U.S. INFORMATION SERVICES

FORECAST COMPENDIUM, 1991

INPUT

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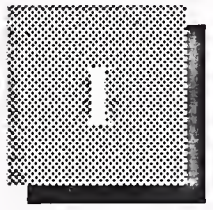


Introduction

This report is a compendium of a series of reports written by INPUT on the key segments (delivery modes) of the U.S. information services industry. The report reviews and analyzes the eight major delivery modes that constitute INPUT's definition of the information services industry. These are:

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

A
Purpose and Organization

1. Purpose

The purpose of the report is to provide the reader with:

- Five-year forecasts, an assessment of market drivers, analysis of competitive trends, and identification of leading vendors.

- An assessment of trends and events within the U.S. information services industry, and in each of the delivery modes

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

- Review the forces shaping the market
- Develop internal corporate financial projections
- Identify new markets and product and services opportunities

- Assess the competitive trends
- Determine potential market directions
- Assist in prioritizing investments

2. Organization

A preliminary chapter, Information Services Market Overview, summarizes the contents of the rest of this report. Each chapter thereafter is organized as described in Exhibit I-1. Each delivery mode within the information services industry follows this format.

EXHIBIT I-1

Report Format

- A - Delivery Mode Forecast and Driving Forces—Introduces and defines the delivery mode, presents a five-year forecast and discusses key growth promoters and growth inhibitors.
- B - Forecast by Submode—Each of the product/service segments or submodes within a delivery mode is forecasted and key driving forces are discussed.
- C - Forecast by Market Sector—Each delivery mode is forecasted by 16 vertical or industry-specific markets—such as discrete manufacturing, wholesale distribution—as well as by cross-industry markets—such as human resources and accounting
- D - Leading Vendors—This section provides a synopsis of some of the issues vendors are grappling with and changes under way in the competitive environment, and lists the leading vendors and their market shares.

In addition, full details of the definitions used by INPUT in this report are given in Appendix A.

Information services continues to attract widespread vendor attention. This report is designed to assist vendors in achieving a consolidated view of each delivery mode. It can be read in conjunction with other INPUT reports dedicated to individual delivery modes for more detail. It can also be read in conjunction with a similar report consolidating the European information services industry, *The Western European Market Forecast for Computer Software and Services, 1991-1996.*

B
Scope and Methodology

1. Scope

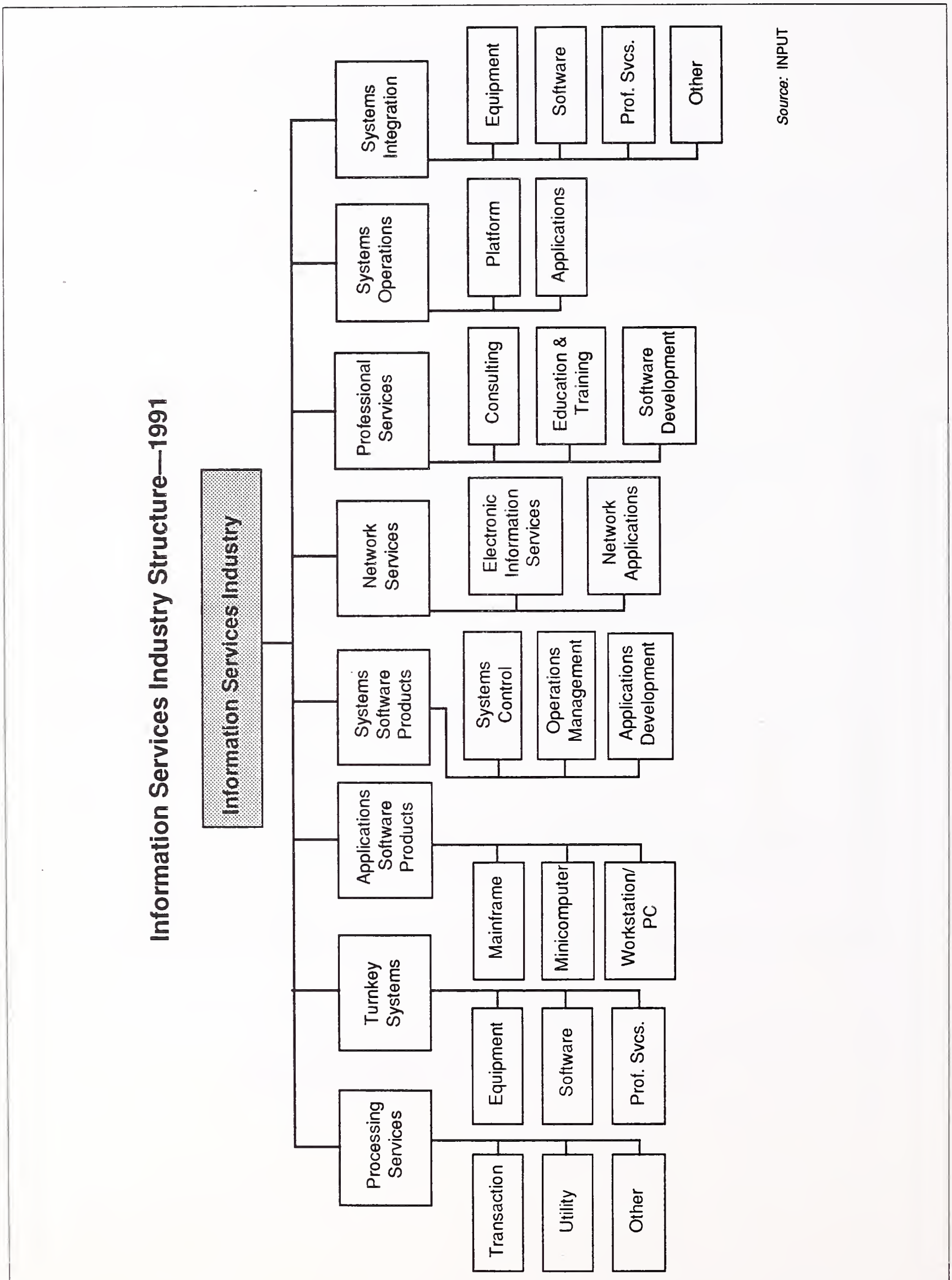
The forecasts in this report are of user expenditures that are noncaptive (generally available to vendors). Many large organizations have portions of their information services requirements satisfied by internal divisions. The resulting expenditure is not available for competitive bid by the general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

Exhibit I-2 defines the structure of the information services industry as used by INPUT in its market analysis and forecasts. The industry consists of eight delivery modes, each of which contains a number of submodes.

- Delivery modes are specific products and services that satisfy a given user need. Market sectors specify who the buyer is and delivery modes specify what the user is buying.

- INPUT develops a five-year forecast for the delivery mode and each of the submodes.

EXHIBIT I-2



For a more complete discussion of INPUT's information services industry structure and market sector definitions, please refer to INPUT's *Definition of Terms*.

2. Methodology

This report is based principally on research activities conducted by INPUT during 1991 within its Market Analysis Program.

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

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

a. Base-Year Expenditure Calculations

- INPUT determines previous-year information services revenues for the eight delivery modes and 22 industry 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 industry.

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

- The result is a base-year (1990) user expenditure for each of the 22 vertical and cross-industry sectors and the 8 delivery modes.

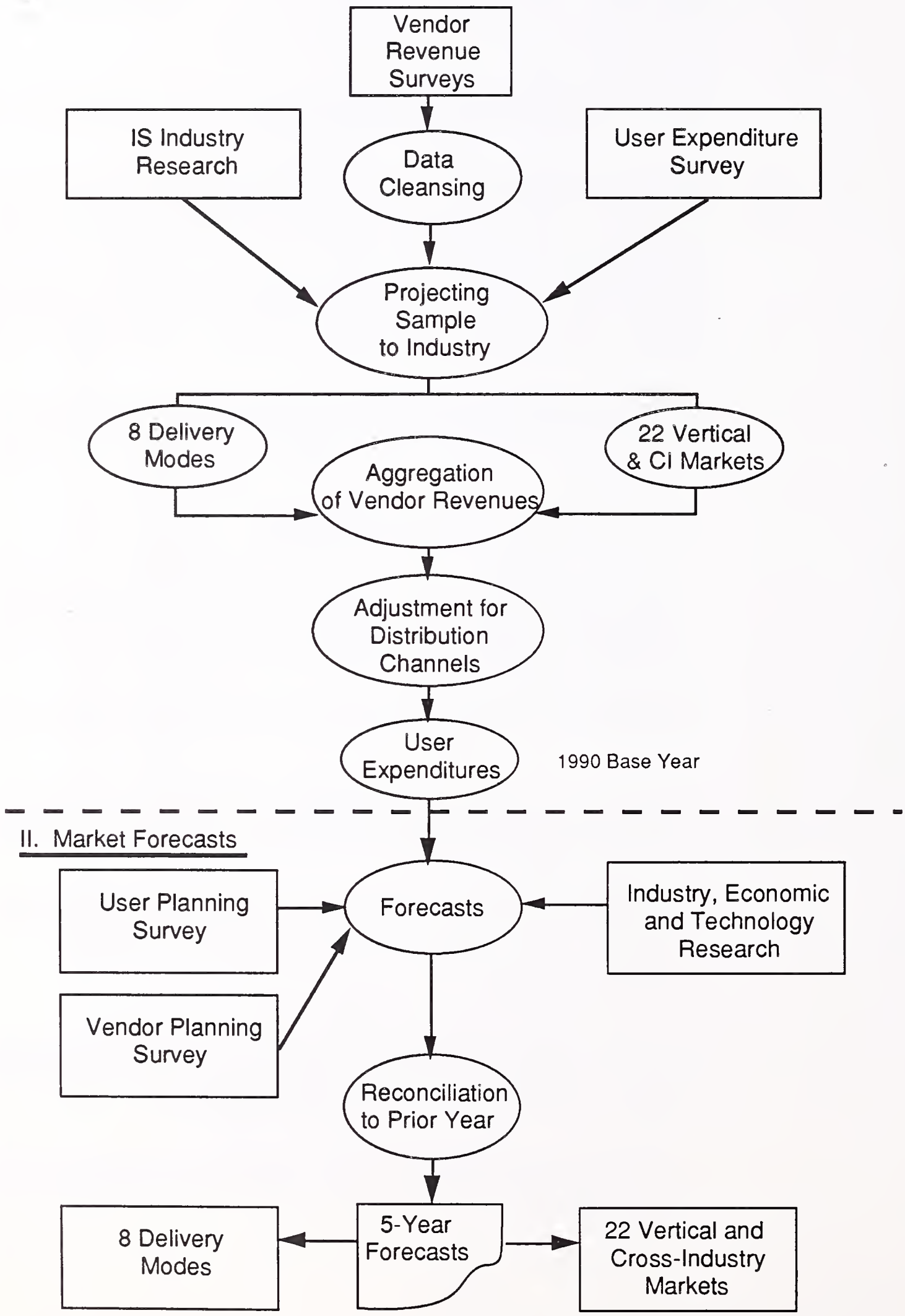
b. Market Forecasts

- In the forecasting step, INPUT surveys information systems executives to determine their projected expenditure levels, both in aggregate and for each of the outside information services categories.

- In addition, a second set of vendor interviews is conducted later in the year to obtain an understanding of how key vendors view the market and its opportunities.

EXHIBIT I-3

INPUT Research Methodology



- The result is a five-year forecast for each of the 22 vertical and cross-industry sectors and the 8 delivery modes. The delivery mode and market sector forecasts are correlated.

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

C
Economic Assumptions

INPUT forecasts are presented in current dollars (i.e., 1996 market sizes are in 1996 dollars including inflationary forecasts). In developing the five-year forecasts, INPUT has incorporated economic assumptions regarding the outlook for the U.S. economy as a whole (see Exhibit I-4).

The GNP and GNP Deflator growth rates used in INPUT's market projections for 1991 through 1996 are from the CONSENSUS™ forecast, Blue Chip Economic Indicators of Sedona, Arizona. The Blue Chip CONSENSUS forecast is derived from a panel of economists representing leading financial, industrial, and research firms across the U.S. and has a 13-year track record of balanced and accurate projections.

EXHIBIT I-4

U.S. GNP and Inflation Growth Assumptions
1990-1996

Overall Economy	1990A	1991E	1992E	1993E	1994E	1995E	1996E
Nominal GNP	5.0	3.8	6.3	6.7	6.5	6.0	6.2
GNP Deflator	4.1	3.9	3.6	3.9	3.9	3.8	3.7
Real GNP	0.9	(0.1)	2.7	2.8	2.6	2.2	2.5

Source: CONSENSUS™ forecast, Blue Chip Economic Indicators

Blue Chip Economic Indicators - 1991-1992 from Vol. 16, No. 7, July 10, 1990
- 1993-1996 from Vol. 16, No. 3, March 10, 1990

D
Related Reports

Related reports of possible interest to the reader include:

1. U.S. Markets

- *U.S. Processing Services Market, 1991-1996*
- *U.S. Application Solutions Market, 1991-1996* (applications software products and turnkey systems)
- *U.S. Systems Software Products Market, 1991-1996*
- *U.S. Professional Services Market, 1991-1996*
- *U.S. Systems Integration Market, 1991-1996*
- *U.S. Systems Operations/Outsourcing Market, 1991-1996*
- *Industry Sector Reports, 1991-1996* (15 reports on all major industry sectors, e.g., insurance)
- *Cross-Industry Sector Reports, 1991-1996* (7 reports on information services markets that serve all vertical industry sectors, e.g., accounting)

2. European Markets

- *The Western European Market for Computer Software and Services, 1991-1996*
- *Systems Software Products—Western Europe, 1991-1996*
- *Trends in Processing Services—Western Europe, 1991-1996*
- *Systems Integration Market Forecast—Western Europe, 1991-1996*
- *Systems Operations Market Forecast—Western Europe, 1991-1996*
- *Western European Network Services Markets, 1991-1996*

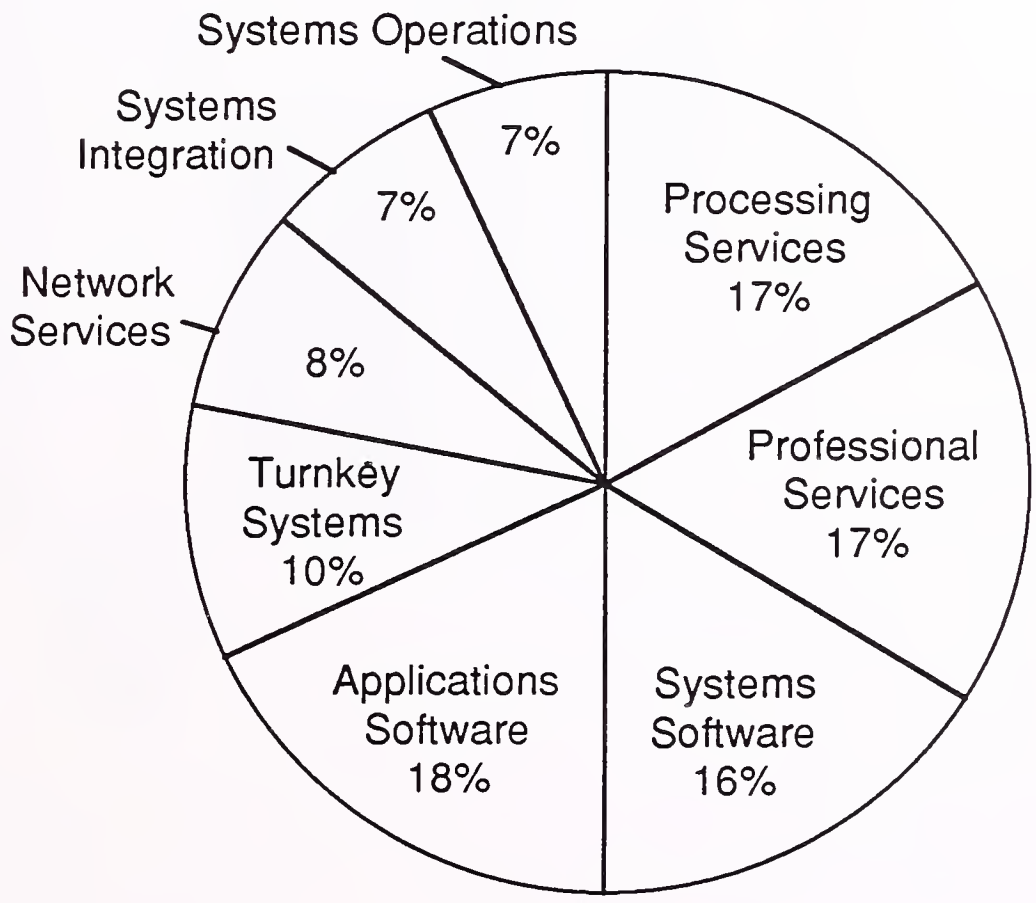
The European markets are also analyzed on a vertical basis for discrete and process manufacturing, insurance, banking and finance, and retail and wholesale distribution.

Information Services Market Overview

In 1990, overall United States information services user expenditures reached $100 billion, as INPUT had projected. Growth during 1990 was 11%, increasing from the $90 billion level in 1989. Exhibit II-1 shows the distribution of 1990 expenditures by delivery mode. The two software products sectors total 34% of the market, whereas processing services plus systems operations total 24%, and professional services plus systems integration represent another 24% of the industry.

EXHIBIT II-1

Information Services Industry Expenditures by Delivery Mode 1990

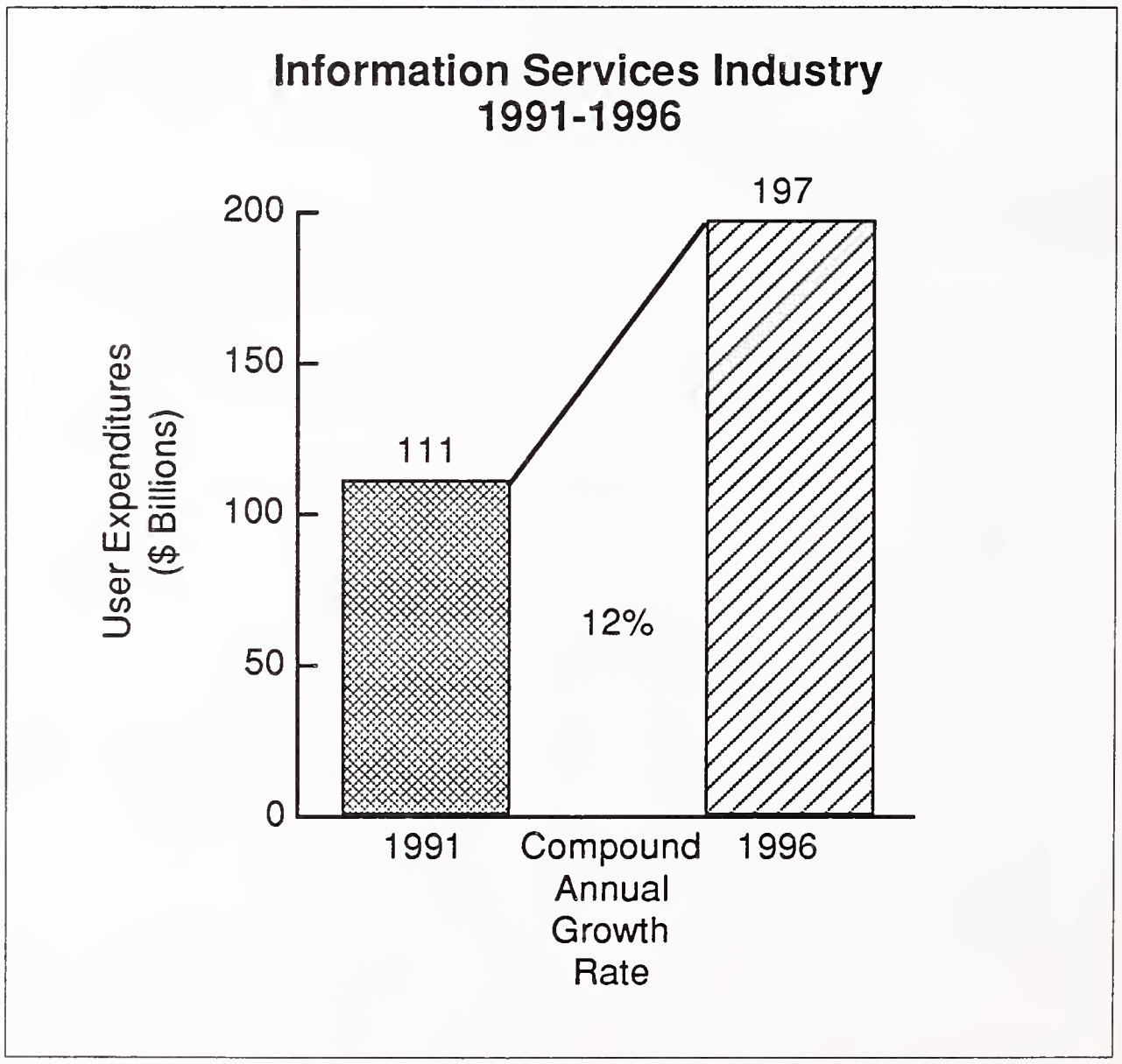


Total Size: $100 Billion

In 1990 INPUT created a new delivery mode—systems operations—by combining the systems operations (facilities management) submodes from processing services and professional services. This delivery mode is the focal point of the major outsourcing trend tracked by INPUT for the past two years and will be a continued focus of INPUT's 1992 Outsourcing and Market Analysis Programs.

The growth rate during 1991 is anticipated to have been 11%, with expenditures reaching $111 billion. This rate represents the second year of much more modest growth for the U.S. information services industry. For the five-year forecast period, INPUT projects a 12% compound annual growth rate (CAGR), resulting in a $197 billion market in 1996, as shown in Exhibit II-2. This CAGR is down from the 13% forecasted for the 1990-1995 period one year ago and is down from a 15% five-year CAGR forecasted in 1989.

EXHIBIT II-2



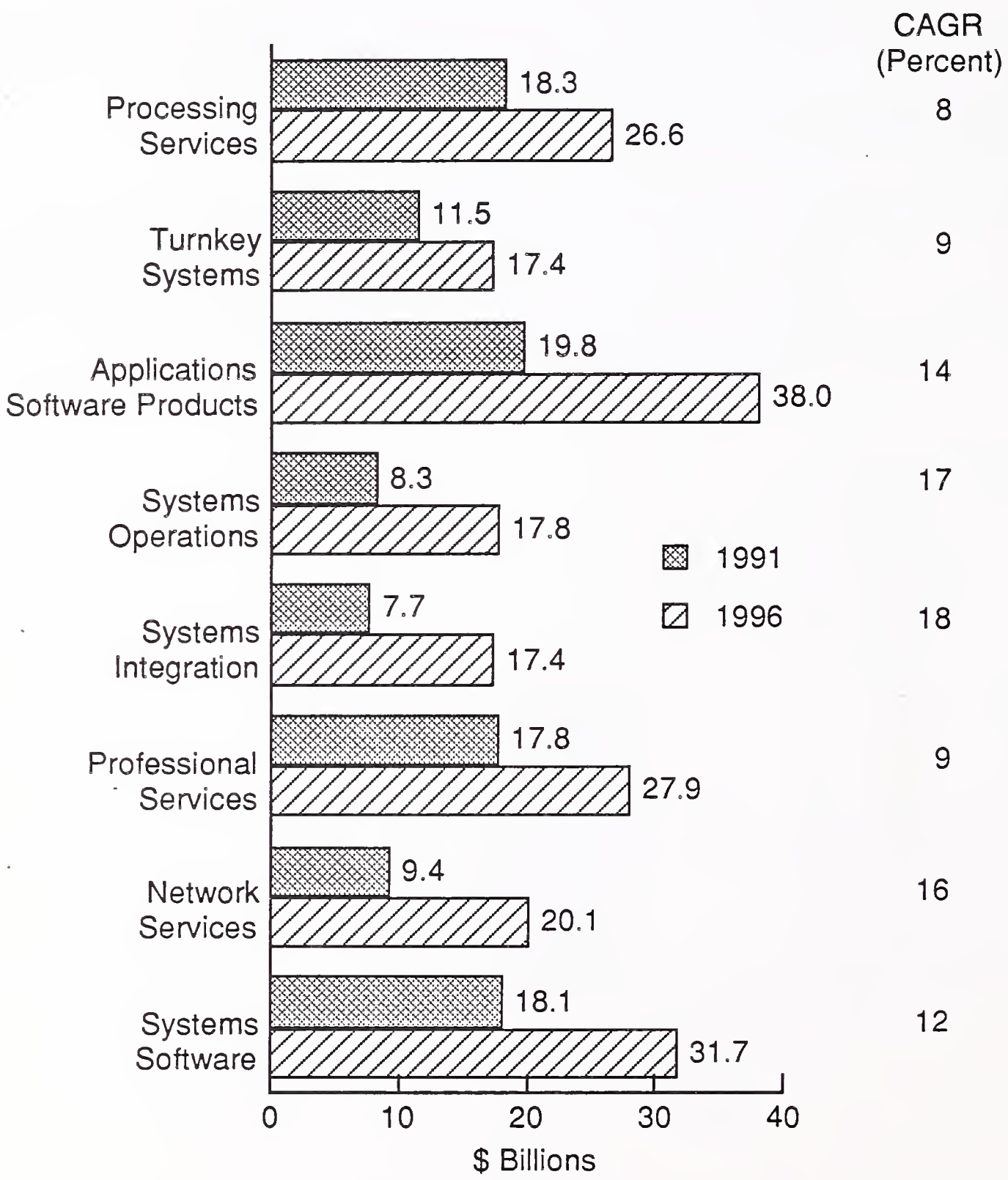
The revision in the five-year forecast reflects a downward revision in growth expectations for the information services industry. Section A, Information Services Environment, discusses the factors behind this slowdown, including the economic environment.

The size and growth rates of the eight delivery modes tracked by INPUT are shown in Exhibit II-3. Systems operations, systems integration, and network services reflect the highest CAGRs for the 1991-1996 period. The growth rate projections are lower than last year's projections for all delivery modes except systems operations where the growth rate increased from 16% to 17%.

Overall, the information services industry remains stable and is growing much faster than the U.S. economy as a whole. However, the rate of growth continues to experience decline, and—as Section A discusses—there are a number of factors impacting the industry in addition to the economy. Opportunities remain numerous, but a number of underlying revolutions are causing significant disruption.

EXHIBIT II-3

Information Services Industry Delivery Modes, 1991-1996



A
Information Services Environment

The primary forces impacting the information services market in the early 1990s are listed in Exhibit II-4.

EXHIBIT II-4

Primary Forces
1991-1996

- Weak economy
- Market size—$100 billion
- Increasing influence of large vendors
- Downsizing—shifting technology foundation
- The changing buyer
- Outsourcing—users making larger decisions
- The standards process

The economic slowdown and recession of 1990 and 1991 have caused a significant decrease in the year-to-year growth rates for the information services industry. Rates have decreased from typical annual rates of over 15% to just over 10% growth in 1991.

- The information services industry is still growing much faster than the overall economy, but the exciting growth of the 1980s is not expected in the near term.

- When the economy recovers in 1992 or beyond, the information services industry will see some improvement, but will not experience the quick recovery that followed prior recessions.

The market has reached some level of maturity, with $100 billion in expenditures in 1990 and a projected market size of $111 billion in 1991. An industry of this size finds it harder to grow, but also benefits from increased stability in downturns.

The largest vendors continue to increase in size at least as quickly as the industry grows. Through acquisition and merger as well as true revenue growth, the larger vendors are increasing their dominance. This dominance results in slower change within the industry as the smaller, more nimble vendors are absorbed. And in the information services industry, slower change tends to correlate with slower growth.

- The recent and continuing efforts by IBM to find a new organizational formula for growth exemplify this belief.

- Slower growth by Andersen Consulting and other large services firms in 1991 is a further measure of the challenge. Firms may grow faster than the overall industry, but not without some difficulty and retrenchment or acquisition activity.

Exhibit II-5 lists the leading vendors and their 1990 market share.

EXHIBIT II-5

Selected Leading Information Services Vendors, 1990

Vendor	1990 U.S. Revenues ($ Billions)	Market Share (Percent)
IBM	5.8	6
EDS*	2.4	2
ADP	1.7	2
Computer Sciences	1.5	2
Digital Equipment	1.3	1
Andersen Consulting	1.2	1
Unisys	0.9	1
First Financial Mgmt.	0.9	1
Microsoft	0.8	1
Computer Associates	0.7	1
American Express ISC	0.7	1
PRC	0.7	1
Total	18.6	20

* Excluding GM

The newest major force in the information technology area is downsizing. Downsizing has numerous meanings, but in general relates to a fundamental shift within the information technology foundation from very singular large processing capability to distributed but integrated processors of all sizes. The more correct description for this trend may be rightsizing.

- In the immediate term, the apparent benefits of downsizing are very attractive and are causing many information systems organizations to rethink overall IT strategies. But gaining full benefit can require major re-engineering of key application systems and their underlying data bases, which takes time and resources in a period of economic recession.

- Over the next five years, INPUT believes that downsizing—or rightsizing—will become a revolution within the IT arena and cause major changes in the information systems function and process, as well as the information software and services industry.

- Refer to the recently completed INPUT report, *Putting Downsizing in Perspective*, for an in-depth assessment of the downsizing revolution.

Throughout the 1980s, business managers at all levels became more involved in the information systems processes of their organizations—first as users of fourth-generation languages, then of personal computers, and finally of LANs, relational data bases, etc. At the same time, information systems became more essential in tying the organization together. A direct result—which will have significant impact in the early 1990s—is general management is now deeply involved in major information systems decisions. General management often totally controls the budget decision.

- For the using organization this control means that the information systems executive is more defensive and more fully drawn into the operation, thus the decision criteria changes.

- For the information services vendor this control means there are often two buyers with different priorities and needs. The selling process may be harder and more complex.

- In the 1990s, INPUT believes the buyer of information technology and services will become—to a major degree—the true end user, not the traditional information systems manager of the 1970s and 1980s.

The end of the 1980s saw the beginning of a major shift in the information services market—the movement to outsourcing. Information services and products have always been outsourced, but the degree or breadth of many outsourcing decisions and the amount of risk that the vendor was willing to accept were different.

INPUT recorded these shifts with the definition of two new delivery modes—systems integration and systems operations—over the past three years. These two delivery modes are now the fastest growing delivery modes (17% CAGR for systems operations and 18% CAGR for systems integration). Together they comprise 15% of the information services market and their share will increase throughout the 1990s.

- The movement toward outsourcing offers major opportunities to the aggressive and larger vendors and signals a need for major changes in the strategies of information services vendors of all sizes.

- Outsourcing also creates significant new challenges for information services vendors. A true outsourcing relationship increases the business risk assumed by the vendor, broadens the level of responsibility assumed and the skills required by the vendor, and typically shifts the financial relationship toward a fixed-price structure.

Outsourcing will be the fastest growing sector of the market for the next five years. Buyers and vendors have much to learn about how this type of relationship evolves and brings financial benefit to both organizations.

In the late 1980s and to date in the 1990s, the standards process has had major impact on the information services industry. Although most of the impacts are beneficial to users, INPUT believes that these impacts currently negatively affect growth within the industry.

- Usually progress in standards is slow and causes a wait-and-see attitude among users or buyers. The benefits are attractive and appear worth waiting for.

- The current open systems phenomenon has both crystallized and confused the impacts of standards. Promises of true interoperability and all that it implies suggest there is great value in an open systems-based IT strategy, but the technology is not really available. The result is a slowdown in long-range IT decisions and an inclination to make current, short-range IT decisions.

- INPUT believes that by the middle of the decade (perhaps as early as 1993) the impacts of the standards process on industry growth will be much more favorable.

B

Delivery Mode Forecasts

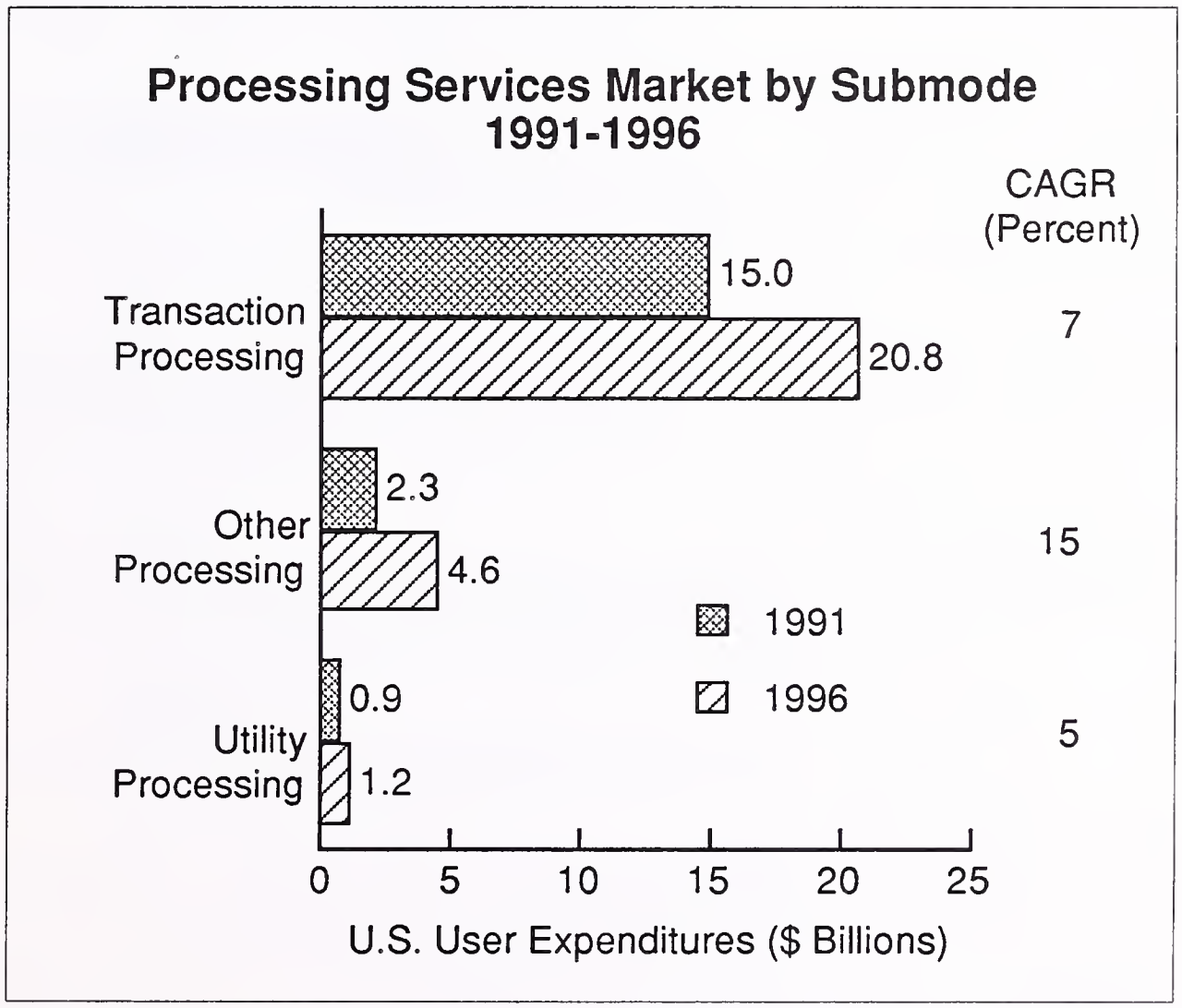
1. Processing Services

INPUT defines the processing services market as including three market sectors: transaction processing, utility processing, and "other" processing.

INPUT has sized the 1991 processing services market at $18 billion and projects that it will grow at a modest compound annual rate of 8% to about $27 billion in 1996. This growth rate compares to a 9% CAGR forecasted in 1990. A significant factor in the conservative growth estimate is the effect of the recession, which has decreased growth in transaction volumes to some degree and increased price competition.

Exhibit II-6 provides the forecasts for each submode.

EXHIBIT II-6



- The dominant submode is transaction processing where growth is projected at only a 7% CAGR, resulting in an almost $21 billion market in 1996. In 1990, INPUT projected a growth rate of 9% per year for the next five years.

- Other processing services will grow at a 15% rate through 1996, reaching $4.6 billion. The fastest-growing portion of this submode is disaster recovery services.

- The utility submode will only grow at 5% as these types of services continue to move to internal capabilities using workstation- and LAN-based processing. Utility processing services represents a modest $1 billion dollar market segment.

The inhibiting forces in the processing services industry fall into two broad categories: the economy and specific trends within the processing services industry. These forces are summarized in Exhibit II-7.

EXHIBIT II-7

Processing Services
Inhibiting Forces

- Delayed economic recovery
- Tight budgets
- Competition from other information services modes
- Limited planning
- Short supply of technical skills
- Use of shared resources

In order of average importance to respondents.

In addition to the economy, the processing services sector is impacted by general budgetary constraints and the growing use of systems operations or lower cost downsized-technology solutions.

- Some application services traditionally sourced from processing services vendors are being reviewed for conversion to internal approaches.

- The strong growth experienced in the systems operations area has a downward impact on transaction processing services. The result is that most processing services firms are already or will soon consider offering services under the framework of platform or application systems operations.

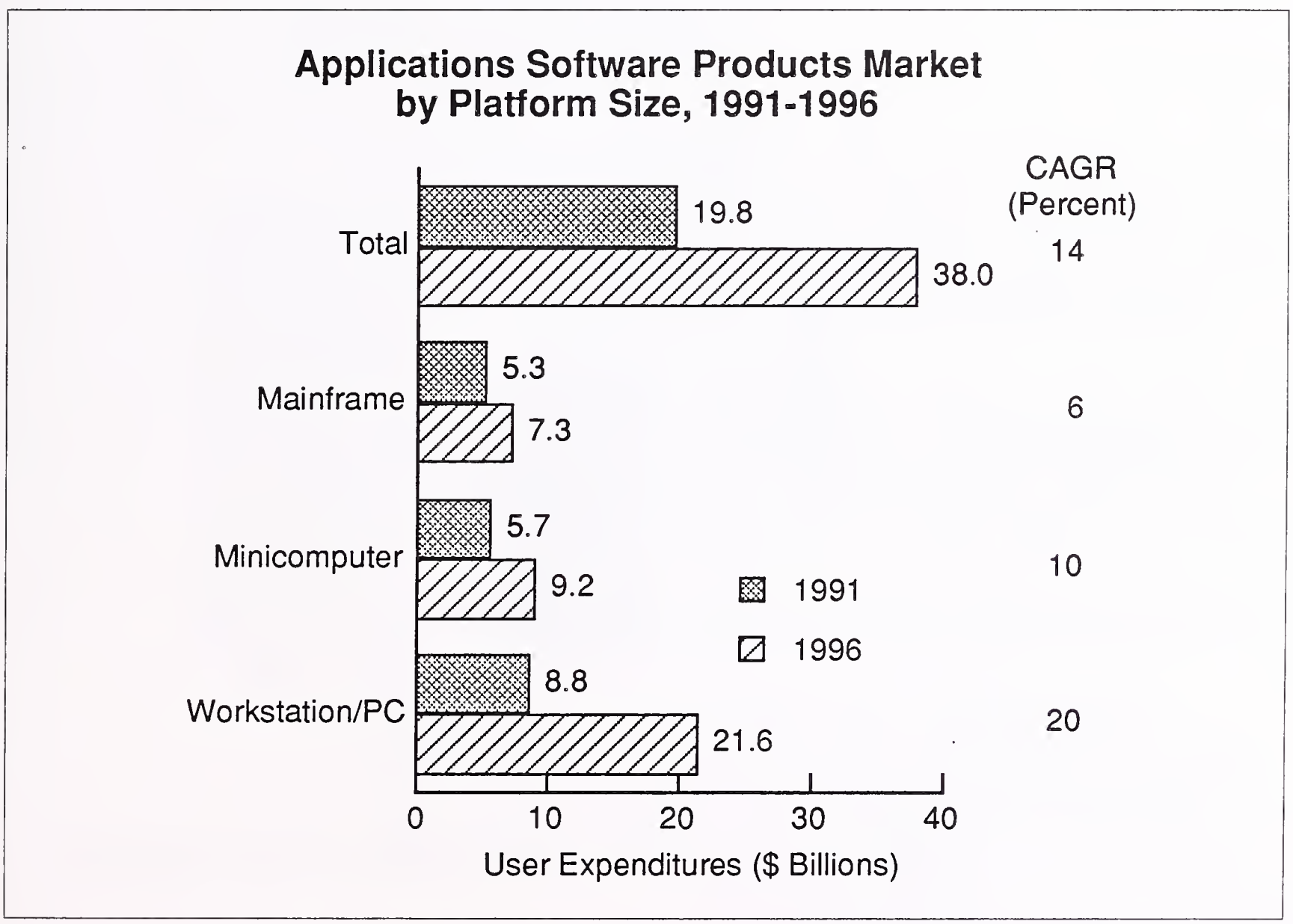
2. Applications Software Products and Turnkey Systems

Applications software products and turnkey systems provide users with an application solution.

As shown in Exhibit II-8, the applications software products market will expand from $19.8 billion in 1991 user expenditures to $38 billion by 1996, a CAGR of 14%, which is unchanged from the 1990 projection.

- The mainframe sector will experience the least growth with a five-year CAGR of only 6%. This submode will grow from $5.3 billion in 1991 to $7.3 billion by 1996.

EXHIBIT II-8

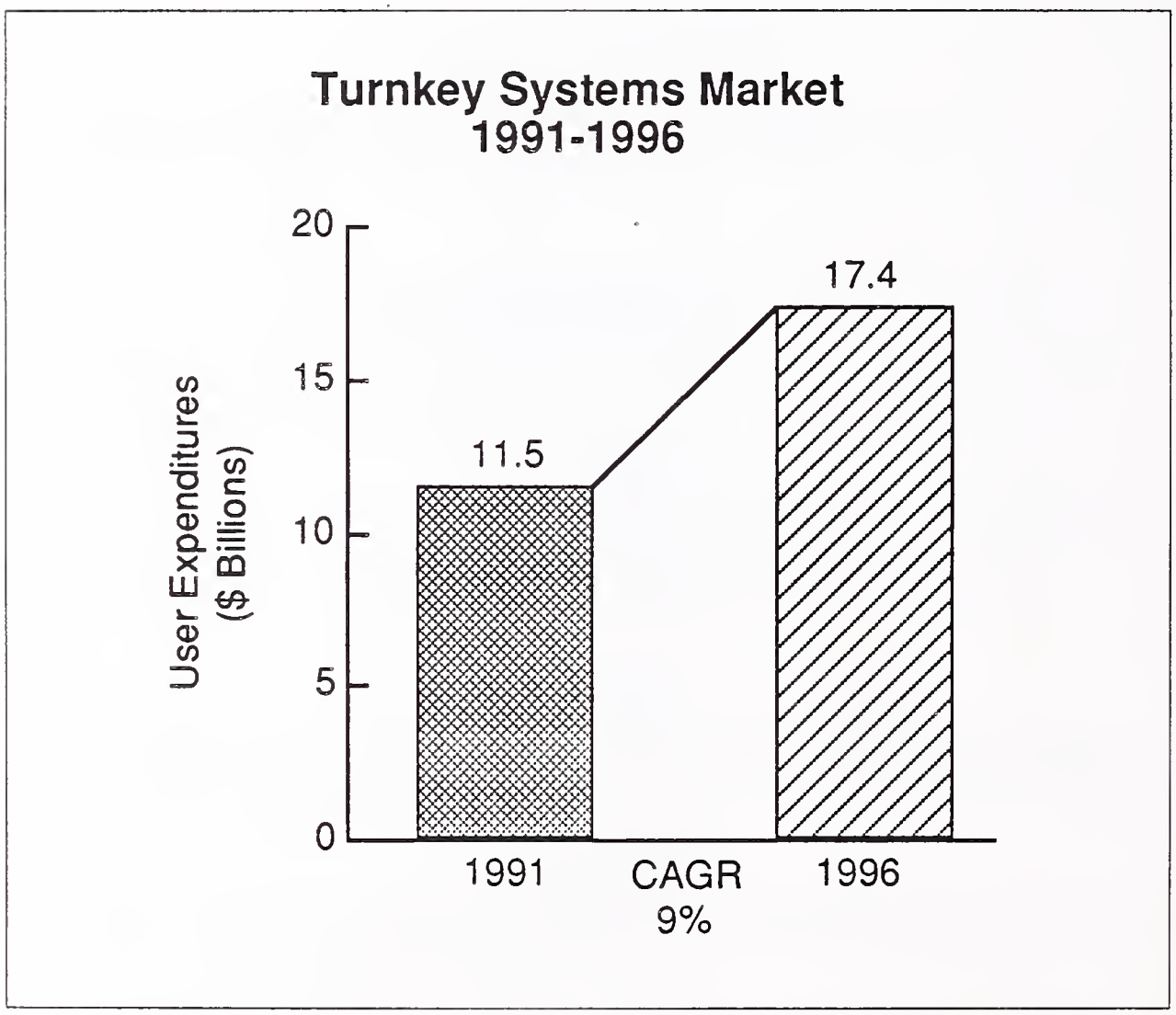


- The minicomputer submode with $5.7 billion in 1991 will see growth of 10% per year to $9.2 billion by 1996. Much of this growth will be on larger client/servers.

- The workstation/PC submode will see the greatest growth, increasing from $8.8 billion in 1991 to $21.6 billion by 1996. In spite of strong growth over the past few years, this platform level continues to command significant expenditure as processors upgrade and the movement to Windows grows.

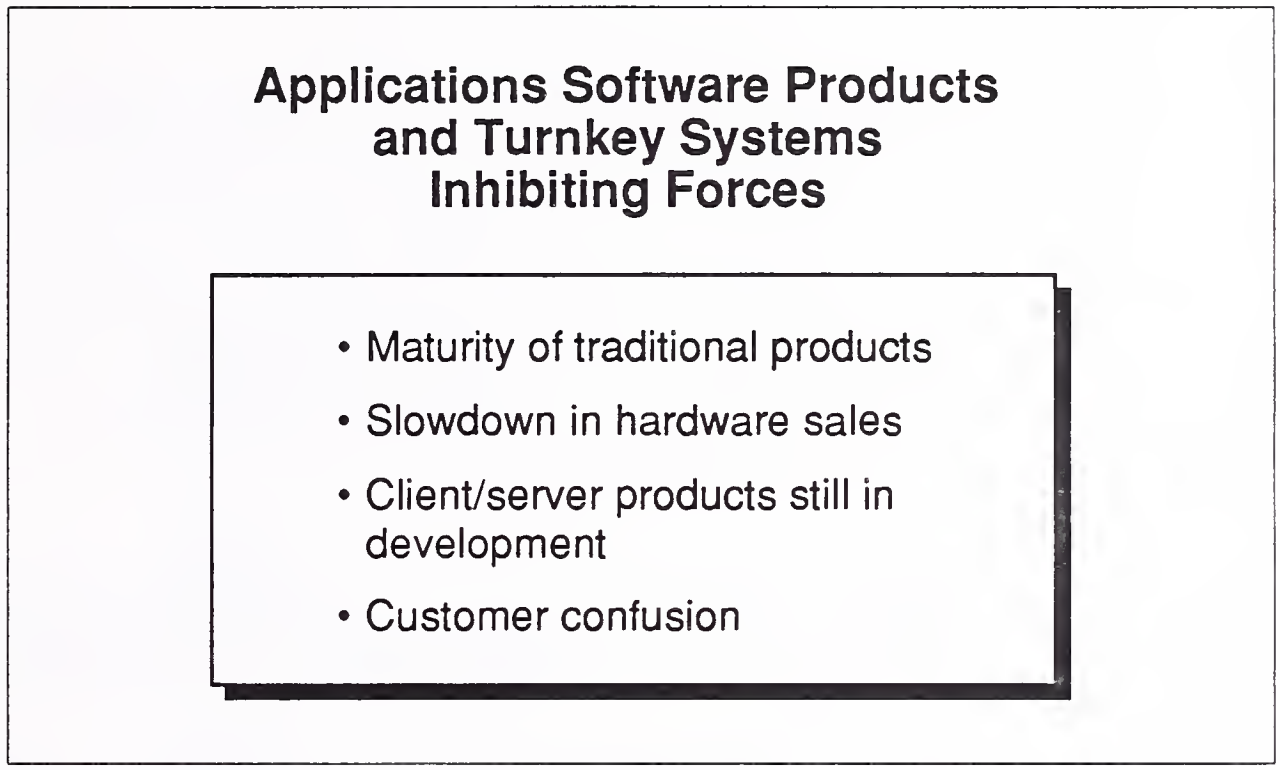
Growth for turnkey systems, on the other hand, will be markedly lower—expanding from $11.5 billion in 1991 to $17.4 billion in 1996 at a CAGR of 9%, as shown in Exhibit II-9. The lower growth is tied to the continuing shift of traditional turnkey systems vendors to only applications software products. The strength in this market is at the workstation/PC and low-end client/server level where unit sales are relatively low and the contribution of the hardware to the total sale modest.

EXHIBIT II-9



The factors negatively impacting growth in these two delivery modes are listed in Exhibit II-10.

EXHIBIT II-10



In general, the applications software products and turnkey systems markets have felt few, if any, effects of a slowed economy and recession. The fact that hardware sales will slow further in the short term due to the economy is offset by pressure on profits at end-user organizations; expensive in-house development projects are put on hold, thus enhancing the possibility for additional external purchases of applications software products.

Turnkey systems vendors are experiencing moderately adverse effects from the slowed economy, principally because of slower hardware sales and because a significant part of their customer base—manufacturing industry sectors and small companies—is feeling adverse effects from the slowdown.

In addition to the economy, other forces impacting growth in application solutions markets include:

- Computer shipments will continue to fuel application solutions growth—albeit at a slower rate—over the next five years. Lower cost client/server processors will soon be supported by new applications software product offerings, which will help sustain growth in these delivery modes.

- The product transition to client/server architectures is a growth inhibitor in the short term. Client/server products from most leading vendors will enter the market in 1992 and 1993. The growth benefits will follow, but until products are available, confusion in the applications software products and turnkey markets restrains growth.

3. Systems Software Products

The overall systems software products market will expand from $18.1 billion in 1991 to $31.7 billion by 1996, at a compound annual growth rate of 12%. This rate is down from the 14% forecast in 1990.

Exhibit II-11 shows this forecast by platform level. The growth rates range from a low of 10% for the mainframe level to 19% for the workstation/PC level.

EXHIBIT II-11

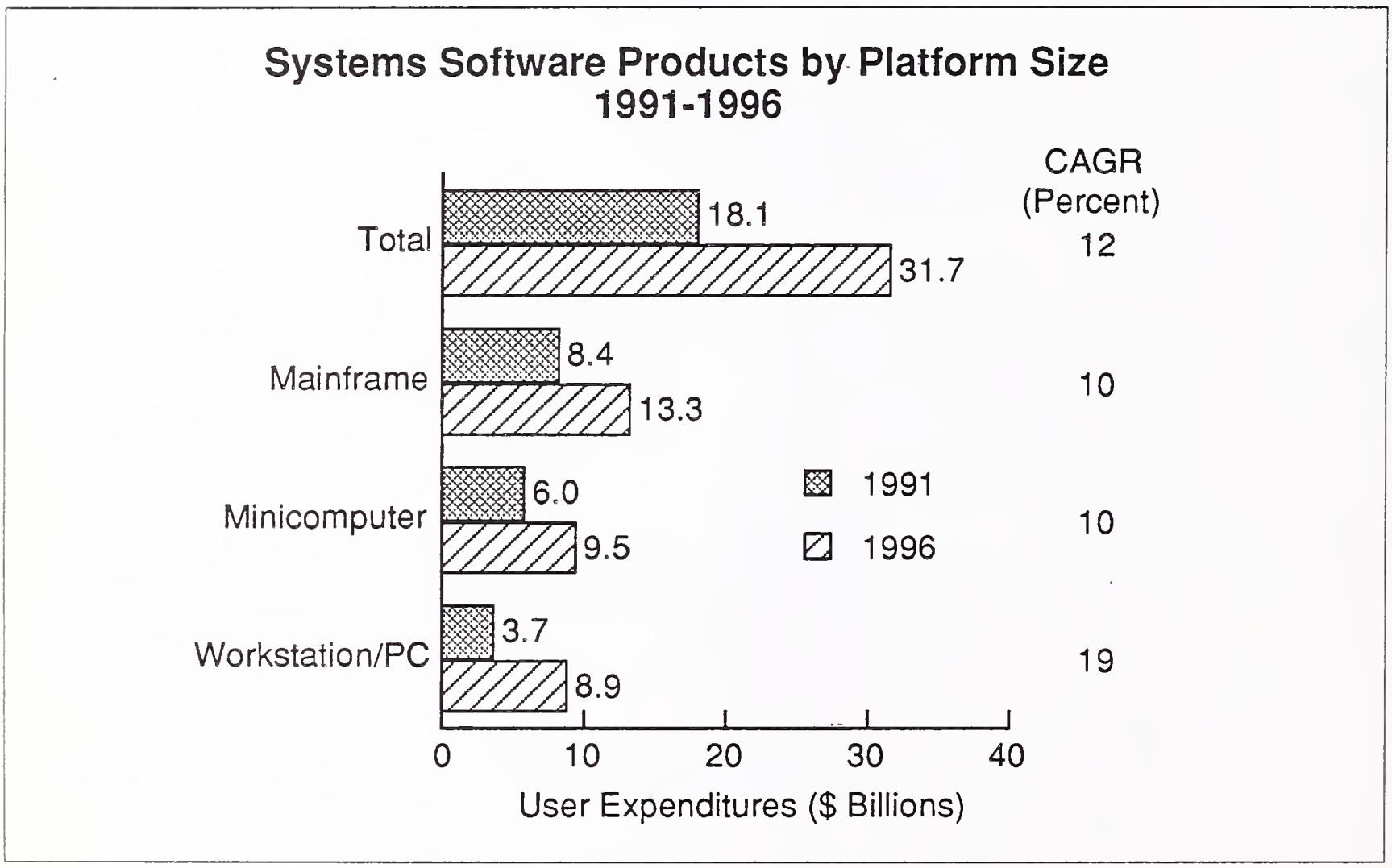
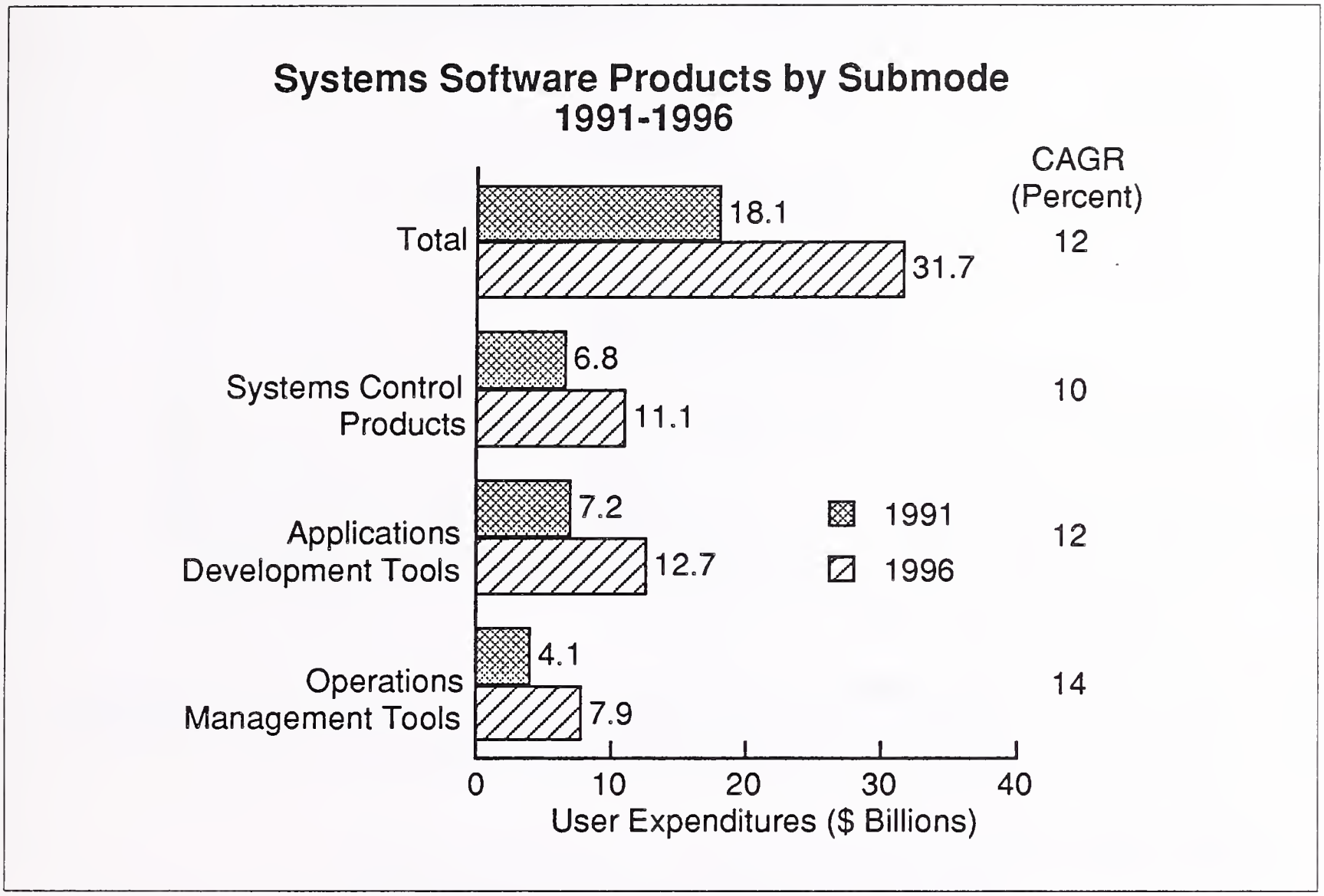


Exhibit II-12 provides this forecast by the three submodes for systems software products: systems control products, applications development tools, and operations management tools. The growth rates range from 10% for systems control to 14% for applications development tools.

EXHIBIT II-12



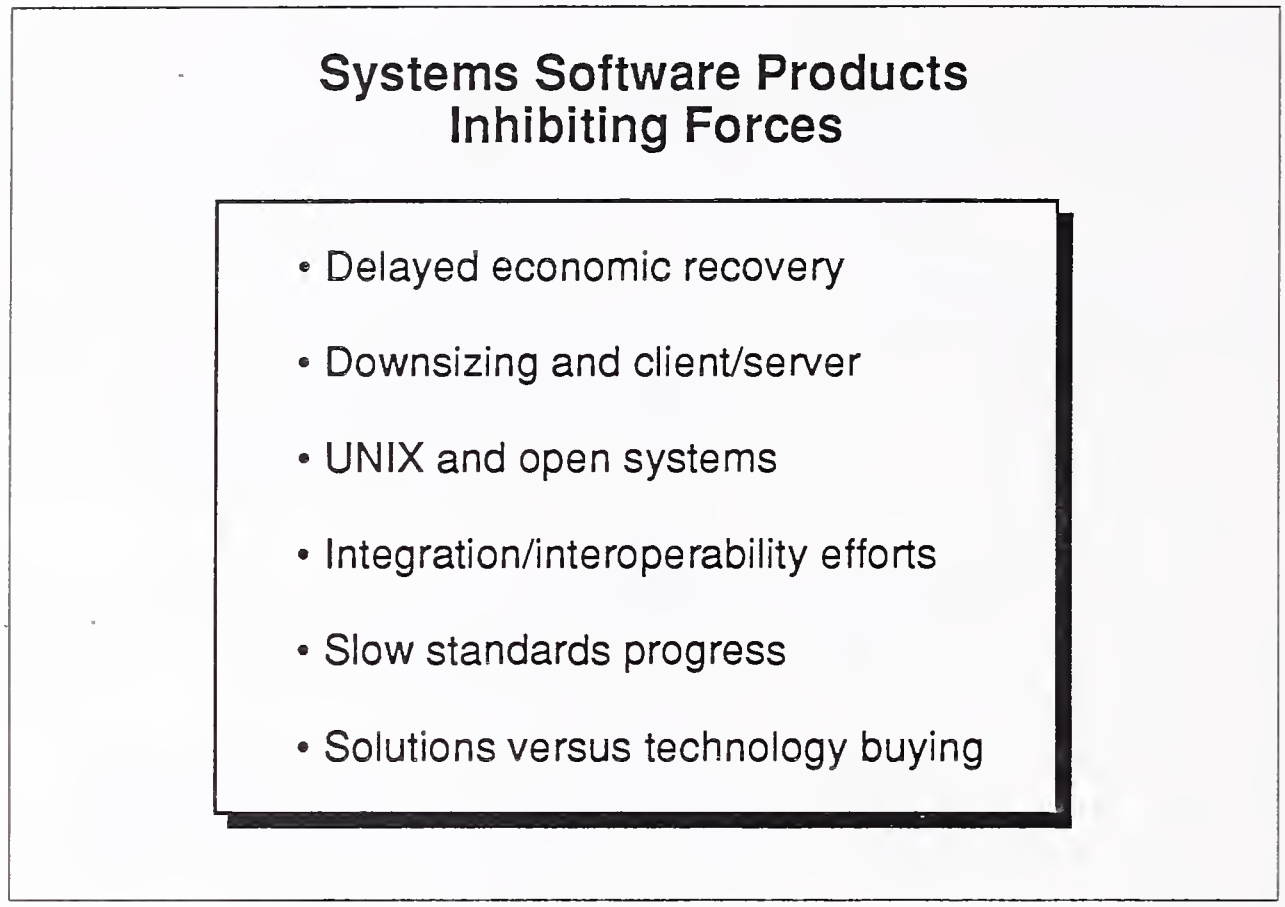
The market for systems software products is being affected by both the economic environment and the shifting technology environment. Exhibit II-13 lists key forces impacting growth.

The systems software products market is primarily driven by hardware sales, which have declining growth rates even for personal computers. The current consolidation in data centers both drives and inhibits systems software demand, as does the emphasis on network integration.

Another inhibiting factor is the beginning movement to client/server technology. As with any new technology, a learning curve slows purchases early in a technology's life.

Other technology issues impacting growth are the standards process, confusion about open systems, and a tendency to wait for true interoperability.

EXHIBIT II-13



A final factor is the growing preference to buy a solution instead of the underlying technology, particularly as buying becomes a general management and not an information systems function.

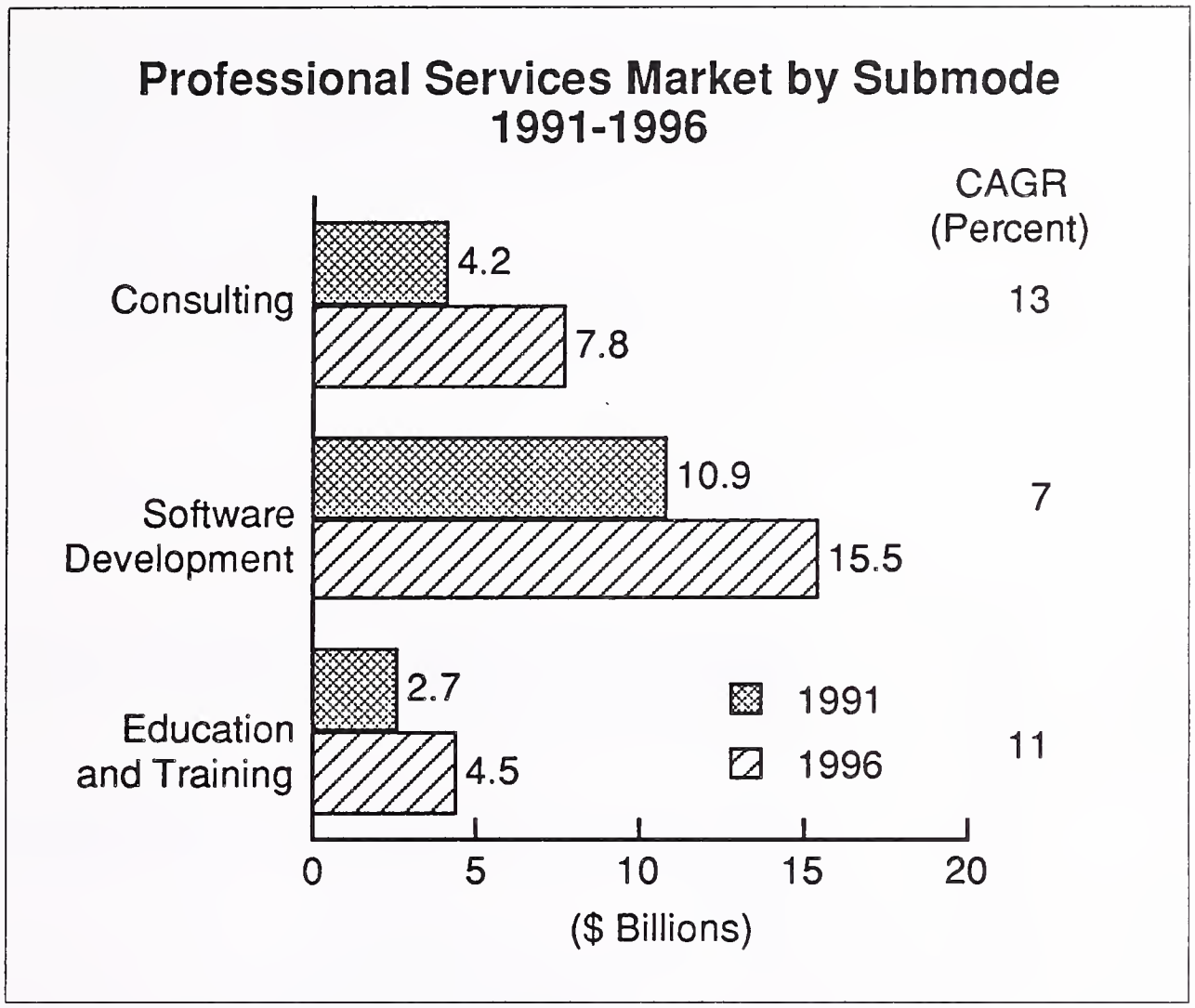
4. Professional Services

The professional services segment of the information services market has suffered the most from the current recession. As a result, INPUT has lowered the five-year forecast for professional services to just 9% CAGR from 12% in 1990. Exhibit II-14 presents that forecast for each of the three submodes of professional services: consulting services, software development, and education and training.

- The consulting services submode will experience the strongest growth with a CAGR of 13% reaching $7.8 billion in 1996. There remains a strong willingness to look outside to identify new approaches to past and future information technology requirements.

- Software development is the largest submode, representing over 60% of the total professional services market. At the same time, software development is experiencing the greatest decline in growth because of the recession and the turn to systems integration. A 7% CAGR will increase a $10.9 billion market in 1991 to $15.5 billion in 1996.

EXHIBIT II-14



As indicated in Exhibit II-15, the current environment for professional services is marked by an increasing impact from the economic downturn. Also listed are other factors inhibiting growth.

EXHIBIT II-15

Professional Services Inhibiting Forces

- Lingering recession
- Increasing use of applications software products
- Impact of shift to systems integration
- New competitors
- New buyers and shift to solutions buying

The traditional professional services vendor is learning to compete increasingly with the alternatives of purchased software products and systems integration. In many instances, this competition is leading such vendors to form significant alliances and to broaden offerings to include systems integration in areas of specific strength.

Increasing price competition within the software development submode is leading to decreased margins in the near term.

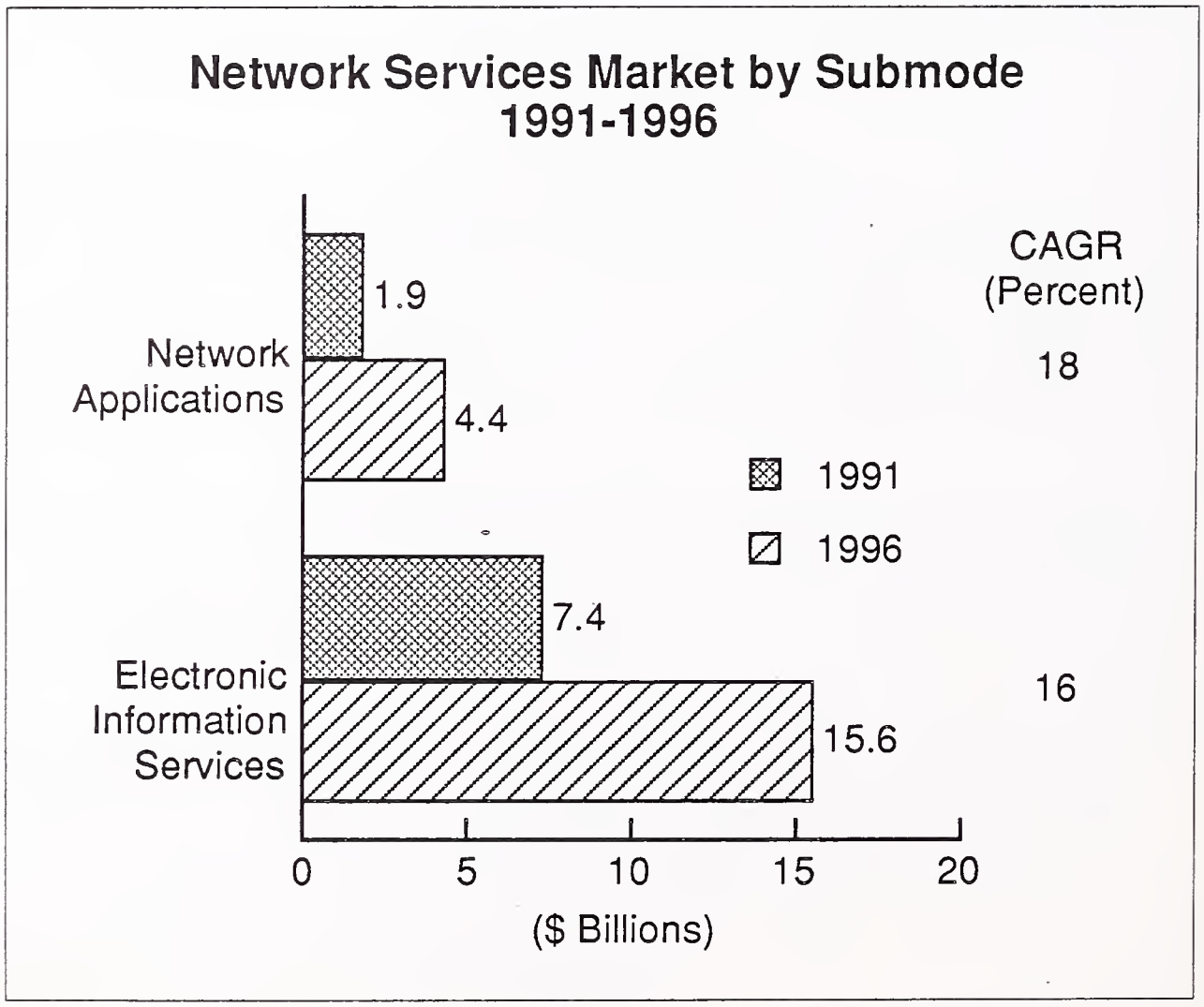
5. Network Services

The network services market will increase at a CAGR of 16% between 1991 and 1996, growing to a level of $20 billion in user expenditures in 1996.

The growth rate for network services is down slightly from the 1990 forecast of 17%, continuing a small year-to-year decrease from rates of 20% in the late 1980s.

Exhibit II-16 provides the market size and growth rates for the network services submodes—network applications and electronic information services.

EXHIBIT II-16

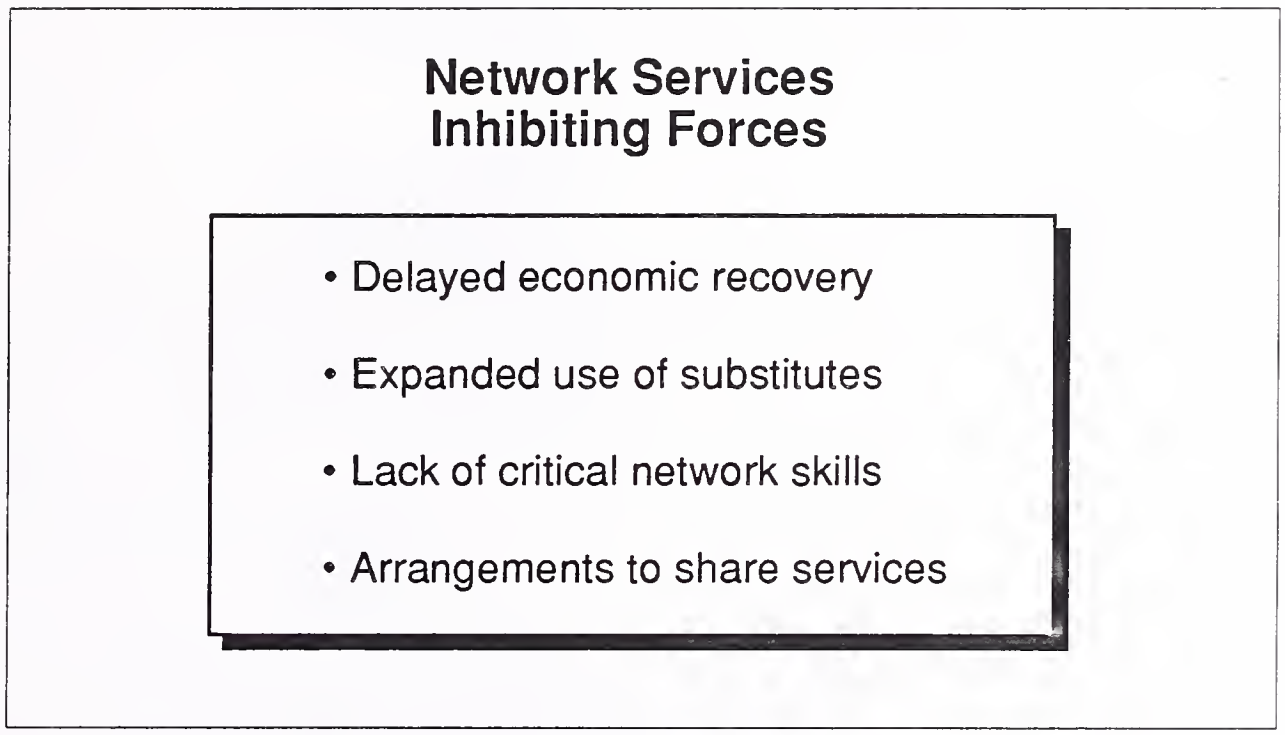


- The smaller segment, network applications, will see the greatest growth with a 18% CAGR driven by the continuing increase in use of EDI, electronic mail, and other value-added network services.

- The electronic information services submode will grow at 16% during the 1991-1996 period.

Exhibit II-17 identifies the inhibiting forces currently constraining the network services market.

EXHIBIT II-17



6. Systems Operations

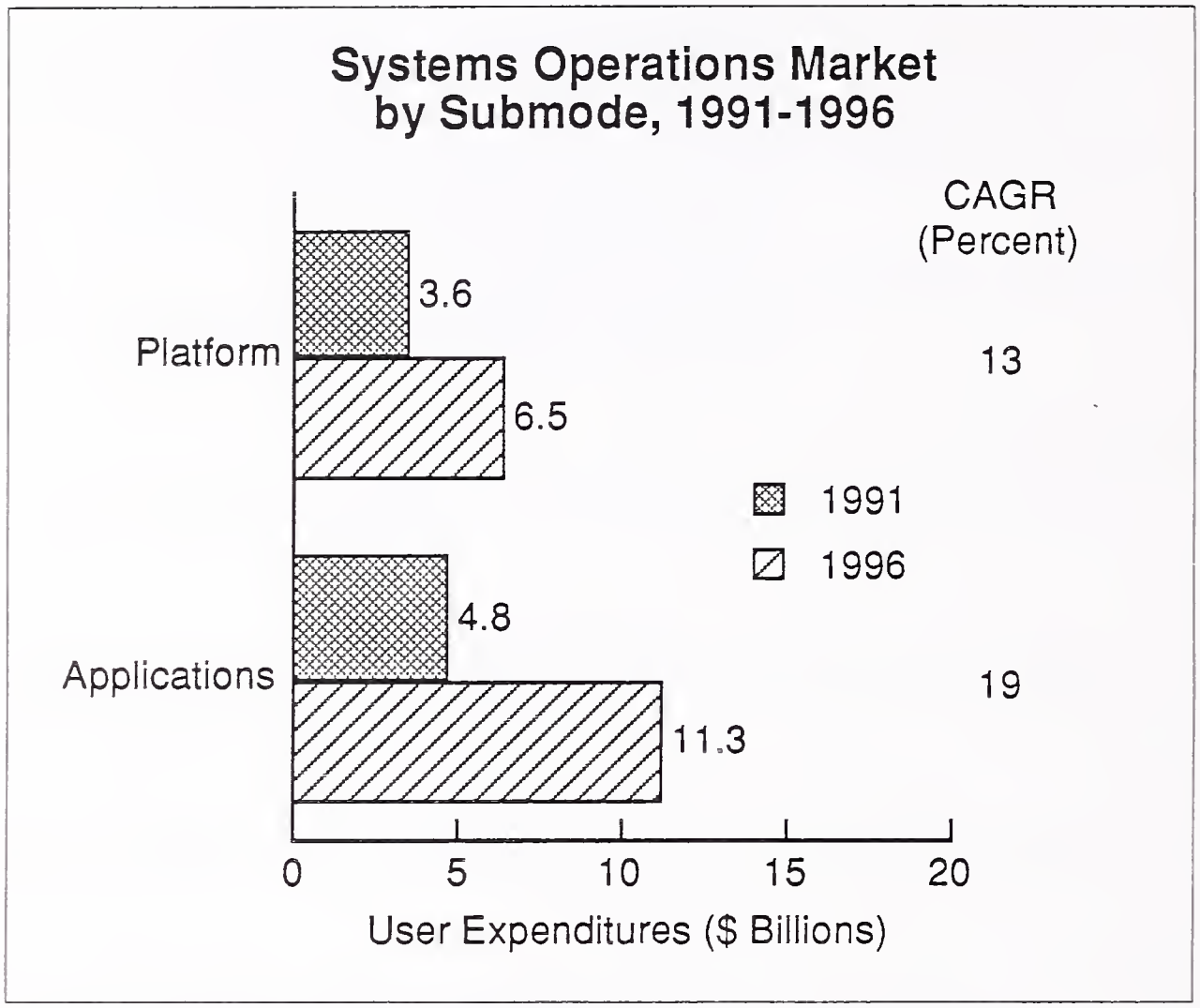
In 1991, INPUT changed the submodes for systems operations to platform and applications systems operations. Under the platform submode, the vendor assumes responsibility for the operation of the primary data center and often the network and secondary data centers or LANs. Under the applications systems operations submode, the vendor also assumes responsibility for support (maintenance and possibly new development) of the primary applications systems.

Exhibit II-18 presents the forecast for the two submodes.

- Platform systems operations will grow at a compound annual rate of 13%, with revenues increasing from $3.6 billion in 1991 to $6.5 billion in 1996. The platform systems operations growth rate varies significantly within each industry market, however, because of forces in each sector.

- Applications systems operations will grow at a compound annual rate of 19%, from $4.8 billion in 1991 to $11.3 billion in 1996. This compares with an 18% CAGR projected in 1990.

EXHIBIT II-18



The accelerated growth in the applications sector reflects an increasing desire by users to off-load applications 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.

The issues facing the systems operations market are relatively unchanged from 1990. The development and growth of this market sector has not been hampered by the recession and, in fact, is more likely positively impacted. The opportunity to off-load the investment decision and capital costs to the vendors is very attractive to companies of all sizes.

7. Systems Integration

U.S. businesses, more than ever, are feeling the pressure of competition from domestic and foreign companies. This pressure has forced organizations to look closely at their core businesses to identify solutions that differentiate their products and services from the competition's products and services. In many cases, the application of information technology can make the difference in offering a superior service faster or reducing the length of product development cycles.

The result has been the continuing willingness to turn to systems integrators to find complex solutions to key information systems requirements.

Exhibit II-19 presents the revised INPUT forecast for 1991-1996 for the commercial and federal government sectors. The commercial sector will grow at a 19% CAGR, reaching over $10 billion in 1996, while the federal sector will reach almost $7 billion with a 16% CAGR for the same period.

EXHIBIT II-19

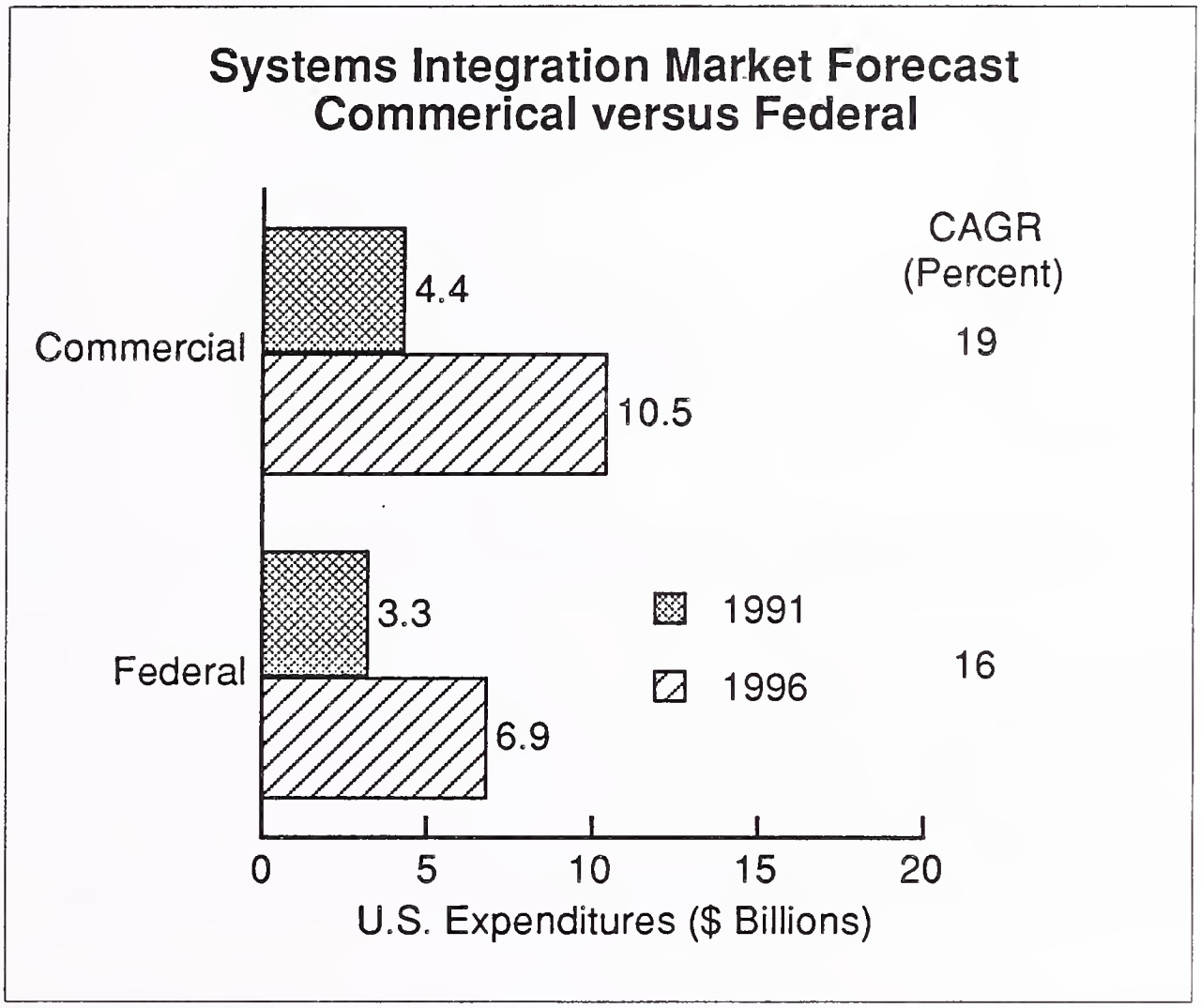
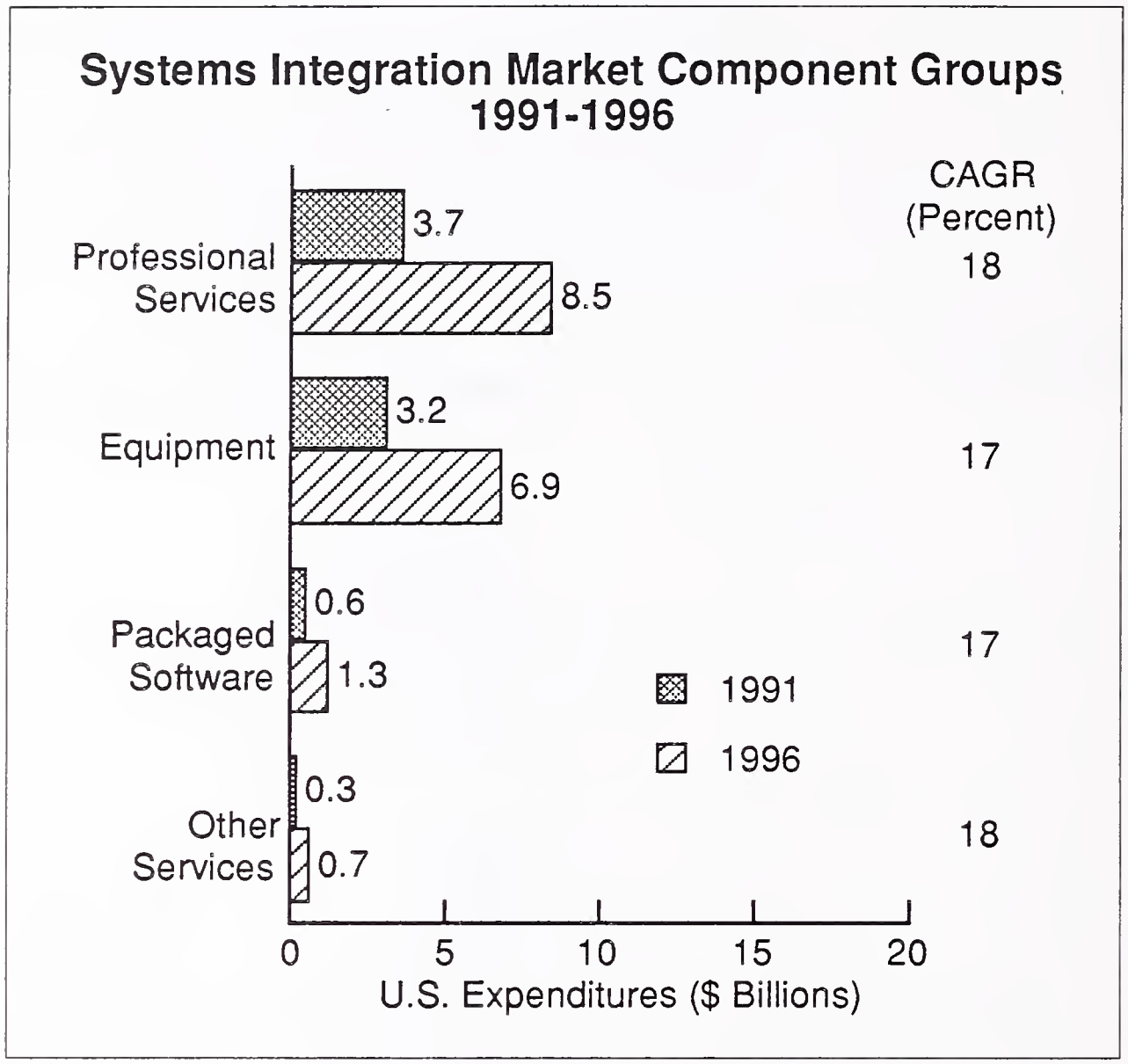


Exhibit II-20 presents the same forecast by the four components of the typical systems integration project: professional services, equipment, software products, and other services. The equipment and professional services components comprise the greatest proportion of the systems integration market.

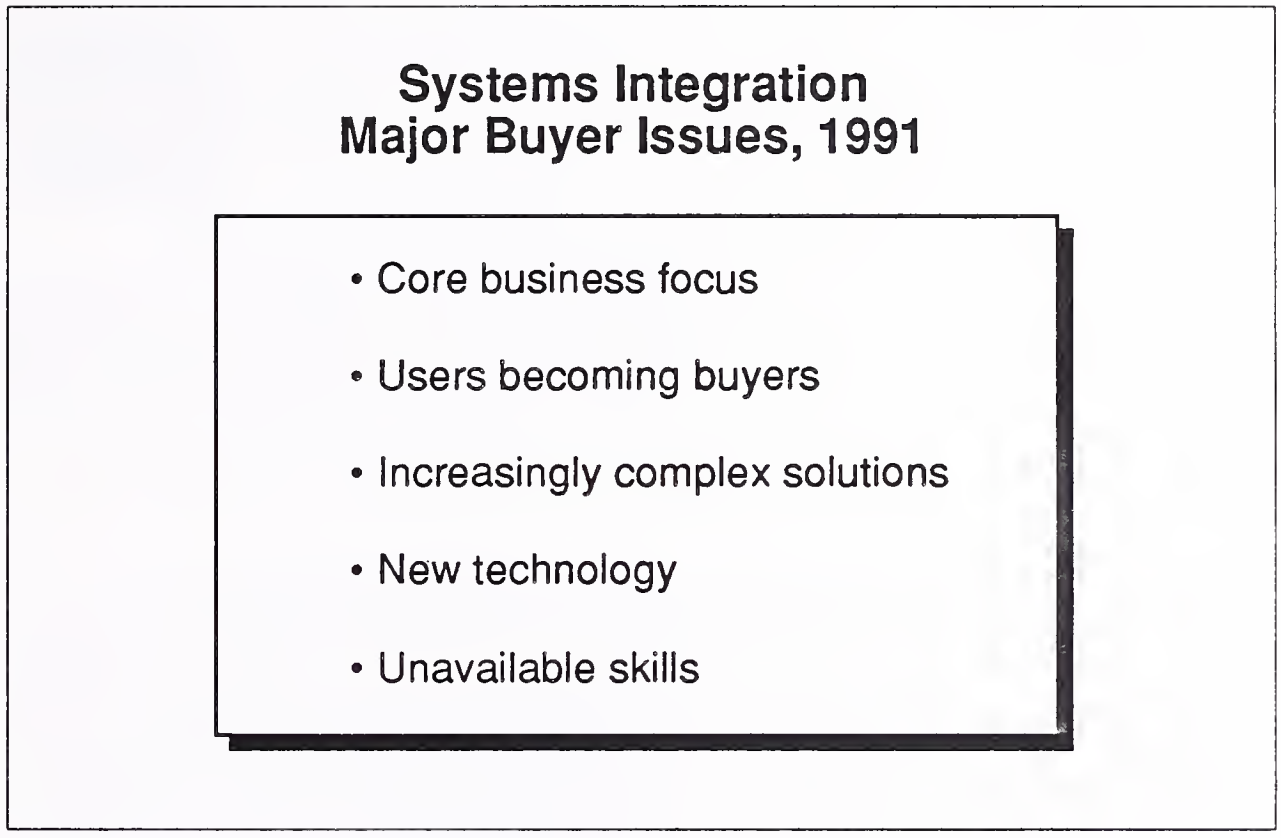
EXHIBIT II-20



In Exhibit II-21 INPUT identifies the major buyer issues in the systems integration submode for 1991 and beyond.

An increasing amount of information systems expenditures is no longer controlled by internal information systems organizations. The organizations are, in many cases, becoming the buyers of solutions and are controlling the solution budgets. Many of the solutions that users seek include new technologies—such as artificial intelligence, image processing, and a variety of advanced telecommunications alternatives such as LANs, WANs, and MANs.

EXHIBIT II-21



In many instances, the systems integrator can routinely implement the new technology and solution faster than the internal information systems function.

The economic recession has had some impact on the systems integration market. In the near term, existing projects are being completed faster than planned and new projects are both smaller and taking longer to be contracted. INPUT has lowered its systems integration forecast by 1% for the next five years, but continues to see a strong and viable market for those vendors that are capable of assuming the risk of total project responsibility and have a record of demonstrated success.

The growth in demand is focused in a few vertical industries and is not uniformly spread among those industries facing increasing competition.

C
Conclusions

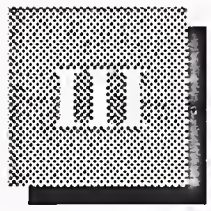
Exhibit II-22 summarizes INPUT's current outlook for the U.S. information services industry. In summary, these conclusions describe a changing industry. Growth will come from different sources, the winning vendors will change, and the characteristics of computer manufacturers—such as IBM, DEC, and Unisys—will change.

EXHIBIT II-22

U.S. Information Services Industry Conclusions

- Slower growth for 1991-1996
  - Slow rebound in 1992
  - Market growth of 10% per year through 1993
  - Maturity in some sectors, confusion in others
- Outsourcing will be the bright spot
  - Services versus products
  - Solutions versus systems
  - Primary versus secondary vendors
  - Functions as well as projects
  - Long-term relationships with users
  - Increased reliance on vendor
  - Increased risk for vendor
- Confusion about technology alternatives
  - Client/server in the learning stage
  - LAN-based applications being tested
  - Open systems unproven
  - Waiting for standards benefits
- The buyer has changed
  - Users comfortable with information technology decisions
  - Vendor must learn to sell to user, not information systems
- Influence of large vendors will grow

INPUT believes some revolutions are under way—outsourcing, downsizing, networking, and re-engineering of the information systems process. These revolutions are just becoming apparent, and the depth and degree of their influence remains to be fully understood. The information services industry may see a new beginning in the next five years. The successful vendor will be more flexible, with closer ties to its customers and a solution versus technology orientation to its customer offerings, whether service- or software products-based.



Processing Services

The processing services delivery mode includes three submodes: transaction processing, utility processing, and "other" processing services.

- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the 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.

- *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 the vendor's system.

- *Other Processing Services* - Vendor provides service—usually at the 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.

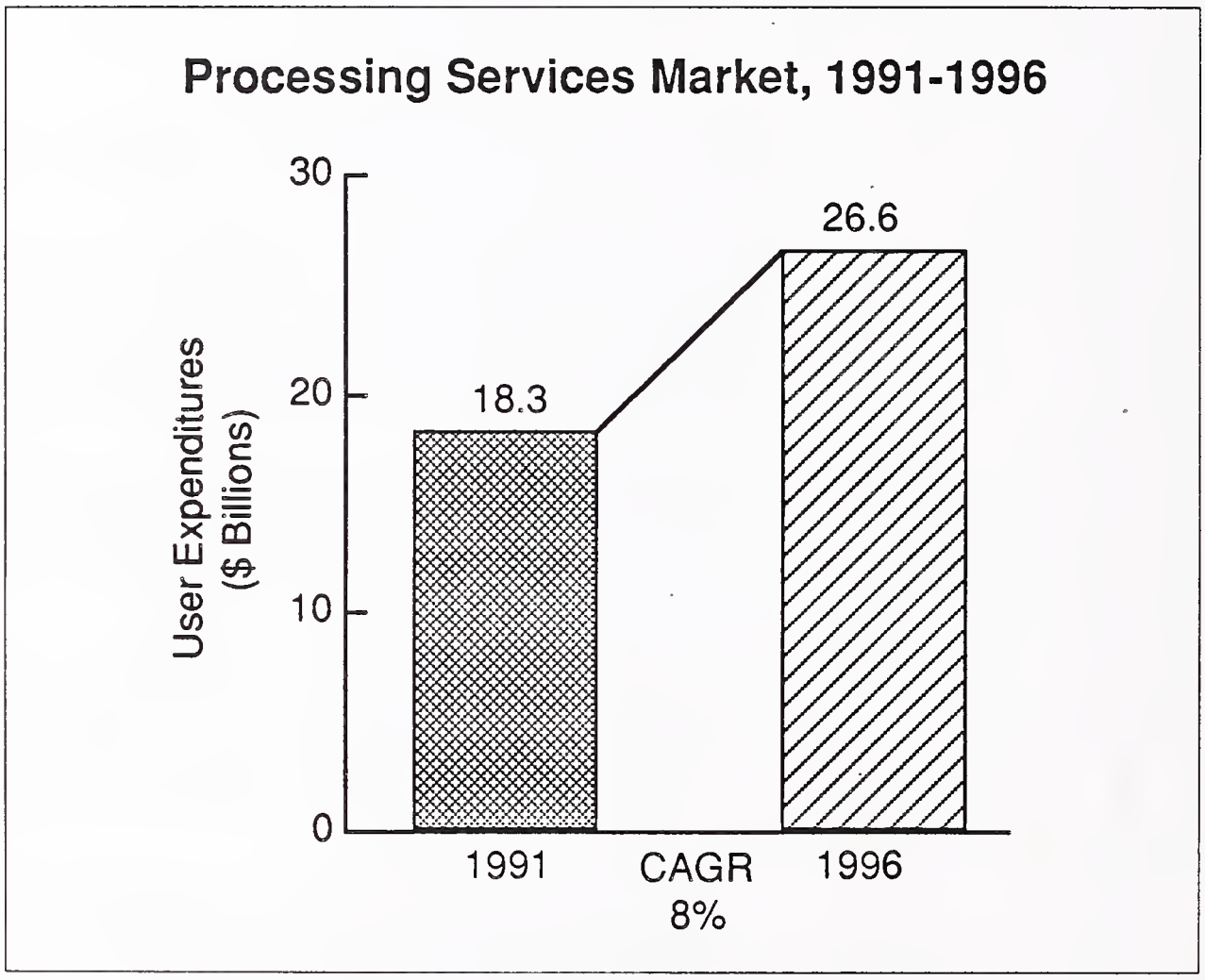
A

Delivery Mode Forecasts and Driving Forces

1. Forecast

Based on its ongoing surveys of user expenditures, INPUT estimates that the processing services market will grow at a compound annual rate of 8% to $26.6 billion in 1996, as shown in Exhibit III-1.

EXHIBIT III-1



2. Forces Impacting the Processing Services Market

The three chief forces having an impact on the processing services market are the tendency of companies to rely on processing services for certain types of business functions, the expanding role of end users, and economic pressure resulting from the protracted downturn. These forces and their impact over the planning period are summarized in Exhibit III-2.

The first type of force driving the use of processing is illustrated by the reliance of many firms on vendors who handle payroll, plastic card and tax processing, and other high-volume, common application systems.

- This force will help processing services vendors hold on to a certain volume of business, where IS technology and end-user interests do not make another alternative considerably more attractive.

- Where other alternatives such as systems operations or downsizing application systems to run on workstations rather than on processing services provide a notable advantage in economy or in the service of end-user interests, processing services vendors may find it possible to offer that alternative. Bank processors such as First Financial Management and EDS have found it possible to sell systems operations as well as processing services.

EXHIBIT III-2

Forces Impacting the Processing Services Market

- Force
  - Reliance on processing services
  - Protracted economic problems
  - End-user pressures
- Impact
  - Use of processing services vendor where possible
  - Consideration of systems operations and downsizing
  - Change, if it will support end-user goals

The expanding role of end users has encouraged the use of systems operations and downsized applications where those activities will support business goals or lower departmental costs.

End users are also supportive of the use of processing services where the industry/application knowledge of the processor or network and other capabilities of the processor would be costly to obtain in-house. In general, end users are not proponents of building in-house IS capabilities.

Due to the current economic pressure and the willingness of end users and management to consider large-scale changes in the use of IS, this is a period of opportunity.

- Processing vendors can use the increased functionality of new equipment, software and network capabilities with their past experience and knowledge to increase work in certain industry markets.

- Vendors may have to expand into other modes of service delivery, particularly systems operations, to take advantage of opportunities.

Economic pressures, however, can also cause firms to put aside or delay plans that would have resulted in the implementation of new processing applications. Many businesses have adopted a cautious approach to activities that will require even a limited investment in training or the commitment to use a service over a limited period of time.

B

Forecast by Submode

All processing services delivery submodes will experience market growth during the forecast period, as shown in Exhibit III-3. "Other" processing services, driven by interest in disaster recovery, will grow most rapidly at a compound rate of 15%, which will double expenditures for this submode from $2.3 billion in 1991 to $4.6 billion in 1996.

EXHIBIT III-3

Processing Services
User Expenditure Forecast by Submode, 1990-1996

Market Sector	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Processing Services	17,023	18,274	19,661	26,639	8
- Transaction Processing	14,096	15,020	16,014	20,795	7
- Utility Processing Services	898	943	990	1,204	5
- Other Processing Services	2,030	2,311	2,657	4,640	15

Utility processing is still being used by large businesses and the government when certain unique resources are required to run or test applications, or it is more desirable or economic to utilize resources from a vendor than provide them internally.

Expenditures for utility processing services were $0.9 billion, and INPUT forecasts that these expenditures will grow at a compound annual growth rate of 5% to $1.2 billion in 1996. Since the growth rate has been declining over time and investment in resources is required for utility processing, this service is most feasible as a supplementary service of a vendor offering other processing services.

The major submode of processing services, transaction processing, will grow at a compound annual growth rate of 7% to increase from $15.0 billion in 1991 to $20.9 billion in 1996.

The market for "other" services is growing at a dynamic compound annual growth rate of 15% in user expenditures, driven by the increasing recognition of the need for disaster recovery services. This growth rate is three times larger than the growth rate for the utility processing services market.

The market for disaster recovery services is estimated to be currently about 20% of the "other" processing services market. It has been dominated by three large vendors—Comdisco, IBM and SunGard—but many other vendors are now entering or exploring the market. It may take time for some new vendors to gain meaningful market share due to the investment required, but the equipment and maintenance services firms are becoming more interested in this service, since it offers an opportunity.

The "other" market also includes a group of operational services which should be mentioned. The pick-up and delivery of work, remote data entry, and special output services have provided opportunities for processing vendors to obtain additional revenue.

Some of the other services—computer output on microfilm (COM), laser printing, and remote data entry—have been sold separately as well as with transaction processing services.

COM has been an important source of revenue for some firms in the processing services market, such as Anacomp and Endata (now part of First Financial Management). The use of CD ROM and on-line storage has begun to take some business from COM, but expanded use by current users and the low cost of COM, particularly COM readers, should encourage continued use.

Except for "other" processing services, which is driven by the growth of disaster recovery, the market growth in submodes is modest. However, the processing services submodes all provide a steady increase in user expenditures for vendors, in addition to opportunities for marketing other services, particularly systems operations, in some industry markets.

C

Forecast by Market Sector

The transaction processing market is divided into industry-specific and cross-industry sectors. These are examined separately.

The distribution of the $12.2 billion in user expenditures forecast for industry-specific transaction processing in 1991 is shown in Exhibit III-4 across 15 industry sectors.

EXHIBIT III-4

Processing Services
User Expenditure Forecast by Market Sector, 1990-1996

Market Sector	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Delivery Mode Total	17,023	18,274	19,661	26,639	8
Vertical Industry Markets	11,441	12,189	13,021	17,159	7
Discrete Manufacturing	795	838	875	1,038	5
Process Manufacturing	681	717	743	895	5
Transportation	2,030	2,070	2,183	2,980	8
Utilities	201	217	248	421	14
Telecommunications	895	1,020	1,173	2,052	15
Retail Distribution	165	174	183	243	7
Wholesale Distribution	289	310	334	452	8
Banking and Finance	3,100	3,440	3,757	4,988	8
Insurance	351	375	402	530	7
Medical	500	526	551	660	5
Education	185	191	196	218	3
Business Services	1,644	1,692	1,722	1,824	2
Federal Government	200	187	193	220	3
State and Local Govt.	257	288	322	507	12
Miscellaneous Industries	148	144	139	131	-2
Cross-Industry Markets	2,654	2,831	2,993	3,636	5
Accounting	146	150	155	175	3
Education and Training	95	95	89	68	-6
Engineering and Scientific	123	128	129	131	1
Human Resources	1,523	1,676	1,844	2,460	8
Office Systems	38	36	34	26	-6
Planning and Analysis	205	190	167	108	-12
Other Cross-Industry	525	556	575	676	4
Generic Markets	2,928	3,254	3,647	5,844	12
Processing Services					
- Utility	898	943	990	1,204	5
- Other	2,030	2,311	2,657	4,640	15

Expenditures in the banking and finance sector, $3.4 billion, are over 66% larger than those in the next largest sector, transportation, which is dominated by the expenditures tied to reservation systems.

At the end of the period from 1991 to 1996, banking and finance will remain the largest industry sector, still accounting for about 29% of the expenditures in transaction processing. The dominance of opportunities in banking and finance explains why a large percentage of leading vendors serve this market.

During the period from 1991 to 1996, expenditures for the telecommunications market will grow more rapidly than in the rest of the industry markets, moving telecommunications into third place behind transportation and banking and finance in user expenditures in 1996.

Cross-industry transaction processing services are those that meet the needs of any industry, such as payroll processing, scientific computing services, office systems and education and training.

- Human resources is the largest of these markets, as a result of payroll processing, accounting for over half of user cross-industry expenditures in 1991.
- Human resources will rise to almost two-thirds of cross-industry expenditures in 1996, as some other cross-industry application systems are either customized for particular industries so that expenditures for them are moved to industry markets, or they are moved in-house.

D
Leading Vendors

1. Competitive Trends

The major competitive issues include the following:

- Many companies that are prospects for or users of processing services that serve industry applications are interested in the benefits of systems operations as an alternative to processing.
- Developments in workstations, networks and software products have increased the possibility for moving work in-house from a processing services vendor.
- Professional services and turnkey vendors are using new technology and the desire to save costs as arguments for selling solutions that will move processing work in-house.

- An issue for vendors of processing services is the use of pricing and service features to obtain work from competitors or retain business under competitive attack.

- Another competitive issue is the age of the application products being used by the processing vendor. Vendors may attempt to keep the functions and capabilities of their applications ahead of competition to enjoy advantages in features and functions, or they may be responsive to clients when needed. Vendors may also attempt to hold costs down by keeping old software products in use and updating them only when there is a danger of losing a sizable amount of business.

2. Market Shares

Leading vendors in the processing services market are listed in Exhibit III-5. These vendors tend to fall into one of two groups:

- One group focuses heavily on one or occasionally two specific industry or cross-industry markets and includes vendors such as Paychex, First Financial Management and Shared Medical.

- The second group focuses on work in a group of market sectors and includes vendors such as GEIS and CDC.

Some vendors that have been devoted primarily to one or two markets have expanded through internal development or acquisitions into other industries.

- ADP has been identified principally with payroll processing (human resources), but it also has substantial business with brokerages, distributors, and firms in the business services industries.

- American Express was known in the processing services industry for its subsidiary, First Data Resources, which was active primarily in credit card-related processing. However, FDR has expanded into new industries, and American Express has acquired vendors serving the health industry sector that have been grouped together with FDR in the American Express Information Services Company.

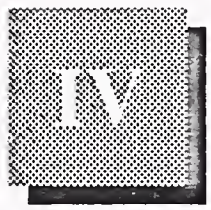
Although a number of processing services vendors have extended their services into additional markets, about 40% of the large vendors listed in Exhibit III-5 have continued to serve or devote a large percentage of their service to a single market.

The market that has received most vendor attention among industry and cross-industry markets is banking and finance. The second most popular market is human resources. Other major markets include health care and transportation.

EXHIBIT III-5

Leading Processing Services Vendors
U.S. Revenue, 1990

Rank	Vendor	Estimated Processing Services Revenue Share ($ Millions)	Market Share (Percent)
1	ADP	1,237	7
2	First Financial Management (FFM)	739	4
3	American Express ISC	725	4
4	Control Data	307	2
5	Covia	239	1
6	NDC	210	1
7	Comdata	188	1
8	CCH Computax	185	1
9	Equifax (includes Telecredit)	182	1
10	EDS	180	1
11	GTech	177	1
12	FIserv	169	<1
13	GEIS	165	<1
14	NCR	150	<1
15	Shared Medical	137	<1
16	SunGard	134	<1
17	Comdisco DRS	130	<1
18	Paychex	128	<1
19	Anacomp	114	<1
20	IBM	100	<1



Turnkey Systems

Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products
- Professional services - services to install or customize the system or train the user, provided as part of the turnkey system sale

A

Delivery Mode Forecast and Driving Forces

User expenditures for turnkey systems vendors/VARs grew at a CAGR of 11% from 1985 to 1990, reaching $10.4 billion in 1990. The turnkey systems market is forecast to reach $17.4 billion by 1996. The CAGR for turnkey systems will be 9% for the 1991-1996 period (Exhibit IV-1), the same as INPUT's 1990 forecast.

Several strong turnkey systems growth promoters and growth inhibitors will balance each other out so that INPUT's forecasted growth rate remains the same as last year's.

1. Growth Promoters

The key driving forces during the next five years are summarized in Exhibit IV-2.

EXHIBIT IV-1

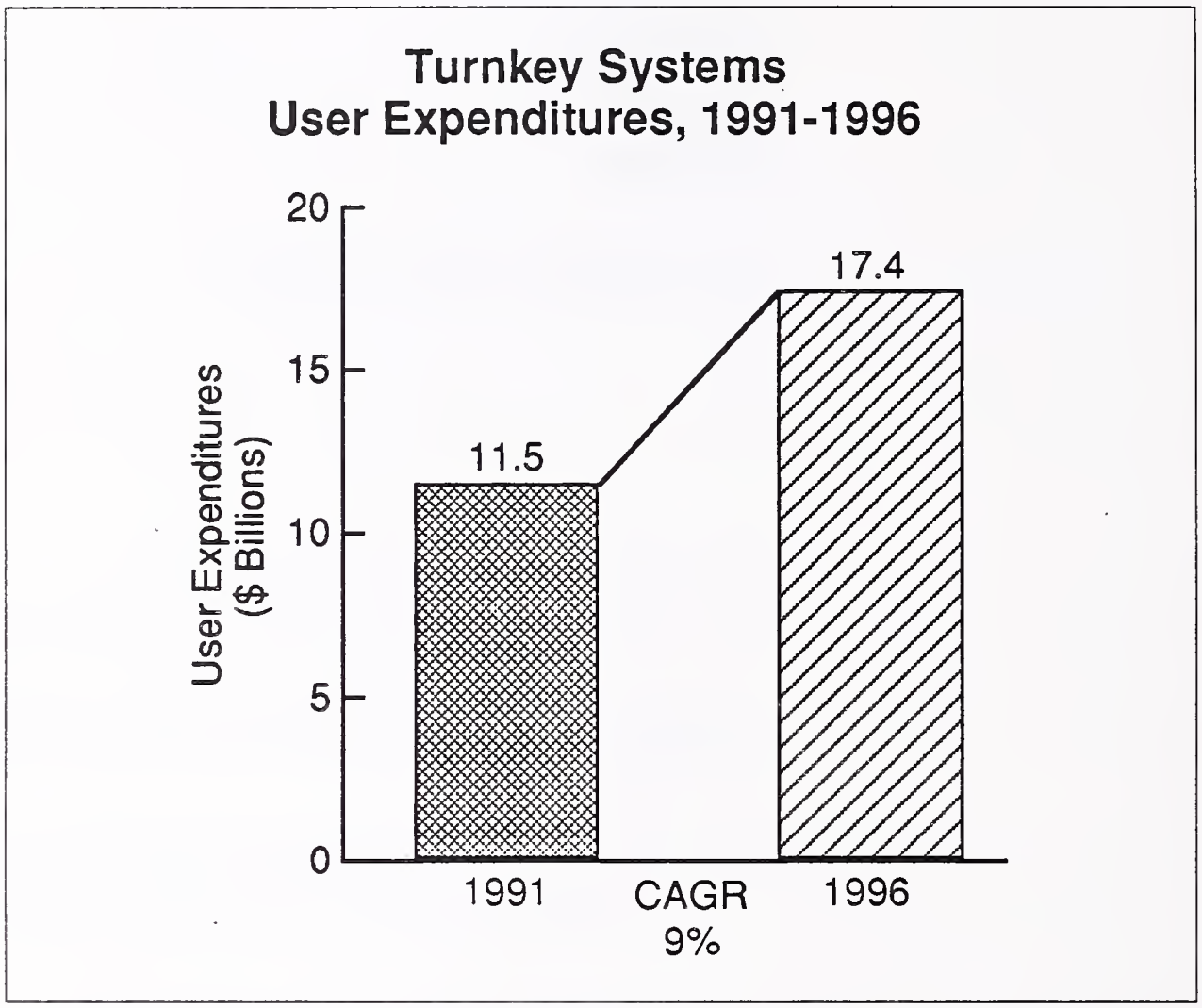


EXHIBIT IV-2

Turnkey Systems Driving Forces

- Downsizing
- Emphasis on solutions
- Aggressive VAR recruitment efforts
- Infusion of new products
- Systems and network integration needs

More powerful and smaller hardware platforms facilitate a deeper penetration of application solutions by small companies. And turnkey vendors and VARs generally sell to small and midsized firms. This underlying growth promoter has fueled turnkey systems/VAR growth since the advent of the personal computer, and it will continue to do so.

Likewise, emphasis on solutions and specificity continues to be a driving factor for this delivery mode. Users are still clamoring for more specificity.

Ultimately, margins on new hardware platforms will fall but—at least initially—the new hardware will provide a much-needed profit boost for this delivery mode.

An infusion of new products—applications software products as well as hardware—will fuel the VAR channel, especially during the last half of this forecast period. Faced with the complexities and time involved in engineering/re-engineering their own software products, turnkey vendors and VARs are likely to become more of a willing conduit for other vendors' applications software products. Turnkey vendors/VARs will add the necessary customization.

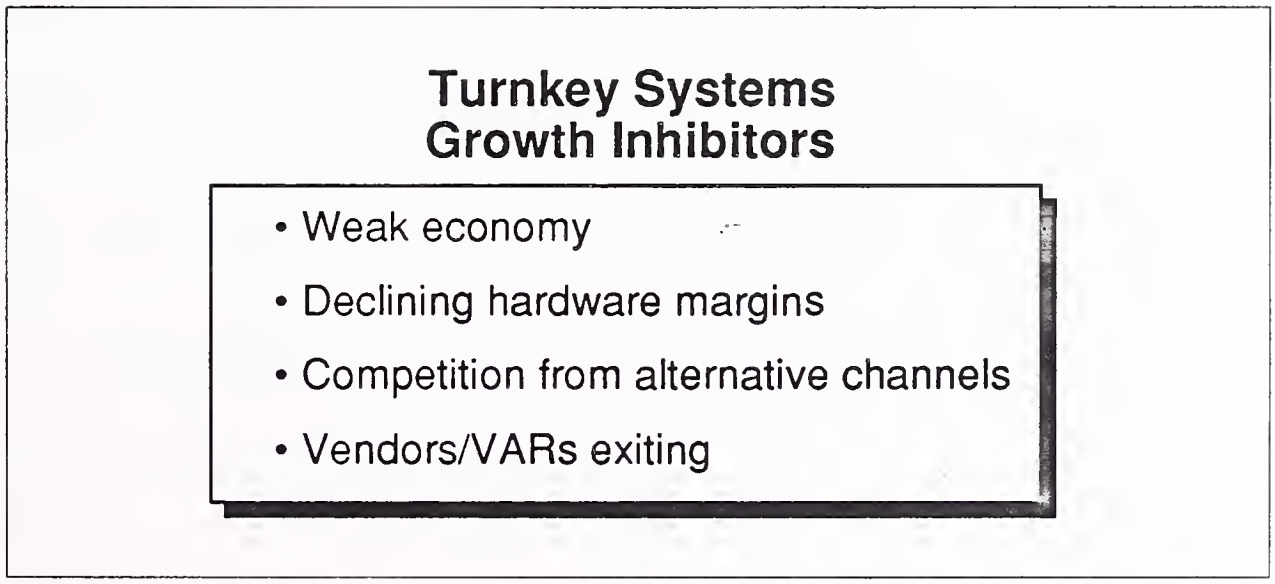
A window of opportunity exists for turnkey systems vendors and VARs in the area of systems integration. UNIX systems integration and custom consulting will be a big business

Equipment vendors are beginning to respond to systems integration needs by developing new professional services organizations. However, large systems integrators—such as EDS, CSC, and Andersen Consulting, who are doing a good business in proprietary-to-proprietary integration—have not yet aggressively pursued these opportunities.

2. Growth Inhibitors

Growth for this delivery mode will be inhibited by the factors listed in Exhibit IV-3.

EXHIBIT IV-3



VARs and turnkey vendors that sell predominantly to small companies—such as the many VARs that sell to business services firms—experience the adverse effects of an economic downturn because smaller firms are the first to cut back on capital expenditures. The majority of VAR/turnkey vendors sell to small businesses.

Turnkey and VAR service contracts and support services, however, are not adversely affected by a weak economy. In fact, this portion of their business expanded as customers sought ways to leverage the products they already have.

Declining hardware margins are not a new issue for turnkey systems vendors; they have been plagued with this issue since the introduction of the personal computer. As personal computers became more readily available at lower prices and through alternative distribution channels—including mail order, discount houses, and superstores—the advantages of turnkey systems were eroded. Hardware sales have become so price driven that many VARs simply cannot afford to compete. The new generation of workstations and personal computers will temporarily boost margins for turnkey vendors/VARs, but the long-term results will be the same.

VARs and turnkey vendors are exiting the business. Although hardware vendors are attempting to slow the exit, it may be too little too late for many of the smaller VARs and turnkey vendors. Whether they can or will provide the necessary programs in support of VARs remains to be seen. Hardware vendors are expected to take on more of a systems integration role and increase their margins by selling more software themselves.

Over the next several years, turnkey systems vendors and VARs will experience a surge of new competition from systems integrators as well as from dealers that are becoming more VAR-like. This competition will have a detrimental effect on growth for the delivery mode.

B

Forecast by Submode

Exhibit IV-4 reflects the following turnkey systems trends:

- The equipment portion of turnkey systems will continue its decline as a portion of the whole. A great deal of new hardware will be in the pipeline over the next several years. INPUT believes that initially this will bolster turnkey systems expenditures and "stave off the wolves" until margins on the new equipment decline, as happened for preceding hardware generations.

- As lower end PCs are increasingly routed through other third-party channels, turnkey vendors and VARs will look to more sophisticated hardware, including client/server configurations, to bolster their sagging profits. This will be a stopgap, short-term measure, however, as the profit margins on new PC and workstation hardware that supports client/server architecture will also quickly decline.

- The applications software products portion of turnkey is expected to grow at a compound annual rate of 10% through 1996. Turnkey systems vendors will be delivering their new software and, more significantly, there will be an infusion of new applications software products from independent software and systems vendors who are seeking alternative channels for their downsized products.

- Professional services, including systems integration, UNIX, client/server implementation and customization, will be attractive to VARs because of the higher margins. Although there is increasing need for these services, INPUT has not adjusted the CAGR for the professional services portion of turnkey upwards from last year's forecast because of the strong response to this need by many different IS delivery modes that are in competition with turnkey systems/VARs.

EXHIBIT IV-4

Turnkey Systems
User Expenditure Forecast by Submode, 1991-1996
($ Millions)

Delivery Modes	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Turnkey Systems	10,434	11,474	12,530	17,411	9
- Equipment	5,008	5,508	6,014	8,357	9
- Software Products	3,756	4,131	4,511	6,268	9
- Applications	3,235	3,557	3,884	5,397	9
- Systems	522	574	627	871	9
- Professional Services	1,669	1,836	2,005	2,786	9

C

Forecast by Market Sector

Primary markets for turnkey systems are industry-specific markets and usually specific niche segments within such markets. Examples include hospital management, physicians' group practice, and insurance agency systems.

INPUT believes that cross-industry applications will increasingly be included with industry-specific market solutions, as turnkey systems suppliers seek out additional software products with which to increase revenues by providing additional applications that can be marketed to both new and existing customers.

A user expenditure forecast by market sector for turnkey systems/VARs is presented in Exhibit IV-5. As with applications software products, the largest market for turnkey systems is discrete manufacturing; CAD/CAM is the largest of all turnkey systems applications.

EXHIBIT IV-5

Turnkey Systems
User Expenditure Forecast by Market Sector, 1990-1996
($ Millions)

Market Sectors	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Delivery Mode Total	10,434	11,474	12,530	17,411	9
Vertical Industry Markets	9,096	10,063	11,037	15,500	9
Discrete Manufacturing	2,460	2,798	3,097	4,715	11
Process Manufacturing	509	568	634	1,000	12
Transportation	250	275	302	443	10
Utilities	85	93	105	172	13
Telecommunications	462	519	581	931	12
Retail Distribution	664	707	754	992	7
Wholesale Distribution	456	487	522	683	7
Banking and Finance	925	1,000	1,075	1,460	8
Insurance	292	311	331	397	5
Health Services	928	994	1,060	1,269	5
Education	216	231	247	324	7
Business Services	743	810	885	1,235	9
Federal Government	494	612	736	938	9
State and Local Government	150	167	186	284	11
Miscellaneous Industries	462	491	522	657	6
Cross-Industry Markets	1,338	1,411	1,493	1,911	6
Accounting	422	435	448	504	3
Education and Training	170	182	196	293	10
Engineering and Scientific	112	123	134	173	7
Human Resources	82	84	86	92	2
Office Systems	65	66	67	74	2
Planning and Analysis	50	50	50	50	0
Other Cross-Industry	437	471	512	725	9

The growth in turnkey systems in the telecommunications sector results from the need for an increasing number of application-driven services, such as voice messaging, E-mail, and EDI, and the need for universal gateways that are operated as standalone systems.

The actual amounts of user expenditure, and growth rates, are provided in individual industry and cross-industry sector reports within INPUT's Market Analysis Program.

D
Leading Vendors

1. Competitive Trends

As existing turnkey systems vendors/VARs develop their new products, they are "buying time" by expanding into additional service offerings, expanding geographically, and making acquisitions. In the meantime, a window of opportunity exists for new competitors. Competition in the 1990s is going to be brutal. Vendors and VARs will need deep pockets and/or strong alliances in order to survive.

Some of the competitive trends are:

- An increasing number of turnkey vendors are expanding regionally and nationally as well as selling internationally. VARs are forming strategic alliances with each other or acquiring other VARs as a means of expansion.

  The availability of downsized solutions brings with it a host of integration issues. In light of the importance of integration, turnkey systems vendors and VARs will increasingly provide additional services to their customers. In doing so, they at times will work with, and at other times compete against, systems integrators.

- The ability of smaller companies and larger companies to gain true value out of today's personal computer and client/server applications products is predicated on some level of customization. The ability for a VAR to develop a profitable business from low-priced hardware and software is also dependent on customization services.

- VAR acquisition and consolidation continues. Several VARs in the $2 million to $3 million range have little capital, have grown only modestly over a period of time, and are ripe for acquisition. Acquisitions will be made not only for technology purposes but also for geographic expansion or vertical sector expansion.

2. Market Shares

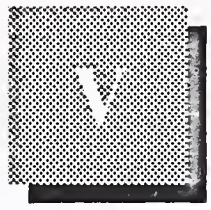
The list in Exhibit IV-6 shows the largest turnkey companies, most of which have been in existence for many years and play a strong role in one or more vertical industry sectors. One example is Reynolds and Reynolds, which has long had a leading position in the automotive dealership market. Note that computer systems vendors that also sell software bundled with their general-purpose hardware are not considered turnkey systems vendors and are therefore not listed.

There are some 10,000 turnkey systems vendors/VARs. INPUT estimates that 5,000 of them have average revenues of $100,000 from sales of their own applications software products. The other 5,000 either have revenues greater than $100,000 or sell other vendors' applications software products.

EXHIBIT IV-6

Leading Turnkey Systems
Vendors'/VARs' 1990 Market Shares

Vendor	U.S. Revenues ($ Millions)	Market Share (Percent)
Intergraph	442	5
Reynolds and Reynolds	193	2
Mentor Graphics	167	2
Schlumberger	160	1
ASK Computer Systems	134	1
Triad	125	1
Gerber Scientific	121	1



Applications Software Products

Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two submodes.

- *Industry-Specific Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.
- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

A

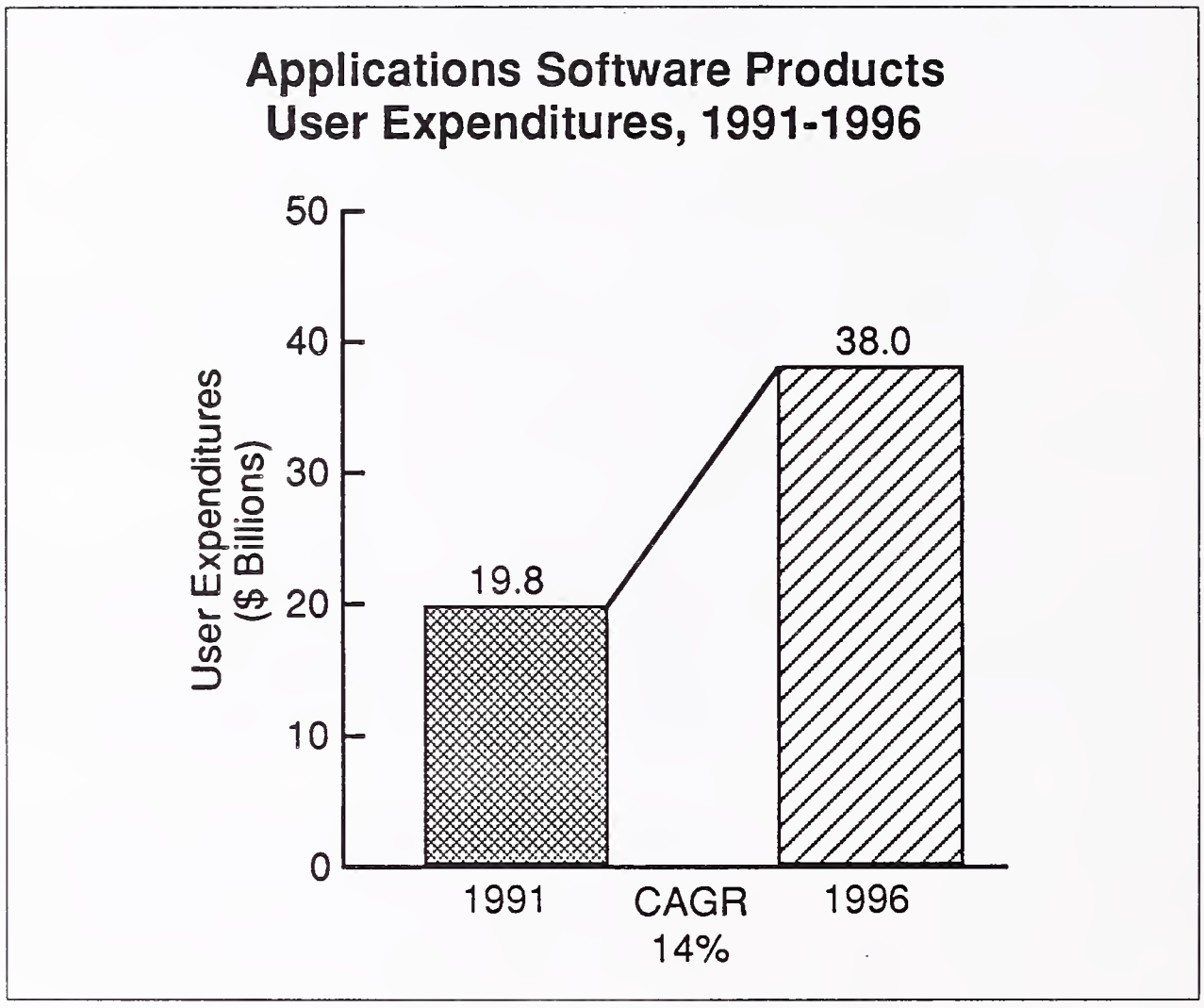
Delivery Mode Forecast and Driving Forces

During the last five years (1985 to 1990) user expenditures for applications software products grew at a rate of 20% compounded annually, reaching $17.7 billion in 1990. User expenditures for turnkey systems vendors/VARs grew at a CAGR of 11% from 1985 to 1990, reaching $10.4 billion in 1990.

During 1990 the applications software products market felt only minor effects of a slowed economy. The fact that hardware sales were down was offset by pressure on profits at end-user organizations; expensive in-house development projects were put on hold, enhancing the possibility for additional external purchases of applications software products.

Over the next five years, user expenditure for applications software products is forecast to grow at a CAGR of 14%, reaching $38.0 billion by 1996, as shown in Exhibit V-1. The annual growth rate will gradually increase from 13% in 1992 to 15% by 1996 as new applications software products are introduced. INPUT also forecasted a CAGR of 14% last year.

EXHIBIT V-1



1. Growth Promoters

Several significant growth promoters for applications software products over the next five years are listed in Exhibit V-2.

EXHIBIT V-2

Applications Software Products
Driving Forces

- New technologies
- New products
- Customer emphasis on productivity improvements
- Pent-up demand for new products

New hardware and systems software technologies will spawn new applications software products, which will fuel user expenditures. New personal computers and workstations based on more powerful microprocessors create an environment for more sophisticated and more user friendly applications software products, including multimedia applications. Systems software products—such as operations management products that support the commercial UNIX environment, and network management tools—will likewise create new opportunities for application solutions.

Applications software products based on new technologies are beginning to appear, but—as described in the preceding chapter—they will not be available in large enough quantities to impact the forecast until the last half of this forecast period and beyond.

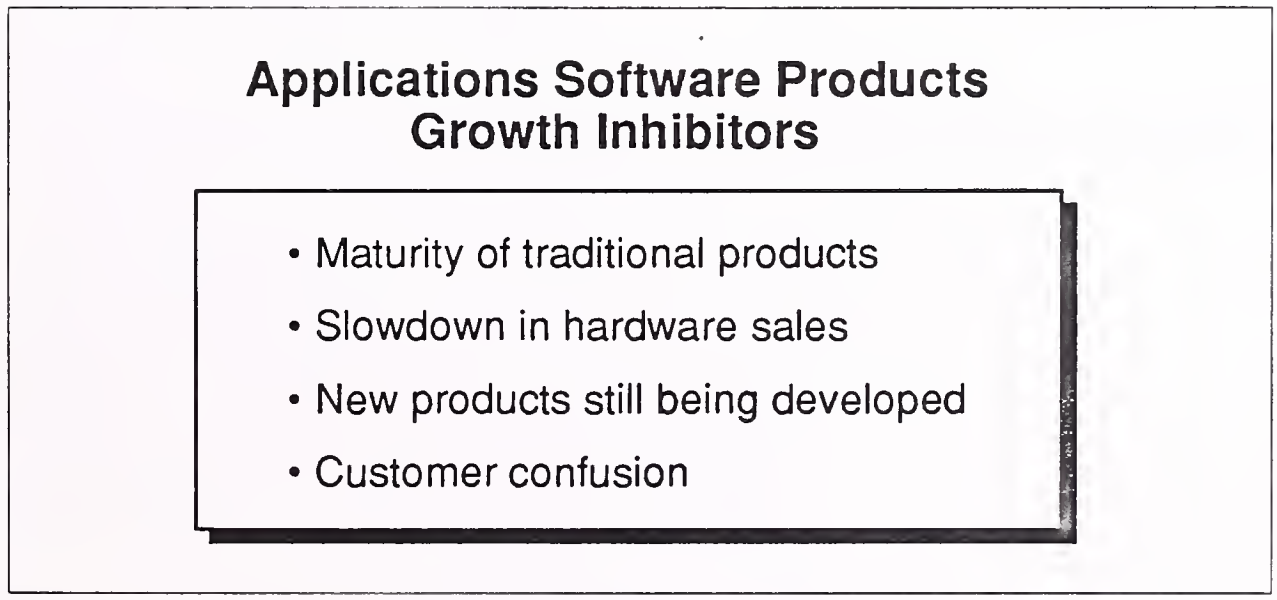
A weak economy does not appear to have a negative impact on applications software products expenditures. The selective installation of new applications software products—including downsized solutions—is viewed as a means of minimizing corporate costs and improving productivity.

Customers are asking for new solutions and understand the advantages of downsized and open systems software. They are eager to purchase and are waiting for more product availability. They are going ahead with selected applications software product purchases and are beginning to use the services of systems integrators to develop customized client/server and UNIX application solutions.

2. Growth Inhibitors

User expenditures for applications software products will be inhibited by the factors listed in Exhibit V-3.

EXHIBIT V-3



During the 1980s a reasonably good applications software product was an obvious improvement over former, typically manual, ways of performing a task and was enthusiastically embraced with little question. Today, however, users already have some software solution in place; they are willing to buy a replacement only if it provides new and better features than the software that is already installed.

Additionally, the declining growth rate for mainframes and midrange computers, and the current slowdown in personal computer shipments, are restricting the market for traditional applications software products.

New technology-based products are for the most part still on the drawing board. For example, only a few vendors—such as Ross Systems, Oracle, and Lawson Associates—have thus far made major commitments to supply UNIX-based applications software products. Several client/server applications software products are being developed, but only a handful are available. PeopleSoft's PS/HRMS human resources product is one of the first suites of client/server products.

New software products are being purchased by early adopters, while the majority of users are waiting for more products from which to choose. Sales decisions are taking longer as users evaluate their options.

INPUT believes that new pricing strategies will have negligible, if any, impact on the overall user expenditures forecast. On one hand, prices will be lower because they will most likely be based on platform size, and downsized solutions will predominate. On the other hand, new downsized applications software products will carry heftier price tags than the traditional productivity tools in wide use today. The industry is also moving towards pricing according to number of concurrent users. As new applications software products proliferate, these factors may balance each other out.

B

Forecast by Submode

Exhibit V-4 reflects the following trends:

- Even though unit sales of mainframe-based applications software products are declining, prices continue to go up by 10% to 15% per year. INPUT is therefore forecasting a 6% CAGR for the forecast period. In addition, price increases drive up the amount spent on maintenance, which is estimated to account for the majority of user expenditures.

- Many central software systems are as much as 10 to 15 years old; thus, significant system upgrades based on old architectures and languages are impractical. Replacement raises financial problems, and invites major

re-examination of system requirements and functions that could prove costly and disruptive to ongoing operations. Therefore, the trend is to develop or purchase new software for client/server architectures, networked PCs, and minicomputers, thereby offloading applications from the mainframe, rather than replacing or significantly modifying mainframe-based applications software.

EXHIBIT V-4

Applications Software Products
User Expenditure Forecast by Submode, 1990-1996
($ Millions)

Delivery Modes	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Applications Software Products	17,676	19,842	22,352	38,030	14
- Mainframe	5,017	5,315	5,630	7,260	6
- Minicomputer	5,221	5,749	6,288	9,155	10
- Workstation/PC	7,438	8,778	10,434	21,615	20

- Software for mainframes is shifting from application-specific to generalized multi-application data bases. Mainframes will become repositories of data that users will access to meet specific needs.

- The highest growth will continue to be for workstation and PC-based applications software products.

- Minicomputer-based applications software products will also exhibit continued growth, but not as strong as workstation and PC-based product growth. This growth continues to come from customers who are rounding out the applications software product suites that run on the AS/400. Growth will also be promoted, especially in the second half of the forecast period, by new technologies and products.

C
Forecast by Market Sector

The largest market for applications software products is discrete manufacturing. Linking the factory floor with business/planning and engineering/design areas will continue to drive user expenditures for discrete manufacturing applications software products. Banking and finance has historically been the leading user of information services among all industries that INPUT surveys. It is the second-largest industry-specific market for applications software products.

Telecommunications industry applications have traditionally been developed internally, with as much as 90% of applications resulting from internal development. Since deregulation, however, telecommunications companies are looking increasingly to outside providers.

Overall growth promoters for the business services sector are the trend towards a service economy and the fact that its businesses—such as real estate, law, and accounting—are information intensive.

Five years ago (1986), industry-specific markets accounted for 51% of the total applications software products market. INPUT has consistently forecast this segment to grow to 55% of the total over a five-year period (1991) and remain at this proportion over the next five years.

The most prevalent application in almost any company—and the largest cross-industry sector—is accounting. The fastest growing cross-industry sector is office systems. Word processing and integrated office systems (IOS) account for the bulk of expenditures for office systems.

The actual amounts of user expenditure, and growth rates, are provided in Exhibit V-5.

D
Leading Vendors

1. Competitive Trends

As existing applications software products vendors develop their new products, they are "buying time" by expanding into additional service offerings, expanding geographically, and making acquisitions. In the meantime, a window of opportunity exists for new competitors. Competition in the 1990s is going to be brutal. Vendors will need deep pockets and/or strong alliances in order to survive.

EXHIBIT V-5

Applications Software Products
User Expenditure Forecast by Market Sector, 1990-1996
($ Millions)

Market Sectors	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Delivery Mode Total	17,676	19,842	22,352	38,030	14
Vertical Industry Markets	9,707	10,894	12,183	20,643	14
Discrete Manufacturing	1,755	1,967	2,224	3,799	14
Process Manufacturing	520	595	683	1,198	15
Transportation	351	390	431	661	11
Utilities	180	202	227	366	13
Telecommunications	317	378	452	930	20
Retail Distribution	241	272	306	506	13
Wholesale Distribution	475	527	587	958	13
Banking and Finance	2,130	2,270	2,430	3,480	9
Insurance	768	852	955	1,750	15
Medical	869	985	1,125	2,089	16
Education	606	676	746	1,143	11
Business Services	759	880	1,017	1,791	15
Federal Government	390	520	580	1,316	20
State and Local Government	127	143	163	293	15
Miscellaneous Industries	219	237	257	363	9
Cross-Industry Markets	7,969	8,948	10,169	17,387	14
Accounting	2,028	2,250	2,501	3,992	12
Education and Training	208	242	284	558	18
Engineering and Scientific	564	651	749	1,344	16
Human Resources	644	694	763	1,242	12
Office Systems	2,014	2,250	2,604	4,552	15
Planning and Analysis	2,074	2,375	2,720	4,756	15
Other Cross-Industry	437	486	548	943	14

Key competitive trends include:

- *Regional and international expansion* - revenue growth in the last several years has been in a respectable 20% to 25% range for publicly held applications software firms. A large portion of this revenue growth is due to international expansion.

- *Service and customization expansion* - the availability of downsized solutions brings with it a host of integration issues. Increasing emphasis on integration causes challenges for vendors whose product lines consist of multiple applications that have been acquired (rather than "home-grown") along the way, and for vendors that do not have a complete suite of products. The fact that D&B Software will be replacing its various separate product lines with a singular client/server implementation is an example of the importance vendors are ascribing to integration.

  A discernable shift is under way towards more tailoring of applications software products by both software vendors and their customers. The ease with which a product can be tailored and the increased availability of tools with which to do this are compelling selling points. Vendors want to eliminate as much as possible the need for hard coded modifications. For example, PeopleSoft's PeopleTools is a set of proprietary customization facilities.

- *Acquisitions and alliances* - acquisitions and alliances continue at a rapid pace, although not for all the same reasons as in the 1980s. One of the principal reasons to acquire and/or form alliances during the 1990s is technology/product development. Consolidation will also continue due to the desirability of transportable applications that will run on many PCs, workstations, or mainframes.

- *Increased competition from equipment vendors* - we can expect hardware vendors' market share of applications software products to increase during the 1990s.

  A notable example of increasing emphasis on software products by equipment vendors is:

  - Sun reorganized to create two software subsidiaries—one to develop more software and peripheral products, and one to improve UNIX itself.

- Sun Microsystems spun off its software business and created Sun Software, Inc. Its first product is Tooltalk, which allows interapplication communications on a heterogeneous network. Sun Software's mission is to offer Sun software on other RISC computing platforms on the UNIX operating system. Sun is making all of its software available to license.

- *New competition* - in INPUT's user survey, purchasers indicated that number of years in business and the availability of a broad range of applications software products were of "less than average importance" when selecting a vendor. Users want to be able to choose from a variety of vendors; one-stop shopping for applications software products is not of critical importance. These findings strongly suggest that room exists in the marketplace for new (and small) vendors.

- *Copyright litigation* - a decade ago a software patent was almost unheard of. Now, as a result of the increasing competitiveness of the industry, thousands of programs are covered by patents or copyrights.

2. Market Shares

The leading applications software products vendors are shown in Exhibit V-6. Revenues for each company are developed from a combination of INPUT interviews and information from INPUT's vendor files. Revenues are non-captive U.S. revenues only.

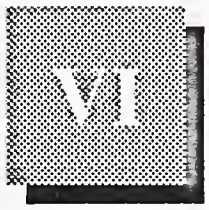
Only nine applications software products vendors have market shares of 1% or greater. No single company has even a 5% share of the overall market. (The reader is referred to individual industry sector reports for listings of leading vendors by sector.)

The largest companies in the 1990s will not necessarily be the same as the largest companies in the 1980s. As the market switches to workstations and client/server architectures, only the companies that successfully re-engineer their software, or develop (or purchase) entirely new products in a timely manner, will survive.

EXHIBIT V-6

Applications Software Products Leading Vendors' 1990 Market Shares

Vendor	U.S. Revenues ($ Millions)	Market Share (Percent)
IBM	767	4
Lotus Development Corp.	404	2
Microsoft	353	2
Dun & Bradstreet	335	2
WordPerfect	316	2
Computer Associates	230	1
Groupe Bull	210	1
Software Publishing	110	1
Unisys	92	1
Borland	82	*
American Software	80	*

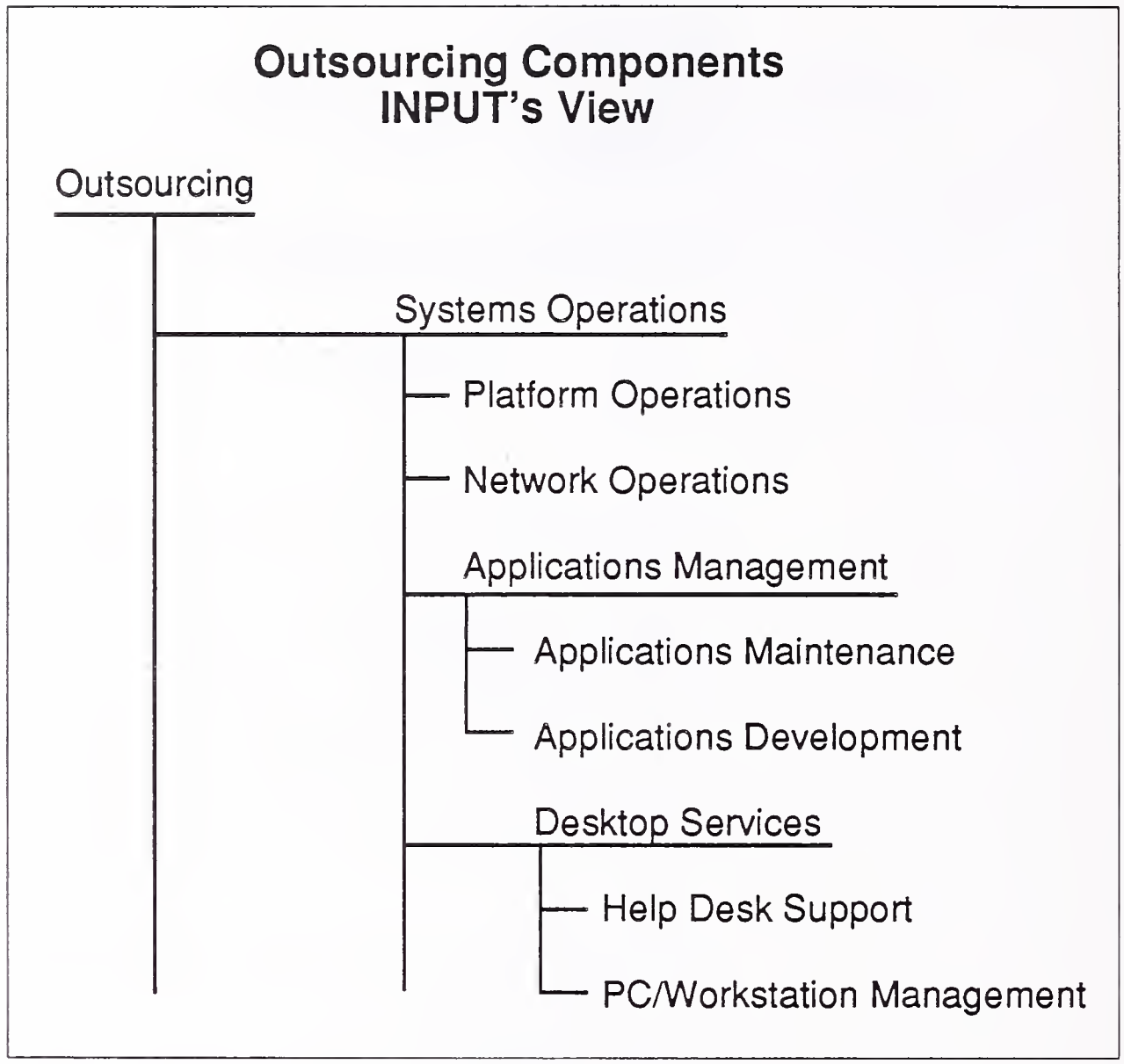


Systems Operations

Outsourcing has become synonymous in much of the current literature with systems operations. INPUT defines outsourcing as the *contracting of all or a major part of an information systems process to an external vendor on a long-term basis*. The vendor takes responsibility for the performance of the process. Outsourcing is a method of acquiring a vendor to provide for existing operations, not a delivery mode. Within this framework, systems operations represents the major portion of the outsourcing market. It can include a variety of elements, as illustrated in Exhibit VI-1. The client that chooses to procure only one of the elements is still outsourcing to a vendor.

All of the elements in the outsourcing category represent functions or processes that are performed, rather than projects that are accomplished. Platform operations and network operations are obviously functions upon which an organization depends for its survival. In the same vein, the maintenance and/or management of an organization's applications software is a function crucial to the successful accomplishment of its mission. Applications management can include applications development and/or applications maintenance. Finally, desktop services—which include such functions as the user help desk and the maintenance of workstations and PCs in the user environment—represent another function crucial to the daily operational efficiency of an organization.

EXHIBIT VI-1

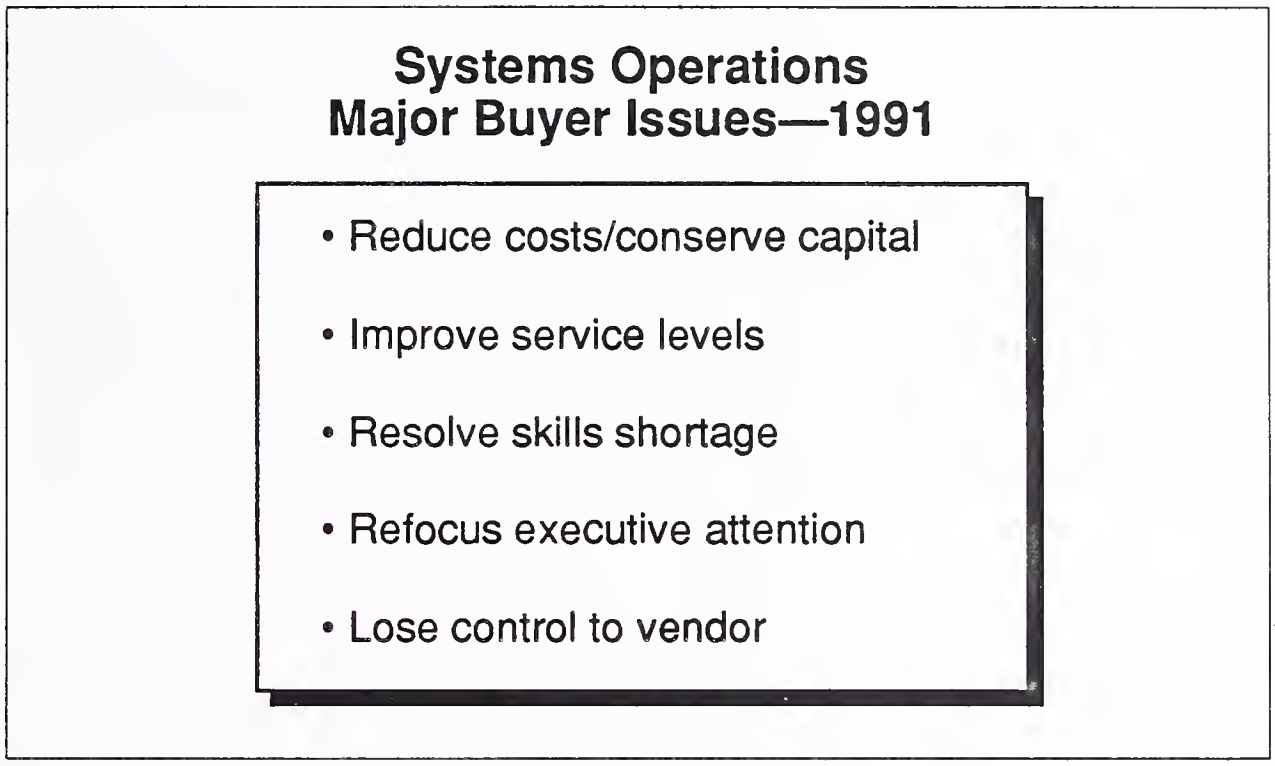


The buyer issues presented in Exhibit VI-2 have been identified by user executives as the major issues that arise when considering the outsourcing of systems operations.

Many organizations face continuing pressure to reduce costs and preserve capital. The stagnant economy is causing even more firms to reassess how they can further reduce expenses and is changing the investment plans of many companies.

Many companies are becoming convinced that outside vendors can provide a higher level of service than their own internal organizations. They often feel they have more leverage over a vendor's resources than over their own.

EXHIBIT VI-2



Constantly changing technology breeds two problems for the user community: not only is senior management finding it difficult to understand the new technology, but it is also finding it increasingly difficult to recruit staffs that can apply the new technology to meet competitive needs.

Senior executives in many firms need, more than ever, to focus attention on their core business, be that making cameras or selling hamburgers. Often, information systems are not considered part of that core business, but a part which, nonetheless, consumes a lot of executive time for the reasons cited above. Turning over systems operations to a vendor eliminates a major demand on executives' time.

One major concern still troubles companies considering outsourcing. Many feel there is no turning back once they have turned their IS operations over to a vendor. They are probably right if they have not carefully planned to create a return path from the vendor. As the relationship between the vendor and the user organization gets more firmly established, the user becomes less capable of reassuming responsibility for IS operations. This is not necessarily bad, but the user must be aware that this is the route taken.

A

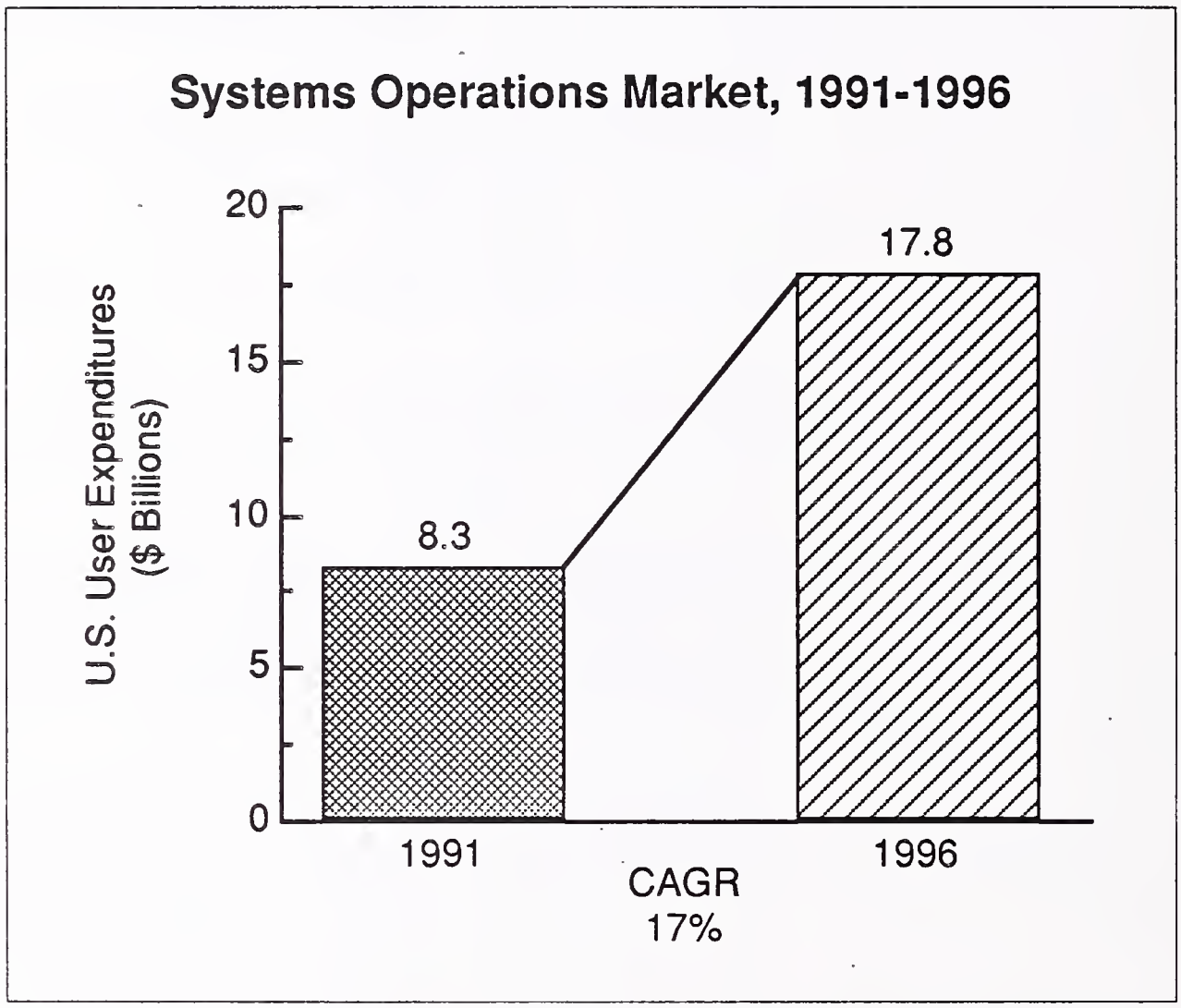
Delivery Mode Forecast and Driving Forces

1. Forecast

INPUT projects that user expenditures for systems operations will be $8.3 billion for 1991 for the combined commercial and federal markets. Growing at a compound annual growth rate of 17%, these expenditures will reach $17.8 billion in 1996, as illustrated in Exhibit VI-3. This represents

a slight increase in the growth rate over that reported last year and reflects the continued health of the market, increasing acceptance of the outsourcing option as a viable one, and improving economic conditions in the later years of the forecast.

EXHIBIT VI-3



There continue to be major differences between conditions in the federal government and commercial markets. In the federal market, the emphasis on budget constraints and the recurring federal budget deficit are the overriding considerations. Defense budgets are being cut drastically, leading to consolidation of a number of information systems by the Pentagon. Federal government IS expenditures for 1991 are expected to be $1.7 billion, growing to $2.6 billion in 1996, for a compound annual growth rate of 9%—slightly lower than the 10% CAGR predicted last year.

Interest in systems operations continues to increase in the commercial market, resulting in a compound annual growth of 18% for the period from 1991 to 1996—a slight increase over the 17% forecast last year by INPUT. Systems operations expenditures by commercial enterprises in 1991 are expected to be $6.6 billion, growing to $15.2 billion in 1996.

B

Forecast by Submode

Exhibit VI-4 illustrates how the market is split between the two types of systems operations and how this spread will accelerate over the forecast period. In platform operations, the vendor is responsible for managing and operating the client's computer and/or communications systems. In applications operations, the vendor operates and manages the computer and/or communications operations and is also responsible for maintaining, or maintaining and developing, the client's applications systems.

EXHIBIT VI-4

Systems Operations
User Expenditure Forecast by Submode, 1990-1996

Delivery Modes	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Systems Operations	7,237	8,300	9,658	17,818	17
- Platform Sys Oprns	3,114	3,550	4,098	6,497	13
- Applications Sys Oprns	4,123	4,750	5,560	11,321	19

INPUT projects that applications systems operations, already the dominant mode, will grow at a compound annual growth rate of 19% through the period. Expenditures will grow from $4.8 billion in 1991 to $11.3 billion in 1996. Platform operations expenditures will grow from $3.6 billion to $6.5 billion in the same period, at a CAGR of 13%. The difference reflects the client community's greater acceptance of the concept of total systems management by vendors.

C

Forecast by Market Sector

Annual expenditures for systems operations services from 1991 to 1996 are included in the table in Exhibit VI-5. The industries are ranked based on projected 1996 user expenditures.

EXHIBIT VI-5

Systems Operations
User Expenditure Forecast by Market Sector, 1990-1996

Market Sectors	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Delivery Mode Total	7,237	8,300	9,658	17,818	17
Vertical Industry Markets					
Discrete Manufacturing	486	574	688	1,400	20
Process Manufacturing	395	466	559	1,146	20
Transportation	124	148	181	377	21
Utilities	25	28	32	55	14
Telecommunications	64	74	84	175	19
Retail Distribution	150	182	227	552	25
Wholesale Distribution	66	79	94	181	18
Banking and Finance	1,761	2,046	2,419	4,659	18
Insurance	778	902	1,037	1,885	16
Health Services	753	866	1,024	1,986	18
Education	73	83	95	155	13
Business Services	80	97	119	261	22
Federal Government	1,546	1,686	1,837	2,593	9
State and Local Gov't	921	1,052	1,242	2,358	18
Miscellaneous Industries	15	17	20	35	16

As seen in the exhibit, the top four industries—banking and finance, federal government, state and local government, and health services—represent 67% of the expenditures in 1991 and 66% in 1996.

D
Leading Vendors

1. Competitive Trends

The market in which firms are operating continues to be extremely competitive as the shrinking consumer dollar must be courted by more firms, both domestic and foreign. Companies must serve their customers better and, in turn, they must get high-quality service from their IS departments.

The vendor and the client must develop a clear understanding of each others' capabilities and commitments before a real systems operations contract can be entered into. It is a grueling task for both the vendor's marketing force and the prospect's evaluators.

Fifty percent (50%) of the prospects interviewed by INPUT prepared a formal solicitation document. The prospect's purpose is to provide vendors with common data upon which to base their proposals.

The other firms simply assembled their requirement data and notified known vendors or current suppliers that they were looking for an external systems operations management arrangement.

The selection process is essentially a screening process. The first set of responding vendors is narrowed down to a smaller, more viable short list through a preliminary evaluation. This usually involves a comparison of some common criteria. The short list of vendors is then reviewed more thoroughly and discussions are typically begun with several vendors.

Certain vendor capabilities repeatedly appeared as selection criteria. The most frequently mentioned items were the related criteria, systems operations experience and technical ability. Note that experience was defined as prior systems operations experience. Buyers wanted to entrust their data processing centers to experienced hands, not to new players in the game.

The next most frequently mentioned items included the financial stability of the prospective vendor. Buyers are looking for some assurance that the selected vendor will be a viable provider for the long term. For that reason they weigh the financial condition of the vendor heavily as an important characteristic.

Several other selection criteria were less frequently mentioned by respondents to INPUT's user survey. A more thorough discussion of these less important items can be found in INPUT's report, *Systems Operations Buyer Issues and Alternatives*.

2. Market Shares

Exhibit VI-6 lists the leading systems operations vendors in 1990 based on reported annual revenues.

EXHIBIT VI-6

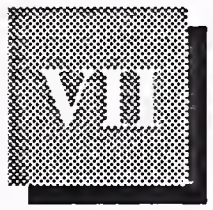
Leading Systems Operations Vendors 1990

Vendor	Market Share (Percent)
EDS	14
CSC	6
Systematics	3
IBM	3
ACS	2
SMS	2
SIAC*	2

*Securities Industries Automation Corporation

This year IBM appears on the list for the first time. The restructuring of its SO efforts into the ISSC subsidiary has resulted in new revenue, plus a redistribution of revenues that were counted in other revenue categories.

CSC obtained most of its revenues from the federal market, but its recent win of the General Dynamics contract will change that next year. However, EDS is still more widely dispersed across various vertical industries. The other firms in the list specialize in three or fewer industries and have demonstrated strength within their markets.



Systems Integration

Systems integration is a vendor service 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.

- *Equipment* - information processing and communications equipment required to build the systems solution. This component may include custom as well as off-the-shelf equipment to meet the unique needs of the project. The systems integration equipment category excludes turnkey systems by definition.

- *Software products* - prepackaged applications and systems software products.

- *Professional services* - the value-added component that adapts the equipment and develops, assembles, or modifies the software and hardware to meet the system's requirements. It includes all of the professional services activities required to develop, and if included in the contract, operate an information system, including consulting, program/project management, design and integration, software development, education and training, documentation, and systems operations and maintenance.

- *Other services* - most systems integration contracts include other services and product expenditures that are not easily classified elsewhere. This category includes miscellaneous items such as engineering services, automation equipment, computer supplies, business support services and supplies, and other items required for a smooth development effort.

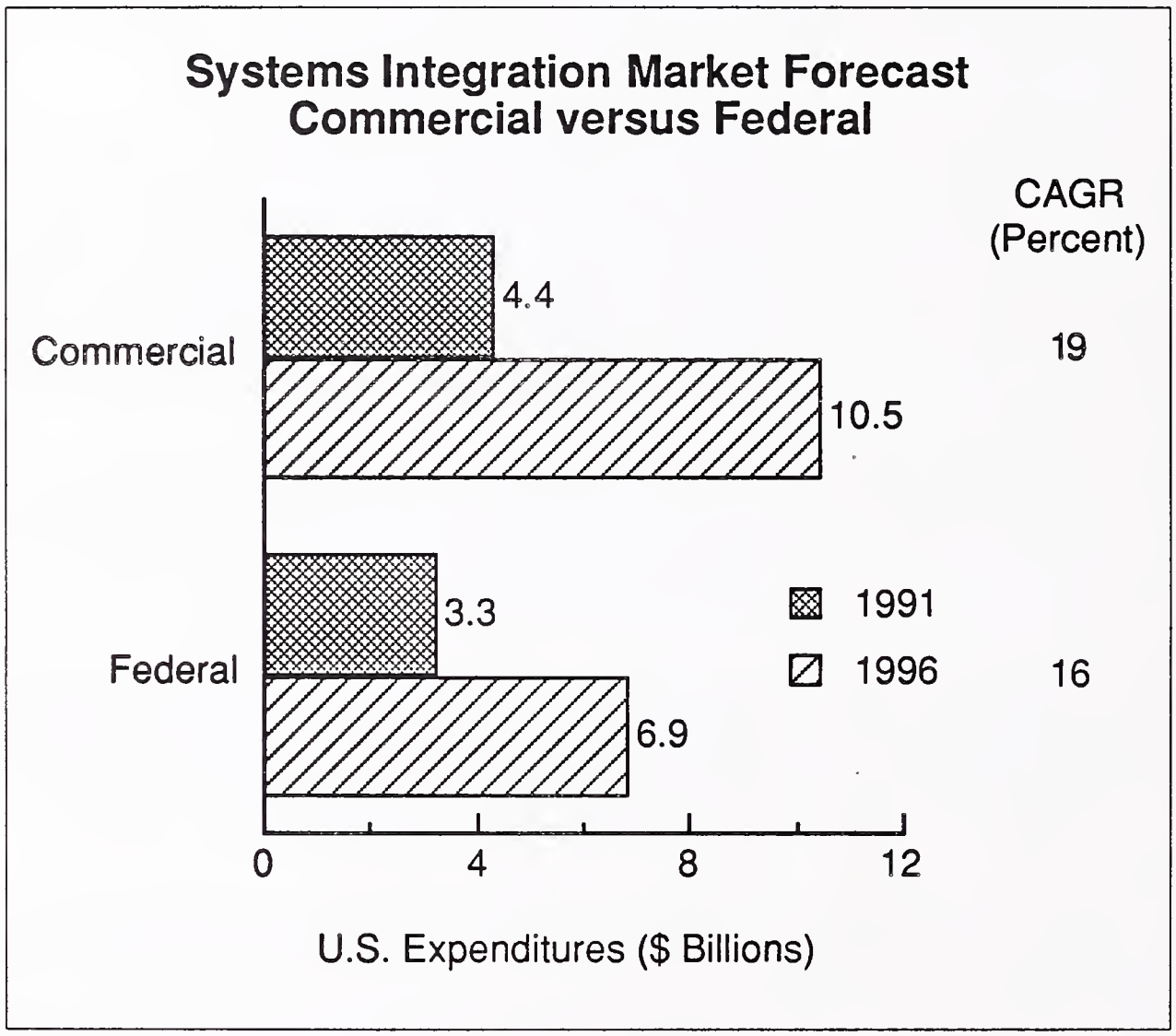
A

Delivery Mode Forecasts and Driving Forces

1. Forecast

There are several important points to note about the five-year forecast for the commercial and federal systems integration markets. (See Exhibit VII-1.)

EXHIBIT VII-1



- The commercial market is expected to experience a somewhat shallow growth rate (12-13%) over the next one, perhaps two, years. Capital remains limited and there are numerous conflicting priorities.

- The commercial market is expected to rebound in the latter years of the forecast period, assuming that the economy picks up. Organizations note that there are numerous committed projects that need to be funded.

- Because of slower market growth in the 1989-to-1991 timeframe, the overall size of the market has been reduced. INPUT believes that the market size projected for 1995 will be realized in 1996.

- The federal market exhibits somewhat different characteristics. The market was previously projected to grow 15% between 1989 and 1990. The actual growth over the same period was in excess of 45%, establishing a higher base than projected.

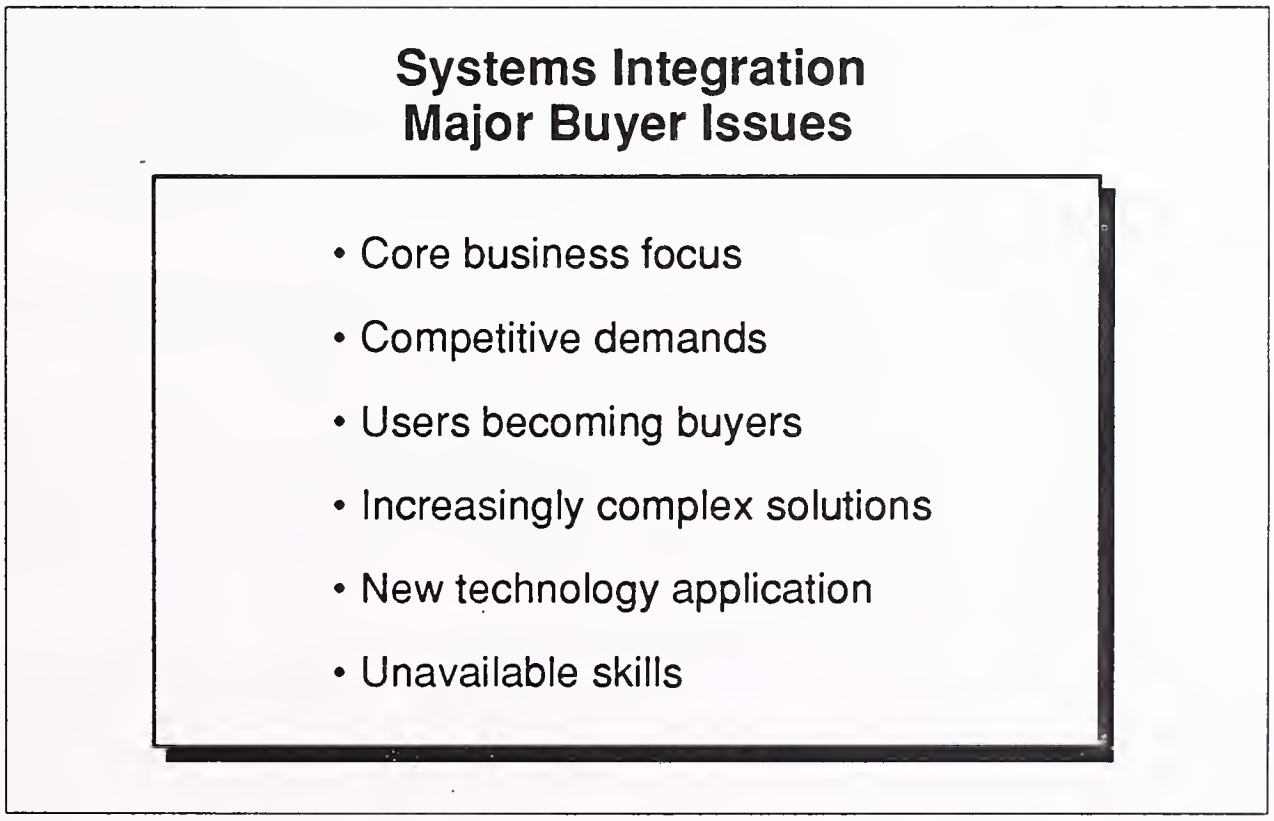
- Growth reflects spending for projects that had been previously committed but not initiated, rather than a dramatic increase in growth rate.

- Because of the changes in the federal market, INPUT projects that the federal systems integration (FSI) market will exhibit a slow rate of growth through 1991 as agencies begin to absorb committed expenditures. Following 1991, additional new projects will be funded, contributing to a five-year growth rate of 16%.

2. Driving Forces

U.S. businesses, more than ever, are feeling the pressure of competition from domestic and foreign companies. This pressure is forcing organizations to look closely at their core businesses to identify solutions that differentiate their products and services from the competition's. In many cases, the application of technology can make the difference in offering a superior service faster or in reducing the length of product development cycles. These new solutions are becoming increasingly complex as they change traditional business processes and serve new organizational structures that often are required to operate around the clock and throughout the world. Exhibit VII-2 identifies major buyer issues.

EXHIBIT VII-2



As INPUT studies information systems budgets, it has become apparent that an increasing amount of information systems expenditures are no longer controlled by internal information systems organizations. This is because user organizations are in many cases becoming the buyers of solutions and control the budgets for them. Many of the solutions that users seek include new technologies such as artificial intelligence, image processing, and a variety of advanced telecommunications alternatives such as LANs, WANs, and MANs. Systems integrators with good track records provide an attractive alternative to internal information systems organizations that often lack adequate resources and skills to meet new user requirements. Some internal organizations also lack the application knowledge and experience in new technologies that are required for the solutions being sought.

On the other hand, during 1990 the domestic economy slowed and domestic industry spent $533 billion for plant and equipment, an increase of 5.0% over 1989. This was less than one half of the 1988-to-1989 increase of 11%. An increase of just 2.5%, to $533 billion, is projected for 1991. While industry will continue to invest in new capital equipment, INPUT believes that the recession will slow the number of new commercial SI projects started in 1991.

Problem-solving actions by industry increased expenditures for commercial systems integration to $3.8 billion in 1990, despite predictions of a lower GNP. INPUT forecasts that a still-cautious industry will selectively invest in new and expanded information systems in the near term, and that expenditures for vendor-provided SI solutions will reach $10.5 billion in 1996. This sum represents a CAGR of 19%, down from the 23% predicted last year. Narrowing margins and reluctance to invest in new information systems solutions, and much less use of outside vendors to implement them, are expected to continue to hinder demand for systems integration.

When considering the overall Commercial Systems Integration (CSI) market, several points are of particular note.

- The recession, overall economic lethargy, and financial difficulties in specific industries (manufacturing, banking, and finance in particular), have contributed to slow growth of the systems integration market over the past year.

- The length of projects has become shorter. Organizations indicate a need for short-term payback from new systems. This need has contributed to the definition of projects that are smaller, require less time to implement, and result in shorter-term paybacks.

- With smaller project sizes, project values have also declined. Organizations indicate that they are spending half as much on new projects as they were two to three years ago. The reduced spending reflects keen competition for capital and the need for shorter-term investment benefits.

The net result of shifts in project size, project value, and the impact of economic pressures has been to bring the forecast for the systems integration market more in line with the overall growth of the information services industry, at least in the short term.

In the longer term, INPUT expects the systems integration market to rebound and outpace the overall market, but significant changes should not be expected until economic confidence returns and companies are more confident that they can make additional investments.

B

Forecast by Submode

SI expenditures can be broken into four basic components: computing and telecommunications equipment, professional services, systems and applications software, and other ancillary expenditures. The distribution and forecast of these expenditures is in Exhibit VII-3.

EXHIBIT VII-3

Systems Integration
User Expenditure Forecast by Submode, 1990-1996

Delivery Modes	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Systems Integration	6,884	7,684	9,060	17,394	18
- Equipment	2,822	3,150	3,715	7,132	18
- Software Products	482	538	634	1,218	18
- Applications	310	346	408	783	18
- Systems	172	192	227	435	18
- Professional Services	3,304	3,688	4,349	8,349	18
- Other Services	275	307	362	696	18

Earlier forecasts projected that expenditures for equipment would decline as a percent of the total, and they have, but the decline appears to be bottoming out. Analysis of hardware expenditures indicates that price declines are being more than offset by increases in the acquisition of client/server equipment and networks that integrate the delivery of information throughout the organization.

Of particular note is the somewhat higher rate of growth for consulting and design/integration services (20%), as compared to the overall industry growth rate of 19%. Organizations in nearly all industries note a need to better understand the relationship between integrated systems and integrated business operations. This need results in greater expenditures for consulting and design/integration.

C

Forecast by Market Sector

Discrete manufacturing was the largest commercial market for systems integration in 1990 and will continue to be throughout the forecast period (see Exhibit VII-4). The key business functions continue to be streamlining and integrating the entire product development, manufacturing, and distribution processes. This is a massive undertaking for most companies but is essential to retain competitiveness and market share.

State and local governments will be the second largest SI market over the forecast period. These organizations have many of the same problems as the federal government, and provide integrators with an opportunity to replicate a solution over a sizeable number of governments.

The third largest CSI market is utilities. This industry has a special set of applications, generation plant, and network management systems that provide opportunities for a number of industry-focused vendors. Although utilities' growth rate is relatively slow (a CAGR of 12%), it will continue to provide opportunities over the five-year forecast period, but will slip from third to fourth in size by 1996.

The fourth largest CSI market in 1990 is banking and finance, and it will be third largest in 1996. This sector will continue to recover from the impacts of deregulation, the thrift crises, and from lower brokerage volume. There will still be a need for integration of a number of individual services into systems that include all of a customer's activities with the institution. However, the growth of these opportunities (CAGR of 20%) will be slower than forecasted in 1990 (CAGR of 30%).

EXHIBIT VII-4

Systems Integration
User Expenditure Forecast by Market Sector, 1990-1996

Market Sectors	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Delivery Mode Total	6,884	7,684	9,060	17,394	18
Vertical Industry Markets					
Discrete Manufacturing	943	1,136	1,406	3,042	22
Process Manufacturing	152	170	192	391	18
Transportation	146	164	191	412	20
Utilities	469	512	572	914	12
Telecommunications	180	201	231	485	19
Retail Distribution	224	273	322	704	21
Wholesale Distribution	135	156	180	331	16
Banking and Finance	354	404	470	1,022	20
Insurance	186	210	239	481	18
Health Services	224	247	277	419	11
Education	81	91	106	200	17
Business Services	127	152	188	438	24
Federal Government	3,103	3,322	3,916	6,897	16
State and Local Gov't	554	640	764	1,644	21
Miscellaneous Industries	6	6	6	14	18

D
Leading Vendors

1. Competitive Environment

The information industry has evolved from a product to a services orientation and from an environment where the customer was totally responsible for implementation to one where vendors are assuming responsibility. Customers are seeking one-stop shopping and vendors are striving to add additional products and services so as to become full-service providers. User organizations are clearly looking outside for a single point of responsibility.

Product and service providers are adding front-end consulting and back-end operations. Some are seeking to achieve these goals by building from within or by making acquisitions, and others look to alliances to provide this full-service image. In 1990 there was a recognition that these services needed to be located physically close to the customer. So a number of vendors abandoned centralized SI organizations and moved SI resources into field organizations.

Vendors recognize the importance of understanding the client's business, particularly in an environment where long-term relationships are important. To achieve this goal, vendors are making significant investments in industry architectures and solutions, hiring industry experts, and establishing alliances with consulting firms or professional services firms that already have industry expertise.

The larger vendors that already have product industry coverage have established goals to improve SI vertical-industry coverage to protect existing customer relationships. Smaller vendors are honing niche skills and gaining market coverage through alliances with the larger vendors that seek vertical-industry skills.

Vendors are building and marketing proprietary products and methodologies. Solid methodologies for requirements analysis, systems design, program management, and integration and implementation improve the odds for program success and reduce the risk of catastrophic failure. These methodologies also build a record of success that can be used for reference selling. Framework products continue to be developed that can be tailored to satisfy a client's specific business needs.

Finally, a growing number of secondary vendors are seeking participation in the market. Many have products that were previously sold as standalone systems but are now candidates for integration into larger solutions. These products include basic computing equipment as well as robots, warehouse storage and retrieval systems, on-board computers, and a variety of communications products. Other vendors seeking SI participation include companies that have developed solutions internally and want to market these skills to others in their industry.

2. Market Shares

Exhibit VII-5 shows market shares of the top five vendors in 1990.

EXHIBIT VII-5

Systems Integration
Vendor Market Share, 1990

Vendor	Revenue ($ Millions)	Percent
IBM	1,280	17
Andersen Consulting	686 (1)	10
EDS	644 (2)	9
DEC	525	8
CSC	441	6

1. Excludes equipment revenues
2. Non-GM business

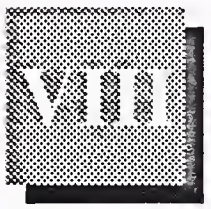
- IBM was the leader in the commercial and government sectors of systems integration in 1990. IBM has increased its focus on the SI market with the formation of the Applications Systems line of business.

- Andersen Consulting, little known in the information services industry just a few years ago, continues to demonstrate dramatic growth in the SI market. Ranked third in 1989, Andersen moved to second in 1990, based almost entirely on commercial SI revenues, where it is now the revenue leader.

- EDS is the leading processing services/SI vendor, runs second in SI revenues to IBM in the federal sector, and is third overall.

- CSC made its SI mark in the government sector (state and federal) by employing its extensive experience as a full-service vendor to win contracts. This firm is third in the federal sector and a frequent competitor of EDS.

- Digital Equipment's (DEC) ranking has jumped significantly over the past year, resulting in DEC replacing Unisys in the top-five vendor ranking. Over the past year, DEC has made significant strides in unifying its systems integration business.



Professional Services

This category includes three submodes: 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 the information system, 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.

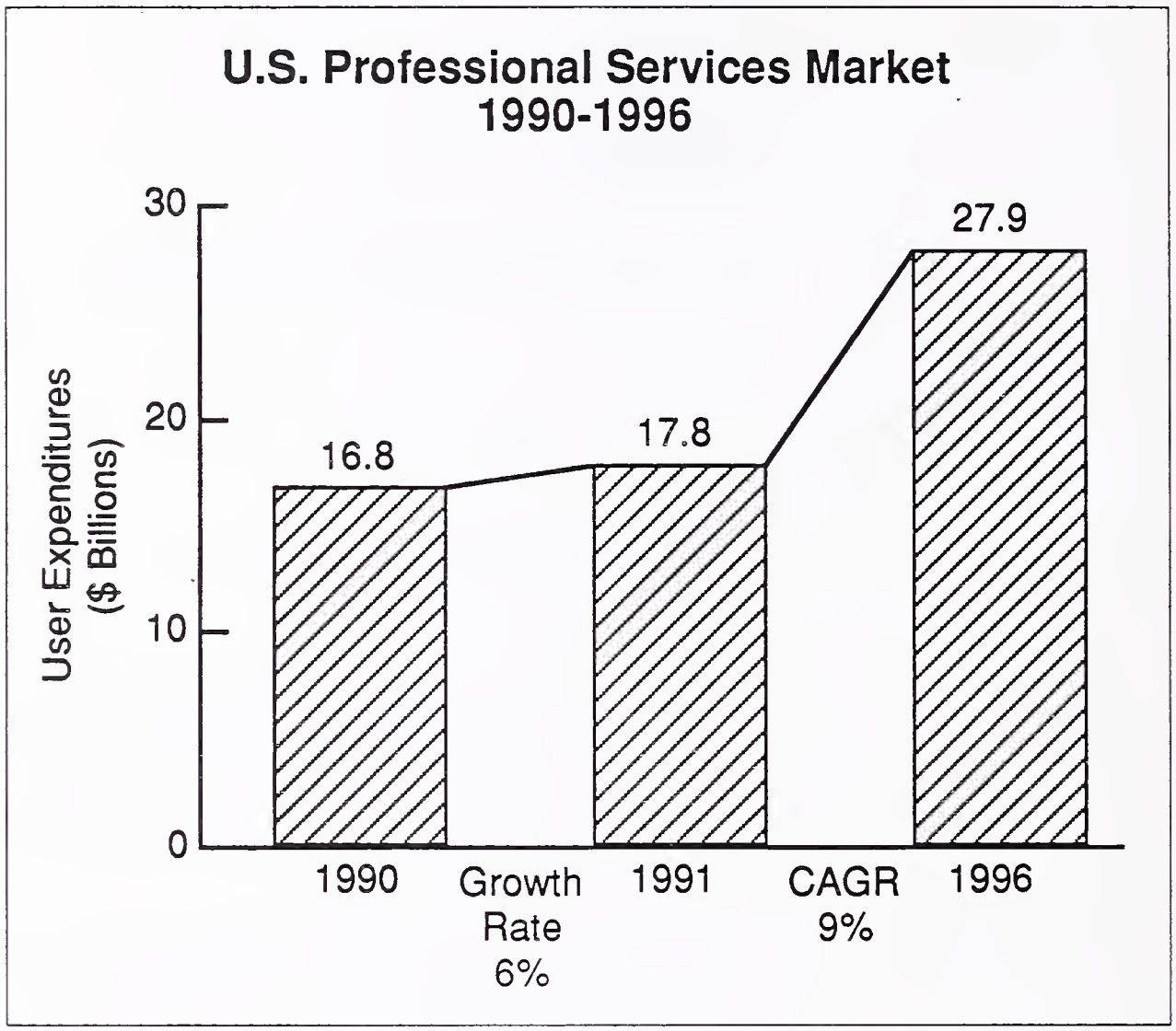
- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation, and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

A
Delivery Mode Forecast and Driving Forces

1. Forecast

Primarily due to the impact of the economic downturn, the professional services market grew at a drastically slower rate (practically flat for the first four months of the year), from a 1990 user expenditure level of $16.8 billion to a 1991 level of $17.8 billion, representing an annual growth rate of 6%. Over the five-year forecast period shown in Exhibit VIII-1, professional services will grow at a 9% CAGR, reaching $27.9 billion in 1996.

EXHIBIT VIII-1



2. Driving Forces

Growth promoters are outlined in Exhibit VIII-2 and discussed below.

Continuing growth in professional services is due to the pressure on users to implement and enhance applications systems that are critical in order to increase revenues or services or reduce significant costs. These applications systems can require experience and skills which may not be available within an organization when needed, so outside services must be used. This is in line with the increasing drive to outsource which will lead to outsourcing of application support including enhancement and maintenance.

Additionally, organizations may choose to maintain a work force below peak levels needed to implement and enhance applications and rely on professional services firms during peak periods.

Professional services vendors can provide unique skills and experience necessary for problem solving. As a result of their independence, vendors can provide or support alternative solutions to industry-specific problems.

EXHIBIT VIII-2

Professional Services Driving Forces

- Lack of internal experience and skills
- General trend toward outsourcing
- Independent approach to problem solving
- Prevents need to hire short-term staff

In addition to offering aid with the analysis of business planning related to current and strategic systems issues, professional services consulting helps users select from the myriad of applications software or turnkey systems available to satisfy the user's needs. Professional services firms attempt to make impartial recommendations in the selection process. By contrast, a consultant from a software products or turnkey systems company that offers a certain type of solution will attempt to promote that product.

If applications plans and needs become more complex, users hire professional services firms based on their sophisticated development skills or experience in developing complex applications systems. Their ability to perform specialized, one-time services such as supplying a particular application module or software conversion from one hardware platform to another represents substantial added value. The use of an outside service prevents hiring staff that is needed for only a limited time.

On the other hand, the lower forecasted growth rate for professional services compared to the previous year's INPUT forecast is due to the forces summarized in Exhibit VIII-3 and discussed below.

EXHIBIT VIII-3

Professional Services Growth Inhibitors

- Movement to SI projects
- Delay or cutback in systems development projects
- Systems operations not longer considered professional services

- The movement or reclassification of some professional services engagements to more complex systems integration projects, or the absorption and lack of recognition of professional services work required to support outsourcing to a systems operation firm.

- The delay or cutback in systems development projects resulting from impacts of the economic downturn and other negative business factors in some industries, which reached their greatest force during the first quarter of 1991 when contract business in some geographic regions fell drastically.

- The removal of the systems operations (facilities management) subsegment from professional services. It was growing and will grow measurably faster than the three submodes that now make up professional services, although it only amounts to 10% of professional services at present.

B

Forecast by Submode

1. Software Development

In 1990, user expenditures for software development were about $10.4 billion, making this segment the largest of the three professional services submodes. It is expected to grow 5% in 1991 to $10.9 billion (see Exhibit VIII-4), and will increase at a CAGR of 7% through 1996.

EXHIBIT VIII-4

Professional Services
User Expenditure Forecast by Submode, 1990-1996

Delivery Modes	1990 ($M)	1991 ($M)	1996 ($M)	CAGR 91-96 (%)
Professional Services	16,761	17,757	27,892	9
- Consulting	3,900	4,234	7,848	13
- Software Development	10,401	10,872	15,525	7
- Education and Training	2,460	2,651	4,519	11

The growth rates are below last year's forecasts for a number of reasons:

- Lower priced ("agency") providers are reducing the revenues that result from some software development.
- SI vendors will bid to include more separate standalone software development jobs in SI contracts, thereby reducing software development work by professional services firms.
- Turnkey vendors will expand their bidding on jobs that will not involve the supply of equipment.
- Software product vendors will expand software modification and enhancement work through the use of CASE and 4GL tools.
- More enhancement of application systems will be done by in-house staffs through the use of CASE tools with consulting aid from professional services vendors. Software development work by vendors will be reduced.

INPUT's definition of software development includes the following services:

- User requirements definition
- Systems design
- Data base design
- Programming
- Testing
- System modification and maintenance
- Documentation/technical writing
- System conversion
- Network development
- Other services

Software development is driven, in general, by the ongoing need to make application systems more responsive to business needs as well as to utilize new technologies in hardware and telecommunications, new generations of software products, and increasing purchases of information systems capabilities by organizations of all sizes. It is also strongly driven by the need to integrate networks, applications, and data bases.

Hardware vendors' introductions and upgrading of central processors mean more business for professional services firms. Series of product introductions, such as IBM's AS/400, RS6000 and ESA, Digital Equipment Corp.'s VAX 9000 mainframe, and new workstations from a number of vendors have led to software conversion business as users develop new applications or modify existing software.

The IS vendors that develop software products do not always use the benefits of new technologies such as higher density disk and tape storage drives, relational data base management software, 4GLs, optical disks, optical scanners, integrated voice/data products, and computer-assisted software engineering (CASE). Professional services vendors tend to support these technologies as well as convert existing user application systems in order to use these technologies. However, some software product vendors are now taking more advantage of opportunities to supply professional services to enhance use of their products. This should continue, particularly by making use of CASE methodology.

Small businesses converting from manual methods or processing services to in-house PCs or minicomputers also require software development. There are vendors who support set-up and customization of newly purchased software for small users. Some will modify accounting and other PC packages to support market needs of smaller firms.

2. Consulting

The consulting submode had 1990 user expenditures of $3.9 billion and is forecast to grow 9% in 1991 to $4.2 billion. The economic downturn caused a drop in forecast usage in 1991, but the demand for consulting services will cause growth to increase.

According to INPUT's definition, the consulting segment of professional services includes the following:

- Software installation planning
- Information systems audit
- Personnel planning
- Policies and procedures development
- Network planning and design
- Information systems strategic planning
- Systems analysis
- Other

Information technology planning and other consulting revenue has grown as Big Six accounting firms, CSC, IBM, DEC and others have increased their services in this area. In addition, Booz Allen and McKinsey have been emphasizing strategic consulting services which involve reviewing the impact of information systems on business planning and business operations. These firms as well as other consultants concentrating on planning are now increasing professional services consulting assignments.

3. Education and Training

Education and training, at $2.5 billion in 1991, is the smallest segment of the professional services delivery mode, amounting to about 11% of professional services revenue. This number represents only external user

expenditures for such services; monies spent for internal training are not reflected in the figures. The education and training submode will grow 8% in 1991 and at a CAGR of 11% from 1991-1996, reaching $4.5 billion in 1996, as illustrated in Exhibit VI-11. The rate for 1991 is below the previous estimate due to the economic conditions in 1991. Growth will resume at previously forecasted levels in 1992.

Although growth fell in the first half of 1991, it has begun to resume due to the steady introduction of more complex application systems and technology use. More sophisticated multimedia and hypertext-based training tools are being introduced. The importance of education and training far exceeds its position based on user expenditures relative to consulting, software development, or even systems operations. It is the foundation upon which information services vendors base plans for continuing work and the means that large commercial, government, and services customers use to upgrade their expertise.

As this segment matures, services are becoming increasingly specialized. Specifically, education and training covers the following types of services:

- Methodology and software engineering
- Systems software
- Hardware platforms
- Technology
- Information systems management

C

Forecast by Market Sector

In 1991, users will have spent about $17.8 billion for professional services, spread across 15 industry sectors. These expenditures, by industry, are shown in Exhibit VIII-5.

In 1990, spending for professional services by the six leading industries accounted for over 84% of total user expenditures. The top six industries are, in order:

- Discrete manufacturing
- State and local government
- Banking and finance
- Process manufacturing
- Federal government
- Insurance

By 1996, process manufacturing will be larger than banking and finance.

EXHIBIT VIII-5

Professional Services
User Expenditure Forecast by Market Sector, 1990-1996

Market Sectors	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Delivery Mode Total	16,761	17,757	19,412	27,892	9
Vertical Industry Markets					
Discrete Manufacturing	4,163	4,459	4,842	6,705	9
Process Manufacturing	1,977	2,119	2,324	3,336	10
Transportation	213	233	250	333	7
Utilities	233	249	268	359	8
Telecommunications	950	1,098	1,265	2,226	15
Retail Distribution	207	220	232	292	6
Wholesale Distribution	327	351	371	465	6
Banking and Finance	2,040	2,184	2,311	2,880	6
Insurance	1,434	1,532	1,662	2,305	9
Health Services	254	272	295	411	9
Education	76	82	89	128	9
Business Services	281	304	323	417	7
Federal Government	2,136	1,900	2,038	2,700	7
State and Local Gov't	2,362	2,638	3,017	5,167	14
Miscellaneous Industries	108	116	125	168	8

Several factors contributed to the current spending levels in the key industries:

- Driven by the need to become more competitive, discrete manufacturers continue to spend heavily to automate production processes and materials management/distribution functions, improve the network infrastructure, and improve order entry processes. The heaviest expenditures are for software development. Consulting expenditures and the use of systems integration in this industry grew in 1990 and 1991.

- Despite economic problems, state and local governments in general expanded network and computing capabilities and implemented new eligibility and emergency response applications as well as other accounting, revenue collection, and health and human services applications. Professional services firms were also hired to perform software consulting to protect the investment in existing applications software. Since state and local governments must operate on a pay-as-you-go basis, these organizations are major users of systems operations contracts.

- Although the federal government has sizable contracts to replace second generation computer systems in accounting and finance, logistics, and personnel systems, work has slowed due to reductions in Defense Department and other expenditures. Systems integration, as well as professional services contracts, have been utilized to upgrade applications to achieve improved effectiveness. The use of consulting has decreased in relation to software development due to the bias of Congress against this type of work, which often utilizes the expertise of ex-employees.

- Consolidation, deregulation, and internationalization in the banking and finance markets created opportunities for professional services firms offering software development and consulting, although systems integration and outsourcing by systems operations firms took advantage of some of these opportunities. Steps to reduce operational costs have also led to ongoing use of professional services in the banking and finance industry as well as major shifts to systems operations. The challenges facing the industry are creating significant economic pressures, which resulted in much slower growth in 1990 (estimated at 5%) than in previous years.

- Processing manufacturing, driven by the ongoing need to reduce costs, continued to re-automate its production processes. Process manufacturing companies are also modifying their information systems to yield more customer and marketing data. Information systems upgrades are necessitating extensive investments in skills upgrades for professional staff. Professional services expenditures in process manufacturing include software development, education and training, and consulting.

The trend toward greater use of standards, particularly in network operations, is an additional driving force for software development. Despite the promulgation of numerous sets of standards, standards are missing in software development. Hardware and software vendors imbed proprietary hooks in their products at levels requiring sophisticated knowledge. Custom software development expertise is needed to overcome the advantage of standard products.

Education and training for software products covers CASE tools, UNIX and open systems, and parallel architecture, as well as vendor products such as CICS, DB2 and Digital's and Oracle's data base management systems.

New hardware platforms force users and software developers to learn the technical ins and outs of these products. IBM's introduction of the AS/400 midrange system and RS6000, and the introduction of new workstations, automatically necessitated training and education for user and developers.

Information systems managers as well as non-IS managers need high-level information on emerging technologies such as imaging systems, robotics, industrial automation, AI, LANs, telecommunications, data communications, and voice/data integration.

Information systems managers require exposure to new methodologies for running the IS department. Education and training is required in order to keep up with changes in project management and software development methodologies.

Higher level training classes once offered only to vendor personnel may now be attended by user personnel as well as vendor personnel.

D

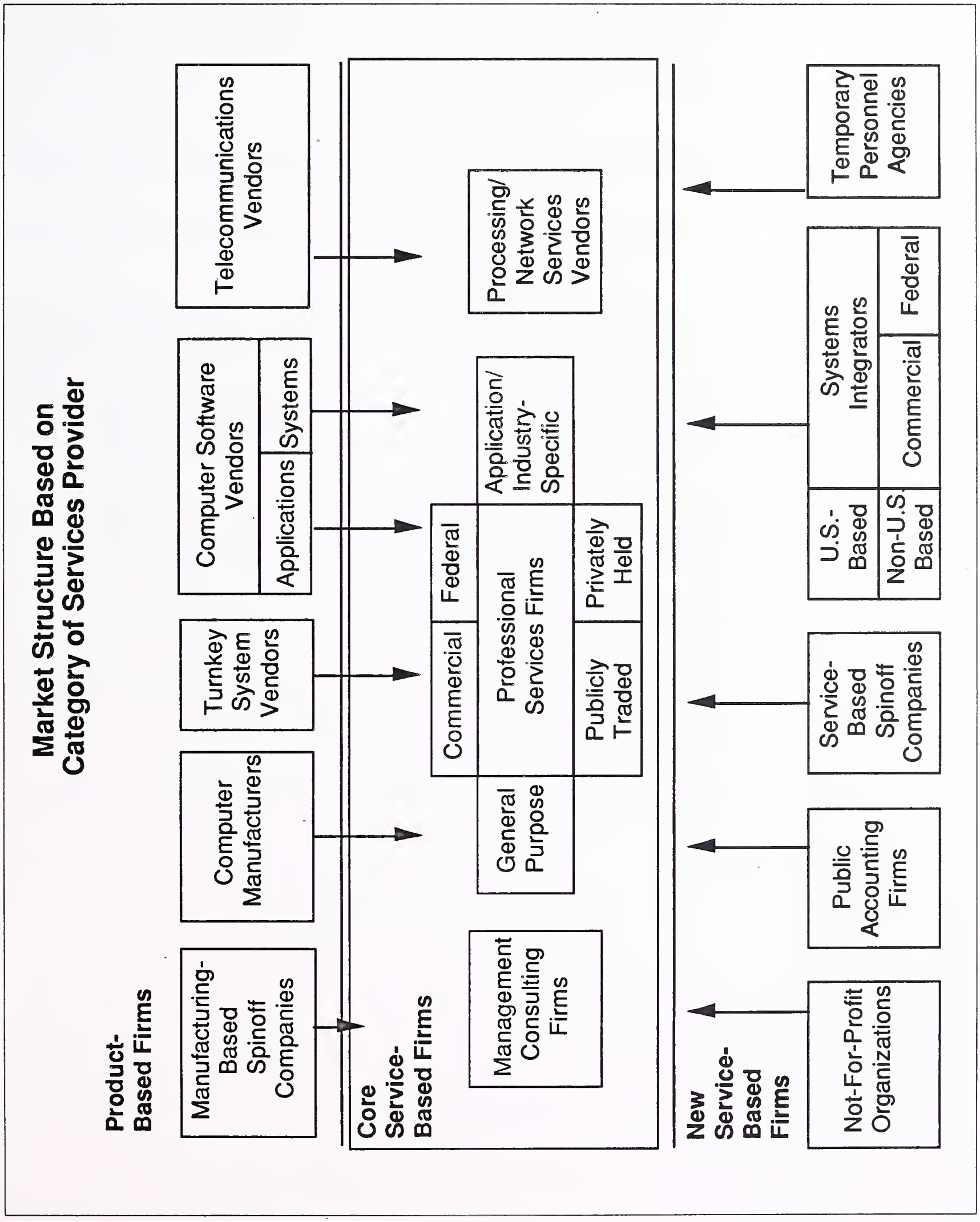
Leading Vendors

Exhibit VIII-6 indicates the different types of firms that are participating in the professional services market. This market can be divided or structured based on the category of service provider. That type of structure places professional services firms into one of three categories:

- Product-based (computer hardware, software, communications products)
- Core service-based(professional services is a principal line of business)
- Newer service-based

Core service-based firms are the industry pioneers, some having offered professional services since the late 1950s. Although the public accounting firm Arthur Andersen & Company (now Andersen Consulting) has been a key player in professional services since the mid-1950s, the newer service-based firms generally did not enter the professional services market until the 1960s or 1970s. Product-based firms, which sell primarily computer hardware or other products, entered the professional services market between 1965 and 1984. IBM, with its early emphasis on customer service and support, helped build the market for professional services.

EXHIBIT VIII-6



As shown in Exhibit VIII-7, the top vendors of professional services in the U.S. include many companies devoted principally to other products and services. The list includes manufacturers of computers, airplanes and other products, public accountants and a phone company subsidiary. Less than 40% of the top firms listed in Exhibit VIII-7 are devoted chiefly to professional services.

Among the top 25 professional services vendors, computer manufacturers and the providers of public accounting and auditing services stand out.

- IBM, DEC, NCR/ATT, Unisys and Hewlett-Packard can all be found among the top 20 vendors.

- Andersen Consulting, the business organization set up by the partners of Arthur Andersen in view of the size and growth of its non-accounting business, ranks fourth in professional services. Coopers and Lybrand, Ernst & Young, and KPMG also rank in the top 25, and the remaining 2 members of the Big Six, Price Waterhouse and Deloitte & Touche, would also be in the top 25 except for the reclassification of some of their revenue as systems integration related.

IBM, CSC, EDS and Andersen remain entrenched in the top four positions among professional services firms. They each enjoyed more vigorous growth than most other leading firms in this service mode.

- Revenues of the top four firms grew at an average rate of over 18% between 1989 and 1990.

- Three of the six vendors in ranks 5 through 10 of professional services revenue in 1989 grew at a rate under 3% in 1990.

- Only two vendors in positions 5 through 15 had growth in revenue of over 6% in 1990.

EXHIBIT VIII-7

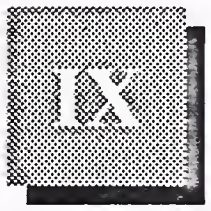
Largest U.S. Professional Services Vendors, 1990

Rank	Vendor	Professional Services Revenues ($ Millions)
1	IBM	490
2	CSC	475
3	EDS	468
4	Andersen Consulting	310
5	Logicon	221
6	PRC	207
7	CGA	201
8	DEC	195
9	NYNEX/AGS	194
10	CTG	191
11	Unisys	180
12	Ernst & Young	168
13	A.D. Little	165
14	Hewlett-Packard	151
15	Harris Corp.	150
16	NCR	148
17=	Coopers & Lybrand	145
17	CDC	145
19	BDM International	136
20	Grumman	135
21	Applied Learning	105
22	KPMG	104
23	McKinsey	103
24	Computer Data Systems	102
25	Martin Marietta	100

Professional services firms continued the trend of expanding services in the systems integration market during 1990, driven by the higher growth rates for systems integration business. Many leading professional services vendors offer systems integration, as illustrated in Exhibit VII-2.

- All of the 10 leading vendors of professional services also offer systems integration services, and most of these vendors have substantial revenues from systems integration. One of the characteristics of leading professional services vendors is their ability to offer systems integration.

- Some vendors announced an entry into the systems integration market in 1990; whereas part of the professional services business of others was reclassified as systems integration during the past year on the basis of the types of contracts they had concluded with clients.



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 submodes: *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.

A

Delivery Mode Forecast and Driving Forces

The network services market continues to show a favorable prospect for growth despite increased pressures on the revenues and earnings of some vendors in the marketplace.

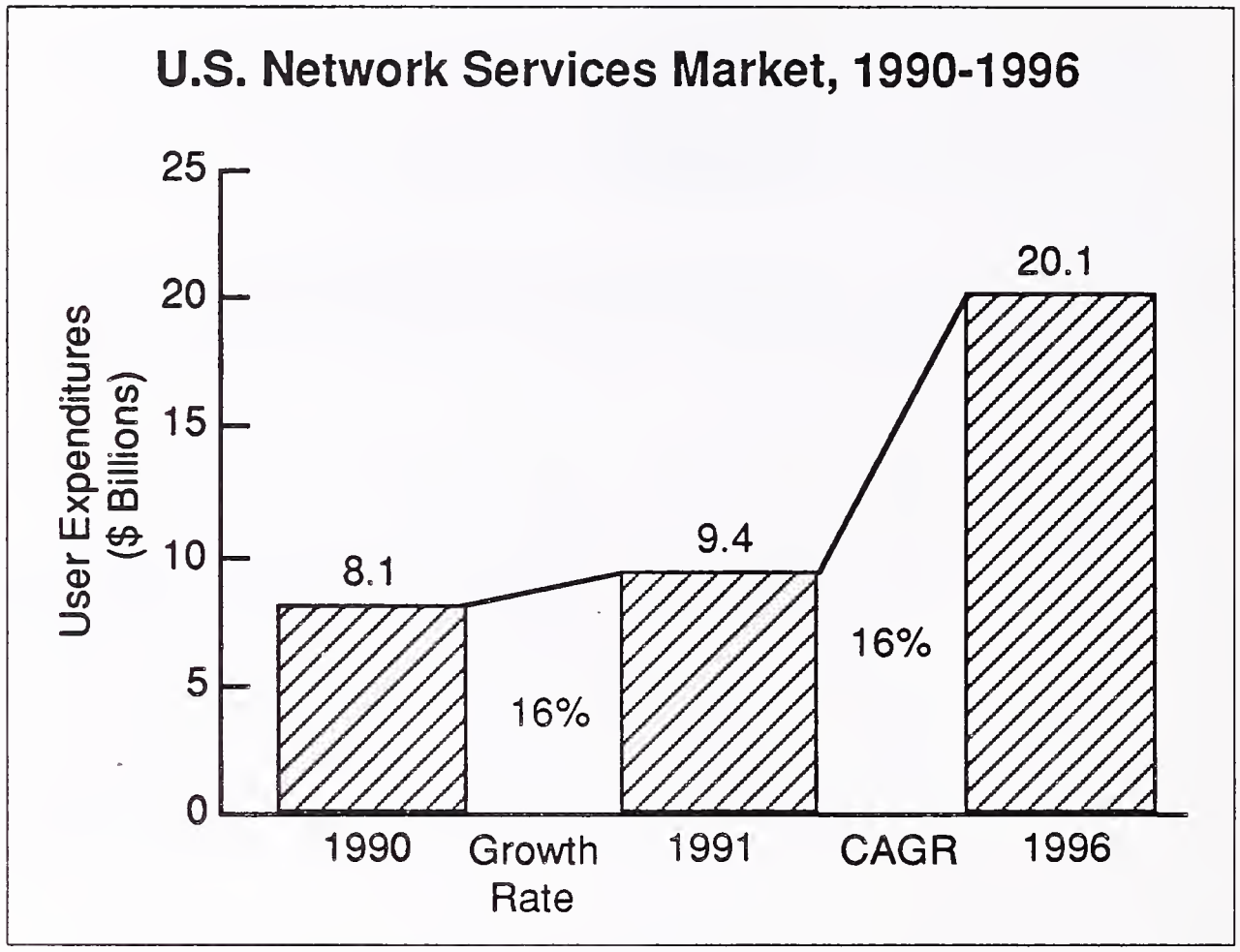
The market for network services (Exhibit IX-1) is growing from a 1990 level of $8.1 billion in user expenditures to a level of $9.4 billion in 1991—a growth rate of 16%. User expenditures will grow at a compound annual growth rate (CAGR) of 17% during the next five years to reach $20.1 billion in 1996.

Continuing growth is due to the fact that network services can assist in revenue generation or cost reduction by creating a more automated way of conducting business.

- Network applications provide electronic rather than paper means of handling business with customers, suppliers, service companies, and government offices—as well as with other offices in an organization. Instructions, messages, data, and payments can be handled more quickly and save time and costs.

- Information necessary to make decisions, conduct research, aid clients, or keep processes functioning can be sought and accessed more rapidly and on an automated basis.

EXHIBIT IX-1



The lack of expertise in network capabilities also helps to drive the use of network services vendors.

- In order to market and deliver their products, vendors have developed a staff with these capabilites.
- End users that are in need of on-line data or want to utilize network applications can become involved with network services vendors to obtain aid, which can lead to the consideration of vendor capabilities.

B

Forecast by Submode

1. Electronic Information Services

Exhibit IX-2 shows that user expenditures for electronic information services (EIS) will grow to $7.4 billion and rise at a CAGR of 16% between 1991 and 1996—to a level of $15.6 billion in 1996.

EXHIBIT IX-2

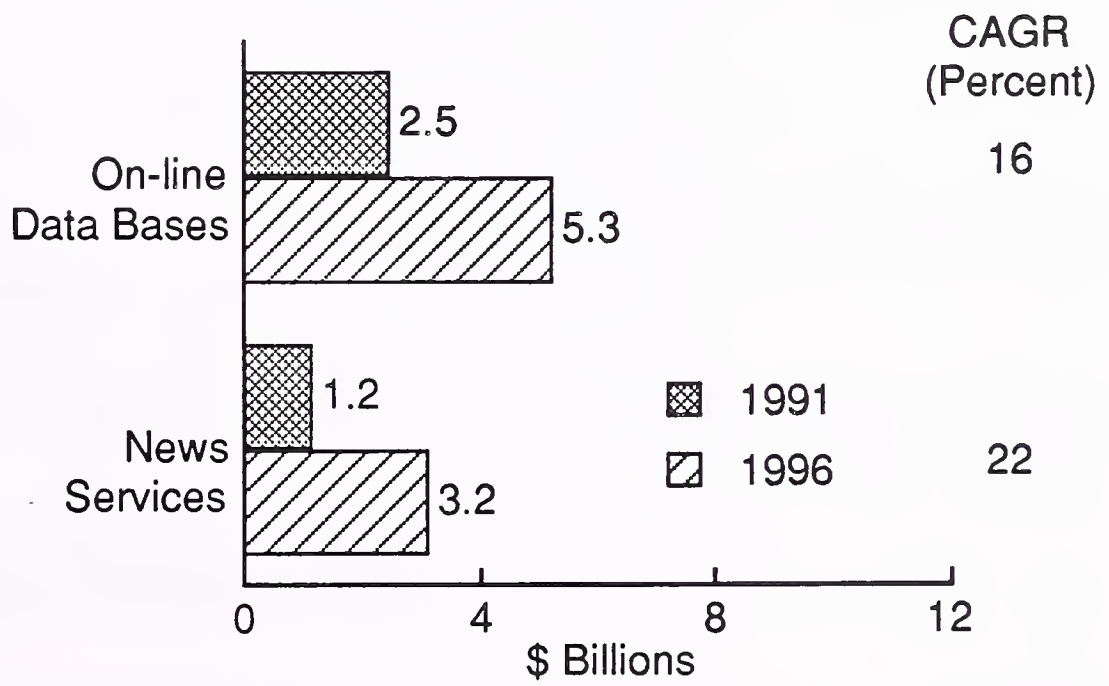
Network Services
User Expenditure Forecast by Submode, 1990-1996

Delivery Modes	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Network Services	8,089	9,350	10,782	20,052	12
- Electronic Info. Svcs.	6,420	7,419	8,527	15,615	16
- Network Applications	1,669	1,931	2,255	4,437	18

The type of information delivered through EIS is divided into two main types in Exhibit IX-3: on-line data bases and news services.

EXHIBIT IX-3

Electronic Information Services Market by Submode, 1991-1996



- Expenditures for on-line data bases are more than twice as large, at $2.5 million, as expenditures for news services.

- Expenditures for news services are growing at a CAGR of 22%—almost 25% larger than the rate for on-line data bases because they can be utilized in a much wider range of industries and activities.

The use of EIS is driven in general by improvements in the use of communications and computing technology that can result in lowered user costs, more timely data, and improved means of accessing and utilizing data.

Improvements can also include easier means of accessing data through new terminal or PC features, voice messaging, or graphical interfaces. These developments and improvements are needed to cope with the expanding amount of information available

Developments in PC software have added to the ability to use EIS by facilitating access to multiple data bases and by accessing data on preset schedules—as well as by manipulating and combining data with the use of spreadsheet, data base, statistical, graphics, and other programs.

2. Network Applications Market

User expenditures in the network applications market are growing at a rate of 16%—from $1.7 billion in 1990 to $1.9 billion in 1991. Growth will continue at a CAGR of 18% to a level of $4.4 billion in 1996.

- Network applications amounted to about one-fifth of network services expenditures in 1990 and will include about 1% more of these expenditures by 1991.

- Network applications are driven by needs or demands of clients and by developments in communications, just as the use of EIS is. However, network applications also save postage, office labor, and other costs—thereby encouraging the use of electronic payment and mail versus paper-based media.

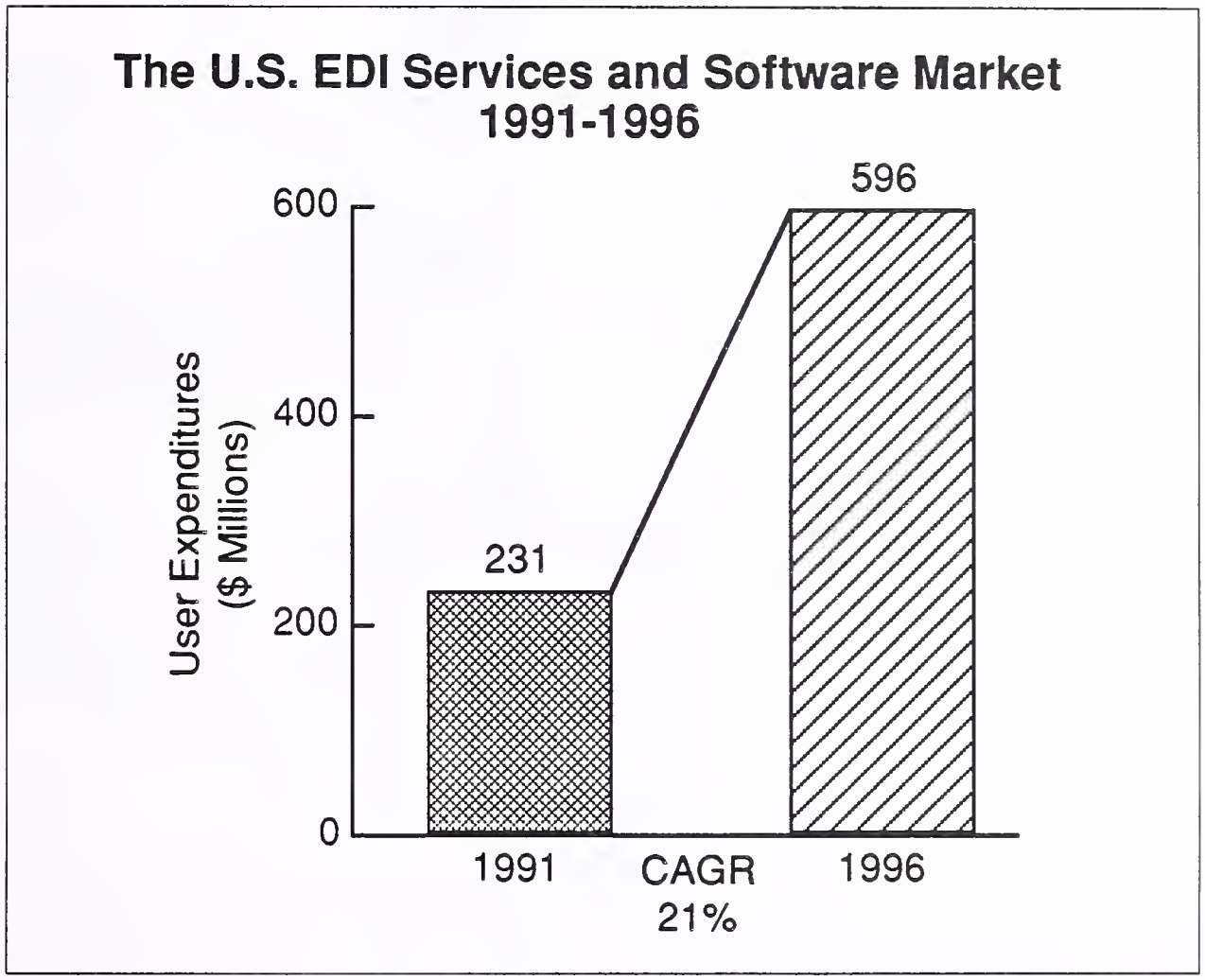
Developments that improve network quality and service capabilities—such as internetworking—promote the use of EDI, electronic mail, videotex, and other network applications.

In addition to reducing costs, saving time, and promoting business, network applications provide means of improving work and organizing better communication with suppliers and customers.

3. EDI Market

Due to interest in the EDI component of the network services, INPUT provides a separate analysis of this market. The expenditures for network services and software to serve this market are shown in Exhibit IX-4.

EXHIBIT IX-4



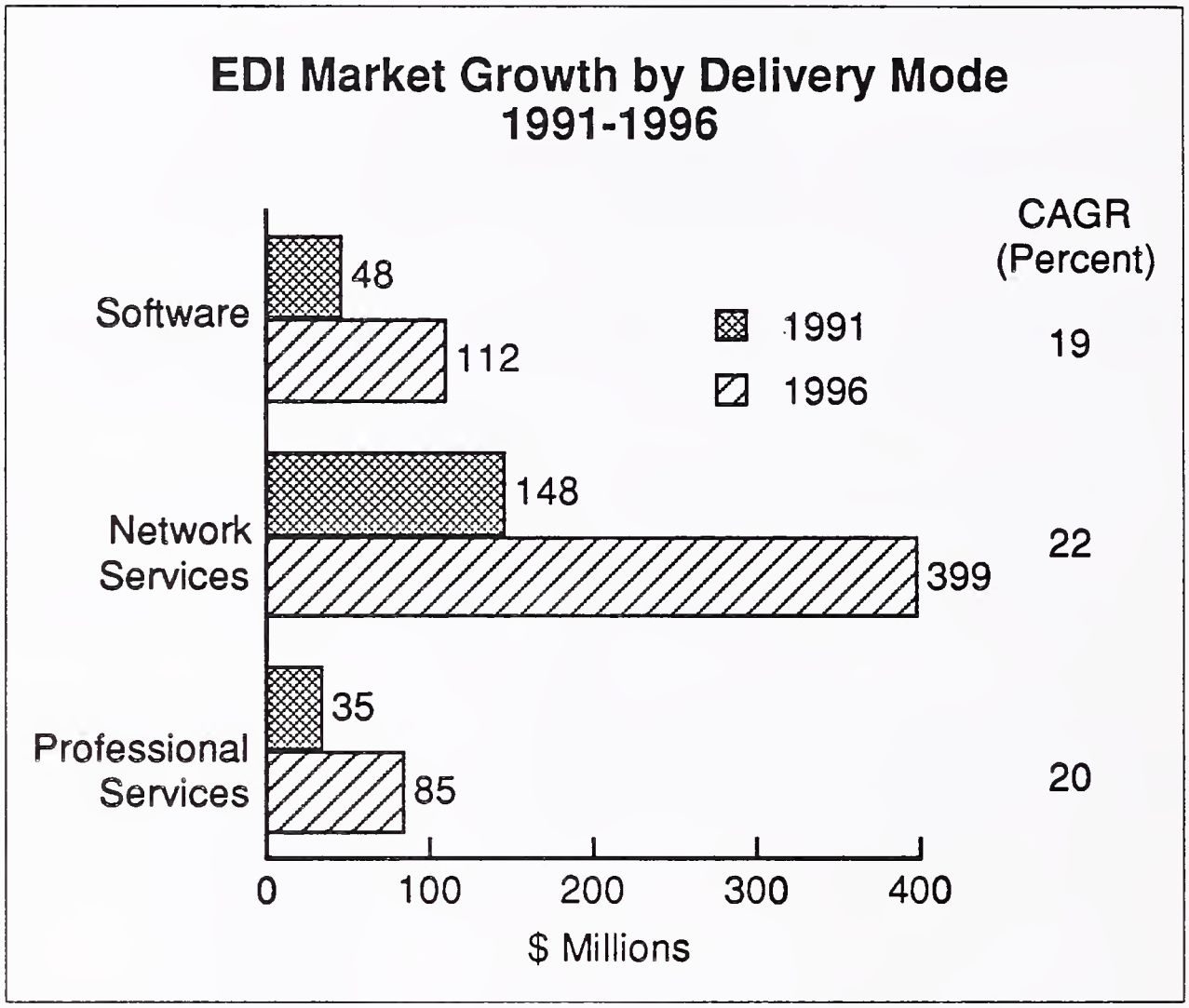
- The market illustrated in Exhibit IX-4 is projected to grow at a compound annual growth rate of 21% from 1991 to 1996. Expenditures will increase from $231 million to $596 million.

- The forecast growth rate of 21% has risen from the rate of 19% previously forecast for 1990-1995, and INPUT forecasts expenditures for the mid-1990s to be 75% higher than what INPUT previously estimated.

Despite the current increase in growth, INPUT feels that growth will start to level off later in the decade.

Exhibit IX-5 shows the growth by delivery mode for EDI. The rates of growth for the three modes shown are relatively similar. However, the greatest absolute growth in expenditures is for network services, which will benefit from the spurt in EDI growth encouraged by recent interest in reducing costs and speeding up business interaction.

EXHIBIT IX-5



C

Forecast by Market Sector

The user expenditures of $9.4 billion for network services in 1991 can be divided among industry and generic markets, as shown in Exhibit IX-6. By *generic*, INPUT means use can be made of this service in such a broad or general way across industries or in applications that it is impossible to divide the use by cross-industry or industry categories. Network services have certain EIS offerings—such as on-line data bases of securities, credit, and economic data—that qualify as generic markets.

The expenditures for each will be nearly equal in 1991, but the expenditures for generic markets are growing at a faster rate since vendors selling access to generic data for one market usually find that the data can be sold to other markets.

EXHIBIT IX-6

Network Services
User Expenditure Forecast by Market Sector, 1990-1996

Market Sectors	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Delivery Mode Total	8,089	9,350	10,782	20,052	16
Vertical Industry Markets	4,955	5,627	6,469	11,635	16
Discrete Manufacturing	69	86	109	268	26
Process Manufacturing	696	825	976	1,920	18
Transportation	270	300	354	686	18
Utilities	26	28	31	43	9
Telecommunications	93	110	129	258	19
Retail Distribution	155	187	229	507	22
Wholesale Distribution	221	275	338	777	23
Banking and Finance	740	850	980	1,710	15
Insurance	208	228	252	402	12
Health Services	446	504	578	1,126	17
Education	163	191	224	419	17
Business Services	548	592	681	1,201	15
Federal Government	1,134	1,234	1,333	1,825	8
State and Local Gov't	76	92	111	248	22
Miscellaneous Industries	110	125	144	245	14
Generic Markets	3,134	3,723	4,313	8,417	18
On-Line Data Bases	2,152	2,530	2,888	5,260	16
- Bibliography/Text	300	365	439	976	22
- News	682	828	986	2,181	21

The differences in use of network services between industry markets is pronounced.

- The expenditures in the federal market are about five times larger than in any other market. The explanation is heavy use of network applications: EDI, VANs, and electronic mail.

- In 1991, three industries show user expenditures of under $100 million, one has expenditures of over $1 billion, and others are divided above and below $300 million.

- In 1996, one still has an expenditure level of below $100 million and four have expenditures of above $1 billion.

A group of industries—including discrete and process manufacturing, wholesale and retail distribution, and state and local government—have high growth rates. These growth rates reflect increased use of EDI in most cases.

The wide range of results by industries indicates that vendors should be selective about the markets to which they offer network services.

Vendors that offer information services products in industry markets—such as process manufacturing, banking and finance, and business services—but do not offer network services in those markets should definitely explore opportunities for offering those services.

The federal government is the largest user of network services—the federal government made expenditures of $1.2 billion in 1990, based mainly on the use of network applications to meet the needs of civilian and defense agencies.

As shown in Exhibit IX-7, the leading industries in the use of EIS are banking and finance, process manufacturing, and business services.

- Expenditures in the banking and finance industry are driven by the use of on-line data bases to supply pricing and other financial and economic information to price or evaluate equities, portfolios, collateral, alternate courses of action, or other business situations.

- Expenditures in business services are driven by the use of on-line data bases of financial, legal, and other business data to help in preparing analyses, reports, or other products or services.

- Process manufacturing includes a number of industries—such as chemicals, pharmaceuticals, and petroleum—that are heavy users of on-line technical information used in manufacturing, storing, shipping, pricing, and a variety of other purposes.

EXHIBIT IX-7

Electronic Information Services
User Expenditure Forecast by Market Sector, 1990-1996

Market Sectors	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Submode Total	6,418	7,419	8,527	15,615	16
Vertical Industry Markets	3,284	3,696	4,214	7,198	14
Discrete Manufacturing	35	43	52	114	22
Process Manufacturing	610	708	818	1,400	15
Transportation	210	226	265	486	17
Utilities	23	25	27	37	8
Telecommunications	76	90	104	204	18
Retail Distribution	107	125	148	286	18
Wholesale Distribution	55	63	71	118	13
Banking and Finance	650	750	860	1,500	15
Insurance	155	171	191	317	13
Health Services	274	304	338	556	13
Education	102	120	142	269	18
Business Services	531	575	660	1,154	15
Federal Government	315	334	353	440	6
State and Local Gov't	37	44	50	90	15
Miscellaneous Industries	104	118	135	227	14
Generic Markets	3,134	3,723	4,313	8,417	18
On-Line Data Bases	2,152	2,530	2,888	5,260	16
- Securities	870	1,014	1,166	2,110	16
- Credit	1,063	1,257	1,420	2,570	15
- Economic/Other					
On-Line News Services	932	1,193	1,425	3,157	21
- Bibliography/Text	300	365	439	976	22
- News	682	828	986	2,181	21

Exhibit IX-8 shows the expenditures for network applications by industry markets.

EXHIBIT IX-8

Network Applications Market
User Expenditures by Industry, 1991-1996

Industry Sector	User Expenditures $ Millions		1991-1996 CAGR Percent
	1991	1996	
Discrete Manufacturing	43	154	29
Process Manufacturing	117	520	35
Transportation	74	200	22
Utilities	3	6	14
Telecommunications	20	54	22
Wholesale Distribution	212	659	25
Retail Distribution	62	221	29
Banking and Finance	100	210	16
Insurance	57	85	8
Medical	200	570	23
Education	71	150	16
Business Services	17	47	22
Federal Government	900	1,385	9
State and Local Government	48	158	27
Miscellaneous Industries	7	18	21
Industry-Specific Total	1,931	4,437	18
Generic	NA	NA	NA
Total Network Services	1,931	4,437	18

- The expenditures in the federal market are about five times larger than in any other market. The explanation is heavy use of network applications: EDI, VANs, and electronic mail.

- A group of industries—including discrete and process manufacturing, wholesale and retail distribution, and state and local government—have high growth rates. These growth rates reflect increased use of EDI in most cases.

D
Leading Vendors

The list of top vendors of network services in Exhibit IX-9 illustrates that competitors in this marketplace come from a variety of industries.

- The competitors include publishers of financial information—such as Dow Jones and Dun & Bradstreet; book publishers such as McGraw-Hill; a bank, Citicorp; the leading computer manufacturer, IBM; a newspaper holding company; two subsidiaries of manufacturers of noncomputing products; and vendors of information industry services.

- Information services vendors that offer network services tend to be known chiefly for services in other delivery modes such as ADP and CSC.

Exhibit IX-9 illustrates that the market is dominated by a group of large vendors.

- The top ten vendors in this exhibit account for 45% of the 1990 revenue for network services.

- The next five vendors add 10% more to the total revenue.

In addition to the large vendors, there are vendors in the middle of the market from a revenue standpoint—such as Policy Management Systems, which has about $70 million in revenues, and a large number of vendors with limited revenues.

The top five vendors of network services in Exhibit IX-9 include only vendors of one submode of network services, EIS. There are two vendors of network applications among the next five largest vendors.

Four of the top five vendors have EIS products for financial subjects, and the other vendor, Mead Data Central, has EIS products that offer legal information and news.

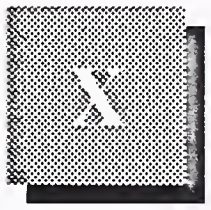
Four of the top five vendors are subsidiaries of companies that have substantial revenues in non-information-services areas. Four of the next five vendors have the same characteristic.

EXHIBIT IX-9

Leading Vendors of Network Services in 1990

Rank	Vendor	Estimated Revenue ($ Millions)	Market Share (Percent)
1	TRW (including Chilton)	700	9
2	Dow Jones (Telerate)	425	5
3	Dun & Bradstreet	415	5
4	Mead Data Central	410	5
5	Equifax	390	5
6	Reuters	372	5
7	McGraw-Hill	325	4
8	BT Tymnet	220	3
9	ADP	215	3
10	Sprint	214	3
11	Citicorp (Quotron)	195	2
12	Knight-Ridder (& Dialog)	172	2
13	GEIS	148	2
14	CompuServe	146	2
15	IBM	145	2

Only two of the top five vendors offer other modes of information services. Dun & Bradstreet offers software products, and Equifax offers processing services as a result of its acquisition of Telecredit.



Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. INPUT divides systems software products into three submodes.

- *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.

A

Delivery Mode Forecast and Driving Forces

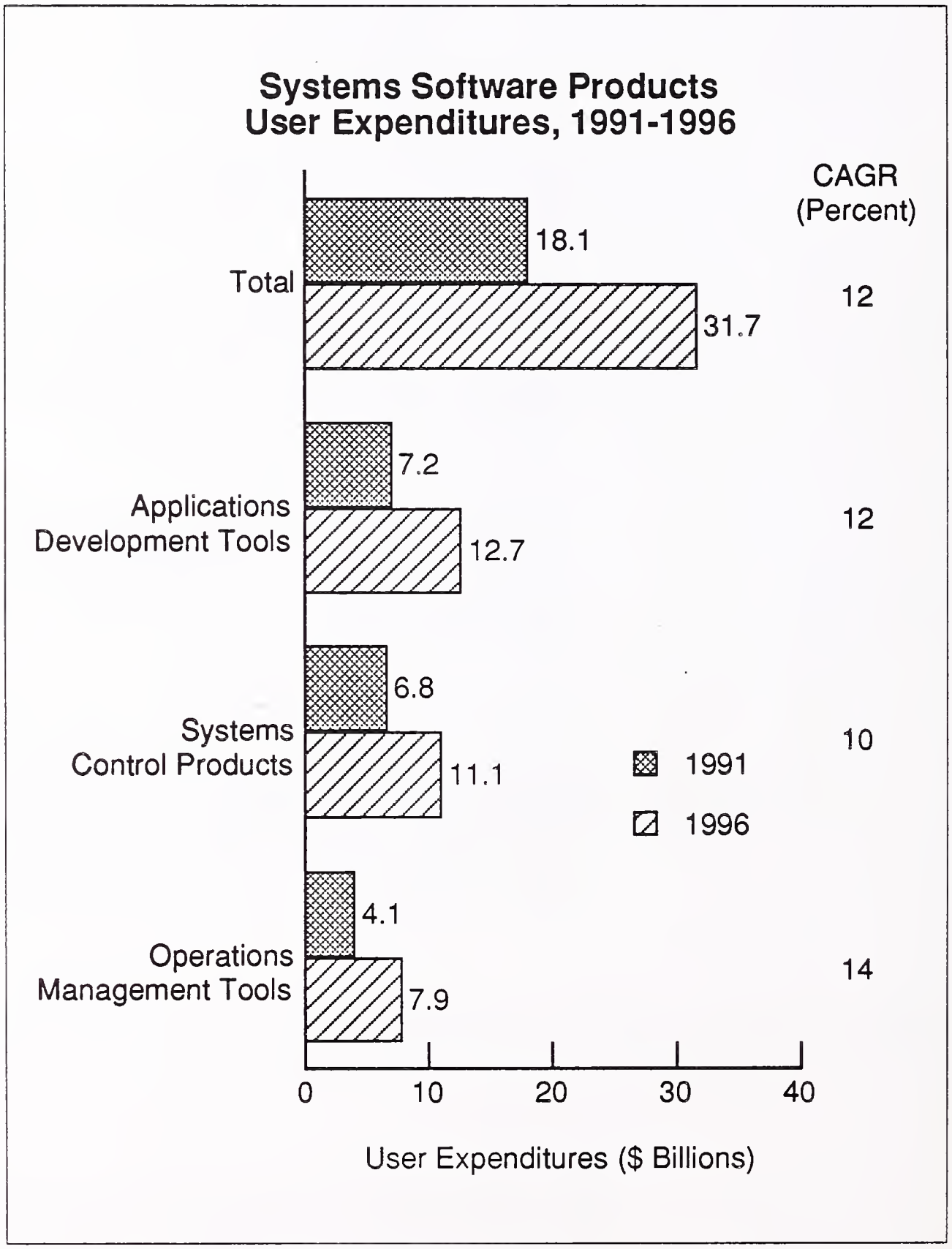
1. Forecast

User expenditures on systems software grew from $6.3 billion in 1985 to $14.5 billion in 1989. User expenditures reached a peak annual growth rate of 30% in 1987, due in large part to the strong growth of departmental/ minicomputer systems (AS/400 introduction) and also the strong

growth in personal computer shipments. Annual growth since then has declined to 13% in 1990 and will remain at 10% for 1991 and 1992, then pick up to 13% for the 1993-1996 time period.

As shown in Exhibit X-1, the overall systems software market will expand from $18.1 billion in 1991 user expenditures to $31.7 billion by 1996, a CAGR of 12%.

EXHIBIT X-1



INPUT's forecast for systems software products of a 12% CAGR for the 1991-1996 period compares to INPUT's applications software products forecast of 14% over this same five-year period. INPUT believes that the kinds of technology shifts that will have a positive impact on the applications software products market will also have a positive impact on systems software products. But though the fact that these technology shifts are still in the initial stages is not deterring purchase of applications software products, it will—in the short term—be a deterrent to purchases of systems software products.

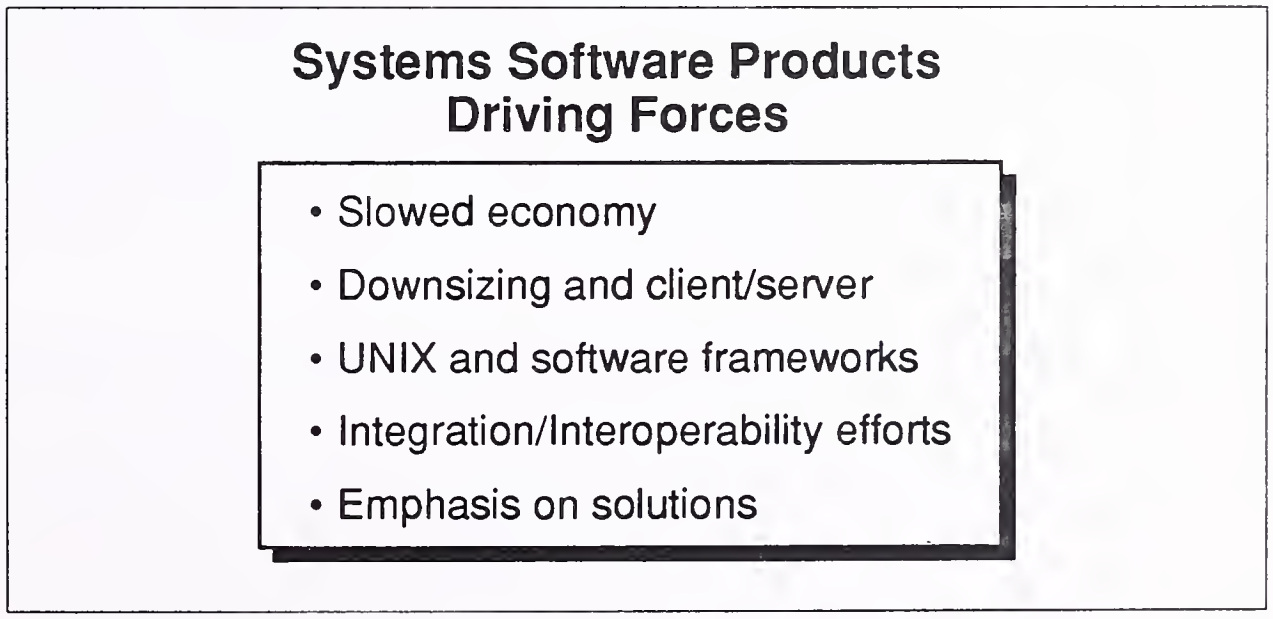
In addition, an obvious and fundamental shift is occurring that makes the solution aspect of software the number-one priority. In this respect, applications software products are more synonymous with solutions, whereas systems software products are considered supporting, albeit necessary products. To the extent that systems software products are presented as solutions they will be eagerly embraced.

The fastest growing submode will be operations management tools, which encompass network administration and control products. The trend towards multiplatform, multivendor networks and network integration will fuel this growth.

2. Driving Forces

The key driving forces of the systems software market are listed in Exhibit X-2 and described in this section.

EXHIBIT X-2



All of these driving forces act as growth promoters and as inhibitors to varying degrees and during different timeframes. In this section INPUT describes the timing of each driving force and discusses whether it is an inhibitor or a promoter. These fundamental assumptions drive INPUT's systems software products forecasts.

- *Slowed Economy* - It is likely that most 1992 information systems budgets will be developed under the current economic pressures and will reflect spending constraints for 1992. The existence of budget constraints may slow spending increases even if recovery comes sooner.

  Even though downsized solutions running on workstations and personal computers provide compelling price/performance advantages, purchases of computers—including smaller platforms—are down. What negatively impacts hardware shipments will also negatively impact new purchases of both applications and systems software products.

- *Downsizing and Client/Server* - One could argue that downsizing is a software products growth inhibitor. Users' expectations are that products that run on smaller platforms will have smaller price tags than software products for mainframes. Thus it is unclear that lower priced platforms can sustain high priced software. However, there are indications that the pricing structure of much of systems software will change from platform- to user-based. It is unclear what, if any, impact this will have on the user expenditure forecasts.

  Downsizing will open up the systems software market to all sorts of new product needs and opportunities. The kinds of systems software products that reside on mainframes will become increasingly necessary in some fashion on minicomputers, workstations and personal computers.

- *UNIX and Software Frameworks* - Because UNIX and software frameworks are still in such a formulative stage on the vendor side, on the user side they are causing more confusion than anything else; therefore so-called standards inhibit growth of systems software expenditures in the short term. One can't help but think that, over the long term—and perhaps as early as 1994—standards will start to become a growth promoter; there will be rules to follow and therefore more people will want to play.

- *Integration/Interoperability* - LAN and network integration is the single most important IS objective over the next several years. Thus, products and services that enhance multivendor and multiplatform computing solutions will be widely popular. And in fact, interoperability—of which LAN and networking solutions are a major part—will drive the use of other systems software products such as distributed DBMSs, client/server and cooperative processing models.

  Yet integration and interoperability solutions remain elusive. With some 20 DOS networks alone, integrating and administering an enterprise solution becomes incredibly complex. Answers will, again, come in an evolutionary fashion. As new network management and control products become available they will be eagerly purchased, but this will take time.

- *Emphasis on Solutions* - Lower costs and improvement of overall productivity is cited as the key technology goal as it relates to applications software products; however, this goal is not among top systems software priorities. As applications software products are viewed as a way to lower costs, systems software is perhaps viewed more as a background support product necessary to run applications software.

B

Forecast by Submode and Platform Size

In this section the forecast and specific driving forces/inhibitors for each of the submodes within systems software products are discussed. The forecast is presented for mainframe, minicomputer and PC/workstation categories. Exhibit X-3 provides INPUT's submode forecast for systems software products.

EXHIBIT X-3

Systems Software Products
User Expenditure Forecast by Submode, 1990-1996

Market Sectors	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Delivery Mode Total	16,390	18,100	19,960	31,700	12
Systems Control Products	6,200	6,800	7,500	11,100	10
Operations Management Tools	3,700	4,100	4,570	7,900	14
Application Development Tools	6,490	7,200	7,890	12,700	12

1. Systems Control Products

Systems control products are supervisory programs that provide automatic management and allocation of systems/network resources during the execution of applications programs. These products include operating systems, emulators, network control products such as NetView and NetMaster, library control, access control, and spoolers.

User expenditures for systems control products will grow from $6.8 billion in 1991 to $11.1 billion in 1996, representing a CAGR of 10%.

As the majority of expenditures for systems control products are for operating systems, and as new hardware units are at a low shipment rate, this will depress overall growth for this submode. Most of growth is maintenance of existing systems control products due to price increases. Proprietary operating systems will grow at the rate of price increases plus a small increase for new installations.

There are, however, several bright spots in systems control products expenditures:

- Expenditures on UNIX systems control products are growing at twice the rate of expenditures on systems control products as a whole.

- Major opportunities exist to provide systems control products such as security systems, access control products and configuration managers for smaller platforms.

- A major opportunity also awaits vendors of network control software, since users will be dramatically changing the way in which they handle information.

2. Operations Management Tools

Operations management tools are used by operations personnel to manage the computer and/or network resources and personnel more effectively. At the high end, this category includes mainframe job scheduling and accounting systems, disk/tape library systems, performance monitoring/ tuning systems, etc. At the level of workstations and PCs, this category currently includes programs such as disk management utilities.

Operations management tools also include DBMS utilities which manage, control and audit data maintained in data bases; DBMS utilities serve functions ranging from security and formatting of data to usage accounting and tuning of applications programs and data base design.

The key distinction between systems control products and operations management tools lies in who is managing what, and within what timeframe. Systems control products are used by the system for real-time self management, with thousands of transactions/decisions being made per second. Operations management tools provide manually directed, macro-level management of resources, with input transactions/decisions measured in tens or hundreds per hour for a large mainframe system.

The operations management tool market, the smallest of the three systems software submodes, will grow from $4.1 billion in 1991 to $7.9 billion in 1996, a CAGR of 14%. Vendors active in this arena include Boole & Babbage, Candle, Goal, Legent and Systems Center, as well as the large vendors Computer Associates and Microsoft.

Operations management is not a new market, having been in existence since the advent of the mainframe. However, the complexity of managing a data center has grown exponentially with the increasing numbers and varieties of computers, terminals and users; the task is especially growing in complexity because of the need to combine different operating systems, data bases and networks. This need is for new and different tools than in the past. Growth is also driven by the fact that applications are becoming more critical to organizations; errors and systems outages are becoming increasingly unacceptable. Another important growth area will be LAN and inter-LAN-based monitoring and control.

3. Applications Development Tools

Applications development tools are used by system developers 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, CASE tools and other development productivity aids.

Data base management systems are considered systems software because they are normally used to develop applications programs. Though it is possible for individual users to develop personal productivity applications using products like dBase, this is not the general pattern with data base management systems, even on the PC. By contrast, spreadsheets—whether implemented on a mainframe or on a PC—are more typically used as personal productivity tools or planning and analysis tools than for developing "applications" as commonly defined.

User expenditures for application development tools are expected to grow from $7.2 billion in 1991 to $12.7 billion in 1996, a CAGR of 12%.

Applications development tools is the largest submode, accounting for 40% of total user expenditures on systems software products in 1991. Applications development backlogs, compounded by the need to maintain and re-engineer existing software products, are continuing to drive this market. Also driving this market is the increasing complexity of software product development requirements.

Growth will accelerate as standards such as AD/Cycle emerge. AD/Cycle will enhance growth of CASE, because at present, few truly integrated CASE solutions are available, and it is difficult to integrate various tools from different vendors. But AD/Cycle will not be a growth promoter until the 1994-1995 time period.

During the next several years users and vendors alike must sort out how all these various tools—relational, 3GL, 4GL, and traditional DBMSs, CASE, and object-oriented programming—will co-exist. A fundamental and primary education process is needed.

- INPUT is adjusting its DBMS forecast downwards again this year from a 14% to 12% five-year CAGR. INPUT forecasts that the DBMS market will grow from user expenditures of $3.4 billion in 1991 to $5.6 billion in 1996. Although short-term issues need to be resolved, INPUT nonetheless believes that the DBMS market will experience strong growth through the 1990s.

- CASE began to attract significant attention in the mid-1980s with the common use of personal computers and the development of powerful workstation technology. Since then it has developed into a $450 million market (1991). Growth is forecast at 22% CAGR to reach $1,260 million by 1996.

4. Forecast by Platform Size

Exhibit X-4 shows user expenditures for systems control products by platform size.

EXHIBIT X-4

Systems Software Products
User Expenditure Forecast by Platform Size, 1990-1996

Delivery Modes	1990 ($M)	1991 ($M)	1992 ($M)	1996 ($M)	CAGR 91-96 (%)
Systems Software Products	16,390	18,100	19,960	31,700	12
- Mainframe	7,800	8,400	9,140	13,350	10
- Minicomputer	5,460	6,000	6,520	9,500	10
- Workstation/PC	3,130	3,700	4,300	8,850	19

- Mainframe-based products will continue to dominate. Overall growth will be limited by low mainframe shipment rates. Nonetheless, this inhibiting effect will be countered by continuous price increases of existing software. The most extensive use of operations management software is in the mainframe sector.

- As corporations downsize their computer operations, more attention will be paid to systems software in all submodes for minicomputers.

- Workstation and PC-based systems software products growth will be healthy and reflects growth of more expensive operating systems including OS/2 and Microsoft's eventual NT operating system. It also reflects introduction of operations management tools for downsized and client/server computing, and the ongoing growth of applications development tools that reside on smaller platforms.

C
Leading Vendors

1. Competitive Environment

Large systems and software vendors will increase their market shares because they are the only ones that can drive standards. Other medium-sized and small companies must sooner or later follow.

As hardware sales continue their decline, equipment vendors will gradually transfer more attention to software.

The thousands of smaller systems software companies face the potential problem of undercapitalization, as they must not only constantly develop new products, but also incur additional ongoing expenses.

As is true in the applications software products industry, the trend towards standards and integration will continue to cause industrywide consolidation in systems software products. A number of significant acquisitions have taken place in the 1990-1991 timeframe. In fact, only about two dozen independent systems software product companies of significant size—$50 million or above—are left.

In response to market need, and most especially to sell more product and generate more revenues, the services portion of both systems and applications software companies will continue to expand. Systems and applications software vendors will increasingly become partners with systems integrators.

A decade ago, a software patent was almost unheard of. Now, as a result of the increasing competitiveness of the industry, thousands of programs are covered by patents or copyrights. All this is making small software companies nervous about new development projects, because they have don't know whether or not they're infringing on a pending patent. Among their concerns is that patents will be granted for computer interfaces—programs that link different computers or different programs to one another.

2. Market Shares

The top 20 systems software products vendors are shown in Exhibit X-5. Revenues for each company are developed from a combination of INPUT interviews and information from INPUT's vendor files. Revenues are noncaptive U.S. revenues only. IBM commands a 16% share.

EXHIBIT X-5

Systems Software Products
Leading Vendors' 1990 Market Shares

Vendor	1990 U.S. Revenue ($ Millions)	Market Share (Percent)
IBM	2,870	16
Digital Equip. Corp.	530	3
Computer Associates	470	3
Microsoft	415	2
Oracle	390	2
Novell	360	2
Hewlett-Packard	325	2
Unisys	200	1
BGS	150	1
Wang Laboratories	140	1
Adobe	140	1
Legent	115	1
Pansophic	110	1
SAS	105	1
Information Builders	97	1
Candle	95	1
Cadence	90	<1
Ingres	83	<1
Sterling	81	<1
Ashton-Tate	73	<1

Digital commands a strong and lasting presence in the midrange sector of systems software. The other three leaders weave a curious competitive trail of simultaneously competing against each other and working with each other. For example, the companies that Computer Associates is seeking to acquire are IBM business and development partners. Microsoft, on the other had, has publicly and strongly severed its previously close ties with IBM and will be competing directly against IBM in the systems software arena for workstations and personal computers.