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1991-1996

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1280 Villa Street, Mountain View, California 94041-1194 (415) 961-3300

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

Market Analysis Program (MAP)

U.S. Application Solutions Market, 1991-1996

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MAASP • 504 • 1991

Abstract

This annual report provides analysis and five-year forecast of the U.S. application solutions market for the period 1991-1996. The forecasts contained in this report divide the market into the applications software products and VAR/turnkey systems markets and their corresponding submodes.

The five-year forecast period, using the base year of 1990, covers 15 industry-specific and seven cross-industry sectors for each of the market segments. The report discusses issues and trends and provides recommendations on how vendors can take advantage of the forces driving these markets.

The report contains 152 pages and 74 exhibits.

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Exhibits

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Introduction

This report is part of a series of market analysis reports written each year by INPUT on the key segments (delivery modes) of the U.S. information services industry. The delivery modes analyzed during 1991 are as follows:

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

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

A

Purpose and Organization

1. Purpose

This report analyzes the application solutions market, which comprises the applications software products and turnkey systems delivery modes of the U.S. information services industry.

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

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- The report assesses trends and events within the U.S. economy, the U.S. information services industry, and the systems software delivery mode to provide the reader with a comprehensive foundation for understanding this market sector and for anticipating future directions.

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

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

2. Organization

This report is organized as described in Exhibit I-1. Each delivery mode report within the Market Analysis Program follows this format. The industry and cross-industry sector reports, described below, follow a very similar format.

This report is published in segments throughout the year to subscribers to INPUT's Market Analysis Program. Subscribers will receive the material as the research and analysis is completed, with the first chapters shipped in the second quarter. The forecast is shipped in the third quarter.

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EXHIBIT I-1

Market Reports Format

I. Introduction
- Introduction and definition of the delivery mode and its substructure or segments.

II. Executive Overview
- Synopsis of the entire report, written at the end of the year.

III. General Business Climate
- An overview of the business climate within the information services industry as a whole and the particular market segment of each report.

IV. Information Systems Environment
- The information systems environment and user perspective as it relates to the specific delivery mode or market.

V. Vendor Issues and Trends
- An assessment of the delivery mode from the vendor point of view.

VI. Information Services Market Forecast
- Presentation of the information services market forecast by delivery mode and submode.

VII. Competitive Environment
- Discussion of the competitive environment for information services within the delivery mode—with market share analysis and vendor profiles.

VIII. Conclusions and Recommendations
- Summary of risks and opportunities.

A. INPUT Definition of Terms
- Definitions and descriptions of market structure and terms used throughout INPUT's reports.

B. Forecast Data Base
- A detailed forecast by delivery mode, submode, and industry/cross-industry sector. Contains a reconciliation to the previous year's Appendix B.

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B

Scope and Methodology

1. Scope

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

a. Information Services Industry Structure

Exhibit I-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.

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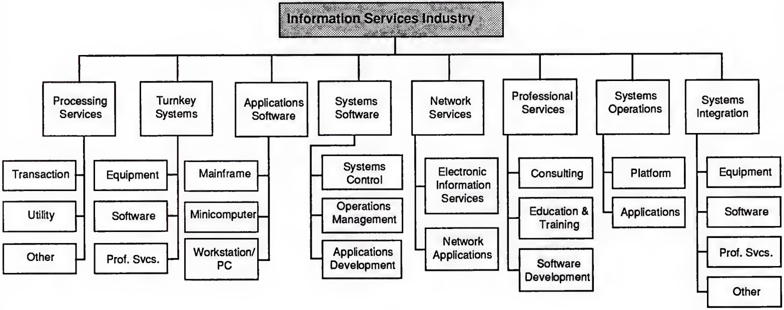
EXHIBIT I-2

Information Services Industry Structure—1991



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INPUT also publishes market sector reports analyzing 15 industry and 7 cross-industry market sectors. These reports, published annually by INPUT, analyze the information services opportunities in industry sectors such as insurance, transportation, and discrete manufacturing—and in cross-industry sectors such as accounting, human resources and office systems.

The relationship between delivery mode forecasts and market sector forecasts is shown in Exhibit I-3.

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

EXHIBIT I-3

Delivery Mode versus Market Sector Forecast Content

Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	Other
Processing Services	Transaction	X	X	
	Utility			X
	Other			X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform	X		
	Applications	X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications	X		
	Electronic Information Services	X		X
Systems Software Products				X

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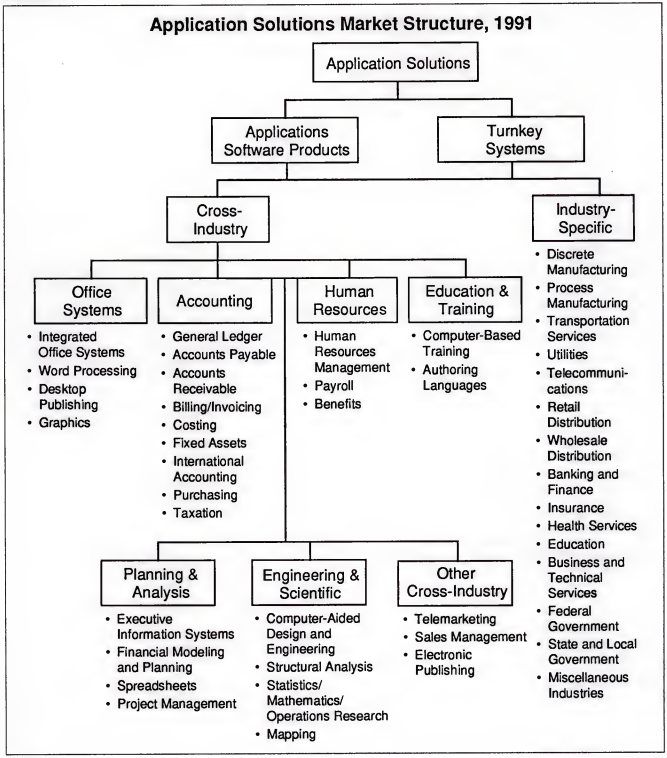
b. Delivery Mode Description

As shown in Exhibit I-4, application solutions is composed of the applications software products and turnkey systems delivery modes. Each delivery mode is analyzed by the cross-industry and industry-specific markets to which they are sold.

EXHIBIT I-4



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Application solutions are prepackaged or standard solutions to common business applications. These applications can be either industry-specific (e.g., a turnkey system for a law office) or cross-industry (e.g., human resources software). In general, application solutions services involve minimal customization by the vendor, and allow the user to handle a specific business application without having to develop or acquire a custom system or system resources. Exhibit I-4 is a diagram of the market structure for application solutions, including applications software products and turnkey systems.

Although application solutions include three delivery modes—applications software products, turnkey systems, and processing services—only the first two are included in this report. INPUT has combined these two delivery modes into one report this year because of their similarities and the trend towards unbundling turnkey systems so that hardware, applications software and services are sold separately. In this report, the term application solutions refers to applications software products and turnkey systems. Processing services is the subject of a separate INPUT Market Analysis Program report.

i. Applications Software Products

Applications software is packaged software purchased for in-house computer systems.

- Industry-specific applications software products perform functions related to fulfilling business or organizational needs unique to a specific vertical market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, and automobile dealer parts inventory.

- Cross-industry applications software products perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems.

User expenditure forecasts include lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the users' sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included.
Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

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User expenditures on applications software products purchased for resale by other delivery modes—namely, turnkey systems vendors and VARs (value-added resellers), and systems integrators—are excluded from applications software forecasts. However, where turnkey systems vendors have unbundled their products, and sell applications software separately from the hardware, the applications software expenditures are included in applications software forecasts. Applications software products sold through other channels, however, such as through computer retailers, are included in the user expenditure forecasts.

ii. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom applications software into a single system developed to meet a specific set of user requirements. The turnkey vendor adds value in software and support services, often providing the applications software and customizing services. Most CAD/CAM systems and many small business systems are turnkey systems.

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

The distinction between a turnkey system vendor and a value-added reseller (VAR) has become fuzzy, and the two terms are used interchangeably. IBM invented the term "value-added reseller" in the mid-1980s when it introduced its first workstation. It wanted to emphasize the value-added aspect of this distribution channel rather than sell its workstations through original equipment manufacturers (OEMs) who do bring to mind added value in the sense of customization and services.

Turnkey systems vendors/VARs may also provide systems integration, acquiring software products as well as equipment from other vendors.

As with applications software products, turnkey systems are divided into two categories—industry-specific systems and cross-industry systems.

2. Methodology

INPUT's methodology for market analysis and forecasting is summarized in Exhibit I-5. As in past years, INPUT has continued to survey information services vendors to determine their U.S. information services revenues, and to query information systems organizations about expenditures and outside services acquisition plans. INPUT interviewed vendors a second time to understand their views of market opportunities over the short and long terms.

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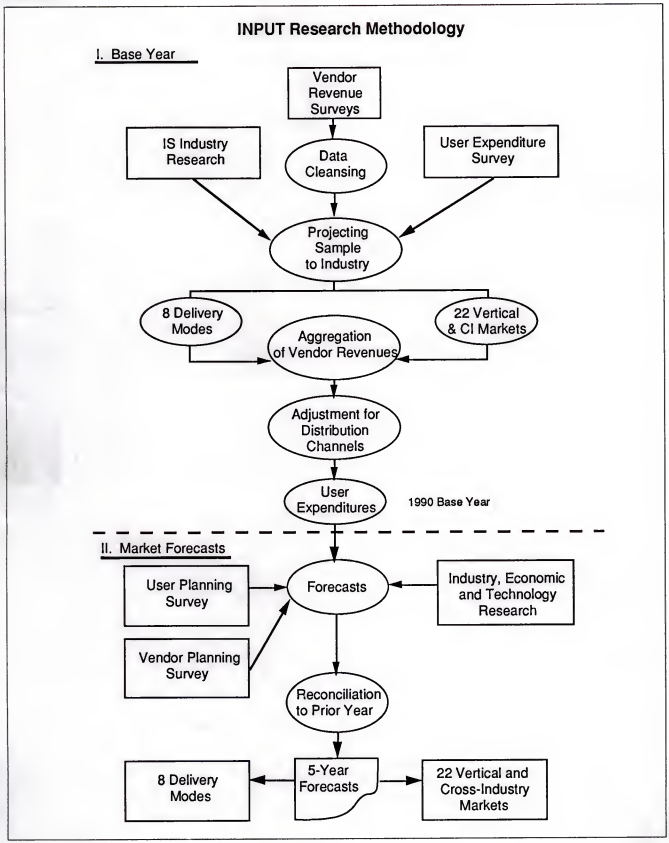
EXHIBIT I-5



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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. Estimates rely upon interviews, public data, and INPUT's own estimates.
- The initial data are 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.
- 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 according to the diagram in Exhibit I-3.

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. One may use these projections to track INPUT's forecasts from year to year.

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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 for the U.S. economy as a whole.

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

The 1991-1996 assumptions are contained in Chapter VI, Information Services Market Forecast.

D

Related Reports

Related reports of interest to the reader are:

1. U.S. Markets

- *U.S. Processing Services Market Analysis Report, 1991-1996*
- *U.S. Systems Software Products Market Analysis Report, 1991-1996*
- *U.S. Professional Services Market Analysis Report, 1991-1996*
- *U.S. Systems Integration Market Analysis Report, 1991-1996*
- *U.S. Systems Operations Market Analysis Report, 1991-1996*
- *U.S. Industry Sector Markets, 1991-1996* (15 reports on all major industry sectors—e.g., insurance)
- *U.S. Cross-Industry Sector Markets, 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.

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II

Executive Overview

The application solutions market is defined by INPUT as comprising two delivery modes: applications software products and turnkey systems.

In this Executive Overview, INPUT provides a summary of user issues and driving forces that will impact application solutions over the next five years, presents overall growth projections for applications software products and turnkey systems, and draws conclusions about this fast-moving portion of the information services industry.

A
User Issues

User issues are outlined in Exhibit II-1 and briefly described below.

EXHIBIT II-1

User Issues

- Large applications development efforts persist
- More functionality and features desired
- A variety of vendors preferred
- A variety of technology goals and approaches
- UNIX a low priority

Large applications development efforts persist in spite of widescale availability of packaged applications software products.

- Although ready-made products are plentiful, users continue to indicate that much software—be it cross-industry or industry-specific—is still not specific enough for their needs. The age-old dilemma for vendors is how to make their products industry- or corporate-specific enough so

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that users will purchase rather than develop, and at the same time create wide enough product appeal to stay in business. This may imply added interest in turnkey vendors and VARs who can add specific functionality, and serve a smaller, specialized market.

- At the same time, INPUT does detect a constantly—albeit slowly—increasing willingness to buy versus develop, and expects the shift to newer technologies (such as client/server) to increase this willingness.

Foremost in the minds of corporate IS managers are lowering costs and improving corporate productivity. In order to do this, they have among their top goals over the next several years the installation of new or updated applications software products.

In addition to specificity, users want software products that provide them with higher levels of automation in areas where they lack the in-house expertise to develop the applications software themselves. They also want products that operate on multiple platforms and that can be easily integrated.

Integration within a single vendor's applications software products, however, is not high on the priority list of vendor selection criteria. Nor is number of years in business. This implies that users want to be able to select applications software products from a variety of vendors and that being an established vendor is not necessarily a strong advantage in today's marketplace.

Other top technology goals are LAN implementation and integration, downsizing, and data accessibility. It is interesting to note that these goals in fact precede faster/easier applications development.

Even though integration and interoperability are among the top goals of IS managers, UNIX implementation is not universally perceived as the solution. In fact, in an INPUT survey, open systems/UNIX was mentioned as a technology goal by only 16% of respondents. This is not surprising, given the confusion surrounding the numerous "flavors" of the UNIX operating system. It is clear that UNIX is considered only one of several options for interoperability and "openness."

B
Driving Forces

INPUT has identified four key applications software products driving forces and five additional forces impacting turnkey systems/VARs, outlined in Exhibits II-2 and II-3 and discussed below.

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EXHIBIT II-2

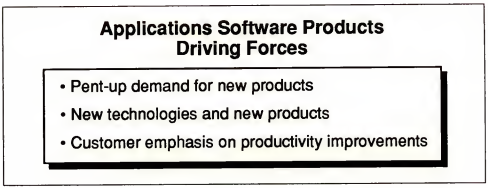
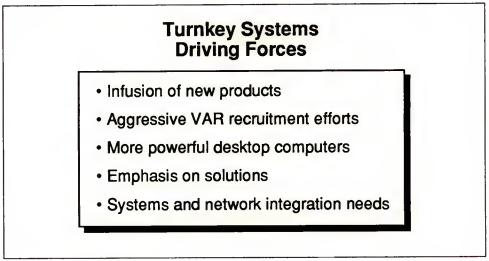


EXHIBIT II-3



A pent-up demand for new products and solutions will drive growth. Customers are asking for new solutions with better features and functionality. They are eager to purchase and are waiting for more product availability.

New technologies will spawn new applications software products, which will fuel user expenditures. New applications software products are beginning to appear, but will not be available in large enough quantities to impact the forecast until the last half of this forecast period.

Technologies impacting the outlook for applications software products expenditures include standards, downsized and client/server solutions, networking and integration, distributed data, and graphical user interfaces.

- Standards are progressing in hardware and systems software platforms that will have a splintering effect in the short term, causing vendor and user confusion. In the long term, standards will contribute to consolidation and growth.

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- IS organizations are beginning to offload their mainframes of applications as a means of reducing costs and enhancing applications accessibility. The concept of the mainframe as a data repository is gaining ground, as is the client/server concept. As downsized solutions become more widely available, they will be purchased.

- Because LAN integration is one of the most important objectives for IS managers, products and services that enhance integration of multivendor, multiplatform computing solutions will experience strong growth over the next several years.

- Vendors are scrambling to develop RDBMS-based products with which to compete in the 1990s marketplace. However, applications software products that are truly RDBMS-based are slow to hit the market.

- Use of graphical user interfaces (GUIs) is beginning to grow, at the expense of MS-DOS. GUIs will promote the use of applications software products by the general user base and allow for a form of integration and use of more applications per user. However, it will take time for GUIs to be understood, learned and broadly applied.

In the meantime, users are going ahead with selected applications software product purchases. Although demand for specific kinds of applications software products is weakening, the economic slowdown does not appear to have a negative impact on applications software products expenditures overall.

An infusion of new applications software products will fuel the VAR channel, especially during the last half of this forecast period. Both software and hardware vendors are launching aggressive VAR recruitment efforts. Faced with the complexities and time involved in engineering/re-engineering their own software products, turnkey vendors and VARs are likely to become more willing conduits for other vendors' applications software products rather than developing their own. They will add the necessary customization.

Because proprietary hardware platforms are no longer a value-add for turnkey vendors, and margins on standard platforms continue to decline, turnkey vendors and VARs continually seek the best hardware value through multiple sources and many are exiting the hardware business altogether.

Hardware vendors are launching new programs not only to gain back the VARs' allegiance, but also—importantly—to assist VARs in selling their new products. For example, Hewlett-Packard's Enterprise Computing Solutions program assists VARs and integrators in migrating mainframe customers to client/server computing schemes designed around its products and services.

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In addition to new opportunities created by new software and renewed emphasis on third-party channels, the ever-increasing power of workstations and personal computers continues to broaden the market for turnkey systems vendors and VARs. 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.

As more powerful computers become more affordable, smaller companies will automate previously manual functions—the kinds of functions that large companies have automated for years. For example, marketing and sales systems and human resources systems will gain wider appeal; they are becoming more cost effective for the smaller user.

VARs and turnkey vendors are able to capitalize on the continuing shift in emphasis away from providing technology to providing specific solutions to a problem; their forte is expertise in an industry-specific or cross-industry sector, and their customer base is predominantly smaller companies.

VARs and turnkey vendors will continue to provide more service content to their offerings as the demand for increasingly sophisticated software creates a need for services in the form of customization, training and support. More systems integration and consulting work will also be part of VAR/turnkey vendors' service offerings in response to the need to link disparate, enterprise-wide systems.

A window of opportunity exists for turnkey systems vendors and VARs in systems integration. UNIX systems integration and custom consulting will be a big business as users grapple with the issues surrounding implementation of enterprise-wide solutions and standards such as UNIX networking design, implementation and management.

C
User Expenditures

User expenditures for applications software products are forecast to grow at 14% compounded annually over the next five years, reaching $38 billion by 1996, as shown in Exhibit II-4. The annual growth rate will gradually increase from 13% in 1992 to 15% by 1996 as new applications software products are introduced.

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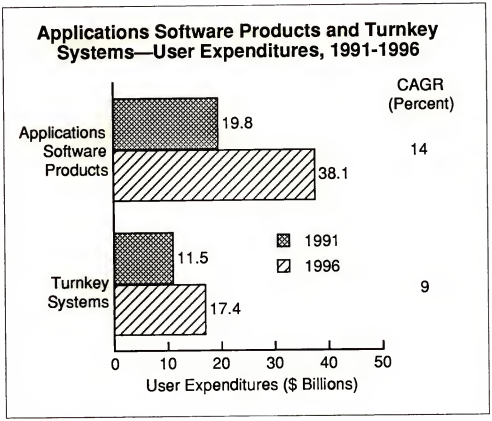
EXHIBIT II-4



User expenditures on turnkey systems are somewhat lower. The turnkey systems/VAR market is forecast to reach $17.4 billion by 1996. The CAGR will be 9% for the 1991-1996 period. With standardization under way in not only software but also hardware, turnkey vendors will no longer be able to capitalize on the added value of their proprietary systems. In addition, a weak economy, continuing declines in hardware margins, and competition from alternative channels such as systems integrators will keep growth of user expenditures on turnkey systems at a modest rate over the next five years (Exhibit II-4).

In either case—whether for applications software products or a turnkey system—sales decisions are taking longer as users evaluate their options. Due to the plethora of new hardware platforms, operating systems, client/server versions, and software frameworks available, user confusion will prevail over the forecast period.

Even so, customers are asking for new solutions and are eager to purchase. They are going ahead with selected applications software product and system purchases and are beginning to use the services of systems integrators to develop customized client/server and UNIX application solutions.

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As markets for "traditional" applications software products and turnkey systems mature, customers have more specific wants and a better understanding of what they need. Therefore today—compared to the 1980s—customers rather than vendors are setting the buying criteria. Vendors will have to listen in order to succeed.

D
Vendor Competition

About 20,000 vendors (only including vendors with revenues over $100,000) vie for a piece of the $31.3 billion applications software products and turnkey systems market. This means that the majority of them are very small—less than $1.5 million in revenues, on average. In fact, only eight vendors had revenues from U.S. applications software products exceeding $90 million in 1990, and only seven vendors had revenues exceeding $100 million from U.S. turnkey systems sales.

The ten largest applications software products vendors and turnkey systems vendors are listed in Exhibit II-5.

EXHIBIT II-5

Leading Vendors

Applications Software Products
- IBM
- Lotus Development Corp.
- Microsoft
- Dun & Bradstreet Software
- WordPerfect

Turnkey Systems
- Intergraph
- Reynolds and Reynolds
- Mentor Graphics
- Schlumberger
- ASK Computer Systems

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Of the top five applications software products vendors, IBM is the only systems vendor. IBM's stated goal is to obtain 50% of its revenues from selling software and services by the year 2000. Software and services contributed $23 billion of IBM's $69 billion in 1990 worldwide revenues. Software revenues grew from 10% of sales in 1986 to 14% last year. We can expect hardware vendors' market share of applications software products to increase during the 1990s.

Lotus, Microsoft and WordPerfect vie for PC-based applications software product market share; Dun & Bradstreet is the only mainframe-based independent software vendor on this list. D&B Software is transferring its entire series of product lines to a common client/server base.

The largest turnkey systems vendors play a strong role in one or more vertical sectors and have, for the most part, been in existence for many years. 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.

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. Opportunities exist for new market entrants where large U.S. vendors and VARs may not be able to transition quickly.

E
Conclusions and Recommendations

During the last five years (1985-1990), user expenditures for applications software products grew at a rate of 20% compounded annually. User expenditures for turnkey systems grew at a CAGR of 11% from 1985-1990. Over the next five years, however, growth rates for both of these delivery modes will decline.

The slower growth rates are due in large part to maturity of more traditional products—much of what was previously done manually has already been automated—and to the transition under way to new kinds of applications software products that provide better and faster automation at less cost.

In the meantime, customers have become more knowledgeable about their needs and they have at least one generation of applications software products under their belts. They are now in a position to tell vendors what they want, rather than simply taking what vendors give them. Over

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time—as standards progress—they will also have many more products from which to choose. Thus, continued allegiance to vendors is not a certainty.

Vendors will have to work harder to make a sale. Vendors are under pressure not only to have better products, but also to be better sales professionals. They will have to listen carefully to the needs of their customers and be solutions oriented rather than technology oriented. In order to meet these demands, provision of high-quality education, service, and support—or aligning with a company that can provide these—is critical to success.

Given the trend towards applications downsizing and mounting interest in integration, vendors in the 1990s will be selling to a diverse customer set, including various departmental managers as well as centralized IS managers. Vendors must therefore be able to sell to a variety of customers at the tactical and strategic levels.

As the ultimate corporate IS goal is enterprise-wide computing, any given vendor must provide a united front and be able to meet multiple needs within a corporation. In order to do this, a large vendor may need to form alliances with firms that have expertise it lacks. Alliances are as important, if not more so, for the success of smaller niche vendors that may lack the marketing abilities to go it alone.

In order to support a multivendor and multiplatform strategy, turnkey vendors must either diminish reliance on hardware or support a broad range of hardware platforms. Vendors are under more pressure to open up their systems. Customers may still want a turnkey solution, but don't want to feel trapped. As platforms become more of a commodity, this will become easier to do.

Vendors must re-orient their marketing and sales efforts to reflect not only the realities of a more sophisticated customer, but also the realities of new technology and pricing strategies. In this regard, the provision of a clear, easy-to-follow product migration path is essential. As new technology-based products are introduced, users need to be able to migrate to them at their own pace, adopting what they choose while maintaining current solutions, if that makes sense to them. There will be many more variations on this theme in the marketplace than before.

These overall recommendations are outlined in Exhibit II-6.

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EXHIBIT II-6

Conclusions and Recommendations

- Conclusions
  - Slower growth rates
  - Customer is a more informed buyer
- Recommendations
  - Sell to a variety of audiences
  - Alliances
  - Multiplatform
  - Clear product migration strategy

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III

General Business Climate

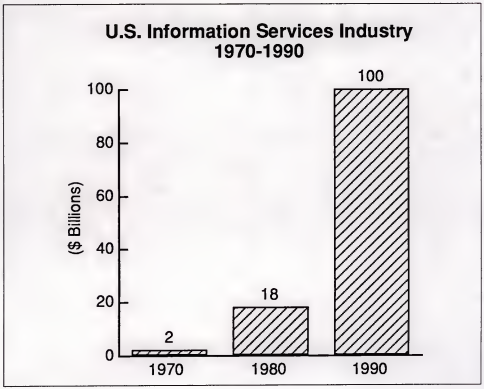
In this chapter INPUT provides an overview of the current business climate for the U.S. information services industry and for the applications software products and turnkey systems delivery modes.

A

1990 Results

In 1990, the U.S. information services industry reached a milestone, ending the decade at about $100 billion in size. As Exhibit III-1 shows, the industry increased in size over five times during 1980s and is 50 times larger than it was in 1970, when the industry represented $2 billion in user expenditures.

EXHIBIT III-1



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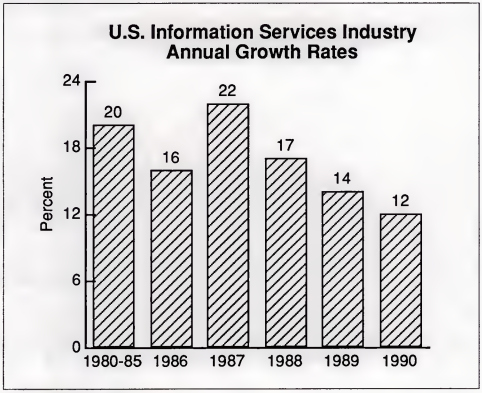
During 1990, the industry grew at just under a 12%—from about $90 billion to $100 billion. As Exhibit III-2 indicates, 1990 reflects an intensification of a decline that started in 1989. The average annual growth during the first eight years of the decade was over 19%.

Worldwide, the industry continues to experience greater growth rates of close to 20%, and many U.S. vendors are experiencing growth that exceeds that of the U.S. industry as a whole. This growth is primarily due to international sales, but is also due to the focus on specific industry markets. Inflation rates and somewhat stronger economies are driving the industry to higher growth levels overseas.

EXHIBIT III-2



On a delivery mode basis:

- The smaller systems integration, systems operations, and network services delivery modes are growing faster than the rest of the industry.
- The software products sectors grew at or slightly above the industry average.
- The larger professional services and processing services sectors, as well as the smaller turnkey systems sector, are growing slower than the industry average. User expenditure on turnkey systems was 9% higher in 1990 than in 1989.

Exhibit III-3 summarizes 1990 results.

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EXHIBIT III-3

U.S. Information Services Industry 1990 Results Summary

- Reached the $100 billion milestone
- Growth 2 to 3 times the economy continues
- Growth slowed in 1990 relative to 1989
- Economy causes confusion

Overall expenditures on applications software products was up only 12% in 1990 and is forecast to grow at a CAGR in the mid-teens over the next five years. This growth compares to a 23% CAGR for the previous five-year period.

Expenditure on turnkey systems was 9% higher in 1990 than in 1989 and will maintain a modest growth rate through 1996. Although turnkey systems once accounted for over half of total user expenditures for these two delivery modes, turnkey systems' share had declined to 37% by 1989. The two key reasons for turnkey systems' decline are decreasing hardware prices and the exit of turnkey vendors from the hardware business altogether as they become vendors of applications software only.

B

Driving Forces

There are a number of fundamental forces impacting the information services industry in the 1991-1992 timeframe that will have measurable impact on the overall growth rate for the 1991-1996 five-year period covered by this market analysis report. Each force will affect the industry as a whole, as well as each of the eight delivery mode sectors used by INPUT to analyze the industry and its key trends.

Exhibit III-4 identifies six primary driving forces impacting the U.S. information services industry. The impacts are multidimensional, fundamental, and long lasting. Each is discussed in this chapter and throughout this report.

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EXHIBIT III-4

Information Services Industry
Primary Driving Forces, 1991-1996

- The economy
- Globalization
- Influence of large vendors
- Outsourcing (buy versus make)
- Shifting technology foundation
- The changing buyer

C

Key Trends

1. Economic Impacts

The economy, as well as the overall size of the information services industry, is a significant factor in the user expenditure level for information services and software products.

- The inflation rate of the past few years has been much more modest than in the mid-1980s. INPUT forecasts and market sizes are in current dollars—thus lower inflation means lower growth.
- Real economic growth had been modest over the past few years prior to the recession that started in late 1990. Deferred and canceled expansion plans in all industry sectors certainly slow the expansion of information services expenditures.
- The shift of information processing to smaller computers lowers the software products investment, based on current pricing practices. Quantities of software products sold increase, but revenue levels grow at more modest rates.

In 1990, a year with little to no real growth in the overall economy and inflationary growth of about 5%, the information services industry grew 12%.

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- INPUT's 1990 and 1991 economic assumptions were for nominal GNP growth of 5.4%; real GNP growth was 1% or less.

- At this point in 1991 (the second quarter), the economy remains in no-growth status, with some improvement expected by late in the year. At the same time, inflationary pressures are modest. INPUT expects another modest growth year in 1991 and again in 1992. The expected slow upturn will have the following positive and negative impacts on the U.S. information services industry in the near term:

- Positive impacts include:

  - Increased motivation to buy rather than make, in particular for larger systems requirements. Response time and impact on business operations are the key criteria.

  - The interest in systems operations, which permits organizations to redeploy capital investments and lower direct headcount, is being reinforced.

  - A tight economy is helping develop interest in lower-cost solutions that come from client/server-based applications software products.

- Negative impacts include:

  - Decision processes are lengthened in a tight economy, causing deferral of major information systems projects.

  - With tight information systems budgets, the internal information systems staff can be favored over contracted professional services vendors, thus negatively impacting a major segment of the industry.

Applications software products markets have felt few if any of the effects of a slowed economy. 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 possibilities for additional external purchases of applications software products. Applications software and turnkey solutions become excellent alternatives when response time is reduced and internal resources are constrained.

Turnkey systems vendors, however, are experiencing moderately adverse effects from the slowdown in the economy.

- Hardware purchases are put on hold—and hardware is a key ingredient of the turnkey solution.

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- Turnkey vendors who sell to manufacturing vertical markets are feeling a negative impact as capital expenditures are delayed. Because spending on turnkey systems by the manufacturing sectors—principally CAD/CAM products and resource planning—accounts for a relatively large percentage of total expenditures on turnkey systems (36%), whatever impacts the manufacturing sector's health also affects turnkey systems user expenditures.

- VARs and turnkey vendors that sell predominantly to small companies—such as the many VARs that sell to business services firms—will experience the adverse effects of an economic downturn, as smaller firms are the first to cut back on capital expenditures.

Turnkey and VAR service contracts and support services, however, have not been negatively impacted by a slowed economy. In fact, this portion of their business is expanding as customers look for ways to leverage the products they already have.

2. Globalization

INPUT has cited globalization as a driving force for the past three years. During that time markets have opened, vendors have expanded their international focus, and users have begun to expect global capabilities.

- The European market is making progress toward a single market. Now 1992 is less than a year away and many changes are apparent. In addition, the European market is stronger than the U.S. market, although both are suffering in the current economy.

- The worldwide orientation of the larger services vendors is verified by the investments in Europe by Computer Sciences Corporation and Digital Equipment and by the ever-expanding interest of Japanese vendors in the U.S. information services industry.

The following are notable examples of software firms' expanding their presence in international markets:

- Computer Associates' net income from foreign operations was 28% of its total net income for 1990.

- Microsoft's international sales were 55% of total fiscal 1990 revenues.

- Oracle's international sales are 49% of total revenues.

The primary positive impact of globalization is the ability of larger vendors to balance their businesses in multiple markets with less impact from market downturns.

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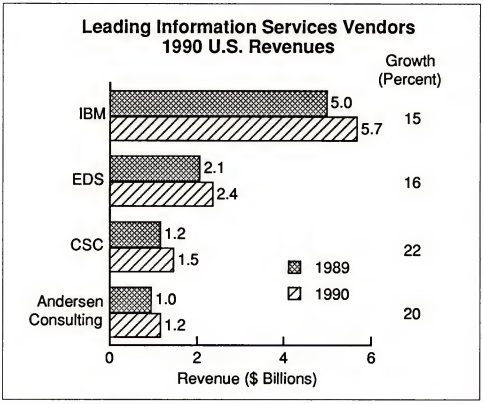
The primary negative impact from globalization is that it may make it harder for smaller vendors to grow and/or maintain independence.

3. Influence of Large Vendors

The influence of the larger information services vendors has increased significantly over the past few years.

- The newer systems integration and systems operations sectors, though smaller than more traditional sectors such as professional services and processing services, are growing faster than the traditional sectors and are dominated by the leading vendors.
- A number of larger vendors are growing faster than the overall market. Exhibit III-5 lists four of the largest information services vendors that can be considered multi- or full-service vendors and reveals their U.S. 1989 and 1990 information services revenues. All four increased information services revenues by at least 15%, greater than industry growth as a whole.

EXHIBIT III-5



- Certainly there are numerous smaller firms that are also growing faster than the general market, but overall, the dominance of the larger vendors is increasing.

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Size is becoming more important, as a predictor of survival and of the level of support an applications software products or turnkey systems vendor can deliver to its customers.

Although there are few barriers to entry in the software arena, it is questionable whether a small software company or VAR can remain viable without alliances. VARs and the smaller turnkey systems vendors are at a disadvantage in terms of geographic reach. They may have the best software for a specialized niche, but no way to expand their customer base; marketing alliances are a key requirement for growth.

Small companies can no longer expect to survive on their own in the long term. Such companies need a broader distribution reach, and the advertising, marketing and public relations that only a larger buyer can provide. Size alone provides far greater benefits to the business side of a software operation than it does to product idea generation.

The large-vendor influence is increasing in other ways as well.

- Starting with IBM, many large services vendors are making minority and majority investments to gain influence on technology, access to software products for remarketing, and market share.

- DEC's investment in Kienzle in Europe and EDS's investment in ASK Computer Systems are two examples of large vendors' seeking new channels and resources.

- As hardware profits decline, large hardware vendors are reorganizing in order to be more responsive to growing markets for software and services. DEC, for example, created its Software Products Group last year; and Sun has reorganized to create two software subsidiaries—one to develop more software and peripheral products and one to improve the UNIX operating system. IBM has also recently reorganized in order to increase its software and services business.

- Consolidation is also a factor. Mergers among the major accounting firms have reduced the number of players, but have given two of the firms (Ernst & Young and Deloitte Touche) added resources to follow the example of Andersen Consulting. A third—Price Waterhouse—is also experiencing significant growth in its information technology-based business.

- Applications software vendors will continue to consolidate as more emphasis is placed on integration and interoperability. Applications software products firms are not only acquiring each other, but they are also acquiring firms that have new technology bases—such as transaction processing data bases and client/server CASE tools—of paramount importance to the growing need to develop better applications software products based on these new technologies.

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The increasing use of business consulting linked to professional services has provided a means for the large accounting and consulting firms, as well as some large information services and software firms, to gain a greater share of the industry. INPUT expects this trend to continue over the next few years. The opportunity for the smaller, more specialized software product or services vendors is not disappearing, but it is changing character.

- Alliances with larger vendors will be essential, at least as secondary sales and support channels.

- Specialization—in terms of the technology used or the industry served or both—will become more important and common.

This bodes well for turnkey systems vendors and VARs whose added expertise in vertical niches is the basis of their success. It also bodes well for continued growth in industry-specific applications software products. Provision of tools for easy customization and integration will become increasingly important to success for vendors with cross-industry applications software products.

The continuing increase in the strength and impact of the larger vendors will have the following positive and negative impacts:

- Positive impacts include:

  - The larger vendors have the financial strength to minimize the risk of systems management services.

  - The larger vendors have financial resources available to invest in new technologies, often through investment in smaller and specialized firms.

  - A common set(s) of standards are more likely—IBM's SAA and DEC's NAS for example—which will cause conformity in the marketplace, more consolidation, eventual interoperability, and portability.

- Negative impacts include:

  - Alliances may become a requirement for smaller technology firms to survive and prosper.

  - The dominance of the larger vendors will continue to grow.

  - Larger vendors tend to move more slowly, which will hamper development and acceptance of new technology. This slowness will provide opportunity to small vendors that seize technology initiative.

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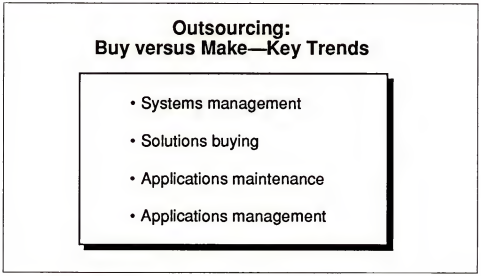
4. Outsourcing (Buy versus Make)

Since its inception, the information services industry (services and software products) has tended to outgrow the internal information services budget by continuously creating new products and services that permit the information systems function to outsource (buy versus make). This has always been an outsourcing industry. And though growth has slowed, a number of factors will permit continued growth that exceeds growth in the economy, the computer hardware sector, and the internal information systems budget.

Key trends in outsourcing are listed in Exhibit III-6.

EXHIBIT III-6



a. Systems Management

Outsourcing the management of information systems or at least significant elements of information systems continued to gain momentum during 1990. Helped more than hindered by the recessionary economy, the inclination of the general management of large organizations to consider outsourcing increased.

The ability to transfer much of the financial risk and, perhaps more importantly, the technological risk of a project or operations to a specialist has numerous attractions for general management.

- The attraction that will become more and more important will be the ability to disconnect the information technology part of the solution from the business decision. General management is concerned with business results, and does not want to debate the pros and cons of a technology. The appeal of the vendor's offer to take on risk either in a project (systems integration) or in operations (system operations) can only grow during the 1990s.

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- The nature of most outsourcing activities within larger organizations often makes them favor the large vendors, adding impetus to the trend described above. If there is major risk involved, the buyer will bet on the company most able to accept risk and take responsibility.

- Perhaps the most important attraction is the ability of buyers to gain access to a broad information technology on an arm's-length business basis in a single decision.

  - The systems integration vendor can provide all the needed expertise in a new technology at the beginning of a project. There is no internal training lag time while the information systems staff gains the knowledge and experience required.

  - The systems operations vendor can provide a full utility-based service at a predictable cost over a number of years. This should make for fewer surprises from the overall information systems program.

b. Solutions Buying

Buying applications software is a well-established practice in the U.S. market where the use of packaged software is commonplace. However, the current change in the way U.S. organizations are managed and the availability of low-cost, high-performance client/server computing is bringing new impetus to the application solutions market.

- The fundamental decentralization of U.S. business management with the corresponding reduction of corporate staffs is creating a major requirement for business unit (distributed) application systems. Furthermore, the buyer is not an information systems professional and is willing to outsource (buy) with some customization.

- Just when the smaller business unit needs independent application solutions, there is a hardware revolution to support the need. Client/server technology provides affordable, high-powered computing.

The ability to find a VAR that can provide a package plus customized systems on client/server-based software is bringing the solution value of systems integration to the decentralized business unit.

c. Applications Maintenance and Applications Management

In line with the shift to outsourcing systems management to systems integrators and systems operations firms, the buyer is also seeking to gain more-defined relationships with more-traditional professional services vendors. Instead of contracting for temporary personnel, the buyer is beginning to contract for services like applications maintenance and applications management.

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- Applications maintenance is contracted, 24-hour support of existing applications systems. The vendor provides a set level of services and interacts directly with the end user.

- Applications management is contracted management of development and maintenance of a set of applications. The vendor provides the software and all of the expertise and staff to assure that the application is successfully used over an extended period. Applications software products firms can become applications management vendors for their clients or let some other vendor do it.

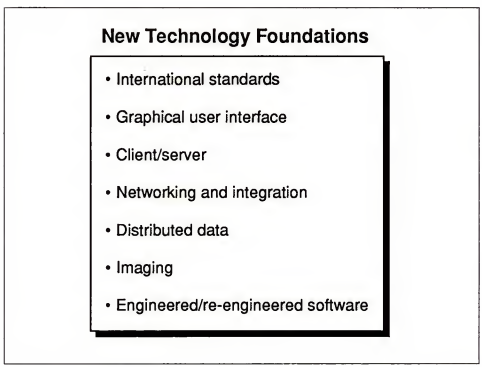
The trend towards outsourcing is creating new demand for the provision of additional services by applications software firms and turnkey systems vendors. Customers are beginning to want to pay vendors to maintain their software rather than hire their own people to do it. Increasing need for customization and integration is also creating new demand for outsourced services.

5. Shifting Technology Foundation

Significant new technologies became available in the late 1980s and are gaining momentum in the 1990s. An underlying characteristic of much of this new technology is a shift in the technological foundation. Many elements of technology are shifting to new foundations.

Exhibit III-7 lists the key elements of this shift in underlying technology.

EXHIBIT III-7



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Each element is causing organizations to stop and rethink key aspects of their information systems infrastructure strategy. Rethinking can slow the adoption in the short term, and create new vendor opportunities over the longer term.

All of these new technologies and foundations cause confusion in the industry and with the buyer. Confusion slows buyers' and vendors' decision making. Strategies need to be revised and investment plans shifted, and education is required.

- Standards are driving every major computer manufacturer and software products developer to revise strategies and change product development plans. New products are delayed and then require longer initial sales introductions.

- The user interface of the personal computer in its graphical pull-down menu and windowing form will be the only interface acceptable to users from now on. The text-based interfaces of the 1970s and 1980s will no longer be tolerated. Every major software product developer is re-engineering the user interfaces to its products. The widespread availability of easy-to-use graphical user interfaces will promote the use of application solutions by the general user, and allow for use of more application solutions per user.

- Downsizing, the common term for moving an application to a client/server-based installation, will be the greatest phenomenon of the early 1990s. Whether or not the installation is actually downsized, it will be moved to a new processing location and take on new characteristics. Major reengineering of internal systems by the information systems function and a shift to buying server-based application products is underway. All of the impacts are not known. One, software products pricing based on the size of the platform, will have to change. Certainly some confusion exists and is impacting buying decisions.

- The growing use of PCs, workstations, and LANs has mandated a move to integrate the information networks of large and small organizations. Today's networking products permit the distributed applications that have been discussed for years but were never possible.

- The way data is stored and turned into information has been fairly constant since the creation of the first hierarchical DBMS in the early 1970s. For almost 15 years the challenge was to build data bases, not consider building them with new types of components. The shift started with commercial use of relational DBMSs, but it is the distributed DBMS, and perhaps more importantly image processing, that will cause major reengineering of the data base architectures of larger organizations. Major new investment is required and of necessity will come over time.

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- Applications software vendors are scrambling to develop RDBMS-based products to compete in the 1990s marketplace. Oracle launched this trend with its financial applications software products. Vendors are writing products using general SQL tools and are teaming with RDBMS companies such as Ingres, Sybase, and Gupta as well as Oracle to make their application solutions available across a range of RDBMSs and hardware platforms.

- The age of truly engineered and re-engineered software through CASE technology is dawning. In five years the approach to maintenance will have finally changed and there will have been major advances in programmer productivity.

The positive and negative impacts of the shift in technological foundation are listed below. Certainly over the five-year period of this forecast the positives greatly offset the negatives.

- Positive impacts from this shifting technology foundation include:

  - New types of solutions will become available.

  - The role of the end user in information systems can continue to expand.

  - Opportunities for new as well as existing vendors are created.

  - Application systems can be increasingly molded to the character of the organizations they support.

- Negative impacts are:

  - Any shift causes confusion and hesitation in the near term. The magnitude of the current technology shift could cause confusion and slow investment through the middle of the decade.

  - The size of the task to shift to client/server technology in organizations with large centralized systems causes conflicting priorities between reengineering and meeting new requirements.

  - The technology shift now in process is creating a significant additional training and education requirement.

  - Growth is slowed while the new technology is understood and learned.

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6. The Changing Buyer

The decision maker for the purchase of information services remained relatively constant until the late 1980s. The information systems executive and key staff (systems development and data center operations managers) decided when to go outside and who to contract with.

This leadership has changed significantly in the past few years and promises to change even further. As integration becomes increasingly important, the decision to purchase any given applications software product will involve multiple departments/divisions and multiple levels of an organization. As the information services vendor moves to provide a full long-term service or a full solution, the general manager is becoming the buyer. The impacts are significant.

- Technology becomes less important and the business or operational impact becomes more important.
- The impact of the information systems function becomes more consultative and less direct.
- The ability to try new ideas and approaches is increased.
- The time to completion is controlled by the organization's ability to afford, not the ability of information systems to develop.

D Summary

The year 1991 is exhibiting significant changes from the 1980s. The changes suggest more modest, but continued strong and stable, growth for the information services industry.

- An economy that does not shift quickly helps management make longer term decisions, albeit at a slower pace.
- A market of $100 billion that is strongly impacted by the direction of the larger vendors should be expected to grow somewhat slower.
- The increasing tendency of larger organizations to turn to vendors for services that include real and significant elements of systems management and have a solutions orientation will lead to larger, longer term decisions—decisions that can take longer but have a lasting impact.
- The shift in the underlying technology foundation is for the better—more valuable and productive applications solutions will result. But shifts bring re-engineering, reinvestment, and retraining—and require time and money.

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- The role of the general manager concerning the deployment of information technology continues to increase. In many instances the general manager is more influential than the information systems manager, particularly regarding major decisions. Over time the general manager's influence will have positive impacts on the size and growth of the information services industry—as long as the vendors provide satisfaction.

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Information Systems Environment

In order to better understand what was most on the minds of IS managers regarding applications software products, INPUT surveyed top computer executives in medium- to large-sized corporations. INPUT also conducted a series of telephone interviews with the respondents to obtain additional information about and clarification of some of the points in the written questionnaire.

The purpose of the questionnaire was to probe managers about specific areas of applications software products such as their purchase plans, customization and product and vendor preferences and their key technology goals. INPUT was therefore able to test its previous conclusions about the marketplace as well as to obtain additional insights.

Individuals completing the questionnaire were predominantly MIS directors, systems development and programming managers. The survey document itself is Appendix C of this report.

The views of 56 IS managers are tabulated and the results analyzed. Although large development budgets persist, spending on packaged applications software products is healthy. Cross-industry products and products with little or no need for customization are generally preferred.

A

Demographics

Exhibits IV-1 and IV-2 show the distribution by vertical sector and revenues of the corporations that participated in the survey.

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EXHIBIT IV-1

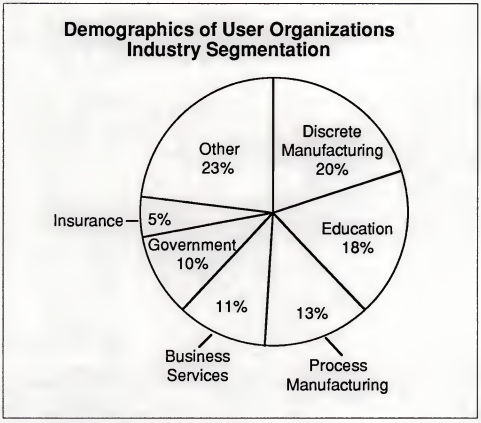
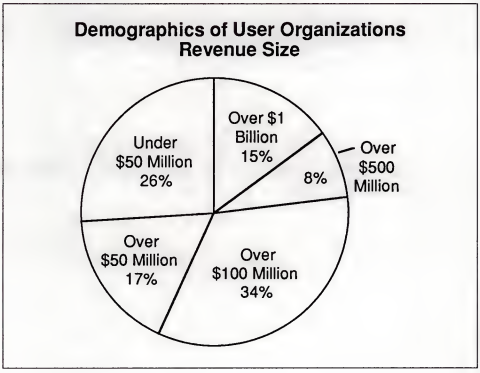


EXHIBIT IV-2



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- The mail survey included all industry segments. Industries with the greatest representation are: discrete manufacturing (20%), education (18%), and process manufacturing (13%). The largest sectors within the "Other" category—each consisting of about 5% of the survey sample—are transportation, retail distribution and banking and finance.

- 15% of respondents have revenues over $1 billion; about 35% of the companies have revenues between $100 million and $500 million; and 26% are under $50 million in revenues.

Although the sample represents a cross-section of vertical markets and company sizes, the survey results have been analyzed in total rather than by industry sectors or size groupings.

B

Applications Software Products Purchase Plans

Respondents were asked questions about overall budget size, cross-industry and industry-specific product spending, spending by platform size, and spending for new versus existing applications software products.

1. Budget Size

Exhibit IV-3 shows the distribution of applications software products budgets.

EXHIBIT IV-3

Applications Software Products Budget

Budget Size	Percent of Respondents
Over $1 million	2
Over $500,000	6
Over $250,000	13
Over $100,000	27
Under $100,000	52

- On average, the applications software products budget for 1991 is $291,000.

- The average budget will grow to $360,000 in 1992, a healthy 24% increase.

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- The expenditure growth from 1991 to 1992 is higher than INPUT expected. A weak economy does not appear to have a negative impact on applications software products expenditures for this survey sample. In fact, when questioned further, respondents indicated the selective installation of new applications software products—including downsized solutions—is viewed as a means of minimizing corporate costs and improving productivity. Corporate restructuring through downsizing or acquisition also creates a need for new application solutions. Thus an economic slowdown enhances rather than inhibits applications software expenditures.

- Respondents were asked to indicate whether or not these amounts encompass all applications software packages purchased or licensed for their entire organization. If not, they were asked what percentage of total purchases they estimated the amounts to be. Respondents indicated that the figures given were about 70% - 80% of the total for their entire organization. The actual average budget for 1991 could therefore conceivably be in the $350,000-$400,000 range, growing to $430,000 t0 $500,000 in 1992.

2. Cross-industry versus Industry-specific

Respondents were asked to estimate the percent of budget spent on cross-industry and industry-specific applications software products. To assure accurate responses, INPUT's definitions of cross-industry and industry-specific applications software products were included in the questionnaire as follows:

- Cross Industry—Software products that perform a specific function appicable to a wide range of industry sectors. Examples are accounting, financial modeling, human resources, payroll, word processing, spreadsheets.

- Industry-Specific—Software products that perform functions related to solving needs unique to a specific vertical industry and sold to that industry only. Examples are portfolio management, MRPII, and medical record keeping.

- Data base management systems (DBMSs), graphical user interfaces such as Windows, and applications development tools, including CASE tools, are not considered applications software. Also excluded are processing services and network services.

Exhibit IV-4 shows the respondents' average 1991 and 1992 budgets, broken out by these two categories.

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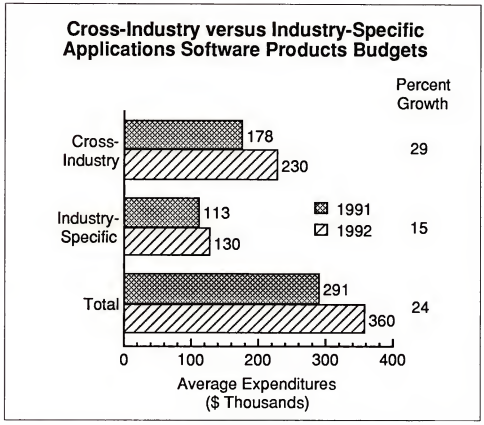
EXHIBIT IV-4



- Expenditures on cross-industry software not only represent a much higher percent of the budget; growth for 1992 is twice as high as for industry-specific software.

- Respondents with small or no industry-specific purchases had these comments:

  - They do not want to be locked into a specific solution they will have for years and are particularly reluctant to purchase industry-specific solutions, due to all the change underway in ther industry as well as in the computer hardware and software industries.

  - Their needs are too specialized for industry-specific software and therefore favor they in-house development.

  - They want control over their software and want to be sure it can interoperate with what is already installed.

  - The applications software selection for their type of hardware is meager.

  - Too much customization would be required, which makes the software hard to maintain.

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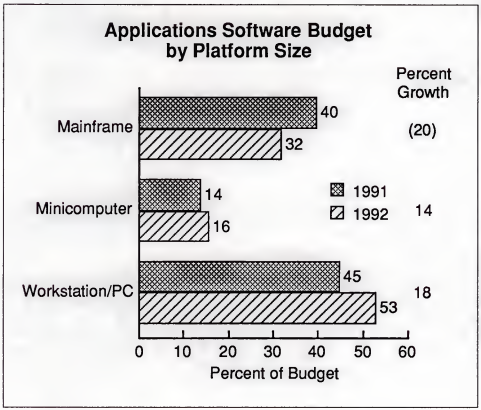
3. Expenditures by Platform Size

Respondents were asked to estimate the revenue percent split by platform size.

- As shown in Exhibit IV-5, expenditure for applications software products that run on workstations and personal computers represents the largest proportion (45%) and is growing the fastest (18%).

EXHIBIT IV-5



- Expenditures on mainframe-based applications software, on the other hand, are declining as a percentage of the whole.

- Expenditure on minicomputer-based products represents the smallest proportion of the budget (14%), but this proportion will increase in 1992.

Respondents were then asked if the budget split by platform size is different for cross-industry and industry-specific applications software. Thirty-three percent indicated that the split was different, as shown in Exhibit IV-6.

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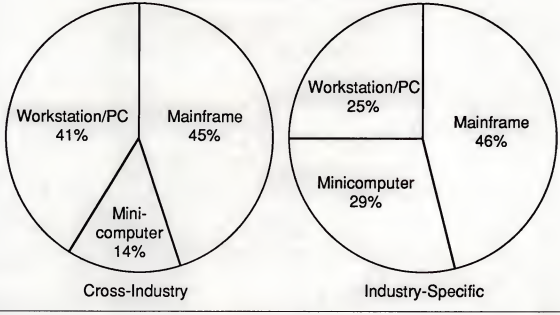
EXHIBIT IV-6

1991 Applications Software Budget by Cross-Industry/Industry-Specific and Platform Size (33% of Respondents)



- For 33% of respondents, more is spent on cross-industry software for workstations and personal computers; and more is spent on industry-specific software for minicomputers.

  Adding the responses of the 33% that said more is spent on cross-industry software for workstations/PCs (Exhibit IV-6) to the 67% that did not notice any distinctions by platform size (Exhibit IV-5) reveals the following (Exhibit IV-7):

- For the survey sample as a whole, the only real distinction is that more industry-specific software is purchased for minicomputers; expenditures are 50% higher for minicomputer-based industry-specific software than for cross-industry software.

- For respondents in total, the split of cross-industry and industry-specific running on workstations and personal computers is essentially the same.

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EXHIBIT IV-7

1991 Applications Software Budget by Cross-Industry/ Industry-Specific and Platform Size (100% of Respondents)

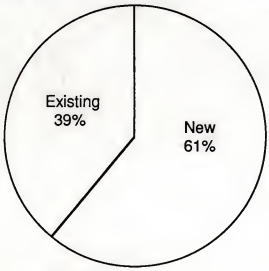
Platform	Percent of Respondents	
	Cross-Industry	Industry-Specific
Mainframe	42	36
Minicomputer	14	21
Workstation/PC	44	43
Total	100	100

4. New versus Existing

Respondents were asked what percent was spent on new applications software packages versus maintenance and annual license fees for existing software. On average, 61% of their total 1991 budgets are for purchase of new applications software products and the remainder is for maintenance and annual license fees (Exhibit IV-8). The percentage split is about the same for 1992.

EXHIBIT IV-8

Expenditures on New versus Existing Applications Software Products



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- The percent spent on new purchases is noticeably higher than INPUT expected. Comparable INPUT data from other research indicates this percentage to be more in the range of 25%-30% spent on new applications software products and 70%-75% spent on maintenance/licensing fees.

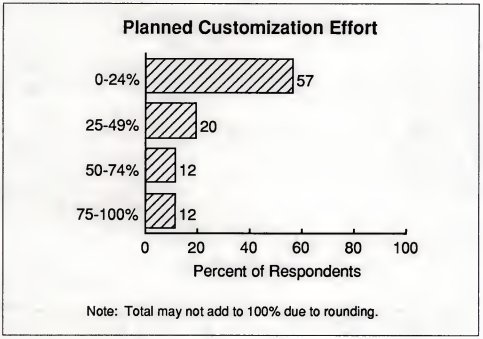
- Plausible reasons for the seemingly high expenditures on new packages could be the continued shift towards PC spending and the significant number of small companies in the survey sample. Smaller companies are more likely to buy lower-cost software where maintenance costs are less significant.

C

Planned Customization Effort

The question asked was, "Of all new applications software product purchases, what percentage of packages will you modify or customize?" The results are shown in Exhibit IV-9.

EXHIBIT IV-9



Note: Total may not add to 100% due to rounding.

- The majority of respondents will customize 25% or less of their purchases; only 12% of respondents will customize 75% or more of their applications software products. The average amount of customization is somewhere between 20%-30%.

- Discussions with vendors reveal that vendors are increasing the customizability of their products and expanding their customization toolsets. Nonetheless, given responses to several of the other questions asked in this survey, users do not want to have to customize and they favor products that don't need it. In fact, as discussed in Section E below, easily customizable software is only a moderately important vendor selection criterion.

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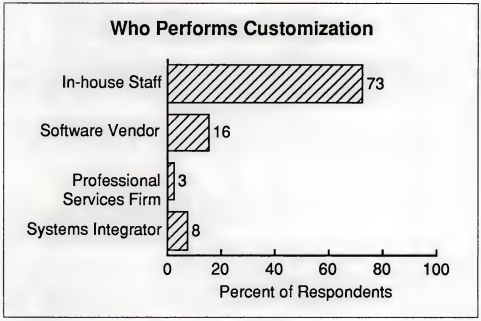
- As shown in Exhibit IV-10, of the customization that is performed, most is done in-house; only 25% is done by outside service vendors including applications software firms. INPUT expects the amount performed by external service providers to increase.

EXHIBIT IV-10



D

Total Applications Development Plans

- The average applications development budget for 1991 is $1.3 million, over four times greater than what is spent on packaged solutions. Therefore, even though purchase is on the increase, a great deal of applications development is still taking place.

- Overall, 52% of the budget is for enhancement/maintenance of existing systems and 48% is for development of new systems.

  - Responses ranged from a process manufacturer that purchases all of its applications software and a bank that purchases most of its software to a specialized business services firm that develops essentially all its company-specific applications software internally. The percent split may be dependent on vertical market and degree of need for specificity.

  - INPUT research in late 1990 indicated 67% for enhancement/maintenance and 33% for new development. Thus, the actual split may be about 60%/40%.

- Of the total applications development budget, an average of 63% is spent on internal development and 37% is spent on contracted professional services. Three respondents indicated that more than 70% of the total is spent on contracted services.

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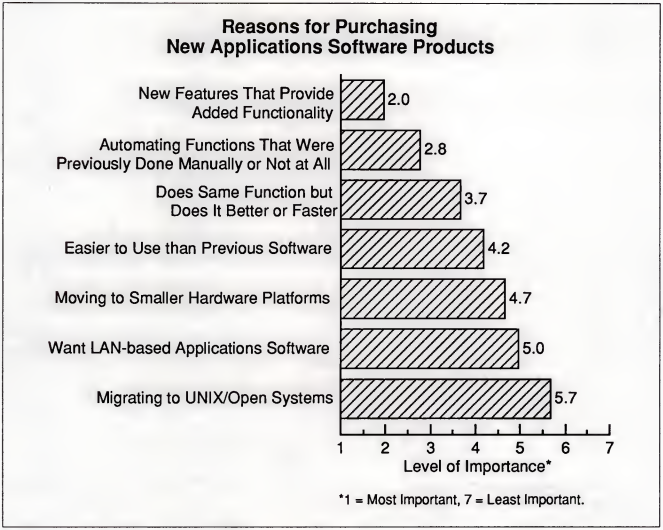
E

Product and Vendor Preferences

Respondents were asked to rank in order of significance seven specific reasons for purchasing new applications software products—1 being the most significant reason and 7 the least significant reason. Thus, a ranking of 4 indicates average significance within this set of criteria. The results are presented in Exhibit IV-11.

EXHIBIT IV-11



- No single criterion ranked a 1, indicating lack of consensus about the single most important product selection criterion.
- New features is the most significant reason to purchase new applications software products and was rated 2.0 on average. For respondents, new features means:
  - New functions not previously available and that they do not have in-house expertise to develop

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- Functions that decrease number of transactions necessary
- Portable across hardware platforms
- Expandability—meet needs as company grows
- Interfaces to other application solutions

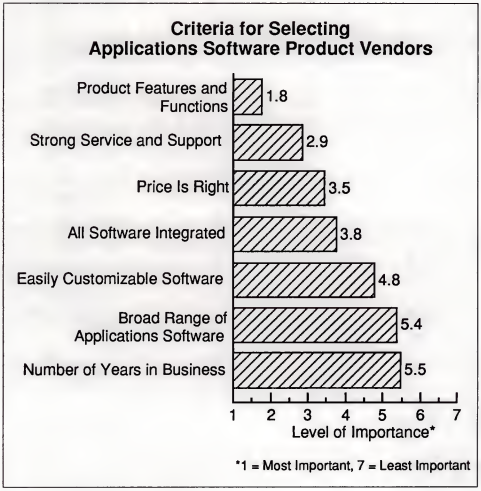
- Respondents ranked automating functions previously done manually as second in importance.

- The move towards smaller hardware platforms and the desire for LAN-based applications software ranked fifth and sixth out of a list of seven criteria. This is consistent with the relatively few mentions of downsizing and networking as key technology goals—23% and 27% of the respondents respectively (see Section F below).

- UNIX/open systems ranks last as a reason to purchase new applications software products.

Respondents were also asked to rank each of a series of criteria in selecting an applications software products vendor, where 1 is the most significant/important reason and 7 is the least significant/important reason. The results are shown in Exhibit IV-12.

EXHIBIT IV-12



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- The most important reason to select an applications software products vendor is the product features and functions, which is consistent with findings about reasons for purchasing a new product.
- Users are willing to pay more for not only features/functions but also strong service and support capabilities.
- It is interesting to note that integrated software is about in the middle (3.8) in terms of importance in selecting a vendor. This finding implies that for a product with new/better features and/or a vendor with strong service and support, users are willing to tackle integration themselves or hire someone to do it.
- For this survey sample, easily customizable software ranked only a 4.8 in significance. This ranking implies that users do not customize purchased software to a large degree and it is consistent with findings that, on average, users customize only between 20% and 30% of the applications software products they purchase.
- Given discussions with vendors, INPUT expected this ranking to be higher. Vendors are adding customization capabilities in hopes of expanding their market reach.
- A broad range of applications software from a single vendor is of less than average importance (5.4) as a vendor selection criterion. Clearly, users want to be able to choose from a variety of vendors; one-stop shopping for applications software is critical.
- The number of years in business is ranked last as a vendor selection criterion.

These findings strongly suggest that room exists in the marketplace not only for new features/functions but also for new vendors.

F

Key Technology Goals

Respondents were asked to list their three key technology goals over the next several years as they relate to applications software products. Similar goals are grouped into ten categories. Exhibit IV-13 lists these categories and indicates the number of goals mentioned within each category.

- No category of goals was mentioned by more than 27% of respondents, indicating lack of consensus about technology directions over the next several years.
- Lower costs and improvement of overall productivity in a general sense is tied for first place as a key goal; it is assumed that this is the goal of all respondents, although not all of them mentioned it as a "technology goal."

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EXHIBIT IV-13

Key Technology Goals

Category of Goals	Number of Responses
Lower Costs, Improve Overall Productivity	15
Install New/Updated Applications Software	15
LANs/Networking	15
Integration	13
Downsize Hardware/Software	13
Data Accessibility	12
Quick, Easy Applications Development	11
Ease of Use	9
Open Systems/UNIX	9
Other	4

- The two specific technology goals that came out on top are new or updated applications software and LANs/networking. Presumably they are viewed as key ways to lower costs and improve productivity. Each of these categories of goals was mentioned by 27% of the survey sample.

- Although these findings cannot be used to forecast types of products that will be purchased, the following applications software product purchases/installations were mentioned: personnel/payroll/benefits, inventory management, financial systems, new banking applications, purchase order processing, office automation, warehouse management, process measurement, purchase request tracking, and point of sale systems.

- The technology goals of LANs/networking, integration, downsizing and data accessibility are interrelated. All enable users to access and share data and/or applications software products and resources more easily. About 45% of all mentions encompassed these four areas.

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- It is interesting to note that these goals in fact precede faster/easier applications development. Quick/easy applications development is still among the top ten technology goals, but it is in the bottom third of the top ten. According to 1990 INPUT research, some of the approaches being used to control applications development resource consumption are: limiting resource allocation, purchasing packaged software products, re-engineering applications, and taking on maintenance-only functions.

- Three respondents mentioned EDI as a key technology goal.

- A variety of integration goals were mentioned, including:

  - Implement enterprise model
  - Integrate data bases
  - Operate over multiple platforms
  - Integrate applications
  - Link currently incompatible application systems

- Downsizing goals—mentioned by 23% of respondents—are evenly split between offloading the mainframe to minicomputers, workstations, PCs and PC-LAN configurations, and implementing client/server technology. Offloading the minicomputer was not mentioned.

- Data accessibility goals—mentioned by 23% of respondents—include more timely access to data, implementing EISs (executive information systems), improved ease of uploading to or downloading from the mainframe, easy-to-use reporting and query facilities, and implementing a DBMS.

- Faster/easier applications development was mentioned as a key technology goal by 16% of respondents. Examples of the kinds of goals related to development are:

  - Implement CASE (several mentions)
  - Reduce need for customization
  - Develop efficient development procedure
  - Obtain object-oriented DBMS

- Open systems/UNIX was mentioned as a technology goal by 16% of respondents, the same percentage as for improved applications development.

G

Survey Conclusions

Exhibit IV-14 outlines the survey conclusions. A discussion of these conclusions follows.

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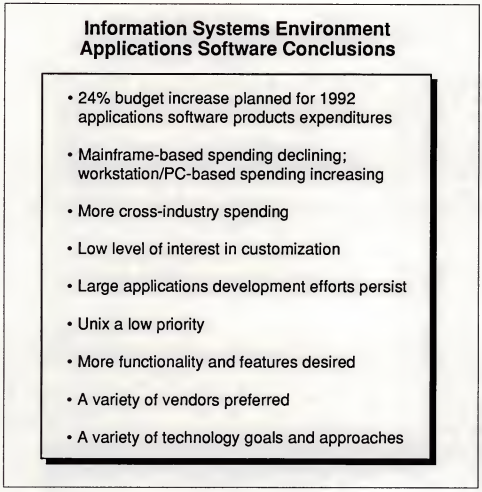
EXHIBIT IV-14



On average, planned expenditures for next year will be 24% higher than for 1991. This is a healthy increase, more than INPUT expected. INPUT's five-year forecast—presented in Chapter VI, Information Services Market Forecast—considers the survey results as well as other factors and research data.

A weak economy does not appear to be dampening expenditure plans; on the contrary, it may promote expenditures as users look to applications software products as a way to reduce costs and improve productivity within their corporations. Purchases of applications software products are being closely scrutinized; products that obviously improve productivity will be purchased and other "nice to have but not necessary" products will suffer.

Spending on applications software products for workstations and personal computers is growing the fastest; spending on mainframe-based products shows a decline. This pattern is the opposite of that shown in research on systems software products: for systems software products,

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mainframe-based expenditures are still the strongest. This suggests that the mainframe as data repository for offloaded or downsized applications is viable.

The survey sample spends more on cross-industry applications software products—61% of the total budget and growing—than on industry-specific products. Several respondents expressed the concern that industry-specific software isn't specific enough for their needs and they don't want to have to customize the product. A reason for lack of interest in customizing is that customized products are harder to maintain. Another comment in favor of internal development as opposed to purchasing industry-specific software is the desire to maintain control over corporation-specific solutions.

Given some of these concerns, large applications development efforts persist in spite of vendors' efforts to make their products easier to customize. A dilemma for vendors is deciding what it will take to get users to purchase rather than develop; if they make their products more specific, the potential market size is limited. Vendors are responding to this challenge by not only adding customization and flexibility to their products but by providing services in support of users' development efforts. It would appear that the latter will provide the most immediate returns.

On the other hand, survey respondents expressed keen interest in products with new or better features and functions as well as products that can automate previously manual tasks. They want more specific products—that ideally require little or no customization—yet the profit structure of the industry may not provide much room for vendors to comply.

Integration of a vendor's applications software products and number of years in business are not high on the priority list of vendor selection criteria. This implies that being an established vendor is not necessarily a strong advantage in today's marketplace and that room exists for new market entrants. This may also imply added interest in turnkey vendors and VARs who can add specific functionality, and serve a smaller, specialized market.

Respondents indicated a wide variety of technology goals and approaches as they begin to shift along with shifting technology foundations. Foremost in their minds is to lower costs and improve corporate productivity. As expected, UNIX is a low priority; other frameworks such as SAA and NAS were not mentioned as (short-term) technology goals.

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H

Turnkey Systems

Although the turnkey systems delivery mode was not included in this survey, it is included in this report as an application solution.

Generally speaking, turnkey systems—encompassing a total solution of software, hardware and service—are purchased for the fundamental purpose of running a business. In other words, the applications are, foremost, industry-specific production-level applications. For example, a law office will purchase a complete industry-specific accounting package that includes professional services billing, client disbursements, and client cost-tracking sysgems, which will be the mainstay of its business. A cross-industry human resources package will be a secondary consideration, the purchase decision typically being made after the turnkey solution has already been procured.

Thus—in contrast to applications software package purchasing patterns indicated by the survey results—the software emphasis for turnkey systems is industry-specific rather than cross-industry. Another obvious distinction is that far fewer turnkey purchases are mainframe-based.

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Vendor Issues and Trends

This chapter discusses the ways in which technology trends are impacting the applications software products and turnkey systems delivery modes and the resulting issues vendors are grappling with. Section A discusses the technology trends, Section B discusses the issues, and Section C summarizes the impacts of these trends and issues.

A

Trends

Vendors are beginning to develop and introduce new applications software products that encompass the technology foundations summarized in Exhibit V-1 and described below.

EXHIBIT V-1

Shifting Technology Foundation

- Standards
- Downsizing and client/server
- Networking and integration
- Distributed data
- Graphical user interface
- Imaging
- Engineering/re-engineering software

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1. Standards

Standards are progressing in hardware and systems software platforms that will in the short term have a splintering effect, causing vendor and user confusion. In the long term, standards will cause consolidation.

Recent activities, that at least point towards sets of standards, include the following:

- IBM and Apple have announced they will work together to develop a new operating system based on object-oriented software.
- The Advanced Computing Environment (ACE), a consortium of more than 60 companies, is developing common hardware and software technology for personal computers and workstations. The platforms are based on Mips Computer Systems Inc.'s R3000A and R4000 RISC chips. Compaq's first ACE product is expected to be released in early fall as a development platform for independent software vendors.
- Although progress was made in 1990, IBM's standard, SAA, is still in the formulation stages, and user interest has been lower than anticipated. A recent INPUT survey found that only 20% of IS organizations have SAA (or other vendors' frameworks such as DEC's NAS) implementation as an objective over the next several years. Portable, SAA-compliant applications software products are not expected until the mid-1990s.
- Vendors are beginning to move ahead with UNIX, and a level of vendor commitment and planning is present that did not exist even one year ago. A notable example is NCR's total move to a standard UNIX platform.

Most of the UNIX applications software products available today are either from PC vendors porting their products to UNIX platforms or UNIX vendors offering PC-like products for UNIX platforms. Although thousands of UNIX software packages are available—ranging from accounting and time management to spreadsheets and word processing—much of them offer the same character-based functionality available on a PC, though on a more expensive hardware platform.

Applications software products are needed to take advantage of UNIX's networking and application-linking functionality. Production-level applications software products require a data base strategy, communications capability, and hierarchical storage technology, among other things. This means that vendors who successfully offer production-level applications need to be technically broad based.

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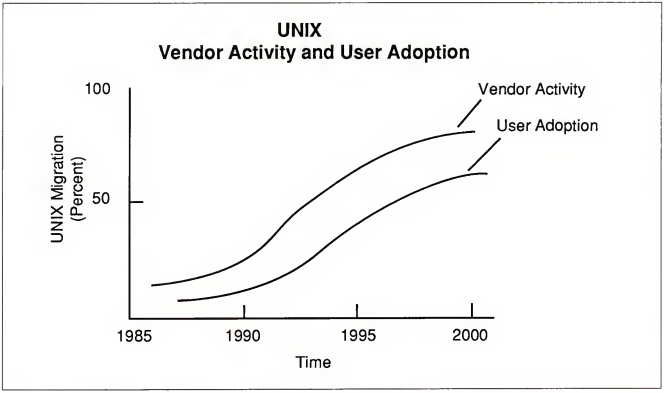
Although integrators and in-house programming organizations have undertaken relatively sophisticated UNIX development, little of the innovation has yet appeared as commercial packaged applications software products. Relatively small companies like Lawson Associates and Ross Systems are leading the way. Large applications software products vendors will follow.

As Exhibit V-2 shows, however, user acceptance will drag behind vendor activity. UNIX will remain difficult to sell over the next several years. Nonetheless, as the traditional vendors commit to open systems, larger numbers of independent software vendors, turnkey systems vendors/VARs—and users—will follow.

EXHIBIT V-2



2. Downsizing and Client/Server

IS organizations are beginning to offload their mainframes of applications as a means of reducing costs and enhancing applications accessibility The concept of the mainframe as a data repository is gaining ground, as is the client/server concept.

Although there are varying definitions of client/server, common components are outlined in Exhibit V-3.

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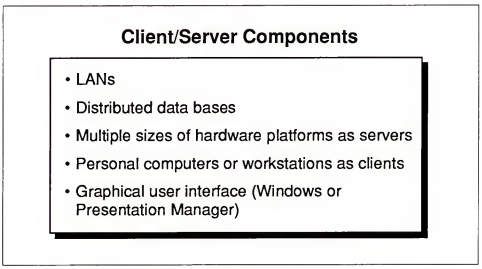
EXHIBIT V-3



Examples of varying versions include:

- Computer Associates' mainframe data base access at the workstation level through CA-Compete—a new spreadsheet product—provides the ability to populate the spreadsheet with data residing on a mainframe data base through SQL statements. Compete is a multidimensional spreadsheet using Microsoft Windows 3.0.

- PeopleSoft's suite of human resources products has a Microsoft Windows 3.0 graphical user interface and supports SQL data base systems such as SQL Server, Gupta, Oracle, and DB2. The product also complies with SAA. Support is planned for OS/1 and Presentation Manager. PS/HRMS operates on a variety of computers (PC LANs, midranges, and IBM mainframes).

Client/server products will appear in cross-industry and industry-specific sectors in varying degrees. Although almost all major applications software vendors are developing client/server HRMS products, few are being developed in the banking and finance sector because of the large amounts of data that need to be accessed and transferred among users. Client/server payroll packages are for the most part not yet on the drawing boards either, due to the bottleneck created in transferring large quantities of data back and forth and to the heavy printing requirements. However, they will come in time as vendors begin to develop good client/server solutions that are mainframe based.

Increasing emphasis is being placed on developing a single consistent architecture across platforms. A sales strategy for the new client/server products—as well as for UNIX products, which may or may not be client/server—is to position them as multiplatform and multivendor. The fact that the same version can run on any platform from a workstation, to

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a LAN-based configuration, to a mainframe-based DB2 configuration is a selling point when migrating customers to a client/server product because it makes the migration easier. The user sees the same screens, is subject to the same edits, observes the same security, views the same reports, etc. as before.

3. Networking and Integration

According to a 1991 INPUT survey, LAN integration is the single most important objective for IS managers over the next several years. Seventy-five percent of respondents indicated than LAN and network integration is an objective during the 1991-1993 period, with another 5% after 1993. Products and services that enhance integration of multivendor, multiplatform computing solutions will experience strong growth over the next several years.

LAN applications, however, are still relatively unsophisticated. In a INPUT survey earlier this year frequently mentioned applications were the following:

PC Applications
- PC Tools
- Desktop Publishing
- Electronic Mail

Central Business Applications
- Mainframe DBMS Queries
- Executive Information Systems
- Accounting
- Order Entry
- Sales
- Production Scheduling

Software Applications
- CAD/CAM
- CASE

4. Relational and Distributed Data

According to a 1991 INPUT survey, 35% of user organizations are planning for relational DBMSs in 1991 and another 14% during the 1992-1993 period. Therefore, the move to relational systems is still quite solid, spurred by growing acceptance of IBM's DB2. Users are also reporting purchases of relational products from companies such as Oracle, Informix, and Sybase.

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As expected, distributed DBMS is mentioned more often as an objective during the 1992-1993 period than it is currently. LAN and network integration are prerequisites for broad usage of distributed DBMSs. Therefore, as LAN integration proceeds, distributed DBMS implementation will follow.

Applications software products vendors are scrambling to develop RDBMS-based products to compete in the 1990s marketplace. Oracle launched this trend with its financial applications software products. Vendors are writing products using general SQL tools and are teaming with RDBMS companies—such as Ingres/ASK, Sybase, Gupta, and Oracle—to make their application solutions available across a spectrum of RDBMSs and hardware platforms.

Again, application solutions that are truly RDBMS-based are slow to hit the market. Application solutions companies are stymied. They want to keep their applications portable, and they like a flat-file DBMS because it's easy to maintain. Also, performance is good, it's easy to port, and they've had a flat-file DBMS for a few years and wish to add new modules. But now they have to struggle with how to implement a relational DBMS. Due to this dilemma, most of the RDBMS application solutions are not new products, but are re-engineered versions of existing products.

5. Graphical User Interfaces

The graphical user interface (GUI) is upon us. Standards are in place now and usage is beginning to grow at the expense of MS-DOS and OS/2. However, users have little experience with GUIs, and vendors are just beginning to announce applications that run under Windows. For example, Lotus is just now about to release 1-2-3 for Windows.

GUIs, along with products like X-Windows, Presentation Manager, Motif and SCO Open Desktop, will have a significant impact on the application solutions market. However, as with all advances, they will take time to be understood, learned, and broadly applied. A GUI increases the productivity of a user through standardization because menu bars and dialogue boxes are similar across a number of applications. Therefore, a user does not have to learn the idiosyncrasies of each application, but can begin using them immediately. GUIs will promote the use of application solutions by the general user base and allow for use of more applications per user.

6. Imaging

Electronic imaging technology is being examined and seriously considered by an increasing number of user organizations.

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In a recent INPUT survey approximately 80% of the users indicated that they have identified a specific set of applications for applying imaging technology. Although there is a limited number of large electronic imaging applications installed today, there is a large backlog. The ability to integrate visual images of original documents with text and data is increasingly important to support service requirements.

A further indicator of the growing importance of electronic imaging is the percent of planned applications that have electronic imaging content, which ranged from a low of 5% to a high of 100% among vendors able to provide estimates. The average was 39%. Considering the early stages of growth of electronic imaging, INPUT believes that such percentages are significant. Imaging will add value to applications software products and turnkey vendor/VAR offerings.

7. Engineered/Re-engineered Software

CASE has held out the promise since the mid-1980s of making a significant impact on the applications development process. CASE proponents see opportunities for significant improvements in:

- Elapsed time it takes to develop applications
- Application quality
- IS staff productivity

This promise has so far been largely delayed. Currently, CASE technology and methodology is largely oriented towards forward engineering. In 1991 this limits CASE to roughly one-third of the potential applications development market. (This market includes maintenance and modifications activities). By 1996, INPUT estimates that almost half the applications development market could make use of re-engineering technology. Little more than 10% could utilize forward engineering technology, as now defined. Consequently, the development of re-engineering technology is very important for CASE take-off in the 1990s.

PC- and workstation-based software development environments that make RDBMS-based applications software easier to develop both for vendors and their customers are becoming more widely available. For example, PowerBuilder from Powerpoint allows programmers to build commercial software that integrates graphic client applications with RDBMS servers. It supports SQL and several RDBMSs, including SQLBase and Oracle Server. Objectview, developed by Matesys, uses graphical tools to generate either BASIC or C code with embedded SQL to run against SQL Server.

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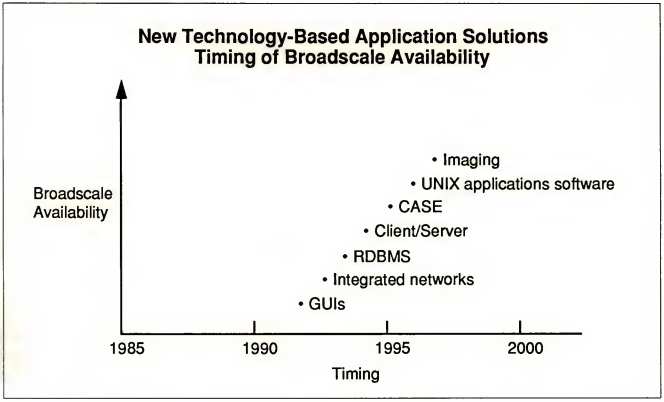
Products that incorporate these technologies will become widely available at different times. Exhibit V-4 below shows when INPUT believes application solutions employing the technologies described above will be available in large enough numbers to make a significant impact on the industry.

EXHIBIT V-4



Client/server products, for example, will not really be commercially available in quantity until 1993 and beyond. Large-scale and production-level UNIX-based applications software products will not be widely available until after 1995.

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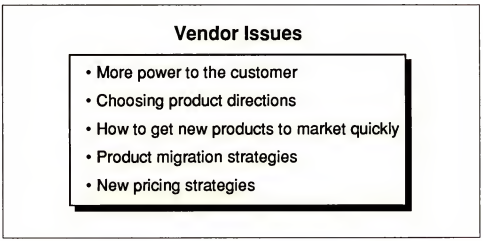
B

Issues

Issues resulting from the above technology trends are outlined in Exhibit V-5 and discussed below.

EXHIBIT V-5



1. More Power to the Customer

Markets for much of the applications software products in place today are mature. Most companies, for example, have already purchased at least one generation of accounting software. These applications are an obvious improvement over previously manual tasks, and because a large number of users don't want to go to the trouble to install a new solution, the rate at which new software is being purchased has slowed. Users want to purchase new software only if it provides an obviously better solution for them.

As markets for "traditional" application solutions mature, customers have more specific wants and a better understanding of what they need. It is imperative that vendors impress upon the user community that their new products provide better and richer functionality. Therefore today—compared to the 1980s—customers rather than vendors are setting the buying criteria and vendors will have to listen in order to succeed.

The issue is how to get users' attention. A continuing issue for vendors—especially of industry-specific software—is enticing users to purchase rather than develop their own applications. Even with the increasing development backlogs, lack of programmers, and the trend towards outsourcing, users still spend more on internal development than on purchases of applications software products. Vendors are responding to this challenge by not only adding product flexibility and customization tools, but also by providing services in support of users' development efforts. They are also increasing their distribution through third parties, such as VARs, that can provide industry specificity and are eager to customize.

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2. Choosing Product Directions

Vendors must decide which of the shifting technology foundations and product options to pursue and must be careful to not overextend themselves.

Many new hardware and operating system platforms are being and will continue to be introduced. A key question is what computing environments—e.g., SPARC, RISC, MS-DOS, OS/2, Windows and UNIX—are the most appropriate to pursue. Both vendors and VARs must be flexible enough to change with the changing system platform tides.

If UNIX is pursued, an issue for both applications software products vendors and turnkey vendors/VARs is deciding which UNIX hardware and systems software platforms to port to.

- Ross Systems has initially targeted DEC Ultrix.
- Dun & Bradstreet Software Services has targeted IBM AIX-based products
- Although Oracle is predominantly a systems software vendor, its strategy is perhaps the premiere example of a multivendor/multiplatform execution. ORACLE RDBMS ports to over 25 hardware platforms. ORACLE Finances is also multivendor/multiplatform, although to a lesser degree.

In the long run and on a large scale, a multivendor/multiplatform strategy will be more successful due to users' desire to use the same software product in various locations that have different vendors' hardware in place.

Vendors and VARs must also learn which client/server versions will prove to be most effective for any particular application/environment. Vendors that offer a single version of client/server to the exclusion of other client/server and traditional alternatives are at risk. These companies need to be able to "tweak" their technology strategies on short notice.

3. How to Get New Products to Market Fast

As sales of proprietary or traditional products wane, vendors rush to get new products to market. The majority of products need to be developed from the ground up, which presents challenges:

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- Application development tool standards and integrated environments do not exist for UNIX. This lack of standards causes confusion. Due to the confusion, applications software vendors, such as Lawson Associates, are developing their own tool environments. Systems vendors in particular are beginning to offer integrated programming environments, such as NCR's Cooperation and DEC's Fuse.

- Development of new generations of applications software products running in a client/server mode requires splitting software applications between an intelligent workstation and a host. Most of what has already been introduced and touted as client/server is nothing more than the capability to download data to a PC for individual use and manipulation; the actual applications software still resides entirely on the PC or the host. Although a great deal of real client/server software is currently under development, a migration to these applications will take several years.

- As software becomes more complex and integrated—and as time to market is perceived as critical to success—product quality may suffer. Software vendors must be cautious about selling products before their time.

4. Product Migration Strategies

New product introductions will be accompanied by new strategies for migrating customers over to the new product lines as effortlessly as possible.

For UNIX-based applications software products, trying to protect license revenue from existing applications software products based on proprietary operating systems is a critical issue. UNIX applications software products that are on the drawing boards are not talked about because of concern over erosion rate and loss of existing installed base.

To succeed, midrange and mainframe-based applications software products vendors will need to reorient their product marketing and sales efforts to reflect the realities of new technologies and pricing strategies.

5. New Pricing Schemes

A rash of pricing issues has materialized with the advent of downsized versions of applications software products and networked computers where multiple users can share a single software product. The traditional pricing scheme based on size of platform implies that customers with smaller computers are charged less for the same software than those using large mainframes. The rationale behind this pricing scheme is that customers using bigger hardware get more value from a program than those running the software on smaller computers.

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Users are eager for new pricing schemes. Driven by frustration over some software pricing issues, 30 large user organizations recently formed the Software Asset Management Group in an effort to foster changes in vendors' policies.

Vendors are looking into new pricing schemes to apply to new technologies and are beginning to respond in a variety of ways:

- Microsoft has taken a strong stand against concurrent application use and metering (the practice of keeping one copy of an application at the server and monitoring usage, rather than each user having an individual copy), and has made it clear to its networking customers that they must have one copy of an application software product for every user.

- PeopleSoft's client/server pricing scheme is based on the platform size and number of users. Each platform size has a different pricing scheme and, after a certain number of users, an additional user access fee is charged. Site licenses are an option on a case-by-case basis.

- Lawson's UNIX applications software products are based on platform size and number of concurrent users. Lawson has also changed pricing of its proprietary products to be based on number of users. Its prices for UNIX and proprietary applications software products are the same.

Several other pricing strategies being considered for client/server products are the following:

- Offering client/server as a product upgrade to an already installed system and not charging existing clients extra

- Offering client/server as an add-on to an already installed solution

Another interesting twist in pricing is that additional tools will most likely be embedded or bundled in the new client/server product offerings. Some of these tools will come from technology partners rather than directly from the applications software products vendor. The technology partners will need to agree on pricing schemes for any given solution.

Users may be expecting downsized solutions to have lower prices because in many cases they will run on lower priced hardware platforms. Little evidence exists, however, that client/server implementations will offer less costly solutions; users will have to invest in new hardware, will need LAN integration and network management expertise, and will require new systems software to support client/server applications software products. Therefore, it is imperative that vendors position the new products as much more functionally attractive than existing installations.

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Another pricing issue about which there is little consensus is whether to charge a one-time license fee plus annual maintenance charges, or charge on a recurring basis for both the license and the maintenance.

C

Impacts of Trends and Issues

Exhibit V-6 list some of the key impacts that the above technology trends and resulting issues will have on application solutions.

EXHIBIT V-6

Impacts of Technology Trends

- More competition
- Less allegiance to hardware vendors
- Emphasis on service
- Customization
- Alternative distribution channels
- Improved long-term technology development efforts

1. More Competition

Application solutions competition will increase in a number of ways:

- There will be much more competition in the marketplace for enhanced features/functions based on the technologies described in Section A. New features/functions will also automate previously manual tasks at a greater level of detail than their predecessor products. The result will be better products and, eventually, potentially lower prices.

- Competition will increase due to the adoption of multivendor/ multiplatform strategies. Rather than smaller markets defined by hardware and operating system software platform, all vendors will be competing against all other vendors. Again, the result will be better products and, eventually, lower prices.

Applications software products vendors will have to compete on the basis of software features and functions, more specificity, and the value their support services add—the attributes that turnkey vendors/VARs currently possess.

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2. Less Allegiance to Hardware Vendors

Turnkey vendors and VARs are beginning to lessen their allegiance to hardware vendors because:

- VARs are turning to distributors and affiliate relationships to capture the best possible prices on microcomputer hardware. The distributor is therefore taking on an increasingly important role.

- As UNIX and open systems gain momentum, and as turnkey vendors and VARs port their products to several different hardware platforms, they will lessen their dependence upon, and allegiance to, a single vendor's hardware.

- The impact on turnkey vendors/VARs of a multivendor/multiplatform strategy is that they will have to drop their hardware business and thereby become software vendors rather than VARs. They will not be able to afford the inventory nor will they be able to support multiple vendors' hardware platforms.

The very nature of the vendor/VAR relationship, and therefore the VAR channel, is changing. Hardware vendors are under increasing pressure to provide high-quality programs for their VARs.

3. More Emphasis on Service

User demands for service will continue to increase in response to incorporating new products into existing environments and the need to link disparate, enterprise-wide systems. Lower margins on hardware and eventually software will require vendors to take on more and more income from professional services.

Likewise, turnkey vendors and VARs will need to rely more heavily on service content within turnkey, as well as the added value of their software product offerings, as the demand for increasingly sophisticated software creates a need for customization, training, and support.

Every VAR will have to do some soul searching to decide whether and/or when to exit the hardware business. Given the shifting technology foundations, some VARs will opt to exit the turnkey business and sell service only. Many will elect to take on more of a systems integrator role.

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It will become increasingly difficult to distinguish between VARs and network or systems integrators, which will cause channel confusion over the short term. Systems integration work is more of a project-by-project business that requires more flexible pricing and configuration terms compared to traditional VAR programs.

4. More Emphasis on Customization

A discernible shift is under way towards more tailoring of applications software products by software vendors and third-party service providers, as well as by the customer. 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.

5. Alternative Distribution Channels Take on More Importance

As applications software products and systems vendors introduce new products, and as the costs of direct sales continues to increase, they will evaluate alternative distribution channels.

- Ashton-Tate has formed a Consumer Sales Division to distribute selected software products through mass market channels, including electronic stores, office supply stores, warehouse clubs, software-only chain stores, and department stores.

- Apple Computer has initiated a new VAR program, IBM plans to make changes to its VAR authorization program, and both companies are considering using distributors as a conduit to VARs.

- Computer Associates is emphasizing the VAR and reseller channel for its microcomputer-based applications software products. The company is launching new training programs, a co-op plan providing up to 5% funding for advertising, and a volume incentive option.

- Hewlett-Packard has a new Enterprise Computing Solutions program to assist VARs and integrators in migrating mainframe customers to client/server computing schemes designed around its products and services.

- Sun Microsystems doubled the number of training classes for resellers in 1990 and will double them again this year.

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As UNIX and open systems gain momentum, turnkey vendors and VARs will be selling more third-party software rather than their own internally developed software. The reason is that it is too costly and time consuming for many of the smaller VARs to rewrite their own software. Independent software vendors will be quick to oblige, as they seek channels for their new software products. Applications software products vendors—whose downsized solutions will come with lower pricetags—will seek ways to sell more at lower cost.

6. Improved Long-Term Technology Development Efforts

Improved long-term technology development efforts will be brought about by UNIX and the development of standards in the following ways:

- The ability to strengthen staff technical skills by focusing them on preferred standards instead of proprietary technology
- Long-term decreased development costs because vendors will not have to develop multiple applications for multiple platforms
- The ability to compete on skills and solutions, not hardware and prices

Open systems will be slow in producing these positive results, however, not only because of the fragmentation issue that will persist, but also because user acceptance of UNIX, although steady, is relatively slow.

All of these impacts have a direct bearing on user expenditure forecasts, presented in Chapter VI.

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Information Services Market

A Market Overview

1. Historical Perspective

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. These sizes and growth rates are compared to the total information services industry in Exhibit VI-1.

Taken together, applications software products and turnkey systems accounted for 28% of total IS industry expenditures by 1990.

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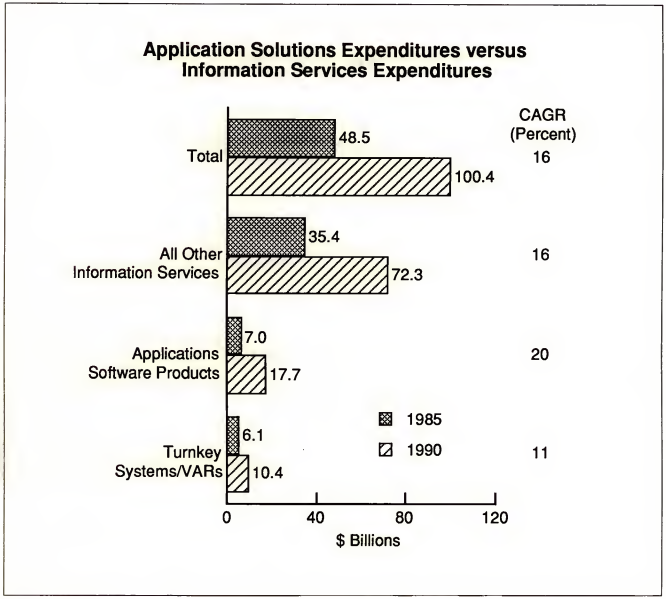
EXHIBIT VI-1



2. Forecasts

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.

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Expenditures on minicomputer-based applications software products have been adjusted downwards for 1990 compared to INPUT's previous year forecast for 1990, as we feel this number had been overstated in the past. With this adjustment, actual 1990 expenditures for applications software products as a whole were $17.7 billion compared to the forecasted $18.1 billion (Exhibit VI-2).

EXHIBIT VI-2

Application Solutions
1990 versus 1991 Actuals and Forecast

1990 Actuals and Forecast	1990 Forecast ($B)	1990 Actuals ($B)
Applications Software Products	18.1	17.7
- Mainframe	5.1	5.0
- Minicomputer	5.6	5.2
- Workstation/PC	7.5	7.4
Turnkey Systems	10.3	10.4
- Equipment	4.8	4.9
- Software	3.8	3.9
- Professional Services	1.7	1.7
1990 and 1991 Forecast	**1990-1995 CAGR (%)**	**1991-1996 CAGR (%)**
Applications Software Products	14	14
- Mainframe	8	6
- Minicomputer	10	10
- Workstation/PC	20	20
Turnkey Systems	9	9
- Equipment	6	6
- Software	10	10
- Professional Services	11	13

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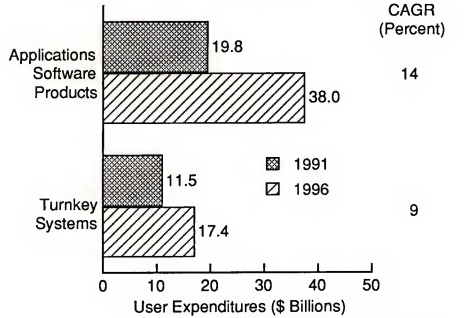
With regard to turnkey systems, 1990 actuals were slightly higher than forecasted due to larger than expected expenditures by the telecommunications and federal government sectors.

INPUT's 1991 forecasted growth rate for applications software products as a whole for the period 1991-1996 remains the same as INPUT's 1990 forecast for the period 1990-1995, even though the forecast for mainframe-based products has been adjusted downwards slightly. The forecast for turnkey systems remains at 9%, even though the professional services portion has been adjusted upwards to 13%.

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 VI-3. 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 VI-3

Applications Software Products and Turnkey Systems—User Expenditures, 1991-1996



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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, the same as INPUT's 1990 forecast.

The fact that INPUT's forecasted growth rates are the same as last year's masks the fact that a great deal of change is under way in these two delivery modes; the market is doing anything but standing still.

B

Applications Software Products

1. Driving Forces

Several significant growth promoters for applications software products over the next five years are listed in Exhibit VI-4.

EXHIBIT VI-4

Applications Software Products Driving Forces

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

As described throughout this report, 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.

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Exhibit VI-5 provides the economic assumptions used in developing 1991-1996 U.S. information services market forecasts. As with the 1990-1995 forecasts, INPUT has again used the CONSENSUS™ economic forecast published by Blue Chip Economic Indicators.

EXHIBIT VI-5

U.S. GNP and Inflation Growth Assumptions 1990-1996 (Percent)

1990 Report Assumptions*

Overall Economy	1990E	1991E	1992E	1993E	1994E	1995E	1996E
Nominal GNP	5.4	5.4	6.7	6.7	6.7	6.5	6.4
GNP Deflator	4.4	4.6	4.1	4.0	4.0	3.9	3.8
Real GNP	1.0	0.8	2.6	2.7	2.7	2.5	2.6

1991 Assumptions**

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

E = Estimated, A = Actual

Source: CONSENSUS™ forecast, Blue Chip Economic Indicators

* Blue Chip Economic Indicators - Vol. 15, No. 10, October 10, 1990
** Blue Chip Economic Indicators - 1991-1992 from Vol. 16, No. 7, July 10, 1990
- 1993-1996 from Vol. 16, No. 3, March 10, 1990

This economic forecast, when compared to that of the previous year, reflects the impacts of the late 1990 recession on the U.S. economy.

- Nominal growth and inflation in 1990 were less than forecasted, with real GNP growth less than 1%.

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- The primary effect of the recession is being felt in 1991, where real GNP growth will be close to zero, and controlled inflation will result in a nominal GNP growth of less than 4%, or about 1.5% less than projected one year ago.

- U.S. economic growth is projected in the CONSENSUS forecast to average about 2.5% Real GNP growth per year from 1992 through 1996, with inflation (GNP Deflator) under 4% and Nominal GNP growth averaging just above 6%.

The impacts on INPUT forecasts in general are a continuation of the more modest growth rates forecasted in 1990 into 1991 and 1992. While the impacts vary by delivery mode, the recession is lingering into the second half of 1991, and INPUT does not foresee a quick recovery for information services spending.

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

- Beyond 1992, INPUT believes a gradual improvement in growth rates will develop. The growth rates in the later part of the forecast period may actually be driven more by such trends as the acceptance of outsourcing and client/server technology than by improvements in the economy.

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. Users have had more compute power on the desktop than they can use and seek software products that can share the processing power among various similar and dissimilar platforms so that this compute power will be used more effectively. Corporate restructuring through downsizing or acquisition also creates a need for new applications software products.

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.

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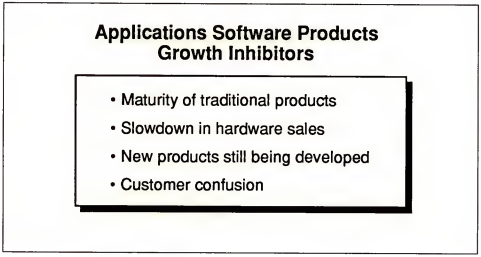
Lack of products that conform to SAA and other vendors' frameworks, such as Digital Equipment's NAS and Computer Associates' CA90s, is not having a detrimental effect on market growth. Conforming to these frameworks is a long-term rather than a short-term goal for IS departments. Last year, INPUT believed that users were delaying purchases in anticipation of future conformance to applications software products. This year, however, it is apparent that they are purchasing regardless of immediate conformity to proprietary standards.

User expenditures for applications software products will be inhibited by the factors listed in Exhibit VI-6.

EXHIBIT VI-6



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.

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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.

2. Forecast by Platform Size

Exhibit VI-7 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.

- 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.

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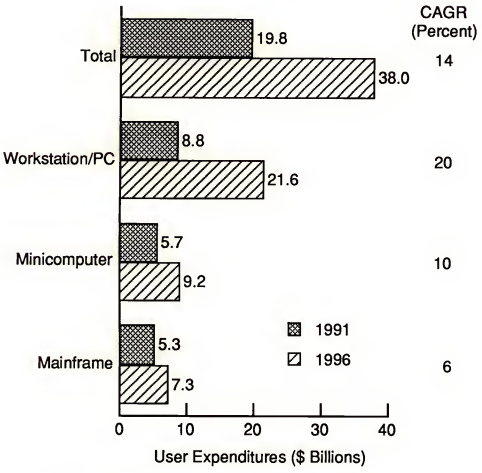
EXHIBIT VI-7



Note: Numbers may not add due to rounding.

- 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.

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3. Forecast by Industry-Specific versus Cross-Industry Sector

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. Recently, however, INPUT conducted research that indicates cross-industry applications software products expenditures will be greater in 1992 than expenditures on industry-specific solutions.

Plausible reasons why cross-industry growth could be stronger in the short term are:

- Industry-specific software isn't specific enough and too much customization is necessary. Vendors are covering both bases by developing "starter sets" of cross-industry or industry-specific software that could be easily customized to industry-specific or corporate-specific needs. As the need for specificity increases, more vendors will provide easy-to-use tools and services that allow customization by either customers themselves or VARs/turnkey systems vendors.

- The market is behaving immaturely; that is, new technology-based products are being adopted in cross-industry applications first, which is what happened in the 1980s when much of the software that is in use today was seen for the first time.

- Downsized cross-industry products may be more widely available than industry-specific solutions The first UNIX applications software products for commercial purposes, for example, were general office automation applications.

- More industry-specific software is mission critical; it is the early adopters that are willing to forge ahead and purchase UNIX or distributed solutions for key applications. The rest of the market will follow in time and is waiting for more product availability.

- There is growing concern about integration and the ability of applications software products to interoperate with what is already installed. Interoperability may be a more significant factor for industry-specific solutions.

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If these reasons prove to be true over the next year, then expenditures for cross-industry applications software products will exhibit greater growth over the next two to three years than expenditures for industry-specific applications software products. INPUT will monitor growth and if appropriate, revise its forecast next year.

The largest and fastest growing markets for industry-specific and cross-industry applications software products are listed in Exhibits VI-8, VI-9 and VI-10.

EXHIBIT VI-8

Largest Industry-Specific Markets for Applications Software Products

- Banking and Finance
- Discrete Manufacturing
- Medical
- Business Services
- Insurance

EXHIBIT VI-9

Fastest Growing Industry-Specific Markets for Applications Software Products

- Telecommunications
- Federal Government
- Medical

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EXHIBIT VI-10

Cross-Industry Markets for Applications Software Products

Largest
- Accounting
- Office Systems
- Planning and Analysis

Fastest Growing
- Education and Training
- Engineering and Scientific

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.

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

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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.

C

Turnkey Systems Forecast

The turnkey systems market is forecast to reach $17.4 billion by 1996. The CAGR for turnkey systems is forecast to be 9% for the 1991-1996 period. Several strong 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. Driving Forces

The key driving forces during the next five years are summarized in Exhibit VI-11.

EXHIBIT VI-11

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.

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Equipment vendors' direct response to industry-specific needs has historically been inadequate. They are therefore bolstering their indirect channels' recruitment efforts and programs. As the cost of maintaining a direct sales force increases and hardware platforms get smaller, equipment vendors need viable alternative channels for their new generations of hardware. Vendors also need to rely more on the VAR/turnkey channel to provide support. Vendor recruitment efforts have appeared as a stronger driving force this year and will continue to create momentum for this delivery mode.

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. Other vendors' applications software products sold through the VAR channel become part of the turnkey systems/VAR delivery mode. Although the likelihood of increased applications software sales through turnkey systems and VARs is great, INPUT does not believe this will have a major effect on either delivery mode.

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 as users grapple with issues such as the following:

- Implementation of enterprise-wide solutions and standards
- UNIX networking design/implementation
- UNIX networking management
- Testing and porting
- Maintenance services

Equipment vendors are beginning to respond to these 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.

Growth for this delivery mode will be inhibited by the factors listed in Exhibit VI-12.

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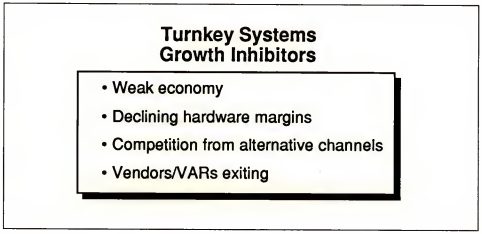
EXHIBIT VI-12



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.

In 1990, turnkey vendors that sold to manufacturing vertical markets felt the negative impacts of a weakened economy as capital expenditures were delayed. Because spending on turnkey systems by the manufacturing sectors—principally for CAD/CAM products and resource planning—accounts for a large percentage of total expenditures on turnkey systems (36%), whatever impacts the health of the manufacturing sectors also affects turnkey systems vendors' health.

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.

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As turnkey vendors and VARs sold more personal computers (and now, workstations), the value of the applications software products they sold also decreased. Smaller hardware platforms dictated that the software would also be lower priced. This will continue to be the case until new UNIX and client/server solutions fill the pipeline.

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.

VARs and turnkey vendors are exiting the business for the following reasons:

- Declining hardware margins
- Risk of being stuck with an obsolete workstation
- They cannot afford to re-engineer their products or do not have the expertise to support the new products.
- They cannot afford to carry multiple hardware product lines if and when they adopt a multivendor, multiplatform strategy for their software.

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.

2. Forecast by Submode

Exhibit VI-13 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.

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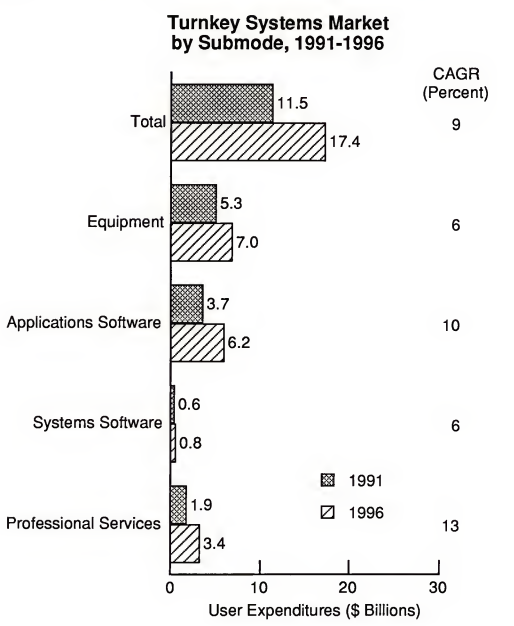
EXHIBIT VI-13



- 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.

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- 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.

3. Forecast by Industry-Specific versus Cross-Industry 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.

The strongest application areas for turnkey systems/VARs are listed in Exhibits VI-14 and VI-15. As with applications software products, the largest market for turnkey systems is discrete manufacturing; CAD/CAM is the largest of all turnkey systems applications.

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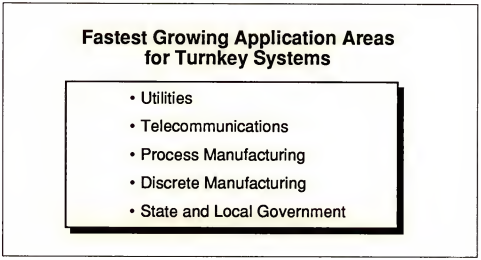
EXHIBIT VI-14

EXHIBIT VI-15



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.

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Competitive Environment

As existing applications software products vendors and 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.

A Competitor Trends

1. 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.

- Computer Associates' net income from foreign operations was 28% of the total for 1990.
- Microsoft's international sales were 55% of total fiscal 1990 revenues.
- Over 50% of Ashton-Tate's revenues are from non-U.S. sources.
- WordPerfect's 1990 non-U.S. revenues were 30% of the total.

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.

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2. 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 "homegrown") 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.

In light of the importance of integration, applications software products 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.

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.

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.

The reason for increased outsourcing of customization—and desire for specificity in the product to begin with—is the shortage of skilled software professionals and IS organizations' desire to trim costs. Customers are looking more to the vendor for support. Vendors and VARs are happy to oblige due to slowdown in software products and hardware growth over the last several years. Once the product is customized by a vendor, typically the vendor may be contracted to continue to maintain and customize as required.

3. 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.

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- Software developers who need Windows technology may not have the time to develop it but have the resources in place to buy it.

- The emphasis placed on open systems causes more, and increased variation of, alliances between would-be competitors who are working together to develop interoperability schemes.

Examples of recent applications software products acquisitions are:

- Ashton-Tate's acquisition of Interbase Software Corp., a developer of transaction processing data bases for UNIX and VMS

- Borland's pending acquisition of Ashton-Tate

- Microsoft's acquisition of Consumers Software Inc.

- Comshare's agreement to purchase Execucom Systems for $12 million

- Ross Systems' acquisition of the principal assets of Argonaut Information Systems of California, which offers payroll and human resources products (1990)

- Lotus' acquisition of Samna Corporation and cc:Mail (1990)

VAR acquisition and consolidation continues as well. 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.

Large VARs are able to secure small rounds of venture-based financing in order to acquire other VARs. VARs are continuing to expand out of the niche region to establish a national presence by acquiring other, smaller VARs. For example CAD Solutions (San Jose, CA) has received two rounds of venture funding since 1989, securing more than $6 million to help finance its expansion. CAD Solutions, with the help of venture money, made a number of acquisitions last year including the purchase of Electronic Design Group (San Jose, CA), and Focus Inc. (San Diego). Evernet Systems Inc. (Los Angeles) has also expanded through acquisition with financial support from the venture capital community.

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Examples of alliances are the following:

- In April of this year PeopleSoft formed development and marketing agreements with Hewlett-Packard and Microsoft. PeopleSoft and HP are delivering an HP Allbase/SQL server version of PeopleSoft products for the HP3000. PeopleSoft is a member of Microsoft's new SQL Server Industry Specialist Program.

- IBM's Wang and Lotus deals

4. Increased Competition from Equipment Vendors

Three notable examples of increasing emphasis on software products by equipment vendors are:

- DEC's Software Products Group was created last year. Among other things, this group is in charge of developing, packaging, and pricing applications software products for general distribution.

- 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.

- IBM's stated goal is to obtain 50% of its revenues by the year 2000 from selling software and services. Together, now, software and services contributed $23 billion of IBM's $69 billion in 1990 revenues. Software revenues grew from 10% of sales in 1986 to 14% last year.

We can expect hardware vendors' market share of applications software products to increase during the 1990s.

5. 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.

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Opportunities exist where large U.S. vendors and VARs may not be able to transition quickly. New kinds of entrants to the U.S. application solutions market include:

- European firms, such as Coda, Systems Union, and SAP, are beginning to enter the U.S. market.

- Smaller vendors are succeeding in the UNIX and client/server environments. PeopleSoft, with $8 million in revenues this year, is a good example of a new company with a new client/server product. Lawson Associates is another example of a relatively small company that is among the first to make a major product commitment to UNIX.

- Network and systems integrators offer the same kinds of services that many turnkey vendors/VARs and applications software products vendors are beginning to offer, but they profess non-alliance with any specific vendors' product offerings. In a large sense, a small systems integrator provides the same product/service set that a turnkey vendor/VAR can provide, but without allegiance to any vendors' specific hardware or software. As open systems gain momentum, this non-allegiance will gain increasing favor.

In addition, some systems integrators buy the rights to applications software they've developed for their customers and resell "shell" versions of it to additional customers.

- Traditional dealers—this channel is splintering as some dealers become mass merchandisers and others are taking on the appearance of VARs.

6. 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.

The Office of Technology Assessment is readying a proposal for Congress in January. One of the key items on its agenda is to define whether copyrights, patents, or neither, can be used to protect the screen appearance, or so-called "look and feel" of a computer program. Apple's suit against Microsoft and Hewlett-Packard is currently the most important case that revolves around this issue.

All this is making small software makers nervous about new development projects because they have no idea if they are infringing on a pending patent. Among their worst fears is that patents will be granted for computer interfaces—programs that link different computers or different programs to one another.

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B

Market Shares/ Leading Vendors

The leading applications software products vendors are shown in Exhibit VII-1, and the leading turnkey systems vendors are listed in Exhibit VII-2. 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.

EXHIBIT VII-1

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	<1
American Software	80	<1

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.) Note that the information in these two exhibits shows vendor revenues rather than user expenditures.

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.

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EXHIBIT VII-2

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

The list in Exhibit VII-2 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.

Exhibit VII-3 depicts the revenue demographics of applications software products.

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EXHIBIT VII-3

Applications Software Products and Turnkey Systems Companies—Applications Software Revenue Demographics, 1990

No. of Companies	U.S. Revenue Category ($ Millions)	Average Revenue	Total Revenue	Percent of Total
25	> 75	150.0	3,800	20
40	50-75	65.0	2,600	14
50	25-50	35.0	1,800	9
100	10-25	15.0	1,500	8
2,790	.25-10	1.5	4,200	22
3,000		4.7	14,000	74
5,000	> .25	0.1	5,000	26
8,000			19,000	100

The exhibit shows the following:

- Applications software products revenue, not total IS expenditures
- U.S. revenues from applications software product development, both by applications software products companies and turnkey systems vendors/VARs
- All companies with over $100,000 in annual revenue from applications software products

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 (and are represented in the appropriate category in Exhibit VII-3), or sell other vendors' applications software products.

The exhibit also reflects INPUT's identification of the 18 vendors listed in Exhibits VII-2 and VII-3, and data from INPUT's ongoing survey of revenues of U.S.-based applications software products companies. The Data Sources directory lists 3,000 companies with applications software products revenue of more than $200,000.

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C

Company Profiles

The following are profiles of several applications software products and turnkey systems companies mentioned in this report. They are representative of the types of companies and strategies operating in the application solutions marketplace.

1. Dun & Bradstreet Software Services, Inc.,
3445 Peachtree Rd., N.E., Atlanta, GA 30326-1276; (404) 239-2000

Dun & Bradstreet Software (DBS), a company of The Dun & Bradstreet Corporation, was formed in March 1990 by the merger of Management Science America (MSA) and McCormack & Dodge (M&D).

DBS' approach to its next generation of applications software products is to incrementally deliver a single client/server product line for ease of migration for current customers. Components of the client/server strategy include relational SQL-based technology, graphical user interfaces—initially using Microsoft Windows 3.0—and groupware-enabled functionality. Its first module will be for flexible benefits and will be available in early 1992.

DBS will use Powersoft's PowerBuilder tools to build its next generation of client/server applications software products. Under a pact with Powersoft Corp., DBS has licensed PowerBuilder and will sell and support the tools. In exchange, Powersoft, which is also a Microsoft Corp. SQL Server partner, will receive royalties.

In addition, DBS will continue to enhance its current product lines. Future plans call for UNIX and SAA compliance, object-oriented design, and a global offering for multinational corporations.

As it moves forward, DBS' challenge continues to be explaining how it intends to merge its multiple product lines and how it will migrate its existing customers to its next-generation product.

DBS has been staffing up its Consulting Division; services revenues have grown 25% per year over the last two years and account for an estimated 20% of North American revenues.

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2. International Business Machines, Application Solutions Division, 472 Wheelers Farm Road, Milford, CT 06460; (203) 783-7000

IBM is the world's largest software company. Its stated goal is for software products and services to account for 50% of its revenues by the year 2000. Software and services contributed $23 billion of IBM's $69 billion in 1990 revenues. Software revenues grew from 10% of sales in 1986 to 14% last year.

The Application Solutions Division (ASD) oversees industry-specific software and professional services, and it employes 30,000 people worldwide. ASD industry groups develop and acquire niche software in vertical market sectors. Its transportation group, for example, teamed up with US Air to develop the Airline Application Development System.

IBM has made over $500 million in equity investments in small U.S. software companies since early 1988. This activity directly benefits IBM financially and encourages third parties to port software to IBM platforms.

Examples of how IBM is emphasizing service include:

- In early 1990 IBM formed a 50-50 joint venture with Coopers & Lybrand. The new Meritus Consulting Services provides management consulting to selected industries.
- In early 1990 IBM announced it would work with AT&T to make their respective mainframes and network management systems work better together. This should help both companies win outsourcing deals.
- IBM has reorganized its sales force into 64 geographical and industry-oriented trading areas. Each has authority to create customized bundles of services and products.
- IBM now gives equal sales quota weight to services and product revenues.

IBM's Systems Services Division, which provides systems integration, outsourcing and DP services, became a a wholly owned subsidiary in May of this year.

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3. Intergraph Corporation, One Madison Industrial Park, Huntsville, AL 35807-4201; (205) 730-2000

Intergraph is a turnkey supplier of systems that support design, drafting, and analysis functions. Its four main markets are architectural and civil engineering, geographical information systems mapping, mechanical design, and federal systems. Revenues for the fiscal year ending December 1990 increased 21% to $1,044.6 million. Net income decreased 21%.

Since 1984 Intergraph has based its turnkey systems on a proprietary CLIPPER RISC-based hardware platform that runs under Intergraph's UNIX operating system. Intergraph builds the chip for itself and a handful of customers. INPUT believes it will become more difficult for Intergraph to sell these systems to a market that will increasingly favor open systems and standards.

All Intergraph software is compatible across all of its CLIPPER hardware platforms. Intergraph has a marketing alliance with Informix whereby Intergraph sells Informix RDBMS products. Intergraph products are integrated and based on the Informix RDBMS. Intergraph also resells Oracle and ASK/Ingres RDBMS products.

In late 1990 Intergraph acquired DAZIX/Cadnetix, Inc., a supplier of electronic design automation software. This year Intergraph entered into an agreement with Sun Microsystems whereby Sun's SPARC systems will be resold with the DAZIX software. Intergraph may have to expand the role of Sun's platforms for its turnkey systems for broader, long-term appeal.

4. Lawson Associates, Inc., 1300 Godward Street, Minneapolis, MN 55413; (612) 379-2633

Lawson's revenues reached $31 million (June 1990), up from $26 million a year earlier.

Lawson focuses on three application areas—accounting, human resources, and distribution applications software. The software runs on Unisys 4600 line, IBM RISC 6000 AIX, HP 9000, DEC System 5000 series, and Sequent S series. Lawson is investigating other platforms as well.

Revenue of $1.6 million this year was from UNIX applications software; the company expects UNIX to account for $5 million next year. In terms of features, Lawson's UNIX products are exactly the same as its proprietary products. Lawson's CASE tool for UNIX, called UNIVERSE, comes bundled with its applications software products.

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Lawson's target market is emerging midsized companies with revenue in the $40 million to $400 million range.

The company was founded in 1975. In December 1990 Lawson opened its first offices outside the U.S. The products are targeted at European subsidiaries of Lawson's existing U.S. customers.

5. Mentor Graphics Corp., 8500 S.W. Creekside Place, Beaverton, OR 97005-7191; (503) 626-7000

Mentor Graphics is one of the leading turnkey vendors of CAD/CAM products. Fiscal 1990 revenues for Mentor Graphics were $435 million, up from $428 million in 1989.

The weak economy, as well as Mentor's transition to a new product line, is having a detrimental effect on profits. The company reported losses during the first two quarters of fiscal 1991.

During the last year, Mentor introduced its second-generation electronic design automation (EDA) software product. In addition to its CAD/CAM and EDA products, Mentor Graphics also offers three CASE product lines. The target market for the company's products is electronics manufacturing companies, primarily in the aerospace, semiconductor, computer, telecommunications, and consumer electronics industries.

Since 1981 Mentor software has run only on Apollo (HP) workstations. In 1990, however, Mentor signed an agreement with Sun Microsystems and is in the process of porting all of its products over to Sun platforms.

6. Shared Medical Systems Corp., 51 Valley Stream Parkway, Malvern, PA 19355; (215) 296-6300

Shared Medical Systems (SMS) provides financial systems (billing, budgets, and cost accounting), patient management systems, and clinical systems designed for a wide variety of medical departments. Its systems serve both clinical and financial functions, in some cases operating in a mixed mode where clinical information is entered and used on local, distributed computer systems for direct needs. It is then uploaded to SMS processing centers for aggregation—especially to meet financial needs for accountability. SMS resells IBM and DEC hardware.

SMS is positioning itself to lead the industry in three key technologies for the 1990s. Firstly, it is using the latest LAN communication technologies to integrate both existing departmental computer systems and newly installed systems. Secondly, SMS sees image processing using optical disc technology as very important, especially in changing the use of information systems by departments like radiology. Thirdly, it is committed to RDBMS technology as the key to increasing the accessibility of information systems.

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7. Software Publishing Corp.,
1901 Landings Drive, Mountain View, CA 94043; (415) 962-8910

Founded in 1980, Software Publishing is a leading supplier of business productivity software for personal computers. Fiscal 1990 revenues reached $140.6 million.

In January 1991, SPC announced the sale of its Entry Level Series (PFS) product line to Spinnaker Software Corp. of Cambridge (MA) in a stock transaction valued at approximately $3.7 million.

The company's current focus is on information presentation and information access applications provided through the following product lines:

- Harvard Series of presentation graphics and project management products
- Professional Series of word processing, data management and spreadsheet products
- The InfoAlliance Series of products, introduced in September 1990, that supports networked, multiplatform computing environments within corporations

The company's primary channel of distribution is software distributors and retailers.

Non-U.S. sales are 23% of total fiscal 1990 sales. In May, Software Publishing signed a letter of intent to acquire Precision Software Ltd., of Surrey, England for $25 million. Precision Software offers a data base technology for the Windows environment. Precision Software's 1990 revenues were around $10 million.

Its long-term information access development plans are based on the client/server model.

8. Systems Union, Inc.,
10 Bank Street, White Plains, NY 10606; (212) 753-7777

Systems Union is the U.S. arm of the European-based Systems Union Group and exemplifies the kinds of companies that U.S. firms will be competing with in the international accounting software products arena. Its current year revenues in the U.S. are in the $2 million to $3 million range. Its target market is multinational U.S.-based firms.

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SunSystems is a family of integrated multicurrency accounting and business software packages that have two basic modules. The SunAccount module is a combined ledger accounting system that translates and consolidates critical financial information in all world currencies; adapts to all international accounting standards; and is available in several language versions, including French, Spanish, English, Chinese, Japanese, and German. The SunBusiness module, which integrates with SunAccount, manages all elements of single or multicurrency invoicing, sales order processing, and inventory control. It enables users to tailor contents of their sales invoices to meet their individual needs.

Client/server versions that support the Oracle or SQL Server RDBMS were announced in February 1991. The versions operate similarly on PCs, a range of PC-LANs, DEC VAX, DEC Systems ULTRIX, IBM RISC System/6000 and AS/400 workstations, midrange computers, and UNIX-based systems from NCR, Pyramid, Altos, and other vendors.

Systems Union is a Microsoft SQL Solutions Partner; SunSystems is the first accounting front-end to Microsoft's SQL Server RDBMS.

10. Triad Systems Corporation,
3055 Triad Drive, Livermore, CA 94550; (415) 449-8606

Triad is a turnkey supplier to three vertical markets: the automotive parts aftermarket, retail hardgoods dealers, and the dental market. Triad resells IBM and ATT/NCR hardware as well as its own proprietary hardware.

The company also provides automotive parts pricing and catalog updating data base electronic information services. It also offers lease financing to a substantial portion of its customers through its wholly owned subsidiary, TSC Leasing Corporation.

Fiscal 1990 revenues were $144.7 million, down from $148 million in 1989. Service revenues rose 5%, whereas revenues from its Automotive Division, Hardgoods Division, and Dental Division all decreased. Its data base electronic information services revenue rose 29%. Revenues from system sales declined 23%.

The company's strategy is to increase its installed base through greater penetration of its three vertical markets.

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Conclusions and Recommendations

Conclusions and Recommendations

A
Conclusions

During the last five years (1985-1990), user expenditures for applications software products grew at a rate of 20% compounded annually. User expenditures for turnkey systems grew at a CAGR of 11% from 1985-1990. Over the next five years, however, growth rates for both of these delivery modes will decline.

The slower growth rates are due in large part to maturity of more traditional products—much of what was previously done manually has already been automated—and to the transition under way to new kinds of applications software products that provide better and faster automation at less cost.

In the meantime, customers have become more knowledgeable about their needs and they have at least one generation of applications software products under their belts. They are now in a position to tell vendors what they want rather than simply taking what vendors give them. Over time—as standards progress—they will also have many more choices available. Thus continued allegiance to vendors is not a certainty.

Vendors will jockey for position during this time of transition. They must change their orientation from adding value through proprietary differentiation to adding value through service and solutions. Fundamental vendor philosophies will therefore need to shift along with product and technology shifts.

These fundamental technology, product and vendor transitions are cause for major confusion for vendors and also for buyers. Although power is shifting to the customer, this is not to say that customers know what choices to make. Buying cycles are becoming longer. As confusion reigns over the next several years, new vendors may have an opportunity to enter the U.S. market and succeed at the expense of previously established vendors.

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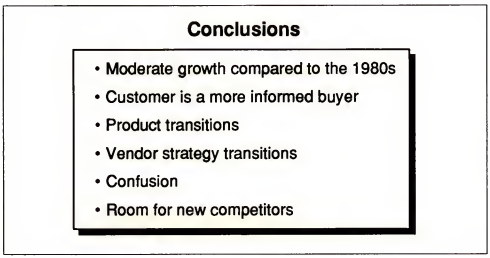
These ideas are outlined in Exhibit VIII-1.

EXHIBIT VIII-1



B
Recommendations

Vendors will have to work harder to make a sale:

- Customers do not want to be locked into one vendor for their applications software product needs.
- Many applications software product areas are mature.
- Customers know more about their needs now than they did in the 1980s; they will not purchase unless the product is clearly an improvement over their existing solutions.
- Customers are confused about all the new technologies and products being introduced.
- New competitors will move in where already established vendors are failing.

Vendor recommendations are outlined in Exhibit VIII-2 and briefly discussed below.

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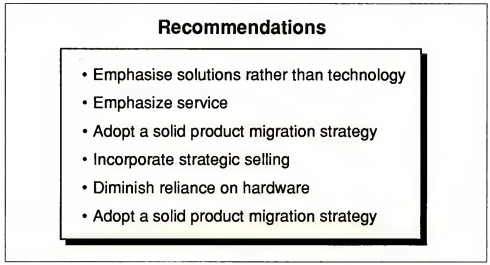
EXHIBIT VIII-2



Vendors are under pressure not only to have better products but also to be better sales professionals. They will have to listen carefully to the needs of their customers and be solutions oriented rather than technology oriented. In order to meet these demands, provision of high-quality education, service, and support—or aligning with a company that can provide these—is critical to success.

Vendors will need to add value on the basis of:

- Systems integration
- Value-added services
- Customization
- A lasting technology base

Given the trend towards applications downsizing and mounting interest in integration, vendors in the 1990s will be selling to a diverse customer set that includes various departmental managers as well as centralized IS managers. Vendors must therefore be able to sell to a variety of customers at a tactical as well as strategic level. As the ultimate corporate IS goal is enterprise-wide computing, any given vendor must provide a united front and the ability to meet multiple needs within a corporation.

In order to do this, a large vendor may need to form alliances with firms that have expertise it lacks. Alliances are as important, if not more so, for the success of the smaller niche vendors, who may lack the marketing abilities to go it alone.

Independent software vendors have a clear advantage over systems vendors in their ability and willingness to pursue a multivendor and multiplatform strategy; systems vendors have an obviously closer allegiance to their own hardware platforms. To this end, supporting standards as they evolve is critical to success. Supporting various types of UNIX is only one of several different directions a vendor can take.

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In order to support a multivendor and multiplatform strategy, turnkey vendors must either diminish reliance on hardware or support a broad range of hardware platforms. Vendors are under more pressure to open up their systems. Customers may still want a turnkey solution, but don't want to feel trapped. As platforms become more of a commodity, this will become easier to do.

Vendors must re-orient their marketing and sales efforts to reflect the realities of a more sophisticated customer as well as the realities of new technology and pricing strategies. In this regard, the provision of a clear, easy-to-follow product migration path is essential. As new technology-based products are introduced, users need to be able to migrate to them at their own pace, adopting what they choose to adopt while maintaining current solutions if that makes sense to them. There will be many more variations on this theme in the marketplace than before.

Vendors will need to choose their product and technology directions carefully: product mistakes are costly; the economy is in a longer-lasting slump than was anticipated; and sales of many "traditional" applications software products are slowing. Smaller vendors especially must be careful not to overextend themselves by trying to be all things to all people.

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Definition of Terms

A

Introduction

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs. The structure defined in Exhibit A-1 is also used in Europe and for the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year INPUT reviews its industry structure and makes changes if they are required. When changes are made they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

The changes made in INPUT definitions this year are as follows:

- *Systems Operations Submodes* - the submodes of systems operations have been redefined from processing services and professional services to platform systems operations and applications systems operations.
- *Business Services Industry* - the industry sectors of business services and personal services have been combined into a single business services sector.
- *Transportation Industry* - the information services expenditures relating to airline reservation systems have been returned to the transportation sector where they resided prior to 1990.

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B

Overall Definitions and Analytical Framework

1. Information Services

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

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

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

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

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user

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information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

2. Market Forecasts/User Expenditures

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

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

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)

- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

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

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

3. Delivery Modes

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

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

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

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

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

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

4. Market Sectors

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

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called "industry-specific" markets.
- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called "cross-industry" markets.
- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line data base market.

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

5. Other

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

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

C

Delivery Modes and Submodes

Exhibit A-1 provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

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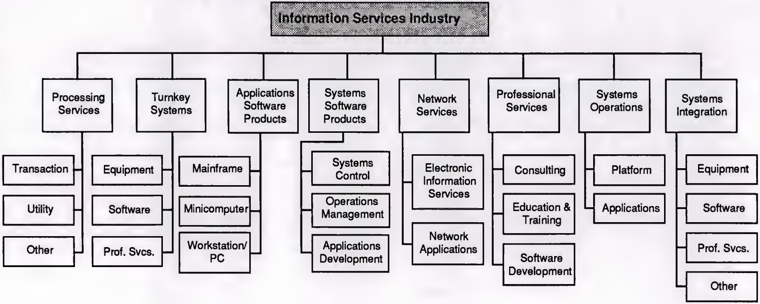
EXHIBIT A-1

Information Services Industry Structure—1991



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1. Software Products

INPUT divides the software products market into two delivery modes: systems software and applications software.

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

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

a. 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.

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

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b. 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.

2. Turnkey Systems

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

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

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

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

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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

3. Processing Services

This 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.
  - *Carry-in Batch* - Where users physically deliver work to a processing services vendor.
- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and/or data bases, enabling clients to develop their own programs or process data on 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.

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4. Systems Operations

Systems operations was a new delivery mode introduced in the 1990 Market Analysis and Systems Operations programs. It was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1991 the submodes have been redefined as indicated below.

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes where the difference is whether the support of applications, as well as data center operations, is included.

- *Platform systems operations* - the vendor manages and operates the computer systems, often including telecommunications networks, without taking responsibility for the user's application systems.

- *Applications systems operations* - the vendor manages and operates the computer systems, often including telecommunications networks, and is also responsible for maintaining, or developing and maintaining, the user's application systems.

In the federal government market. systems operation services are also defined by equipment ownership with the terms "COCO" (Contractor-Owned, Contractor-Operated), and "GOCO" (Government-Owned, Contractor-Operated).

The ownership of the equipment, which was the previous basis for the systems operations submodes, is no longer considered critical to the commercial market. Most of the market consists of systems operations relationships using vendor-owned hardware. What is now critical is the breadth of the vendor/client relationship as it expands beyond data center management to applications management.

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

5. Systems Integration (SI)

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

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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.

Systems integrators perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning

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- Life cycle support, including
  - System documentation and user training
  - Systems operations during development
  - Systems maintenance

6. 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.

7. 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. Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information

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vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

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

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

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

b. Network Applications

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

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

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

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

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

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TWX, and other messaging services. This also includes bulletin board services.

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

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

D

Sector Definitions

1. Industry Sector Definitions

INPUT has structured the information services market into 15 generic industry sectors, such as process manufacturing, insurance, transportation, etc. The definitions of these sectors are based on the 1987 revision of the Standard Industrial Classification (SIC) Code system. The specific industries (and their SIC Codes) included under these generic industry sectors are detailed in Exhibit A-2.

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EXHIBIT A-2

Industry Sector Definitions

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

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EXHIBIT A-2 (CONT.)

Industry Sector Definitions

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

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EXHIBIT A-2 (CONT.)

Industry Sector Definitions

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

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2. Cross-Industry Sector Definitions

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

Accounting - consists of applications software products and information services that serve such functions as:

- General ledger
- Accounts payable
- Accounts receivable
- Billing/invoicing
- Fixed assets
- International accounting
- Purchasing
- Taxation
- Financial consolidation

• Excluded are accounting products and services directed to a specific industry, such as tax processing services for CPAs and accountants within the business services industry sector.

Human Resources - consists of application solutions purchased by multiple industry sectors to serve the functions of human resources management and payroll. Examples of specific applications within these two major functions are:

- Employee relations
- Benefits administration
- Government compliance
- Manpower planning
- Compensation administration
- Applicant tracking
- Position control
- Payroll processing

Education and Training - consists of education and training for information systems professionals and users of information systems, as well as the use of computer-based training tools for the training of any employee on any subject.

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- The education and training cross-industry sector only considers education and training offered for a noncaptive market; in other words, this sector does not include educational services provided by information services vendors to their customers for training on their own products.

- Education and training that is provided in a classroom setting, live, is not included in this cross-industry sector. This sector is not to be confused with the education industry-specific sector, the subject of another MAP report, which addresses primary and secondary education as a vertical market for IS services.

Office Systems consists of the following:

- Integrated office systems (IOS)
- Word processing
- Desktop publishing
- Graphics

- IOSs—such as IBM's OfficeVision, HP's NewWave Office and DEC's All-In-1—typically include the following core functions, all of which are accessed from the same desktop: electronic mail, decision support systems, time management and filing systems.

- Office systems graphics include presentation graphics (which represent the bulk of office systems graphics), paint and line art, page description languages, and electronic form programs.

Engineering and Scientific encompasses the following applications:

- Computer-aided design and engineering (CAD and CAE)
- Structural analysis
- Statistics/mathematics/operations research
- Mapping

- Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from the cross-industry sector as it is specific to the manufacturing industries. CAD or CAE that is dedicated to integrated circuit design is also excluded because it is specific to the semiconductor industry.

Planning and Analysis consists of software products and information services in four application areas:

- Executive Information Systems (EIS)
- Financial modeling or planning systems
- Spreadsheets
- Project management

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Other encompasses marketing/sales and electronic publishing application solutions.

- Sales and marketing includes:
  - Sales analysis
  - Marketing management
  - Demographic market planning models
- The fundamental difference between electronic publishing and desktop publishing (within the office systems sector) is that electronic publishing encompasses a method of document management and control from a single point—regardless of how many authors/locations work on a document—whereas desktop publishing is a personal productivity tool and is generally a lower end product residing on a personal computer.
- Electronic or computer publishing systems that are sold strictly and specifically to commercial publishers, printers, and typesetters are excluded from cross-industry consideration and are included in the discrete manufacturing industry.

3. Delivery Mode Reporting by Sector

This section describes how the delivery mode forecasts relate to the market sector forecasts. Exhibit A-3 summarizes the relationships.

- *Processing services* - the transaction processing services submode is forecasted for each industry and cross-industry market sector. The utility and other processing services submodes are not considered industry or cross-industry specific and are only forecasted for the total market.
- *Turnkey systems* - all of the turnkey systems delivery mode is considered either industry or cross-industry specific and is forecasted for the 15 industry and 7 cross-industry sectors. Each component of turnkey systems (equipment, software products and professional services) is forecasted by market sector.
- *Applications software products* - all of the applications software products delivery mode is considered either industry or cross-industry specific and is forecasted for the 15 industry and 7 cross-industry sectors. In addition, each forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.
- *Systems operations* - all of systems operations is considered industry specific. Each of the submodes (platform and applications systems operations) is forecasted for each of the 15 industry sectors.

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EXHIBIT A-3

Delivery Mode versus Market Sector Forecast Content

Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	Other
Processing Services	Transaction Utility Other	X	X	 X X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform Applications	X X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications Electronic Information Services	X X		 X
Systems Software Products				X

- *Systems integration* - all of systems integration is considered industry specific. Each of the components of systems integration (equipment, software products, professional services and other services) is forecasted for each of the 15 industry sectors.

- *Professional services* - all of professional services is considered industry specific. Each of the submodes (consulting, education and training, and software development) is forecasted for each of the 15 industry sectors.

- *Network services* - all of the network applications submode of network services is considered industry specific and is forecasted for each of the 15 industry sectors. The electronic information services submode is considered to have both industry-specific and non-specific elements.

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The forecast for electronic information systems includes forecasts for the 15 industry sectors as well as an additional forecast component that applies to the market as a whole.

- *Systems software products* - All of the submodes (systems control, operations management, applications development) are considered neither industry- nor cross-industry specific. They are only forecasted in total. In addition, each submode forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.

E

Vendor Revenue and User Expenditure Conversion

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

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

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

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

Exhibit A-4 summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to end-user expenditure (market size) figures for each delivery mode.

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EXHIBIT A-4

Vendor Revenue to User Expenditure Conversion

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

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Appendix: Forecast Data Base

A

Forecast Data Base

Exhibits B-1 through B-6 provide INPUT's forecasts for applications software products and turnkey systems. The forecasts are presented by platform size and submode, and by market sector.

EXHIBIT B-1

Applications Software Products and Turnkey Systems Forecast by Platform Size and Submode, 1990-1996

Delivery Mode	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
SW and Turnkey Market	28110	11	31316	34882	38885	43525	48880	55440	12
Turnkey Systems	10434	10	11474	12530	13571	14686	15888	17410	9
-Equipment	4874	8	5273	5668	6010	6303	6593	6980	6
-Software	3883	11	4324	4749	5195	5720	6293	7010	10
• Applications Software	3326	12	3734	4124	4540	5026	5563	6224	11
• Systems Software	557	6	592	625	655	694	730	786	6
-Professional Services	1677	12	1877	2113	2366	2663	3002	3420	13
Applications Software	17676	12	19842	22352	25314	28839	32992	38030	14
-Mainframe	5017	6	5315	5630	5989	6382	6799	7260	6
-Minicomputer	5221	10	5749	6288	6889	7576	8340	9155	10
-Workstation/PC	7438	18	8778	10434	12436	14881	17853	21615	20

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EXHIBIT B-2

Applications Software Products
User Expenditure Forecast by Market Sector, 1990-1996

Market Sector	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Market Sector Total	17676	12	19842	22352	25314	28839	32992	38030	14
Vertical Industry Markets	9707	12	10894	12183	13752	15620	17827	20643	14
Discrete Manufacturing	1755	12	1967	2224	2530	2881	3295	3799	14
Process Manufacturing	520	14	595	683	783	899	1036	1198	15
Transportation	351	11	390	431	478	538	596	661	11
Utilities	180	12	202	227	255	287	325	366	13
Telecommunications	317	19	378	452	539	646	774	930	20
Retail Distribution	241	13	272	306	345	392	446	506	13
Wholesale Distribution	475	11	527	587	662	743	845	958	13
Banking & Finance	2130	7	2270	2430	2615	2860	3160	3480	9
Insurance	768	11	852	955	1093	1266	1496	1750	15
Medical	869	13	985	1125	1296	1505	1768	2089	16
Education	606	12	676	746	829	921	1026	1143	11
Business Services	759	16	880	1017	1177	1367	1590	1791	15
Federal Government	390	33	520	580	683	794	886	1316	20
State & Local Govt.	127	13	143	163	187	216	252	293	15
Misc. Industries	219	8	237	257	280	305	332	363	9
Cross-Industry Markets	7969	12	8948	10169	11562	13219	15165	17387	14
Accounting	2028	11	2250	2501	2792	3131	3527	3992	12
Education & Training	208	16	242	284	335	398	475	558	18
Engineering & Scientific	564	15	651	749	863	998	1159	1344	16
Human Resources	644	8	694	763	855	960	1092	1242	12
Office Systems	2014	12	2250	2604	2974	3432	3961	4552	15
Planning & Analysis	2074	15	2375	2720	3120	3584	4125	4756	15
Other	437	11	486	548	623	716	826	943	14

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EXHIBIT B-3

Mainframe Applications Software Products

Market Sector	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Market Sector Total	5017	7	5315	5630	5989	6382	6799	7260	6
Vertical Industry Markets	3101	7	3301	3521	3760	4044	4340	4670	7
Discrete Manufacturing	372	3	383	410	442	467	492	524	6
Process Manufacturing	157	8	169	182	193	203	212	225	6
Transportation	135	6	143	149	155	169	175	182	5
Utilities	42	10	46	50	53	56	60	64	7
Telecommunications	160	15	184	212	243	280	322	370	15
Retail Distribution	44	9	48	51	54	57	60	63	6
Wholesale Distribution	233	5	245	255	268	275	287	298	4
Banking & Finance	950	7	1010	1080	1160	1270	1400	1540	9
Insurance	311	5	327	344	367	388	413	438	6
Medical	344	7	369	395	422	446	470	500	6
Education	80	3	82	84	86	87	89	91	2
Business Services	115	3	119	122	124	128	131	134	2
Federal Government	90	22	110	114	126	137	144	151	5
State & Local Govt.	51	8	55	58	62	67	72	77	7
Misc. Industries	17	-6	16	15	15	14	13	13	-4
Cross-Industry Markets	1916	5	2009	2109	2219	2338	2459	2590	5
Accounting	728	4	757	787	819	852	885	920	4
Education & Training	38	5	40	41	42	43	44	46	3
Engineering & Scientific	135	8	146	157	170	184	199	215	8
Human Resources	258	3	265	278	292	307	322	338	5
Office Systems	160	2	163	164	165	170	173	176	2
Planning & Analysis	415	8	447	478	512	548	586	627	7
Other	182	5	191	204	219	234	250	268	7

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EXHIBIT B-4

Minicomputer Applications Software Products

Market Sector	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Market Sector Total	5221	10	5749	6288	6889	7576	8340	9155	10
Vertical Industry Markets	3217	10	3550	3873	4238	4661	5137	5654	10
Discrete Manufacturing	935	12	1046	1158	1268	1389	1522	1685	10
Process Manufacturing	185	12	207	231	258	288	322	356	11
Transportation	97	8	105	114	124	135	147	156	8
Utilities	59	10	65	71	78	86	95	102	9
Telecommunications	76	22	93	113	138	168	205	251	22
Retail Distribution	112	11	124	137	152	168	186	205	11
Wholesale Distribution	111	10	122	137	152	168	186	200	10
Banking & Finance	680	6	720	765	825	900	990	1085	9
Insurance	116	6	123	128	132	136	140	145	3
Medical	266	9	290	316	344	375	409	449	9
Education	154	11	171	182	197	214	232	252	8
Business Services	196	10	216	236	256	278	303	325	9
Federal Government	120	25	150	158	177	208	240	270	12
State & Local Govt.	28	11	31	35	39	44	50	57	13
Misc. Industries	82	6	87	92	98	104	110	116	6
Cross-Industry Markets	2004	10	2199	2415	2651	2915	3203	3501	10
Accounting	529	6	560	594	629	667	707	750	6
Education & Training	24	8	26	28	30	32	34	36	7
Engineering & Scientific	211	14	241	272	303	338	375	415	11
Human Resources	242	6	256	275	298	323	348	376	8
Office Systems	557	14	634	720	820	935	1065	1190	13
Planning & Analysis	324	9	353	384	415	449	486	526	8
Other	117	10	129	142	156	171	188	208	10

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EXHIBIT B-5

Workstation/PC Applications Software Products

Market Sector	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Market Sector Total	7438	18	8778	10434	12436	14881	17853	21615	20
Vertical Industry Markets	3389	19	4038	4789	5744	6915	8350	10319	21
Discrete Manufacturing	448	20	538	656	820	1025	1281	1590	24
Process Manufacturing	178	23	219	270	332	408	502	617	23
Transportation	119	19	142	168	199	234	274	323	18
Utilities	79	15	91	106	124	145	170	200	17
Telecommunications	81	25	101	127	158	198	247	309	25
Retail Distribution	85	18	100	118	139	167	200	238	19
Wholesale Distribution	131	22	160	195	242	300	372	460	24
Banking & Finance	500	8	540	585	630	690	770	855	10
Insurance	341	18	402	483	594	742	943	1167	24
Medical	259	26	326	414	530	684	889	1140	28
Education	372	14	423	480	546	620	705	800	14
Business Services	448	22	545	659	797	961	1156	1332	20
Federal Government	180	44	260	308	380	449	502	895	28
State & Local Govt.	48	19	57	70	86	105	130	159	23
Misc. Industries	120	12	134	150	167	187	209	234	12
Cross-Industry Markets	4049	17	4740	5645	6692	7966	9503	11296	19
Accounting	771	21	933	1120	1344	1612	1935	2322	20
Education & Training	146	21	176	215	263	323	397	476	22
Engineering & Scientific	218	21	264	320	390	476	585	714	22
Human Resources	144	20	173	210	265	330	422	528	25
Office Systems	1297	12	1453	1720	1989	2327	2723	3186	17
Planning & Analysis	1335	18	1575	1858	2193	2587	3053	3603	18
Other	138	20	166	202	248	311	388	467	23

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EXHIBIT B-6

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

Market Sector	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Market Sector Total	10434	10	11474	12530	13571	14686	15888	17410	9
Vertical Industry Markets	9096	11	10063	11037	11985	12991	14065	15500	9
Discrete Manufacturing	2460	14	2798	3097	3404	3727	4084	4715	11
Process Manufacturing	509	12	568	634	709	793	889	1000	12
Transportation	250	10	275	302	332	366	402	443	10
Utilities	85	9	93	105	119	134	152	172	13
Telecommunications	462	12	519	581	654	735	828	931	12
Retail Distribution	664	6	707	754	804	858	915	992	7
Wholesale Distribution	456	7	487	522	559	604	653	683	7
Banking & Finance	925	8	1000	1075	1160	1250	1355	1460	8
Insurance	292	7	311	331	349	366	380	397	5
Medical	928	7	994	1060	1116	1161	1192	1269	5
Education	216	7	231	247	265	283	303	324	7
Business Services	743	9	810	885	962	1045	1129	1235	9
Federal Government	494	24	612	736	790	846	896	938	9
State & Local Govt.	150	11	167	186	206	230	255	284	11
Misc. Industries	462	6	491	522	556	593	632	657	6
Cross-Industry Markets	1338	5	1411	1493	1586	1695	1823	1910	6
Accounting	422	3	435	448	461	475	490	504	3
Education & Training	170	7	182	196	213	239	275	293	10
Engineering & Scientific	112	10	123	134	144	153	159	173	7
Human Resources	82	2	84	86	88	89	90	92	2
Office Systems	65	2	66	67	69	70	72	73	2
Planning & Analysis	50	0	50	50	50	50	50	50	0
Other	437	8	471	512	561	619	687	725	9

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B

Forecast Reconciliation

Changes in expenditures on applications software products reflected in the data base are due to the following:

- Expenditures on minicomputer-based applications software products have been adjusted downwards for 1990 compared to INPUT's previous year forecast for 1990, as we feel this number had been overstated in the past. With this adjustment, actual 1990 expenditures for minicomputer-based applications software products were $5.2 billion rather than the forecasted $5.6 billion.

- The federal government sector's expenditures on applications software products in 1990 have been adjusted downwards by 29%; previous year's forecasts for this sector included a certain percentage of cross-industry applications software products that had already been counted in the appropriate cross-industry sector forecasts.

- Banking and finance's forecasted expenditures over a five-year period have been lowered to reflect more conservative growth rates.

With regard to turnkey systems, 1990 actuals were slightly higher than forecasted due to larger than expected expenditures by the telecommunications and federal government sectors.

For both applications software products and turnkey systems, INPUT's 1991 forecasted growth rate for the period 1991-1996 remains the same as INPUT's 1990 forecast for the period 1990-1995.

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EXHIBIT B-7

1991 Data Base Reconciliation
Applications Software Products and Turnkey Systems

Delivery Mode	1990 Market				1995 Market				90-95 CAGR per data 90 rpt (%)	90-95 CAGR per data 91 rpt (%)
	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)		
SW and Tky. Sys.	28481	28110	-371	-1	50253	48880	-1373	-3	12	12
Turnkey Systems	10339	10434	95	1	15553	15888	335	2	9	9
-Equipment	4830	4874	44	1	6563	6593	30	0	6	6
-Software	3847	3883	36	1	6230	6293	63	1	10	10
• Aps. Soft.	3294	3326	32	1	5486	5563	77	1	11	11
• Sys. Soft.	552	557	5	1	744	730	-14	-2	6	6
-Prof. Svs.	1662	1677	15	1	2760	3002	242	9	11	12
Applications SW	18142	17676	-466	-3	34700	32992	-1708	-5	14	13
-Mainframe	5054	5017	-37	-1	7305	6799	-506	-6	8	6
-Minicomputer	5575	5221	-354	-6	8845	8340	-505	-6	10	10
-Workst./PC	7513	7438	-75	-1	18551	17853	-698	-4	20	19

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EXHIBIT B-8

1991 Data Base Reconciliation
Applications Software Products Market

Market Sector	1990 Market				1995 Market				90-95 CAGR per data 90 rpt (%)	90-95 CAGR per data 91 rpt (%)
	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)		
Total Applications Software Products Market	18143	17676	-467	-3	34700	32992	-1708	-5	14	13
Vert. Indus. Mkts.	10075	9707	-368	-4	18961	17827	-1134	-6	13	13
Discr. Mfg.	1828	1755	-73	-4	3412	3295	-117	-3	13	13
Process Mfg.	535	520	-15	-3	1069	1036	-33	-3	15	15
Transportation	359	351	-8	-2	603	596	-7	-1	11	11
Utilities	185	180	-5	-3	333	325	-8	-2	12	13
Telecom.	317	317	0	0	774	774	0	0	20	20
Retail Distr.	249	241	-8	-3	459	446	-13	-3	13	13
Wholesale Distr.	484	475	-9	-2	872	845	-27	-3	13	12
Banking & Finance	2150	2130	-20	-1	3860	3160	-700	-18	12	8
Insurance	779	768	-11	-1	1538	1496	-42	-3	15	14
Medical	891	869	-22	-2	1843	1768	-75	-4	16	15
Education	619	606	-13	-2	1043	1026	-17	-2	11	11
Bus. Services	775	759	-16	-2	1603	1590	-13	-1	16	16
Federal Govt.	546	390	-156	-29	945	887	-58	-6	12	18
State & Local Govt.	132	127	-5	-4	268	252	-16	-6	15	15
Misc. Industries	226	219	-7	-3	340	332	-8	-2	9	9
Cross-Ind. Mkts.	8068	7969	-99	-1	15739	15165	-574	-4	14	14
Accounting	2028	2028	0	0	3763	3527	-236	-6	13	12
Ed. & Training	210	208	-2	-1	480	475	-5	-1	18	18
Eng. & Scientific	582	564	-18	-3	1180	1159	-21	-2	15	15
Human Resources	643	644	1	0	1097	1092	-5	0	11	11
Office Systems	2059	2014	-45	-2	4088	3961	-127	-3	15	14
Planning & Analy.	2100	2074	-26	-1	4208	4125	-83	-2	15	15
Other	446	437	-9	-2	923	826	-97	-11	16	14

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EXHIBIT B-9

1991 Data Base Reconciliation
Mainframe Applications Software Products Market

Market Sector	1990 Market				1995 Market				90-95 CAGR per data 90 rpt (%)	90-95 CAGR per data 91 rpt (%)
	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)		
Total Mainframe Applications Software Products Market	5054	5017	-37	-1	7305	6799	-506	-7	8	6
Vert. Indus. Mkts.	3139	3101	-38	-1	4712	4340	-372	-8	8	7
Discr. Mfg.	372	372	0	0	535	492	-43	-8	8	6
Process Mfg.	157	157	0	0	230	212	-18	-8	8	6
Transportation	135	135	0	0	176	175	-1	-1	5	5
Utilities	42	42	0	0	65	60	-5	-8	9	7
Telecom.	160	160	0	0	322	322	0	0	15	15
Retail Distribution	44	44	0	0	65	60	-5	-8	8	6
Wholesale Distr.	233	233	0	0	306	287	-19	-6	6	4
Banking & Finance	950	950	0	0	1584	1400	-184	-12	11	8
Insurance	311	311	0	0	449	413	-36	-8	8	6
Medical	322	344	22	7	511	470	-41	-8	8	6
Education	80	80	0	0	93	89	-4	-4	3	2
Business Services	115	115	0	0	136	131	-5	-4	3	3
Federal Govt.	126	90	-36	-29	153	144	-9	-6	4	10
State & Local Govt.	53	51	-2	-4	74	72	-2	-3	7	7
Misc. Industries	17	17	0	0	13	13	0	0	-5	-5
Cross-Ind. Mkts.	1916	1916	0	0	2593	2459	-134	-5	6	5
Accounting	728	728	0	0	885	885	0	0	4	4
Ed. & Training	38	38	0	0	49	44	-5	-10	5	3
Eng. & Scientific	135	135	0	0	210	199	-11	-5	9	8
Human Resources	258	258	0	0	300	322	22	7	3	5
Office Systems	160	160	0	0	173	173	0	0	2	2
Planning & Analy.	415	415	0	0	644	586	-58	-9	9	7
Other	182	182	0	0	331	250	-81	-24	13	7

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EXHIBIT B-10

1991 Data Base Reconciliation
Minicomputer Applications Software Products Market

Market Sector	1990 Market				1995 Market				90-95 CAGR per data 90 rpt (%)	90-95 CAGR per data 91 rpt (%)
	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)		
Total Minicomputer Applications Software Products Market	5575	5221	-354	-6	8845	8340	-505	-6	10	10
Vert. Indus. Mkts.	3472	3217	-255	-7	5549	5137	-412	-7	10	10
Discr. Mfg.	1009	935	-74	-7	1595	1522	-73	-5	10	10
Process Mfg.	200	185	-15	-7	337	322	-15	-4	11	12
Transportation	105	97	-8	-8	153	147	-6	-4	8	9
Utilities	64	59	-5	-8	99	95	-4	-4	9	10
Telecom.	76	76	0	0	204	205	1	0	22	22
Retail Distribution	121	112	-9	-7	194	186	-8	-4	10	11
Wholesale Distr.	120	111	-9	-7	195	186	-9	-5	10	11
Banking & Finance	700	680	-20	-3	1200	990	-210	-17	11	8
Insurance	126	116	-10	-8	146	140	-6	-4	3	4
Medical	288	266	-22	-8	444	409	-35	-8	9	9
Education	167	154	-13	-8	245	232	-13	-5	8	9
Business Services	212	196	-16	-8	311	303	-8	-3	8	9
Federal Govt.	167	120	-47	-28	257	240	-17	-7	9	15
State & Local Govt.	28	28	0	0	52	50	-2	-4	13	12
Misc. Industries	89	82	-7	-8	118	110	-8	-7	6	6
Cross-Ind. Mkts.	2104	2004	-100	-5	3296	3203	-93	-3	9	10
Accounting	529	529	0	0	708	707	-1	0	6	6
Ed. & Training	26	24	-2	-8	34	34	0	0	6	7
Eng. & Scientific	228	211	-17	-7	384	375	-9	-2	11	12
Human Resources	242	242	0	0	355	348	-7	-2	8	8
Office Systems	602	557	-45	-7	1100	1065	-35	-3	13	14
Planning & Analy.	351	324	-27	-8	511	486	-25	-5	8	8
Other	127	117	-10	-8	204	188	-16	-8	10	10

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EXHIBIT B-11

1991 Data Base Reconciliation
Workstation Applications Software Products Market

Market Sector	1990 Market				1995 Market				90-95 CAGR per data 90 rpt (%)	90-95 CAGR per data 91 rpt (%)
	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)		
Total Workstation Applications Software Products Market	7513	7438	-75	-1	18551	17853	-698	-4	20	19
Vert. Indus. Mkts.	3465	3389	-76	-2	8700	8350	-350	-4	20	20
Discr. Mfg.	448	448	0	0	1281	1281	0	0	23	23
Process Mfg.	178	178	0	0	502	502	0	0	23	23
Transportation	119	119	0	0	274	274	0	0	18	18
Utilities	79	79	0	0	170	170	0	0	17	17
Telecom.	81	81	0	0	248	247	-1	0	25	25
Retail Distribution	85	85	0	0	200	200	0	0	19	19
Wholesale Distr.	131	131	0	0	372	372	0	0	23	23
Banking & Finance	500	500	0	0	1076	770	-306	-28	17	9
Insurance	341	341	0	0	943	943	0	0	23	23
Medical	259	259	0	0	889	889	0	0	28	28
Education	372	372	0	0	705	705	0	0	14	14
Business Services	448	448	0	0	1156	1156	0	0	21	21
Federal Govt.	253	180	-73	-29	535	502	-33	-6	16	23
State & Local Govt	50	48	-2	-4	141	130	-11	-8	23	22
Misc. Industries	120	120	0	0	209	209	0	0	12	12
Cross-Ind. Mkts.	4049	4049	0	0	9850	9503	-347	-4	19	19
Accounting	771	771	0	0	2169	1935	-234	-11	23	20
Ed. & Training	146	146	0	0	397	397	0	0	22	22
Eng. & Scientific	218	218	0	0	585	585	0	0	22	22
Human Resources	144	144	0	0	442	422	-20	-5	25	24
Office Systems	1297	1297	0	0	2815	2723	-92	-3	17	16
Planning & Analy.	1335	1335	0	0	3053	3053	0	0	18	18
Other	138	138	0	0	388	388	0	0	23	23

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EXHIBIT B-12

1991 Data Base Reconciliation
Turnkey Systems Market

Market Sector	1990 Market				1995 Market				90-95 CAGR per data 90 rpt (%)	90-95 CAGR per data 91 rpt (%)
	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)	1990 Report (Fcst) ($M)	1991 Report (Fcst) ($M)	Variance from 1990 Report ($M)	Variance from 1990 Report (%)		
Total Turnkey Systems Market	10338	10434	96	1	15553	15888	335	2	9	9
Vert. Indus. Mkts.	9000	9096	96	1	13731	14065	334	2	9	9
Discr. Mfg.	2460	2460	0	0	4084	4084	0	0	11	11
Process Mfg.	509	509	0	0	889	889	0	0	12	12
Transportation	250	250	0	0	402	402	0	0	10	10
Utilities	85	85	0	0	145	152	7	5	11	12
Telecom.	420	462	42	10	770	828	58	8	13	12
Retail Distribution	664	664	0	0	915	915	0	0	7	7
Wholesale Distr.	456	456	0	0	653	653	0	0	7	7
Banking & Finance	939	925	-14	-1	1408	1355	-53	-4	8	8
Insurance	292	292	0	0	380	380	0	0	5	5
Medical	928	928	0	0	1192	1192	0	0	5	5
Education	216	216	0	0	303	303	0	0	7	7
Business Services	743	743	0	0	1159	1129	-30	-3	9	9
Federal Govt.	427	494	67	16	545	896	351	64	5	13
State & Local Govt.	151	150	-1	-1	255	255	0	0	11	11
Misc. Industries	462	462	0	0	632	632	0	0	6	6
Cross-Ind. Mkts.	1338	1338	0	0	1822	1823	1	0	6	6
Accounting	422	422	0	0	489	490	1	0	3	3
Ed. & Training	170	170	0	0	275	275	0	0	10	10
Eng. & Scientific	112	112	0	0	159	159	0	0	7	7
Human Resources	82	82	0	0	90	90	0	0	2	2
Office Systems	65	65	0	0	72	72	0	0	2	2
Planning & Analy.	50	50	0	0	50	50	0	0	0	0
Other	437	437	0	0	687	687	0	0	9	9

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Appendix: Applications Software Questionnaire

INPUT is conducting its annual research on trends, opportunities and driving forces shaping the applications software products industry. Your response to the following questions will provide a foundation for this research.

The questionnaire concerns purchase of applications software products for mainframes, minicomputers and workstations/personal computers and should be completed by the corporate IS or systems development executive. In return, INPUT will send you a summary report of its findings. Your participation is greatly appreciated.

Please mail your completed questionnaire by April 30, 1991 to: MAP, INPUT, 1280 Villa Street, Mountain View, CA 94041-1194, or Fax to (415) 961-3966.

Demographics

1. In which of the following industries does your organization participate?

☐ Discrete Manufacturing	☐ Insurance
☐ Process Manufacturing	☐ Medical
☐ Transportation	☐ Education
☐ Utilities	☐ Business Services
☐ Telecommunications	☐ Federal Government
☐ Retail Distribution	☐ State & Local Gov't.
☐ Wholesale Distribution	☐ Consumer & Home
☐ Banking & Finance	☐ Other (Specify) _____

2. What are your organization's revenues and number of employees?

a. Revenue	b. Number of Employees
☐ Over $10 Billion	☐ Over 10,000
☐ Over $1 Billion	☐ Over 5,000
☐ Over $500 Million	☐ Over 1,000
☐ Over $100 Million	☐ Over 500
☐ Over $50 Million	☐ Under 500
☐ Under $50 Million	

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3. What is your position/title?

4. Which of the following describes your information systems organization?

☐ Corporate IS ☐ Division IS

This questionnaire makes a distinction between cross-industry and industry-specific applications software. Please use these definitions when responding to the questions:

Cross-industry—Software products that perform a specific function applicable to a wide range of industry sectors. Examples are accounting, financial modeling, human resources, payroll, word processing, and spreadsheets.

Industry-specific—Software products that perform functions related to solving needs unique to a specific vertical industry and sold to that industry only. Examples are portfolio management, MRPII, and medical recordkeeping.

Data base management systems (DBMSs), graphical user interfaces such as Windows, and application development tools including CASE tools, are not included as applications software. Also excluded are processing services and network services.

Expenditures and Purchase Plans

5. Overall, how much will your organization spend in 1991 on the purchase/license of applications software packages? In 1992?

	Expenditures ($1,000)
1991	_____
1992	_____

Does this amount encompass all applications software products packages purchased/licensed for your entire organization?

☐ Yes ☐ No

If no, what percentage of total purchases do you estimate this to be? (circle one)

<40% 40%-59% 60%-79% 80%-89% 90%-100%

6. For the expenditures indicated in #5, how much would you say is spent on cross-industry applications? Industry-specific? Please estimate expenditures in dollars ($1,000s) or percent (%), whichever is easiest.

	1991	1992
Cross-Industry	_____	_____
Industry-Specific	_____	_____
Total	_____	_____

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How much of the total would you say is spent on applications software packages for each platform size? Please estimate in dollars ($1,000s) or percent (%), whichever is easiest.

	1991	1992
Mainframe	_____	_____
Minicomputer	_____	_____
Workstation/PC	_____	_____
Total	_____	_____

7. Is the split by platform size different for cross-industry and industry-specific applications software?

☐ Yes ☐ No

If yes, please estimate percent split by platform size.

	Main frame	Mini computer	Workstation/ PC
Cross-Industry	_____	_____	_____
Industry-Specific	_____	_____	_____
Total	100%	100%	100%

8. For total expenditures indicated in #5, what percent do you think is for purchase of new applications software packages vs. maintenance/annual license fees for existing software?

	1991	1992
New applications software packages	_____	_____
Maintenance/Annual license fees	_____	_____
Total	100%	100%

9. Is the split by new vs. maintenance/annual license fees different for cross-industry and industry-specific?

☐ Yes ☐ No

If yes, please estimate split.

	New	Maintenance/ Annual License Fees
Cross-Industry	_____	_____
Industry-Specific	_____	_____
Total	100%	100%

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10. In the table below, please indicate 1991 expenditures on the cross-industry application types listed. Also for each application type, please estimate expenditures by platform size. Estimate expenditures in dollars ($1,000s) or percent (%), whichever is easiest.

(insert Cross-Industry chart)

11. In the table below, please list the industry-specific applications software packages on which you will spend the most in 1991, and indicate amount of expenditure. Also for each package, please estimate expenditures by platform size. Estimate expenditures in dollars ($1,000s) or percent (%) whichever is easiest.

(insert cross-industry chart)

12. Of all new applications software purchases, what percentage of packages will you modify or customize?

☐ >10% ☐ 10%-30% ☐ 30%-50%
☐ 50%-70% ☐ 70%-90% ☐ 90%-100%

Who will do the customization?

☐ In-house staff
☐ Software vendor
☐ In-house staff
☐ Professional services vendor
☐ Systems integrator

13. Please estimate total 1991 expenditures on applications software for the following categories. Estimate in dollars ($1,000s) or percent (%), whichever is easiest.

_____ Purchase of applications software packages
_____ Maintenance and enhancement of existing software
_____ Internal development of new applications software

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14. Please rank in order of significance the following reasons that you purchase new applications software packages. Assign a number, 1-8, to each reason, where 1 is the most significant reason and 8 is the least significant.

	Ranking
New features that provide added functionality	_____
Does same functions but does it better or faster	_____
Automating functions that were previously done manually or not done at all	_____
Migrating to open systems/UNIX	_____
Moving to smaller hardware platforms	_____
Want LAN-based applications software	_____
Easier to use than previous software	_____
Other _____	_____

15. Please rank the following reasons for selecting an applications software vendor. Assign one number, 1-8, to each reason, where 1 is the most significant/important reason and 8 is the least significant/important.

	Ranking
Number of years in business	_____
Product features and functions	_____
Broad range of applications software	_____
All software integrated	_____
Easily customizable software	_____
Strong service and support	_____
Price is right	_____
Other _____	_____

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15. What are your three key technology goals over the next several years as they relate to applications software products?

a. _____

b. _____

c. _____

Thank you for participating in our survey. If you would like us to send you a summary of the survey's findings please provide your name and address. No salesperson will call you and your responses to the survey will be kept in strict confidence.

Name: _____
Company: _____
Address: _____
_____
Phone: _____

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

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