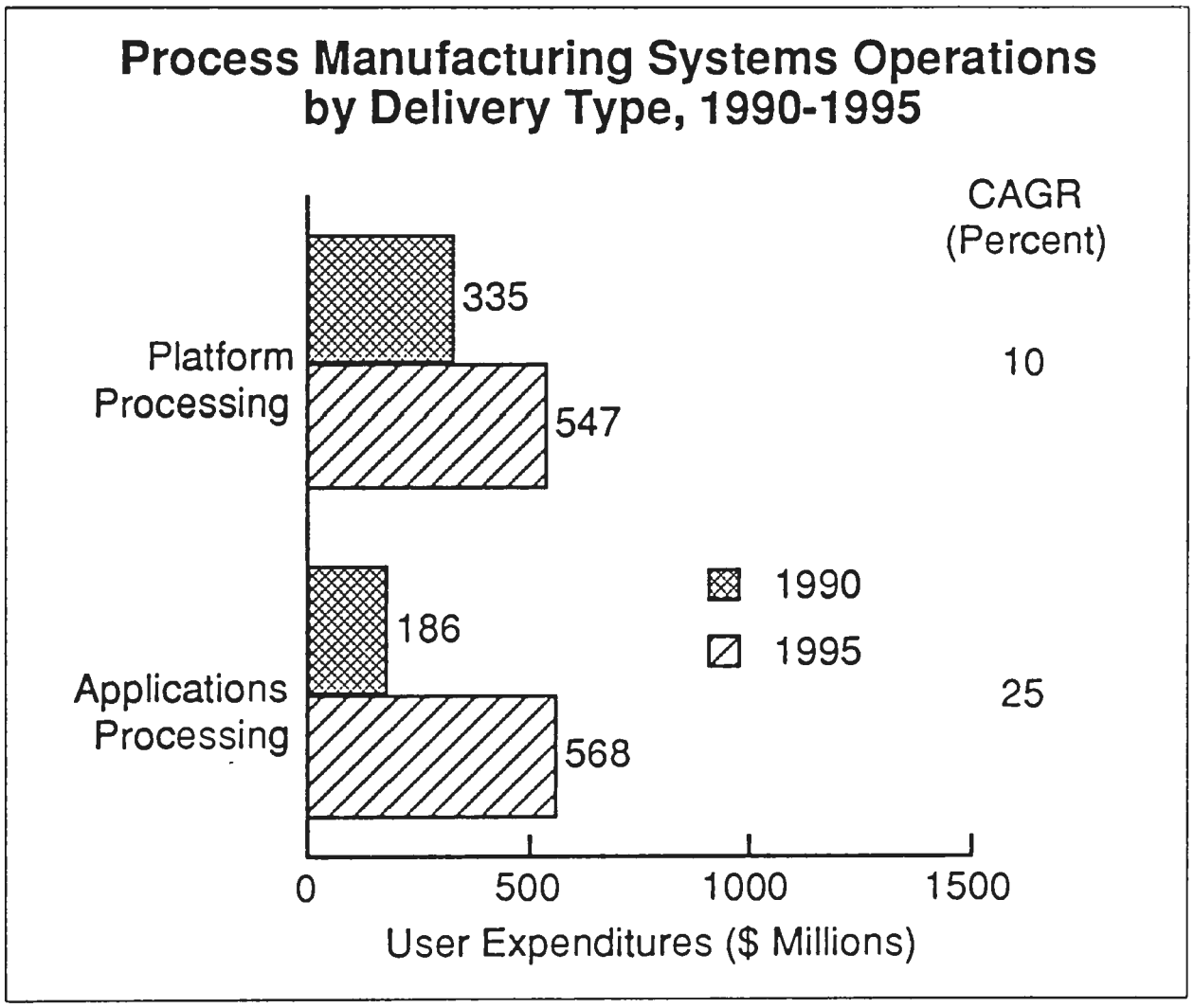


EXHIBIT IV-18



Those vendors with a strong presence in the discrete manufacturing sector also appear as strong suppliers in this segment. Andersen Consulting is particularly strong in food processing, while EDS has been very successful in capitalizing on the consolidation in the oil and gas industry. Many companies in this sector have indicated that using a systems operations vendor provides greater flexibility to meet changing IS requirements as business demands change. This motivation often was cited as more important than any immediate cost savings.

Other vendors with a manufacturing specialty such as Genix Group, Litton Computer Services, and Power Computing will also continue to benefit from the need for process manufacturing expertise in the marketplace.

G

Retail Distribution Industry

The retail distribution sector includes single establishments and chains in apparel, food, appliances, drugs, hardware, etc.

1. Industry Forces

Fears concerning a slowing economy and other gloomy economic outlooks—such as higher interest rates, oil prices, taxes, and a large price tag on the S&L bailout—are causing consumers to cut back on their spending. Retail sales, seasonally adjusted, had dropped 1.5% at the end of the first six months of 1990 and continued to slide in the third quarter; increased price competition and a battle for market share could be the consequences.

There are only 800 large retailers among the more than one million companies that are the principal targets for systems operations vendors in the immediate future. The emphasis of these companies will be on improving and integrating external and internal communications.

Externally, communications with the customers is very important. Better communication links facilitate the flow among customers, outlets, retailers, and wholesalers. The use of information systems for credit checking and POS data collection ensures the steady flow of funds while monitoring inventory. Back-office use of computer-to-computer order processing increases the speed of locating and delivering merchandise.

Internally, the primary use of automation thus far is applications for closely monitoring finances, supporting financial decisions, and analyzing profit margins—but not for providing strategic management decision information.

Although management is concerned with the increasing communications costs required to support broader networks, it believes that the use of technology is the only way to simultaneously control costs, track cus-

tomer buying patterns, manage inventory, and match merchandise to demographic buyer interests.

2. Information Systems and Services Environment

The mission of IS—given the broad diversity of products handled by each outlet—is to provide systems that control logistics associated with warehouse and shelf inventory, pricing, and obsolescence of goods, etc., while also handling credit/bad check verification, bad credit loss control, cash handling, and funds consolidation and transfer.

From a functional point of view, retail organizations are looking to outside vendors for communications networks, micro/mainframe connectivity, and systems operations capabilities. IS managers feel the current staff is not available and/or does not have the technical capabilities required for this. Specific skills they lack are network design and complex program management. Exhibit IV-19 highlights some of the key positive and negative factors affecting the retail distribution industry.

EXHIBIT IV-19

Key Factors in Retail Distribution Industry

- Positive
  - Increasing use of POS
  - Strong need for attention to customer service
  - Network design and project management needs
  - Drive to higher inventory turnover
  - Mergers and consolidations of retail outlets
- Negative
  - Infrequent user of outside services
  - Smaller-than-average IS expenditure
  - Financial problems in retail chains
  - Low profit margins across industry

IS is also expected to deliver customer-oriented services for faster and simpler order entry, transaction processing, in-store processing (distributed processing), and the use of such technologies as EDI to reduce paperwork.

Real-time information to support improved decisions by management means improved marketing/sales data, sales demand forecasting by demographic areas, vendor performance ratings, telemarketing systems, and inventory deployment models.

Increased integration of data processing with communications in the distribution industry appears to be essential to providing on-line connectivity of all operating elements, distributed processing to all locations, and end-user support throughout the organization.

Point of sale technology provides information that can be applied to inventory turnover, demographically based demand, advertising effectiveness, sales efficiency, and space utilization analyses that are rapidly replacing merchandising intuition as the basis for distribution decisions.

Retail establishments have rediscovered the critical importance of customer service to ensure repeat sales. Among the tools being employed are rapid credit checks and multiple payment methods, early warehouse response to local out-of-stock requests, telemarketing services, and accurate tracking of shipments to clients. All of these depend on rapid and accurate transfer of information that may exceed current systems network capabilities.

Leaders in the retail industry are investing in better ways of increasing inventory turnover. Methods include EDI for rapid transfer of orders from production sources and suppliers and, in turn, shipment to specific outlets to minimize risky interim shortages of salable goods in demand.

3. Systems Operations Potential

Most IS managers feel their applications needs are too specialized, so few are looking for extensive development help. They feel processing outsourcing is where they can reap substantial benefits. Exhibit IV-20 shows the large concentration of outsourcing expenditures in processing services.

Small margins, low investment capital availability, increasing labor costs, and rising facility costs have discouraged frequent use of outside services for development, except when considered absolutely essential. Respondents in the mail-order sector appear especially reluctant to outsource.

The large number of medium-sized firms have traditionally not been driven by the need for automated solutions as much as by merchandising skill. But this situation is changing. As large wholesalers and retailers find their margins shrinking even further in a more competitive environment, they are acquiring some of these firms and creating new IS consolidation requirements that can't be met by internal staff.

4. Systems Operations Forecast

The forecast for this market sector, shown in Exhibit IV-20, indicates that the growth continues at just below last year's projection at a 24% CAGR. As mentioned above, the need for consolidation of support services, stimulated by a rash of mergers, acquisitions and retrenchments in the retail sector, has made the market for platform systems operations particularly attractive.

EXHIBIT IV-20

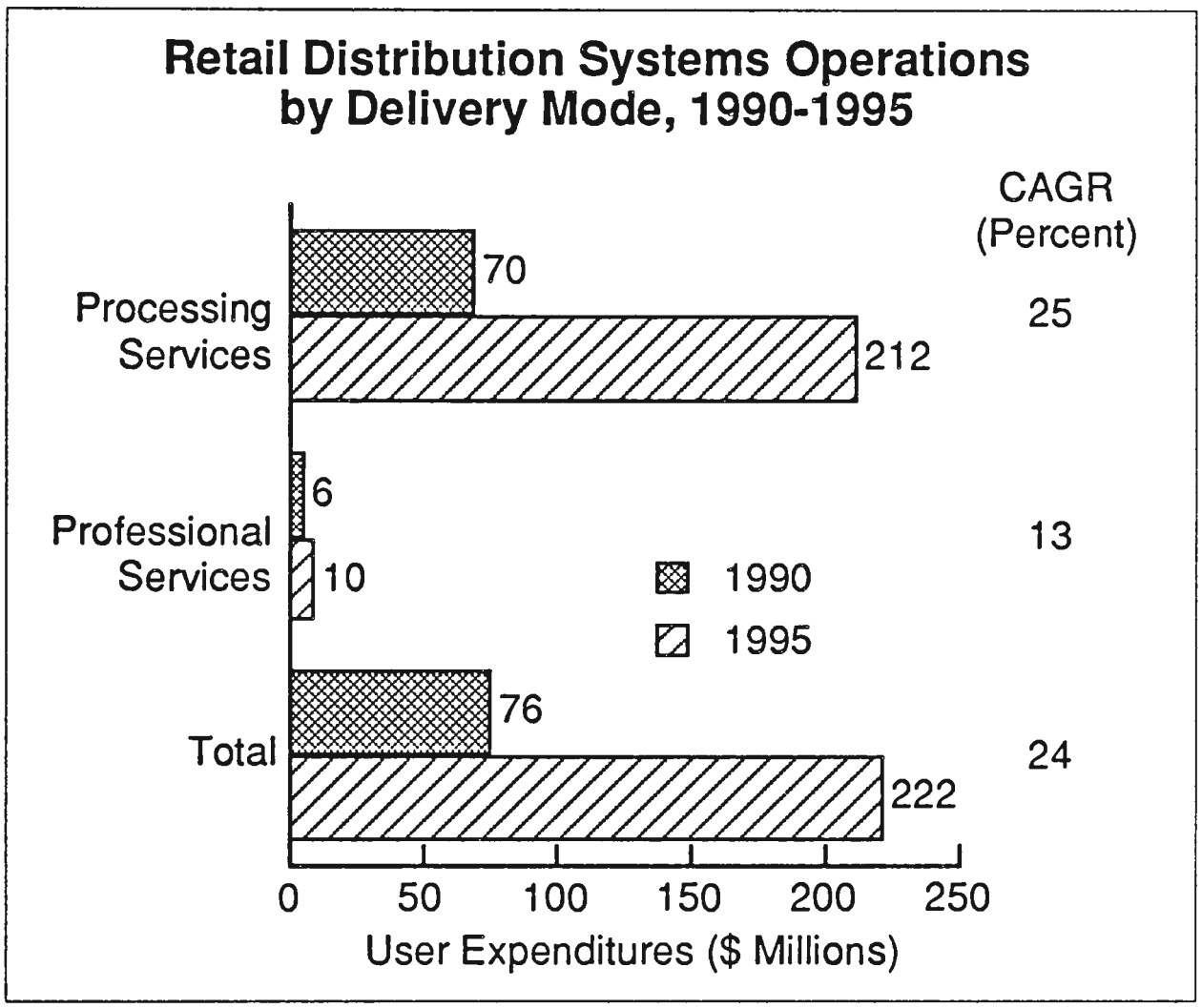
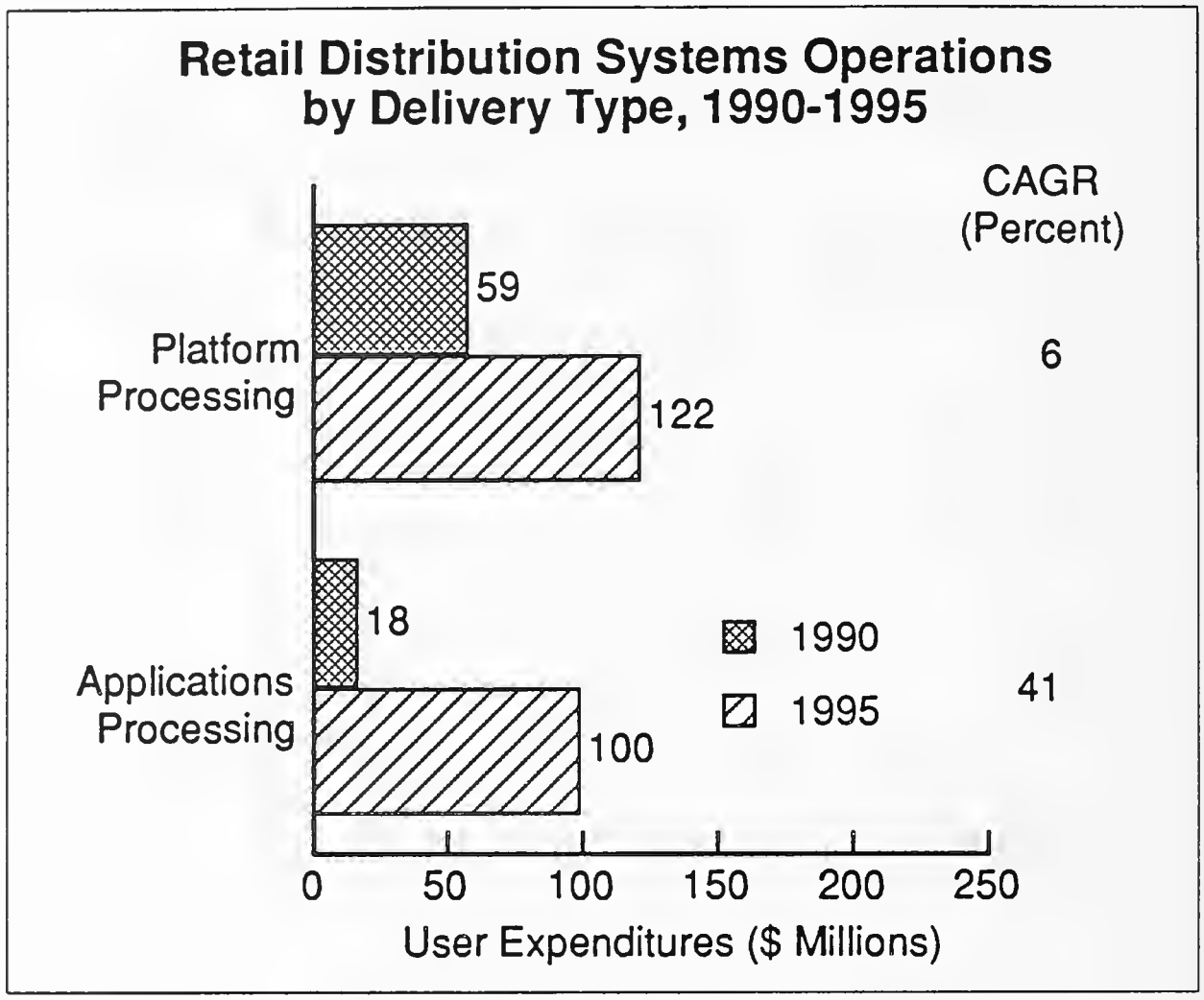


Exhibit IV-21 presents the user expenditures split between applications and platform processing for the forecast period. Applications processing becomes much more dominant in this vertical industry as the vendors become more familiar with the applications the clients are dependent on. An example of this trend is CSC's parlaying its medical claims experience into a processing contract with the optical distributor, Pearle Vision.

EXHIBIT IV-21



Some traditional multimarket vendors have penetrated this market sector. EDS and Andersen Consulting both report activity in the retail industry. More specialized systems operations vendors, notably Affiliated Computer Systems and the Sabre Division of Federated Stores, have the lion's share of the revenue in this sector because they have built up a solid base of experience in retail distribution that inspires confidence in prospects. Affiliated Computer Systems, for example, is processing all work for the Southland Corp., which is financially strapped as a result of last year's leveraged buyout and this year's subsequent bankruptcy proceedings.

H

State and Local Government

This sector includes city, county, regional/district, and state government bodies, particularly those involved with public safety, highways, welfare, education, health and social services, and sanitation.

1. Industry Forces

Much like the federal government, state and local governments have come under greater financial pressures as requirements for services increase without corresponding improvements in the tax base. The passage of the Gramm-Rudman-Hollings Deficit Control Act continues to have an impact on federal support of state governments.

Past contracting patterns have shown that 45% of state and local government expenditures come from state governments, 30% from cities, 14% from counties, and only 11% from districts and other authorities. Use of outside services is seen as more economical and politically more desirable since it avoids increasing government employment levels.

2. Information Systems and Services Environment

The mission of information systems departments in state and local governments has broadened considerably in recent years, in spite of budget limitations. The demand for new services, especially on-line systems, has increased for health and social services, tax and fee collection for licenses, court and criminal justice needs, real estate construction/inspection/assessment data, voter/vehicle and business registration, and public safety services. Exhibit IV-22 highlights the factors affecting this market.

EXHIBIT IV-22

Key Factors in State and Local Government Market

- Positive
  - New program and service demands
  - Shortage of qualified in-house staff
  - Increasing network and resource-sharing demands
- Negative
  - Dispersed market (82,000 government units)
  - Emphasis on local vendors
  - Federal budget reduction impact
  - Federal revenue-sharing ended

Most of the older government information systems that operated in the batch processing mode are being replaced by interactive on-line service systems. Replacement or upgrade of hardware and software to meet new requirements has been met by standalone workstations, PC-based or turnkey systems—or by systems operations vendors.

Connectivity between systems has been resolved at state and large metropolitan centers by reliance on commercial networks from the common carriers. Network implementation between office information systems, larger data processing systems, and contracted services still requires attention in the medium-sized facilities of counties and districts.

Unfortunately, this market is large (82,000 government units) and geographically dispersed, presenting a significant problem for marketing and sales activities. The wide separation of opportunities also appears to foster greater dependence on local vendors that may lack adequate support staffs.

Despite the urgency of the need, many vendors find it difficult to compete because the roles and influence of officials, IS management, and advisory groups are not always clear, and some decisions seem arbitrary or politically motivated.

These negative factors are only aggravated by the current reduction in the federal budget which, in turn, impacts significantly the block grants passed on to the states.

3. Systems Operations Potential

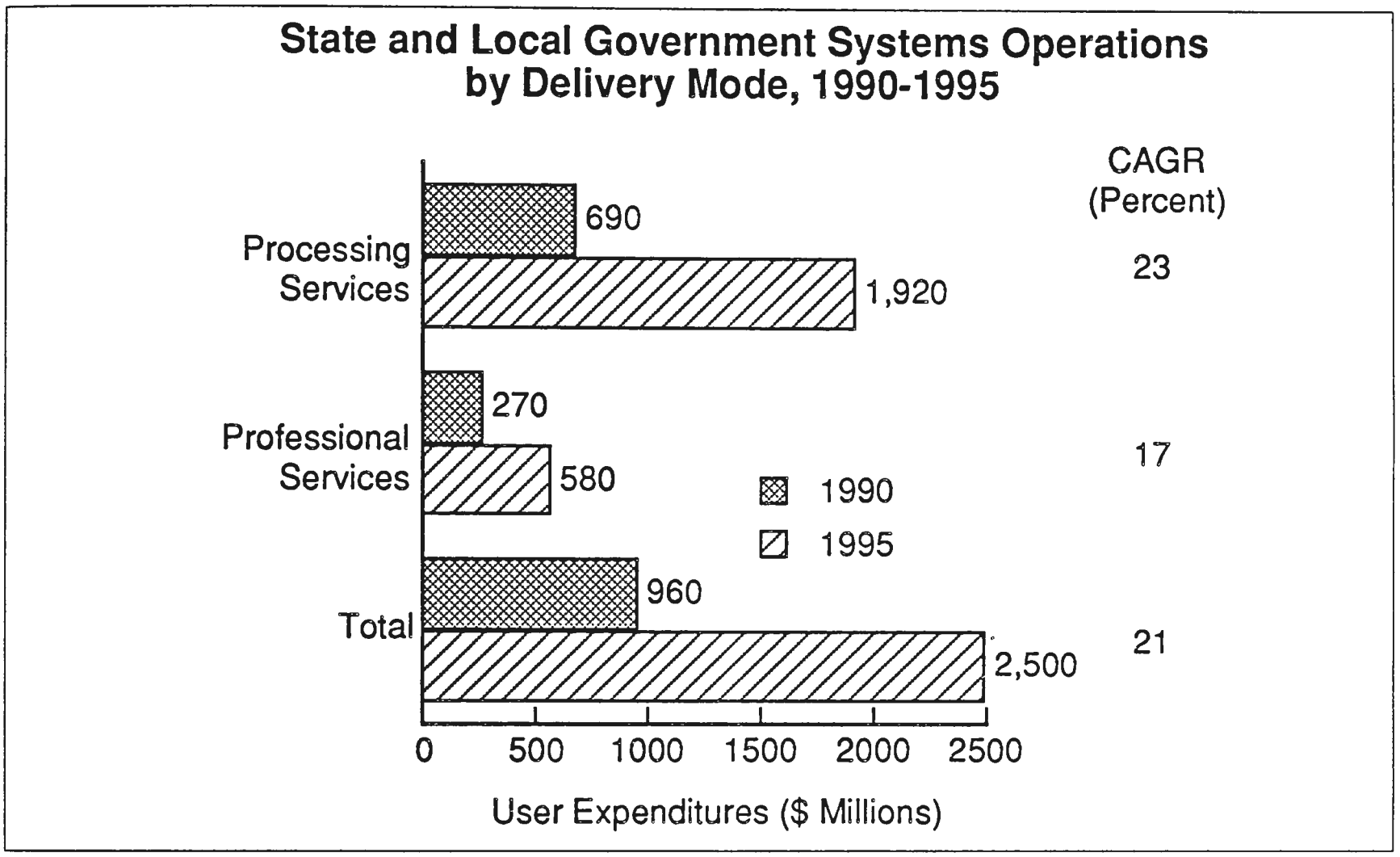
The shortfall of qualified project managers and technology specialists on in-house staffs will substantially increase SO prospects. Executives and governing bodies want systems that can share data, provide planning services and information on public issues, assure the integrity and security of personal data, reduce current maintenance backlogs, and offer more timely budget and financial data. Regional and district officials desire software tools that support analyses of alternative solutions to public sector problems.

One interesting window of opportunity appears to be the extension of SI projects into SO contracts upon their completion. By the end of the project, the contractor is well known to the client and has a better understanding of the system than anyone, including the client.

4. Systems Operations Forecast

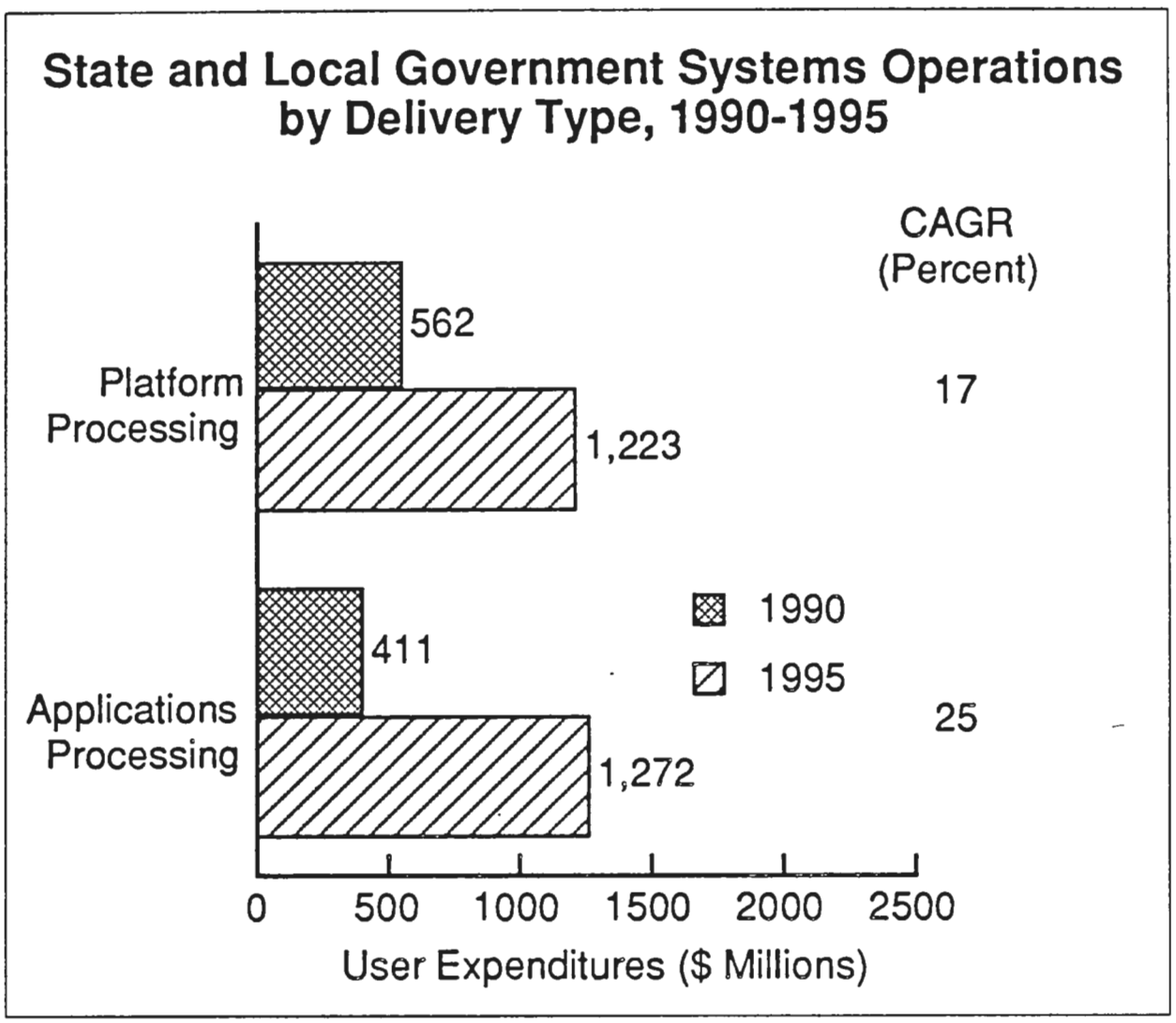
Exhibit IV-23 shows that the growth rate for the state and local government sector will be at 21% overall, with the growth for the processing services mode at 23% over the period 1990 to 1995. The uncertain future of funding through state and local taxes may lower growth over the period. The need for outside expertise and more efficient processing that SO vendors can supply does exist, but the decision makers are dispersed into relatively small units.

EXHIBIT IV-23



There will be a gradual trend towards more application processing operations over the 1990-1995 period, as seen in Exhibit IV-24. The platform processing vendors in this industry market will begin assuming responsibility for software as clients find it more difficult to recruit staff with technical skills and as clients begin to appreciate that they can all share common software from state to state in a number of applications areas.

EXHIBIT IV-24



EDS, Systemhouse, and SCT have traditionally been successful in this marketplace and should continue to be. Andersen Consulting and McDonnell Douglas are parlaying systems integration work into longer-term systems operations contracts. One interesting development is the promotion of supercomputer centers at the state level to entice research firms and technical industry to relocate in a state. The state of Alabama has a contract with Boeing Computer Services to operate a supercomputer center for the state that provides processing services to universities and industry. It is not likely that Boeing will expand this endeavor into other states, but plans for these centers exist in Minnesota and Washington as well.

I Transportation Industry

This sector is composed of airlines, railroads, trucking and other transportation businesses—including shipping, mass transit, postal, and pipeline services.

1. Industry Forces

This industry continued to perform poorly in 1990 because of the downturn in the economy, environmental concerns, and increased oil prices. All of the transportation industries are feeling the pinch of the economic slowdown because they are closely linked to the general economic trends

of the U.S. economy. However, there are many areas that are showing innovation and profitability.

Increased use of less-than-full-truckload shipments and double trailers are helping to increase trucking revenues, although threatened rate discounts could cut margins in the 1990-1991 period. Air freight shipping also increased, along with scheduled passenger traffic. Air cargo and air-express competitors have added automation, extended data communications, and bar-code readers to their arsenal of competitive weapons. Intermodal shipping companies that combine rail, road, and water transportation are on the increase, with several employing sophisticated load-modeling tools to improve efficiency.

2. Information Systems and Services Environment

Limited growth in IS expenditures will continue as transport firms seek to control costs to remain competitive. Productivity and efficiency are paramount considerations, so IS organizations have been kept small and productive.

Systems necessarily are communications intensive. Travel reservation systems, crew and maintenance scheduling, and route and load optimization modeling are the backbones of the industry. Part of the industry strategy is replacement of personnel with technology-driven systems. Technology lowers the cost of overall service by reducing labor costs, and at the same time improves the speed of response required to remain competitive.

These systems, when properly designed, also provide management with better information for statistical analyses of operations data, rapid response to changing market prices, labor and fuel cost savings, and sales/marketing planning and analysis.

The deregulation of this industry fostered a competitive environment that demands the use of automation technologies as competitive tools. Price wars based on more progressive tariff structures have cut so dramatically into revenue that many firms need to take additional cost-cutting measures. The industry has only a limited number of large transportation companies in the airline sector and rail transport with the sophistication to accomplish the technological changes internally.

The competitive battleground is largely in the reservation systems required for securing, at a guaranteed price, space for the movement of people or cargo. Since prices seem to change daily with deregulation, and since the agents who need this up-to-date information are dispersed over vast areas, complex networking experience is the ticket to the industry. Some positive factors are in place for SO vendors to step in and service the market, as seen in Exhibit IV-25.

EXHIBIT IV-25

Key Factors in Transportation Industry

- Positive
  - Network design/integration
  - Automated systems seen as competitive tools
  - Limited capital investment availability
- Negative
  - Limited opportunities outside of airline segment
  - Little growth in IS expenditures
  - Limited use of outside services

3. Systems Operations Potential

SO vendors will need to solve problems of how to make changes to a complex system easily and without interrupting ongoing operations. Vendors need to offset the recognized technical weaknesses in the prospect's internal staff as well as their limited capabilities in project management. These and other negative factors are outlined in Exhibit IV-25.

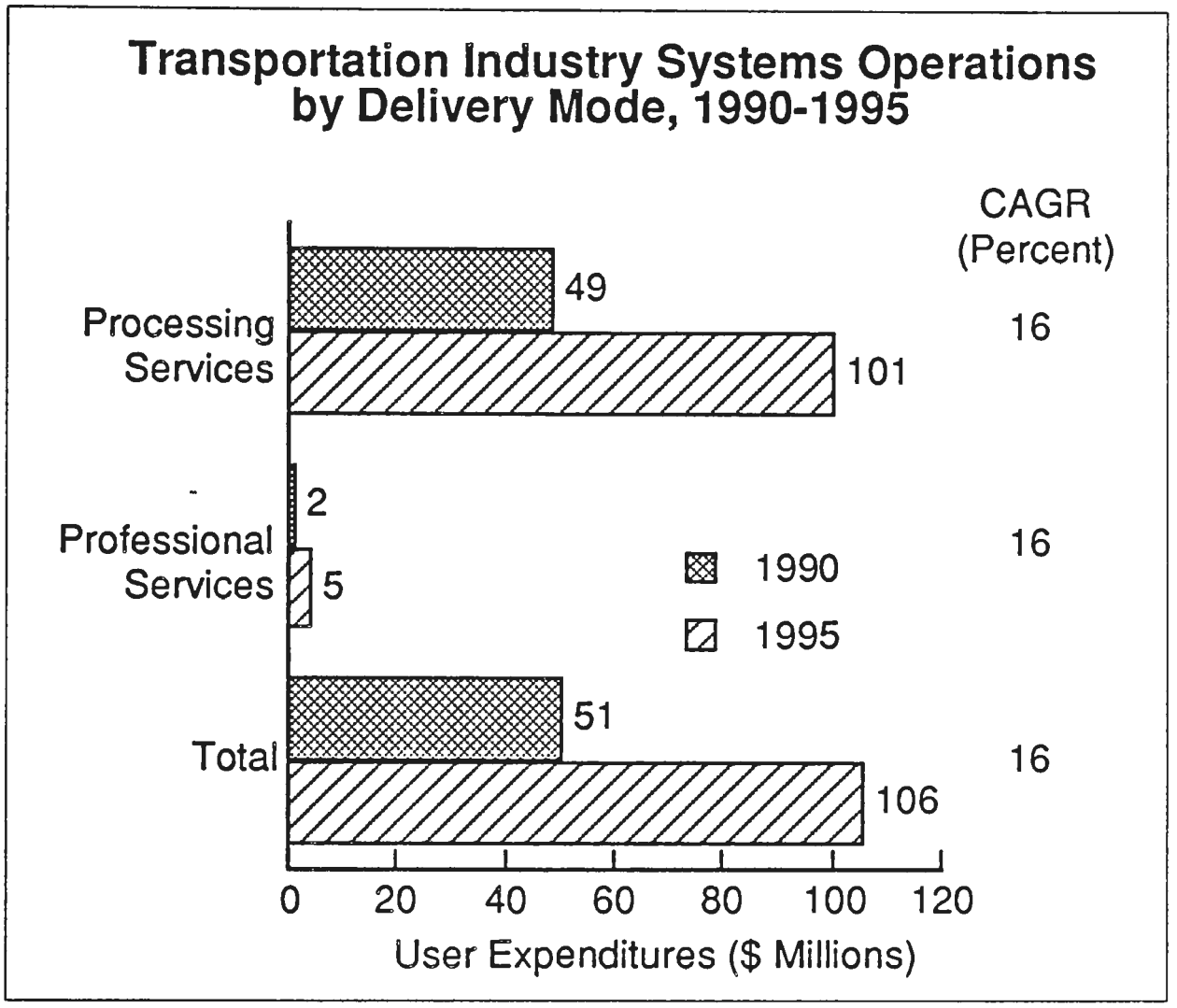
There are a limited number of opportunities because of the low level of anticipated expenditures outside the airlines segment. In the airline sector, opportunities will tend to involve communications-intensive solutions.

Beyond major airlines, the rail industry has begun looking at some automation projects that have potential for systems operations outsourcing, but the trucking industry seems unable to support them. These segments are not particularly accustomed to the use of technology or the need to apply automation.

4. Systems Operations Forecast

The projected CAGR for the period 1990 to 1995 for this market sector is 16%, up from the projected 12% reported in INPUT's last report. This forecasted increase represents activity in the airlines sector. Exhibit IV-26 presents this data.

EXHIBIT IV-26

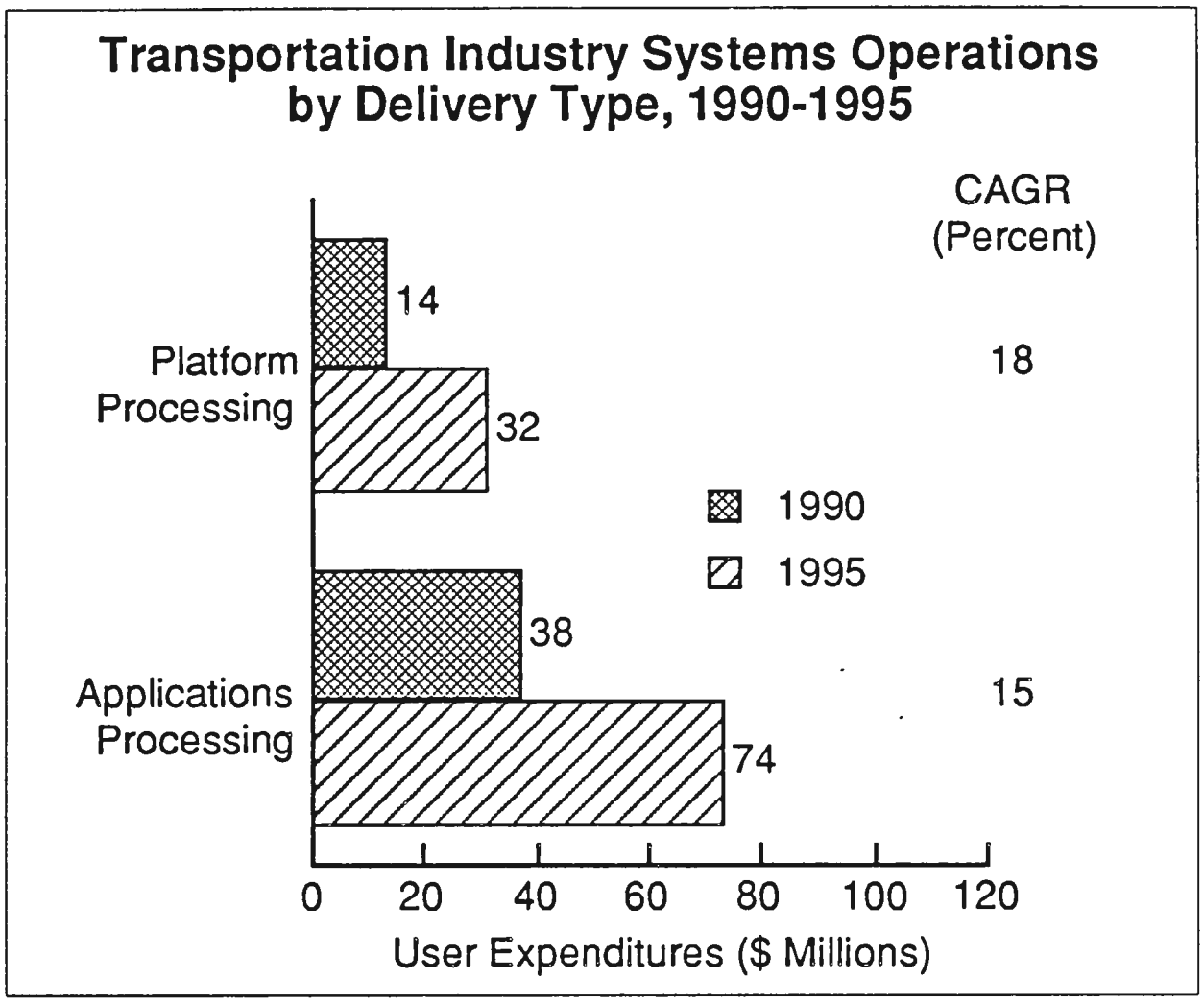


INPUT expects other portions of this market—rail, trucks, and ocean transportation—to continue to be stagnant in spite of their urgent need to reduce costs. There appears to be a lack of sophistication in some of the sectors, which results in reluctance to outsource operations. In the rail transportation sector, respondents indicate that any outsourcing that will develop will be strictly for communications services or remote special data-gathering functions, not for complete information processing centers.

In Exhibit IV-27, the expenditures split between platforms and applications processing is expected to be maintained over the five-year period. The market share for applications processing reflects the continued activity in the airline sector, as opposed to new developments in other sectors.

Specialized vendors such as Covia and EDS are the dominant vendors in this marketplace. There is no reported activity among other major SO vendors in this sector, though Andersen Consulting has done some systems integration projects in the transportation market.

EXHIBIT IV-27



J

Telecommunications Industry

This sector is composed of the major providers of telecommunications—AT&T, MCI, Sprint, GTE, Contel, the Regional Bell Operating Companies (RBOCs), independent local exchange carriers, long-distance resellers, 800 and 900 services, and cellular operators—as well as companies providing broadcasting, cable TV, and optical fiber and satellite networks. As the media available for information transfer become more varied, this sector may be better described as the electronic communications industry.

1. Industry Forces

The telecommunications industry continues to post nominal growth overall. But vendors such as AT&T and MCI report substantial gains, and subsectors such as cellular phone and VSAT show significant growth potential. As yet, they have not felt any substantial impact from the slowdown in the economy.

Merger activities reflect an industry need to dominate or establish presence in selected markets and to place greater emphasis on service rather than circuit capacity. MCI's acquisition of an equity interest in Infonet and the acquisition of TELCOM-ONE are notable examples, as is the Contel/GTE merger. AT&T's acquisition of Western Union electronic mail service is pending.

While substantial investments are being made, the industry is still in a holding pattern until the next round of liberalization occurs. Most RBOCs are waiting to be able to provide more than gateway services. Meanwhile, independent companies are positioning themselves to be end-to-end providers of information services.

2. Information Systems and Services Environment

Bell telecommunications companies lost a major source of IS support when they were separated from AT&T. This lost capability is now replaced by in-house capabilities. There is a tendency to build internal expertise and a large processing base because the capital equipment involved is included in the base used to calculate the rates, much as in other regulated industries. This not only limits the outsourcing potential, but encourages the telephone companies to provide services themselves. Many have chosen to do so.

The new and emerging information carriers—such as cable TV, Teletex, and cellular systems—are using IS to operate billing, traffic and programming management, maintenance scheduling, and marketing programs. Their need for flexibility of services, connectivity among operating elements, and response to changing market conditions may cause them to seek external resources since these carriers are not regulated sectors of the industry and gain no advantage in procuring hardware.

3. Systems Operations Potential

With the tendency for the major communications providers to maintain a large internal processing capacity, the challenge for systems operations vendors is to identify certain niches where they can provide added value. McDonnell Douglas, for example, has identified a CAD/CAM market where they can provide expertise to the network engineering departments of the major communications providers.

Certain major independents and the RBOCs have been outsourcing much of their labor requirements, including the operations of data centers. In those cases, the management of the data center remains the purview of the client, but this tendency should be watched, as it provides an opportunity for systems operations.

In other sectors of the communications market, the SO potential should be greater. Many of the new, emerging firms in the cellular phone and cable TV industry need the billing, problem tracking, scheduling software, and processing capacity that vendors have available now. SO vendors may be competing with RBOC data processing departments that are also positioned to service this market, but this potential should be noted.

The highly unionized workforce in the telecommunications industry is a negative factor for the penetration of certain sectors of this market. Exhibit IV-28 illustrates some of the positive and negative forces in this marketplace.

EXHIBIT IV-28

Key Factors in Telecommunications Industry

- Positive
  - New industry sectors lack IS skills
  - Widening range of services requiring support
  - General health of telecommunications industry
- Negative
  - Desire to keep hardware in-house
  - Perceived in-house technical skills
  - Highly unionized workforce

4. Systems Operations Forecast

INPUT projects the CAGR for this industry over the period from 1990 to 1995 to be 16%, slightly less than the projection for last year. The barriers to penetration mentioned above—e.g., highly unionized workforce and heavy investment in computer equipment—should continue to have an effect. Note that both processing services and professional services modes are growing at similar rates, the data is presented in Exhibit IV-29.

From Exhibit IV-30, it is apparent that there is an imbalance in the growth rate between the application type and the platform type (21% and 5%, respectively) for the telecommunications industry. This is both a function of the vendors that are primarily the RBOCs and professional services companies, and the fact that the smaller companies in this industry—the most likely prospects—are looking for total solutions from the vendors, not just processing
solutions.

EXHIBIT IV-29

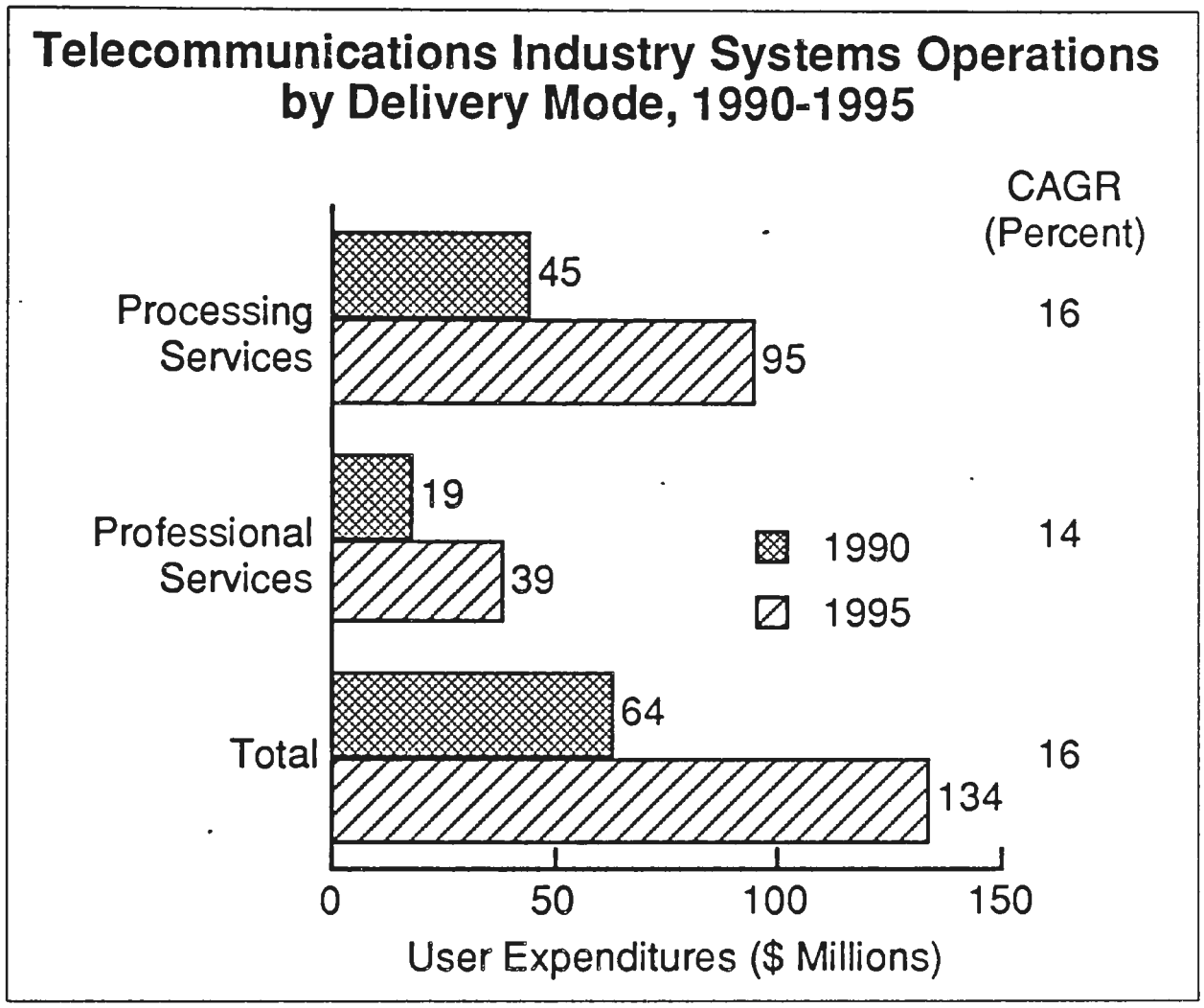
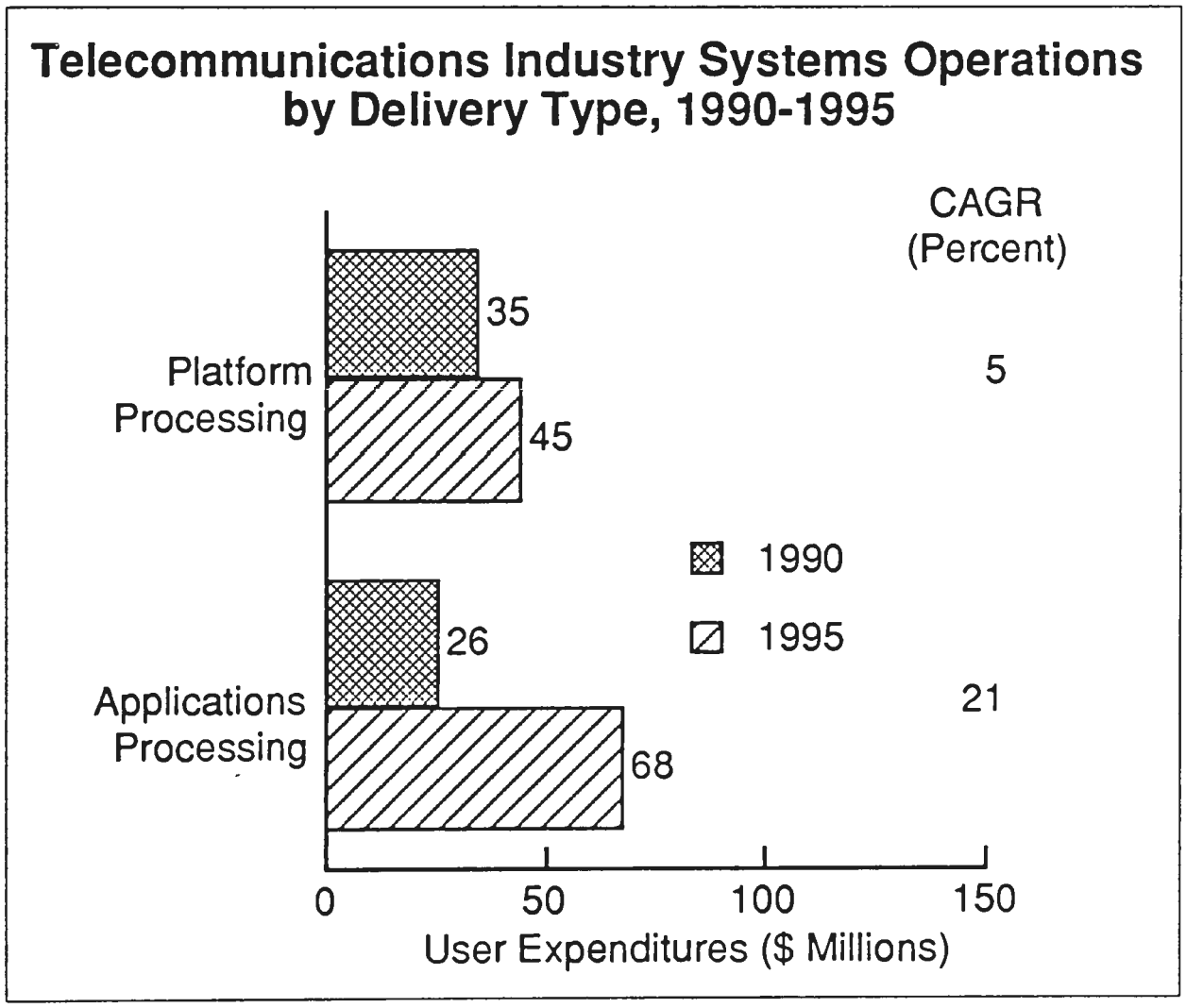


EXHIBIT IV-30



When assessing the prime vendors in this industry, Cincinnati Bell Information Services, Ameritech, and U.S. West stand out as providing services to the smaller independents. They are actively pursuing this marketplace and can offer industry expertise and processing capacity that is hard to match. Other companies, such as McDonnell Douglas and Telos, have found particular applications niches that they continue to exploit. Some vendors with professional services roots, such as Andersen Consulting, AMS, and Systemhouse, report revenues in this industry sector. The balance between the professional services mode and the processing mode reported supports this finding.

K

Wholesale Distribution Industry

This sector includes establishments that, acting as brokers, sell goods to retailers or industrial/commercial/institutional groups.

1. Industry Forces

The wholesale distribution market includes a number of widely different submarkets with equally different growth rates. Some very large wholesale establishments are leading-edge users of information technology, but many more—in the thousands—are very small and do not employ the technology. There are three types of firms: independent distributors (merchant wholesalers), which account for about 55% of sales; manufacturer's sales branches, which generate about 35% of sales revenues; and agents and brokers, which handle somewhat less than 10% of sales and whose numbers are diminishing.

Winners for 1990 in this sector include paper, petroleum, machinery, lumber, and farm products. Areas that lost market share or revenue were autos, auto parts, and metals. The impact on IS is unclear because firms with losses are now moving to improve their market positions with updated resources.

Measures to ease the pressure on margins include increased inventory turnover, secured high-volume purchases, longer and larger purchase commitments, and automation improvements that contribute to the bottom line by enabling rapid response and deployment of products. Better communications will accelerate the information flow between wholesalers, retailers, and manufacturers/sources of goods. Back-office use of computer-to-computer order processing will reduce the time needed to locate and deliver merchandise.

2. Information Systems and Services Environment

IS in the medium to large wholesale organization is faced with meeting rising management expectations and satisfying increasing demands for the integration of data and applications, while managing the limited technical investment. The mission is complicated by the traditional instability of the sales-oriented organizational environment.

Productivity of the IS staff is frequently impacted by varying backlogs of short-term or one-time application demands. Users in sales, management, and traffic are demanding increasingly complex tools, such as upgraded applications and on-line teleprocessing to gain a competitive edge. To meet these demands, IS is looking to reduce processing costs, expand connectivity, and introduce network techniques such as EDI.

The cost constraints inherent in this sector limit the level and availability of in-house staff to address service issues with the latest technology while meeting day-to-day processing requirements. In addition, IS managers are having difficulty gaining any meaningful insight into future industry directions that would influence the selection of information technologies.

Only a small number of wholesalers are currently employing distribution resource planning (DRP) with inventory modeling, automated warehouses, and OLTP (on-line transaction processing) resources. More of the larger firms are expected to move in this direction to remain competitive, but the smaller firms will have to find that expertise outside.

Like the retail distributors, wholesale distributors have not made use of outside services except for hardware maintenance and essential software support. In an industry largely guided by merchandising intuition—using relatively small IS staffs and financially constrained by narrow margins—there has been minimal outsourcing of systems operations.

3. Systems Operations Potential

There are approximately 30,000 wholesale distributors with between $5 million and $20 million in annual sales, plus another 6000 with sales in excess of $25 million. This large and diverse base of prospects is faced with the need to automate but lacks the skilled in-house resources to accomplish it. Only the largest distributors have adequate staff to change how they address market needs. Many of the smaller firms look to the large firms for direction. Exhibit IV-31 summarizes the market factors.

Part of the lack of penetration in this vertical market is attributable to the existence of widely different submarkets. SO vendors' experience is seen as relatively narrow. Each submarket sees itself as having unique requirements that can only be addressed by knowledgeable specialists.

From a systems operations viewpoint, however, this market offers broad challenges that could be addressed by technology and tools already employed successfully in other markets. The marketing of SO capabilities has to offer phased transition over time to minimize the impact on day-to-day operations.

EXHIBIT IV-31

Key Factors in Wholesale Distribution Industry

- Positive
  - Network requirements for retailers
  - Strong interest in inventory controls
  - Automation needed for survival
- Negative
  - Cost pressures/low margins
  - Need to keep operations running during transitions
  - Widely different submarkets
  - Many small wholesalers

4. Systems Operations Forecast

The wholesale distribution sector is expected to grow at 19% for the period 1990 to 1995. This segment starts with a low base and continues to be a small portion of the total systems operations market.

Exhibit IV-32 illustrates that most of the growth is in the processing services mode. INPUT believes that this is a result of the industry's incentive to find lower-cost ways to meet its data processing requirements.

Exhibit IV-33 illustrates that most of the processing in this vertical industry is platform systems operations. Most clients indicate they know their business best and will not entrust software to vendors. This trend will continue, though the growth rate for applications systems operations will accelerate by 1995.

No major systems operations vendor appears to have advantage in this sector, and user respondents indicate that they do not find any vendor with expertise in the wholesale distribution business. Certain large wholesalers—particularly agricultural cooperatives such as Agway and Land O'Lakes—do processing for smaller co-ops in their submarket, but this pattern does not seem to occur in other submarkets. No marketwide pattern has yet emerged.

EXHIBIT IV-32

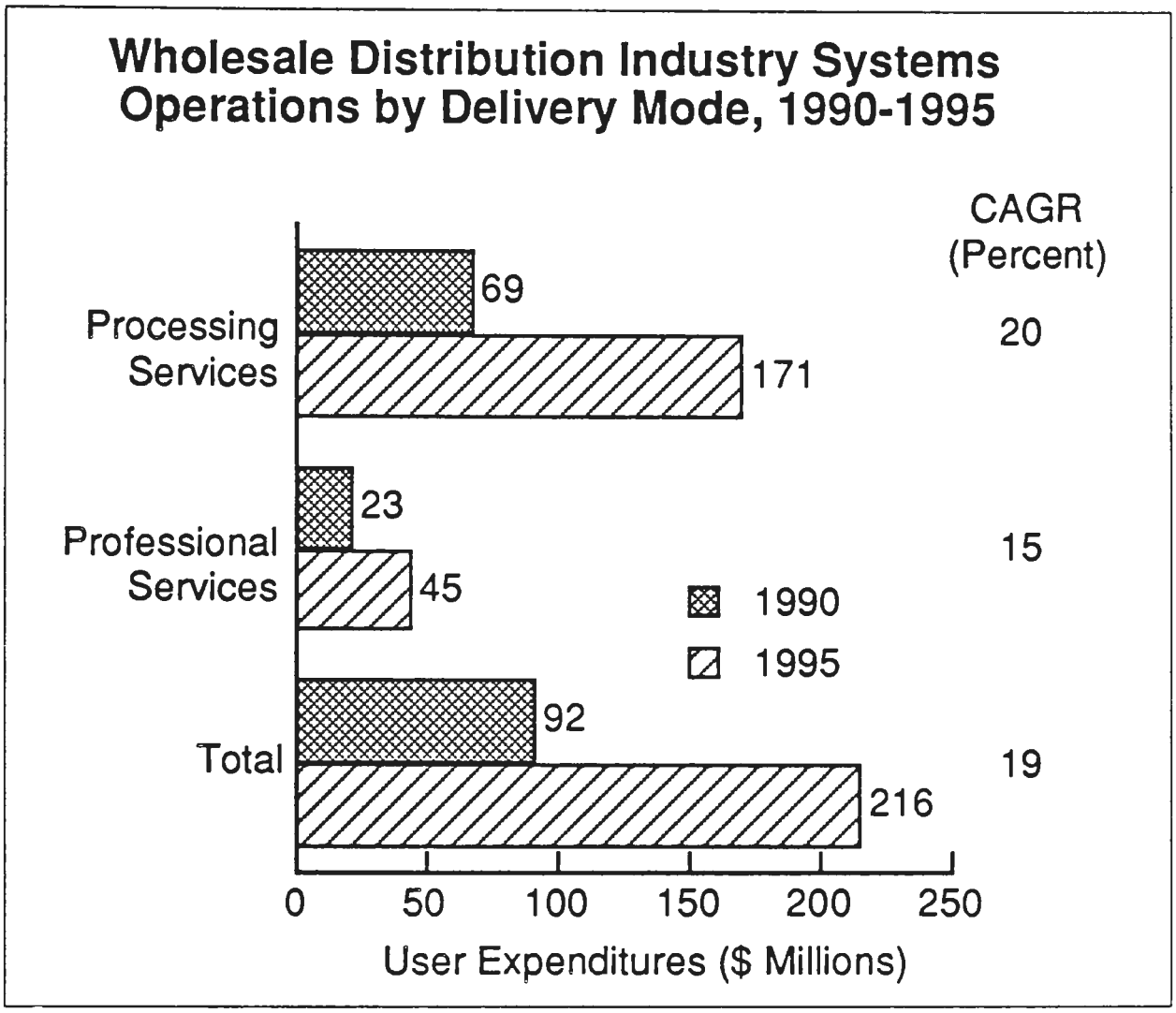
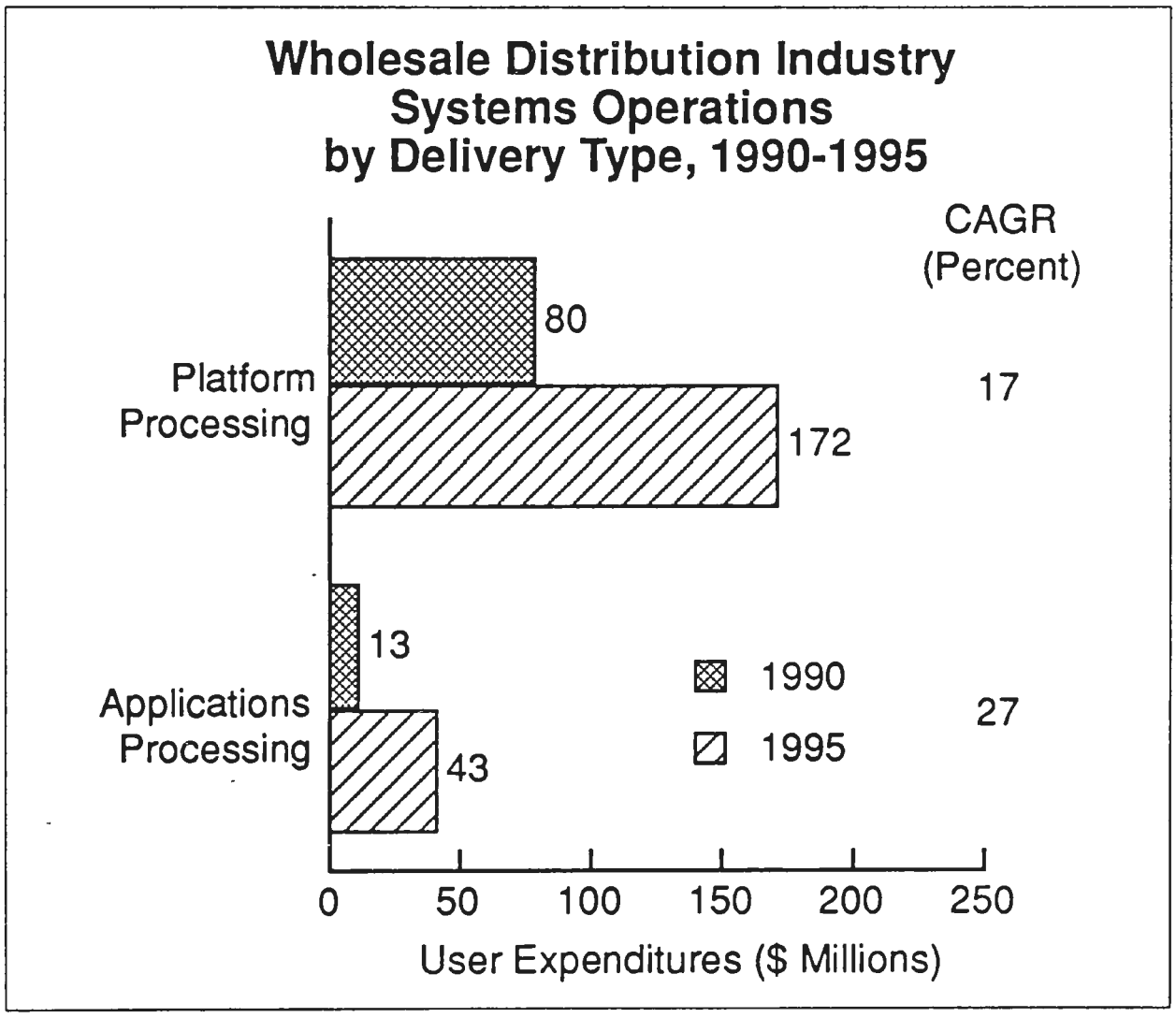


EXHIBIT IV-33



L

Utilities Industry

This sector includes the energy market (electricity generation and coal/nuclear/hydro/oil/solar/geothermal/gas energy production), water utilities, and sewage/waste disposal and treatment, but excludes telecommunications.

1. Industry Forces

Although the Iraqi invasion of Kuwait has sharply increased oil prices and is hitting some energy industries hard, the electric utilities industry has minimized the effects of the price increase by reducing its dependence on oil and shifting its production to other sources of fuel, such as natural gas. Natural gas has the most to gain from the increase in oil prices because environmental concern and oversupply have already made gas favorable and cheap. Nuclear power still stirs environmental issues and faces high set-up costs. Coal burning also faces environmental concerns about air pollution.

Pressures for mergers, improved cooperative load sharing, and a search for funds for more facilities continue in the utilities industry. The poor condition of utility balance sheets results from the enormous cash drain many utilities have suffered as a result of litigation, project overruns, environmental clean-up measures, and, in particular, nuclear power plant construction. Poor balance sheets are unlikely to be resolved in the near future.

2. Information Systems and Services Environment

IS has been forced to shift from a comfortable day-to-day operating orientation to one where IS must meet dynamic demands within constrained budgets. Management has directed IS to help in enhancing operating efficiency and productivity to make the utility more profitable, and to reduce costs while increasing the ability to serve users. Cost containment remains the principal focus of all operations support activities.

As demand increases, awareness should increase that systems operations vendors are a source of expertise that has been relatively untapped to date. Many of the support systems are being changed from batch to on-line, and issues regarding the proper use of advanced technologies and distributed versus central processing are now being addressed in new systems requirements.

Utilities are discovering the use of technology for maintaining a competitive edge. Customer files are becoming marketing data bases to improve service to customers and to market new products. AI-based automated process control is helping to minimize materials consumption and optimize resource applications.

Under the consumer-oriented constraints imposed by regulatory and environmental authorities, and the resultant low ROI, investments are limited and prevent implementation of a number of desirable improvements in data and control systems. Operating executives have modular, rather than total, views of the systems; their perspective is restricted to raw materials, processing, maintenance, or customer relations. Traditional views are slow to be modernized in this basic industry.

3. Systems Operations Potential

Exhibit IV-34 presents key factors affecting the IS departments in the utilities industry.

EXHIBIT IV-34

Key Factors in Utilities Industry

- Positive
  - Increasing complexity of technology
  - Hardware/software obsolescence
  - Automation of repetitive tasks
- Negative
  - Day-to-day orientation of IS
  - Limited number of establishments
  - Financial constraints
  - Incentive to build up in-house capacity

Information systems managers in the utilities vertical industry market are faced with the increasing complexity of technology, whose introduction is a labor-saving measure. This technology includes remote meter readers, remote sensing hardware, other control equipment and devices to eliminate redundancy. Their own data processing shops and staffs, meanwhile, are becoming obsolete and cannot interface with the new technology. Systems operations vendors can leverage scarce technical experts and help them out of their dilemma. Yet, there are strong counteracting forces to these incentives.

The in-house orientation that is traditional in utilities firms continues, fostered by a conviction that their cost containment policies are working. The fact that the firm's capital equipment base is used in calculating the rate base for most utilities encourages the accumulation of data processing hardware in-house. The net effect is to discourage the search for solutions outside the company, except in very specialized cases.

4. Systems Operations Forecast

The compound annual growth rate (CAGR) for this industry for the period from 1990 to 1995 is 15%. There is no change from the 1989 forecast. Both the processing services mode and the professional services mode are growing at the same rate, although the amount of professional services work is only 15% of the total, and it will continue at that rate. See Exhibit IV-35 for a summary.

EXHIBIT IV-35

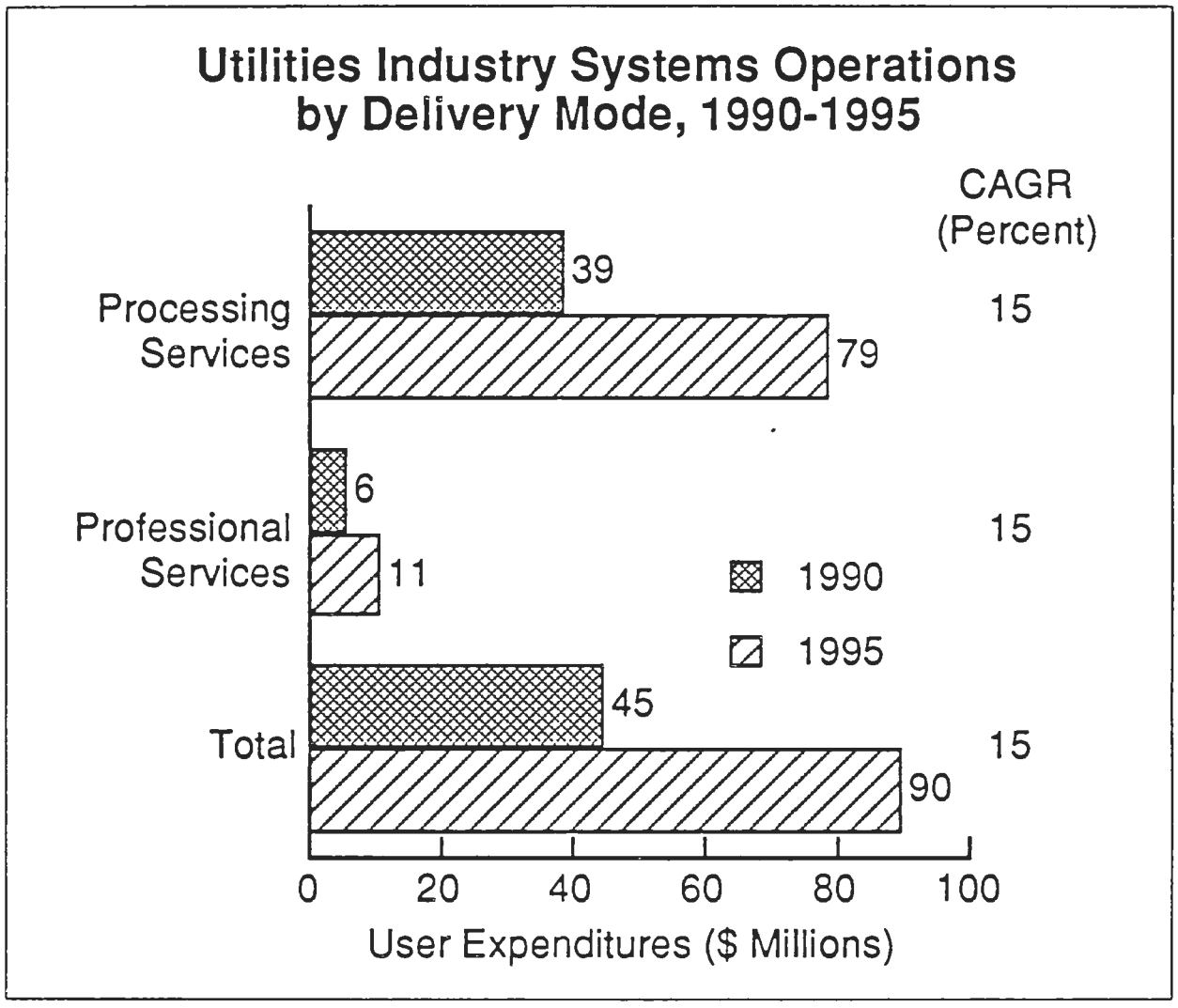
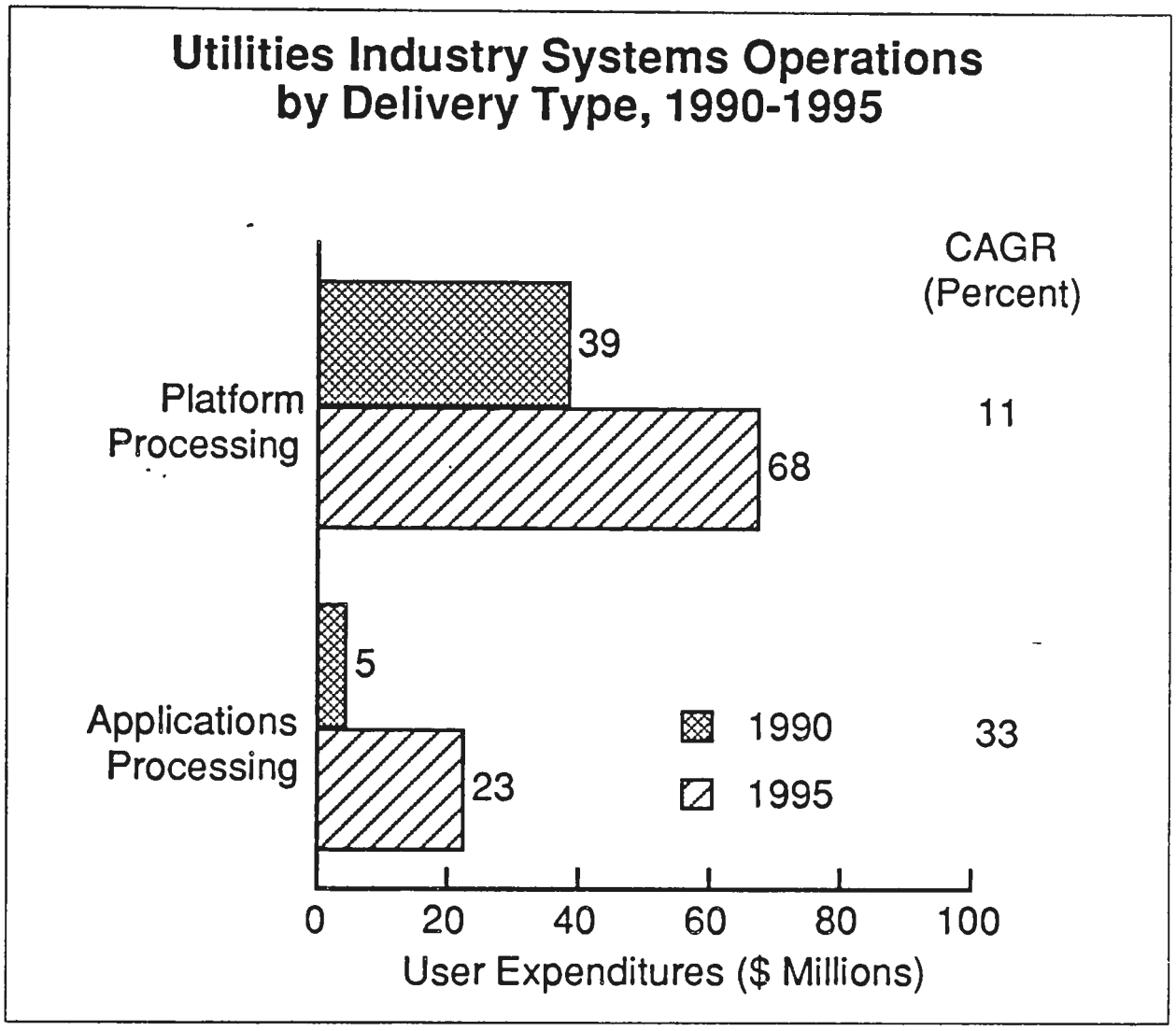


Exhibit IV-36 illustrates how applications processing, despite its small expenditure base, will grow in the 1990-1995 period. Applications processing should exhibit the same general tendencies of other vertical markets to grow more rapidly in the applications processing type of operations.

EXHIBIT IV-36



The industry continues to be in-house oriented because of the incentive to invest in hardware. No major vendor has penetrated this barrier yet. MCN, the data processing subsidiary of Michigan Consolidated Gas, recently merged with Genix Group, a force in the manufacturing sector of the systems operations market. This new relationship may lead to some penetration, since the new entity can certainly provide expertise in the utilities sector. Power Computing has also reported activity in this sector, particularly in providing CDC-based services (Duke Power Computing is a recent contract), but very few other suppliers can be identified. Both IBM and EDS have made systems operations proposals to utilities in the Midwest, but neither have closed any business as yet.

M

Business/Technical Services Industry

This sector includes real estate companies, business and legal services firms (excluding hotel reservations), and firms providing engineering, accounting, research, management and related services.

1. Industry Forces

Some of the forces affecting the business/technical services industry are the general economic slowdown, globalization, and expansion into homogeneous markets. With the U.S. economy facing a recession, companies are looking to outside business services to reduce their internal costs and keep their businesses focused and flexible.

As the growth of U.S. manufacturing goods slows, interest is changing towards global markets. Larger business and technical servicea firms are becoming more international in scope. Smaller business service companies will also stand to gain from this global expansion if larger local businesses leave to follow the foreign opportunities.

There has also been an incursion of CPA firms and manufacturing entities expanding into consulting services. These businesses are diversifying into homogeneous markets. The same type of expansion can be seen in full-service-type offerings of large law firms.

2. Information Systems and Services Environment

Though this vertical industry market is characterized by small businesses and partnerships, the larger firms and associations depend on IS for a range of services—from mailing list processing to engineering support. Much of the IS support is provided by outside firms or is based on PCs and workstations.

Continued pressure to operate more efficiently is causing some old systems and software to be upgraded. Lack of technical expertise within this industry will continue to slow down any major change.

3. Systems Operations Potential

As mentioned above, many firms in this vertical industry market are accustomed to working with outside vendors. Generally, they obtain consulting or processing services on a short-term basis. They often need varying amounts of help on a seasonal basis and have not been accustomed to entering into longer-range contracts with vendors.

The large accounting firms in this market are certainly sophisticated enough to benefit from the latest technology, particularly in networks and data management. Associations and service-based organizations are often served by jointly owned, fee-based support organizations that could be considered as captive outsourcing organizations. Exhibit IV-37 sums up the factors at play in this market segment.

4. Systems Operations Forecast

This vertical industry represents the smallest current market for systems operations. It is projected only to grow at a CAGR of 12% for the period 1990 to 1995, as seen in Exhibit IV-38. The processing services portion is projected to grow at 15%, while the professional services mode is only expected to grow at a rate of 9%. Since the spread of expenditures is fairly evenly divided between the two modes, the growth rate is the average of the two growth rates.

EXHIBIT IV-37

Key Factors in Business/Technical Services Industry

- Positive
  - Demands for networks and data bases
  - Markets creating new system demands
  - Receptive to outside services
- Negative
  - Few large enterprises
  - Economic uncertainty
  - Diverse market subsegments
  - "Captive" outsourcing organizations

EXHIBIT IV-38

Business/Technical Services Industry Systems Operations by Delivery Mode, 1990-1995

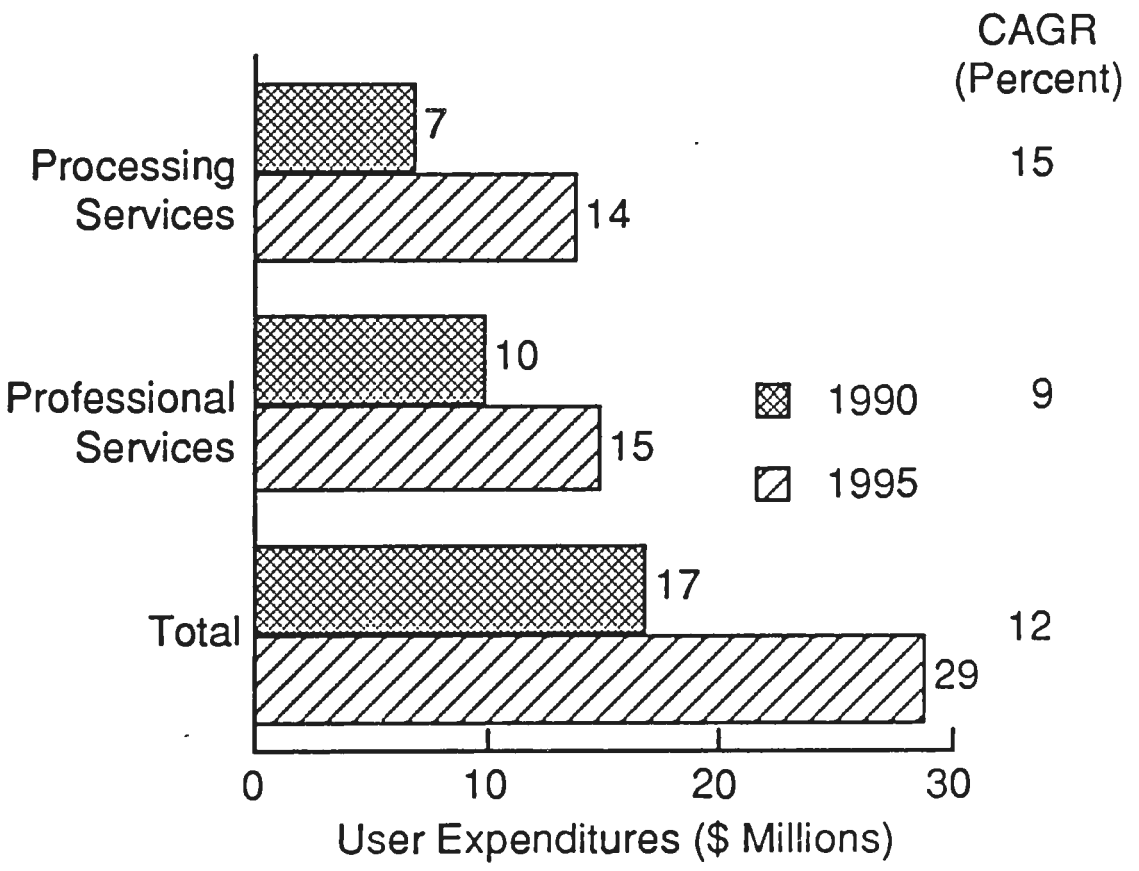
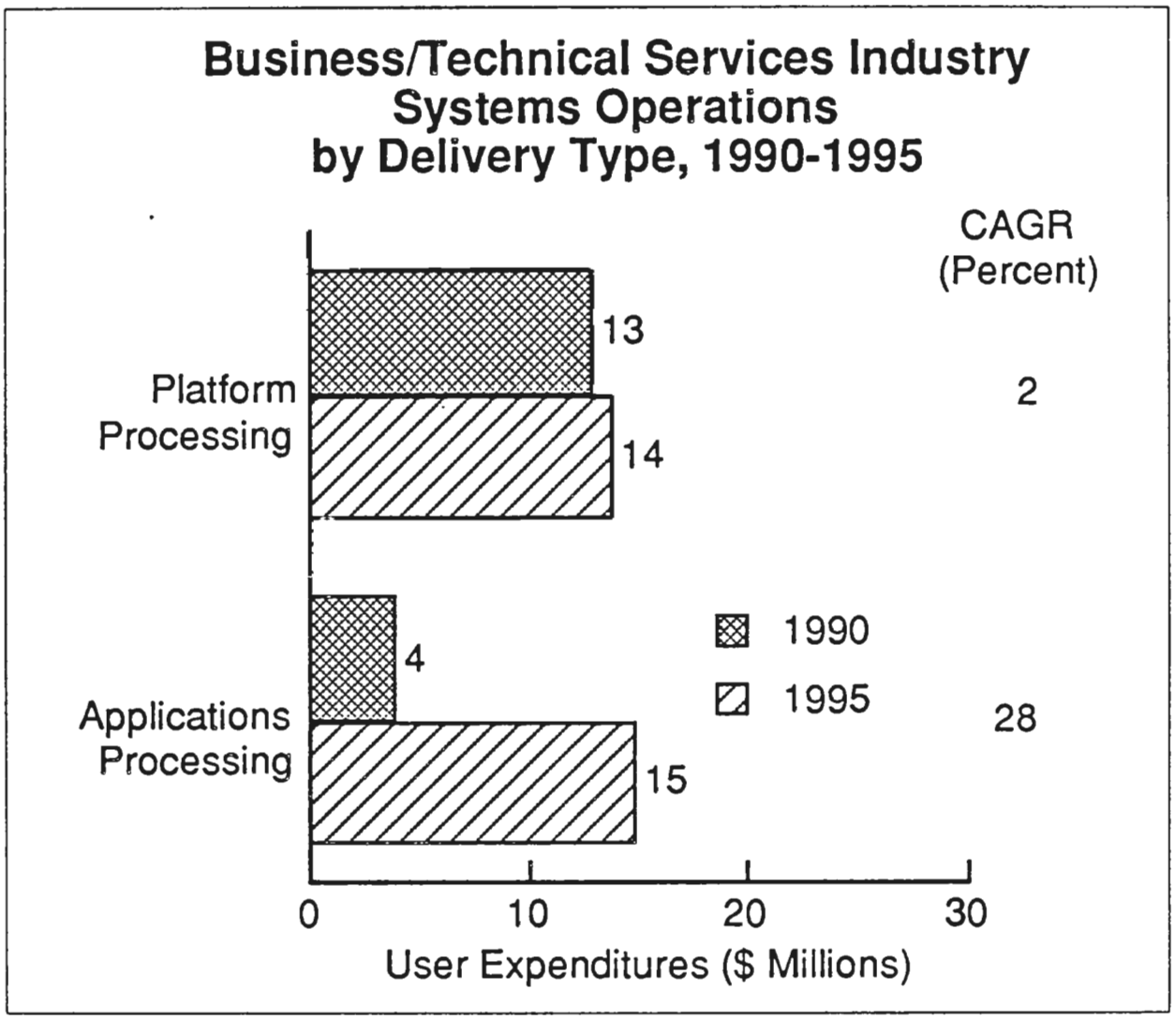


Exhibit IV-39 illustrates that there will be a substantial increase in applications processing system operations in the vertical market in the 1990-1995 period. This immature industry market will be affected by the general business trends as it grows. This accounts for the larger growth in applications systems operations.

EXHIBIT IV-39



There are no dominant vendors in this industry market. The PRC subsidiary of Black and Decker has long been active in the real estate marketplace, but it currently provides processing services, not systems operations, for that sector. The Big Six accounting firms are information services vendors in their own right, and some, such as Andersen Consulting, have entered the systems operations market.

N

Personal/Consumer Services Industry

This sector includes the airline reservations business, travel agencies, hotels, and hotel reservations services, the entertainment business in its various forms, automobile services, other repair services, membership organizations, and social services organizations.

1. Industry Forces

The two largest industries in this sector are the travel-related and hotel industries. These industries are probably the only two in the segment

They are also very closely related. Together they face the rising fuel price crisis and the economic slowdown, which could slow the use of domestic travel.

Since 1989, the hotel industry has been experiencing an oversupply of rooms and weaker demand. To combat this problem, there has been an emphasis on niche markets in different price levels, such as economy accommodations and all-suite accommodations. The hotel reservation systems are becoming more advanced, with central reservation systems appearing that allow reservations for rooms, cars, and airline tickets to be purchased at one location.

The travel service industry is made up of mostly small businesses, with the exception of the airline industry. The airline reservations business continues to fare well and is becoming more innovative due to deregulation and increased competition. Rental car companies are also experimenting with automated reservation terminals, located in airports, that are used to speed up the acquisition process.

2. Information Systems and Services Environment

This sector is made up of extremes. On one hand, the airlines reservations systems and the hotel reservations systems are classical outsourcing functions with large volumes of transactions and a large network component. On the other hand, there are subsegments of this market sector that are very small and diverse with very unsophisticated IS needs.

The reservations system has long been an area where the latest IS technology has been applied to improve responsiveness and efficiency in transaction processing. Large mainframes were applied to the task early in the industry's evolution. It also continues to be a very fruitful area for the application of the latest communications technology, and EDI technology has potential for application here.

The demands for technology are driven by a need to be responsive to customer needs. This same need exists among the auto dealerships and the social service organizations, which have been less quick to adopt the technology.

3. Systems Operations Potential

There is a recognized potential in the airlines reservations sector that is currently being pursued aggressively by EDS. What started out as a large processing operation owned and managed by the airlines, System One, became a problem as the airlines' financial situation deteriorated due to mergers, acquisitions, and the intensified competition that deregulation of the airline industry entailed. The outsourcing of systems operations

provides them with a source of cash to be applied to their debt servicing and ongoing operations.

This same cash crunch may be developing in the hotel industry as the economy slows and hotel chains are a prime candidate for systems operations vendors. These same factors may be in motion in the automobile industry as well, in which case the preponderance of independent dealers would make a concentrated thrust much more difficult.

The rest of this sector is made up of small purchasing units that do not appear to be good candidates for anything but a niche vendor. Exhibit IV-40 summarizes the forces at work in this market sector.

EXHIBIT IV-40

Key Factors in Personal/Consumer Services Industry

- Positive
  - Strong customer service orientation (airlines & hotels)
  - Need for cash in certain market subsegments
  - Need for network capabilities
- Negative
  - Segmented marketplace
  - Very diverse expertise required to service market

4. Systems Operations Forecast

The growth for this new sector is projected at 25% for the period 1990 to 1995, as seen in Exhibit IV-41. All the activity in the airline reservation segment of the market will probably lead to growth in systems operations in that area. Currently, all of the growth is in the processing sector, and the professional services portion is negligible and is expected to remain so.

As demonstrated in Exhibit IV-42, there will be balanced growth in the vertical market between platform and applications processing expenditures. This would change significantly were there a major change in the relationships between vendors and clients in the airline reservations segment.

EXHIBIT IV-41

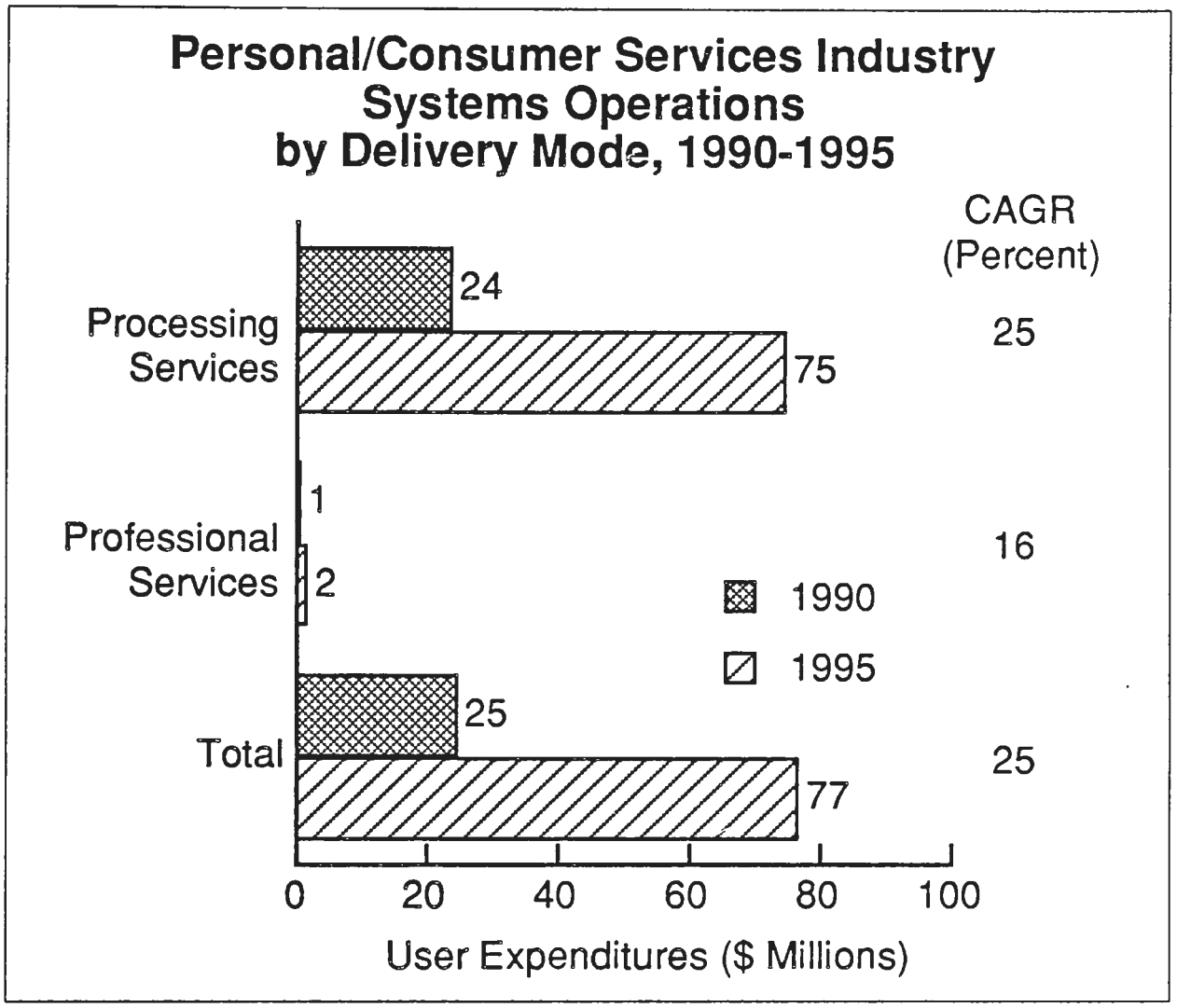
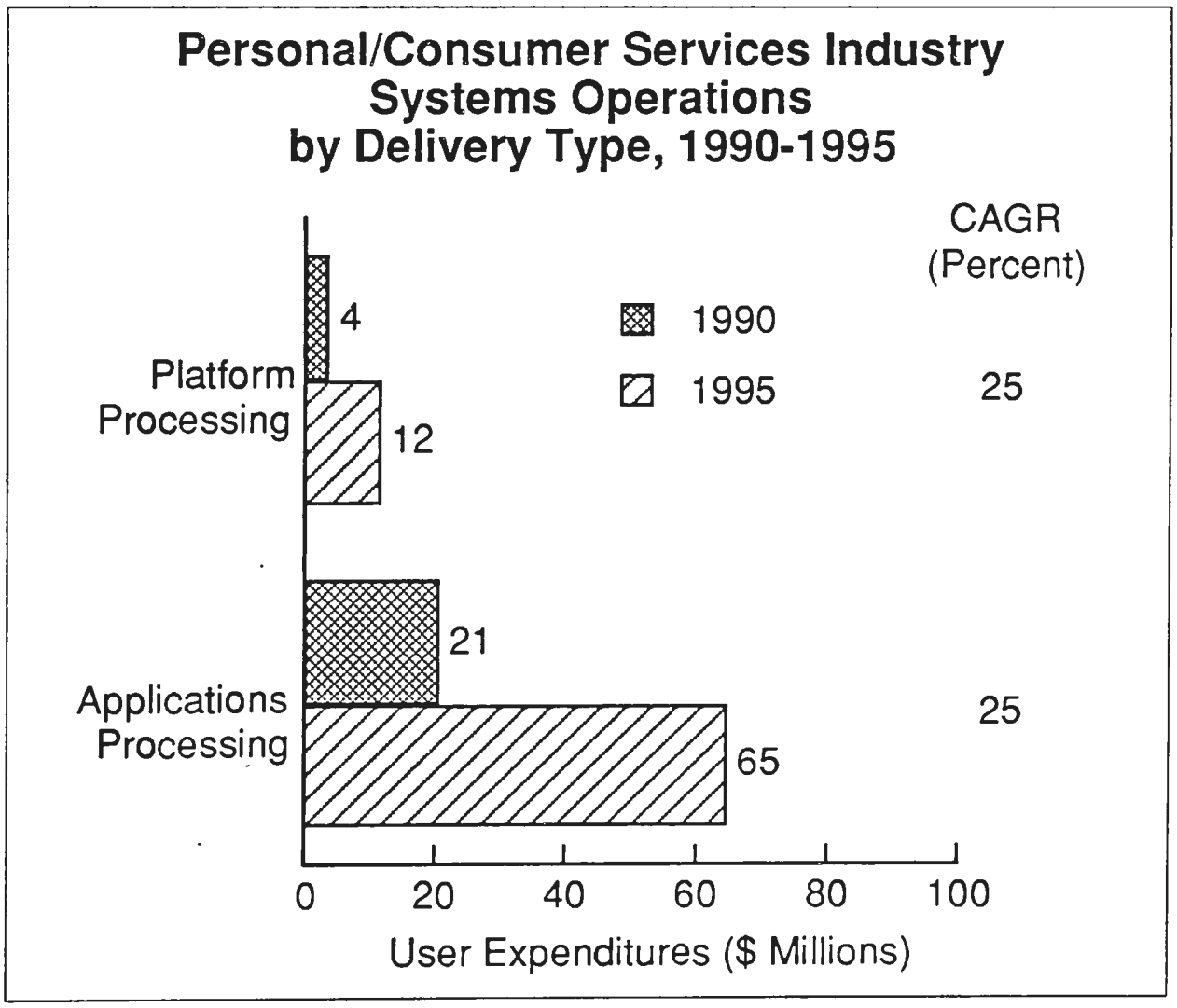


EXHIBIT IV-42



EDS is the dominant vendor in this segment of the marketplace by virtue of its interest in the airlines reservation system. IBM is active in the hotel industry and may be expected to increase its market share. Reynolds and Reynolds, in the automobile industry, has a special expertise that might develop into a systems operations capacity, but it shows no real potential yet.

O

Miscellaneous Industries

This sector includes companies engaged in the agricultural production and construction industries only. This category is the former "other" category without the entertainment and hospitality industries, membership organizations, museums, and auto repairs. They have been reassigned to the personal consumer services and technical/business services sectors.

1. Industry Forces

In the agriculture sector there are a few large, dominant firms that are capable of supporting large projects. The difficulty is finding these opportunities among the multitude of establishments included in this category. In the construction sector, there is more opportunity for information systems applications, but the cyclical nature of this sector causes profitability and cash flow problems for the construction companies and their information services vendors.

Crop price levels improved in 1990 due to a decrease in farm surplus stockpiles and an increase in international demand for meat products and feed grain. International standards of living are on the rise, which is driving up the demand for corn and soybean meal for livestock feed.

Recent developments in agricultural information applications include educational services, computer customer support, and on-line network services that carry information such as commodity and livestock futures prices, weather information, and university agriculture classes.

The forces that affect the construction industry depend heavily on the size of the business and whether it deals with international business. Larger firms that compete in the international markets follow different trends than firms operating solely in the U.S. construction markets.

The U.S. construction market in general is softening. This started in about 1987 with a leveling of the growth rate in the commercial segment—particularly in office construction activity—which reflects the overdevelopment of such structures in the 1980s. One area of potential significant growth in the mid- to late-1990s is the public sector, which could benefit from the reduction of the defense budget. This reduction, of course, is still in question because of the conflict in the Middle East.

The U.S. Department of Commerce predicts strong recovery in construction activity, beginning in the mid-1990s. This is based on its economic outlook for fairly stable interest rates, slow inflation, declining federal budget deficits, and declining trade deficits. Longer-term strength is also predicted for the U.S. manufacturing sector, which will increase demand for industrial construction. However, for the first five years of the 1990s, the Commerce Department is predicting that growth rates for new construction could be significantly lower than overall GNP growth rates during the same period. This prediction reflects an excess of office building construction, near-term high real interest rate, and the current high level of the federal deficit, which will limit spending for public works.

2. Information Systems and Services Environment

The medium- to large-sized agribusinesses and cooperatives use centralized IS to provide the usual range of computer-based services. New requirements include expanding PC networks to connect to research institutions, county agencies, and distribution channels.

End-user participation is a critical issue for IS managers. Where users are not running systems, their assistance is necessary to develop requirements and application systems. Education, training, and support must be supplied to help users meet this challenge—from a very limited budget in most cases.

The impact of technology that can be used in the business or that can make information systems more useful and economic is an issue for IS managers, who must be prepared for changes in this volatile sector. New types of storage technology and more network capabilities can have a sizable impact on information systems use and a positive effect on the attractiveness of outsourcing.

3. Systems Operations Potential

INPUT's user survey has not identified any interest in systems operations programs in agricultural companies or in construction companies. There is no identified vendor activity in this sector at this time. INPUT will continue to monitor this sector for increased signs of activity.

4. Systems Operations Forecast

The forecast for systems operations in this sector cannot be developed since no activity exists at present and no pattern has emerged on which to base a reasonable forecast. Even when these industries were part of the "other" category, they contributed insignificantly to systems operations expenditures forecasts.

P

Federal Government

This sector includes defense and civilian departments, independent agencies, and public corporations.

1. Industry Forces

The key external economic events and trends are summarized in Exhibit IV-43. The extent to which the federal government will respond to the countervailing forces of a general recession—with the resultant loss of tax revenue—the demands of unregulated international trade, and the present Middle East problem is difficult to forecast. There certainly will be a loss of funding for a range of proposed IS projects, which could be partially offset by increasing labor and software demands.

EXHIBIT IV-43

Federal Government Industry Forces

- Trade Imbalance
- Economic Recession
- Cold War Cessation
- Domestic Problems
- Middle East Crisis
- Budget Deficit

- The U.S. trade imbalance continues to depress the value of the dollar. Opposition to free trade conditions under the GATT is coming from subsidized European farmers, and is likely to require continued farm support from the U.S., impacting budget reduction moves.

- There is not likely to be any measurable peace dividend from the end of the Cold War and the democratization of Eastern European countries. Significant strategic policy changes will take time, and the side effects of arms reduction present difficult political choices. Congress will be required to accept extensive military base closings, shutdown of military production facilities, and termination of many thousands of civilian and military personnel. The new 1991 defense budget represents a continuation of the military structure.

- The Iraq situation will strongly impact both the federal budget and the national economy, regardless of its outcome. The recent economic sanctions cost U.S. companies considerable export business. Support of the Desert Storm military operation will accelerate budget outlays, with subsequent economic displacement.

- Several reasons have been advanced for the downward spiral of the economy, both domestic and international. The real estate boom, junk bonds for leveraged buyouts, and unregulated investments by the thrifts have led to both a staggering debt and a loss of credibility of many businesses. The eventual cost of S&L bailouts alone makes any real federal budget reduction extremely unlikely.

- The present administration has not acted effectively in coming to grips with a range of mounting domestic issues. Among those supported by vocal single-issue groups are adequate shelter for the homeless, prevalent health problems like AIDS and cancer, care for the elderly and minorities, continued clean-up of air/land/water pollution, the drug war, overcrowded prisons, rising unemployment, and the rising costs of health care, to name just a few.

- The proposed budget package to reduce the deficit over the next five years is still using the Social Security Fund to conceal part of the deficit, even though this fund is not included in budget calculations. The increasing Social Security surpluses have masked the true size of the operating deficit.

2. Information Systems and Services Environment

Federal IS budgets aim toward greater functionality of the information resources. Most IS organizations are committed to maintaining quality support of their agencies, but continually face rising service-level and applications demands, obsolescence of a certain percentage of resources, and rising maintenance costs. A major share of existing software was custom-developed by contractors and in-house staffs to satisfy applications that have since been extensively modified.

Hardware and software maintenance impact the availability of IS staff to do new applications development and to staff internal projects. New demands for technical assistance to end users equipped with PCs or advanced workstations are also reducing staff availability for new projects.

New and upgraded or replacement system requirements are emphasizing improved service to end users, data integrity, relational data base systems, improved system security, and transparent connectivity. Departmental DP services are being decentralized, but extensively networked, to satisfy the demand for executive information systems and decision support systems.

New applications involve the use of AI in software development and situation modeling, standard financial/payroll/personnel systems, and EDI.

3. Systems Operations Potential

As mentioned earlier, the federal government employed systems operations vendors early on. The terms GOCO (government-owned, contractor-operated) and COCO (contractor-owned, contractor-operated) were used in this market to describe examples of facilities management contracts. These terms correspond to the processing services and the professional services modes of systems operations.

The lack of skilled technical staff in the government sector has long been attributed to the gap in pay scales between the federal sector and commercial enterprises. This real problem makes systems operations an attractive alternative for agencies looking to upgrade and enhance their IS capabilities to better serve the public.

Tightened appropriations and the tendency for Congress to disburse funds on a short timeframe make it more difficult to make capital investments to upgrade increasingly obsolete equipment. Again, the outsourcing of systems operations is an attractive alternative.

Exhibit IV-44 presents these positive factors as well as some negative market factors. Budget restrictions continue to plague the procurement plans of the agencies. Not only is Congress asking more questions prior to procurement, the vendors themselves are protesting many procurements after award, thanks to the Competition in Contracting Act and the adversarial environment it has created. These post-procurement protests have greatly lengthened the procurement cycles in the federal sector. This, in turn, makes it more expensive to bid in this market.

EXHIBIT IV-44

Key Factors in Federal Government Market

- Positive
  - Productivity improvements
  - Technical staff shortages
  - Information technology upgrades
  - Service demand increases
- Negative
  - Deficit-limited budget
  - Greater protest activity
  - Extended implementation schedules

All these deterrents do not seem to have discouraged IS firms from seeking large, lucrative government contracts. The field is crowded and will continue to be highly contested.

4. Systems Operations Forecast

The forecast for this sector has been reduced from last year's figure of 17%. The new projected growth rate for the period 1990-1995 is 10%. This will result in a projected revenue of $2.1 billion in 1995.

An important characteristic of the federal systems operations market needs to be discussed at this point. At the request of Congress, the federal government made significant equipment purchases to modernize its information systems capabilities. The government modernization strategy included direct equipment purchase rather than leasing or other financing alternatives.

As a result of this strategy, the federal government profile for systems operations is unlike the profile of the commercial market. To operate this large base of purchased equipment, it spends three times more for professional services-based systems operations contracts as it does on processing services contracts for services on vendor-owned equipment. This relationship is expected to continue and is illustrated in Exhibit IV-45.

EXHIBIT IV-45

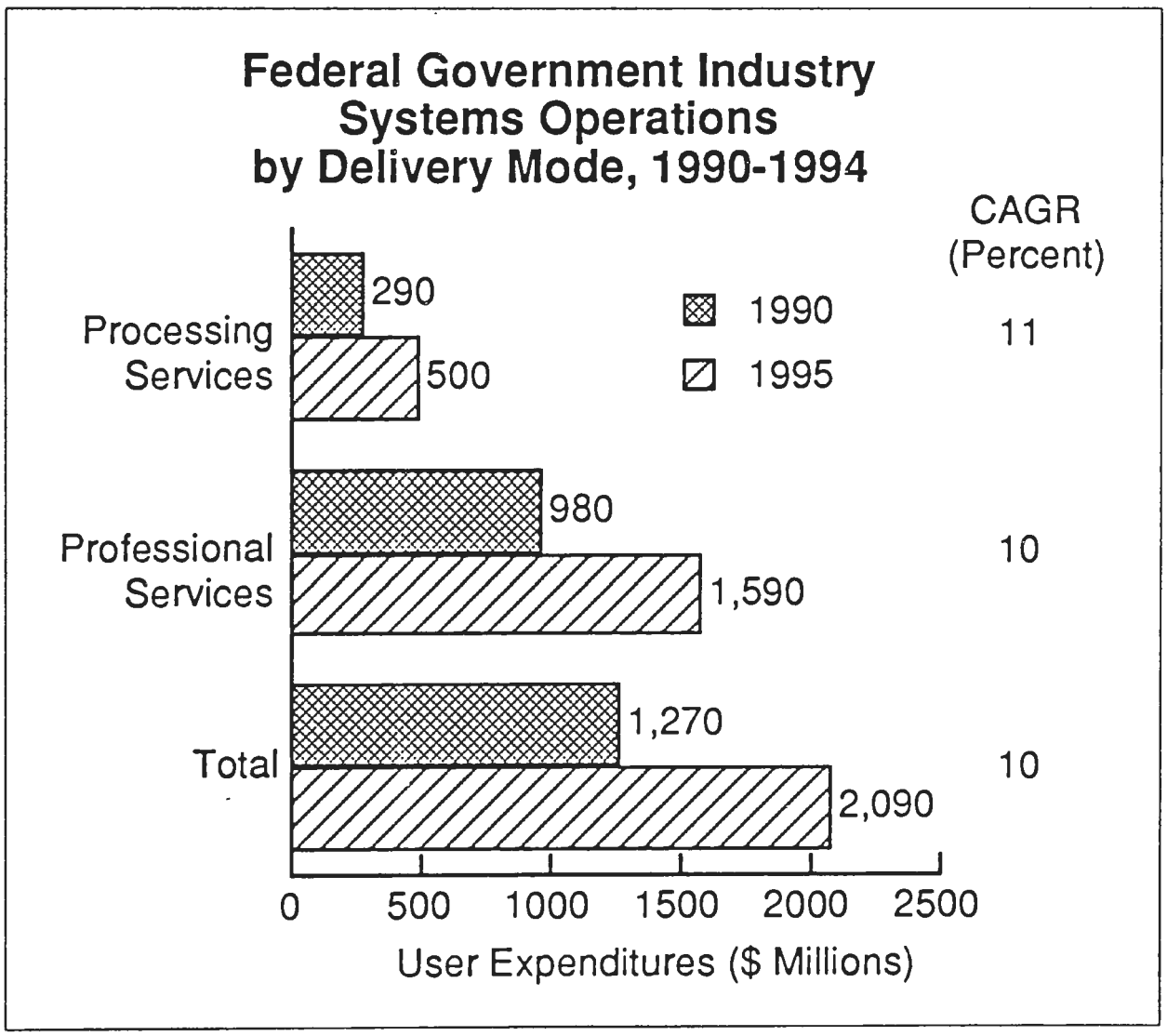
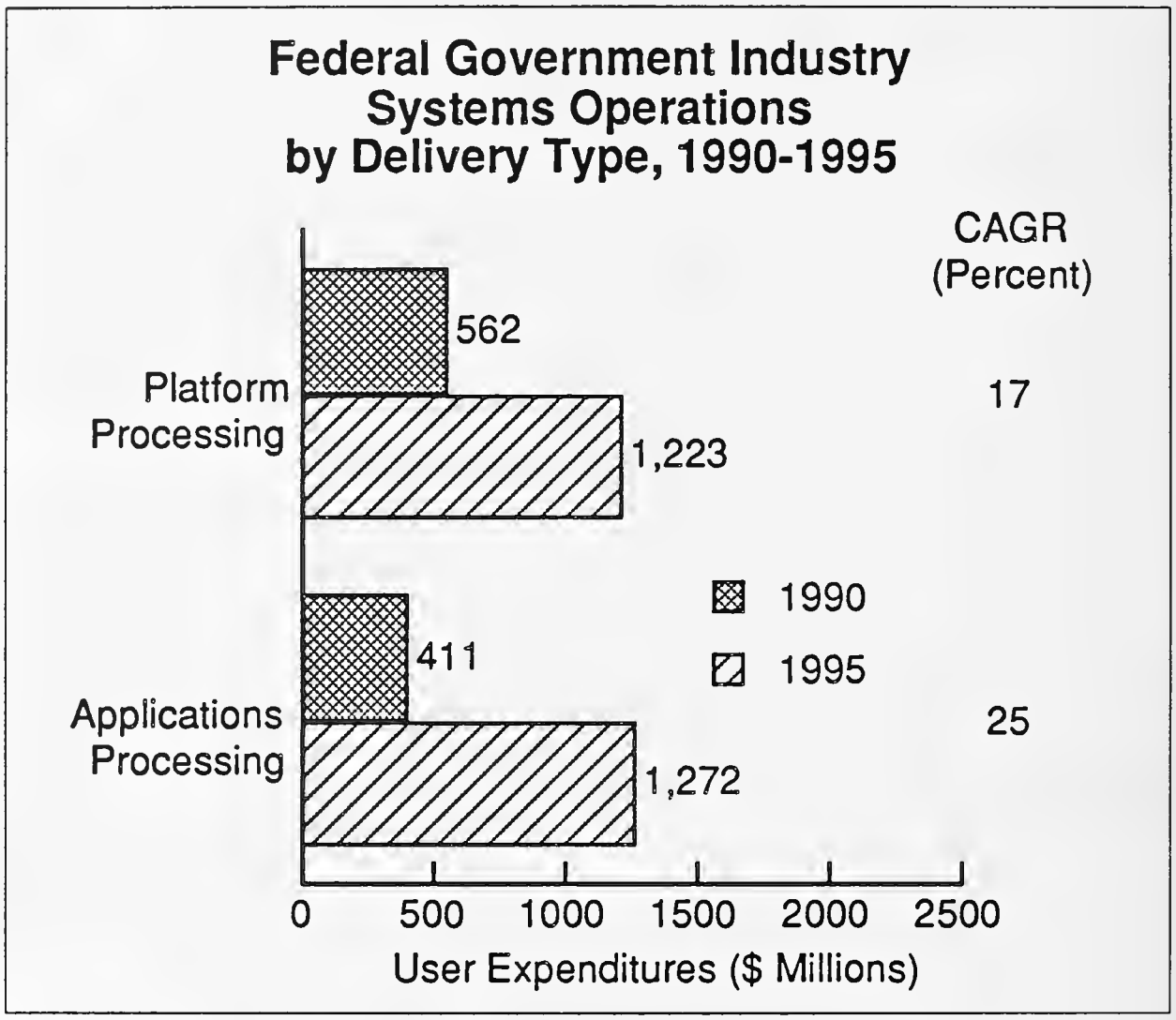


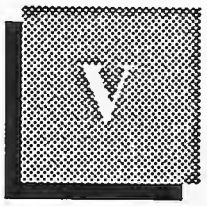
Exhibit IV-46 illustrates how the federal government continues to be heavily weighted toward the applications processing support operation. A higher proportion of federal government systems operations contracts involve both processing and software than in other industry markets. This tendency is expected to continue and even accelerate.

EXHIBIT IV-46



The major systems operations vendors are all represented in the federal market because of the size and complexity of the market. EDS, CSC, TRW, Martin Marietta, Boeing Computer Services, and PRC have existing major contracts. Andersen Consulting, AMS, and Systemhouse are trying to enter the market through their professional services credentials. IBM, DEC, and Unisys are established because of their hardware base. Alliances are becoming more common for the major systems operations bids because of the complexity of the requirements. This trend to form alliances has set the pattern in the federal sector, and it will probably become common in the commercial sector also.

Market Strategies and Recommendations



Market Strategies and Recommendations

The systems operations market has many attractions for the outsourcing vendor. The long-term contracts more common in this market stabilize revenue streams. The potential profit is considerable for the vendor that can capitalize on technology enhancements. The close relationship that develops between the vendor and the client can lead to significant new business in later years.

Yet the risks are also great. Often, the vendor makes an investment in the prospect's business in the form of capital equipment or assumes the responsibility for the operations staff. The client's dependence on the systems operations vendor for services reduces his control over providing enhanced services and using information services as a competitive advantage.

The marketing process must, therefore, be carefully controlled to ensure a minimum of false starts and a high success ratio. Identification of real opportunities early in the cycle becomes critical to success. The techniques that best address the systems operations marketing environment need to be clearly defined. The new concept of vendor/client partnership that is developing needs to be explored in this context also. INPUT's analysis of the marketplace will lead to some recommendations on strategies to best succeed in this emerging marketplace.

A Market and Opportunity Identification

There is no handbook for successful sales in the systems operations marketplace. Those firms that have been successful try to repeat their successes without divulging their approach to the competition. Yet, careful attention to the trade literature coupled with user interviews can provide some useful insights into how successful vendors operate. Discussions with vendors also provide clarifications that can be helpful in identifying opportunities and selecting a market.

In this market the need to assume financial risk makes it particularly important that the prospective vendor have a clear strategy. This strategy has to include a definitive knowledge of the resources available within the company, the availability of partners to supplement the company's resources, the customer base and its needs, and the industry segments that fit best within the company's corporate strategy.

As was evident in Chapters III and IV, the vertical industry markets for systems operations vary greatly in their degree of penetration by systems operations vendors. Within those markets, a subset of the organizations most likely to benefit from systems operations outsourcing can be identified. Exhibit V-1 lists the types of companies that are likely to be good candidates for systems operations. These companies can be found in any industry. Vendors should use all market intelligence at their disposal to classify the prospects in those categories.

The next task is to evaluate if a systems operation prospect is a good candidate. A new set of questions needs to be answered. Is the vendor staff sufficiently familiar with the prospect's industry? Has there been success with that firm in the past? Does that firm have good business prospects? Is the firm actively looking for outsourcing solutions? If there is a match between the company's needs and the vendor's resources, the long process of selling begins. Are noninformation systems executives in the firm receptive to new ideas?

EXHIBIT V-1

Good Prospective Systems Operations Users

- Very fast-growing organizations
  - Demands cannot be met internally
  - Need to merge acquired data processing operations
  - Need to expand geographic scope
- Organizations with major structural changes
  - Divestitures
  - Leveraged buy-out situations
- Organizations in trouble
  - Recovering from bankruptcy
  - Under Chapter 11 protection
  - Reorganized, consolidating firms
- Medium-sized organizations
  - Inadequate development resources
  - Behind the technology curve
  - Limited investment capital
- Organizations with disparate architectures
  - Want to change architecture
  - Have incompatible data centers
- Organizations refocusing on their core business
  - Want to concentrate on what they do well
  - Need to leverage scarce resources

B

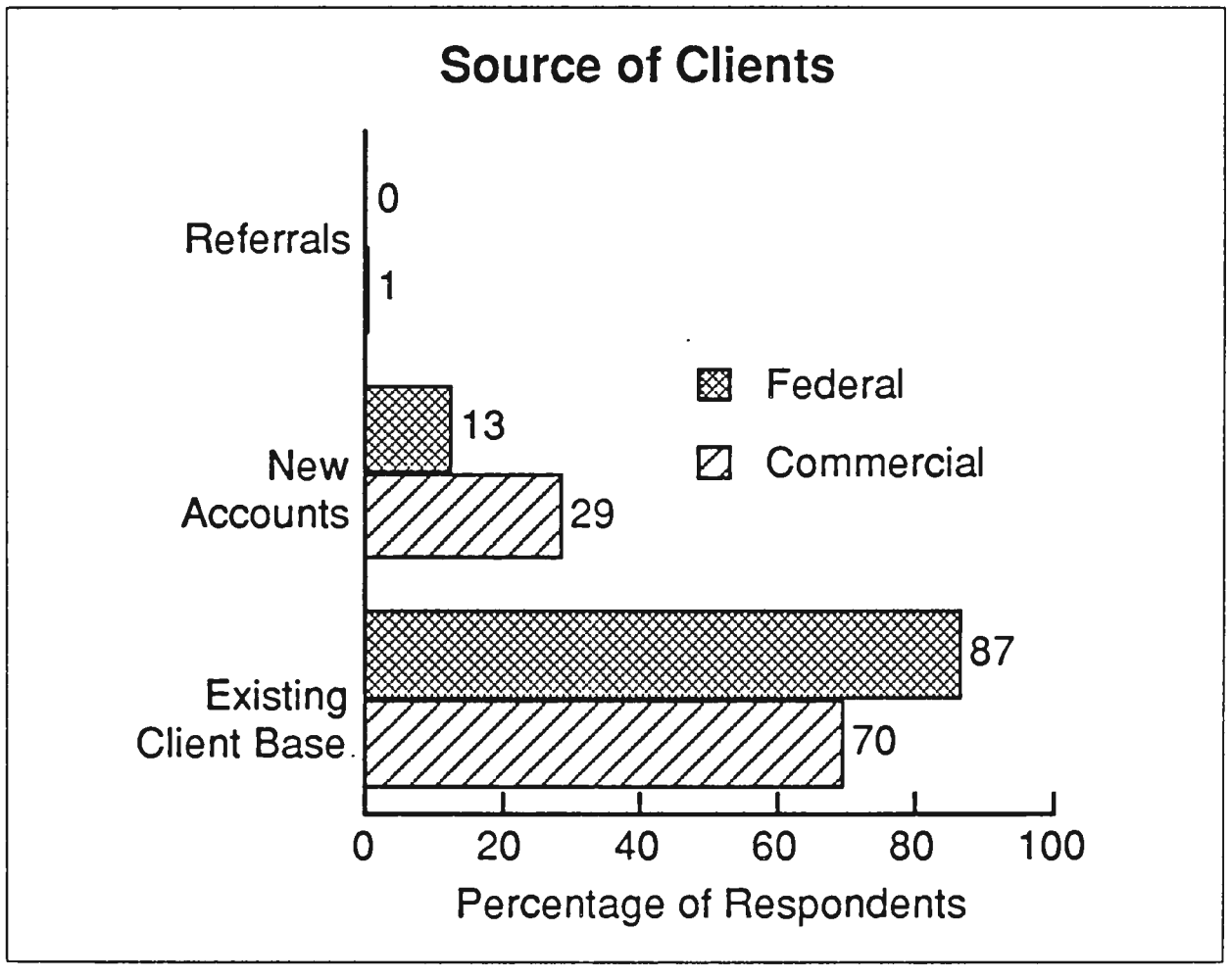
Marketing and Sales

The recurring theme evident in the vendor interviews conducted by INPUT was that the vendor and the client must develop a clear understanding of each other's capabilities and commitments before a real systems operations contract can be entered into. This will result in a long sales cycle. It will be a grueling task for both the vendor's marketing force and the prospect's evaluators. Obviously, both sides will want to maximize benefits.

The prospect firm will either be in an industry that has shown good growth in systems operations or in which the vendor has some demonstrated experience. The prospect may be in an industry that has not yet shown good acceptance of systems operations outsourcing but is still viable since other characteristics are favorable. The company may be in transition; the company may need to make substantial changes in the way it is processing data; the company may be in financial trouble. In any case, the vendor must be confident in his knowledge of the company's business and his ability to demonstrate that knowledge. The vendor is advised to have had some prior business dealings with the firm. If most of these qualifications are met, the sales cycle can continue.

When examining the marketplace for likely candidates, it is important not only to know the potential of that vertical industry, but also the vendor's previous relationship with the prospect. In a series of vendor interviews, INPUT determined that more than 70% of the respondents indicated their source of clients came from within their existing client base. In other words, they were most successful with prospects that already knew their company. Exhibit V-2 presents these findings. Note that both in the federal and the commercial marketplace, experience with the customer is an important success factor.

EXHIBIT V-2



Prior experience can be in many areas: equipment sales, leveraging an earlier systems integration project, or a previous consulting engagement. The entry point is often a function of the type of vendor. Experience first opens the door, then becomes an important factor in the evaluation

phase, particularly if all competitors are otherwise on equal footing. If the vendor has no experience with the client, then industry experience and references are essential.

In addition to industry knowledge and prior business relationships, there is a need to demonstrate the technical qualifications needed to do the entire job. Very few vendors have all the resources at hand to perform as the data processing arm of a firm in any industry they choose. The solution is to form alliances with other firms to round out capabilities that might be lacking. Exhibit V-3 tabulates a list of vendor capabilities and indicates in which areas interviewed vendors used alliances with third-party suppliers to obtain additional services.

EXHIBIT V-3

Vendor Capabilities and Alliances

	Percent Having Internal Capability	Percent Using Alliances
Computer systems operations	100	40
Applications design/development	90	60
Business consulting	90	50
Applications maintenance	80	60
Packaged applications software	80	60
Disaster recovery service	60	80
Equipment maintenance	50	70
Network management	10	30

In the operations, applications, and consulting areas, most firms have the capability in house but still choose to go outside for particular specialized expertise. In the less generic activities, even more vendors form alliances. Disaster recovery, equipment maintenance, and network communications are areas of systems operations that vendors often turn over to specialists rather than establishing an in-house capability.

There is, and should be a sense of uneasiness about alliances by many systems operations vendors, who would prefer arms-length subcontract relations with suppliers. There have been several excellent publications on this subject from the business graduate schools of MIT, Harvard, and

UCLA. The essence of the UCLA study is noted briefly in Exhibit V-4. The problems that contribute to the failure of alliances can occur quickly if adequate planning and execution of the agreement do not occur. Failure to identify roles and responsibilities clearly and how key assets will be shared are quoted frequently as problems, as are differences in business culture.

EXHIBIT V-4

Problems of Vendor Alliances

- Problems
  - Impact of environmental forces
  - Short-term differences in performance
  - Perceptions versus actual benefits
  - Unwillingness to share key assets
  - Differences in business culture
- Steps to minimize failures
  - Clearly determine common objectives
  - Communicate strategy to operating people
  - Avoid complexity
  - Insulate alliances from partners

Steps can be taken to prevent the type of distrust that prevents a successful alliance. Clearly, written objectives in the hands of key managers and open communication appear to be the most effective tools.

It is obviously a massive sales and marketing task to identify the most likely prospect for a systems operations project, line up the proper alliances to flesh out the vendors' technical capabilities, and conduct the negotiations that lead to a successful sale. Yet in some ways, the job for the systems operations vendor is just beginning. The relationship of the systems operations vendor to the client is much more closely meshed than in most other IS marketing situations. Discussions with users and vendors have pointed out that a new type of relationship is being forged.

C

Partnership Management

The term "partnership" has been used by vendors and users to identify the relationship that must exist if a systems operations agreement is to be successful. This relationship begins the day the contract is signed and continues throughout the life of the contract, which is typically five to ten years.

When the user agrees to be completely dependent on a vendor for all its data processing operations, and when a vendor invests in a client's firm by assuming the financial responsibility for computer hardware, facilities, and staff, the relationship has to go beyond a simple contractual arrangement. As mentioned in Section C. 2 of Chapter III, both vendors and users are increasingly aware of the need for this managed relationship.

The tools that make this type of partnership work are not clearly defined in management textbooks or in business school lectures. Some might be identified by a close scrutiny of case studies, however. INPUT talked to both vendors and users and has identified a set of factors for a systems operations partnership to be successful. Exhibit V-5 summarizes these.

EXHIBIT V-5

Tools for Management of the Systems Operations Partnership

- Open communication
  - Daily, at user level
  - Frequent visits at senior management levels
- Strategic planning
  - Vendor must be part of process
  - User must share key information with vendor
- More than a contract
  - Sharing of risks over time
  - Verbal agreements supplement contract
  - Need for mutual trust

Open communication is essential. Not only must the vendor be taking the pulse of the user on a daily basis, but senior management of both companies must be in constant communication to assure both a smooth start of a project and responsive operations during the whole life of the contract. There is no better way to nurture that than to have vendor personnel intimately involved in the planning and strategy development

for the client firm. That implies that the vendor will also be privy to much proprietary information, but this is necessary if the vendor, in turn, is to apply the systems resources to the best competitive advantage of the client.

Many respondents cited that the working arrangements must evolve away from the legal terms of the formal contract toward a true working partnership where both parties are motivated to take risks and assume responsibilities that are mutually beneficial. These are impressive sounding words, yet many of the respondents are convinced that this is the only way these contracts will work.

D

Recommendations

Suggestions for identifying the appropriate prospects for a given vendor have been presented in this chapter as well as in chapters III and IV. Recommendations on how to operate in this marketplace, both prior to contract award and after the contract is won, have been examined. To best summarize this material, a list of recommendations is presented in Exhibit V-6.

EXHIBIT V-6

Recommendations

- Prior to contract award:
  - Select targets carefully
  - Stress expertise in target industry
  - Demonstrate prior success
  - Establish strong alliances
  - Be willing to assume financial risks
  - Nurture long-term relationships
- Upon contract award:
  - Communicate with users/management
  - Close working relationship must develop
  - Need to supplement contract with verbal agreements
  - Participate in strategy/planning

The key points to be made in the presales period are:

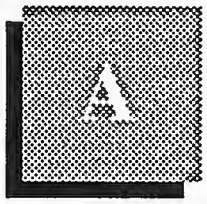
- Select prospects carefully to capitalize on expertise in the target industry and improve the probability that the prospect will be receptive to systems operations.
- Enhance credibility by demonstrating prior success either with that prospect or within the prospect's industry.
- Establish strong alliances with partners that can both supplement industry expertise and provide additional cost-effective resources.
- Understand that the business will be won by the one who is willing to assume some financial risk, usually involving a capital investment or assumption of some of the client's assets.
- Employ contractual terms to protect against undue risk.
- Capitalize on long-term pre-existing relationships with the prospect, who needs to feel that such a relationship is indeed the best choice for him.

The key elements of the post-sale period need to be considered from the onset of the sales cycle also. They are:

- Communicate with both the user's and the client firm's senior management, on a daily basis if necessary.
- Only time will develop the right working relationship, one in which vendor personnel come to be considered part of the client's organization.
- The formal contract will need to be supplemented by both parties agreeing that the good of the partnership will often require actions not specifically written in the contract.
- For all this to occur, the vendor and client must have joint strategy sessions at which important issues can be discussed and key information shared.

Those vendors that successfully master the development of partnerships will be the major systems operations vendors by 1995.

Appendixes



Definitions

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 B, 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:

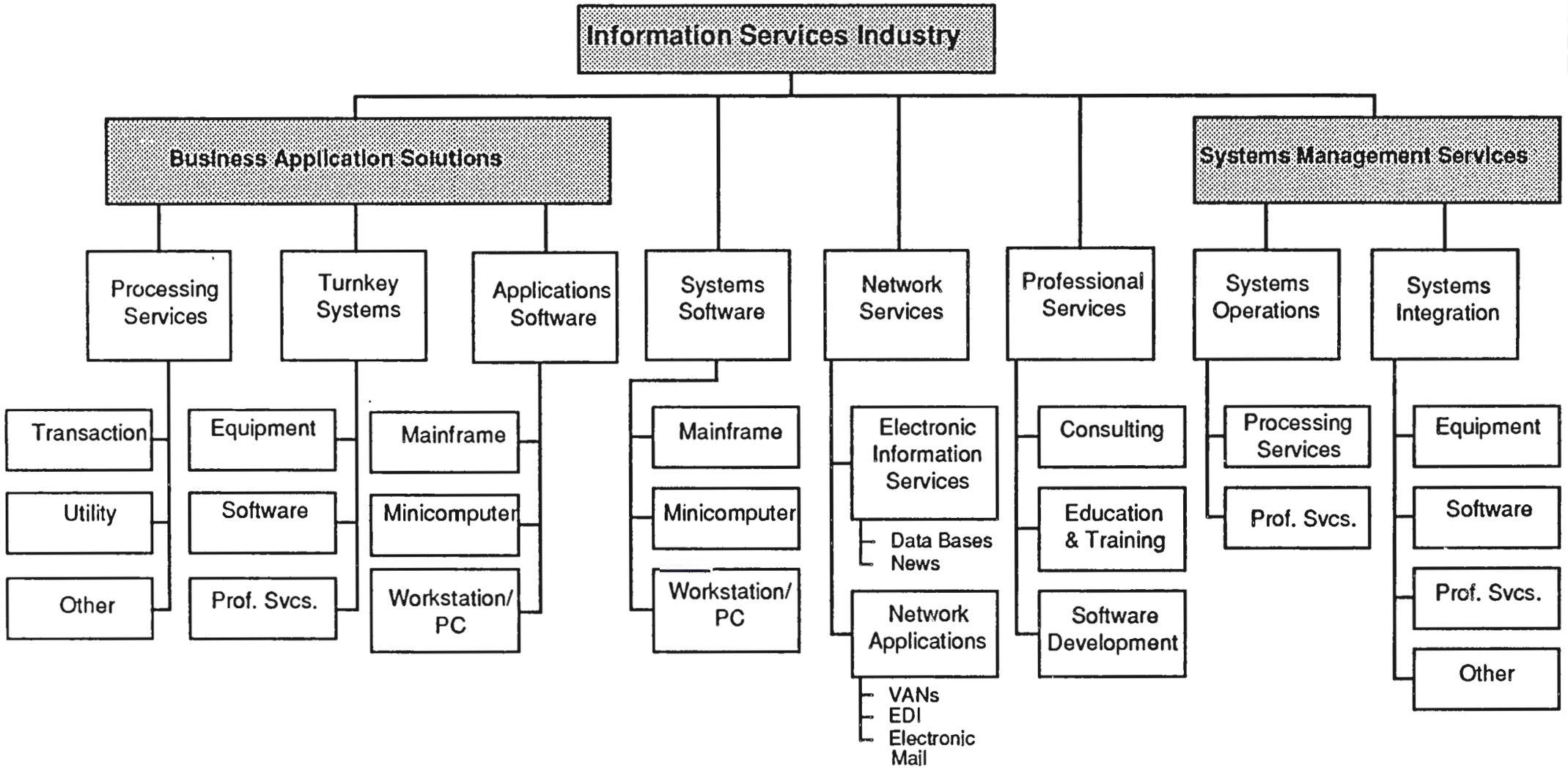
  - *Systems Operations*
  - *Systems Integration*

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.

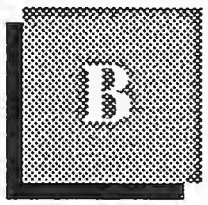
INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers.

- *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.



Vertical Industry Markets vs. SIC Classifications

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 B-1

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 B-1 (Cont.)

Industry Sector Definitions

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

EXHIBIT B-1 (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

C

Forecast Data Bases

EXHIBIT C-1

Systems Operations Processing Services User Expenditure by Industry Sector, 1989-1995 ($ Millions)

Industry Sector	1989 ($M)	Growth 89-90 (%)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	CAGR 90-95 (%)
Discrete Manufacturing	331	25	413	517	641	789	970	1,193	24
Process Manufacturing	388	17	454	527	611	702	815	978	17
Transportation	43	14	49	58	66	75	87	101	16
Utilities	35	12	39	44	50	58	66	79	15
Telecommunications	40	13	45	51	58	66	76	97	16
Wholesale Distribution	58	19	69	82	98	117	141	170	20
Retail Distribution	57	24	71	88	109	136	170	212	25
Bank/Finance	1,318	16	1,529	1,758	2,022	2,325	2,674	3,262	16
Insurance	622	10	684	753	820	894	984	1,111	10
Health	625	14	713	819	950	1,112	1,312	1,601	18
Cons/Pers. Service	19	28	24	31	38	47	60	75	25
Bus/Tech. Service	6	14	7	8	9	10	12	14	15
Federal	249	15	292	338	393	444	470	499	11
State/Local	567	22	692	844	1,030	1,266	1,558	1, 916	23
Education	68	10	75	82	91	100	112	134	12
Miscellaneous	0	0	0	0	0	0	0	0	0
Total Processing Services	4,426	14	5,156	6,000	6,986	8,141	9,507	11,442	17

EXHIBIT C-1 (Cont.)

Systems Operations Professional Services User Expenditure by Industry Sector, 1989-1995 ($ Millions)

Industry Sector	1989 ($M)	Growth 89-90 (%)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	CAGR 90-95 (%)
Discrete Manufacturing	56	22	68	78	89	101	116	136	15
Process Manufacturing	58	15	67	76	87	100	115	135	15
Transportation	2	15	2	3	3	4	4	5	16
Utilities	5	10	6	6	7	8	10	11	15
Telecommunications	16	16	19	22	25	29	33	40	15
Wholesale Distribution	20	13	23	26	29	33	38	45	15
Retail Distribution	5	11	6	6	7	8	9	10	13
Bank/Finance	356	13	402	455	514	586	668	794	15
Insurance	106	10	117	128	142	157	172	189	10
Health	107	13	121	134	148	167	189	224	13
Cons/Pers. Service	1	15	1	1	2	2	2	12	16
Bus/Tech. Service	9	10	10	11	11	12	14	15	9
Federal	860	12	979	1,097	1,218	1,339	1,460	1,591	10
State/Local	230	15	265	304	353	409	475	579	17
Education	18	9	20	21	23	24	26	31	10
Miscellaneous	0	0	0	0	0	0	0	0	0
Total Professional Services	1,849	12	2,106	2,368	2,658	2,979	3,331	3,817	13

EXHIBIT C-1 (Cont.)

Systems Operations User Expenditures Forecast Total, 1989-1995 ($ Millions)

Industry Sector	1989 ($M)	Growth 89-90 (%)	1990 ($M)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	CAGR 90-95 (%)
Discrete Manufacturing	387	20	482	595	730	890	1,086	1,330	22
Process Manufacturing	446	14	521	603	698	802	930	1,113	16
Transportation	45	12	51	61	69	78	91	106	16
Utilities	40	11	45	51	58	66	76	90	15
Telecommunications	56	12	65	75	86	100	116	134	16
Wholesale Distribution	78	15	92	108	127	151	179	216	19
Retail Distribution	62	19	76	94	116	143	178	222	24
Bank/Finance	1,674	13	1,931	2,213	2,536	2,911	3,342	4,057	16
Insurance	728	9	801	881	963	1,051	1,156	1,301	10
Health	732	12	833	954	1,098	1,279	1,501	1,825	17
Cons/Pers. Service	20	21	25	32	40	49	62	77	25
Bus/Tech. Service	15	10	17	18	20	23	25	29	12
Federal	1,109	13	1,271	1,435	1,611	1,783	1,930	2,090	10
State/Local	797	17	956	1,148	1,382	1,676	2,032	2,495	21
Education	86	9	94	103	113	125	138	165	12
Miscellaneous	0	0	0	0	0	0	0	0	0
Total Professional Services	6,275	13	7,260	8,371	9,647	11,127	12,844	15,250	16

D

Forecast Data Base Reconciliations

EXHIBIT D-1

Systems Operations Market Forecast Data Base Reconciliation by Industry Sector ($ Millions)

Delivery Modes	1989 Market				1994 Market				89-94 CAGR per data 89 rpt (%)	89-94 CAGR per data 90 rpt (%)
	1989 Report (Fcst) ($M)	1990 Report (Actual) ($M)	Variance from 1989 Report ($M)	Variance from 1989 Report (%)	1989 Report (Fcst) ($M)	1990 Report (Fcst) ($M)	Variance from 1989 Report ($M)	Variance from 1989 Report (%)		
Discrete Manufacturing	135	387	252	187	319	1,086	767	240	19	23
Process Manufacturing	446	446	0	0	930	930	0	0	16	16
Transportation	56	45	-11	-20	93	91	-2	-2	11	15
Utilities	40	40	0	0	76	76	0	0	14	14
Telecommunications	56	65	9	14	111	116	5	4	15	12
Wholesale Distribution	79	78	-1	-1	180	179	-1	-1	18	18
Retail Distribution	19	62	43	226	55	178	123	224	24	23
Bank/Finance	1,624	1,674	50	3	3,345	3,342	-3	0	16	15
Insurance	728	728	0	0	1,872	1,156	-716	-38	21	10
Health	751	732	-19	-3	1,428	1,501	73	5	14	15
Cons/Pers. Service	15	20	5	33	60	62	2	3	32	25
Bus/Tech. Service	20	15	-5	-25	35	25	-10	-29	12	11
Federal	1,109	1,109	0	0	2,243	1,930	-313	-14	15	12
State/Local	722	797	75	10	2,035	2,032	-3	0	23	21
Education	86	86	0	0	132	138	6	5	9	10
Miscellaneous	0	0	0		0	0	0			
Total	5,886	6,284	397	55	12,914	12,842	-72	-1	17	15