INFORMATION SERVICES OPPORTUNITIES IN CROSS-INDUSTRY MARKETS, 1992-1997

INPUT

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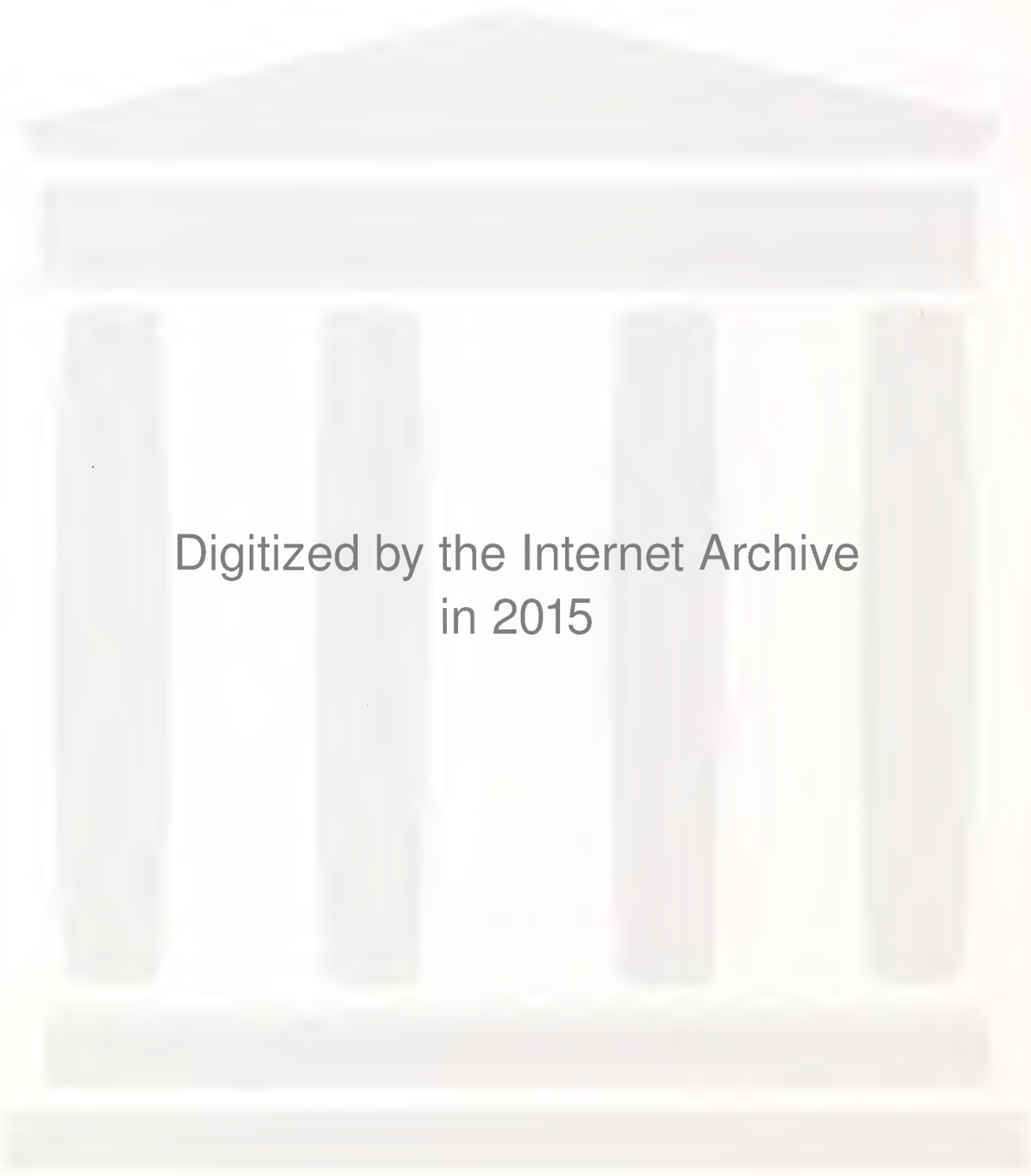
Abstract

This INPUT report, *Information Services Opportunities in Cross-Industry Markets, 1992-1997*, provides forecasts and analyses for the seven cross-industry sectors: accounting, human resources, education and training, engineering and scientific, office systems, planning and analysis, and sales and marketing. The five-year forecasts for each sector cover applications software products, turnkey systems and processing services.

User department directions are identified and the impacts of technologies and trends are rated for each sector. The competitive environment for each sector is described and leading vendors are profiled.

The report contains 226 pages and 89 exhibits.



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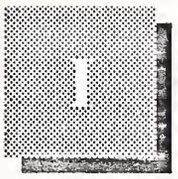


Introduction

A
Purpose and Organization

This report is part of a series of market analysis reports written each year by INPUT on industry and cross-industry sectors of the U.S. information services industry. This report analyzes the cross-industry sectors of the U.S. information services industry.

1. Purpose

The objectives of this report are to:

- Forecast user expenditures during the next five years on information services for each of the seven cross-industry sectors
- Identify and discuss user department directions as they relate to each of the seven cross-industry sectors
- Identify technological issues and trends that are driving the use of information services for the cross-industry sectors
- Discuss the competitive environment and profile leading vendors in each of the cross-industry sectors
- Summarize findings through comparing and contrasting the cross-industry sectors

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

- Review the forces shaping their markets
- Develop internal corporate financial projections

- Identify new markets and product and services opportunities
- Assess the competitive trends
- Determine potential market directions
- Assist in prioritizing investments

2. Organization

This report is organized as follows:

- Chapter II is an overview of the cross-industry sectors of the information services market.
- Chapters III through IX are individual discussions of each of the seven cross-industry sectors. Within each chapter there are five sections.
  - Section 1, *Definitions*, introduces and defines each of the cross-industry sectors.
  - Section 2, *Information Services Markets*, presents the information services market forecasts by delivery mode and submode for each of the seven cross-industry sectors.
  - Section 3, *User Department Directions*, discusses and analyzes interviews with end-user organizations representing the seven cross-industry sectors.
  - Section 4, *Trends/Technology Ratings of Importance*, provides vendor and user respondent ratings of the relative importance of eight technologies.
  - Section 5, *Vendors and Competitive Environment*, discusses the competitive environment for information services within each of the cross-industry sectors and profiles leading and emerging vendors.
- Chapter X summarizes the conclusions of Chapters III through IX.
- Appendix A—*Definition of Terms*—provides definitions and descriptions of market structures and terms used throughout INPUT's reports.

- Appendix B—*Forecast Data Base*—provides a detailed forecast by delivery mode for each cross-industry sector. It also contains a reconciliation to the previous year's cross-industry sector reports.

B
Scope and Methodology

This report addresses the U.S. information services industry in seven cross-industry sectors. It includes only user expenditures that are noncaptive (generally available to vendors). Many large organizations have portions of their information services requirements satisfied by internal divisions. The resulting expenditure is not available for competitive bid by the general vendor community and is not included in INPUT's projections.

1. Cross-Industry Sector Definitions

INPUT defines cross-industry information services as packaged functional application solutions that are used by multiple industry sectors. In other words, these application solutions are not verticalized. For example, accounting, and planning and analysis are functions that are similar enough across all industries to be considered markets in their own right for nonverticalized application solutions.

The seven cross-industry sectors identified by INPUT are:

- Accounting
- Human Resources
- Education and Training
- Engineering and Scientific
- Office Systems
- Planning and Analysis
- Sales and Marketing

2. Delivery Mode Definitions

Cross-industry information services are delivered via applications software products, turnkey systems and transaction processing services. Management support information services such as systems operations, systems integration and professional services, information delivery services and systems software are excluded from cross-industry consideration.

For a more complete discussion of INPUT's information services industry structure and market sector definitions, please refer to the separate volume, INPUT's *Definition of Terms* found in the volume I binder of the 1992 Market Analysis Program reports.

3. Methodology

Data was collected and analyzed from in-depth telephone interviews with 37 vendors and 18 user departments representing all cross-industry sectors. In addition, INPUT's library was used as an information resource, as were the results of previous INPUT reports on key aspects of the information services industry.

C
Forecast Assumptions

In developing the five-year forecasts, INPUT has incorporated current economic assumptions regarding the outlook for the U.S. economy as a whole.

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

- The economic situation is showing signs of improvement and its impact on the information services market will be more favorable in 1992 and beyond than it was in 1991.

1. Economic Overview

The year 1991 was one in which the recession was expected to end, the recovery to start, and the ambiguities of an uncertain economy to gradually disappear. The end of the Middle East crisis brought a brief euphoria, as American troops, victorious in Iraq, returned home to hopes that the end of the conflict would "jump-start" the economy. Some encouraging signs were seen, but by year-end 1991, the U.S. economy was still sluggish, with no clear signs of a near-term sustainable recovery.

Phrases such as "all the necessary pieces to initiate and sustain a recovery are in place" have been common in the media, but as late as May 1992, the hoped-for sustainable upturn in the economy is just starting to be seen. Few disagree that a return to economic growth will happen, but opinions vary widely as to when a steady, sustainable turnaround will be solidly assured, how quickly the economy will rebound, and what the new growth rates will be for the country, the various industries and the financial resources that fuel the economy.

At present, economists are expecting an inflation-adjusted gross domestic product (GDP) to increase 2.8% from the fourth quarter of 1991 to the fourth quarter of 1992, and about the same increase in 1993. This will be the best economic performance in four years, but it is only half the average pace recorded in the initial years of previous recoveries.

2. Economic Impact

Official or unofficial, recession in the U.S. finally ended a decade of largely uninterrupted economic growth.

Economic growth is significant because 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. For example:

- The inflation rate of the past few years has been much more modest than in the mid-1980s and, as noted above, is expected to continue at modest levels. Because INPUT's forecasts and market sizes are in current dollars, lower inflation means lower growth.

- Real economic growth had been modest over the few years prior to the economic slowdown. As a result, deferred and canceled expansion plans in all industry sectors have slowed the expansion of information services expenditures. A 2.8% increase per year in the GDP for 1992 and 1993 is not likely to change this condition.

- The trend toward shifting information processing to smaller computers lowers the software products investment, based on current pricing practices. Thus, the quantities of software products sold increase, but revenue levels grow at a more modest rate.

The net economic influence on the cross-industry sectors for information services is that the slowdown in growth and constraints on budgets seen over the last two years will not appreciably change over the next two years.

Businesses that use cross-industry information services will still be dealing with their own market, product and organizational uncertainties, and although such an environment offers many opportunities for the use of new products and technologies, users are expected to continue their tendency toward cautious change and growth, and strong expense controls.

D
Related Reports

Related reports of possible interest to the reader include:

1. U.S. Markets

- *U.S. Application Solutions Market, 1991-1996*
- *U.S. Processing Services Market, 1991-1996*
- *U.S. Industry Sector Markets, 1991-1996* (15 reports on all major industry sectors, e.g., insurance)

2. European Markets

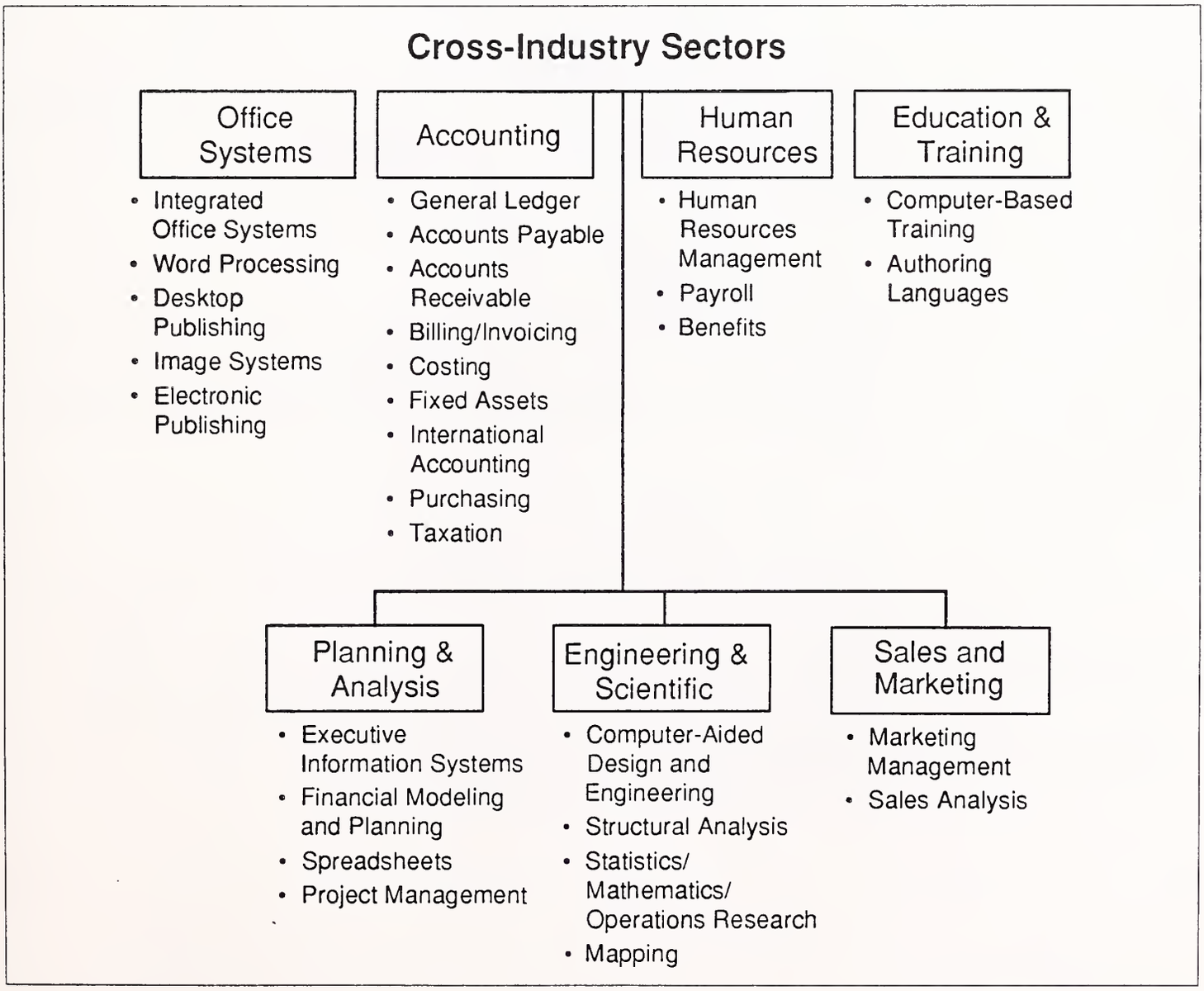
- *The Western European Market Forecast for Computer Software and Services, 1991-1996*
- *Trends in Processing Services—Western Europe, 1991-1996*

II

Executive Overview

INPUT divides cross-industry information services and markets into seven sectors, as shown in Exhibit II-1. These sectors or markets involve multi-industry applications rather than industry-specific applications such as wholesale or retail distribution, or insurance.

EXHIBIT II-1



These cross-industry sectors are periodically redefined to reflect the changing realities of the industry and marketplace. For example, this year INPUT added electronic publishing to the office systems cross-industry sector in recognition of the product similarities and competition between word processing, desktop publishing and electronic publishing systems. Electronic publishing, along with the sales and marketing cross-industry sector, had appeared in previous reports in the "Other" cross-industry sector.

This year INPUT has also elected to write one report encompassing all seven sectors rather than seven individual reports. The reason for this change is that the cross-industry sectors are all impacted similarly by the same driving forces. A benefit of combining the seven sectors into one report is that it enables readers to compare and contrast the differences among sectors, thereby gaining additional insight into each sector's current status and potential.

A

Cross-Industry Sector Expenditures

This section provides a perspective of cross-industry sector information services as a percent of total expenditures for each of the relevant delivery modes and as a percent of total information technology expenditures. Each of the delivery mode forecasts for each cross-industry sector is presented.

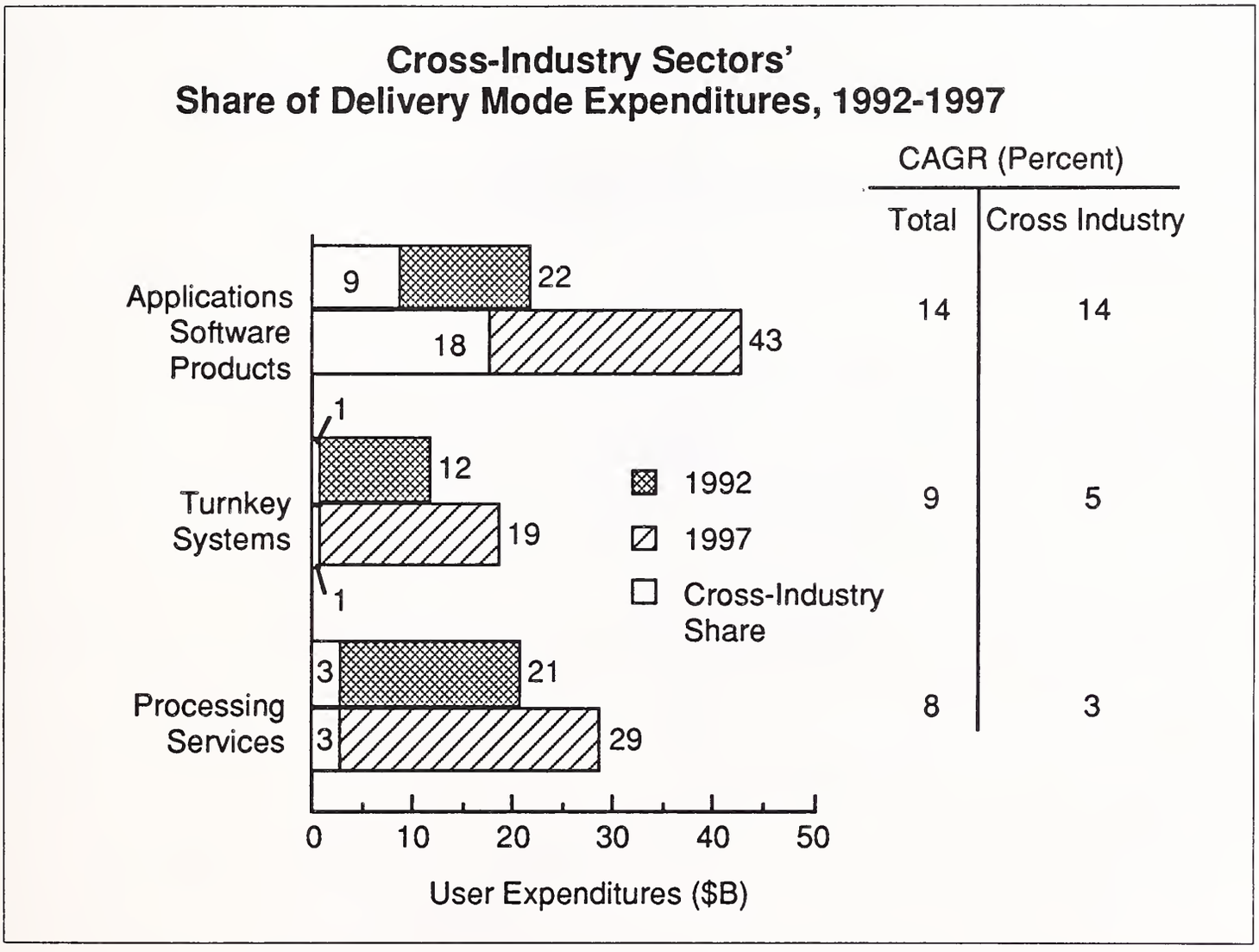
1. Cross-Industry Sectors' Share of Delivery Mode Expenditures

Three information services delivery modes are considered cross-industry. These are applications software products, turnkey systems and transaction processing services. Total estimated expenditures for these three delivery modes (both cross-industry and industry-specific spending) are $55 billion for 1992.

Exhibit II-2 provides cross-industry sectors' share of total delivery mode expenditures. The size of all cross-industry sector markets for applications software products, turnkey systems and processing services combined is an estimated $13.1 billion, or 23% of total expenditures on these three delivery modes. Although cross-industry sectors' share of turnkey systems and processing services will decline slightly over the forecast period, the cross-industry share of the applications software products delivery mode is expected to stay about the same (40% of the total delivery mode).

Even though cross-industry sectors' share of the total applications software products market will remain about the same, INPUT believes that some of the cross-industry sectors, such as education and training, and engineering and scientific, will be impacted negatively by needs for industry-specific functionality. The rapid growth of some of the other sectors, such as office systems and planning and analysis, masks this erosion.

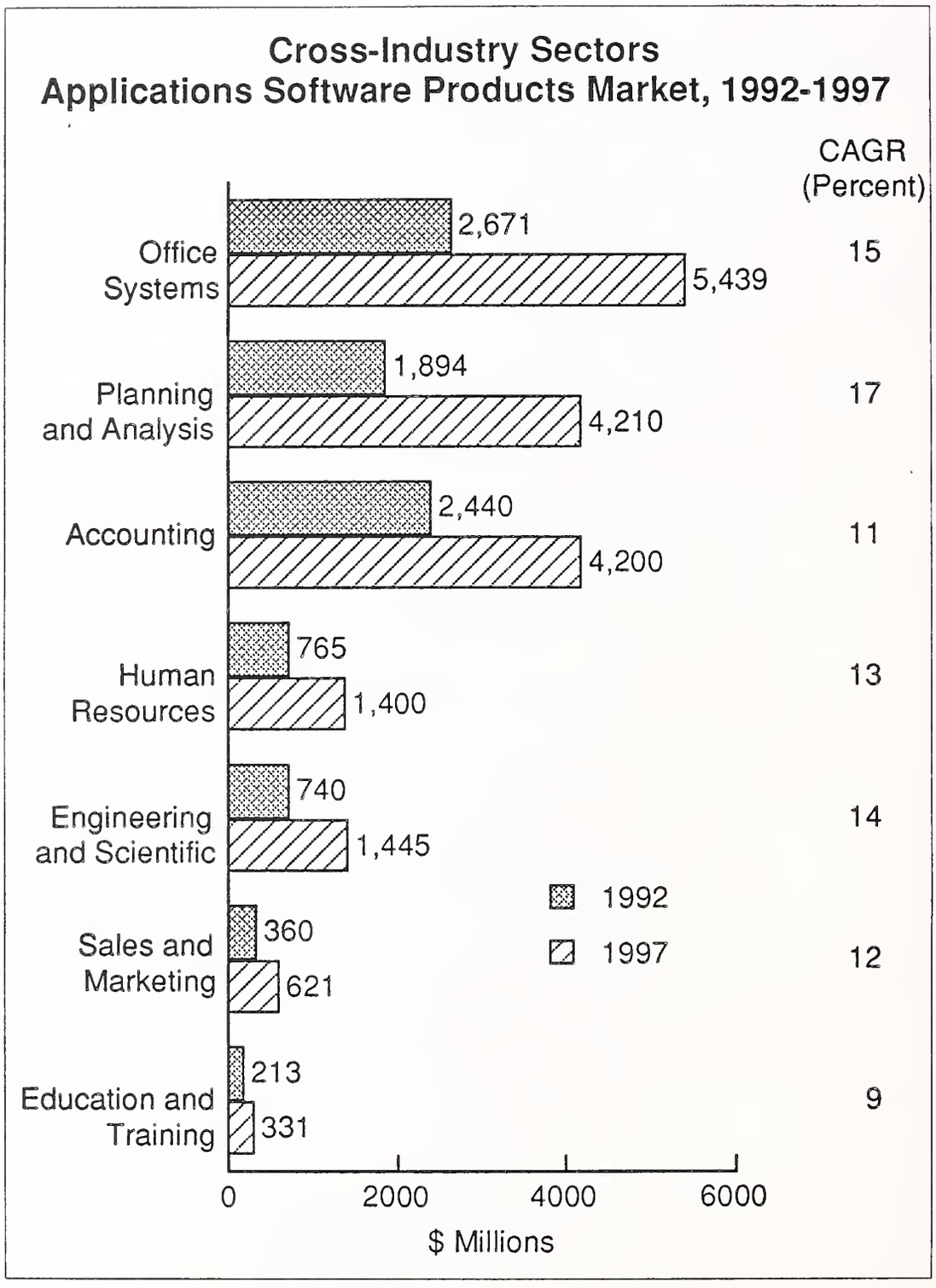
EXHIBIT II-2



2. Cross-Industry Sector Applications Software Products Forecast

Cross-industry sector applications software products are forecast to grow at an average compound annual growth rate (CAGR) of 14% over the forecast period, as shown in Exhibit II-3.

EXHIBIT II-3



Within cross-industry, the CAGR ranges from 9% for the education and training sector to 17% for planning and analysis.

- Office systems and planning and analysis are particularly large sectors because they include two of the largest PC-based applications software product categories, word processing and spreadsheets, each of which represents over $1 billion in 1992 expenditures.

- The office systems and planning and analysis sectors will remain the fastest growing sectors over the forecast period. INPUT expects the word processing and spreadsheet markets to continue to grow between 20% and 25% per year over the forecast period. Expenditures on these two products will carry the rest of their respective sectors in terms of growth.

- Accounting is also a large sector because it was one of the first functions to be computerized, because it lends itself easily to automation. Its growth is somewhat slower than either office systems or planning and analysis, however, because the accounting sector is relatively slow to adopt new technology.

- The education and training sector is the smallest and slowest growing sector. User resistance to computer-based instruction, the high expense of multimedia and the need for industry- and corporation-specific functionality will keep this sector's growth low.

3. Cross-Industry Sector Turnkey Systems Forecast

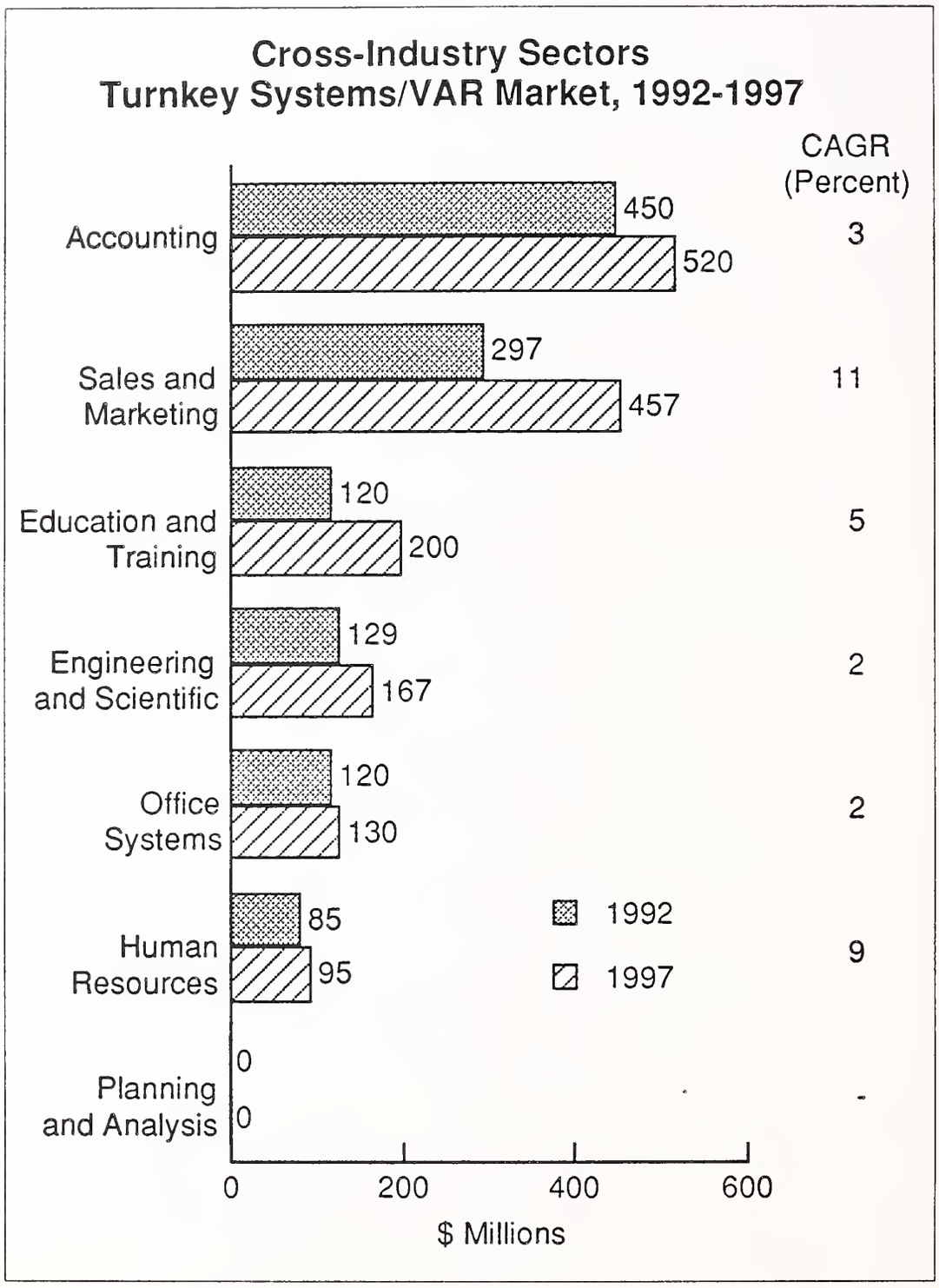
Cross-industry turnkey systems solutions are a small part of the sector (10% of total turnkey systems expenditures) and declining. INPUT forecasts cross-industry sector turnkey systems to grow at 5% compounded annually, compared to a 9% CAGR for the delivery mode as a whole.

One of the trademarks of turnkey systems vendors and VARs is their ability to add value through customization and industry-specific knowledge rather than through cross-industry or functional knowledge.

Exhibit II-4 reflects the following:

- The accounting sector represents 37% of the total 1992 cross-industry turnkey systems market. Even though this is a relatively large portion of the whole, growth will be limited because of the need for accounting software with industry-specific functionality. Although applications software vendors will continue to sell their products through the VAR channel, they will select industry-specific VARs rather than cross-industry VARs for the task.

EXHIBIT II-4



- Sales and marketing is the second largest turnkey systems market and one of the fastest growing. INPUT believes that growth for this sector will be driven over the five-year period by sales of turnkey solutions that incorporate portable and pen-based computers.

- Although the market for computer-based training (CBT) turnkey systems is small, unlike other cross-industry turnkey systems markets CBT turnkey systems are used by large firms as well as small firms. Vendors are providing turnkey solutions that incorporate third-party video disks and CD ROMs as well as the computer platform and applications software products.

- The other bright spot in the cross-industry market for turnkey systems is CAD within the engineering and scientific cross-industry sector. However, the overall CAD market faces saturation, and vendors of generic or low-end CAD are doing missionary selling in order to tap into new markets.

- Within the planning and analysis cross-industry sector, spreadsheets and other planning and analysis tools are sold through VARs and turnkey systems vendors, but they are not the core product of any solution; they are bundled along with other industry-specific rather than cross-industry applications software products.

4. Cross-Industry Sector Processing Services Forecast

Cross-industry sector markets represent 13% of all transaction processing services expenditures. INPUT forecasts cross-industry sectors' share of processing services to grow at a CAGR of 3% over the forecast period, whereas the delivery mode as a whole is forecast to grow at a CAGR of 8%.

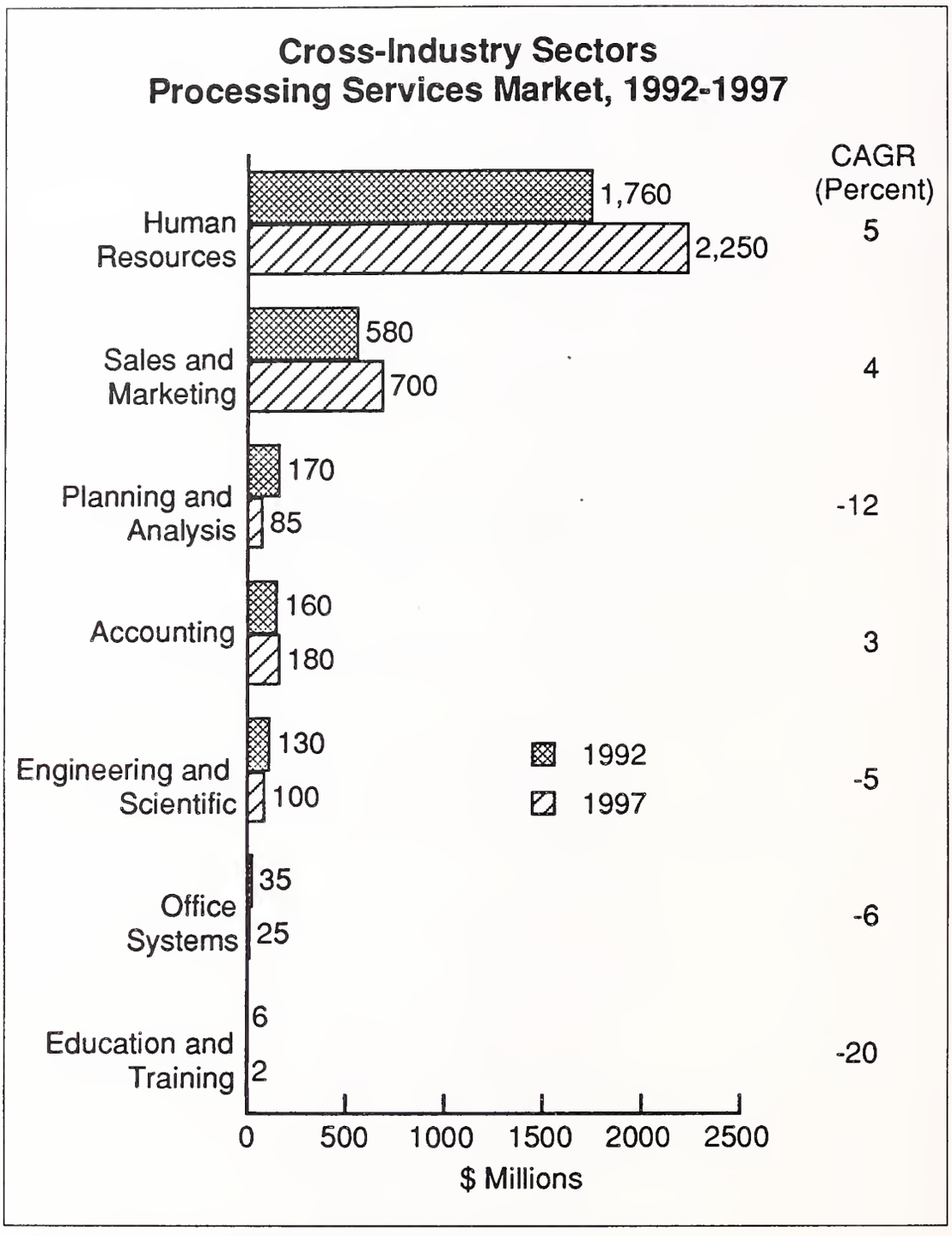
Exhibit II-5 reflects the following:

- The human resources sector represents more than 60% of all cross-industry processing services. It is comprised primarily of payroll processing. As corporations consider alternatives to mainframe-based applications, internal payroll processing on a smaller platform becomes a viable solution. Companies must consider the cost trade-offs, as well as the trade-offs in control, flexibility and ease of data access.

  INPUT has lowered its forecast for the human resources processing services market this year. This low forecast, because of the size of the human resources market, impacts the forecast for the entire processing services delivery mode for cross-industry sectors.

- The second largest sector, sales and marketing, is comprised of regional and local list processing service bureaus. Again, as computer equipment prices decline, smaller hardware platform-based solutions become a viable alternative to external list processing services. The proprietary nature of the lists is a consideration in determining whether a firm is willing to release its lists to an outside vendor for processing.

EXHIBIT II-5



- Most of the other cross-industry sector markets for processing services are declining. The availability of smaller and affordable computer equipment has brought most processing services in-house.

As the growth rates of some of the delivery modes continue to decline—some of the applications software products categories and especially turnkey systems and processing services—INPUT expects cross-industry sector vendors to become more active in the other six delivery modes.

For example, applications software products vendors will continue to expand their activities in professional services and systems integration. Processing services firms are becoming systems operations vendors. These vendors also sell applications software products and turnkey systems. And VARs provide applications software products, and systems integration and professional services.

B

User Department Directions

INPUT interviewed eighteen user departments for this report representing all seven cross-industry sectors. Rather than seek quantitative data through a large number of interviews, INPUT sought out representative examples to capture the flavor of user organization directions. Respondents included an office technology manager, a vice president of finance, a creative services manager (electronic publishing), a payroll manager, a vice president of sales, an instructional technology manager (education and training cross-industry sector) and an engineering department manager. Their companies represent multiple industry sectors, including discrete and process manufacturing, local government, retail, transportation, business services, education, utilities and banking and finance.

If one statement could summarize the results of all user department interviews it would be that all users want more and better ways to extract, analyze and visualize data, and better ways to electronically share data. These expressed needs are consistent with users' high ratings for networking, integration and data base technology (see Section C below).

Users interviewed are working toward fully implemented and integrated LANs that will enable data access and sharing. Many of them expressed the desire to eliminate redundancies and paper. Networking, data access and integration are perceived as the technologies that will best promote such efficiency.

Not surprisingly, other needs are flexibility and ease of customization. Customization and flexibility were mentioned by respondents in the accounting, human resources, engineering and scientific, and sales and marketing sectors. A challenge facing vendors will be whether to become industry-specific experts or remain cross-industry and continue to improve upon their application development and customization tool offerings.

Only two respondents indicated a need for more sophisticated features and functions. INPUT concludes that purchase decisions will be based more on product ability to access data, and integration capabilities than on more sophisticated product features.

The human resources sector was advancing more quickly in incorporating new technologies than were some of the other sectors such as, for example, accounting and engineering and scientific.

C

Relative Importance of Trends and Technologies

As shown in Exhibit II-6, all respondents combined (vendors and users) believe that networking, applications integration and graphical user interfaces (GUIs) are the trends/technologies with the greatest (near-term) impact on their organizations. INPUT believes networking is at the top of the list because it is the enabling foundation by which the other technologies can be implemented corporate-wide.

Not surprisingly, vendors' ratings of the importance of trends or technologies are higher than are users' ratings. This reflects the fact that vendors are the drivers of the new technologies. Users are tasked with absorbing the new technologies so that they can effectively benefit from them.

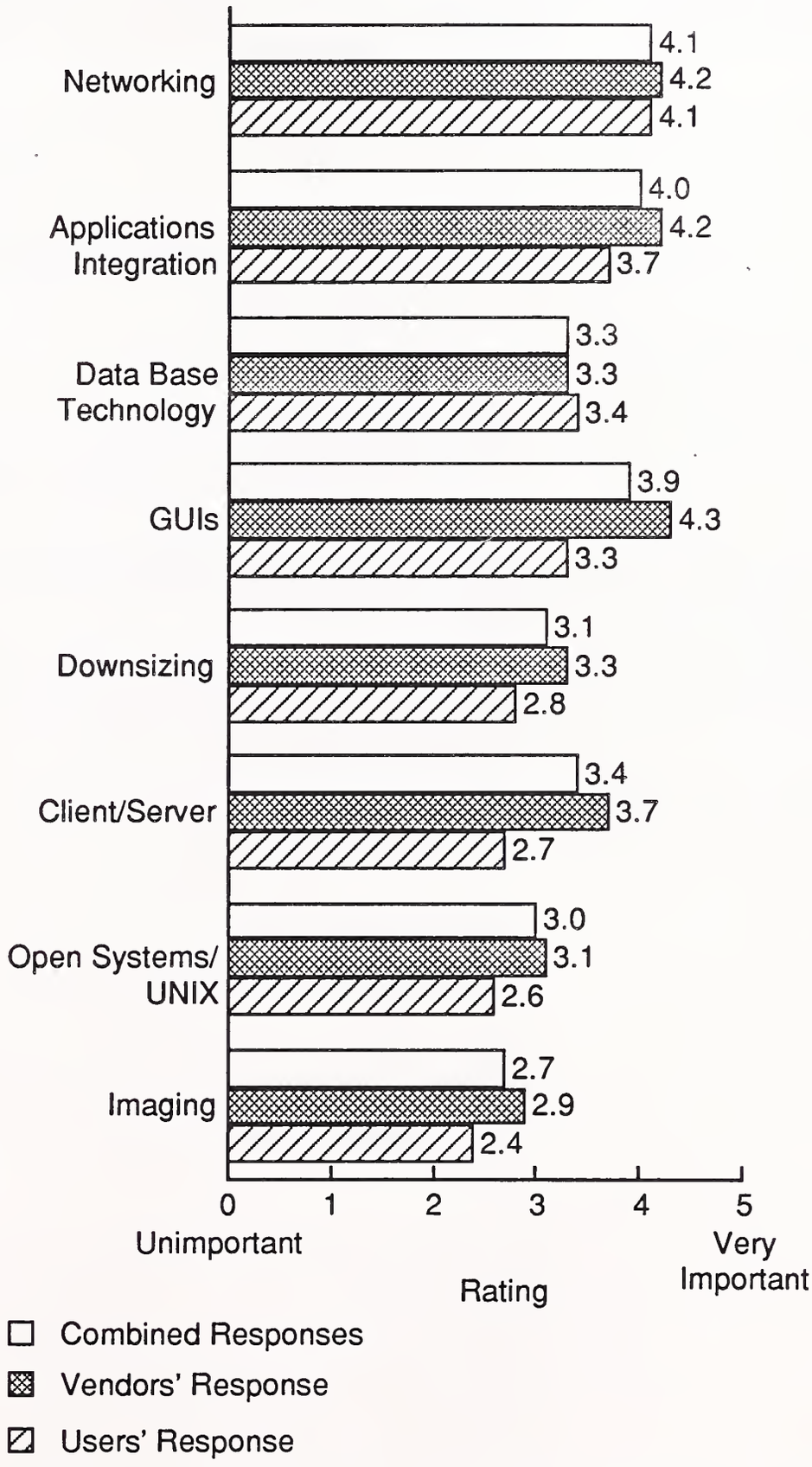
Vendors rate GUIs and client/server noticeably higher than do users. INPUT believes this is indicative of where vendors' development dollars are currently going. On a relative basis, GUIs are not a cause for great change at the user level; and client/server is not yet being readily embraced in the user organizations INPUT interviewed.

The 2.7 rating given to client/server by user organizations is similar to user ratings for downsizing (2.8). Users interviewed believe that the mainframe will continue to be the primary hardware platform for large applications, such as accounting, and will continue to play the role of data repository. INPUT believes that in users' minds client/server and downsizing may be synonymous.

Additional technologies, such as multimedia for the education and training sector, and pen-based computers for the sales and marketing sector, are expected to have significant impact. But for the cross-industry sectors combined, the impact of these additional technologies was not considered high.

EXHIBIT II-6

All Cross-Industry Sectors—Respondents' Indication of Relative Importance of Trends and Technologies



D
Vendor Characteristics and Trends

Although the cross-industry sectors are highly fragmented, market-wise and product-wise, the markets are dominated by a few large vendors.

- Some of the leading cross-industry sector vendors are the largest vendors in their delivery modes. For example, Microsoft, Lotus and WordPerfect are all cross-industry applications software products vendors that vie for PC-based product market share. Dun & Bradstreet is the leading mainframe-based applications software products firm. Its presence is more strongly felt in the cross-industry sectors than the industry-specific sectors.

- Many cross-industry sector applications software products vendors, especially the large ones, serve more than one sector. For example, it is common for vendors of human resources applications software products to also provide accounting and financial solutions. In fact, given the trend toward integration, it will become increasingly risky to rely heavily on a single product type as a source of revenue. Multiple products sold to multiple sectors on multiple platforms will become the norm.

- Two of the largest processing services vendors, Automatic Data Processing (ADP) and Control Data Business Management Services Division, are leaders in cross-industry sectors. These two companies plus Paychex are the largest payroll processing vendors. Additional local payroll processing vendors number around 1,000 and include banks, accounting firms and other small independent firms.

- The largest turnkey systems vendors that participate in cross-industry sectors are CAD vendors. Leaders include CADAM and Intergraph. However, the strong turnkey systems vendors of several years ago—Calma, Versacad, Computervision and Gerber Systems—have significantly lessened their presence or exited the market. Most of the companies lessening their presence are turnkey providers who based their software products on a certain hardware architecture. When the era of the workstation arrived, they were wed to outdated hardware and unbundled/transitioned awkwardly.

The majority of cross-industry sector vendors, however—and there are at least a thousand of them—are small, with revenues under $10 million. Regardless of size, vendors in all three delivery modes serving all cross-industry sectors are beginning to provide new products that address customers' needs for more and better data access and sharing, flexibility, and integration. As the movement to new technologies and products proceeds, vendors must absorb a great deal of change, not only in their products but also in sales and marketing strategies.

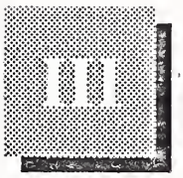
Rather than product features, the level of integration will become a differentiator. Another differentiator will be the provision of services. Services—offered directly by the vendor and in conjunction with third-party services vendors—will not only become a differentiator but a means of survival, as vendors must assist their customers with the absorption of their new products and technologies.

E
Conclusions

All seven cross-industry sector markets face an interesting set of challenges related to information services. In the quest to improve employee and corporate effectiveness, networking, data access and sharing, and applications integration will be the most important trends/technologies over the next five years. Although cross-industry sector user departments have less ambitious plans for downsizing and client/server computing over the near term, within five years these trends/technologies will also become very important.

Cross-industry sector vendors are faced with multiple challenges as they respond to changing customer needs and new technology availability. These challenges, such as needs for new products, new marketing and sales strategies, and more provision of service, will be expensive but not insurmountable. As established vendors continue their transition to new products and technologies, new vendors have an opportunity to move in.

One of the issues established and new vendors alike must address is how to appease a user community that wants more industry- or corporate-specific functionality while at the same time retaining a "cross-industry" flavor for broad market appeal.



Accounting

A
Definitions

The accounting cross-industry sector consists of products and services bought by multiple industry sectors to serve functions such as the following:

- General ledger
- Accounts payable
- Accounts receivable
- Billing/Invoicing
- Costing
- Fixed assets
- International accounting (currency conversion, value-added taxation, and consolidation)
- Purchasing
- Taxation

Related applications covered in other sectors include:

- Financial modeling (see the planning and analysis cross-industry sector, Chapter VIII)
- Sales management and order entry (see the sales and marketing cross-industry sector, Chapter IX)
- Payroll and personnel (see the human resources cross-industry sector, Chapter IV)

Accounting products and services that are developed and sold to specific industries are included in specific industry sector reports such as banking and finance, telecommunications, or insurance.

B

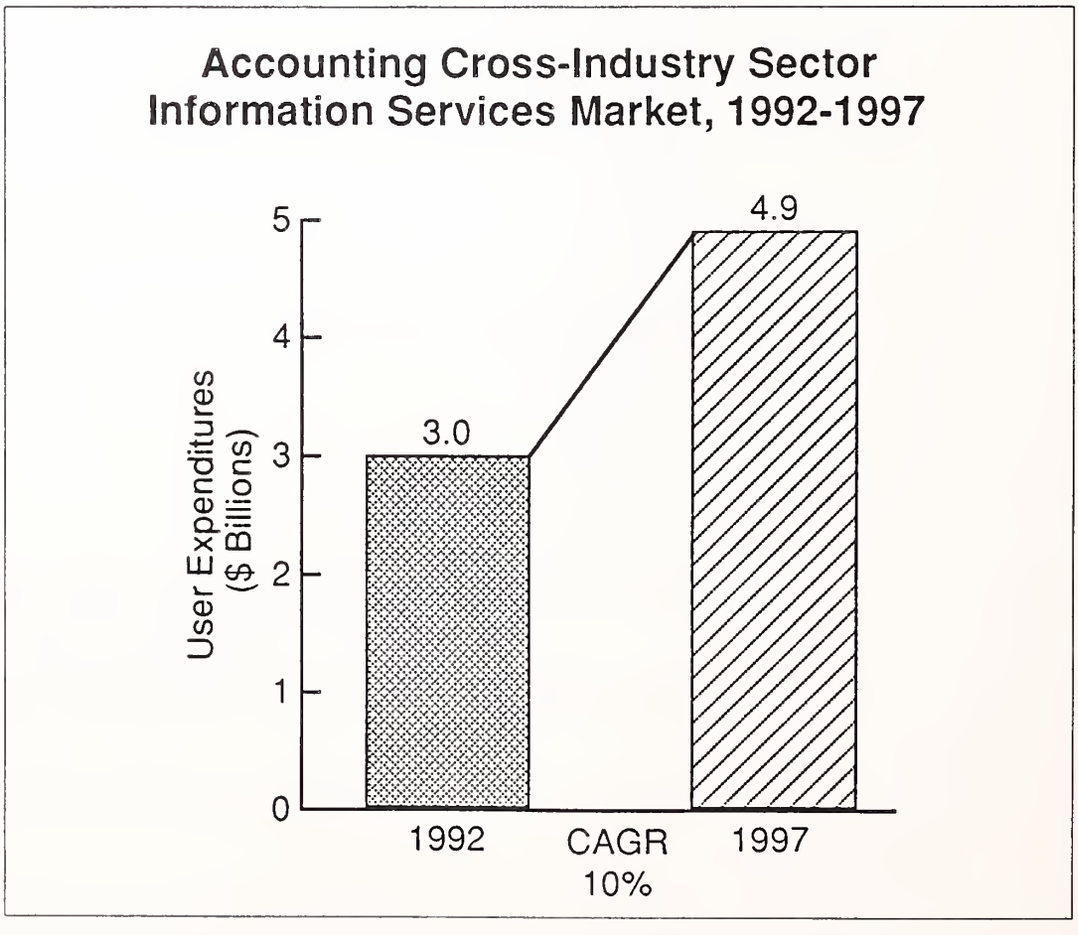
Information Services Markets

Accounting is the largest cross-industry sector, representing some 20% of the total of all expenditures on cross-industry information services. Two reasons for this large size are:

- The accounting function lends itself easily to computerization and was among the first business functions to be computerized.
- In-house development of accounting applications software was a more viable option in the early 1980s and before than it is today. Now developing a full-fledged accounting solution from the ground up is prohibitively expensive to do in-house, and the issue has become whether to purchase a cross-industry package or an industry-specific package.

INPUT's overall forecasts for accounting cross-industry sector information services (Exhibit III-1) and each of the delivery modes (Exhibit III-2) are the same as last year's forecasts.

EXHIBIT III-1



Growth for the accounting cross-industry sector will be driven by the following factors:

New product availability—Compared to last year, INPUT observes more vendor activity in developing and introducing new downsized financial and accounting solutions that take at least part of the accounting function off the mainframe, which means replacement of existing products.

Client/server activity in the accounting cross-industry sector has become more evident over this last year as well. Various versions of client/server software products are under development and are beginning to be offered by the major players. Several examples are described in Section E of this chapter.

User reluctance to migrate to new solutions—Users need new accounting solutions, but they have been slow to buy them (see Section C of this chapter). For years, people have been wary of changing what is often considered the foundation of their business systems. Because accounting is such a pervasive function, changing an accounting system impacts virtually all aspects of a corporation's information environment.

Companies that are in rapidly changing competitive environments and markets, or that are undergoing restructuring, may be more likely to update accounting systems first. Companies that are undergoing international expansion are also most likely to purchase new multinational accounting applications software products.

The transition to new accounting solutions will be painful. INPUT believes that well-conceived product migration strategies are a key to continued healthy growth in expenditures throughout the 1990s. Another key to growth and vendor success is providing assistance to customers in the form of systems integration, education and re-engineering services.

New pricing schemes—Client/server and downsized products will usher in new pricing schemes, including pricing based on number of users rather than size of platform. INPUT believes that new pricing schemes may have a negative impact on the forecasts. On one hand, new and more products will be sold, but on the other hand, they are likely to be lower priced. Given the reluctance of this cross-industry sector user base to migrate to new solutions, there may not be enough new sales in the short term to make up for the lower prices.

Market specificity—Although overall expenditures on cross-industry accounting and financial applications software products are at least twice as large as industry-specific solutions, according to vendors specialized packages are the faster growing area, primarily because individual vertical sectors are less saturated.

- Many vertical-industry accounting packages exist that are targeted for one—and only one—industry sector. An example is a hotel accounting software solution that includes functions for front-desk reservations, credit card acceptance, settlement, authorization, and back-office bookkeeping.

- Industry-specific accounting packages will continue to be in demand, especially where there is much—or unusual—regulation, such as in defense contracting and nonprofit organizations. New government accounting software products have been introduced this last year by Ross Systems, for example; American Software also has accounting systems specific to local and state agencies.

- Banking is another area requiring industry-specific accounting solutions; strict regulations and specific operational requirements force most institutions to purchase specialized industry-specific software.

INPUT believes that the need for specificity and customization of accounting applications software products will increase and that this could potentially be an inhibitor to expansion of user expenditures for accounting cross-industry products.

As shown in Exhibit III-2, of the three delivery modes considered within the accounting cross-industry sector, applications software products is not only the largest delivery mode but will exhibit the healthiest five-year growth rate, even given the market challenges described above. In real terms, user expenditures on accounting cross-industry processing services will decline, as will expenditures on turnkey systems.

1. Applications Software Products

Exhibit III-3 shows growth expected for accounting cross-industry applications software products by platform size.

Mainframe—User expenditures on mainframe-based accounting packages are forecast to grow at about the rate of inflation from 1992 to 1997. New DB2 and enhanced versions will be purchased in the short term. However, during the last half of the forecast period, much of what would have been expenditures on upgrades will be spent on new client/server products. Thus, what would have been all mainframe expenditures will be divided between mainframe and other smaller platform-based applications software products.

Minicomputer—Minicomputer-based accounting applications software products will continue to experience moderate growth.

EXHIBIT III-2

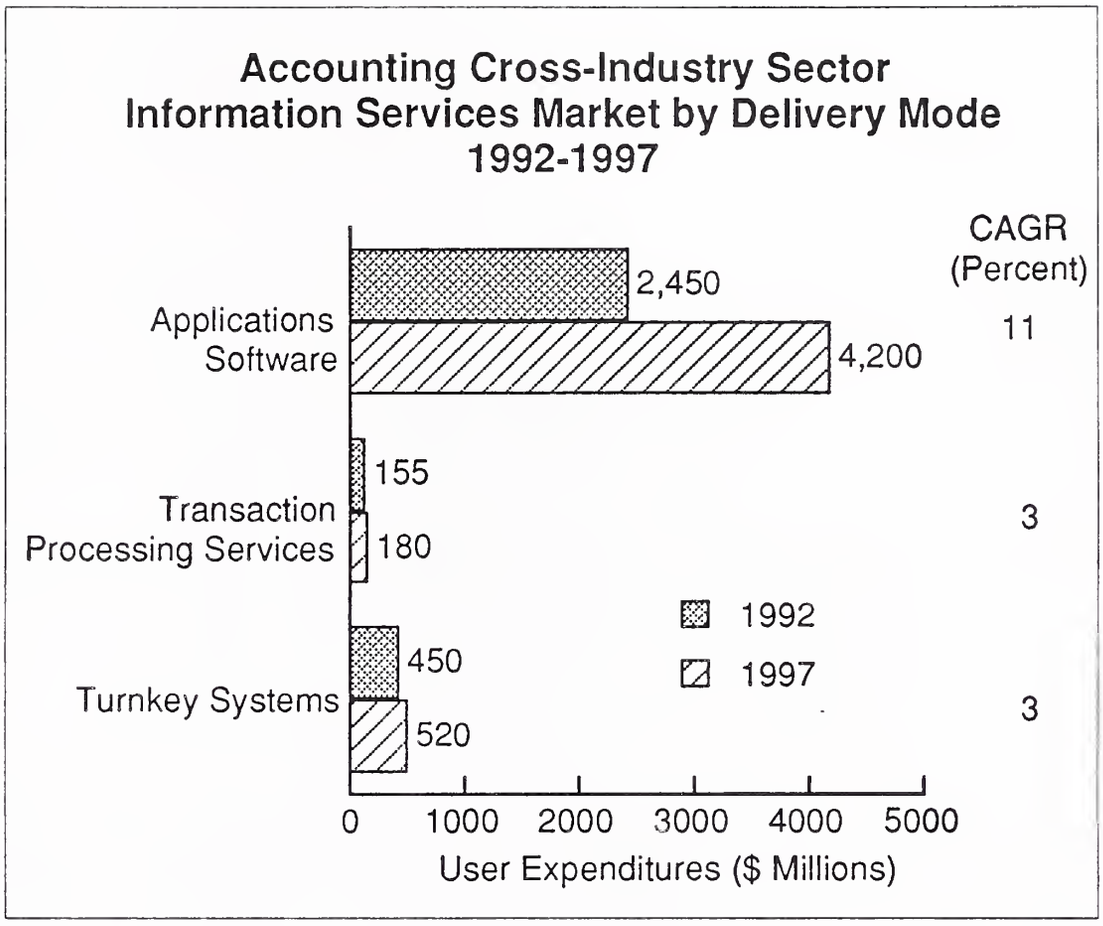
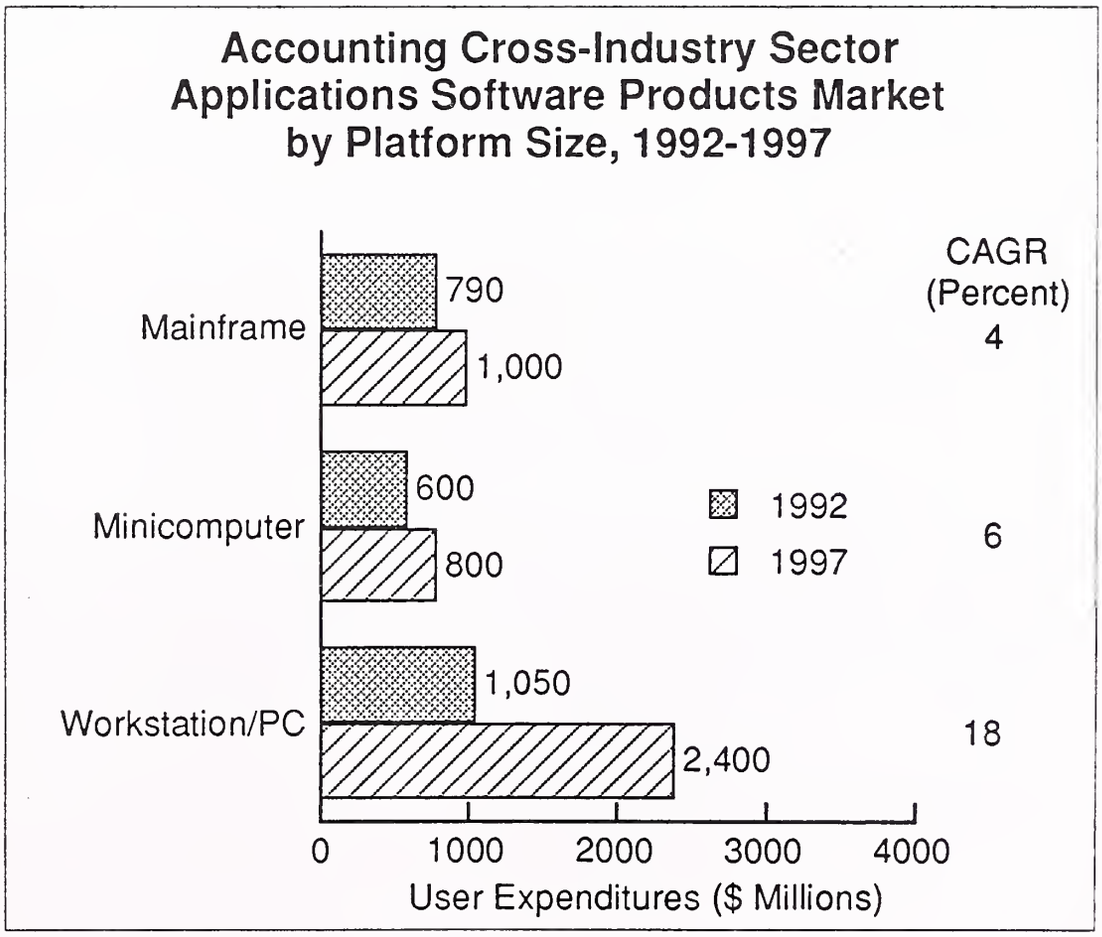


EXHIBIT III-3



- Midsized businesses and divisions of large corporations continue to buy minicomputer-based accounting packages. Because users have made considerable investments in midrange hardware over the last three to four years, solid—albeit modest—growth is therefore still expected as vendors and users complete their product suites.

- Additionally, vendors are beginning to provide client/server products, positioning the minicomputer as the server. They are also beginning to introduce UNIX versions of accounting software for minicomputers.

Workstation/PC—Growth in client/server computing, positioning workstations or PCs as both clients and servers, as well as standalone and networked PC solutions will fuel accounting packages for this platform size.

- Vendors such as Ross have begun to introduce applications software products running on smaller client platforms for portions of the accounting function such as budgeting.

- Small businesses will continue to expand as a market for standalone PC-based accounting and financial systems. Nonetheless, even though prices for these products are low to begin with, prices are on the decline. Part of the reason for the continued price cutting is a distribution channel transition to mass merchandising, including the rise of computer superstores.

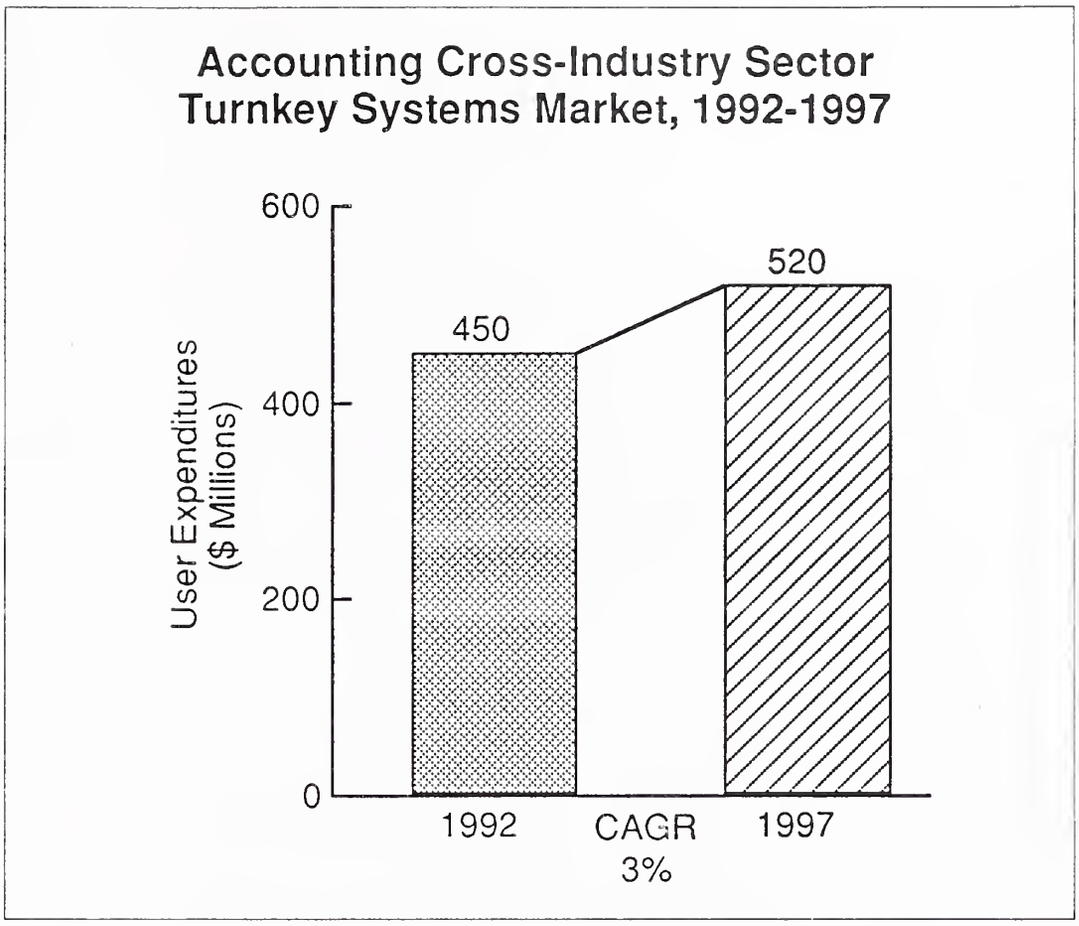
2. Turnkey Systems

Exhibit III-4 shows growth expected in cross-industry accounting turnkey systems.

Turnkey vendors and VARs sell accounting systems predominantly to small and midsized businesses, e.g., businesses under $25 million in sales. These vendors are an affordable alternative to what larger companies get from separate hardware vendors, software products vendors and systems integrators. However, accounting cross-industry turnkey systems are a small and declining market.

- The original accounting turnkey systems were products developed by accounting processing services vendors. Because the markets for their services were being eroded by growing availability of packaged software, they provided an in-house alternative for their customers in the form of minicomputer-based turnkey systems. Although many were installed and some are still being maintained, there are no new sales of these systems.

EXHIBIT III-4



- Because accounting is the backbone application for many businesses, VARs and turnkey systems vendors often start with an accounting package and integrate it with industry-specific operational solutions, creating an integrated industry-specific solution rather than a cross-industry solution.

Therefore, although a large market still exists for accounting turnkey systems, these products are increasingly industry-specific. Additionally, retail sales of cross-industry accounting applications packages and PCs detract from the need for and higher expense of a turnkey system.

3. Processing Services

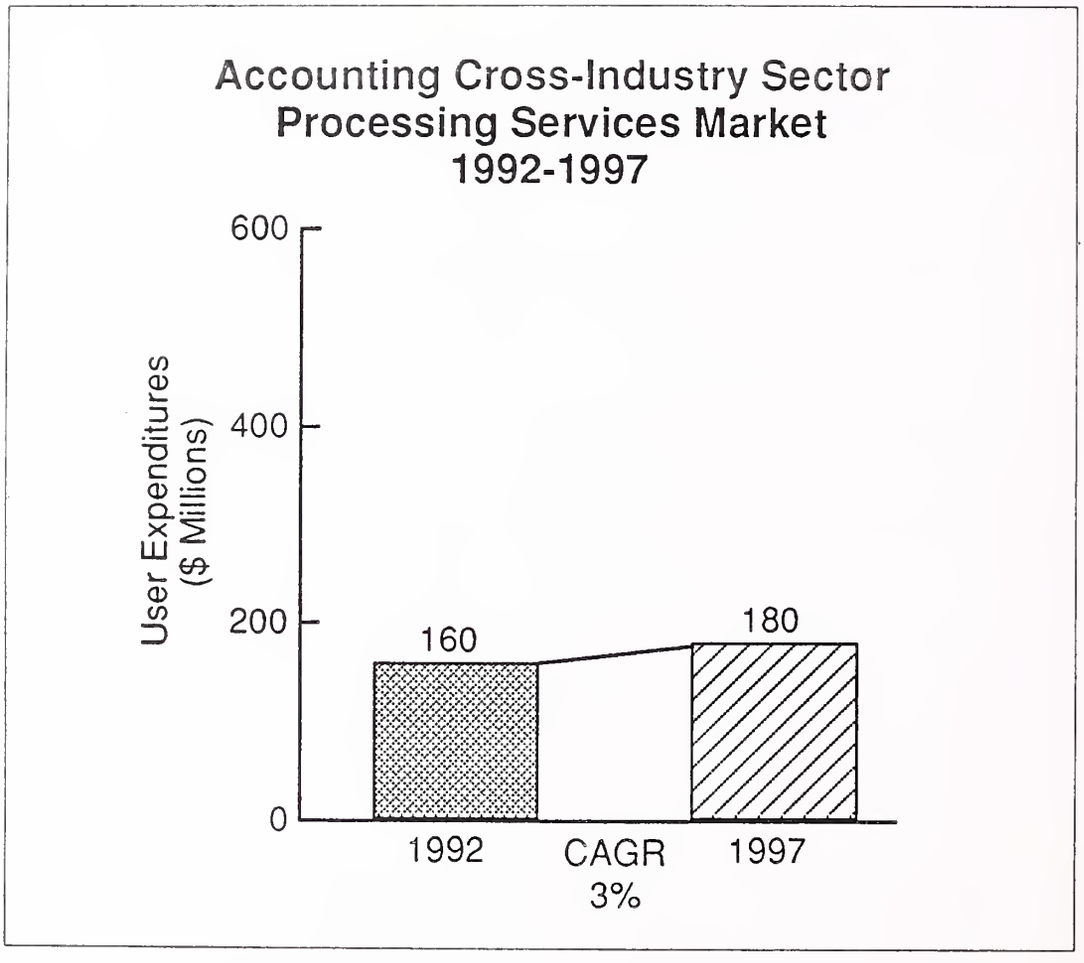
Accounting cross-industry processing services do not include tax processing services sold to accounting firms. Nor do they include payroll processing services (which are in the human resources cross-industry sector), or processing services in support of banking and finance functions such as back-office banking, electronic funds transfer, and retail point-of-sale applications.

There will continue to be a market for data entry of accounting data, such as from time cards, but this is also not considered to be a cross-industry (or industry-specific) transaction processing service.

There are no processing services firms today that perform all aspects of the corporate accounting function. However, many of them offer parts of it, such as the preparation of corporate income tax returns. (If a firm does not provide complete preparation, then it usually performs portions of it, such as gathering data to support what an accounting firm/CPA will do.)

Exhibit III-5 shows the expected expenditure level and growth in accounting cross-industry transaction processing services.

EXHIBIT III-5



Accounting processing services are a small and declining portion of the whole processing services industry. For processing services firms, it has become more a matter of holding onto the existing customer base than of adding new clients. For example, former Bank of America Business Services (recently acquired by ADP), although it provides general ledger and accounts receivable and payable services, does not actively sell or promote these services.

The reasons accounting processing services, cross-industry or otherwise, have become such a small proportion of the total industry are:

- Accounting was one of the first functions to be computerized by corporations because it is relatively static compared to, for example, payroll processing.

- Accounting functions are part of the day-to-day business of any company, as opposed to some of the other large processing services, which are cyclical in nature.

- Companies are less inclined to turn over their operating records to an outside services firm because of security concerns.

- Packaged applications software products that run on personal computers and workstations are available at relatively low cost, which makes it possible for small firms as well as large firms to do their own accounting. Vendors estimate that during the timesharing days, when computing environments were not affordable for many corporations, 20% to 25% of timesharing applications were accounting/financial. But now there is no contest between make versus buy, and almost all accounting application solutions have been brought in-house, typically through the purchase of an accounting software package.

- Accounting as a function is more likely to be differentiated by vertical sector than some of the other cross-industry functions, such as human resources, office automation or engineering/scientific applications; vertical specialization is too complicated and costly for most processing services firms to undertake.

The only real source of new expenditures for accounting processing services is companies that are downsizing and that need transition management of offloaded applications, which may include accounting applications software.

C
User Department Directions

Companies interviewed by INPUT are approaching change in their accounting and financial systems as an evolutionary process. They are adding new functionality and streamlining current operations on an ongoing basis without necessarily incorporating new information technology.

- The controller of a large cement and construction firm was not sure client/server would be of benefit. The finance department may ultimately implement client/server only because its primary vendor is going in this direction.

- DOS is well-entrenched in the company and the controller has no interest in UNIX. One of the company's IS projects this year is to continue to get the bugs out of its network so that financial and statistical data can be consolidated on a regional, national, and North American basis.

- Rather than downsizing (offloading a centralized CPU), the U.S. office of a large international bank is centralizing operations as back-office functions are being pulled back from the regional offices.

- Prior to its acquisition by a Japanese firm, a California-based semiconductor company tried to upgrade its accounting systems, but lacked direction and resisted change. With stronger direction, more reporting requirements, and a need to standardize practices on a worldwide basis, the company purchased an international accounting package from a European vendor.

Companies interviewed are either beginning to implement or have expressed the need for the following:

- Industry-specific functionality—The U.S. operations of a large international bank has needs that are too specific—for example, foreign currency transaction tracking, loan services, capital markets, external pricing services—for most cross-industry accounting software. However, it is using a cross-industry product primarily because of its exceptional report-writing capabilities and the fact that the vendor is able to interface its product with the bank's other financial and accounting systems.

- Flexibility—The semiconductor firm had looked at U.S. vendors' products but found them lacking in flexibility that allows for easy customization of reporting capabilities and integration and multinational accounting capabilities. The European product purchase was made one year ago.

- Standardization—A cement and construction company purchased a new accounting system in 1989 in order to standardize financial and accounting functions across operations that had previously been run as separate companies.

Other needs currently not being adequately met are:

- Ways to more easily extract and summarize expense data and provide status reports to management. This need involves taking transactional data and making it useful for executives through the use of relational data base technology and decision support tools.

- The ability to do budgeting and operations planning and cash forecasting (rather than having access to just historicals) within a single integrated accounting system.

To summarize, these respondents indicated they are not eager to downsize the accounting function or to move operations to a client/server architecture. It appears that they are, however, improving what they already have and are approaching change from the standpoint of features and functions that don't require dismantling what they already have. A need expressed several times, for example, was for more easily customized reporting capabilities. Another need—which is a growth promoter for this sector—is the need to standardize across divisions and across countries.

D

Trends/Technology Ratings of Importance

Respondents within all cross-industry sectors, vendors as well as users, were asked to rate various trends and technologies on a scale of one to five, where one is unimportant or having little impact and five is very important or of significant impact.

The technologies listed in Exhibit III-6 were selected because INPUT believes they will receive the most attention from vendors and users over the next five years. In addition, INPUT believes that their impacts on vendors and users will be profound. Users who deploy these technologies will be re-engineering their business functions. And vendors will need to change not only their products but also the ways in which they price, sell and support them.

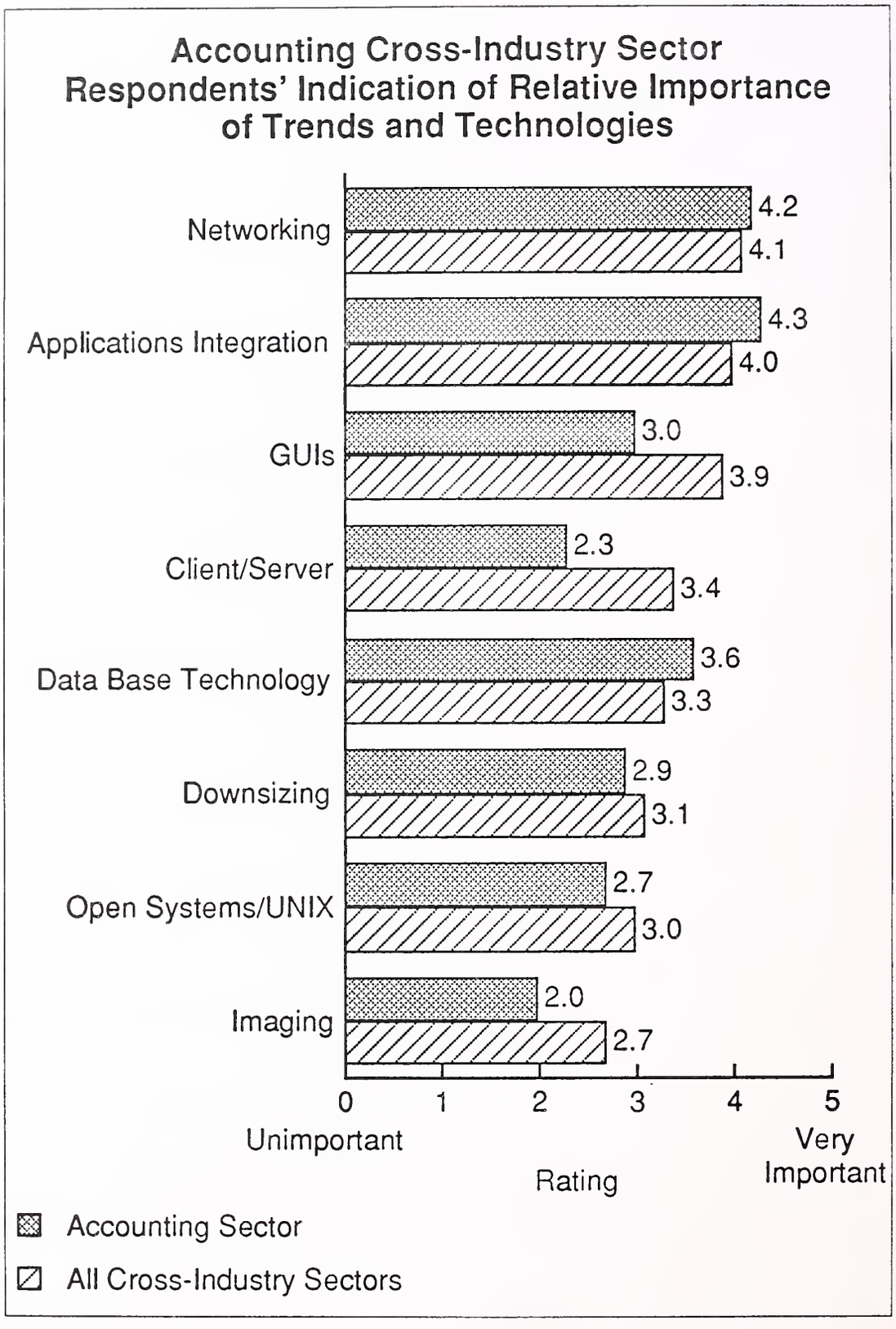
Exhibit III-6 shows the composite rankings of the accounting cross-industry sector compared to the ratings of all cross-industry sectors combined.

As is true with all cross-industry sectors combined, the accounting sector rates networking and applications integration the most important, and imaging the least important.

After the top two, however, accounting sector ratings are generally lower than the ratings of all cross-industry sectors combined. Note especially the low ratings given to client/server architecture and GUIs. These lower ratings confirm that this sector is relatively slow to adopt new technologies.

The fact that data base technology ranks higher than the ratings given by all cross-industry sectors combined confirms that this sector still considers the development and implementation of data bases—a technology that has been around for many years—a priority. In fact, as indicated in the next subsection, new DB2 implementations are still a major vendor activity. It also confirms the traditional centralized mainframe orientation of the accounting sector.

EXHIBIT III-6



The ratings also confirm that the accounting sector, although it wants new features and functions (described in subsection 3 above), does not care what the underlying technologies are.

Respondents for all cross-industry sectors were also asked to rank the technologies and trends in terms of importance five years from now. All technologies for all cross-industry sectors increase in importance over the five-year period.

For the accounting sector, client/server architecture and GUIs will increase in importance so that by 1997 their ratings will be about the same as the ratings given to these technologies for all cross-industry sectors combined. Users and vendors agree that client/server architecture, GUIs and downsizing are future directions. The question that begs to be asked is, when will users be willing to move en masse to downsized and client/server solutions? Existing vendors must be prepared to offer new solutions when the market is ready to buy or new vendors will move in.

As is true with all cross-industry sectors, within the accounting sector vendor ratings are generally slightly higher than user ratings. The largest discrepancies are for open systems, downsizing and GUIs, where vendor ratings are between 2 and 2.5 times higher than user ratings.

E
Vendors and Competitive Environment

1. Vendor Characteristics and Trends

Leading vendors in this cross-industry sector are also likely to participate in the human resources cross-industry sector. For example, Dun & Bradstreet Software, Computer Associates, Integral, Lawson, Oracle, and Ross all compete in both sectors. And PeopleSoft, strong in the human resources sector, is introducing a financial software product suite. Overall vendor trends and reactions are similar, if not the same, for both cross-industry sectors. The major distinctions between the two are that accounting has traditionally been more mainframe-based and therefore has more DB2 implementations, and that international capabilities are more important for the accounting sector.

Below are brief descriptions of vendor trends:

DB2 implementations—Because accounting has traditionally been a centralized mainframe-based application, vendors selling in this sector follow IBM's lead. Thus DB2 implementations are still at the forefront of new product introductions.

- American Software continues development and introduction of DB2 implementations.

- As a short-term strategy, Dun & Bradstreet Software continues to enhance its DB2-based M and E series products.

The DB2 versions have been slow in coming because they require complete rewrites; some of the early versions were reportedly written hastily and were flawed. The fact that DB2 versions are still coming indicates that vendors believe that a significant portion of the accounting function, at least over the next several years, will remain mainframe based.

Client/server—Client/server activity in the accounting cross-industry sector has become more evident over the last year. Various versions of client/server software products are under development and are beginning to be offered by the major players. Notable examples are the following:

- Dun & Bradstreet Software continues its development of an entirely new accounting product line based on OS/2. Initial products will be available by year-end 1992. The company recently announced its first client/server product line (see company profile below).

- American Software's underlying product architecture positions the company strongly to move and expand into client/server.

- Ross Systems introduced a client/server budgeting product in 1991.

- PeopleSoft has announced a client/server financial package.

- Integral has recently announced client/server solutions for distributed human resources and financial computing.

Although accounting applications are among the first to be ported to client/server configurations, as indicated earlier INPUT believes there is more user resistance to implementing accounting client/server products than some of the other applications such as engineering/scientific or even human resources applications. Vendors may therefore be disappointed in preliminary results from client/server products.

Effective vendor migration strategies will be of equal importance to the product offerings themselves. New product introductions will be accompanied by new (and attractive) pricing schemes, new distribution strategies, and strategies for migrating customers to the new product lines as effortlessly as possible.

Another important success factor, and one which is more evident this year than last year, is that vendors will have to offer very strong service, support and training assistance as part of their product migration and sales strategies.

Pricing strategies—Pricing strategies are still on the drawing boards. Some of the pricing schemes being considered are:

- Offering client/server solutions as product upgrades to already installed systems and not charging existing clients extra for them
- Offering client/server as an add-on to an already installed solution
- For new customers, pricing according to number of users simultaneously accessing the system rather than according to platform size

Users will expect downsized solutions to be lower in price. It is unclear, 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 and administer client/server applications software products. Therefore, it is imperative that vendors position the new products as much more functionally attractive than existing installations.

Open systems/UNIX—Although vendors that have traditionally been IBM shops were not yet incorporating UNIX into their product development efforts last year, they are beginning to do so now.

- Whereas Dun & Bradstreet Software was "watching UNIX carefully but not doing anything yet" last year, now the company is porting its entire Millennium product line to UNIX. (This product will be, at least initially, only offered in Europe.)
- Ross is moving toward a UNIX strategy rather than an Ultrix (DEC) strategy and has plans to support two or three versions of UNIX.
- Lawson, an early UNIX adopter, ported its Accounting System software to the IBM RISC System/6000 platform earlier this year.

Multinational products—Even though the importance of a multinational product line has been evident in the accounting sector over the last several years, its importance has become more apparent over this last year. Vendors are globalizing their accounting systems so that a single footprint can be used in a multiple language and multiple currency scenario. European companies such as Coda, SAP and Systems Union are making their presence more strongly felt in the U.S. multinational corporation marketplace.

- Systems Union's SunAccount combines a ledger accounting and reporting package with automatic translation and consolidation of multicurrency accounts into a single base currency.

- SAP sells an integrated and global accounting system, R/2, that also handles other business functions, including inventory control, production planning, and order processing.

- Oracle FINANCIALS is positioned as an international accounting solution.

Applications Integration—Because accounting cuts across so many parts of a corporation, seamless integration is a more critical requirement than it is for some of the other application solutions.

Vendors have placed a great deal of emphasis on integrated functions in the following ways:

- Ease of integrating accounting modules with one another

- Integration of accounting modules with other functions such as inventory control, purchasing, fixed assets, and human resources

Increasing emphasis on integration creates challenges for vendors whose product lines consist of many applications that have been acquired (rather than "homegrown") along the way, and for vendors that do not have a complete suite of accounting modules. The fact that D&B Software will be replacing its various separate product lines with a single client/server implementation is an example of the importance vendors are ascribing to integration/single product families.

2. Leading and Emerging Vendors

Exhibit III-7 is a listing of leading accounting cross-industry sector applications software products vendors.

New vendors will enter this market, as the cost of entry is relatively low for a new entrant that does not have a customer base it must move to a new solution.

- PeopleSoft, mentioned above, is an example of a new competitor in this cross-industry sector.

- Oracle is also a relatively new competitor.

- In addition, Dodge Group (Boston) is building a client/server financial system.

- Microsoft has announced its intention to enter this sector. Microsoft's presence will be a competitive threat to many of the smaller PC-based vendors that populate this sector.

EXHIBIT III-7

Accounting Cross-Industry Sector Leading and Emerging Applications Software Products Vendors

Vendor	Mainframe	Minicomputer	Microcomputer
American Software	X		
Armor Systems			X
Collier Jackson		X	
Computer Associates	X	X	
D&B Software	X		X
Global Software	X		
Integral Systems	X		
J.D. Edwards		X	
MCBA, Inc.		X	X
Oracle		X	
Ross Systems Inc.		X	
Software 2000		X	X
Walker Interactive	X		

Small applications software products and turnkey systems vendors that cannot afford to rewrite software products for smaller hardware platforms, client/server architectures, or UNIX may switch to more of a professional services role, such as providing software development and software maintenance. They thereby exit the product side of the applications software products market. Or they may become distributors for independent software vendors' applications software products.

Smaller vendors also face the possibility of being acquired by their larger, well-capitalized competitors.

The major processing services vendors are ADP—which recently acquired Bank of America's Business Services Division—Litton Computer Services, and Control Data Business Management Services. However, accounting processing services represent less than 5% of these firms' revenues.

INPUT was unable to identify any large turnkey vendors selling accounting cross-industry solutions. Although a small percentage of turnkey systems are cross-industry, the vast majority are integrated with vertical packages and are therefore considered industry-specific.

3. Vendor Profiles

a. American Software

American Software was originally a single-vendor, single-platform (IBM mainframe) applications software products vendor. The company's strategy now is to offer software solutions across multiple hardware platforms (still IBM). Order processing and accounts receivable products that now run on the OS/2 platform are identical in feature and functionality to its CICS VSAM versions. The company offers products on a scalable range of 370-based and AS/400 products, and has the ability to interconnect these environments.

Over the last year, American Software has introduced Integrated Planning Works for OS/2 and an inventory planning and distribution and requirements planning package that can run independently on a PC or can cooperate with a host. American has also introduced a client/server version of Warehouse Management System in which OS/2 is the client and an ES/370 or AS/400 is the server.

The company is progressing in its development of a new client/server model; its original client/server model dates back to 1986.

American Software has expanded its data center operations and now provides systems operations services to customers who are either in the process of downsizing and want a temporary place to put their mainframe software and data processing, or who have adopted an outsourcing philosophy. So far the company has spent $4 million for computer equipment and communications software for this endeavor.

Fiscal 1991 (4/91) revenues reached $92.8 million. Net income was $17.5 million, compared to $19.5 in fiscal 1990. Revenue from professional services was 40% of total revenues.

The company now derives 50% of its revenues from applications software products for the AS/400 platform. Ten percent of revenues came from outside the U.S. in fiscal 1991, compared to 17% a year earlier.

b. Dun & Bradstreet Software

In the short term, Dun & Bradstreet Software (DBS) will continue to enhance its M Series and E Series of accounting and financial applications software products that run primarily on IBM mainframes. It is also moving forward aggressively on a client/server strategy. Products are

scheduled to be available by year-end 1992. One of the challenges this company faces is introducing its new product line in a timely manner while at the same time not losing its customers to other vendors.

In March, DBS announced its first client/server product. This product is really just a glimpse of what will be forthcoming. Financial Stream Analysis allows customers to access financial information that is traditionally stored in host computers.

DBS's client/server model emphasizes server functionality: presentation services and some applications processing is done at the client; the rest of the application processing and data management is done at the server. Sybase is the data base of choice in client/server.

As it moves strongly in the direction of client/server, DBS is moving away from individual products. It will no longer have an Expert Series and a Millennium Series; these will be one integrated product line. Given the problematic nature of DBS's different products, which in customers' views did not seem to fit well together, this strategy is essential for DBS's continued success. Nonetheless, DBS will be challenged by migrating its existing customers to its new product line.

To assist in the migration process, DBS has launched a re-engineering consulting practice and has also established new partnerships with Price Waterhouse, Ernst & Young, Deloitte Touche and Cap Gemini for re-engineering, long-range systems planning and systems integration. These are all new partnerships that are specifically focused on assisting DBS's customers with change.

DBS's strength in the marketplace is its name and size. INPUT estimates fiscal 1991 revenues to have been $485 million, only a 2% increase over fiscal 1990. U.S. sales account for 70% of revenues.

c. Oracle Corporation

During 1988 and 1989, Oracle expanded its offerings to include financial, manufacturing, and office automation applications software products and systems integration services. In February 1990, it introduced Oracle Personnel—originally developed and marketed in Europe—to the U.S. marketplace. INPUT estimates that its revenues from applications software products is approaching $100 million.

Factors that differentiate Oracle from other software products vendors are its multivendor and multiplatform capabilities and the degree of integration between Oracle FINANCIALS and its other applications software products. Oracle's products run on 27 different platforms. Oracle's use of its own CASE tools, and of course its use of its own ORACLE RDBMS, is also a differentiator. Customers can do their own development around Oracle's products using Oracle CASE.

The fact that its products run on so many different platforms is a strength. However, it could also be considered a weakness, as the company has had numerous quality problems in the past, perhaps because of the inherent challenges of supporting so many different platforms. Oracle's focus on its FINANCIALS product over the last year was to put a rigorous quality assurance program in place.

Oracle's revenues are now over $1 billion, which makes it one of the largest software products companies in the world. Although its revenues overall were up in 1991, its U.S. sales were down 13% compared to 1990.

Sixty-two percent of Oracle's 1991 fiscal revenues were from non-U.S. sources; this percentage is up from 50% in 1990. Oracle has been expanding and continues to significantly expand its international product capabilities; Oracle FINANCIALS is now available in six languages (with five more in development) and has multicurrency capabilities.

d. Ross Systems

Over the last year, Ross has undergone a great deal of change:

- It changed its strategy away from strictly DEC platforms to multiple UNIX-based platforms in addition to Ultrix and VMS for DOS.
- It acquired Pioneer Computer Group Ltd., a maker of a process manufacturing software product line and a 4GL product.
- It introduced a government accounting applications software product for state and local agencies.
- It introduced a client/server desktop product for budgeting and expense tracking. The client is a Mac or a PC with Windows or Motif, and the server is a VAX or Ultrix minicomputer.
- It added a desktop executive information system (EIS) through Cognos Power.
- It expanded its presence into the international arena.

In addition to the Pioneer acquisition, Ross has acquired three other companies in the last three years and is likely to continue to expand through additional acquisitions and internationally. Total revenues for fiscal 1991 are estimated to have been in the $80 million range.

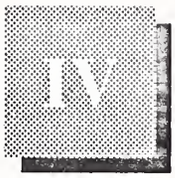
e. Systems Union, Inc.

Systems Union is the U.S. company of the Europe-based Systems Union Group. It exemplifies the kinds of companies with which U.S. firms will be competing in the international accounting software products arena.

SunSystems is a family of integrated multicurrency accounting and business software packages that are made up of two basic modules. The SunAccount module is a combined ledger accounting system that translates and consolidates critical financial information in all world currencies; it 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 last year. The versions operate similarly on PCs; a range of PC LANs; DEC VAX and DEC Systems ULTRIX, IBM RISC System/6000 and AS/400 workstation and 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 use Microsoft's SQL Server RDBMS.



Human Resources

A
Definitions

The human resources cross-industry sector consists of application solutions that are 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 provided in Exhibits IV-1 and IV-2.

B
Information Services Markets

Human resources is an obvious functional area for automation as it involves a tremendous amount of variable records and reporting requirements. Though on the whole a majority of systems are cross-industry, examples of vertical niches are government and health care, with further differentiation between union and non-union.

Purchase from a third party is strongly favored over internal development because of the continuous need for updates; the maintenance requirements are simply too great. Thus the growth of this cross-industry sector, unlike most of the other cross-industry sectors, is not strongly threatened by either the trend toward specialization or the desire for internal development.

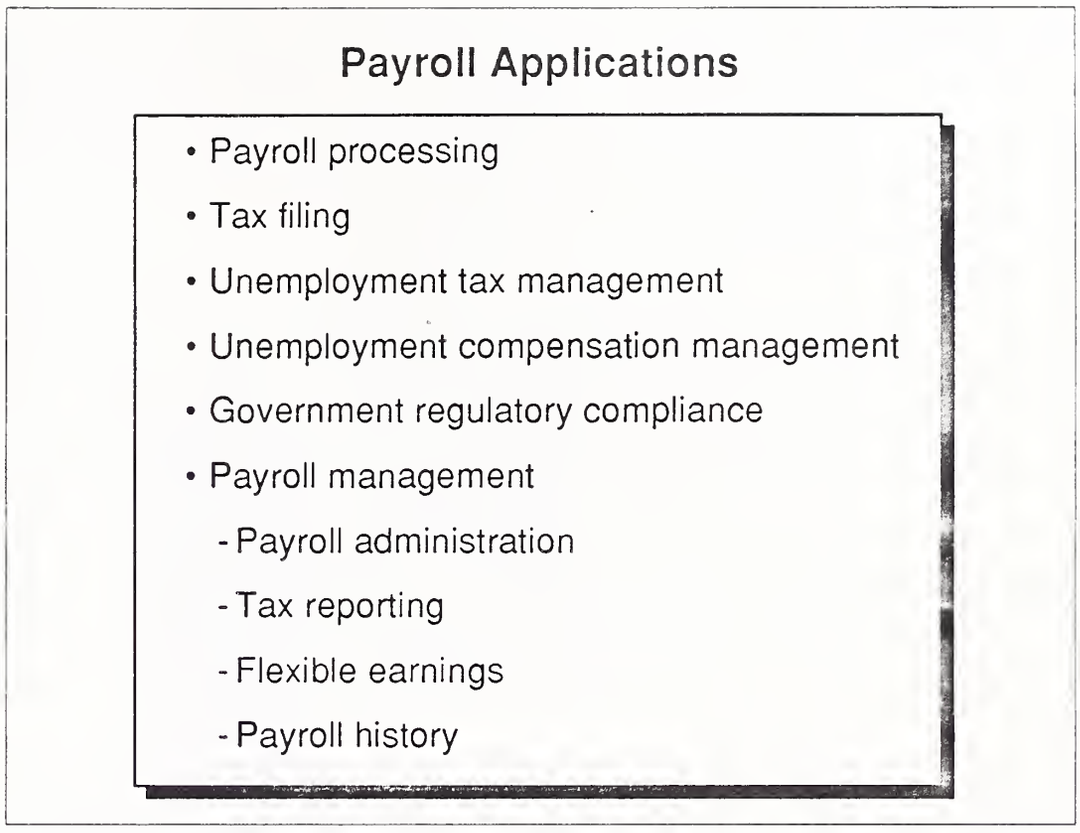
Industry-specific human resources solutions do not appear to be as compelling a need as for industry-specific accounting solutions. However, as is true in some of the other cross-industry sectors, a movement is under way toward more tailoring of applications software products by both the software vendor and the customer.

EXHIBIT IV-1

Human Resources Management Systems (HRMS) Applications

- Employee Relations
  - Time and attendance
  - Grievances
  - Seniority
  - Union/labor relations
  - Employee demographics, history
- Benefits Administration
  - Flexible benefits
  - 401(k)
  - Profit-sharing plans
  - IRA
  - Pension plans
- Government Compliance
  - EEOC
  - AAP
  - OSHA
  - COBRA
- Manpower Planning
  - Career planning
  - Turnover analysis
  - Human resource forecasting
- Compensation Administration
  - Wage and salary structure
  - Compensation budgeting
  - Salary performance review
- Applicant Tracking
  - Applicant demographics
  - Candidate search
  - Interview, selection
- Position Control
  - Inventory
  - Budgeting
  - Forecasting

EXHIBIT IV-2



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 and are offering easier-to-use report writers and front ends for such purposes. As an example, PeopleSoft's PeopleTools is a set of proprietary customization facilities.

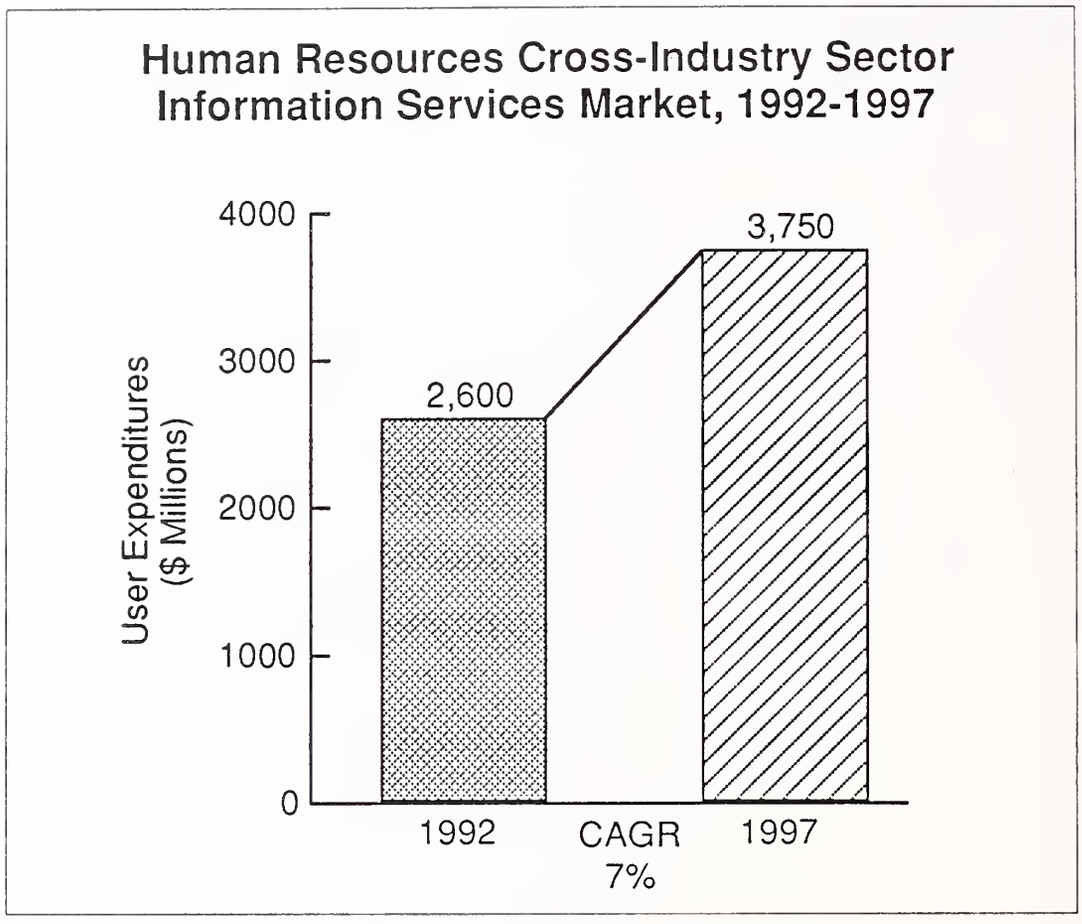
More opportunity for customization is also provided by payroll processing services firms that are adding reporting capabilities. Processing services vendors are expected to be flexible in the presentation of an application solution and be willing to customize it to suit the client's needs.

Exhibit IV-3 is INPUT's information services forecast for the human resources cross-industry sector.

The following are underlying driving forces mentioned in INPUT's report last year that will continue to drive the market during the 1992-1997 timeframe.

Increasing visibility of the human resources (HR) function—It is becoming increasingly apparent that attracting and retaining a highly skilled work force and containing "people costs" are of paramount importance to maintain a corporate competitive edge. The general perception is that effective human resources and payroll systems help to realize these objectives. Corporate executives are taking more notice of the HR function and the IS systems that support it. This driving force has a positive influence on user expenditures.

EXHIBIT IV-3



Regulation—The constant increase in government regulation and in the complexity of the human resources and payroll functions continues to be a major driver of both HR and payroll application solutions. An area of concern for human resources is keeping up with the tremendous amount of new legislation.

Corporate restructuring—Human resources departments must also handle all the changes effected by company consolidations, international expansion and downsizing. One phrase that aptly describes the human resources function is "keeping up with changes." Constantly changing state and federal payroll regulations—FICA rates, minimum wage changes, FSLA requirements, 401(k) and IRA regulations, to name a few—require continuous updates in human resources management systems and payroll application solutions.

Uncertain economy—A slower economy will continue to have mixed influences on expenditures for this cross-industry sector in the short term. On one hand, a recession makes "people data" even more critical to track, review and analyze. On the other hand, a weak economy could signal potential expenditure cuts in all but production-level information services. It could also lead to decreasing need for payroll processing services as the size of the work force levels off.

Human resources and payroll self contained—Although the human resources and payroll functions are not entirely self contained, they are more independent than some of the other cross-industry sectors such as accounting, which cuts across multiple departments and levels. Because of this more contained nature, INPUT believes that new products and technologies will be more easily and quickly adopted by the human resources cross-industry sector. The user interviews discussed in Section 4 of this chapter bear this out.

New pricing schemes—Early indications are that a pricing strategy of choice will be based on the number of employees that will be processed through the system or on the number of payroll transactions. This way, a small organization would be paying less for a client/server solution than an organization with more employees.

INPUT therefore believes that new pricing schemes are less likely to have an adverse impact on human resources applications software products than in some of the other cross-industry sectors.

- Vendors will resist lowering prices; they will sell their client/server products on the basis of functionality/benefits—e.g., distributed data, multivendor, multiplatform—rather than with the lure of lower prices.

- In addition, human resources packages are less likely to be sold through mass merchandisers, at least for now.

A question that must be raised, however, is the extent to which new applications software solutions will erode expenditures on payroll processing services. This issue is addressed below, in subsection 3.

As shown in Exhibit IV-4, the largest human resources sector delivery mode will continue to be transaction processing services for payroll processing. The three delivery modes are discussed below.

1. Applications Software Products

Exhibit IV-5 shows the growth expected in cross-industry human resources applications software products by platform size.

EXHIBIT IV-4

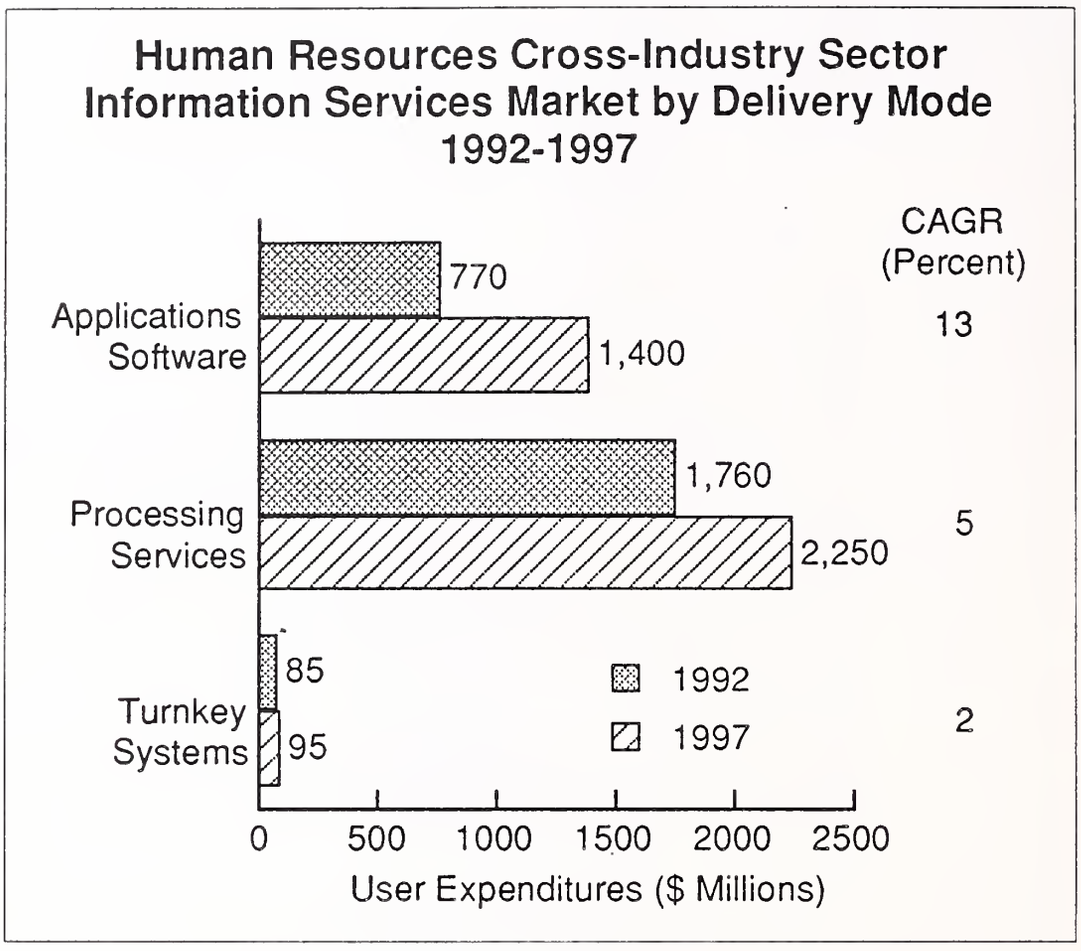
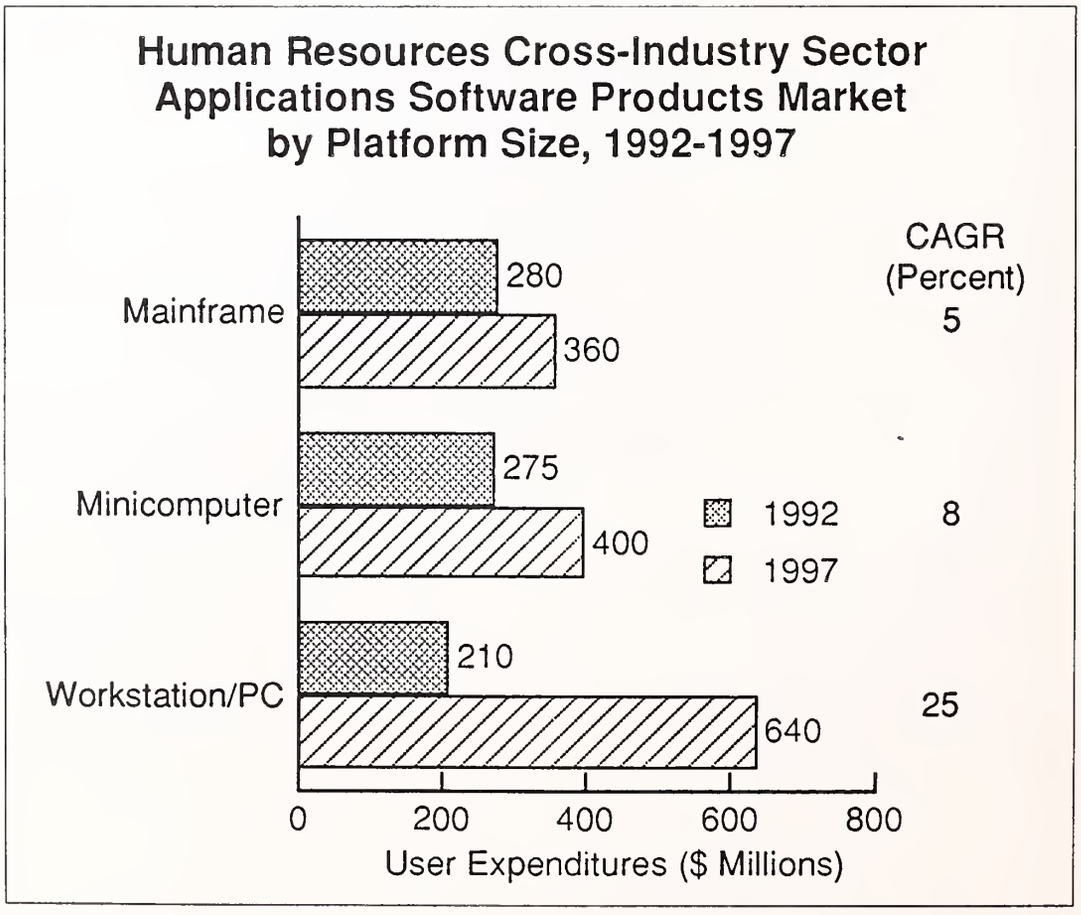


EXHIBIT IV-5



Mainframe—Most of the expenditures on mainframe-based solutions will be for maintenance/licensing fees of existing human resources applications software products as users opt for smaller platforms.

Vendors with mainframe solutions will attempt to diminish the impact of the downsizing trend by providing PC software that complements host-based systems. For example, downsized solutions for some aspects of human resources, but not necessarily a downsized solution for the entire area, is one way of going about this type of compromise. It is an interim step, however, for both vendors and customers.

Minicomputer—A general trend toward more modularity, e.g., a smaller system for benefits, a separate one for payroll, and a separate—yet integratable—system for resource planning, is also a growth promoter for both midrange and PC-based systems.

On the other hand, users will have to weigh the trade-offs between a minicomputer system and a PC LAN system or a client/server system. As a portion of would-be minicomputer users opt for PC LANs and client/server solutions, growth of user expenditures for minicomputer-based HR solutions will be negatively impacted.

Workstation/PC—The move to smaller platforms is well under way in the human resources sector. Client/server solutions perform well here because human resources and payroll are more independent functions than accounting, for example, which cuts across and must tie into many other functional areas within a corporation.

High growth will be especially apparent for workstation and PC solutions in the latter half of the forecast period as vendors introduce—and customers begin to accept—client/server solutions. All leading human resources software products vendors already have or are developing client/server versions of their products.

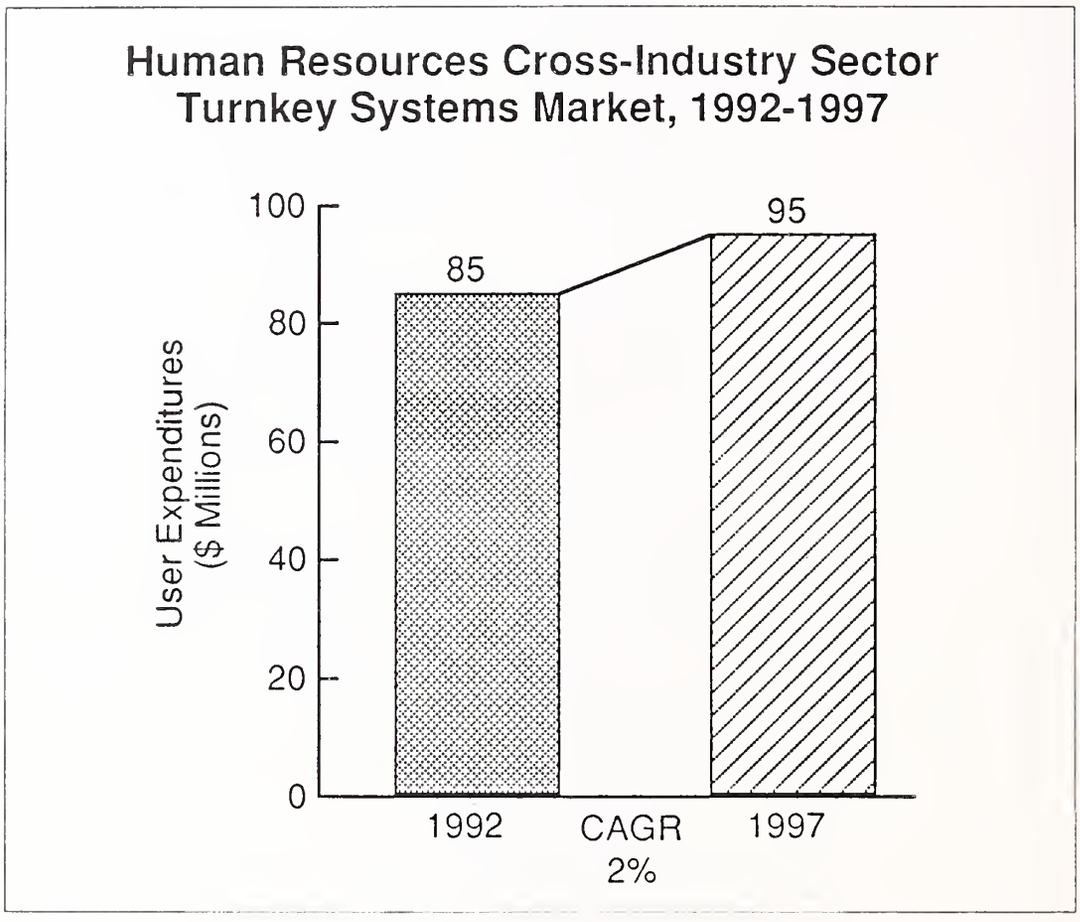
2. Turnkey Systems

Turnkey systems expenditure in the human resources cross-industry sector is a small portion of overall user expenditures and will remain so. Human resources solutions are typically installed on existing hardware or hardware that has already been selected. If human resources and payroll functions are part of a turnkey system, it is usually a system that is industry-specific, such as for health care or for the legal profession.

A growth inhibitor is the increasing visibility given to integration and the productivity/cost improvements inherent in closer ties between human resources/payroll and financial/accounting functions. Turnkey systems that include other applications and are directed to vertical sectors will be the norm rather than turnkey systems dedicated to human resources.

User expenditures are small to begin, with and INPUT forecasts a slow growth rate for this delivery mode. Exhibit IV-6 shows the growth expected in cross-industry human resources turnkey systems.

EXHIBIT IV-6

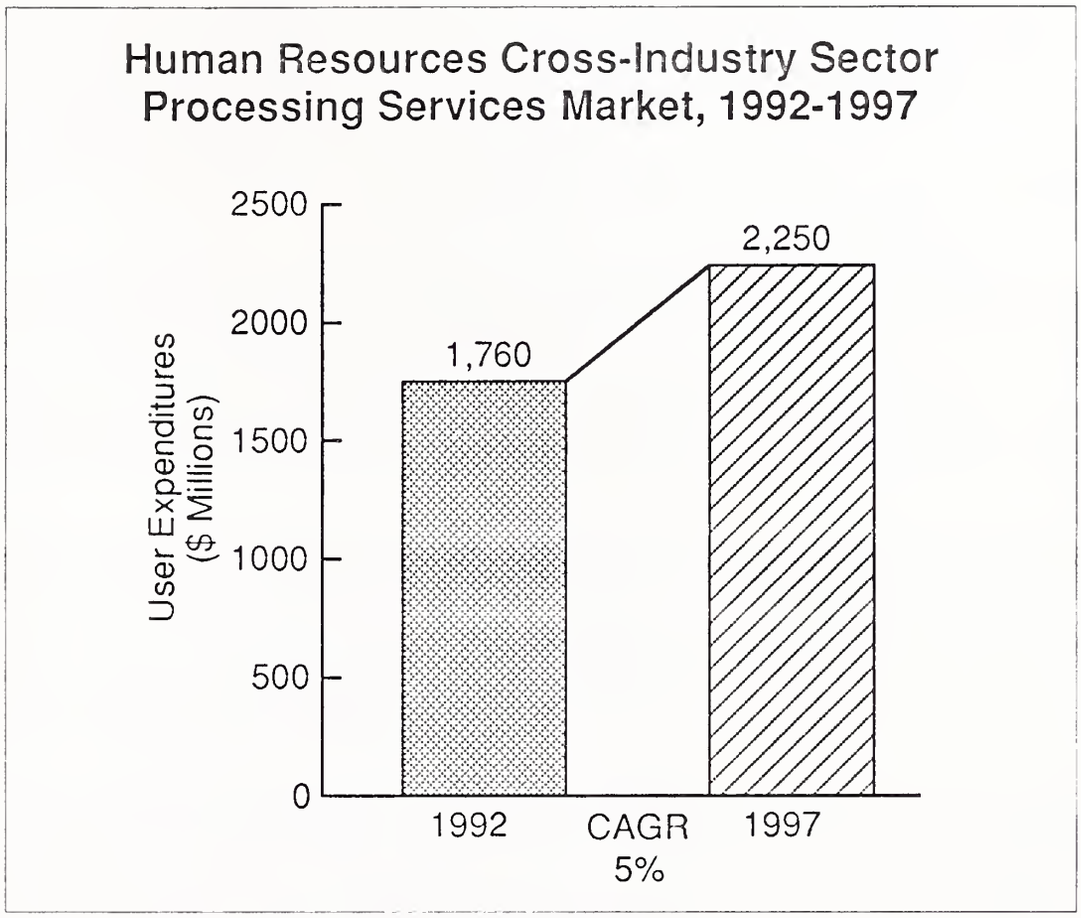


3. Processing Services

Payroll processing is the second largest processing services market, surpassed only by processing services sold to the banking and finance industry sector.

Exhibit IV-7 provides INPUT's 1992-1997 forecast for processing services within the human resources cross-industry sector.

EXHIBIT IV-7



The five-year compound annual growth rate (CAGR) is lower in this year's forecast (5%) than last year's (8%). Processing services vendors must address the following issues:

Downsizing—Offloading the central computer of applications software and/or data may be a growth promoter, as processing services is one of the alternatives to in-house mainframe computing. On the other hand, the alternative is to purchase solutions running on smaller platforms, especially in a client/server environment, as an in-house solution.

Client/server computing—The trend toward client/server computing suggests that the processing services vendor's centralized facility could act as the server while desktop computers at the customer site act as clients in a very interactive relationship. Processing services vendors will need to work aggressively to maintain strong relationships with their customers in this scenario, continuously updating their own software and also supplying, at the very least, client front-end software to their customers.

Data availability—A trend more pronounced this year than last year is customers' interest in more ad hoc data analysis capabilities. A key to continued growth in payroll processing services is vendors' ability to make customers' data available to them or even give it back to them once it's processed. Another success factor is flexible and customizable reporting capabilities.

Control Data Business Management Services Division's Orchestrator software is an example of how a payroll processing firm has responded to the need for data availability. Orchestrator enables users to enter payroll data via their microcomputers and transmit it to CDC-BMS for processing. It also enables customers to retrieve report and data files for ad hoc reporting or integration with Lotus 1-2-3, dBase and Wordstar.

Integration of payroll and human resources—A potential growth inhibitor for payroll processing services is the complexity of integrating payroll services with third-party HRMS, benefits and accounting software. To the extent that processing services vendors provide the HRMS and benefits software themselves and provide ways to integrate the two, growth for their services will be enhanced.

Penetration of smaller accounts—The majority of small companies (50 employees or less) still use a manual system. These small companies represent a sizable potential market for payroll processing services. But the question that remains is whether these companies will opt for PC-based solutions or client/server solutions—as prices for personal computers and workstations continue their decline, as software products pricing also continues to decline, and as systems become easier to use through graphical user interfaces and RDBMSs—or processing services.

In favor of the processing services option is the aforementioned complexity factor and the continual need for product upgrades reflecting changing regulatory requirements.

C
User Department Directions

The human resources respondents—ranging from a human resources IS consultant with a pharmaceuticals firm to a payroll processing manager at a cement company—have recently undergone or are undergoing major changes in their IS products and directions.

- The pharmaceuticals firm is replacing all three of its major human resources systems, including payroll, over a three-year period. It wants to standardize and consolidate much of the HR and payroll function to eliminate redundancies, improve data integrity, and be able to access data more easily. The systems in place now are eight to ten years old.

- A cement company downsized its payroll function from a mainframe to a minicomputer, and then recently decided to outsource the function to a processing services firm as it continued to decentralize its operations.

- A midsized telecommunications company will downsize within the next few years to networked PCs. It will seek not only new downsized HR solutions, but more flexible systems with closely integrated HR and payroll capabilities.

- A recently acquired retail food chain is developing a requirements list for completely new HR systems. Prior to the merger, this firm had customized its HR systems to such an extent over the years that they became too complex and unwieldy.

Human resources example—The pharmaceuticals firm provides an interesting example of the kinds of driving forces impacting human resources.

One of the external driving forces leading to these changes is that within the next several years the patent on one of its major products will expire. The company will therefore face new competition from firms with over-the-counter and generic drugs. The company will be forced to operate more efficiently and competitively.

Another external driving force is that the government is placing more stringent rules on health care plans; it is likely that the firm's current large profit margins will be scrutinized. Again, the company will have to run leaner and meaner and is beginning to prepare for this eventuality. Therefore the human resources function is being pressured into being able to manage the company's internal resources—i.e., people—more efficiently.

The HR department is beginning to respond to these external forces in the following ways: it is adopting new and more equitable compensation plans, flexible benefits, and a new philosophy of performance including reducing the number of levels within a job category. It therefore needs new kinds of systems that support these new kinds of HR functions.

Payroll processing example—The cement company, which recently decided to outsource its payroll function, provides insight into the issues and needs of a large payroll department.

The company's decision to outsource was based on cost. The vendor selection process was difficult because payroll has become a shared function between the human resources and payroll departments. The vendor decision was "made by compromise."

The company needed to decide how much control of its own data it was willing to give up. Given that so much change is under way, both internally and externally, the company wanted to maintain easy access to its payroll data and decided it wanted to give up as little control as possible. It was therefore decided that the vendor would do the processing and then feed the data back to the client. The data would therefore essentially remain in-house.

Regardless of whether or not the function is human resources or payroll, interviewees consistently expressed the following needs:

- More flexibility in payroll processing services, human resources and payroll applications software products
- More easily customizable payroll and human resources applications software products
- More ease of access to information. HR and payroll data bases are becoming much larger.
- More integration of payroll with human resources software

Thus, in sharp contrast to the accounting cross-industry sector respondents, human resources and payroll respondents are undergoing radical changes that imply the advent of new information services and systems.

D
Trends/Technology Ratings of Importance

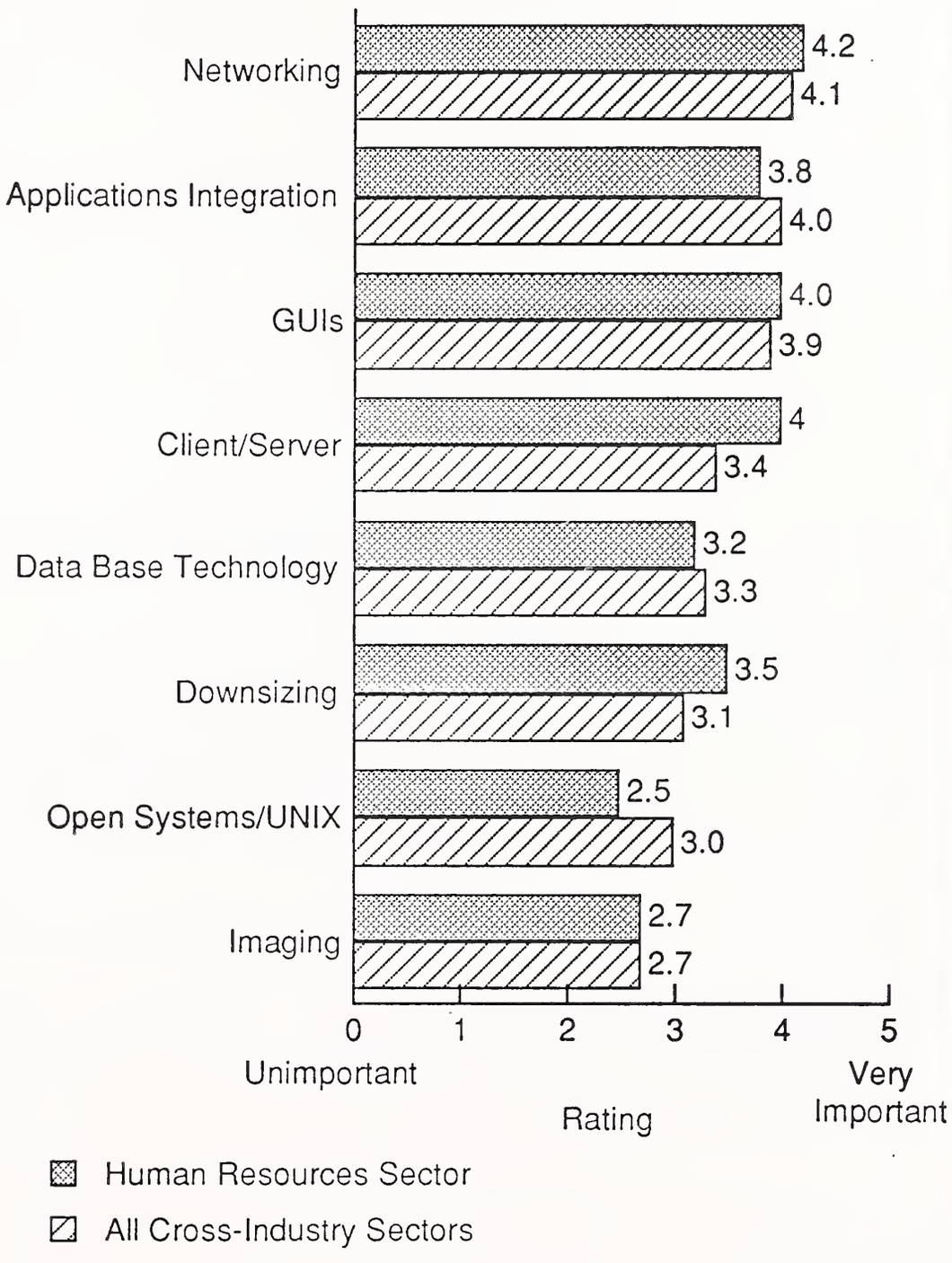
Respondents within all cross-industry sectors—users and vendors—were asked to rate various trends and technologies on a scale of one to five, where one is unimportant or having little impact and five is very important or of significant impact.

The technologies listed in Exhibit IV-8 were selected because INPUT believes they will receive the most attention from users and vendors over the next five years. In addition, INPUT believes their impacts on both users and vendors will be profound. Users who deploy these technologies will undergo re-engineering of their business functions. And vendors will need to change not only their products, but also the ways in which they price, sell and support them.

Exhibit IV-8 shows the composite rankings of the human resources cross-industry sector compared to the rankings of all cross-industry sectors combined.

EXHIBIT IV-8

Human Resources Cross-Industry Sector Respondents' Indication of Relative Importance of Trends and Technologies



As is true with all cross-industry sectors combined, networking and applications integration are ranked high in terms of relative importance. However, the human resources sector is unique in that it ranks client/server architecture, GUIs and downsizing higher than all cross-industry sectors combined. These ratings are in sharp contrast to the accounting sector's relatively low ratings for these three trends.

INPUT believes these responses confirm that human resources and payroll lend themselves well to PC front ends and client/server products because these functions, although they may be integrated, are self contained. In fact, in large corporations such as the pharmaceuticals firm described above, these functions are under the direction of their own IS manager or staff member. They are more likely to have already undergone decentralization, from being mainframe based to being departmentally based.

These findings suggest that vendors selling to the human resources sector must have client/server products available now, or be well into the development process. If they don't, new vendors will take advantage of the opportunity that exists to enter this market.

Respondents for all cross-industry sectors were also asked to rank the technologies and trends in terms of importance in 1997. All technologies for all cross-industry sectors increase in importance over the five-year period.

Even given the above, human resources distinguishes itself in 1997 in that imaging technology, although ranked the same as in all cross-industry sectors combined in 1992, becomes significantly more important in 1997 (4.3 for human resources versus 3.7 for all cross-industry sectors combined).

As is true with all cross-industry sectors, within the human resources sector vendor rankings are generally slightly higher than user rankings. The largest discrepancies for 1992 are for client/server architecture and data base technologies, where vendor rankings are 2.3 and 2.0 times higher than user rankings.

E

Vendors and Competitive Environment

1. Vendor Characteristics and Trends

Vendors who participate in the human resources cross-industry sector are also likely to participate in the accounting sector. Therefore the vendor characteristics and trends are essentially the same except that human resources solutions do not warrant new DB2 implementations, and multinational human resources capabilities are not being pursued.

Downsizing—The use of microcomputers as access points to the data base for uploading or downloading is still being exploited as a product/service extension.

Personal computers have changed the way payroll processing services are delivered to customers. A trend continues for payroll processing firms to accept and transmit data where the client wants it in order to remain a viable alternative to in-house solutions.

Client/server—Various versions of client/server software products are beginning to emerge. Notable examples are PeopleSoft's product line and the products that are under development by Dun & Bradstreet Software and Genesys.

Although almost all major applications software vendors are developing client/server HRMS products, client/server payroll packages are for the most part not on the drawing board due to the bottleneck created in transferring large quantities of data back and forth, and the heavy printing requirements.

Integrated products and services—Vendors are placing increasing emphasis on integrated functions in the following ways:

- Integration of HR modules with one another
- Closer integration of HR and payroll
- Integration of HR and payroll with financial applications

Increasing emphasis on integration creates challenges for vendors whose product lines consist of multiple applications that have been acquired (rather than "home grown") along the way; for vendors that specialize in HR applications software products to the exclusion of payroll applications; and especially for vendors that specialize in HR. Integration also creates challenges for payroll processing firms that do only payroll.

We can therefore expect more collaboration between, and with, specialist vendors and with systems integrators.

Additional Services—The trend toward outsourcing is creating new demand for additional services. Customers are beginning to want to pay vendors to maintain their software rather than hire their own people to do it. There appears to be a trend toward applications software management by the vendor on an ongoing basis.

Revenues from consulting services for Cyborg Systems and Dun & Bradstreet Software now account for 20%-30% of their total U.S. revenues. These services are expanding to include project management, tailoring of applications software products, and on-site education.

As payroll processing services vendors begin to feel pressure from in-house solutions, they will seek additional sources of revenue, such as from applications software products.

2. Leading and Emerging Vendors

Exhibit IV-9 lists leading software vendors in this cross-industry sector. Their current predominant platform types are indicated. Essentially all of them are downsizing.

The market is crowded; at least 100 companies offer human resources and payroll software packages. The smaller companies compete on the basis of price and additional features rather than offering leading-edge technology.

EXHIBIT IV-9

Human Resources Cross-Industry Sector
Leading Applications Software
Products Vendors

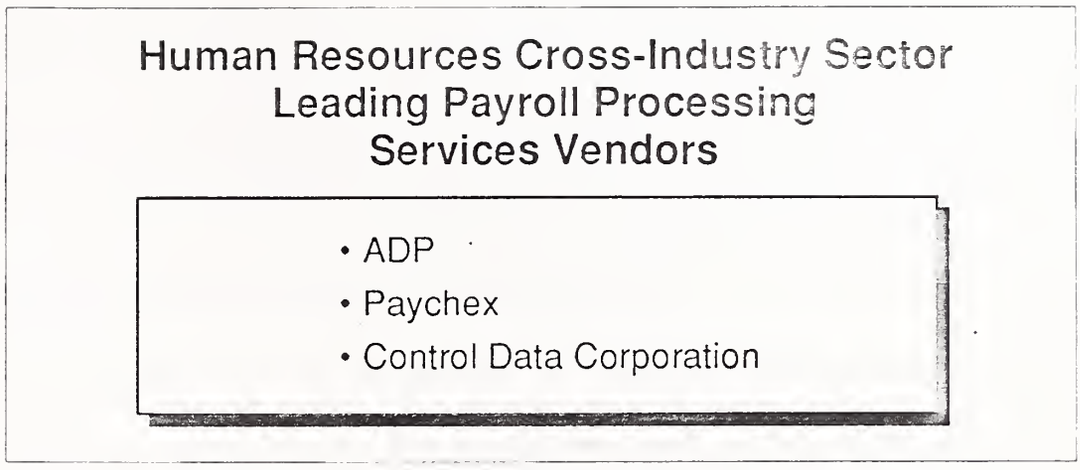
Vendor	Current Platform
Cyborg	Mainframe
D&B Software	Mainframe
Genesys	Mainframe
Information Science	Mainframe
Integral Systems	Mainframe
PeopleSoft	Client/server
Software Plus	Midrange
Software 2000	Midrange
Spectrum Human Resources	Microcomputer
Tesseract	Mainframe

Exhibit IV-10 lists leading processing services vendors in this cross-industry sector.

There are only three nationwide payroll processing services vendors: Automatic Data Processing (ADP), Control Data Business Management Systems, and Paychex. ADP is the clear leader, with approximately $950 million in processing services revenues. Paychex's and CDC's estimated processing services revenues are each in the $100 million to $130 million range.

ADP recently acquired fourth-place Bank of America Business Services Division.

EXHIBIT IV-10



Paychex's focus is to provide basic payroll processing services to small companies (200 or fewer employees); CDC offers a customizable payroll processing service to businesses with 100 or more employees. ADP services the needs of all sizes of companies. Large regional payroll processing services vendors include Automated Payroll Services (Boston) and CRI Computing (Reno). Additional local vendors number around 1,000 and include banks, accounting firms, and other small independent firms. INPUT expects continued consolidation.

3. Vendor Profiles

The companies INPUT has selected to profile exemplify technological trends and a variety of competitive approaches to the human resources cross-industry sector marketplace.

a. Automatic Data Processing, Inc.

Automatic Data Processing (ADP) was formed in 1949 as Automatic Payrolls, Inc. ADP focuses on four businesses: Employer Services, Brokerage Services, Dealer Services and Automotive Claims.

As it pursued a strategy of broadening the scope of each of these four services, the company divested four other businesses in recent years: real estate processing services, automated teller machine processing services, banking information services, and a quotation services business in Canada.

Within Employer Services, ADP provides an integrated package of services, including payroll processing and financial services, human resources, and benefits services. Payroll services are its largest single form of service and include automatic deposit, quarterly and annual social security and income tax withholding reports, W-2 withholding statements for employees, a complete record of payments for each pay period, and periodic employee historic earnings records. Also included are special statistical and audit reports for management, such as payroll and job cost distribution reports, welfare and pension fund reports, and payroll audit reports.

ADP's Employer Services customer base numbers 3,000 large companies, 120,000 midsized (25-500 employees) accounts, and 125,000 small businesses. Employer Services are provided from over 40 regional processing centers in the U.S. and from centers in London, Rotterdam, Campinas, São Paulo, Rio de Janeiro, Toronto, and Montreal.

ADP's fiscal 1991 revenues were $1.8 billion, all of which is U.S. based. INPUT estimates that ADP's revenues are derived approximately as follows:

Employer Services	59%
Brokerage Services	20%
Dealer Services	10%
Automotive Claims	6%
Other	5%

Revenue growth for fiscal 1991 was strongest in Employer Services, which grew at a double-digit rate.

Since the early 1960s, ADP has implemented an active acquisition program, to diversify from its primary business of providing payroll services. Significant gains have been made in brokerage services to automotive dealers and automotive claims services for automobile insurers and repairers.

b. Control Data Corp., Business Management Services Division

CDC-BMS is the oldest American business and data processing services firm, having begun in 1932 as the Service Bureau Company. CDC-BMS provides processing services and software products for payroll, tax filing, human resources management and accounting applications.

Payroll and human resources products and services are all integrated and consist of:

- Signature Payroll and Tax Filing Services files payroll taxes, monitors labor and job costs, and tracks attendance and absenteeism. The service also provides detailed payroll analysis reports.

- Repertoire Human Resources Management System, available since 1985, allows companies to merge their payroll and personnel records into a single data base of employee information for on-line inquiry, updating and reporting.

- Orchestrator software enables users to enter payroll data via their microcomputers and transmit it to CDC-BMS for processing. It also enables customers to retrieve report and data files for ad hoc reporting or integration with Lotus 1-2-3, dBase and Wordstar.

- Repertoire/Applicant Track is a module that allows companies to access previous candidates' skills, education and experience—then generate a "snapshot" of their qualifications that can be routed to hiring managers for review. The module also helps companies determine the cost of each individual hired, so they can channel time and financial resources to employment or search firms with the most proven value. It also helps companies track and analyze EEO data. As of May 1991, Applicant Track was in beta test.

INPUT estimates that CDC-BMS's 1991 revenues were $195 million. Approximately 5% of CDC-BMS' revenue is from accounting processing services. BMS also provides benefits claims services and the Employee Advisory Resource (EAR), a telephone-based employee assistance program for personal problem resolution.

c. Genesys Software Systems, Inc.

Genesys Software Systems, founded in 1981, provides payroll, human resources, defined benefits, defined contribution, human resource planning, and flexible benefits applications software products. Genesys software products, until the last several years, all ran on IBM mainframes.

Genesys is an example of a company whose applications software products are rich in functionality. Its Human Resource Systems has applicant tracking, staffing, wage and salary analysis, training and development, turnover analysis, benefits administration, government compliance and union regulations.

Products now include:

- DB2 versions of all of its products
- Standalone PC and PC LAN versions of its products
- Client/server versions of all of its products, where the server is a 486-based PC
- An imaging product to be used with payroll and human resources client/server products. This product is not yet available for general distribution.

In addition to applications software products, Genesys has gotten involved in two other delivery modes over the last several years:

- The Processing Services Division, formed in 1988, provides benefits and payroll processing services. Genesys is now competing head to head with ADP in the category of companies with more than 400 employees.

- The Data Center Division, also formed in 1988, provides systems operations for customers' Genesys Human Resource software licenses at the Genesys Data Center, either temporarily or on a long-term basis.

Estimated revenues for fiscal 1991 (6/91) are $15 million.

d. Integral Systems

Integral Systems' strategy is to:

- Continue its SAA direction, offering a complete portfolio of financial and human resource management software across all of IBM's SAA-compliant platforms
- Continue to modernize and broaden its AS/400 product line
- Continue to broaden its PC-based product line

Mainframe products include:

Personnel Administration
Payroll Processing
Applicant Management
Position Control
Benefits Administration
Pension Administration
Flexible Compensation

Integral expects its AS/400 software products to increase from their current contribution of 20% of revenues, while mainframe-based software products become a smaller portion of the whole. The company's revenue from services is also expected to take up the slack in mainframe software product sales.

Most of Integral's PC-based applications address specialized needs but tie into a shared mainframe data base. Examples are CAAPS for Affirmative Action management, JobTrak for succession planning, OrgChart for organizational planning and analysis, and Workbench for salary planning and administration.

Integral also offers HR1, a PC workstation-based solution that can interact with a mainframe, for organizations that want to delegate HR record keeping and reporting responsibility to individual divisions or departments but still support the central data base.

Integral's HR Minder enables managers to monitor the HR data base for events—such as upcoming performance reviews—and receive immediate notification for tracked events.

INPUT believes that Integral is still too reliant on revenues from mainframe-based products and that it will have to deliver on a client/server product in the near future in order to remain a serious contender in this market.

e. PeopleSoft

PeopleSoft was founded by the co-founder and former chairman of Integral.

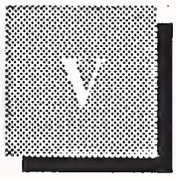
PeopleSoft HRMS includes payroll, personnel and benefits. It has a Microsoft Windows 3.0 graphical user interface and supports SQL data base systems such as SQL Server, Gupta, Oracle and DB2. The product also complies with SAA. Support is planned for OS/1 and Presentation Manager.

PSHRMS also has several report writing options, PeopleTools, an application development tool set, and a set of proprietary customization facilities. PSHRMS also has a kiosk module for employee access to benefits and selected personal data. PSHRMS is exemplary of the new generation of human resources products that are beginning to appear on the market. It was built from the ground up.

PSHRMS operates on a variety of computers (LANs, midranges, and IBM mainframes) and data bases (DB2, RdB, AllBase, SQLBase, SQL Server, and Oracle).

PeopleSoft has had the client/server arena to itself for over two years; this year, however, client/server versions are being introduced by many major competitors. It is not clear that this two-year lead is a major advantage in the long term, as INPUT research shows that the majority of potential buyers are just beginning to embrace client/server technology. PeopleSoft is selling its client/server products to "early adopters." And a large portion of its 1991 revenues came from mainframe-based products.

PeopleSoft has the advantage of not having to please an existing customer base. Revenues in calendar 1991 were $20 million. PeopleSoft projects 1992 revenues of $32 million.



Education and Training

A
Definitions

The education and training cross-industry sector encompasses computer-based training (CBT) products. Training that is instructor-led is not considered in this report.

CBT consists of both authoring systems and courseware. Authoring systems provide a tool kit or shell for courseware development.

CBT is not limited to training about information systems subjects. Initially, CBT focused on technical subjects, but now CBT exists on any subject and for any classification of employee. Examples of major application areas are sales/marketing, safety, health awareness and basic skills/adult literacy, as well as machine and mechanical technologies, industrial maintenance, diesel and automotive technology, and engineering technologies.

INPUT estimates that $2.9 billion will be spent in 1992 on instructor-led education and training related to information systems and services. These expenditures and this type of instruction is included in the professional services delivery mode and is outside the scope of this report.

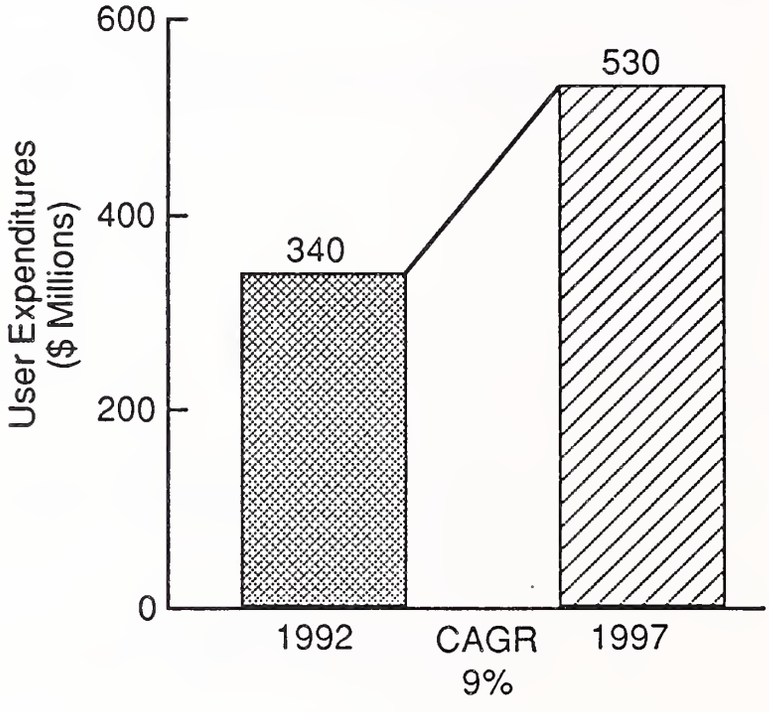
INPUT's coverage of live education and training that is specifically information systems-related is included in its annual report, *U.S. Professional Services Market, 1991-1996*, which will be updated this year for the time period 1992-1997.

B
Information Services Markets

Although CBT as a product/technology is over 40 years old, it is still a small market. INPUT's information services forecast for this sector is shown in Exhibit V-1.

EXHIBIT V-1

Education and Training Cross-Industry Sector Information Services Market, 1992-1997



INPUT is not as bullish on CBT this year as it was last year. Last year INPUT estimated the 1991 market at $519 million, to grow over a five-year period at an overall rate of 12% compounded annually. This year, however, INPUT has dropped its base market number as well as the CBT outlook. INPUT believed last year that CBT was gaining more momentum than it actually was. In reality, CBT continues to be a difficult concept to sell.

As is true with all other growth areas within information services, the need to reduce costs and improve efficiency is a key driver for the education and training sector. Given the findings and publicity of projects like *Workforce 2000*, it is widely acknowledged that the U.S. work force is under-trained.

Nonetheless, the CBT market has serious growth inhibitors:

- The "hard-sell" issues won't go away quickly. A limiter on the size of the market is the perception that some kinds of instruction just cannot be done by a computer. It is unclear how much this view is held because some educators and trainers are concerned about being replaced, or because some material actually is not appropriately taught via computer. In either case, lack of receptivity continues to be an issue for this cross-industry sector.

- As users continue to seek less expensive forms of training, they will investigate CBT. On the other hand, if there is any hesitancy about buying something new and unproved—as CBT is for first-time users—this hesitancy is magnified during an uncertain economy.

- Authoring system availability and acceptance needs to precede widespread courseware usage. Few companies produce and sell authoring systems and the technologies are still relatively complex and expensive. The learning curve for efficient use of CBT remains expensive.

  A number of authoring systems have appeared. Authorware Professional is a prime example. But the market for authoring systems has been slow to take off. One reason for the lack of acceptance has been the personal attributes needed to effectively use an authoring system. The author needs not only a solid understanding of the subject matter and how to teach through the use of technology, but also she or he must have a clear understanding of multimedia tools and know how to design interactions that are fun and conducive to learning.

- Multimedia instruction is limited due to lack of affordable hardware. Also, it is currently limited to a single workstation. Multimedia instruction must be digitized across a network in order to achieve widespread use. Technologies like digital video interactive (DVI) technology, which allows motion video to be transferred digitally across a network, continue to develop and will eventually be affordable, but not in the short term.

- The potential buyer within a corporation is difficult to identify, often being a project team of a functional department rather than a training group or MIS.

What has given the market more credibility recently is the publicity about and recognition over this last year of the efforts of IBM/Apple and Microsoft in multimedia. Multimedia will play a significant role in CBT as it continues to develop.

Opportunity continues to exist for CBT about technologies and products such as new operating systems, networking, client/server architectures, object-oriented programming and applications development.

INPUT believes the market would be given a boost if information technology vendors more strongly endorsed CBT for use with their own products, each enhancing the other's business significantly. The recent Goal/LEGENT merger will be interesting to watch in this regard. LEGENT is a leading systems control software products firm and Goal Systems, although the majority of its revenue comes from systems software products, has a strong CBT business division.

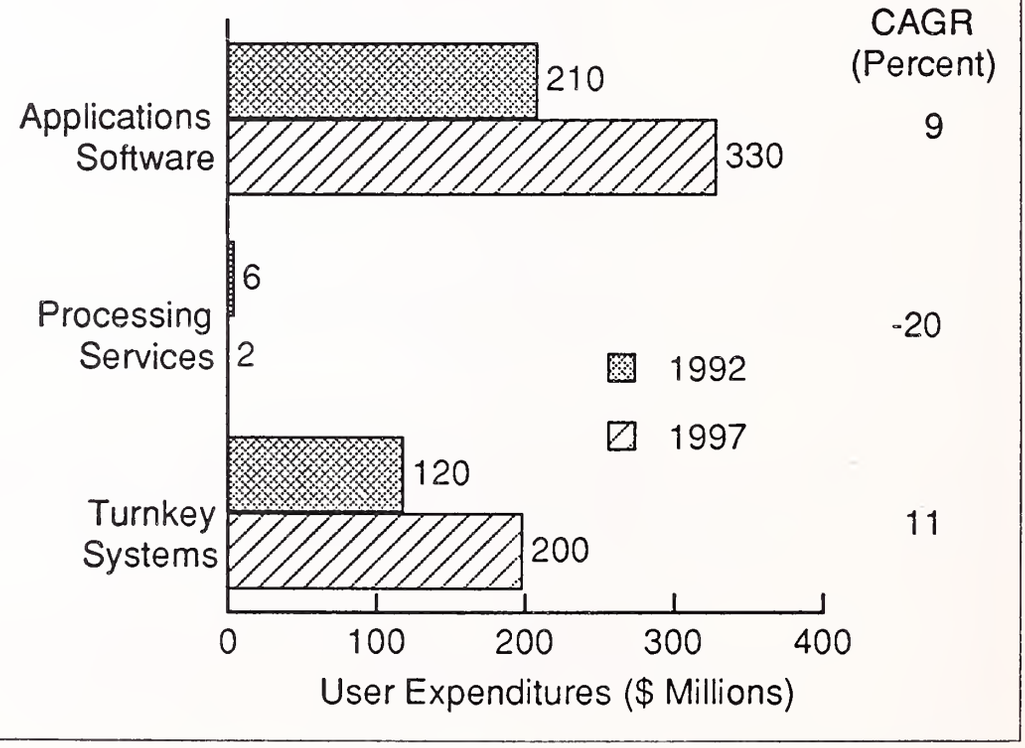
Another potential win for CBT is the area of performance support, which is still in its infancy. The goal of a performance support system is to provide whatever is necessary to generate performance and learning at the moment of need. At present, performance support systems are limited by the technological difficulty in developing them. Only a few companies have software tools for performance support.

Over the long term, however, INPUT believes this could be CBT's strongest hope for eventual widespread acceptance and use, given users' lax support for CBT.

Given the above factors, Exhibit V-2 shows INPUT's forecast for moderate growth of expenditures for education and training applications software products and turnkey systems. Processing services expenditures are rapidly declining.

EXHIBIT V-2

Education and Training Cross-Industry Sector Information Services Market by Delivery Mode 1992-1997



Following is a discussion of each of the individual delivery mode forecasts.

1. Applications Software Products

INPUT's estimate of the 1992 applications software products market by hardware platform for the education and training cross-industry sector is presented in Exhibit V-3.

EXHIBIT V-3

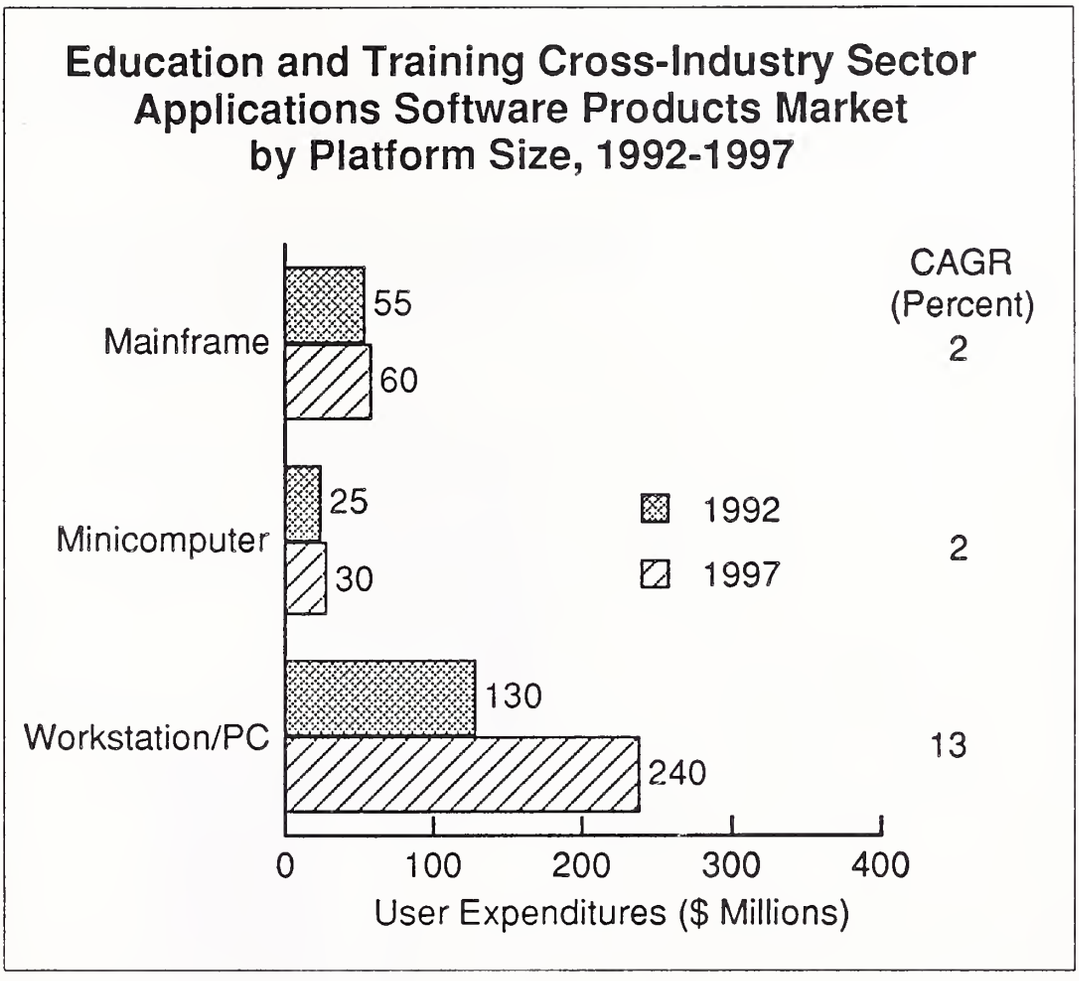


Exhibit V-3 reflects the following:

- Initially, all CBT was delivered via mainframe. For example, all Crwth and Goal Systems CBT products were mainframe-based; now both companies are moving rapidly to PC- and workstation-based products. The transition of individualized instruction from host-based systems to standalone PCs, and then to networked personal computer-based systems will continue during the 1992 to 1997 time period.

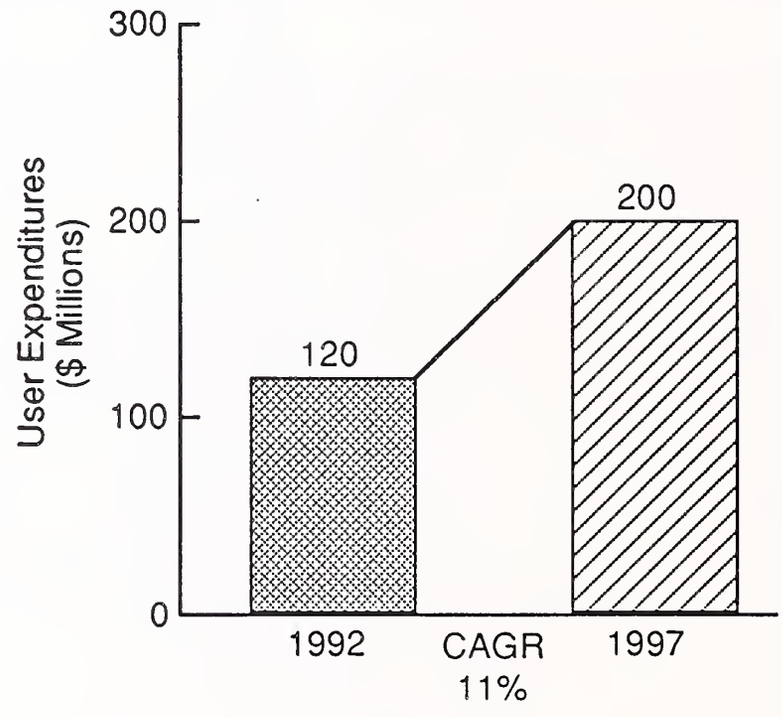
- Although INPUT has lowered its forecasted growth rate from last year's 22% CAGR, PC-based CBT will still experience reasonable growth, one reason being the small base from which it is starting. What will promote the growth of this platform size is the introduction of more generic, shell application packages that can be customized by the end user. What will also promote growth is additional user success stories such as the experience of AT&T's Consumer Products Division (see Section 3 below). However, the availability of on-line help systems will inhibit growth.

2. Turnkey Systems

Exhibit V-4 is INPUT's forecast for computer-based training delivered via turnkey systems.

EXHIBIT V-4

Education and Training Cross-Industry Sector Turnkey Systems Market, 1992-1997



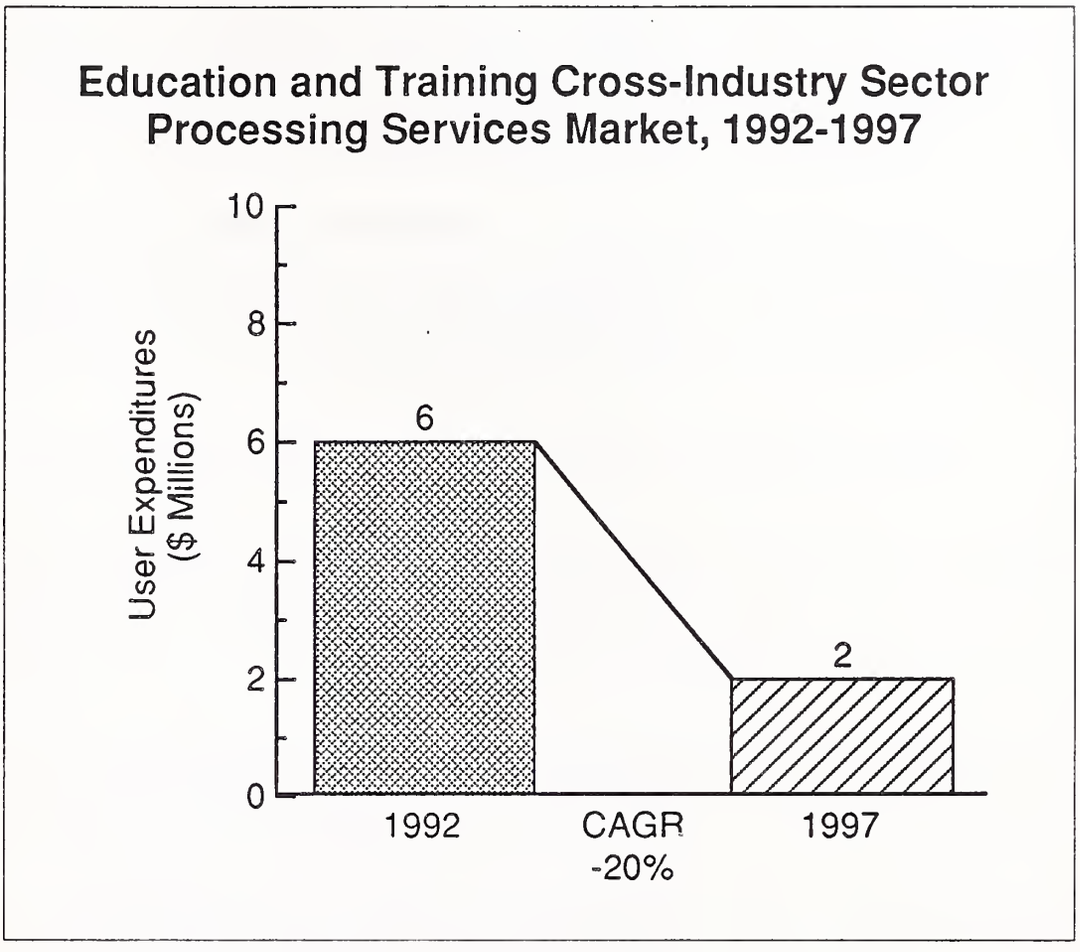
Vendors are providing turnkey solutions that incorporate third-party video disks and CD ROMs as well as the computer platform and applications software. Unlike other cross-industry turnkey systems that are most frequently used by smaller firms, in the case of CBT turnkey systems are used by large firms as well.

Even so, INPUT has lowered its base market number (1992) for turnkey CBT solutions this year, with the recognition that the majority of turnkey CBT systems are sold into the government sector rather than across industries.

3. Processing Services

Exhibit V-5 presents INPUT's education and training processing services forecast.

EXHIBIT V-5



This segment consists of a reservoir of Plato users, but it will continue to decline rapidly due to the availability of CBT on personal computers. Mainframe-based Plato was the first interactive training system and was developed by Control Data Corp. CDC sold the Plato-based family of products to several different companies, none of which expanded the business. The value of the product could not justify the communications costs to connect the host to the terminal.

C

User Department Directions

An IS education consultant within a large pharmaceuticals firm and an instructional technologist within AT&T's Consumer Products Division provide contrasting perspectives about CBT. These two examples provide insights regarding how and when CBT can and cannot succeed. Both indicated constant pressure to get people trained faster and that training is becoming more demanding.

The first company, where an information systems training consultant was interviewed, has multiple autonomous training groups. Training for the various functions, although decentralized, typically takes place within the same geographic region.

Its computer environment is characterized by:

- Different kinds of users—scientists, accountants and marketing employees for example—use spreadsheets in different ways and need different types of training.
- Different divisions have different hardware and software standards.
- The company's IS strategy over the next three years includes putting a GUI-based computer on every desk. In addition to training on how to use GUIs, training about interconnectivity issues will be required.

CBT is not being considered because of the following opinions:

- It is easy for individuals to postpone use of CBT, given the frantic nature of many jobs. Employees are more likely to take the time to learn if they have a specific place to go at a specific time.
- CBT isn't needed for personal productivity tools such as word processing on an elementary level because these applications packages come with built-in tutorials.
- CBT is too expensive; performance support and multimedia are still too expensive.
- Little support in general is given to training at this company. Many departments don't have a training budget.

In contrast, the Consumer Products Division of AT&T had a centralized training unit as it planned for CBT (much of it has subsequently been decentralized).

The following situation existed prior to CBT implementation:

- Sales associates from stores all over the U.S. traveled to a central training site.
- The turnover rate for sales associates is high, as is true in retail overall, at between 40% to 50% per year; thus much of the sales instruction costs were wasted annually.

The goal in investigating alternative methods to train the retail salespeople was to save time and money, to improve selling skills, and to be able to provide better customer service. Other types of written self-paced training methods were investigated, but the decision was to go with CBT.

Trainers who felt their jobs were at risk and that person-to-person interaction was the only effective way to train resisted CBT. It was also initially viewed by all concerned as just another example of the company wanting to save money at the expense of its employees (employees would no longer be able to travel to a training site).

The education unit did a number of things that turned this situation around:

- It had strong leadership and vision, and was willing to make directional decisions in a rapidly changing technological arena.

- It worked hard to continuously build CBT sponsorship.

  - A strong financial case for CBT was presented to upper management showing that CBT would pay for itself within a 2-3-year time period.

  - The phone center managers were brought in on CBT issues and decisions. They were shown the system, knew when it was coming and what to expect. They were trained in how to be training administrators. And the system was made easy to set up.

  - The sales associates were involved through focus groups and were kept informed.

After a year's effort, each of the 400 phone centers was equipped with a 386-based PC with 110 MB hard disk drive, streaming tape drive, laser disk player, stereo monitor for a VCR, touch screen interface, modem and a keyboard. Each CBT station was networked to a central UNIX-based host for CMI (computer-managed instruction) so that students' activity and progress could be polled and tracked.

The CBT stations are in kiosks that can be wheeled out onto the phone center floor. Their function will continue to expand to include being an easy-to-access resource on product information.

In addition to CBT paying for itself within a three-year time period, and saving the time lost due to travel, sales productivity has improved. Ten dollars more per sales person per hour is being sold now than was sold before CBT was implemented.

INPUT concludes that CBT is more likely to be implemented in situations where the same subject needs to be taught in essentially the same way to a large audience; where the audience is spread throughout a large geographic region; where the training department has strong leadership and the function is recognized as important; where cost advantages are easily demonstrated; and when the training department is able to gain the sponsorship and support of a wide group of managers as well as the potential students themselves.

D

Trends/Technology Ratings of Importance

Respondents within all cross-industry sectors, vendors and users, were asked to rate various trends and technologies on a scale of one to five, where one is unimportant or of little impact and five is very important or of significant impact.

The technologies listed in Exhibit V-6 were selected because INPUT believes they will receive the most attention from vendors and users over the next five years. In addition, INPUT believes that their impacts on vendors and users will be profound. Users who deploy these technologies will be re-engineering their business functions. And vendors will need to change not only their products, but also the ways in which they price, sell and support them.

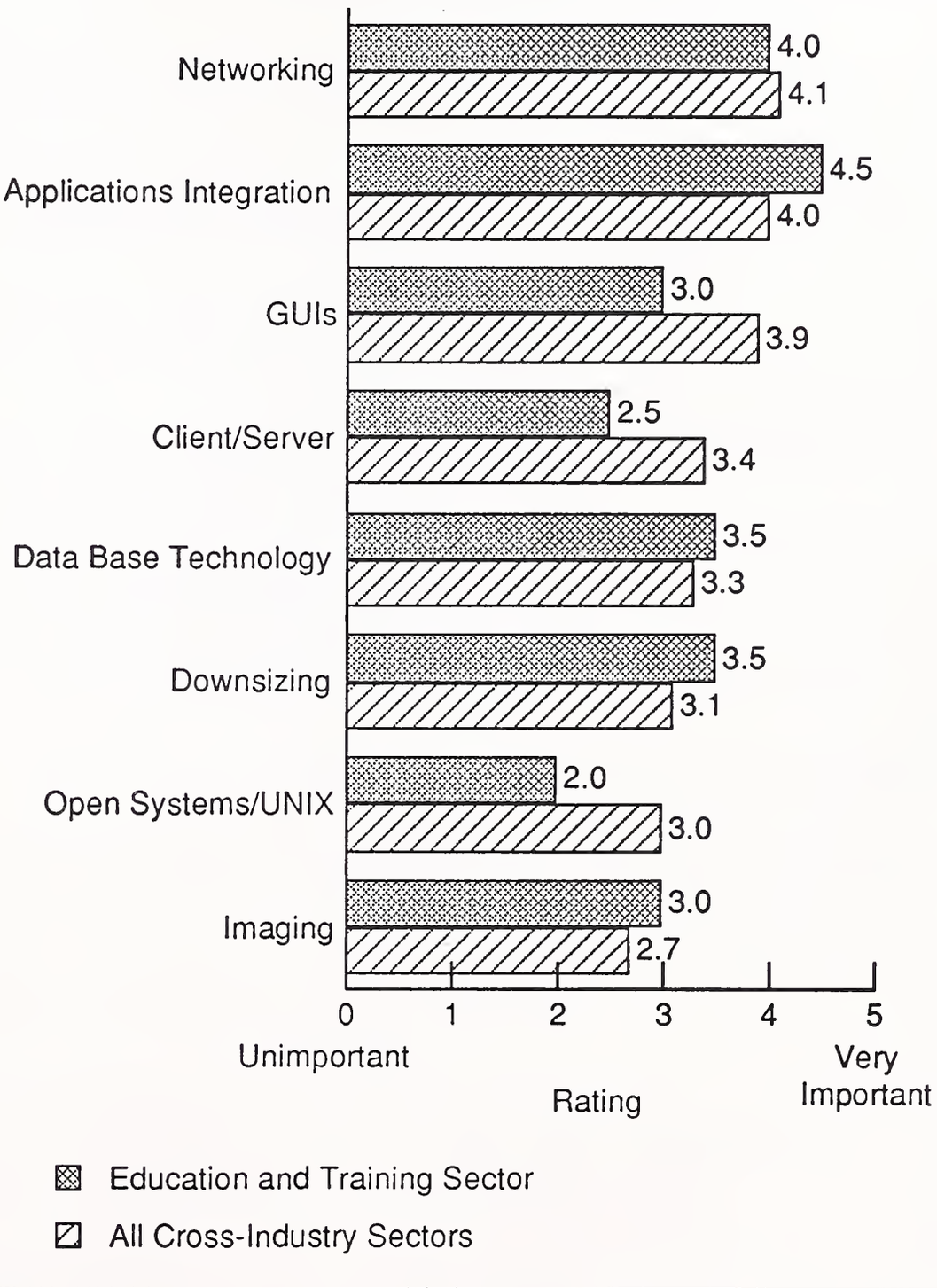
Exhibit V-6 shows the composite ratings of the education and training cross-industry sector compared to the ratings of all cross-industry sectors combined.

As is true with all cross-industry sectors combined, networking and applications integration are rated as the most important for the education and training sector. However, this industry sector does not rank imaging as least important; and in fact imaging is rated as just as important as GUIs. INPUT believes this relatively higher rating is indicative of the role that on-line document viewing and document management will play in education and training. Particularly in performance support, students/ employees will want to have on-line access to instructions or descriptions of certain areas of their work or training at any time during the course of their work.

Understandably for this sector, which must emphasize ease of use, open systems/UNIX is considered least important. Given the importance of ease of use, one would expect GUIs to have a higher rating. INPUT believes that GUIs in fact would create more confusion and distraction, and that ease of use must be built into the training program itself. On the other hand, GUIs will simplify the task of the authoring system developer.

EXHIBIT V-6

Education and Training Cross-Industry Sector Respondents' Indication of Relative Importance of Trends and Technologies



Respondents were also asked if there were any trends or technologies of importance in addition to the ones listed by INPUT. In other sectors there was little response to this question; however, for the education and training sector, several different and new technologies emerged as important. Vendors mentioned the following:

- Shift from analog to video—A program stored on a video disc player has been the main means of animated CBT delivery over the last five years; now, however, other compression techniques, such as the ability to store video on a hard or compact disk, are starting to become available. DVI (Digital Video Interactive) technology is also a key technology that will allow video to be transferred over networks including telephone lines. Intel and IBM are pioneering development in this area.

- Multimedia—As desktop computer prices continue to fall, multimedia capabilities will eventually be available at prices affordable enough for widespread implementation.

Respondents for all cross-industry sectors were also asked to rate the technologies and trends in terms of importance five years from now. All technologies for all cross-industry sectors increase in importance over the five-year period.

Vendors' participation in the technologies and trends are indicated below in Section E.

E

Vendors and Competitive Environment

1. Vendor Characteristics and Trends

Vendor trends include:

- Vendors continue to introduce CBT on technical subjects, including the increasingly complex area of information systems.

- Although far from widespread in development and implementation, more vendors are beginning to develop multimedia instruction—in both academic education and industrial training—and there is more experimentation with performance support systems.

- The competitive landscape will change over the next several years as startup companies enter the multimedia market. There is a risk that these smaller companies will be underfunded.

- As on-line documentation catches on and as multimedia instruction progresses, vendors that participate in the education and training cross-industry market will be competing against electronic publishing firms such as Interleaf and Frame Technology as well as CAD vendors. These three sets of vendors are all experimenting with multimedia; electronic publishing is seeking new uses for on-line "view only" products.

- Historically, CBT vendors sold technology courseware to IS departments. As customers outsource and downsize their applications software products—and as technology moves out to end users—vendors are changing their marketing and selling strategies to reach a broader market. This broader market includes not only information systems managers and departments but also special projects within corporations.

Types of companies that compete in this sector are:

- Companies that provide full-service training solutions, including class instruction, written materials, video tapes, and computer-based training on a variety of technical and academic subjects for public and private schools, business and government

- Smaller companies that provide specific CBT solutions to a range of customer types or a single industry

- Companies that provide software-only education and training for specific products such as Word for Windows or Lotus 1-2-3

- Authoring system vendors

Most education and training vendors are vertically specialized and therefore are not represented in this report. Other vendors that are represented in this report sell authoring systems and consulting services to assist end users in developing their own specialized materials. In many instances, cross-industry solutions represent only a small portion of their overall training offerings.

2. Leading and Emerging Vendors

Dozens of companies—possibly as many as one hundred—sell cross-industry CBT. Leading vendors are listed in Exhibit V-7.

EXHIBIT V-7

Education and Training Cross-Industry Sector Leading and Emerging Applications Software Products Vendors

- Authoring Systems
  - Aimtech
  - MacroMind-Paracomp
  - Computer Teaching Corporation
  - Quest/Allen Communications
- Technology Courseware
  - Crwth Computer Courseware (Division of Science Research Associates)
  - Goal Systems Division of LEGENT
  - National Education Training (formerly Applied Learning International)
- Remedial/General Business
  - Josten's Learning
  - Computer Curriculum Corp.
  - Roach Organization

For many of the companies that compete in this cross-industry sector, CBT is but one education and training delivery mode. For example, Learning International provides traditional seminars, videos, workbooks and trainers; only about one percent of revenue comes from CBT.

Two competitor events in this cross-industry sector are significant:

- Authorware merged with Paracomp, creating MacroMind-Paracomp, Inc. This merger signals the difficulties of maintaining a presence in this small market.

- Goal Systems International has entered into an agreement to merge with LEGENT Corporation. Goal's CBT business, its Information Technology Division, will be operated as an independent business. INPUT believes is likely that LEGENT will ignore Goal's training

business, at least for now, as it continues to emphasize its own primary business, which is systems control products. It is also likely that in the longer term it may incorporate Goal's performance support products into its own product line and use it as a strong selling point.

3. Vendor Profiles

This section contains profiles of a sampling of vendors, showing the diversity of types of companies and approaches.

a. American Training International (ATI)

ATI was formed in 1981 to provide custom training to large organizations. The company redirected its efforts to become a leading publisher of third-party training and assessment programs for personal computer software users.

The company's catalog currently lists over 75 titles under three product categories:

- "Teach Yourself..." training programs for the most popular word processing, data base, spreadsheet and integrated programs, operating systems, and training materials for LAN applications

- "Teach Me..." tutorials designed for the mass merchandising market

- In 1990, ATI introduced computer-skills testing programs. Similar to typing or shorthand tests administered to clerical personnel, ATI's Certify! testing programs provide an objective assessment of a user's skill level on a given software program.

ATI programs are available for DOS, OS/2, Apple Macintosh and UNIX environments.

b. Crwth Computer Courseware

Crwth, founded in 1981, develops and markets mainframe CBT to Fortune 1000 organizations throughout the United States and Canada. Crwth is a business unit of Science Research Associates (SRA). SRA develops and markets self-study training courses for IBM hardware and software, including AIX. Courses are text, video tape and PC-based simulation and exercises. SRA is a division of the MacMillan/McGraw-Hill School Publishing Company.

FORMAT Courseware is the company's flagship product. Courseware is also available under Goal System's PHOENIX EASE. Crwth recently acquired rights to market Computer Systems Research's client/server Enterprise curriculum. A challenge for Crwth will be to develop and/or acquire additional PC-based products and to incorporate some of the features that PCs provide, such as high-quality graphics, into its mainframe product line.

Crwth sells its CBT products to office systems, software product evaluation and end-user computing managers, as well as to accounting/finance departments.

c. Goal Systems International, Information Technology Division

Over this past year Goal Systems:

- Announced intentions to merge with LEGENT Corporation
- Changed its strategy away from CBT to a more all-encompassing concept of performance support
- Continued to move toward a multiplatform product strategy. Goal's older products—Phoenix and Preference—are still predominantly mainframe based. Goal claims that it now has as many products that run on other platforms as products that run on mainframes.
- Moved quickly to introduce GUI-based products. The first GUI-based product introduced was Syllabus, which operates under Windows. OS/2, Mach and UNIX versions are in the works.

Its flagship products are Phoenix, a mainframe-based authoring and presentation system that now extends to IBM midrange and microcomputers; and Preference, a mainframe-based text reference tool. Goal Systems sells the generic courseware shell and the customer develops the specifics of the courseware.

- A relatively new product is Preference/Phoenix, a performance support system.
- Syllabus is a new multimedia authoring system enabling clients to create their own training courseware in the four major GUI environments: Windows, OS/2 PM, UNIX (X-Windows) and Apple Macintosh. Its target market is the distributed, client/server environment.
- Explain is an on-line documentation and on-line help system. With the mainframe as the file server, it provides access to all types of reference text or manuals via PCs, LANs, UNIX workstations, and mainframe environments.

In 1991, Goal broadened its technical capability for on-line documentation and help through its acquisition of Training America Inc. (White Plains, NY) and its Explain product. TAI revenues were in the $2 million range for the year ended June 30, 1991. More acquisitions are planned.

Goal's Information Technology Division's worldwide revenue for calendar 1991 was in the $18 million range.

d. National Education Training Group

National Education Training Group (The Training Group)—formerly Applied Learning International—is a subsidiary of National Education Corporation (NEC). Its purpose is to provide training for information processing, technology management, end-user computing, and human resource development topics to industry and government markets. The Training Group's products include interactive video, CBT, and instructor-led and linear video instruction.

The company was formed in 1987 with the merger of the DELTAK Training Corporation and Advanced Systems, Inc. The Training Group recently reorganized into the following divisions in order to better serve its markets as well as to address opportunities for new technology training.

- Deltak sells products and services to IS centers.

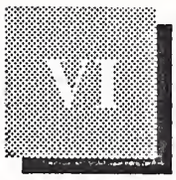
- Human Resources Skills Division sells management, supervisory and personal development education and training materials to human resources departments.

- Industrial Skills Division sells skills-based courses to industrial and manufacturing entities. The Training Group has just recently begun to sell CBT to functional areas other than human resources.

- James Martin Insight, established in June 1991, develops training products on leading information technologies such as open systems, client/server, object-oriented programming and re-engineering. James Martin Insight is a partnership between The Training Group and James Martin & Associates.

The Training Group is working aggressively to round out its product line and decrease its dependence on mainframe hardware and software instruction. James Martin Insight has already released several products on application development techniques, including two extensive products that are interactive.

The company derives 100% of its revenue from training and education to cross-industry markets. The Training Group is NEC's largest operation. Revenue for the parent company is in the $400 million range, and has been flat for the last several years. It is National Education Training's expectation that its new products—along with the reorganization—will boost sales to previous levels.



Engineering and Scientific

A
Definitions

The engineering and scientific cross-industry sector encompasses the following applications:

- Computer-aided design and engineering (CAD and CAE)
- Structural analysis
- Statistics/mathematics/operations research
- Geographic information systems/mapping

Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from this report, 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 engineering industry.

Structural analysis or finite element analysis helps engineers analyze the structural integrity and thermal inadequacies of components. A relatively new and developing market is electromagnetic field analysis, which analyzes the interaction between electronic fields. Examples of applications are:

- Aerospace—fuselage and wing internal load analysis
- Automotive—bumper impact analysis
- Defense—guidance system vibration
- Industrial machinery and mechanical design—gearbox and transfer case stress analysis

Statistical and mathematical analysis applications include all forms of survey analysis for market research and product testing, personnel evaluation, decision support, health care analysis and computer performance evaluation, and operations research. Specific examples include reviewing/analyzing data from accident reports; evaluating air traffic controller information; census data collection; and monitoring of student performance, class selection and education testing.

Geographic information systems (GISs) and desktop mapping are finding a broad range of applications. GISs and mapping software capture, manage, analyze and display geographic information. Traditional uses include environmental monitoring, site planning and natural resource management. Utility and transportation firms are using GISs for facilities planning and management tasks, and government agencies are using GISs to manage public resources. Commercial applications include demographic market analysis to help, for example, retailers decide where to locate new stores; tax assessment; and routing of emergency vehicles.

The area of desktop mapping is a recent development, brought about not only by the proliferation of computer power at the desktop, but also by the increasing availability of geographic data bases and the ability to add street maps.

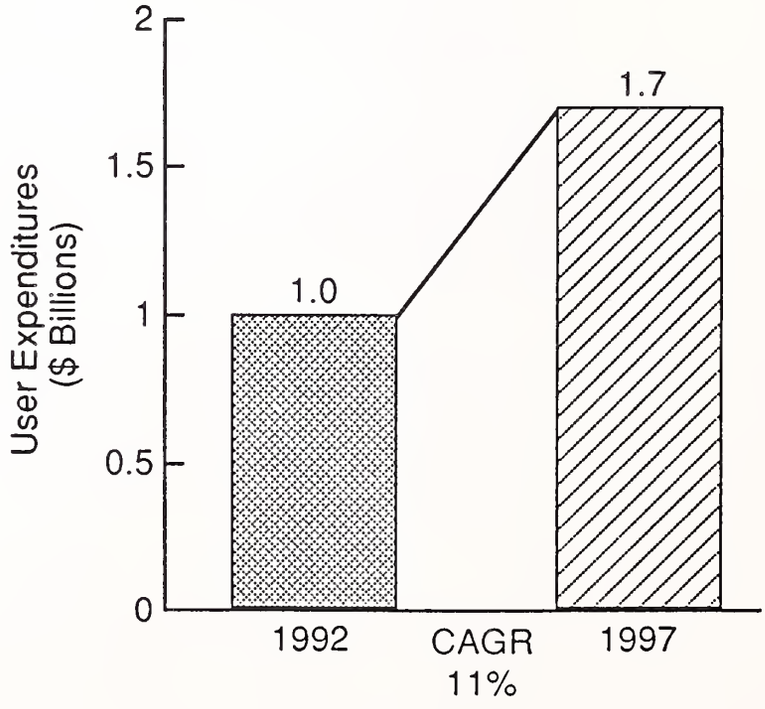
B

Information Services Markets

INPUT's forecast of engineering and scientific cross-industry sector information services is presented in Exhibit VI-1.

EXHIBIT VI-1

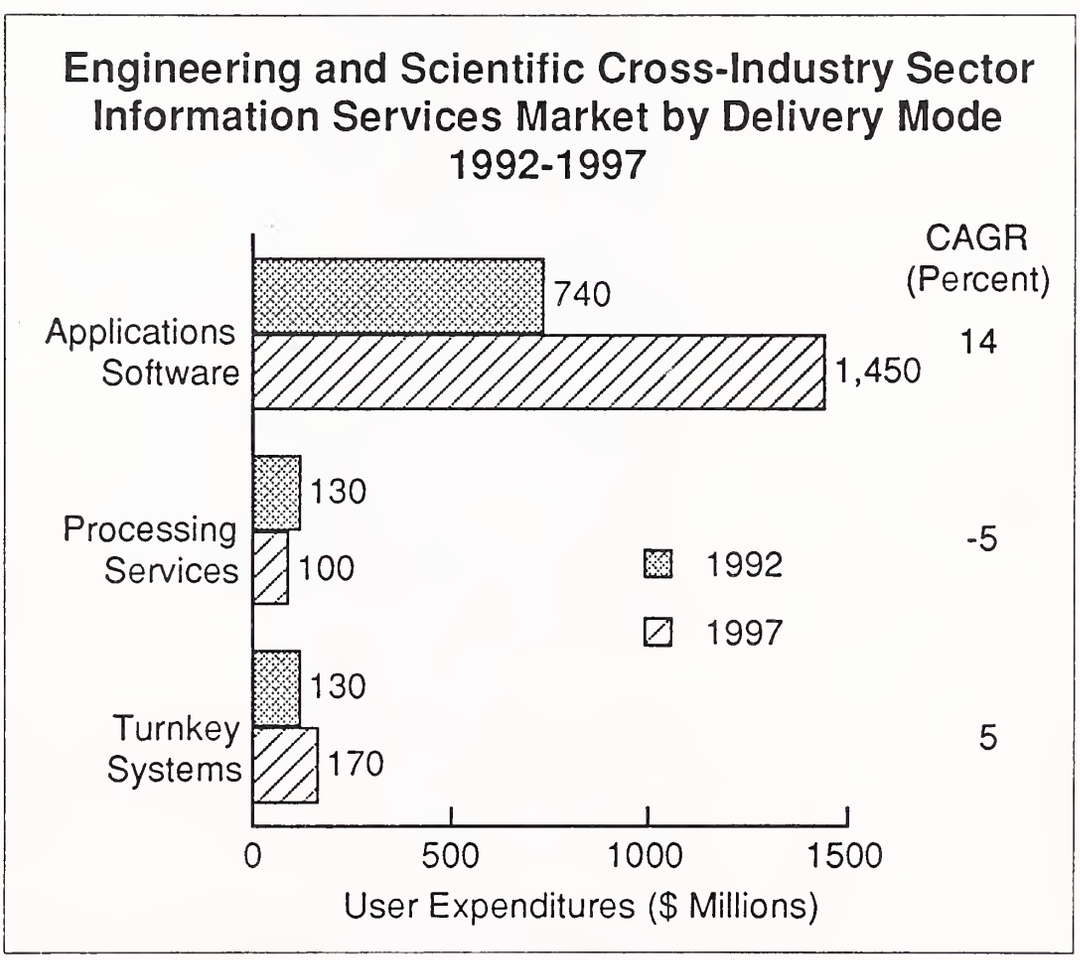
Engineering and Scientific Cross-Industry Sector Information Services Market, 1992-1997



Although the engineering and scientific cross-industry sector is one of the smallest market sectors for information services as a whole, it nonetheless spends a larger dollar amount on applications software products than many of the industry-specific sectors, including process manufacturing, transportation, retail and wholesale distribution, and the federal government.

Most of the expenditures and expenditure growth for the engineering and scientific cross-industry sector will continue to come from applications software products (Exhibit VI-2), primarily products that run on workstations and personal computers.

EXHIBIT VI-2



1. Applications Software Products

INPUT's applications software products forecast considers the following factors:

Economy—Given INPUT's discussions with users (see Section C of this chapter), scientific and engineering departments may be experiencing budget constraints more severe than INPUT expected one year ago. Universities and research organizations have been especially hard hit by the economy. An uncertain economy is a short-term growth inhibitor.

Pricing issue—Up until the mid-1980s practically all engineering and scientific software resided on mainframes and minicomputers. Now growth has clearly shifted to lower priced workstation- and PC-based products.

Although this shift has opened up new markets and new pockets of users—and will be well received by departments with constrained budgets—it also implies lower revenue per unit sold. An issue is which will have a greater impact on the forecasts: more unit sales or lower prices. INPUT believes lower prices will have a greater impact and therefore lower expenditures in the short term, but that higher unit sales may make up for the lower prices over the long term.

Networking issue—Users appear to be at the beginning or in the middle of a steep network implementation and learning curve. Yet data and applications sharing, for which networking is essential, is a key need. Therefore, users' networking sophistication (and the technology itself) will have to evolve more before they will begin to purchase large quantities of new engineering and scientific applications software products. Thus INPUT believes that the networking issue is a short-term growth inhibitor.

Need for industry-specific functionality—One way the need for specificity and customization is being addressed for this cross-industry sector is through more sales of scientific and engineering software through the VAR channel. VARs are predominantly specialized by industry, which detracts from expenditures on cross-industry engineering and scientific applications software products. INPUT believes this is a long- as well as a short-term growth inhibitor.

Potential new markets—CAD, structural analysis tools, and mapping products have been, until the last several years, the sole domain of engineers and scientists. Now, however, because of lower platform costs, a potentially broader market exists for these products.

- Smaller companies and a greater variety of companies are buying CAD. For example, consumer products companies that want to maximize their product designs are beginning to use low-cost CAD.

- General purpose, lower priced statistical software products are used when, for example, a need exists for more sophisticated analysis, greater data capacity or more specialized graph types than a spreadsheet can provide.

- Vendors are introducing desktop mapping software with GIS-like layering features created specifically for business applications. For example, desktop mapping is used as a tool for identifying target markets and determining market penetration and potential.

In order to penetrate these new markets, vendors need to create new types of marketing strategies. These new products are not likely to be at the top of a company's most wanted applications software products list.

Given the above factors, INPUT has lowered its compound annual growth rate (CAGR) for the applications software products delivery mode compared to last year's forecast (INPUT's 1991-1996 forecast was 16% CAGR). INPUT's primary reasons for lowering the forecast are:

- The combined challenges of lower price and the "network bottleneck"
- Vendors will have to develop more new marketing strategies directed at new customers in order to expand their markets.

Exhibit VI-3 shows INPUT's forecast of applications software products delivery by platform size.

EXHIBIT VI-3

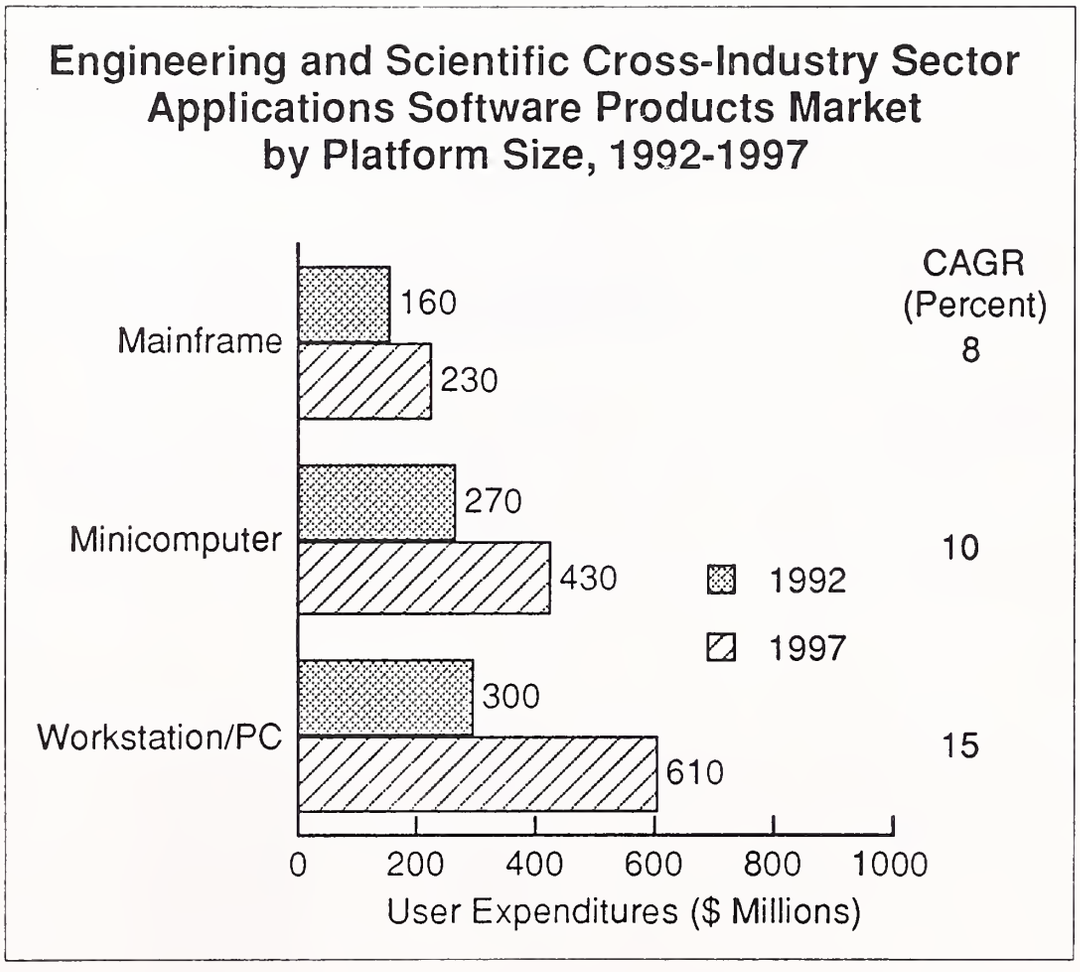


Exhibit VI-3 reflects the following:

- Engineering and scientific sector applications software products have historically been mainframe based. Over 50% of GIS expenditure is still for mainframe-based products, which have traditionally served cartographic, earth resources and other scientific areas. Large government and commercial enterprises use GISs on mainframes and will continue to license upgrades.

- Workstation- and PC-based CAD now accounts for an estimated two-thirds of CAD expenditures. Growth in statistics software has shifted to the PC level due to the emergence of 386- and 486-based machines. Windows will promote growth in the statistical software market; Windows-based products will be forthcoming in 1992.

- The area of desktop mapping is a recent development, brought about not only by the proliferation of computer power at the desktop but also by the increasing availability of geographic data bases and the ability to add street maps.

- The market for structural analysis applications software products at the workstation and PC level is still small, but product availability is increasing.

2. Turnkey Systems

Turnkey systems in this cross-industry sector are predominantly CAD; mapping turnkey solutions are also available.

EXHIBIT VI-4

Engineering and Scientific Cross-Industry Sector Turnkey Systems Market, 1992-1997

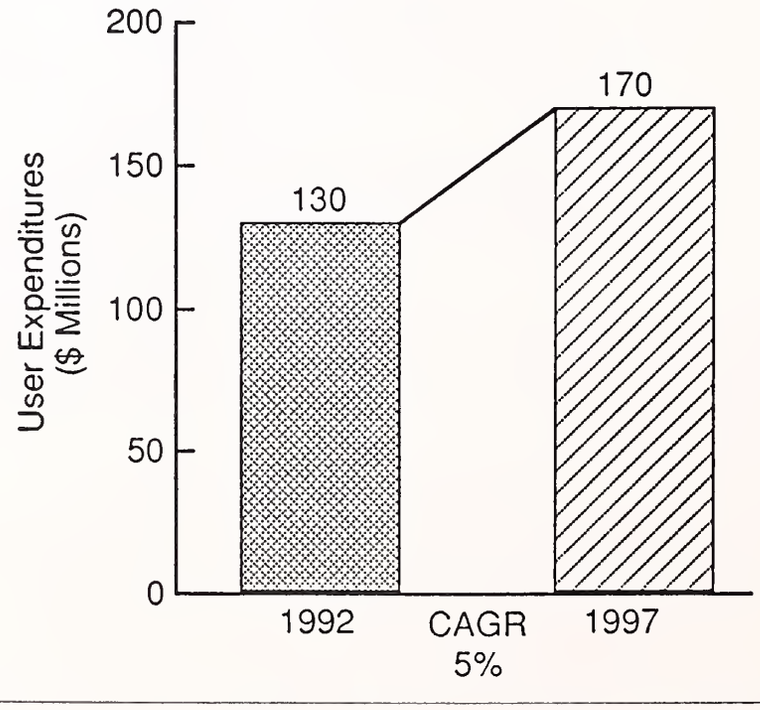


Exhibit VI-4 reflects the following:

- Growth over the five-year period for cross-industry turnkey systems vendors and VARs is limited due to the market's requirements for industry-specific functionality. Thus, sales will be through industry-specific VARs rather than cross-industry VARs.

- The original CAD vendors addressing this cross-industry sector were turnkey vendors, providing what were, at the time, specialized engineering workstations and applications software solutions. Now, however, turnkey vendors are pressured into developing increasingly portable software and not tying their products to a single platform. As CAD software and data base technology has grown in importance compared to hardware technology, many of the original CAD turnkey vendors have been forced to exit this market entirely or become software and service vendors only.

- Limited growth is still available to CAD turnkey systems vendors and VARs as some products are sold to increasingly smaller companies. Opportunities arise for VARs to add technology such as output tools, other cross-industry applications software packages that tie into CAD, special streaming devices, and network software as a bundled solution.

- Desktop mapping vendors are expanding their VAR channels in efforts to expand their markets. However, they are seeking industry-specific VARs such as those that service the retail, medical, and insurance markets.

- As hardware becomes lower cost and more standard, turnkey systems vendors will be forced to add value in other ways such as through additional new technologies, more professional services, and customization. Continued expenditure on turnkey systems is dependent on this additional value being made available.

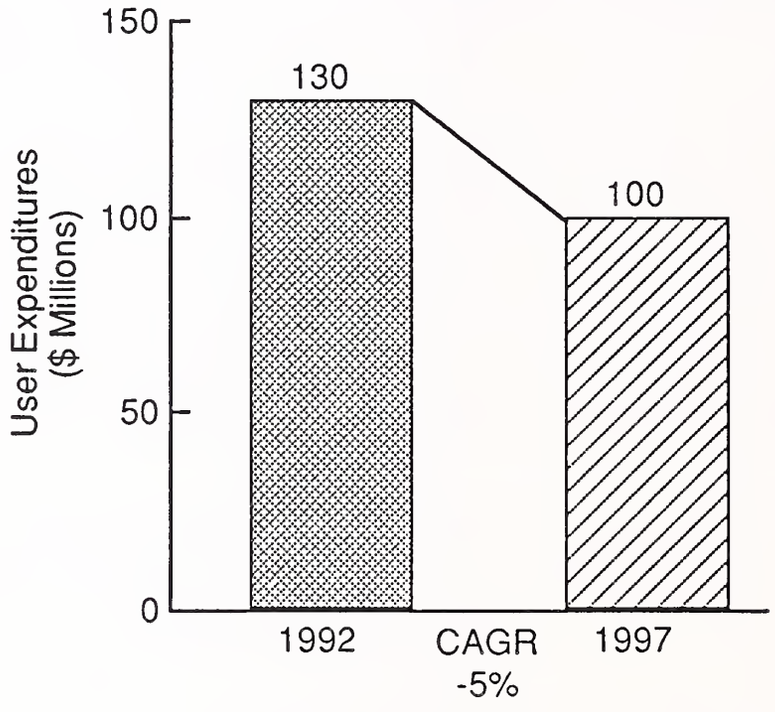
3. Processing Services

Users of processing services are universities and research organizations, and industrial companies that do not have the computer power in-house to run sophisticated engineering and scientific applications. SPSS-X is available as a batch-oriented system for data analysis that appeals strongly to academic researchers, particularly in the social sciences.

Exhibit VI-5 presents INPUT's processing services forecast. This processing services forecast reflects negative growth. INPUT has lowered the forecast for the second year in a row for the engineering and scientific cross-industry sector.

EXHIBIT VI-5

Engineering and Scientific Cross-Industry Sector Processing Services Market, 1992-1997



- The need for engineering and scientific processing services—albeit a small need—may be curtailed as some funding of large research projects is put on hold.

- Although INPUT does not expect mainframe pricing to decline measurably, price/performance ratios continue to improve for minicomputers and especially workstations/personal computers; statistical packages that were previously available only for large computers can now run effectively on the desktop. This phenomenon will limit growth of expenditures on engineering and scientific processing services to research organizations and companies with large ongoing sophisticated computing needs or companies that need a temporary solution to their computing needs.

C
User Department Directions

INPUT interviewed a group manager of a computer-aided engineering department of a large aerospace motor manufacturer, a railroad mapping department manager, and a geological scientist.

- In all three examples, information technology budget constraints prevail. The interviewees are being pressured to use what they already have more effectively rather than purchase new equipment and software. Price is a key factor in any purchase decision.

  The CAE department manager indicated that his company is placing more short-term emphasis on orderly production processes rather than on new development areas that use CAE.

- Offloading applications software products from a centralized computer is under way at the railroad mapping department. This department has made the transition from using mainframes with terminals for all of its work, to using minicomputers primarily as data storage devices, and is now replacing its minicomputers with networked workstations and PCs. All applications software will be downsized to workstations and personal computers.

- On the other hand, in the aerospace manufacturer's CAE department, reliance on the mainframe for data access is well entrenched. This department is moving rapidly to a centralized on-line product management system for handling drawings, documentation and structural and thermal analytical models.

- The members of the CAE department want to get more utility out of their work by using less paper, minimizing redundancy and electronically extracting and sharing data among themselves as well as with other departments. Therefore networking issues, workstation support and the management of information across multiple platforms are their biggest IS issues.

The following needs were expressed:

- The CAE department wants to be able to more effectively reduce large volumes of technical data into understandable, succinct presentations for nontechnical audiences.

- The railroad mapping department is customizing its purchased software product. Systems that relate specifically to railroad industry procedures do not exist. This company indicated that systems need to be powerful, yet generic enough to be easily customizable.

- Applications integration is a key concern, as engineers typically use half a dozen pieces of software—e.g., spreadsheet, plotting package, geometric model—for a single project. A geologist expressed the opinion that scientists in his organization are spending too much time dealing with hardware and software incompatibilities and making pieces of software work together.

- The geologist also indicated that easier-to-use facilities that don't take a lot of specialized input to get fairly detailed results are needed.

- The CAE department indicated that pricing structures need to be more flexible. Site licensing and the freedom to move applications software products from one platform to another and from one facility to another without any pricing changes is desirable. Software as a fixed cost is a problem in an environment in which staff reductions are occurring.

To summarize, better tools are needed for extraction and presentation of large amounts of data. Products that more easily allow for the sharing of data are needed as well. These expressed needs imply that networking technology is fundamental to this cross-industry sector. INPUT believes that these interviews indicate a shift away from the need for more analysis features towards emphasis on information sharing, information management, and graphics for presentation. In order for these needs to be met, not only must the products be available, but also network implementation and integration must be well under way within the engineering and scientific community.

D

Trends/Technology Ratings of Importance

Respondents within all cross-industry sectors, vendors and users, were asked to rate various trends and technologies on a scale of one to five, where one is unimportant or of little impact and five is very important or of significant impact.

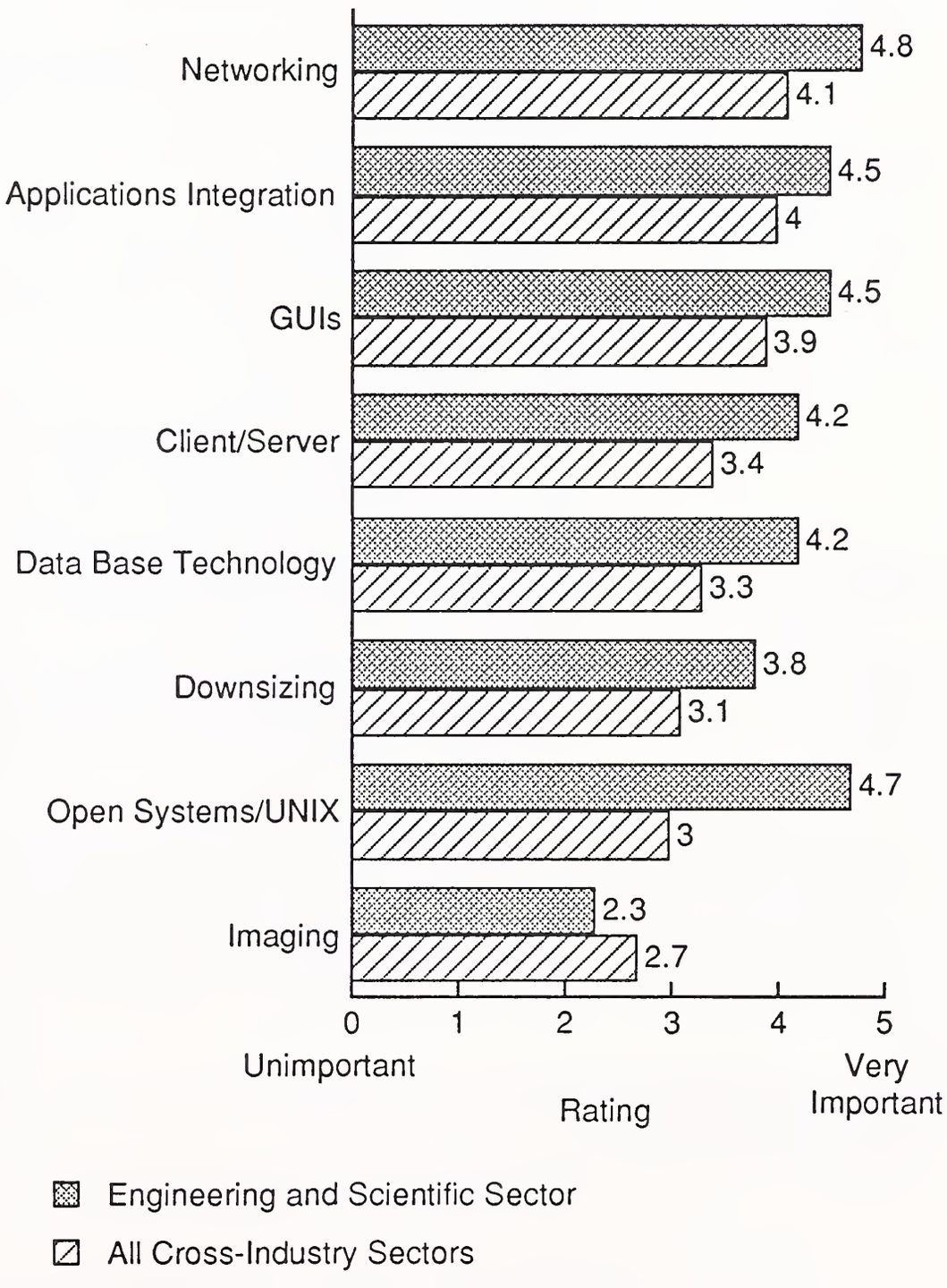
The technologies listed in Exhibit VI-6 were selected because INPUT believes they will receive the most attention from vendors and users over the next five years. In addition, INPUT believes their impacts on vendors and users will be profound. Users who deploy these technologies will be re-engineering their business functions. And vendors will need to change not only their products, but also the ways in which they price, sell and support them.

Exhibit VI-6 shows the composite ratings of the engineering and scientific sector compared to the ratings of all cross-industry sectors combined.

As is true with all cross-industry sectors, networking is ranked as the most important and imaging is ranked as the least important. However, not surprisingly, the engineering and scientific sector is more technology driven than all cross-industry sectors combined; all technologies and trends are rated substantially higher except imaging, which is rated lower in importance. INPUT believes that imaging is rated relatively lower than the cross-industry rating combined because engineering and scientific information content needs to be manipulated rather than viewed as a page.

EXHIBIT VI-6

Engineering and Scientific Cross-Industry Sector Respondents' Indication of Relative Importance of Trends and Technologies



INPUT believes the high ratings given to networking, applications integration, GUIs and data base technology, as well as client/server architecture, confirm the emphasis within this sector on sharing data. Further, the need to share data precedes all other considerations when applications software products purchase decisions are made.

Also, not surprisingly, this cross-industry sector rates open systems and UNIX substantially higher than all cross-industry sectors combined. This rating reflects the fact that UNIX not only has advanced networking capabilities but also that it had its origins in the scientific and engineering community.

Respondents for all cross-industry sectors were also asked to rank the technologies and trends in terms of importance five years from now. All technologies for all cross-industry sectors increase in importance over the five-year period.

The 1997 ratings for the engineering and scientific sector are consistent with the ratings of all cross-industry sectors combined, with one exception: GUIs are rated considerably lower (3.3 compared to 4.5) in 1997. INPUT believes this indicates that GUIs will have already been implemented in large part within the engineering and scientific sector, so their impact will be somewhat lessened by 1997.

As is true with all cross-industry sectors, within the engineering and scientific sector vendor rankings are generally higher than user rankings. For the engineering and scientific sector, agreement exists between users and vendors on the importance of UNIX and applications integration.

Obviously UNIX is well entrenched, and INPUT thinks this sector will be less inclined to experiment with new operating systems such as Windows NT. INPUT believes that, although additional features are nice, vendors must emphasize integration and networking. They will have to pursue a multiplatform strategy and enhance their products with more customization capabilities.

E

Vendors and Competitive Environment

1. Vendor Characteristics and Trends

Vendor trends include the following:

- Vendors continue to add features, new functionality and ease of use to their products. A new firm, Parametric Technology, has gained recognition through adding sophisticated parametric design techniques to its CAD product, ProEngineer.

- Due to continued market need for industry-specific functionality, vendors are more aggressively pursuing industry-specific VARs as a distribution channel.

- As reflected in the forecasts of Section B, strong movement to PC and workstation platforms continues. As reflected in the vendor profiles below, there are also many examples of vendors' pursuing multiplatform strategies.

- At the high end of the product spectrum, as new products are introduced and as users become more familiar with networking, vendors must begin to prepare for a migration of their customer base to new ways of doing business and using new products to their fullest potential. This will be a challenge even for the largest of companies in this cross-industry sector.

- At the low end of the product spectrum, vendors are challenged to create demand for their products. New ways of marketing, increased advertising budgets and product ease of use will become increasingly important.

2. Leading and Emerging Vendors

Computer-aided design and engineering—Over 100 companies participate in the CAD market; however, few participate in the scientific and engineering cross-industry sector due to the continuing trend toward industry-specific functionality and customization. Of the vendors that do participate in automated cross-industry design and drafting, a continuing shakeout and redefinition is under way.

The strong competitors of several years ago—Calma, Versacad, Computervision, and Gerber Systems—have significantly lessened their presence in or exited the market. Most of the companies lessening their presence are turnkey providers who based their software products on a certain hardware architecture. When the era of the workstation arrived, they were wed to the then old hardware and unbundled/transitioned awkwardly.

Because IC and systems design is outside the scope of this report, companies such as Cadence Design Systems, Dazix, Mentor Graphics and Valid Logic, all of which sell the vast majority of their products to engineering companies, are excluded from this discussion.

Although consolidation in the CAD market has slowed, it is still occurring, and vendor "rearranging" is taking place:

- EDS acquired McDonnell Douglas Systems Integration Co. after a bid to buy just the company's CAD/CAM software line was rejected. Its Unigraphics CAD software is one of two preferred CAD systems in use at EDS' General Motors Corp. parent. In addition to Unigraphics, McDonnell Douglas markets GISs, records management software and CAE products.

- CADAM, owned by IBM, will operate as a division of Dassault Systems. IBM is acquiring an equity position in Dassault.

Structural analysis—At least 100 companies offer structural analysis programs, the vast majority of which have niche products for primarily niche markets; a very small part of their business is cross-industry.

Statistics/mathematics/operations research—Vendors providing statistical and mathematical analysis application solutions have for the most part added modular capabilities and broadened their product lines; now statistical analysis is supported as one of many operations. Several hundred statistical applications software products exist for the PC, but only about half a dozen of the companies that make them have revenues over $5 million. Many of these companies will go as quickly as they come.

A critical question that remains is whether companies offering statistical packages only will be able to survive in a market looking for more integration of tools. Today the specialized company must sell directly to the sophisticated, larger user company that is willing to perform the tool integration task itself. The specialized company can also sell its tools via OEM agreements to the broad-line vendor that, in turn, provides the integration task.

In addition to National Science Foundation (NSF) Supercomputer Centers, dozens of regional remote supercomputing centers exist with time available to outside users. Many license applications packages for structural design, simulation and analysis. Processing services firms such as Litton Computer Services, Computer Sciences, Control Data and GE Information Services may offer timesharing services in statistical applications; however, statistical processing services are a small and diminishing portion of their overall business.

GIS/Mapping —The leading GIS vendors have a mainframe orientation. A handful of vendors have desktop mapping product offerings; more are expected to enter this market.

Today's leading cross-industry engineering and scientific vendors are listed in Exhibit VI-7. With the exception of Intergraph, they are software-only vendors whose products run on industry standard platforms. Although no new entrants in the CAD arena are expected, vendors will continue to enter statistics, structural analysis and mapping.

EXHIBIT VI-7

Engineering and Scientific Cross-Industry Sector Leading and Emerging Vendors

Vendors	CAD/ CAE	Structural Analysis	Statistics/ Mathematics/ Operations Research	Mapping
Autodesk	X			
Auto-Trol	X			
BMDP			X	
CADAM (IBM)	X			
Caliper				X
Cosmos		X		
Engineering Mechanics and Research Corp.		X		
Environmental Science Research Institute				X
Intergraph	X			X
MacNeal-Schwendler		X		
MapInfo				X
SAS Institute			X	
SPSS			X	
Strategic Mapping				X
Structural Dynamics Research Corp.	X			
Synercom				X
Swanson Analysis		X		
Unigraphics (McDonnell Douglas)		X		

3. Vendor Profiles

This section contains profiles of a sampling of leading vendors that exemplify key technologies and trends in the engineering and scientific cross-industry sector.

a. CADAM. Inc.

CADAM is a general-purpose CAD product for mechanical drafting. It is positioned as a productivity tool rather than a highly featured design tool. CADAM was originally designed in the 1960s and used by Lockheed. The product and the company were spun off as a separate subsidiary in 1982 and acquired by IBM in January 1990.

In late 1991, IBM announced intentions to acquire an equity position in the French firm, Dassault Systems. IBM also previously sold Dassault Systems' high-end Catia CAD package.

When this acquisition takes place, the assets of Host CADAM (CADAM's mainframe-based product) and its RS/6000-based professional CADAM product will be transferred to Dassault. CADAM Inc. will remain as a separately run division, the focus of which will be desktop CAD for DOS, UNIX and OS/2. It will focus its sales efforts on VARs, whereas before, products were sold through IBM as well.

CADAM's 1991 revenues were $91 million, only 25% of which was from U.S. sales. It has a strong presence in the Asia/Pacific area.

b. Intergraph Corporation

Intergraph is a turnkey supplier of systems that support design, drafting and analysis functions. Intergraph workstations and servers are based on a common hardware platform and run under Intergraph's UNIX-based operating system. All software is therefore compatible across models.

During the last year, Intergraph introduced a new generation of desktop hardware platforms based on its own SQL 100 microprocessor and introduced new compilers that provide a 30% performance improvement.

Intergraph has begun the process of porting its core desktop product, Microstation, across additional vendors' platforms, including Hewlett-Packard, Sun, Macintosh, and Intel-based personal computers.

The company has also decentralized and now operates as three separate groups:

- Its visualization/animation business is now run as the separate Design Engineering Visualization group, reflecting its belief that this is becoming a major market.

- Its Technology Information Management group interfaces with MIS systems.

- It also now has a separate systems integration unit. Intergraph is positioning itself as an integrated solutions vendor rather than a turnkey systems vendor and is expanding its systems integration business.

Intergraph offers a broad array of interactive graphics software applications—more than 750 programs. This software includes a significant number of packages developed by third parties, some but not all of which are in the engineering and scientific cross-industry sector.

Fiscal 1991 revenues (year ended December 1990) were over $1 billion.

c. SAS Institute, Inc.

SAS has reoriented itself to be a provider of an information delivery system as opposed to being a provider of tools, which was its previous philosophy.

SAS has historically dominated, and still dominates, the statistical analysis software market for mainframes and minicomputers; SAS System, the Institute's flagship product, now also runs on desktop computers, including a wide range of UNIX platforms, OS/2 and Windows.

SAS System is an integrated applications software system for data access, management, analysis and presentation. SAS now has over a dozen modules for its original SAS System.

In recent years SAS has moved from the statistical realm into project management, quality improvement, experimental design, and clinical and pharmaceutical software for data analysis. SAS/PH-Clinical software is the company's first product targeted to a specific industry.

Because of the variety of its products and markets, SAS has varying lists of direct competitors. Because of its EIS orientation, SAS is also represented in the planning and analysis cross-industry sector.

Fiscal 1991 revenues were $291.5 million, 84% of which was from mainframe- and minicomputer-based product sales.

It is used in many industries, including aerospace, automotive, construction, electronics, medical, metals, power generation, offshore structures, packaging, railroads and transportation. It operates on 386-based personal computers as well as on workstations, minicomputers and mainframe computers.

Swanson Analysis' annual revenues are in the $35 million to $50 million range.

d. SPSS, Inc.

SPSS, a leading statistical data analysis software company, develops and markets data entry, data management, statistical analysis and presentation software that operates on most models of all major computers.

Its flagship product, SPSS, runs on over 40 mainframes, minicomputers and desktop computers. It provides over 50 statistical processes, including regression analysis, correlation, and analysis of variance.

Applications include all forms of survey analysis for market research and product testing, personnel evaluation, decision support, health care analysis and computer performance evaluation.

The package contains more than 50 statistical procedures, on-line help, a statistical glossary, and extensive data management capabilities.

This year SPSS introduced a new generation of highly interactive statistical software products for graphical environments. It is also developing a family of applied statistics products for nonstatisticians and is enhancing customer support and consulting activities.

SPSS's 1991 revenues were $34.1 million, essentially the same as 1990 revenues.

e. Swanson Analysis Systems, Inc.

This year Swanson Analysis will introduce the next generation of its ANSYS product, release 5.0. Included in the new release are:

- A new data base architecture that provides the ability to interface the applications software product more easily with the data

- The addition of computational fluid dynamics pre- and post-processing capabilities. The new ANSYS will be offered through a partnership with Compuflow and its product, Flotran.

- The addition of structural nonlinearity capabilities

The ANSYS product is a general-purpose, finite element computer program for engineering analysis that includes pre-processing, solid modeling, analysis, post-processing, graphics and design optimization. The code is used for solutions to mechanical, thermal and electronic problems.

The ANSYS program is noted for its nonlinear analysis capabilities such as nonlinear material behavior, which encompasses plasticity, creep, swelling and nonlinear elasticity.

Office Systems

A
Definitions

The office systems cross-industry sector encompasses five application areas: integrated office systems, word processing, graphics, desktop publishing and electronic publishing.

1. Integrated Office Systems (IOSs)

IOSs typically include the following core functions, all of which are accessed from the same terminal, microcomputer or workstation:

- Electronic mail
- Decision support systems
- Time management
- Filing systems

Additional applications software—such as word processing, spreadsheet, and line-of-business software—is interfaced to, and accessible through, the IOS shell. IOS user expenditure forecasts in this report exclude these additional software products because they are purchased separately from the IOS.

An IOS performs in a similar way on all platforms. It has come to be viewed as the "glue" that connects workers with one another, enabling them to access data from multiple data bases resident on a number of hosts or servers, and enabling them to integrate line-of-business software with personal software productivity tools. Thus, an IOS is really more than an office system; it is a corporate communications environment.

IOSs capitalize on the cross-platform architectures of major vendors. Major hardware vendors—such as IBM, Data General, Digital, Hewlett-Packard and NCR—all offer IOSs.

The definition of an IOS is in a state of change, however, as the office concept begins to be replaced with the concept of integrated enterprise-wide environments. Applications software products within these environments will certainly not be limited to office products; the IOS will act as the integrating environment.

In addition to the IOSs mentioned above, more workflow and groupware products are beginning to appear:

- Lotus Notes is gaining recognition as a groupware product.
- WordPerfect's LAN-based Office (soon to be renamed WordPerfect Mail) provides E-mail, calendaring and scheduling on a corporate-wide basis.
- Digital's TeamLinks provides an environment for desktop integration through conferencing and videotext services across wide-area networks.
- NCR is developing a workflow product that will automate tasks that involve the efforts of a number of people within an organization or a number of resources.

For the time being, INPUT is including these types of groupware and workflow products within the IOS category of products.

2. Word Processing

Word processing is the most common microcomputer application and is a basic application within any IOS. Word processing addresses several levels of functionality, from the production of simple correspondence to large document generation where many people within different departments have input.

The newest releases of Word 5.0 and WordPerfect 5.5 include kerning, fractional-point control of line spacing, graphic importing, absolute positioning of graphic items on a page, and automatic text flow through a multipage and multicolumn document—features that were once the sole domain of desktop publishing software.

3. Graphics

Office systems graphics includes:

- Presentation graphics, which represents the bulk of office systems graphics. Most presentations involve a combination of graphs and text. They are used to communicate a series of messages to an audience rather than to analyze data. The presentation graphics software market is

almost exclusively microcomputer oriented (workstation-based graphics packages are primarily used for scientific and technical chores). Close linkages have been made among presentation graphics products, word processing and desktop publishing, as well as spreadsheets and DBMSs.

- Paint and line art including drawing programs, such as MacDraw and MacPaint, used for illustrations. Libraries of clip art objects are available for users who are trying to piece together presentations in a hurry. These products are closely tied to desktop publishing products.

- In the next few years, desktop scanners for both text (OCR) and graphics will begin to compete for desk space with personal computers and printers. As more people buy scanners, prices will drop. Even as prices drop, scanners are becoming more accurate and more versatile. The scanner market, however, is still too small to have a standardized software interface.

- Page description languages describe how text and graphics are displayed on the computer monitor and/or printed page.

- Electronic form programs allow users to create and print forms in-house. Some applications work with OCR scanners, allowing users to scan pictures and logos directly onto the forms. Over the next five years, electronic forms applications will increasingly be merged with digital document management, and reduce traditional printing costs and storage space requirements.

Graphics packages that are used for presentations or freehand drawings and/or are ancillary to desktop publishing are part of office systems. However, graphics software that is data driven and ancillary to data analysis is included the planning and analysis cross-industry sector. CAD/CAM and CAE are included in the manufacturing industries vertical market reports. Graphical user interfaces, such as Microsoft Windows and IBM's Presentation Manager are systems software products and are included in the *U.S. Systems Software Market, 1991-1996* report.

4. Desktop Publishing

The distinction between graphics-based word processing and desktop publishing (DTP) is becoming blurred. Because DTP markets are being usurped at the low end by word processing packages, DTP vendors are looking at the sort of shared document production facilities that high-end, workstation-based publishing packages have always had. They are also attempting to automate more of the design process.

5. Electronic Publishing

Electronic publishing includes composition, printing, and editing software for documents containing multiple typefaces and graphics—including charts, diagrams, computer-aided design (CAD) drawings, line art, and photographs. Electronic publishing products may also have different data formats such as text, graphs, images, voice and video.

Electronic publishing software and turnkey systems automate the document creating process and allow the user to carry out tasks otherwise performed by graphic artists, typesetters and printers. Products run on mainframes, midrange systems and workstations.

The fundamental difference between electronic publishing and desktop publishing 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. Desktop publishing (DTP) on the other hand, is considered a personal productivity tool and is generally a lower-end product residing on a personal computer. The distinction is becoming blurred, however.

B
Information Services Markets

The overall size and growth rate for the office systems cross-industry sector IS expenditures are shown in Exhibit VII-1.

Office systems is truly a cross-industry application. And because of the generic nature of many office tasks, office systems are almost always purchased from outside vendors rather than developed in-house. It is not likely that office systems will become industry-specific. Rather, separate vertical applications software products will be accessible through, and integrated with, office systems. These are two key reasons why office systems is one of the largest sectors for information services.

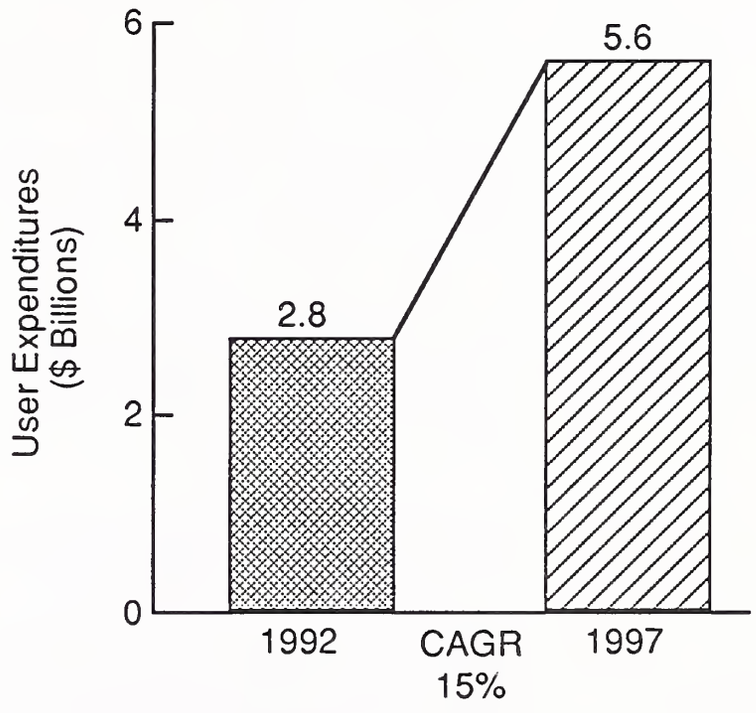
However, during the 1992-1997 timeframe, this industry sector will experience challenges that may inhibit its growth. These challenges are:

- Near market saturation for standalone word processing, graphics, desktop and electronic publishing products
- Lack of market preparedness for wide-scale adoption of integrated products including IOSs, workflow and groupware products

These two forces tugging against one another will slow growth over the short term.

EXHIBIT VII-1

Office Systems Cross-Industry Sector Information Services Market, 1992-1997



In the future, availability of integrated products and marketplace ability to implement them will fuel growth. Additionally, integration of the following kinds of technologies with office systems will promote growth of office systems products:

- Image scanning and optical disks
- Document management and text retrieval software—being pioneered by companies such as Verity and Information Dimensions
- Multimedia capabilities

Integrated Office Systems—A driving force for IOSs is customers' stated needs for integration and data access. Another driving force is that additional groupware/workflow/IOS products will continue to be introduced over the next five years.

Growth inhibitors include:

- Given the trend toward integration of separate office applications software products through a GUI, most notably Windows, users question the need for a full-blown IOS. An IOS, as it has been traditionally defined, may not be needed as the "glue."

- Although an uncertain economy will not have a negative impact on expenditures for relatively inexpensive personal productivity tools—such as PC-based word processors, graphics and DTP applications—IOSs may meet with skepticism.

- In addition, IOSs are still new technologies. Integration of applications and functions and hardware interoperability have a long way to go. In fact, these technology barriers will get worse before they get better: the multitude of operating systems such as Windows, DOS, UNIX, OS/2, System 7, and Solaris fragment the market rather than move the market toward standards.

- Customer confusion—due to the increasing number of choices of hardware, systems software and applications software technologies—is a negative influence overall for applications software products, including office systems.

- Implementing an integrated enterprise environment suggests that the user organization has fully implemented and integrated LANs. INPUT believes that only a small percentage of companies have fully integrated LANs. In addition, implementing an IOS implies that end-user organizations will need to re-engineer business functions and potentially fewer people will be needed—which, although desirable from a corporate standpoint, will be resisted by end-user departments.

Therefore, INPUT believes that in order to enhance product sales, vendors will need to continue their missionary selling efforts for the next several years.

Word Processing—Historically, the driving force for word processing software products expenditures was new personal computer unit sales and product upgrades providing richer features and functions. Now, however, personal computer shipments have slowed and word processors are approaching "features overload." Over the next five years these driving forces will be replaced by the following driving forces:

- Sales of pen-based computers will expand the market for common PC-based applications such as word processing and spreadsheets.

- A migration of products to new operating systems, including Windows, will continue to fuel the growth of the word processing market.

- Suite packaging—combining three or more applications software products together as a single product sale—is more pronounced this year. Suite packaging may enhance unit sales of word processing products but, over several years, INPUT believes this tactic will reduce expenditure growth because of the lower price per unit; purchase of a suite of products is considerably less expensive than the purchase of several individual products.

Graphics—INPUT believes growth of expenditures on graphics applications software products will remain relatively low for the following reasons:

- Graphics products have always been a lower priority than other commonly used packages such as spreadsheets and word processing packages.

- Graphics packages are in competition with graphically oriented word processing packages and spreadsheets. Some of the high-end word processors now have layout capability and can create a variety of attractive tables and bulleted charts. Some, such as WordPerfect's latest release, can import graphs and images. Similarly, many spreadsheets of recent vintage provide advanced graphing and layout capabilities, including color and three-dimensionality, sophisticated text editing and a variety of type styles and fonts.

Vendors of graphics products must strive to make their products more "business critical" to enhance sales.

Ways vendors are enhancing sales of their graphics products include:

- Graphics products are incorporating enhancements and upgrades, making the more sophisticated resemble low-end CAD.

- Ease of incorporation into word processed documents, through the use of GUIs, has enhanced the appeal of graphics software.

- Windows' capability to support live data links to other applications such as spreadsheets and data bases as well as graphics has also enhanced growth of graphics products. Thus, when a number in a spreadsheet changes, graphics and presentations can be automatically updated.

- On-screen presentations and the incorporation of multimedia will eventually enhance graphics usage.

- EISs, although a small market, are beginning to incorporate presentation graphics. Thus, a manager can request to see a series of slides as well as the backup spreadsheet the slides represent.

Desktop publishing—Introduction of the 300-dpi Apple LaserWriter with Adobe Systems Inc.'s PostScript page description language in January 1985 marked the advent of DTP. Such an obvious need existed for DTP that user expenditures grew and reached maturation rapidly.

As word processing packages became more sophisticated, they usurped what was the sole domain of desktop publishing packages. The most recent Microsoft and WordPerfect versions supply graphic image importing, graphical page preview, support for multiple type sizes and styles, detailed page layout controls, and drivers for high-end laser printers and typesetting machines.

At the high end, electronic publishing products from vendors such as Frame Technology and Interleaf, Inc. limit the market potential for sophisticated DTP.

In order to expand their markets, DTP vendors are adding additional functionality:

- Ventura and Aldus both now have data base publishers that enable users to more easily style and prepare data base information for incorporation into desktop publishing applications software products.

- Ventura is pursuing the color DTP market. Although market awareness and acceptance of color will take time, it may expand the market to include a broader function for DTP within corporations.

- Eventual work group publishing for DTP—including revision tracking and keeping specific areas/functions designated for specific people—will help to sustain the DTP market as well.

- View-only copying of electronic documents has large market potential and will be a growth inhibitor for DTP in the future. The advantages of maintaining and updating documents centrally and then distributing them for viewing to a large audience are obvious when compared to the process of hardcopy distribution.

Electronic publishing—Until the last year or two, the market for electronic publishing was limited to companies with ongoing complex publishing and technical documentation needs. Other, less sophisticated publishing needs are met by desktop publishing and word processing products.

Now, however, the availability of low-cost powerful desktop computers and affordable laser printers makes electronic publishing appealing to a broader audience. A stronger growth promoter over the long term will be the expanded role electronic publishing will play in document management and distribution.

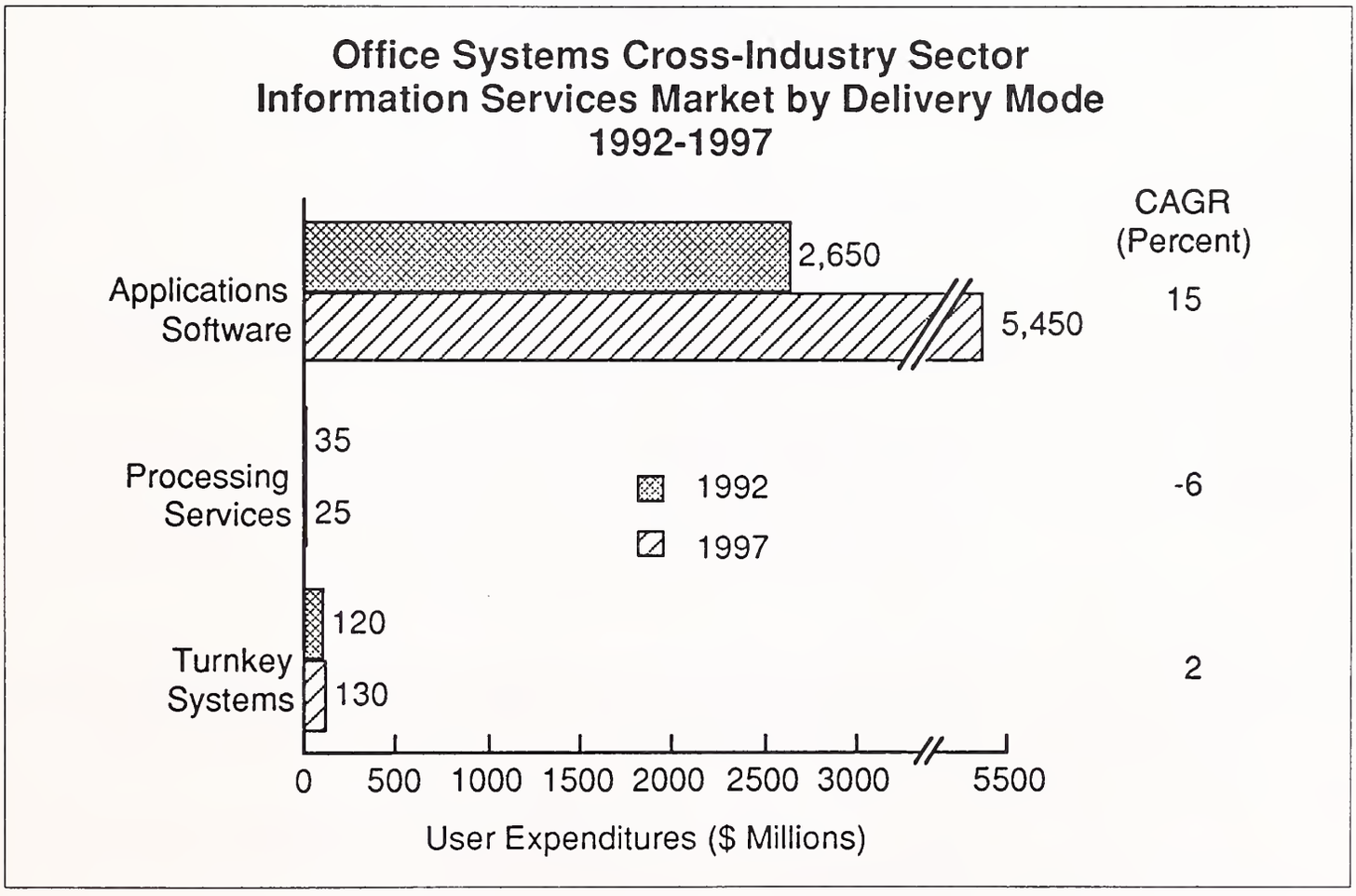
Document management and distribution addresses the coordination of the entire documentation process, including storing, searching, retrieving, routing, linking and distributing documents anywhere on the corporate network. Document management also addresses the problem of the timeliness and accuracy of document information.

Frame Technology and Interleaf both have "view-only" products for document distribution and viewing. However, interoperability and integration are ongoing challenges.

Because of the enormity of these challenges—as well as the potential for big payoffs—providing a document management solution will by no means be limited to electronic publishing vendors. Systems vendors with IOS products have an enormous amount to gain if they can devise an enterprise-wide document management strategy. Electronic publishing will play a valuable role, but it will have to make its presence strongly felt.

As can be seen from the forecast presented in Exhibit VII-2, applications software products expenditures will experience healthy growth over the next five years. However, expenditures on turnkey systems are flat and processing services expenditures are declining.

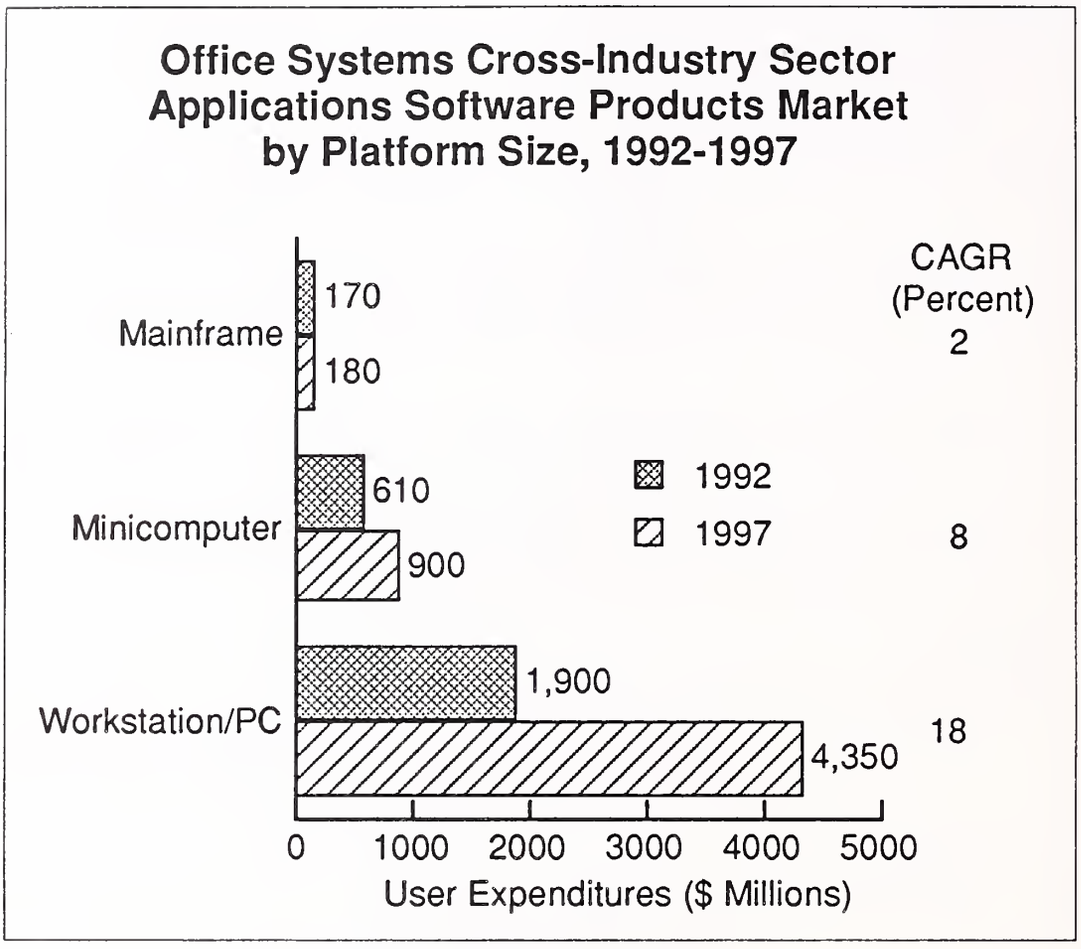
EXHIBIT VII-2



1. Applications Software Products

Exhibit VII-3 presents INPUT's expenditure forecast for office systems applications software products by platform size.

EXHIBIT VII-3



Mainframe and minicomputer—Growth of expenditures for mainframe- and minicomputer-based applications software products is due almost exclusively to price increases on previously existing WP and IOS licenses.

- To remain relevant to PC-oriented offices, midrange vendors all have office systems strategies tying their minicomputers to PCs to share data and, eventually, work cooperatively. IOS is a way to showcase the fact that minicomputers can interact effectively with PCs. These vendors will do best in IOS among their existing customer bases.

- Only a small portion of expenditure on word processing applications software products is for mainframe-based products. Word processing on minicomputers is also rapidly diminishing as WP remains strongly positioned as a personal productivity tool.

- By the very nature of its definition, desktop publishing is not on the mainframe or minicomputer.

- Electronic publishing software residing on mainframes and minicomputers is still in use, but there are few new sales. The typical application is data base publishing using data that resides on the mainframe. But strides are being made to create desktop electronic publishing packages that extract data from multiple data bases.

Workstation/PC—Practically all expenditure growth for office systems applications software products will come from workstation/PC-based product sales.

- A transition has been under way over the last two years from host/terminal-based IOSs to client/server-based IOSs, which means growth at the workstation/PC level. All IOS vendors have made or are making this transition.
  - Hewlett-Packard, NCR and AT&T IOSs now run on LANs rather than mainframes and are client/server in orientation.
  - IBM and DEC, the keepers of the first generation of proprietary office systems, have recently announced enhancements to their systems to operate on the client/server model as well.
- Lower-cost workstations and widespread availability of executive information systems (EISs), graphical user interfaces (GUIs), and relational data base management systems (RDBMSs) all serve to promote the use of department-level applications software products, including marketing and sales and electronic publishing.
- Until now, standard PCs and Macs have been underpowered for editing large, complex documents and color images. Now, with -386, -486 and UNIX platforms at a reasonable price, the market is expanding.
- A migration of all office systems products to Windows will continue to be a driving force for workstation/PC-based office systems products. In fact, the office systems market is embracing Windows more quickly and enthusiastically than any other cross-industry or industry-specific sector. Other multiuser and multitasking operating systems—such as Apple's System 7, UNIX, Windows NT, and new versions of OS/2—will gain momentum in the office systems market as well.

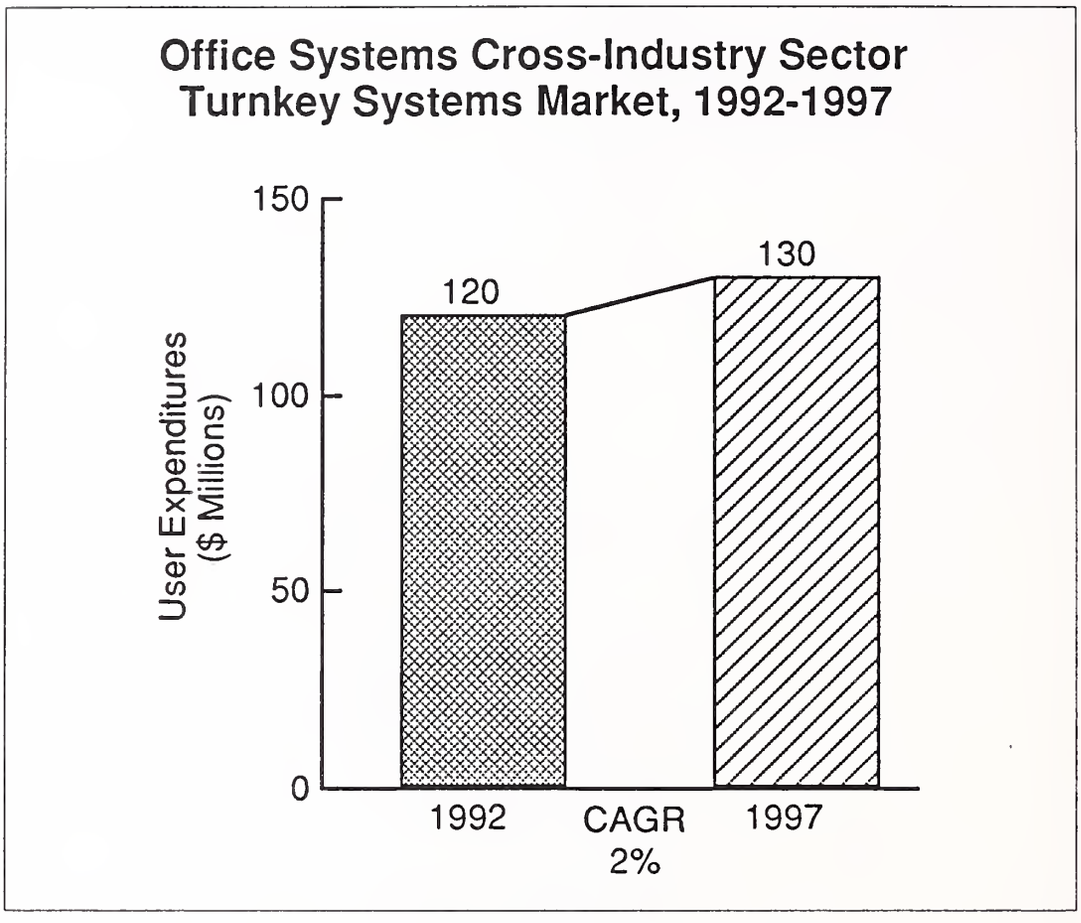
2. Turnkey Systems

According to DTP and electronic publishing vendors, an estimated 30% of revenues come from sales through turnkey systems vendors and VARs. DTP can use special hardware to increase productivity and add new capabilities, such as large-screen monitors and printers, and scanners.

A very small portion of word processing, IOS and graphics are sold through cross-industry VARs. Typically, VARs will bundle office systems products along with other line-of-business or industry-specific applications software products.

INPUT forecasts a CAGR of 2% for cross-industry DTP turnkey systems through 1997 (Exhibit VII-4), which is the same as last year's forecast.

EXHIBIT VII-4



- This slow growth is due to a trend among DTP applications software products and turnkey vendors to port their software to a number of standard hardware platforms. As this occurs, inventory carrying costs for multiple hardware platforms become prohibitive.

- Turnkey growth is slowing for electronic publishing as well, because the market for electronic publishing is simply not large enough to sustain a large number of VARs. Interleaf's exit from the turnkey business in 1990 was a signal of curtailment of VAR activity.

- Low profit margins on hardware, increased importance of standard hardware and multiplatform software left little incentive for many turnkey vendors/VARs to sell the hardware portion of a turnkey system. Therefore, turnkey vendors and VARs that sell electronic publishing applications software products are likely to be industry-specific VARs that can provide other vertical applications software products as well.

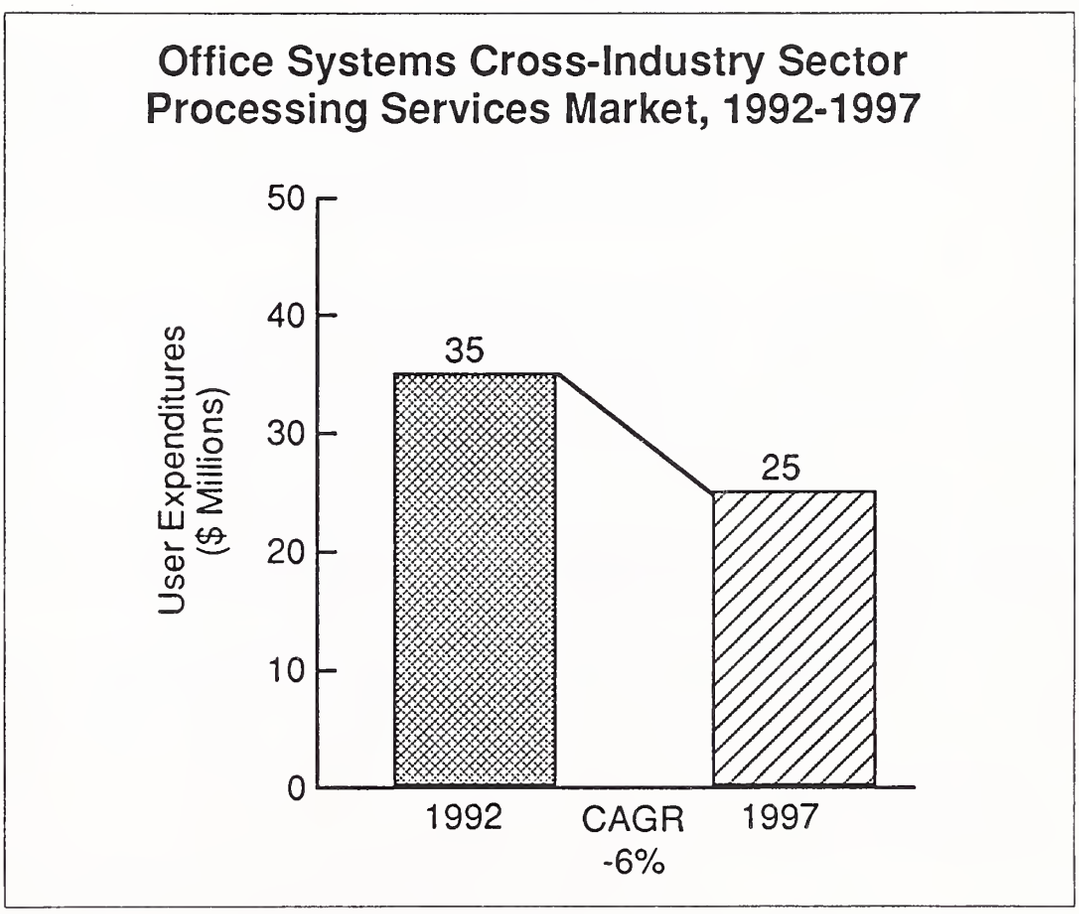
3. Processing Services

The processing services portion of the office systems information services market consists largely of presentation graphics services performed by outside service bureaus. Service bureaus convert the presentation graphics images either to color slides or to hard-copy prints used in the actual

presentation. So-called office automation services—such as PROFS, which was the predecessor to IBM's OfficeVision—are available on a timesharing basis by companies such as Litton Computer Services in case customers want them, but they are seldom used. Both integrated and standalone packaged solutions are widely available.

Exhibit VII-5 presents INPUT's processing services forecast. The negative CAGR is the same as INPUT's forecast last year.

EXHIBIT VII-5



A handful of national service bureaus and numerous small local companies offer slide production services, but many corporate users are bringing the slide-making process in-house after considering such factors as cost, convenience and control.

- With the widespread availability of PC-based solutions and low-cost slide-making equipment, users are able to produce quality graphic products in-house with ease.

- When confidential information needs to be converted into slides, going to an outside services firm is resisted.

C
User Department Directions

Office technology managers from a public transportation company and a pharmaceuticals firm were interviewed regarding office systems directions. In addition, the pharmaceuticals firm's creative services manager was interviewed about trends and issues relating to electronic publishing.

Both companies seek more and easier data accessibility and have in common the near-term goals of fully implemented and integrated LANs and integrated applications. Both are moving strongly toward GUIs. Both are working toward full network implementation and both are concerned about lack of knowledge on the part of users.

Other commonalities are that both respondents believe downsizing will have little or no impact on office systems. For both companies, data will continue to reside on the mainframe and the applications software products will continue to be either on the desktop or on a smaller file server. Neither company is making a major commitment to UNIX.

It is interesting to note that their comments about the office are not confined to a prescribed set of so-called office tasks or functions but are about enterprise-wide computing.

Public transportation firm—This company will have completed corporate-wide LAN implementation by year-end 1992. Standalone desktop office systems applications software will be replaced with LAN-based office applications software products because of their lower cost.

In addition to completing LAN implementation, this company's major office-related project this year is interfacing its mainframe bus scheduling system with a PC-based desktop publishing system for direct publication of schedules and pocket handouts, thereby eliminating the redundancies of hardcopy output and manual data input into the desktop publishing documents.

The company is standardizing on a single vendor's spreadsheets, word processing, and DBMS programs and is selecting additional applications software products that adhere to standards.

A future goal is to have data accessible on every desktop, but the interviewee believes this goal will be difficult to achieve; employees and managers are not knowledgeable enough about how to use PCs and the company has no training budget.

Pharmaceuticals firm—Whereas the first firm is just completing implementation of its first—albeit large—LAN, the second firm is completing integration of all of its previously existing E-mail systems. This company's focus over the near term will be to continue to add robustness to a corporate-wide network. Challenges include getting management to agree on technical strategies—such as standardizing on TCP/IP—and educating users about the capabilities of distributed networks and distributed computing.

As costs of networks come down, this firm will begin to look at ways to move larger quantities of data—which will eventually include FDDI (within two years on a selected basis)—to the desktop. Within the next two to three years, E-mail will become a background activity and data sharing will be the principal focus. Client/server architectures will be fundamentally important in this regard.

Whereas the first company is making initial efforts to integrate by interfacing two previously separate functions—a mainframe bus scheduling program to a desktop publishing system—the second company is beginning to assess groupware products, such as Lotus Notes, as a way of integrating a wide variety of different applications.

- Rather than standardizing on a single vendor as was the case with the public transportation company, this company will continue to support several different vendors' office applications software products. The company doesn't plan any vendor changes, but will not hesitate to switch vendors for an integrated office system that meets its requirements.

Creative Services Department, pharmaceuticals firm—This department's customers are the marketing groups within the firm. Cost/benefit trade-offs are driving this department.

- The company is bringing all electronic pre-press in-house this year to save costs.

- The department must justify its existence on the basis of lower costs compared to outside vendors.

- The department must cost justify any new information technology expenditures.

This department's existence is also based on providing higher quality output than can be obtained from external vendors. Thus any kind of electronic publishing equipment it buys must not only be reasonably priced, but must also provide high quality.

Needs include the following:

- Less templatizing and more flexibility in the way the final product is going to look
- More applications integration and more intuitive ways of working with the software
- More compatibility between formats—the ability to create a document of picture in high resolution and map it to a low-resolution application
- More network capacity so that large computer files can be electronically sent to the marketing department

D

Trends/Technology Ratings of Importance

Respondents within all cross-industry sectors, both vendors and users, were asked to rate various trends and technologies on a scale of one to five, where one is unimportant or having little impact and five is very important or having significant impact.

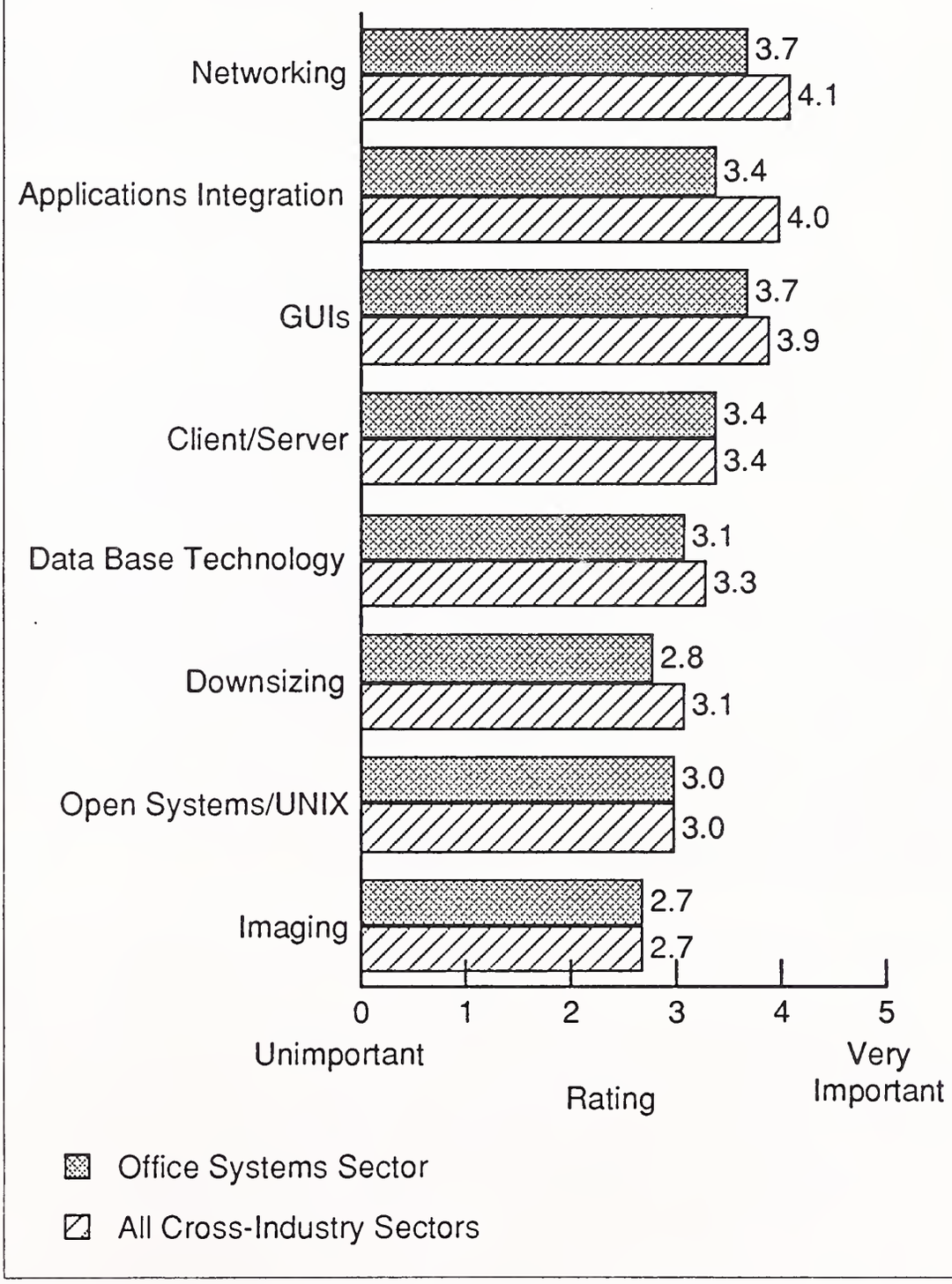
The technologies listed in Exhibit VII-6 were selected because INPUT believes they will receive the most attention from vendors and users over the next five years. In addition INPUT believes their impacts on vendors and users will be profound. Users who deploy these technologies will be re-engineering their business functions. And vendors will need to change not only their products, but also the ways in which they price, sell and support them.

Exhibit VII-6 shows the composite ratings of the office systems cross-industry sector compared to the ratings of all cross-industry sectors combined.

Interestingly, the office systems sector rating for applications integration is noticeably lower than the all cross-industry sectors combined rating. Vendors with IOS offerings and the more technologically advanced user organizations rated applications integration 5.0; on the other hand, vendors with a major focus on pieces of the office such as word processing or graphics—as well as more traditional users—rated applications integration considerably lower.

EXHIBIT VII-6

Office Systems Cross-Industry Sector Respondents' Indication of Relative Importance of Trends and Technologies



INPUT believes the applications integration rating underscores the challenges ahead in selling the IOS concept and product. It underscores the importance of standards and full LAN implementation on the technology side; but it also suggests that these technologies will require users to change from their former way of doing things, and this takes time.

Respondents for all cross-industry sectors were also asked to rate the technologies and trends in terms of importance five years from now. All technologies for all cross-industry sectors increase in importance over the five-year period.

By 1997, the office systems sector rating for applications integration is the same as for all cross-industry sectors combined (4.6). Thus this sector acknowledges the importance of this trend for the future but lacks consensus about its impact (or feasibility) now.

As is true with all cross-industry sectors, within the office systems sector vendor ratings are generally slightly higher than user ratings. The largest discrepancies are in the ratings for open systems/UNIX and data base technology. Vendors consider open systems/UNIX more important than do users (5.0 vs. 3.0) and users think data base technology is more important than vendors do (3.5 versus 2.6). Vendors view open systems and UNIX as key to applications integration and wide-scale implementation of their products. INPUT believes the users' lower scores indicate that user organizations are cognizant of the importance of open systems and standards but have not made a commitment to UNIX.

E

Vendors and Competitive Environment

1. Vendor Characteristics and Trends

Varying approaches to integration—Office systems vendors are approaching user needs for integration and enterprise-wide solutions by porting their products to Windows, developing client/server solutions, and beginning to provide groupware and workflow solutions. The competitive environment will change dramatically as IOSs continue their evolution from completely host-based systems, to PC network and client/server solutions that operate under a GUI, to workflow or groupware software.

- As more users purchase the Windows operating system, shifts in PC-based applications software products vendor leadership positions may occur. Effectively porting products to Windows and capitalizing on its functionality will take on more significance and be a more competitive

advantage than the "bells and whistles" of the applications software product itself. Because all vendors' products will essentially have the same ease-of-use features, customers will be more willing to switch vendors for the most solid Windows rendition.

Windows has created an opportunity for word processing vendors to provide the kinds of functionality initially only provided within DTP products running on Macintosh computers. As word processing packages take on the ease-of-use features and functionality of what used to be the sole domain of desktop publishing products, DTP vendors such as Aldus and Ventura Software will be pitted against WordPerfect, Lotus and Microsoft.

The DTP vendors will have to adopt a product strategy of increasing sophistication (which will cause them to compete directly against electronic publishing applications software products vendors) and/or broader-based product lines. The latter appears to be the strategy of choice. For example, Aldus now has a second, newer, product category it calls business communications products; and both Aldus and Ventura Software have introduced data base publisher packages.

- A prominent trend over the last several years has been a transition away from host/terminal-based IOSs to client/server-based systems. Data General, AT&T/NCR, and HP have all modified their IOS products to a client/server framework. Although DEC's All-In-1 Phase 2 has been slow in delivery, DEC has introduced client/server aspects of DEC All-In-1 and is moving away from using the VAX as the server. IBM OfficeVision client/server products are beginning to appear (OV/2 LAN) as well. As client/server products gain momentum, RDBMS companies are entering the fray. For example, Oracle now has its own electronic mail and word processing packages.

- Office systems is among the first application sectors to embrace the groupware concept. Examples of groupware activities are:

  - Lotus Notes is the most successful groupware product so far, and one of the first truly distributed systems. Notes facilitates group communications for decentralized or geographically dispersed organizations and is being used to develop and deploy such applications as customer tracking, status reporting, and project management. Although it is not specifically billed as an office system, it is being used for office systems applications such as information distribution, electronic mail, and collaborative discussions or authoring.

- In November 1991, Digital Equipment introduced a Windows-based series of products—TeamLinks—that provide conferencing and videotext services across wide-area networks. The initial implementation of TeamLinks will require VAX servers and Windows clients. However, DEC plans to offer the software on Intel-based and UNIX-based servers next year. DEC will also unveil workflow and work group software applications.

- Microsoft has also revealed plans for work group applications software products, which will be one of its central development themes in years to come.

- WordPerfect Office has also been described as a groupware product.

- Work group or collaborative publishing has the ability to spread publishing tasks to different members of a group via a network. Both Aldus and Quark are integrating aspects of Apple's new operating system—System 7.0—with existing products to facilitate cooperative DTP on networks.

• As the notion of work group software expands, additional companies with innovative approaches to groupware may enter the office systems market.

Alliances and acquisitions—In a broad sense, an IOS can now be loosely defined as simply multiple functions of an office nature for multiple users. New kinds of alliances and ongoing acquisitions reflect this broader definition. They also reflect a trend toward what used to be separate products increasingly being incorporated as features within a single system.

Two prominent alliances in the office systems cross-industry sector are the IBM/Lotus alliance and the Digital Equipment/Microsoft alliance.

• In June 1991, IBM announced it would market Lotus' Notes and cc:Mail as part of its office systems family. Eventually, these two products will be more tightly merged into Office Vision. IBM is thereby positioning itself in the work group/collaborative authoring arena. Lotus has become an IBM International Alliance partner, which implies stronger ties than IBM business partner status.

• In November 1991, Microsoft and DEC strengthened and expanded their alliance in the office systems arena. DEC will develop and sell Microsoft applications, such as the Excel spreadsheet and Visual Basic programming environment, that have been enhanced to work with DEC software. And Microsoft's new Windows NT will run on DEC's new alpha platform series.

2. Leading and Emerging Vendors

Leading vendors of each of the application types within office systems are listed in Exhibit VII-7.

EXHIBIT VII-7

Office Systems Cross-Industry Sector Leading and Emerging Applications Software Products Vendors

Vendor	Integrated Office Systems	Word Processing	Desktop Publishing	Graphics
Adobe Systems				X
Aldus			X	X
Ashton-Tate		X		
Computer Associates				X
Data General	X			
Digital Equipment	X			
Hewlett-Packard	X			
IBM	X	X		X
Lotus				X
Micrografx				X
Microsoft		X		X
Software Publishing				X
Quark			X	
Ventura			X	X
WordPerfect		X		X
Deneba Software				X
Claris				X
Symantec (More II)				X

Integrated office systems—To remain relevant to PC-oriented offices, midrange vendors all have office systems strategies tying their minicomputers to PCs to share data and, eventually, work cooperatively. IOS is a way to showcase the fact that minicomputers can interact effectively with PCs. These vendors will do best in IOS among their existing customer bases.

Word processing—The top three vendors in the word processing segment are WordPerfect, Microsoft and Lotus. They all have similar customer sets and offer high-end, Windows-based products.

Graphics—Graphics vendors include Lotus, Microsoft, Aldus and Claris. All of these companies offer Windows-based products.

Desktop publishing—In addition to the original winners in DTP—Aldus and Ventura—low-end DTP is a valid but increasingly competitive market. Companies like Springboard Publisher (Minneapolis, MN) and Timeworks (Deerfield, IL) will face heavier competition.

Electronic publishing—There are only a handful of electronic publishing software vendors.

- The two leading workstation/PC electronic publishing vendors are Frame Technology and Interleaf, Inc.

- Other smaller vendors are ArborText, Compugraphic and Island Graphics.

- XYVISION is a leading minicomputer-based electronic publishing vendor; although it sells into some business environments, much of its sales are to the commercial and professional publishing market.

3. Vendor Profiles

This section contains profiles of a sampling of leading vendors to show the diversity of types of companies and approaches.

a. Aldus Corporation

Aldus was founded in 1984 and developed a relatively inexpensive and easy-to-use software tool that would perform page layout and design functions on the Macintosh. It later developed PageMaker, which still generates about 50% of its sales. PageMaker was the first desktop publishing applications software product on the market and essentially put the Apple Macintosh on the map. The first Windows version of PageMaker was introduced in 1987.

Aldus is now focused on two product areas—its traditional core product group for page layout and graphics art design—and the newer category of business graphics and presentation products like Persuasion presentation graphics for Windows.

In recent years, Aldus has been acquiring technology, products and companies in its mission to build a stronger product line and decrease its reliance on a single product (PageMaker). In February 1990, it made its largest acquisition to date when it exchanged $26 million in stock for ownership of Silicon Beach Software, a maker of graphic arts software for the Apple Macintosh.

In May 1991, Aldus acquired publishing rights to PhotoStyler originally developed by U-Lead Systems. Now called PageMaker Database Edition, the product enables users to easily take data base files and turn them into published references like catalogs. In 1991 Aldus also obtained publishing and marketing rights to PageAhead, a bridge between data base management systems and PageMaker.

Aldus' Advanced Products Group is working with object-oriented programming techniques to develop new products that encompass not only electronic publishing as it is known today, but also technologies such as voice, video, CD ROM, and imaging. Products will be delivered within the next two years, offering electronic delivery as a medium rather than paper and/or film only. The company is broadening its product strategy.

Aldus' 1991 revenues were $167.5 million, a 24% increase over 1990 revenues.

b. Frame Technology Corporation

Frame's original FrameMaker product was UNIX-based and addressed the needs of technical users who produce documents and must integrate into other applications—such as MCAD, CAE and CASE.

Now, however, FrameMaker is available on workstations from Digital, Hewlett-Packard, NeXt Computer and Sun Microsystems, as well as Apple Computer's Macintosh. Frame has recently also released a Windows-based version of FrameMaker. FrameMaker International is available in 13 languages.

In addition to electronic publishing, Frame's product strategy includes a view-only version called FrameViewer (for UNIX) and FrameReader (for the Macintosh).

Licenses are sold to universities, corporations, research and government institutions, software development professionals, and publications groups.

Frame is working on development of tools to integrate FrameMaker with other applications. To this end, FrameMaker can be integrated with SoftBench, a software development integrated framework from Hewlett-Packard. The integration of FrameMaker into the SoftBench framework allows users to create and edit FrameMaker documents directly from other software applications, saving time and enhancing quality in the documentation process.

Frame Technology made an initial public stock offering in February 1992. Its fiscal 1991 revenues reached $41.9 million, an increase of 64% over 1990 revenues.

c. Hewlett-Packard Corporation, Cooperative Computing Division

In June 1990, Hewlett-Packard began shipping NewWave Office, which lets a system running UNIX, OS/2, or HP's own MPE operating system act as a server for clients that may include UNIX, DOS, Windows, OS/2 and Macintosh microcomputers. NewWave Office represents HP's first set of client/server products.

HP's object management facility is at the heart of NewWave Office applications. Through its Object Request Broker, HP is working on developing a standard protocol for distributed object management, which would be a major step toward distributed object computing.

Since its inception, the NewWave Office has expanded to provide an enterprise-wide solution, not just an office solution. HP's NewWave Office now consists of 28 software products and services, including decision support and information sharing services. It incorporates client/server software distribution capabilities, support for Novell's NetWare, platform support for the SCO UNIX System V 3.2, and agent- and object-based E-mail, networkwide ad hoc query, and terminal emulation capabilities.

Among new products scheduled to ship in 1992 are:

- OpenMail—a worldwide E-mail system with expanded functionality. HP will sell the product through OEMs as well as selling it directly.

- An information access component to NewWave Office will allow a knowledge worker to get to any structured data on any system from a single GUI.

- A mail-enabled, object-oriented workflow system

- A full concept-based retrieval system whereby a knowledge worker can locate information inside or outside the organization. This product will work in conjunction with a document management system.

d. IBM Corporation

OfficeVision is the replacement product for IBM's PROFS, a mainframe-based electronic mail product. New functionality for PROFS is only available to OfficeVision users.

OfficeVision is a family of graphical interface applications built on SAA so PCs can act not only as independent processors but also as workstations for access to mini and mainframe data and programs. It is designed to run under all IBM operating systems, including VM, MVS, OS/2 and OS/400. Each version provides a slightly different package of features.

Office Vision/2 LAN is IBM's client/server product offering. IBM has recently begun shipping its Windows client, which has the capability to run OV/2 LAN on a Novell network. All future work for OV/2 LAN will be done on the 32-bit version of OS/2 rather than the 16-bit version.

IBM has a reseller agreement with WordPerfect whereby WordPerfect will automatically come as part of OV/400.

IBM is positioning itself in the work group/groupware arena through the following IBM/Lotus agreements, announced in June 1991:

- IBM is remarketing Lotus Notes and cc:Mail as part of its office systems family. Eventually Notes will be tightly integrated into OfficeVision.

- IBM is licensing the Notes communications capability and data replication function for possible inclusion in future releases of OS/2. Notes functions will eventually become part of the base operating system or an extended service.

- IBM and Lotus are working toward developing a common E-mail system and address book for Notes, cc:Mail and OV/2 LAN. They are also jointly publishing APIs for E-mail and an address book that would be supported across Notes, cc:Mail and all OV platforms.

- Lotus is an IBM international alliance member. This means it has a higher degree of integration, from a company point of view, than does a business partner. Lotus and IBM will jointly develop products and make joint future announcements.

IBM will incorporate the support of additional independent software vendors. Even though it comes from a traditional host-based beginning, its strongest competitor may end up being Microsoft in all areas of systems and applications software products.

e. Interleaf, Inc.

Interleaf, founded in 1981, develops and markets electronic publishing applications software and provides systems integration and customization services. In November 1989, Interleaf announced a major restructuring that removed the company from the turnkey systems part of its business and refocused Interleaf on its major growth and value-added business of software and services.

Since its exit from the turnkey business, Interleaf has been pursuing the following:

- A multiplatform strategy; Interleaf products can now run on 386-based machines

- Broadening its product line to include document management tools such as its Document Manager product, which competes with products such as those from Odesta. It also recently introduced Worldview, a document management product targeted at large corporations with heavy document processing needs.

- Customizing its electronic publishing products for specific customers as well as for industry-specific markets through solutions that include access to multiple applications and data bases. Its "active document technology" enables authors to build a document that is very specific to their needs.

- Placing more emphasis on a view-only version of its electronic publishing product

Revenues for 1991 were $84.3 million, compared with $88.8 million for fiscal 1990; the company attributes the decrease in revenues to its move away from hardware sales. In July 1991, Interleaf acquired its German distributor, Interleaf GmbH for $8.4 million.

f. Lotus Development Corp.

This $829 million software company continues to dominate the spreadsheet market with about a 50% share. Its market share, however, continues to be eroded by its formidable competitors Microsoft and Borland.

Lotus' initial product, Lotus 1-2-3, was shipped in January 1983. Seventy percent of Lotus' revenues still come from this product. INPUT believes this is a precarious position for Lotus, given that the spreadsheet market is fiercely competitive.

The company is making strides toward lessening its dependence on 1-2-3 in the following ways:

- Lotus Notes has gained widespread recognition as an innovative work group package that rivals more sophisticated executive information systems such as those offered by Pilot and Comshare. It is an initial offering and additional products based around the Notes concept of work group solutions will follow, from Lotus as well as from its competitors.

- Lotus has acquired cc:Mail, which is now the leading electronic mail package.

- It continues to work with Novell and has recently signed an agreement whereby Novell will sell Notes through its VAR channel.

Other recent developments for this company are:

- The company is placing more emphasis on suite packaging; Lotus Suite includes cc:Mail, Ami Pro, Freelance, and 1-2-3 for $1,700 whereas each product priced separately would be in the $800 undiscounted retail range. Although the company may be able to gain additional incremental revenue, suite packaging is also a competitive response to similar moves by Microsoft and other major competitors.

- Lotus is making a strong move toward Windows and has introduced Works for Windows, a suite of products including 1-2-3, cc:Mail, Ami Pro and Freelance.

- The company has announced plans to move the Windows desktop suite to Microsoft's Windows for Pen Computing.

- The company is expanding its drive into the retail channel as well as increasing its direct mail sales.

g. NCR

The Cooperative Computing Systems Division (CCSD) is NCR's three-year-old software products division. Its original charter was to provide an integrated office system. Now, however, its primary product, Cooperation, has gone beyond the context of the office. Cooperation is billed as an enterprise-wide integrating environment. It is an interface that sits above the operating system to provide a common look and feel for the entire environment.

Components of Cooperation are:

- Cooperation is considered a client/server architecture where the server platform is either OS/2 or UNIX; clients are DOS. Future directions include the NT operating system.

- An Executive Information System—what CCSD terms a decision enabling system—is built into Cooperation, which allows the user to monitor business and take appropriate action.

- Cooperation also provides an object-oriented GUI which serves as a shell surrounding previously incompatible applications software products.

- The product or environment includes full text search, file retrieval, and file archiving within which a document is automatically converted to whatever the user is working with.

CCSD is divided into three divisions, one each for Cooperation, a workflow product, and object-oriented development.

h. Software Publishing Corp.

Software Publishing Corp. (SPC), founded in 1980, originally focused on entry-level, easy-to-use publishing applications software products. In recent years, SPC has changed its orientation to a more sophisticated product line. As part of this transition, in January of this year SPC sold its Entry Level Series (PFS:) product line to Spinnaker Software Corp. of Cambridge (MA) in a stock transaction valued at approximately $3.7 million.

Rather than publishing and word processing software, the company's current focus is on a more broadly-based information presentation and information access series of applications software products:

- Harvard Series of presentation graphics and project management products. Harvard Graphics is the leading presentation graphics product for PCs.

- The InfoAlliance Series of products, introduced in September 1990, and originally for OS/2 and Presentation Manager environments, now also runs under Windows. InfoAlliance lets users access and combine data from a variety of sources, including Ashton-Tate's dBase and IBM's Data Manager. It is billed as a graphical data access application generator for client/server and standalone environments.

- Professional Series of word processing, data management and spreadsheet products

As part of its transition to a more broadly based product line, SPC has redirected its development efforts away from OS/2 toward Windows. Its first Windows product, Professional Write PLUS, was introduced in March 1991. It is also compatible with the Pen Windows Operating System environment. Windows-based versions of Harvard Graphics and InfoAlliance software are available as well.

In July 1991, Software Publishing acquired Precision Software Ltd. for $25.4 million. Precision Software is the developer of Superbase, an RDBMS for Windows.

SPC's long-term information access development plans are based on the client/server model. InfoAlliance is slated for a key role in a new architecture. Other desktop information system products that the company plans to deliver in 1992 will provide more ways to view and access data.

Fiscal 1991 revenues reached $143.1 million, an increase of only 2% over 1990 revenues.

i. Ventura Software, Inc.

Ventura Software, a subsidiary of Xerox Corp., is a leading supplier of desktop publishing software with its Ventura Publisher products for DOS/GEM, Windows, OS/2 and Macintosh Editions. A likely addition would be a UNIX-based version.

Ventura's product strategy is to broaden its product line and increase product sophistication. Its key product directions are:

- Upgrades to Ventura Publisher
- A data base front end
- Color extensions

Ventura DataBase Publisher enables users to style and prepare data base information for Ventura Publisher, PageMaker and Interleaf. Ventura obtained the rights to the software from GTG Software Ltd., Berkshire, England. GTG will continue development.

The color extensions software—Ventura ColorPro, Ventura Scan, Ventura Separator, and Ventura PhotoTouch—are targeted at the midrange color desktop publishing market. Ventura's aim is to be the leader in affordable color prepress capabilities for Windows users. These products were developed under a technology licensing agreement with Pre-Press Technologies, Inc. of Carlsbad, CA.

A growing portion of Ventura's sales is international due to the mature state of the U.S. DTP market. It has native-tongue DTP products in Australia, Asia, Russia, Sweden, Spain, France, Germany and Portugal. Ventura has recently gone through a reorganization and has a new president at its helm.

j. WordPerfect Corporation

WordPerfect has built a competitive advantage through technology. Unlike its archrival Microsoft, it has had a very focused product orientation and a reputation for high quality in that niche. WordPerfect's focus is word processing and office systems applications software.

WordPerfect has grown into one of the world's largest PC software makers on the strength of its flagship word processing applications software product line for DOS. Now, however, with the shift to Windows, it has to prove itself in this arena. After repeated delays, WordPerfect for Windows began shipping in November, 1991. In the meantime, sales for DOS versions of WordPerfect Word have slowed.

Eighty percent of WordPerfect's total revenue comes from the PC Division, which provides a set of office productivity tools—including WordPerfect, WordPerfect Office PC, WordPerfect Office LAN, PlanPerfect, DataPerfect, and WordPerfect Executive—for IBM and compatible microcomputers.

WordPerfect's relatively new strategy is to port to as many platforms as seem to make sense. In recent years the company has moved beyond its MS-DOS roots to support UNIX and other minicomputer environments. WordPerfect products also run on Apple systems, Amiga and Atari computers, Data General systems, DEC VAX, and IBM 370. Altogether WordPerfect supports 15 versions of UNIX.

WordPerfect Office was the first LAN-based integrated office environment developed by a major PC software vendor. Introduced in October 1988, the system offers programs such as WordPerfect, PlanPerfect and DataPerfect, along with Office Modules that are generally found only in host-based integrated office systems. These include mail, notebook, calendar, and scheduler modules. It runs on PC Networks, VAX, Data General, Macintosh and UNIX systems. WordPerfect plans to introduce the system onto other platforms such as UNIX, VMS, Macintosh and OS/2.

Fiscal 1991 revenues were $634.2 million, an 18% increase over fiscal 1990 revenues.

Planning and Analysis

A
Definitions

Planning and analysis tools support four application areas: spreadsheets, project management, executive information systems (EISs) and financial modeling or planning systems.

1. Spreadsheets

Spreadsheets are by far the largest application, accounting for an estimated $1 billion of total user expenditures on planning and analysis tools. Spreadsheets have been around practically as long as the PC has, and are responsible for the rapid growth in use of PCs during the 1980s. Competition is heating up and products are continually upgraded. Enhancements include Windows-based versions, file linking to worksheet consolidation, three-dimensionality, data base connectivity, improved worksheet publishing, and interoperability across platforms.

Integrated software products that include word processing, presentation text, graphics, and DBMSs with a spreadsheet core are also considered part of the spreadsheet subsector within the planning and analysis sector.

2. Project Management

Whereas executive information systems, financial modeling, and spreadsheets are unstructured decision support tools, project management works best for structured projects that have solid deadlines and clearly defined activities. Project management programs structure the various parts of a job, integrating interim deadlines and limited resources so that all of the pieces fit together properly.

3. Executive Information Systems (EISs)

EIS software began as an application or a tool for summarizing and storing existing data in a specialized data base that supported on-demand queries from the user. The goal was to turn data into information and make it available on demand in character and then graphical form. This was accomplished by linking the power of a relational data base on a host to the ease of use and presentation capabilities of the personal computer. Users tended to be adventuresome senior executives.

Now, in addition to yielding specialized information, EISs have become professionals' and other managers', as well as executives', interface to E-mail, a variety of personal job aides and external data services. The development and implementation tasks have expanded, and the EIS software product has become a tool kit rather than an application.

4. Financial Modeling and Planning

Financial modeling is a generic decision support tool rather than a specific application-based tool for calculating "the answer." Financial modeling tools have functions such as time series analysis and forecasting, econometrics forecasting, and risk management, and are also generalized tool kits for building customized analytical tools.

Excluded from modeling and planning are specialized accounting-based software and bookkeeping systems, or programs that are specific to the banking and finance industry. However, income statements, for example, could be created by using a financial modeling tool kit.

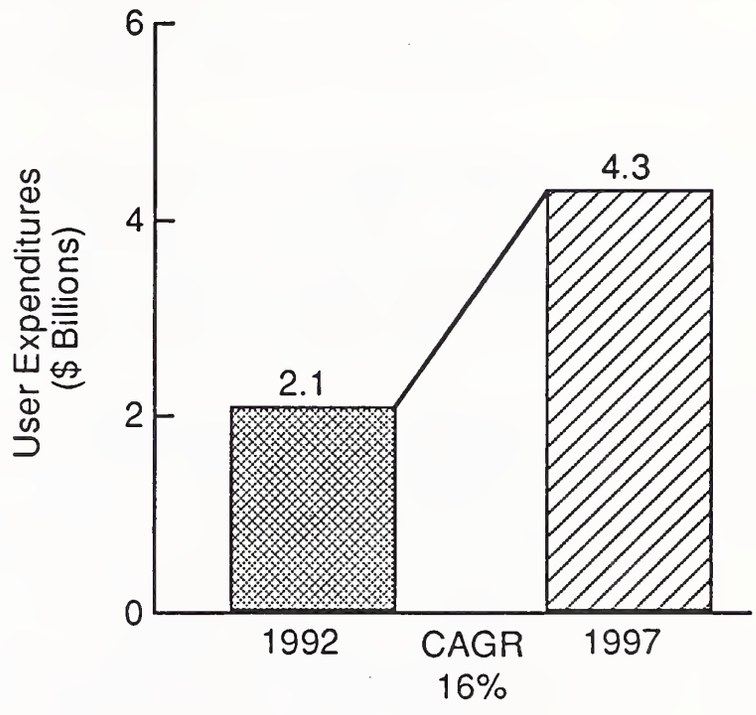
B
Information Services Markets

The size and growth rate for planning and analysis cross-industry sector information expenditures are shown in Exhibit VIII-1.

In-house development of planning and analysis applications software is no longer considered a viable option for project management and financial modeling software, and it was never an option for spreadsheet software. Some in-house development of EISs still takes place, but these are smaller projects that do not require a great deal of maintenance.

EXHIBIT VIII-1

Planning and Analysis Cross-Industry Sector Information Services Market, 1992-1997



Industry-specific planning and analysis tools do exist—for example, project management applications software products for the aerospace and construction industries. However, industry specificity is a small portion of the total and not increasing appreciably. Vendors are more likely to develop products that incorporate functions for key industries, yet sell their products across all industries. Industry and company specificity tends to be covered by third parties that develop and market templates or add-ons for spreadsheets and financial modeling products.

Spreadsheets—INPUT's estimate of the size of the 1991 spreadsheet applications software products market is $1 billion.

Practically everyone who wants or needs a spreadsheet already has one. Nonetheless, growth over the last several years has been in the 30% to 35% range.

This growth is fueled primarily by an ongoing series of product upgrades. Now most of the upgrades are to Windows-based products. When the Windows market for spreadsheets becomes saturated, the next round of upgrades, based on the next generation of operating systems, will fuel the market.

However, INPUT questions how long this product category will be able to sustain the 30% to 35% growth rates of the last several years.

Aggressive price discounting and suite packaging—which have taken place over this last year and will continue—will have a negative impact on growth in the spreadsheet market. Thus INPUT believes that growth over the next two to three years will decline to the 20% range.

In the long term, spreadsheet vendors must succeed in providing products with the ability to access multiple data bases with ease and that work well together. INPUT believes that products with these capabilities will be able to sustain a higher price over a longer period of time. In addition, users must fully implement and integrate their LANs in order to take advantage of the capabilities of planning and analysis solutions.

Project management—In contrast to the spreadsheet market, the market for project management software is relatively untapped. Whereas original users of project management software products were professional planners, now—because of the widespread availability and power of desktop computers and GUIs—general business professionals and managers are potential project management software users as well.

Vendors, however, are challenged by low market demand and need to find ways to increase the market for their products. According to vendors, two challenges are that many professionals do not feel they need project management software and, secondly, even if they did, project management software has traditionally been complex.

In an attempt to broaden market appeal, vendors are not only simplifying the functionality of their products but also making them easier to use and to customize. Microsoft Project, for example, has user-definable dialog boxes and a customizable collection of icons.

INPUT believes that even though vendors' efforts will succeed to some extent, growth for this product category will remain moderate over the short term. Again, as accessibility to data improves and as LAN implementation and integration progress, general business users will find ways to incorporate project management into their daily activities. But this will take time.

EISs—Based on discussions with vendors, INPUT estimates 1991 user expenditures on EISs to be $100 million. As is true with spreadsheets and project management products, the needs for integration and data access drive expenditures on EISs.

Other driving forces for this market are:

- The potential market for EISs is beginning to encompass managers and professionals in addition to executives. In other words, the concept of an executive information system is being replaced by the concept of an enterprise-wide information system.

- Vendors are approaching this potentially large market in a number of different ways:

  - EIS vendors, such as Pilot and Comshare, are expanding the definition of what their products can do. Pilot, for example, views its products within a wider category of visual information access which will eventually incorporate multimedia and imaging, and will encompass other vendors' products as well as its own.

  - Suites of products, such as spreadsheets, project management, word processing, DBMS, and graphics, networked together, take on the appearance of enterprise-wide information systems. Lotus and Microsoft are among the vendors that sell these types of product suites.

  - So-called integrated office systems such as IBM's OfficeVision or NCR's Cooperation are being positioned as enterprise-wide information systems rather than being confined to the concept of an "office" system.

  - Groupware products—such as Lotus Notes—are another approach to enterprise-wide information access and sharing.

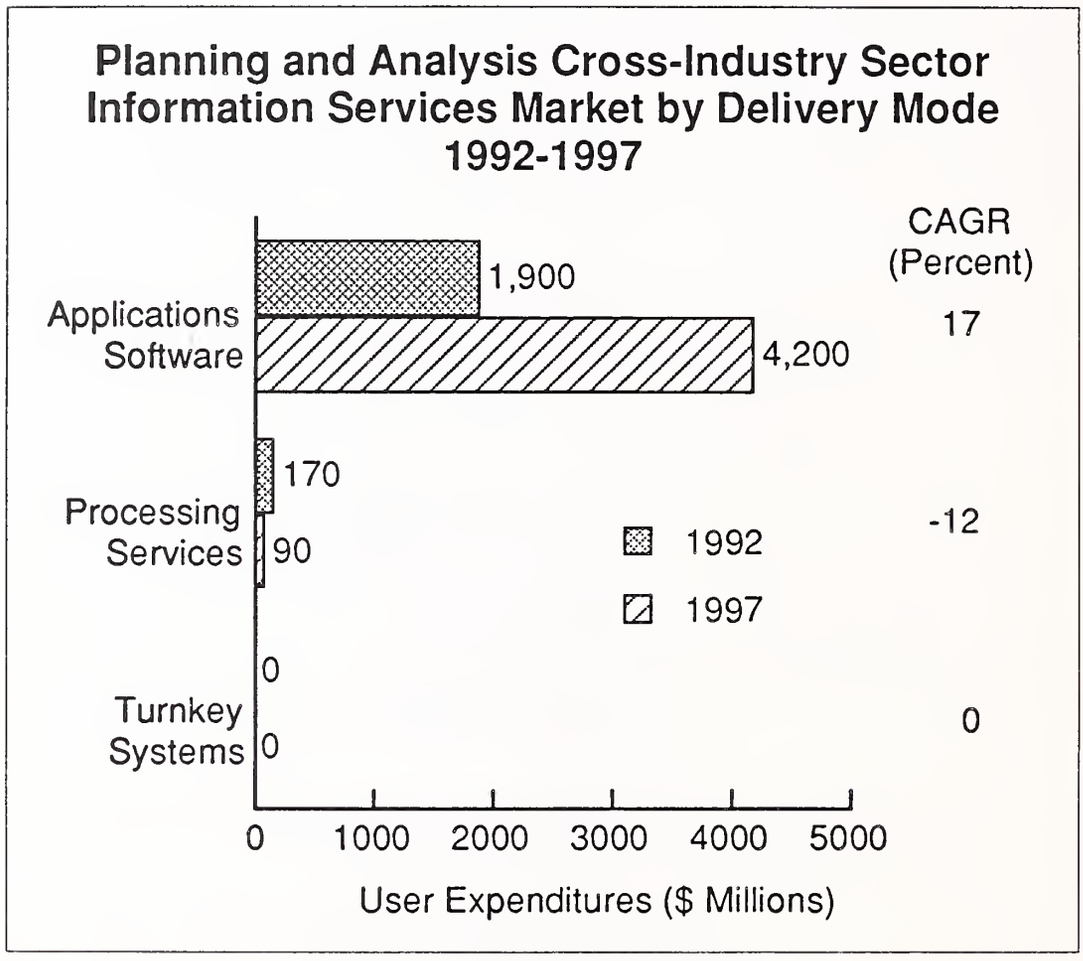
  - Systems integration vendors provide customized consulting and solutions for enterprise-wide systems.

It is not clear whether these competing products will be a growth promoter or a growth inhibitor for the product category known as EIS. Clearly, a very large need exists. The fact that the concept of an enterprise-wide information system is gaining more widespread recognition through additional product availability may drive growth for all product types in a synergistic way rather than inhibit growth. INPUT believes, however, that the term EIS may eventually be replaced by a term that encompasses a variety of product approaches.

Financial modeling—The market for self-contained, low-end financial modeling products has been eroded by spreadsheets and financial modeling characteristics that have been built into applications such as spreadsheets, EISs, accounting applications software or sales and marketing software products, and DBMSs. For example, IMRS has recently added financial consolidation capabilities to its data base product. INPUT believes that the growth for individual financial modeling applications software products is therefore limited.

As can be seen from the forecast presented in Exhibit VIII-2, applications software products expenditures will experience healthy growth over the next five years; however, expenditure on turnkey systems is not growing and processing services expenditures are declining sharply. INPUT has lowered its estimated applications software products expenditures for 1991 and subsequent years, as these numbers were overstated for mainframe- and minicomputer-based products.

EXHIBIT VIII-2



1. Applications Software Products

INPUT's estimate of the 1992 applications software products market by hardware platform for the planning and analysis cross-industry sector is presented in Exhibit VIII-3.

EXHIBIT VIII-3

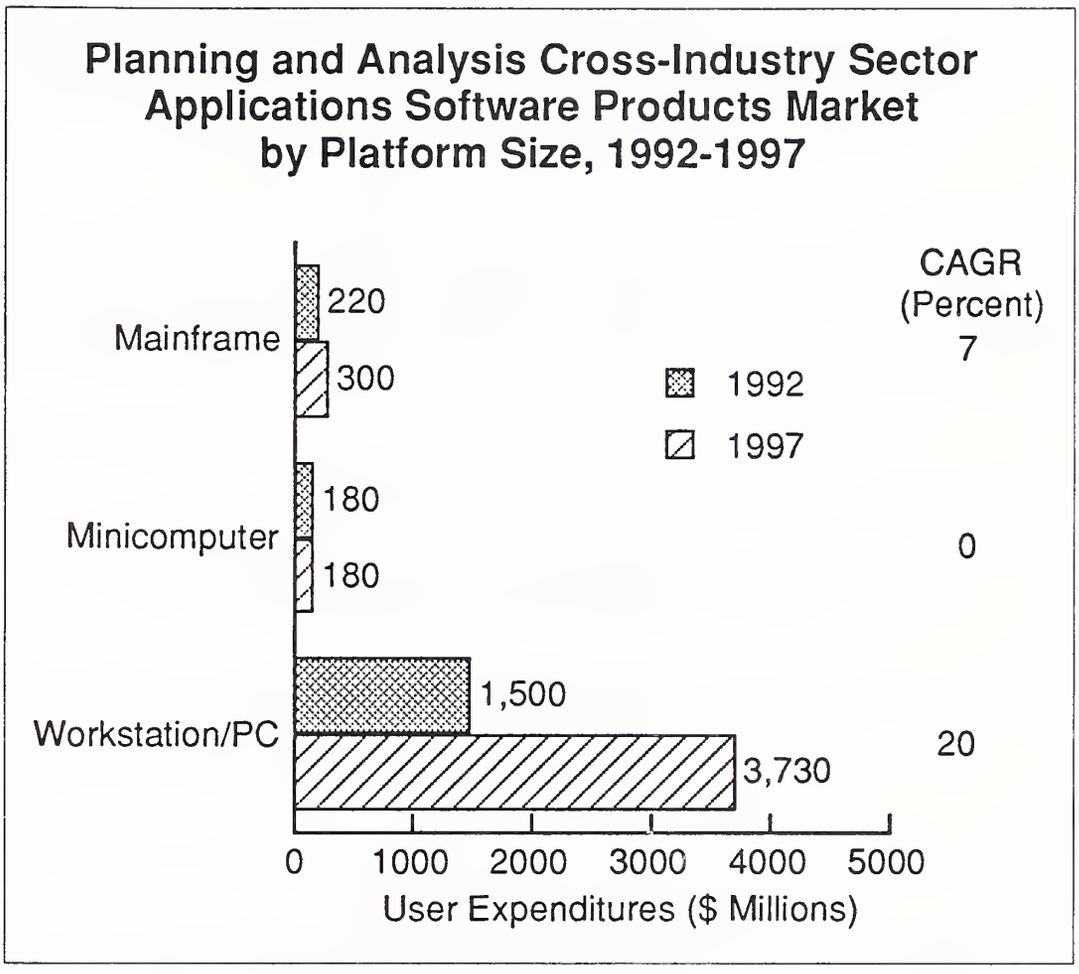


Exhibit VIII-3 reflects the following:

Mainframe—Growth of expenditures for mainframe-based applications software products is due almost exclusively to price increases on previously existing licenses.

- Mainframe-based spreadsheets do not appear to be actively marketed by any vendors.
- Project management products traditionally resided on large host computers and were used almost exclusively in industries such as aerospace and construction.
- The bulk of financial modeling applications software products are still mainframe-based; and portions of EISs reside on mainframes.

Minicomputer—Expenditures on minicomputer-based planning and analysis products are primarily for ongoing licensing. As is true with vendors who originally had mainframe-based planning and analysis applications software products, vendors with minicomputer-based products have made their planning and analysis products available on desktop computers.

Workstations/PC—As with all applications software products, the greatest growth will be at the workstation and, in particular, personal computer level. Planning and analysis as a function has a very broad and increasing appeal.

2. Turnkey Systems

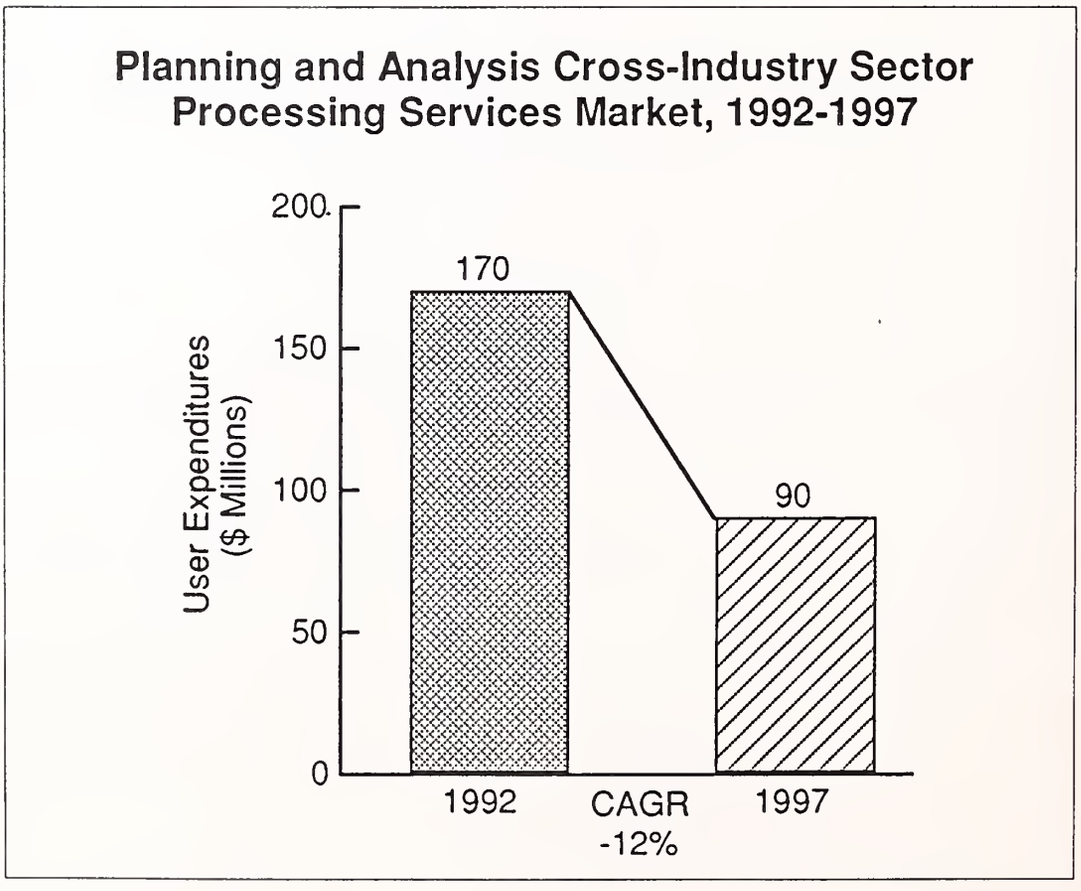
Turnkey vendors and VARs do not sell planning and analysis solutions that are cross-industry. Thus, INPUT has dropped this delivery mode forecast from consideration for this cross-industry sector.

- If and when the VAR channel is used, the VARs are likely to be industry-specific rather than cross-industry.
- Hardware platforms are being shipped with spreadsheets pre-installed through marketing alliances, but these do not constitute turnkey systems.
- The only growing turnkey systems markets that are cross-industry are computer-based training within the education and training cross-industry sector, CAD within the engineering and scientific cross-industry sector, and desktop publishing within the sales and marketing cross-industry sector.

3. Processing Services

Exhibit VIII-4 presents INPUT's processing services forecast.

EXHIBIT VIII-4



Planning and analysis tools are available on a timesharing basis from companies such as SAS and Comshare in case customers want them, but they are seldom used. Planning and analysis processing services are rapidly declining due to the following factors:

- Applications that lend themselves to a processing services solution are those that are constantly changing. For example, payroll processing services must constantly incorporate new federal regulations and tax changes. The maintenance cost and headache to the end user prohibit an in-house solution. Except for EISs, planning and analysis products do not generally need to incorporate external changes on an ongoing basis.

- Processing services are purchased for applications that are done on a regular basis but not constantly. For example, tax processing services are employed quarterly or yearly. Planning and analysis tools, on the other hand, are used daily as personal or group productivity tools.

- Much planning and analysis can now be and is addressed at the PC level. Thus there is a limited need for the sophisticated planning and analysis tools that remote processing services implies.

- Planning and analysis tools must access in-house corporate data bases, which brings up security concerns.

- Various planning and analysis tools are integrated with one another, which inhibits consideration as a processing or timesharing service.

C
User Department Directions

Interviews were conducted with:

- An assistant City Manager
- A member of the Technology Staff of a large government contractor
- The Office Technology Manager of a pharmaceuticals firm

INPUT believes the first two case studies accurately reflect the potentially conflicting needs for ease of use and sophisticated features. Vendors who want their products to have broad appeal may have to segment their markets into sophisticated users and users with relatively simple needs, and emphasize different features and functions for each segment.

The third case study is a company that has implemented an EIS pilot project and has concerns about its lack of robustness.

City government (spreadsheets)—The administrative office of this city uses spreadsheets for budgeting, and sorting and analyzing lists. Although it appreciates the ability to make its spreadsheets look as though they were professionally published through the use of built-in fonts and graphics, it does not incorporate its spreadsheets into any documents themselves because it is too complicated a maneuver.

- A future application will be to use a spreadsheet as a large data base of information (such as inventories, part numbers, repair dates) and do list processing on a larger scale than is done today. Information will be downloaded from the host computer and processed at the desktop within a spreadsheet.

This organization's expressed needs are:

- More ease of use features rather than more sophisticated functions
- A larger spreadsheet that can take on the functions of a larger DBMS

Project management department within a large Department of Energy contractor (project management)—Complex projects for this group require combining many different subgroup tasks into one master project schedule. When the original purchase decision was made five years ago, the only kind of project management product that satisfied this need was mainframe based.

- Now, however, this department—consisting of 20 project planners—uses multiple Windows-based products networked together. Through use of multiple Windows-based spreadsheets they have been able to cut down reporting time from three weeks from the end of the reporting period to a couple of days.

- Their goal is to be able to track and report actual cost of work performed versus budgeted cost of work performed at a per-task level.

  - Part of this effort will involve the ability, through Windows, to update information in one place and have that information automatically updated any place else it resides.

  - In the future this department will download spending plans, budgets and forecasts from the mainframe and integrate this information into project schedules.

  - They will continue to optimize links between spreadsheets and project management products.

- This department wants more sophisticated project management capabilities, including:

- Better time-scaled network diagrams that show events as they relate to each other and as they relate to time

- Integrated drawing packages, flow chart packages, word processing, spreadsheets and project management software products

Office Technology Department, pharmaceuticals firm—This company has an EIS pilot project under way at the senior management level. If it continues to be as successful as initial indications are showing, it will be broadened to include general access to a variety of information sources for a variety of people.

The office technology manager, nonetheless, feels that the EIS product being piloted isn't robust enough for long-term needs, and other products as well are not efficient enough for a large multiserver environment. An EIS must be able to accept data from multiple sources—whether the information is from a spreadsheet, a data base, or a document—format it, and provide a common way of displaying it.

This company will continue to conduct EIS pilots, evaluate products and develop its requirements over the next several years.

D

Trends/Technology Ratings of Importance

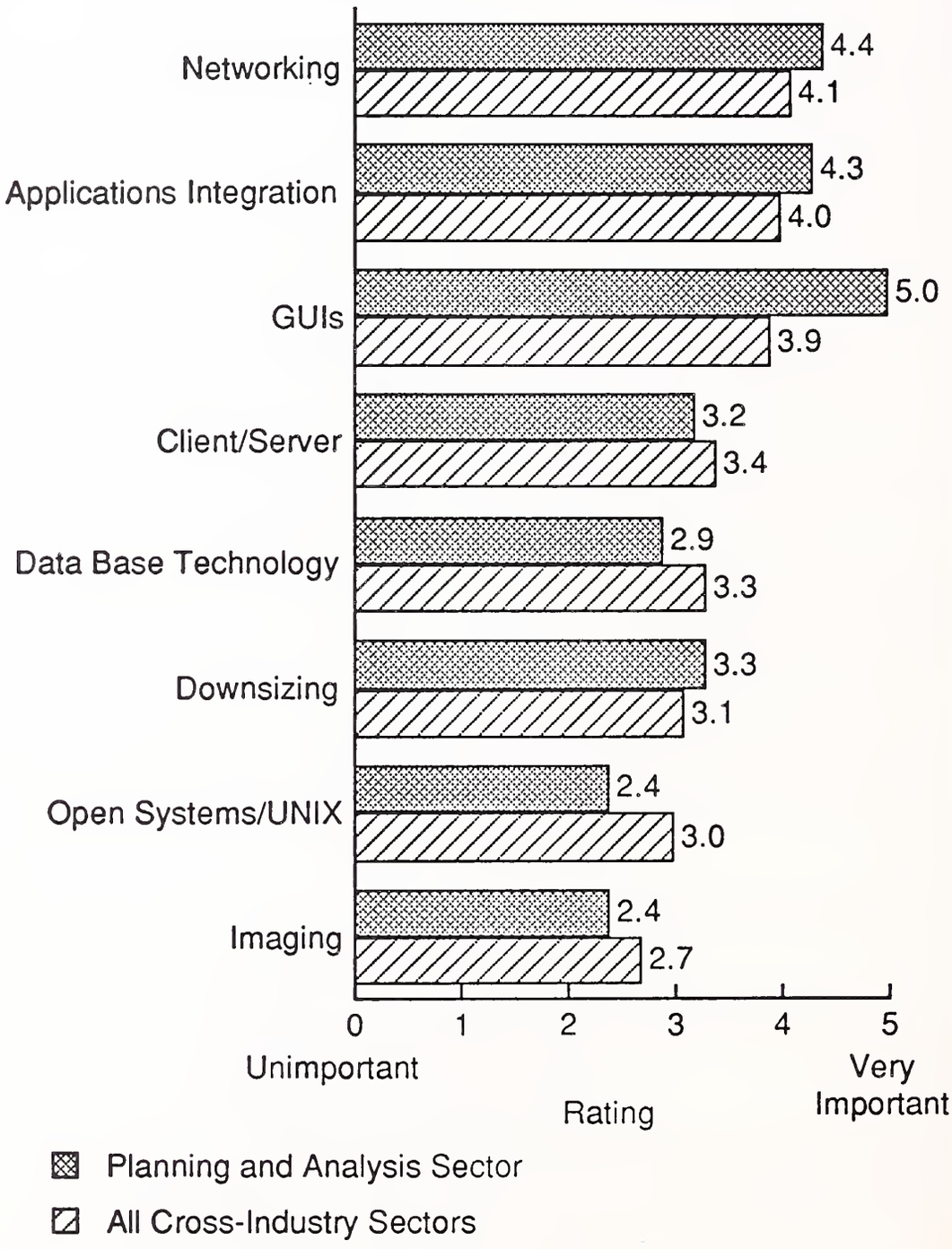
Respondents within all cross-industry sectors, users and vendors, were asked to rate various trends and technologies on a scale of one to five, where one is unimportant or having little impact and five is very important or of significant impact.

The technologies listed in Exhibit VIII-5 were selected because INPUT believes they will receive the most attention from users and vendors over the next five years. In addition, INPUT believes their impacts on both users and vendors will be profound. Users who deploy these technologies will undergo re-engineering of their business functions. And vendors will need to change not only their products, but also the ways in which they price, sell and support them.

Exhibit VIII-5 shows the composite ratings of the planning and analysis cross-industry sector compared to the ratings of all cross-industry sectors combined.

EXHIBIT VIII-5

Planning and Analysis Cross-Industry Sector Respondents' Indication of Relative Importance of Trends and Technologies



As is true with all cross-industry sectors combined, networking and applications integration are rated high in terms of relative importance. However, the planning and analysis sector is unique in that it rates GUIs higher than all cross-industry sectors combined, and in fact gives it the highest rating possible. INPUT believes this rating reflects the preponderance of spreadsheet users and vendors in this category and that spreadsheets are among the first applications to be ported to GUIs.

As would be expected, the planning and analysis sector gives open systems/UNIX a lower rating than all cross-industry sectors combined. Planning and analysis tools are used predominantly by the general business community, which does not endorse UNIX.

Respondents for all cross-industry sectors were also asked to rate the technologies and trends in terms of their importance five years from now. All technologies for all cross-industry sectors increase in importance over the five-year period.

The planning and analysis sector, however, distinguishes itself in that GUIs remain the top-ranked technology over the five-year period, even more important than networking, applications integration and client/server architecture.

As is true with all cross-industry sectors, within the planning and analysis sector vendor ratings are generally slightly higher than user ratings. The largest discrepancy is in downsizing, where vendors' ratings are 1.3 times greater than users' ratings.

Interestingly, users' ratings of data base technology are 1.5 times higher than vendors' ratings. INPUT believes this indicates users' concern about data access and ease of data access, whereas vendors are targeting their efforts on applications integration, including integration of their products with multiple vendors' data bases.

E

Vendors and Competitive Environment

1. Vendor Characteristics and Trends

Best of breed versus product suites—Microsoft is pursuing a best-of-breed spreadsheet strategy that says sales are won by having the best product. Lotus, on the other hand, is more strongly emphasizing a set of products that work well together. INPUT believes that both strategies are valid and are directed to different types of customers.

Discounted pricing and the upgrade market—In order to gain market share, vendors offer potential customers that have equity in another spreadsheet a greatly reduced price if they switch vendors. In the highly competitive spreadsheet market, mass merchandising and advertising strategies, as well as aggressive pricing, are becoming increasingly important. INPUT believes it will continue to be difficult for vendors who have been traditionally mainframe-based to make this transition.

Data accessibility and integration—Vendors are approaching data accessibility and integration in the following ways:

- Migrating products to Windows
- Continuing and increasingly higher levels of integration with DBMSs
- Merging of planning and analysis functions
  - The more sophisticated spreadsheets, such as CA-Compete! have taken on financial modeling features and functions. For example, Computer Associates has merged the functionalities of Teleplan and SuperProject for the VAX. Also, the current VAX version of SuperProject includes graphical extensions of Teleplan.
  - -Spreadsheets have become front ends to DBMSs and are taking on some of the qualities of a low-end EIS.
- Tighter integration of planning and analysis applications with other application areas, e.g., spreadsheets, with word processing and graphics
- Incorporating more applications software products into an EIS shell

Consolidation—Consolidation is expected to continue in this highly fragmented market. Notable acquisitions are:

- In January 1991, Computer Associates acquired substantially all the assets of ManageWare and its principal product, Compete!. Marketed now as CA-Compete!, the product is a multidimensional financial modeling tool for the Windows environment.
- In March 1991, Lotus acquired cc:Mail, Inc. for $25 million plus contingent payments based on future performance. cc:Mail is a LAN-based electronic mail product. cc:Mail now operates as a division of Lotus.
- In April 1991, Comshare, the EIS leader, acquired Execucom Systems, which not only has a solid EIS foothold but also has a financial modeling product offering.

- Borland has acquired Ashton-Tate in a pooling-of-interests transaction. Ashton-Tate provides microcomputer software products for DBMS, word processing, business graphics, decision support, and spreadsheet applications.

Rather than turnkey systems vendors and VARs being a major force for this cross-industry sector, independent applications software products vendors are likely to negotiate alliances with equipment vendors to pre-install a set of software—including basics such as operating system, word processing and a spreadsheet package—before the computer is shipped to the customer. For example, as a promotional strategy, Digital Equipment includes Lotus 1-2-3 with the sale of each RISC platform it ships.

2. Leading and Emerging Vendors

Between 200 and 300 vendors supply financial modeling, EIS, spreadsheet and project planning applications software products. Leading vendors of each of these product types are listed in Exhibits VIII-6 and VIII-7.

EXHIBIT VIII-6

Planning and Analysis Cross-Industry Sector Leading EIS Vendors

- Comshare
- Easel
- Holistic Systems
- Information Resources
- IBM
- Pilot Executive Software
- SAS Institute

Rather than full-fledged EIS systems, a number of companies, including Easel Corp. and SAS Institute, have tools with which the user can create his/her own EIS. Other larger vendors may enter this market as well.

EXHIBIT VIII-7

Planning and Analysis Cross-Industry Sector Leading and Emerging Applications Software Products Vendors

Vendor	Modeling/ Planning	Spreadsheets	Project Management
Computer Associates	x	x	x
Borland	x		x
IBM			x
Information Resources	x		
Lotus		x	
Lucas Management Systems			x
Microsoft		x	x
Multitech			x
Paperback Software	x		
Primavera		x	
Project Software Development			x
SAS Institute		x	x
Scitor			x
Software Publishing		x	x
Symantec		x	x
William H. Roetzheim & Assoc.		x	
WordPerfect		x	

3. Vendor Profiles

The following profiles reflect vendor characteristics and trends discussed in Section 2.

a. Computer Associates International, Inc.

During this last year, Computer Associates (CAI) has made a strong push into Windows and now boasts having the largest number of Windows-based products—more than anyone else, even Microsoft. CAI has been slow in making Windows-based products available and is making up for lost time.

The company is also building a Windows-oriented extension to CA90s, which will broaden the scope of CA90s by including a broader range of services for the desktop.

Its planning and analysis sector products include:

- CA SuperCalc, a mainframe, midrange and microcomputer spreadsheet incorporating graphics, data access and PC upload and translation, and centralized consolidation. CA has announced CA SuperCalc for Windows, which will be available in early 1993. CA-SuperCalc is designed for users familiar with spreadsheet-style consolidation and analysis and is considered a high-end product.

- CA Compete!, an IBM PC and compatible multidimensional spreadsheet and financial modeling product, is now available in a Windows version. This product came from a 1991 acquisition of ManageWare Inc.

- CA STRATAGEM, a fourth-generation language that combines object-oriented data management and programming techniques with data analysis. CA STRATAGEM is billed as a decision support tool kit for extending applications such as budgeting, sales analysis and cost analysis rather than as a financial planning system.

CAI also has project management software, SuperProject and CA-UNIPACK/PEP, a series of four integrated software packages for application development management for project estimation, planning, and expert development advice. These products are high-end products used primarily in resource management applications. SuperProject for Windows was recently announced.

One of its major challenges is continuing to change its emphasis from the mainframe toward desktop applications software products. A related challenge is making the products easy to use.

b. Comshare, Inc.

Founded in 1966, Comshare was one of the first companies to offer generalized processing services. Comshare will continue to phase out its time-sharing services, however, as it focuses attention on serving the decision support and EIS markets.

In March 1991, Comshare acquired Execucom Systems Corp. for approximately $12 million. Execucom was a wholly owned subsidiary of MPSI Systems Inc. and an early leader in bringing artificial intelligence, expert systems and optimization modeling to decision support.

Comshare has traditionally developed its products for use on IBM and Digital computers. Its products now run on the desktop as well, including DOS, OS/2 and Macintosh. Execucom strengthens Comshare's position on these platforms and extends its reach into various UNIX platforms, including DEC Ultrix, Hewlett-Packard, Unisys, Sequent, Sun, and IBM's RS/6000.

Comshare's products include:

- System W and its personal computer counterpart, One-Up, for management accounting applications
- Commander EIS for executive reporting
- Commander FDC for financial reporting
- IFPS, a former Execucom product, and IFPS Plus for unstructured financial decision support
- Executive Edge, an EIS and a former Execucom product
- Paradigm, a workstation-based software product combining spreadsheets, financial modeling languages and artificial intelligence, also a former Execucom product

In 1990, Comshare introduced News Navigator, an on-line access system to public information data bases. Comshare is also venturing into the application-/user-specific EIS area. ARTHUR, for example, integrates EIS technology with merchandise planning and performance tracking systems for the retail sector.

Commander EIS was the second EIS product to reach the market. It has the largest user base (about 750 sites) and now, with the Execucom acquisition, controls about 60% of the market.

Comshare's revenues reached $124.2 million for the fiscal year ending June 1991; 53% of revenue comes from non-U.S. sales.

c. Lotus Development Corp.

This $829 million software company continues to dominate the spreadsheet market with about a 50% share. Its market share, however, continues to be eroded by its formidable competitors Microsoft and Borland.

Lotus' initial product, Lotus l-2-3, was shipped in January 1983. Seventy percent of Lotus' revenues still come from this product. INPUT believes that this is a precarious position for Lotus, given that the spreadsheet market is fiercely competitive.

The company is taking the following steps to lessen its dependence on 1-2-3:

- Lotus Notes has gained widespread recognition as an innovative work group package that rivals more sophisticated executive information systems such as those offered by Pilot and Comshare. It is an initial offering and additional products based around the Notes concept of work group solutions will follow from Lotus as well as its competitors.

- Lotus has acquired cc:Mail, which is now the leading electronic mail package.

- It continues to work with Novell and has recently signed an agreement whereby Novell will sell Notes through its VAR channel.

Other recent developments for this company are:

- The company is placing more emphasis on suite packaging; Lotus Suite includes cc:Mail, Ami Pro, Freelance, and 1-2-3 for $1,700, whereas each separately priced product would be in the $800 undiscounted retail range. Although the company may be able to gain additional incremental revenue, suite packaging is also a competitive response to similar moves by Microsoft and other major competitors.

- Lotus claims to be the only provider of a spreadsheet that operates on the three major desktop platforms—DOS, Windows and Macintosh.

- Lotus is making a strong move toward Windows and has introduced Works for Windows, a suite of products including 1-2-3, cc:Mail, Ami Pro and Freelance.

- The company has announced plans to move the Windows desktop suite to Microsoft's Windows for Pen Computing.

- Lotus continues to improve Lotus 1-2-3's performance (speed) and simplify overall spreadsheet building and creation.

- As part of making Lotus 1-2-3 easier to use, Lotus will provide a multimedia training product for Lotus 1-2-3.

- The company is expanding its drive into the retail channel as well as increasing its direct mail sales.

d. Microsoft Corporation

As developer of MS-DOS and Windows, Microsoft continues to have a tremendous impact on the entire PC applications software products industry. Microsoft has an advantage in that its applications software products development activities work closely with its systems software groups.

Microsoft will continue to heavily impact the applications software products industry as well as to participate in it. It has dropped core development of OS/2 3.0 in favor of a Windows-only strategy for PC and RISC workstations, which will be called Windows NT (New Technology), and will be available by the end of 1992.

A low-end version of Windows will run on DOS, and Windows NT will be geared to more powerful computers and workstations.

Another of Microsoft's key strengths is a broad array of applications software offerings, including Microsoft Excel (spreadsheet), Microsoft Word, Microsoft PowerPoint (presentation graphics), and Microsoft Project. Excel is Lotus 1-2-3's most formidable competitor. All operate under Windows as well as DOS and several of them also operate under Apple's Macintosh operating system and its new System 7.0.

In addition to their availability as separately packaged products, Word, Excel and PowerPoint are being distributed together as The Microsoft Office for Windows.

Microsoft is now the largest worldwide independent software company, with fiscal 1991 revenues of $1.8 billion (up 56% over 1990).

e. Pilot Executive Software

Pilot Executive Software was founded in 1984 and was the first company to offer commercial EIS technology.

Command Center, introduced in 1985, was the first true EIS to reach the market. As the ground breaker, it created its own relational data base and PC interface, and forged a market concept based on a PC/host environment. Command Center has since then expanded from its traditional architecture to include a LAN design.

Pilot is broadening the definition of its product/market. LightShip and TimeBase will appeal to a broader market than Command Center originally was targeted for.

- LightShip, introduced in September 1990, is Pilot's PC- and LAN-based EIS environment that operates on Windows. This product is sold through resellers and VARs. In addition, Pilot has an alliance with Information Builders to repackage its LightShip product as the FOCUS EIS.

- TimeBase, which will begin shipping this summer, is a data server that will manage and manipulate information within a multidimensional structure. For example, it will rationalize quarterly budget information and daily sales and be able to look at two sets of data for equivalent periods.

In January 1991, Pilot acquired the Thorn EMI Computer Software division that owned the FCS (Financial Control System) product line and had Pilot's distribution in Europe. FCS is an integrated financial planning and decision support system that supports spreadsheet, modeling, analysis, consolidation, and data management functions. It operates on all major mainframe and minicomputer systems and on PCs. In addition to the outright ownership of the FCS product line, Pilot also acquired a new workstation-based Decision Support System for Windows 3.0.

Pilot's goal is for its EIS product and the rest of its products to "snap together" and to be able to snap into or replace parts of other products. Pilot's revenues for 1991 were approximately $50 million.

f. SAS Institute, Inc.

SAS is sixteen years old, with 1991 revenues of $295 million. SAS System, the Institute's flagship product, is an integrated applications software system for data access, management, analysis and presentation. SAS System, originally considered a statistical product, today has many of the features of a full planning and analysis tool.

SAS is a strong example of a specialist mainframe-based applications software company that has diversified in two key ways:

- Into multiple applications within a more broadly defined specialty

- Into multiple platforms, including OS/2

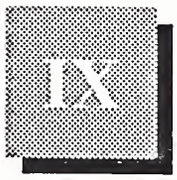
In recent years SAS has moved out of the statistical realm into EIS, project management, quality improvement, experimental design, and clinical and pharmaceutical software for data analysis. SAS will continue to look for opportunities to add new applications software products that are a natural fit with its existing suite of SAS System products, as it pursues a strategy of "enterprise-wide information delivery."

The company will continue to enhance products for better data, applications and hardware integration. It will continue to embellish ease of use through versatility of interfaces.

Recent additions are SAS/Calc and SAS/EIS. In the future, SAS may branch out even further. For example, a desktop publishing application is now in the development stage.

SAS is pursuing a strategy of internal development rather than acquisition, and plows 48% of its revenues back into R&D. In 1990 it completed a six-year, $100-million effort to completely rewrite all products in C language so that they can run on multiple platforms. Now being multivendor, multiplatform is a key aspect of SAS' strategy.

Because of the variety of its products and markets, SAS has varying lists of direct competitors. Because of its statistics software products, SAS is also represented in the engineering and scientific cross-industry sector.



Sales and Marketing

A
Definitions

Marketing and sales information services involve the following:

- List processing, form letters, contact management, tracking and forwarding leads, ranking prospects, prompting scripts for telemarketing
- Sales analysis—monthly history and sales summary files; details of each invoice; tracking of sales month-to-date or year-to-date; and sales by branch, sales territory, customer and product
- Marketing management—reports tailored to management requirements. These include marketing, sales and product strategies; designing and managing sales territories; and analyzing marketing and sales programs by market, territory, product, customer type, price, and channel. Sales and marketing management software is often closely integrated with financial planning and decision support functions.
- Demographic market planning models for selecting geographic location of stores, outlets, and companies. The basic model cuts across multiple industries but requires customization for industries such as petroleum, banking, government services, restaurants, general merchandise, and supermarkets.

Unlike some of the other cross-industry sectors—such as human resources—from a functional standpoint all marketing and sales systems are not alike. Except for the basic functions of storing data for mailings and list processing, additional functions and features vary widely. This diversity reflects the relative immaturity of marketing and sales application solutions. Marketing and sales application solutions are typically closely integrated with accounting, inventory control, purchasing and order entry software. Products range from standalone personal productivity tools to LAN-based multiuser systems to host-based systems.

The majority of marketing and sales software is industry-specific and is therefore not considered in user expenditure forecasts for this cross-industry sector. Vertical industry sectors with emphasis on the selling and distribution functions—such as wholesale distribution, retail distribution and manufacturing industries—are where most of the marketing and sales software resides.

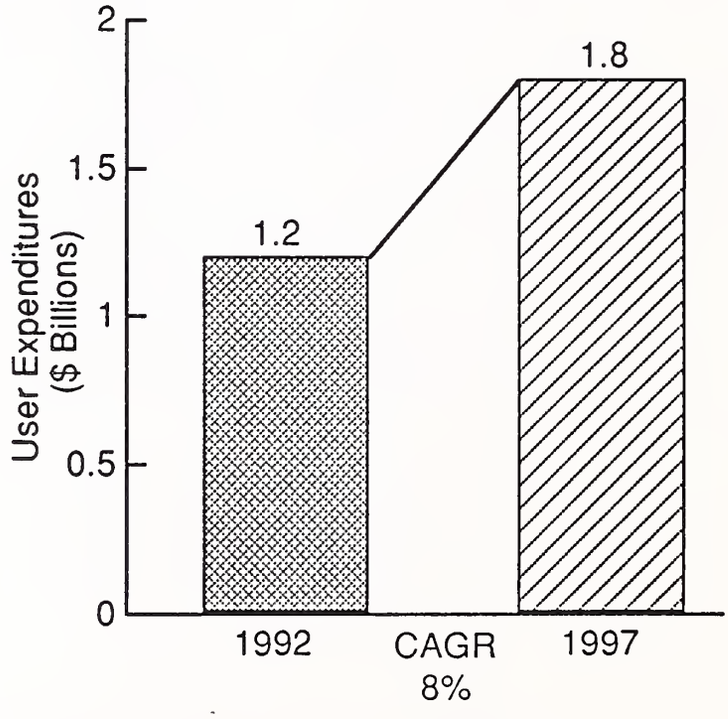
B

Information Services Markets

Exhibit IX-1 presents INPUT's forecast for the sales and marketing cross-industry sector expenditures on information services.

EXHIBIT IX-1

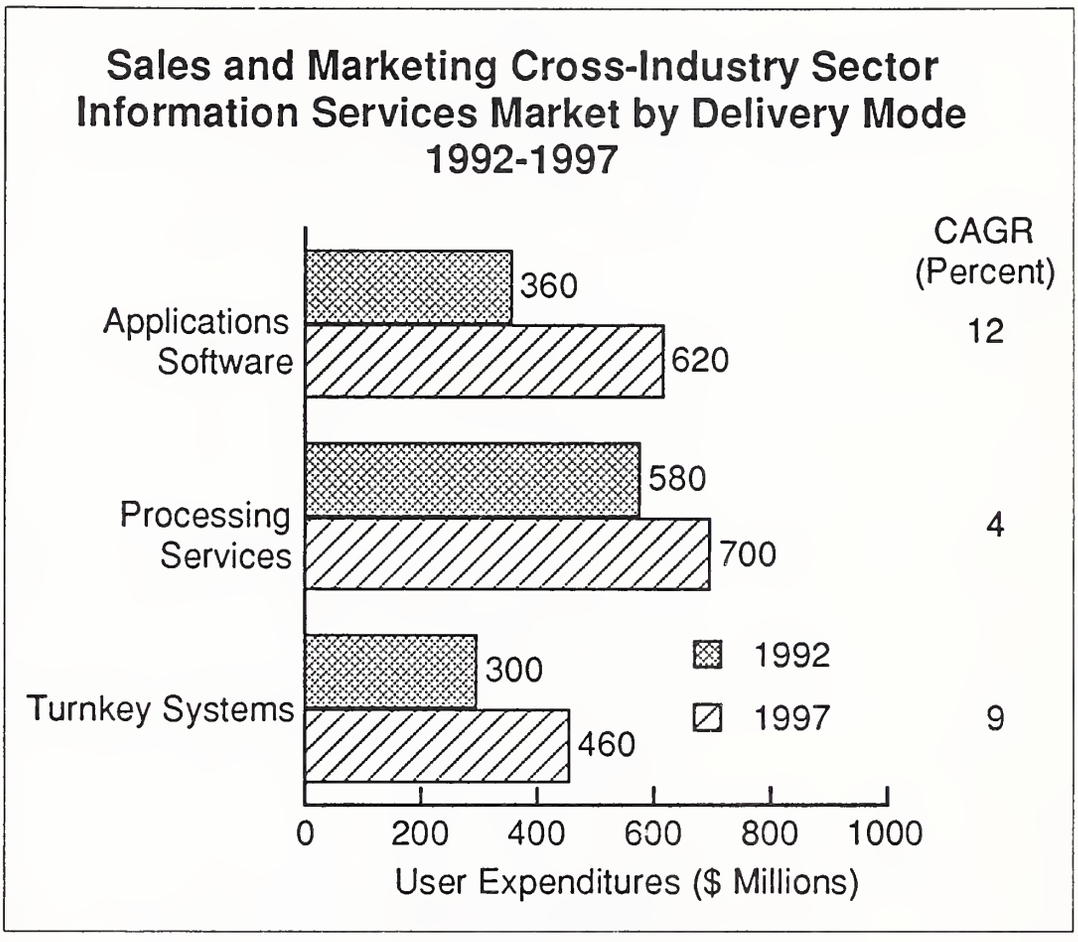
Sales and Marketing Cross-Industry Sector Information Services Market, 1992-1997



An increasingly competitive environment in many industries enhances the appeal of sales and marketing information services. It increases the appeal of products that not only free up more time for sales reps to sell, but also improve customer service and help to target markets.

User expenditures on sales and marketing applications software products and turnkey systems are forecast to grow at the industry averages for those delivery modes; expenditures on transaction processing services, however, are forecast to grow at half the rate of the industry average (see Exhibit IX-2).

EXHIBIT IX-2



1. Applications Software Products

Growth promoters for sales and marketing cross-industry sector applications software products are:

- Growing concern about sales force productivity and product-by-product profitability encourages the use of applications software products that can track actual sales to forecasted sales in a myriad of ways.
- Wide-scale availability of notebook computers, and now pen-based computers, encourages sales force automation. These computers can provide an easy method for each sales rep to keep track of calls and daily activities; it also provides a means of accessing and updating corporate data that saves a great deal of time and eliminates paper use.
- Use of graphical user interfaces (GUIs) makes training on multiple applications software products, once thought to be time consuming, relatively easy.

Unlike some of the other product segments, such as spreadsheets (within the planning and analysis sector), the sales and marketing sector is far from saturated. In fact, based on expenditure levels, INPUT believes a large potential market still exists. One of the growth inhibitors in the past—the large percentage of their time that sales reps spend out of the office and therefore not having access to a computer—is melting away with the continuing adoption of portables.

Additionally, unlike some of the other product segments such as project management, INPUT does not believe that much so-called missionary selling is required. The benefits of information-based selling tools and automated sales force tools are obvious.

INPUT does not believe that changing pricing structures will have an adverse effect on this cross-industry sector. Not that much sales and marketing software resides on the mainframe to begin with; so its offloading to smaller platforms won't make much difference. Rather, the availability of lower priced sales and marketing software that runs on portable computers will have a broad appeal that will more than make up for any effects downsizing might have on overall prices and therefore overall expenditures.

What will continue to be particularly appealing are PC-based or portable PC-based tools that provide access to multiple data bases and that provide easy ways to analyze and present the data. In this respect, sales and marketing applications software products may be competing with customized planning and analysis software products and/or integrated office systems.

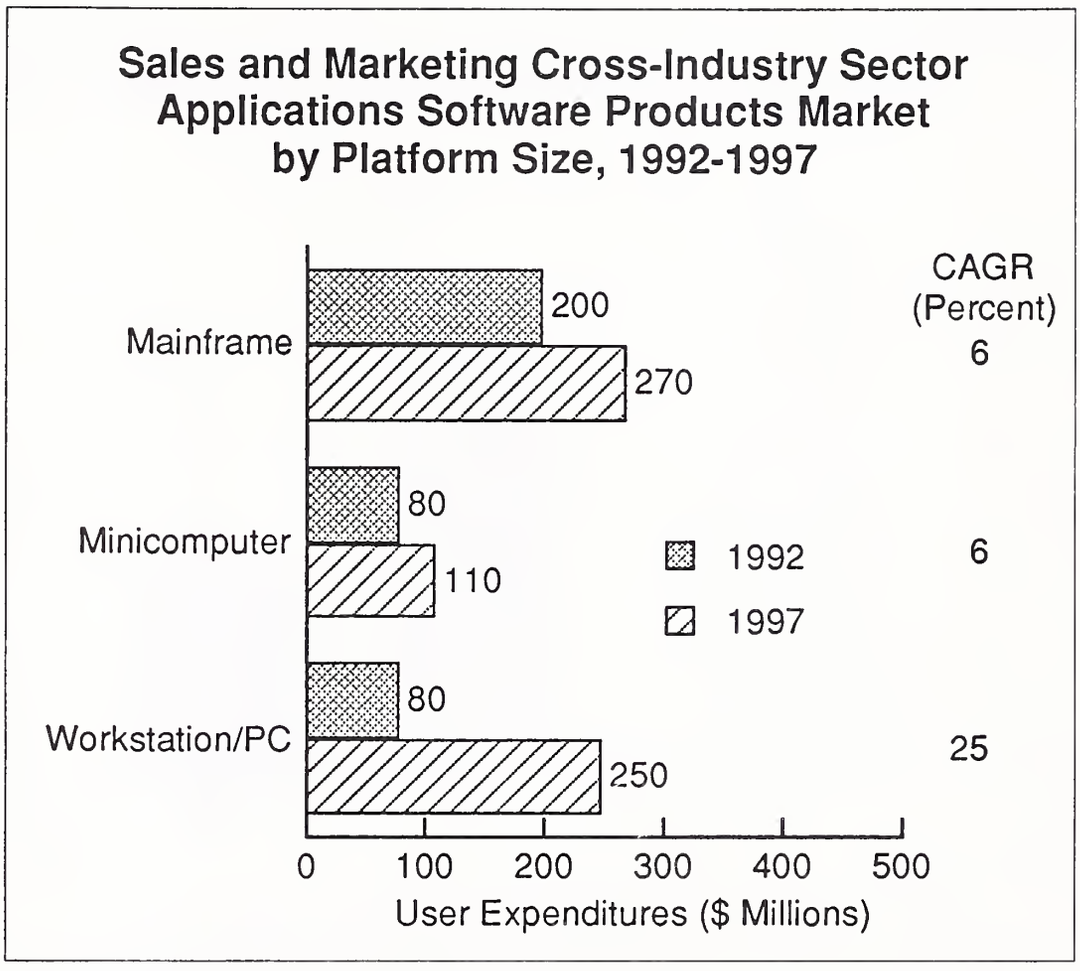
In addition to potential overlap with other cross-industry sectors, other potential growth inhibitors are:

- Most marketing and sales applications are sold to specific industries—especially retail and wholesale consumer goods industries.

- Marketing and sales software will be increasingly integrated with industry-specific packages and/or other more dominant cross-industry packages such as accounting, integrated office systems and executive information systems.

INPUT's estimate of the 1992-1997 applications software products market by hardware platform for the sales and marketing cross-industry sector is presented in Exhibit IX-3.

EXHIBIT IX-3



Mainframe and Minicomputer—The majority of marketing and sales software—applications that consolidate and analyze data collected from sales—currently resides on mainframes and minicomputers.

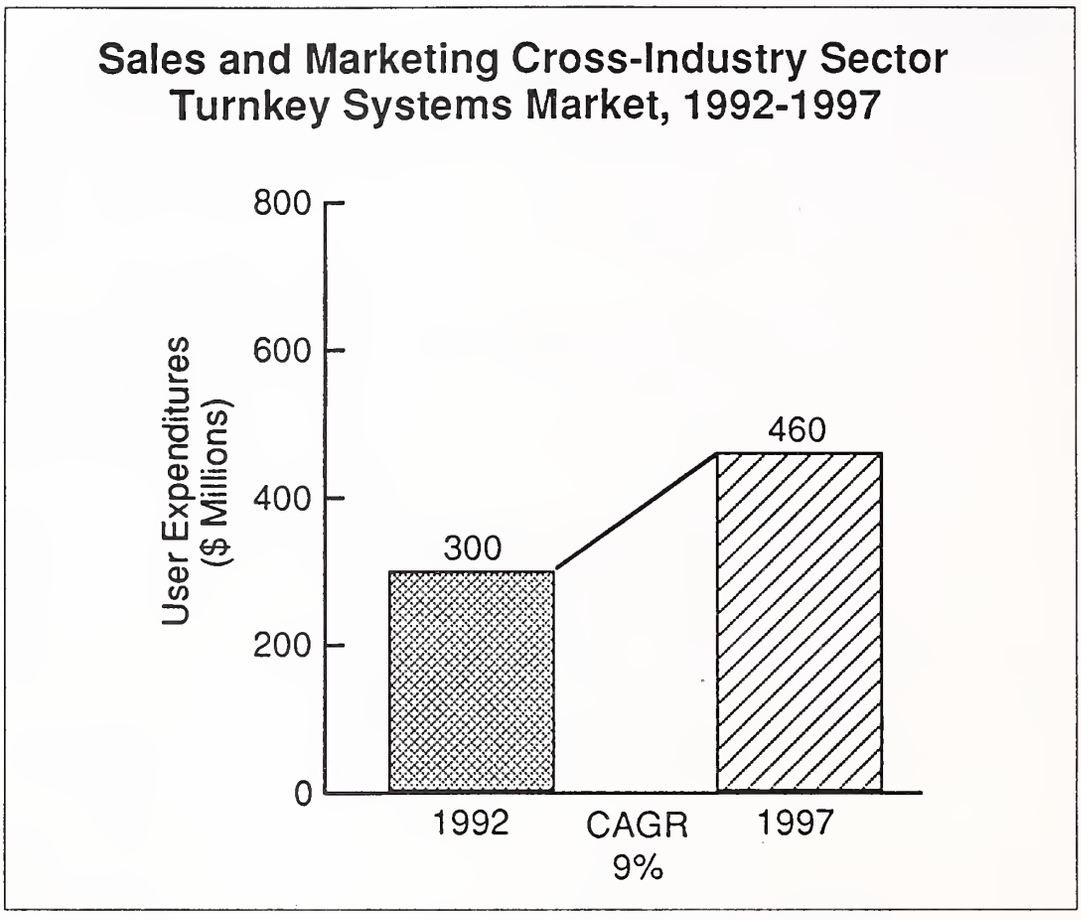
Workstation/PC—Growth of low-end marketing and sales applications software products is tied to the market growth of laptops and, recently, pen-based computers. Growth is expected to continue to be strong for these products.

2. Turnkey Systems

Turnkey systems for the sales and marketing cross-industry sector are forecast to grow at the rate for turnkey systems as a whole (Exhibit IX-4).

Although a substantial number of VARs provide integrated marketing and sales systems to specific industries such as wholesale and retail distribution, far fewer provide cross-industry integrated marketing and sales systems. These VARs must be able to afford the inventory carrying costs of multiple hardware platforms and they must also be well versed in customization and integration.

EXHIBIT IX-4



INPUT does not believe, based on discussions with vendors, that applications software products vendors are selling increasing amounts of sales and marketing products through the VAR channel. Thus these turnkey systems vendors and VARs are likely to have developed their own software that covers a specific niche within sales and marketing, based on their own areas of expertise.

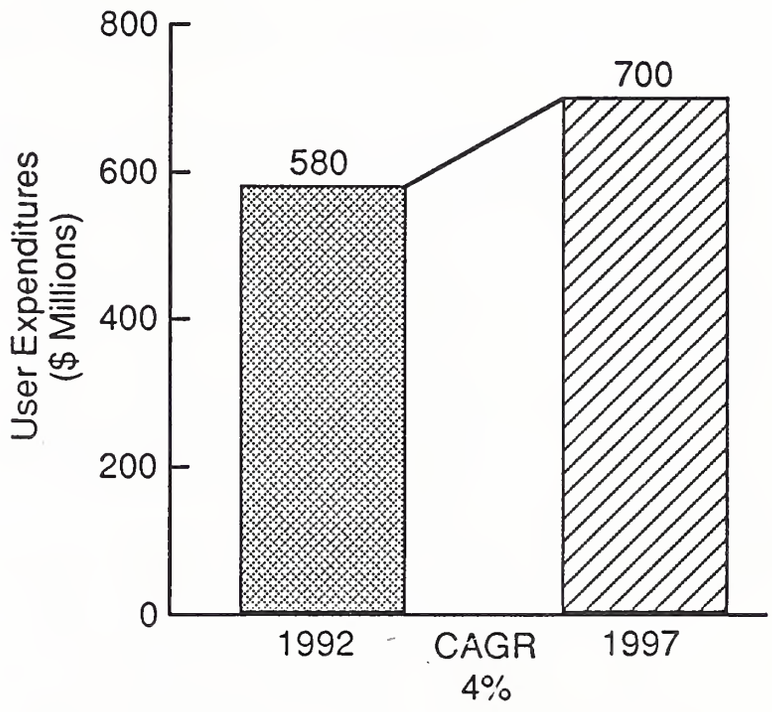
3. Processing Services

Exhibit IX-5 presents INPUT's sales and marketing cross-industry processing services forecast.

Sales and marketing is the second largest cross-industry sector for processing services; human resources (payroll processing) is first. 1992 expenditures on other cross-industry processing services are greater than for either applications software products or turnkey systems. By 1997, however, both applications software products and turnkey systems expenditures will have surpassed processing services.

EXHIBIT IX-5

Sales and Marketing Cross-Industry Sector Processing Services Market, 1992-1997



User expenditures on sales and marketing cross-industry processing services are predominantly for list processing and customer demographic data. Many small regional list processing organizations compete in this delivery mode. Marketing and sales systems have only recently begun to capture the interest of corporate America as critical enough to be brought in-house. The fact that marketing and sales services software is enhanced if it is closely integrated with other aspects of a company's business is a compelling reason to take on the task of internal installation and integration.

Other growth inhibitors are:

- As vendors provide additional applications software products that are easy to integrate and customize, less will be spent on outside processing services.
- Many large companies view customer lists as proprietary and are reluctant to give them to an outside firm because of concerns about security. As workstation-based solutions become more plentiful, more firms will eventually opt to bring this function in-house.
- Lists and data bases are becoming more prolific and more accessible both within companies and through external purchases.

C
User Department Directions

The responses of two sales organizations are summarized and analyzed below.

Manager of Sales Force Systems, pharmaceuticals firm—Currently all reports are provided daily, weekly and monthly in the form of paper documents to regional sales managers. Three primary reports are:

- Call data—which doctors are called upon by each sales rep and the results of each call
- Market share information—data is captured by territory, zip code, district and region. The data is analyzed and compared against data purchased from outside vendors to ascertain market share.
- Inventory of samples—The Pharmaceutical Marketing Drug Act of 1987 requires that all drug samples' location and status are tracked. About 9,000 forms are processed per week. For every sample that is left, a doctor's signature is required. These must be maintained and tracked.

This company has made an ongoing effort to take paper, required in the above reporting processes as well as other reports, out of the system and to provide information to the sales force electronically. The firm has a sample tracking pilot project under way with pen computers. The applications software was developed internally, as nothing on the market met the company's needs.

In the future, this firm will provide the sales force with PC-based access to data from multiple corporate data bases. Budgeting information and product line information will need to be cross-referenced with marketing data.

Downsizing (taking applications software and/or data off of the central computer and distributing it to smaller computers) is not expected to have an impact on sales and marketing applications. Within five years, applications integration, data base technology and client/server applications will have the greatest impact.

Marketing Manager, telecommunications firm—This firm is developing sales and marketing application systems in three areas:

- The company recently expanded its marketing reach to include countries outside the U.S. and has modified its products for new markets. Because there was little applications software on the market that supported international sales activities—international comparison of sales on a per-product and per-country basis—this company is developing its own software.

- The company is also developing a system that will enable it to compare actual sales results to leads to see which leads are most productive. This system will track and compare sales results by how many sales are generated from distributor efforts, direct sales efforts to existing customers, cold-call selling, and leads from promotional activities. Currently the actual sales results data resides on an HP3000 and the inquiries or qualified leads data base resides on a DEC minicomputer. The two data bases need to be integrated or interlinked.

- The third project is capturing information on customer demographics for purposes of building customer profiles for targeted marketing efforts. The company is about to introduce a new type of product and wants to identify vertical markets and clarify ad campaigns.

In both of these examples, data base access and analysis are critical features. It would stand to reason that graphics capabilities are also important for sales and marketing solutions. In both cases, applications are being developed internally because packaged products either aren't available or are inadequate.

These two examples suggest that there's a large potential market for sales and marketing applications software products. Perhaps vendors are torn between providing a product that is specific enough to be useful and generic enough have broad market appeal. Customization tools will play an increasingly important role in this market. Additionally, vendors will benefit from being able to offer systems integration capabilities or having close ties to independent systems integrators.

D

Trends/Technology Ratings of Importance

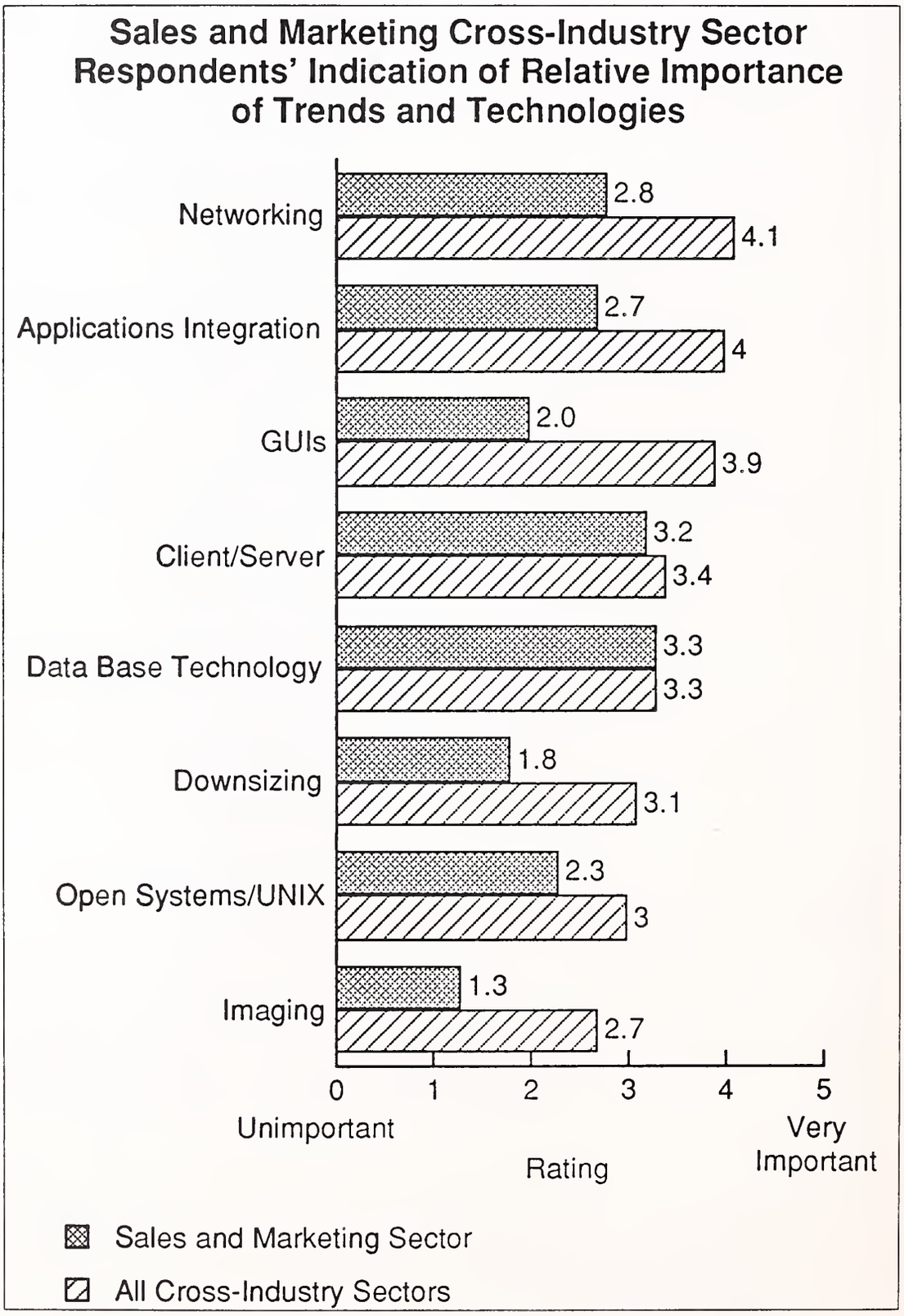
Respondents within all cross-industry sectors, both vendors and users, were asked to rate various trends and technologies on a scale of one to five, where one is unimportant or having little impact and five is very important or of significant impact.

The technologies listed in Exhibit IX-6 were selected because INPUT believes they will receive the most attention from vendors and users over the next five years. In addition, INPUT believes that their impacts on vendors and users will be profound. Users who deploy these technologies

will be re-engineering their business functions. And vendors will need to change not only their products, but also the ways in which they price, sell and support them.

Exhibit IX-6 shows the composite rankings of the sales and marketing cross-industry sector compared to the ratings of all cross-industry sectors combined.

EXHIBIT IX-6



Unlike all cross-industry sectors combined, the sales and marketing cross-industry sector rates data base technology and client/server architectures as the technologies having the greatest impact during 1992; the other cross-industry sectors combined rated networking and applications integration as having the greatest impact.

- It is apparent that data access and data sharing are focal points of many sales and marketing applications software product needs.

- The respondents who rated client/server higher than 3.0 interpreted client/server as meaning a PC with a GUI-based front end accessing a central computer. Although this is a form of client/server architecture, it does not signal the advent of products that share application logic and processing between two computers—a client and a server. But it does signal the importance of local access and analysis of data that resides on a central computer.

GUIs are rated considerably lower by the sales and marketing sector, as are downsizing and imaging. In fact, overall, almost all ratings given by respondents within the sales and marketing cross-industry sector are lower than are ratings given by all cross-industry sectors combined. These lower ratings suggest that this sector is relatively slow to adopt new technologies. This sector is in fact still largely mainframe-based, compared with some of the other cross-industry sectors.

The fact that data base technology is the highest ranking technology suggests that this sector still considers the development and implementation of data bases—a technology that has been around for many years—a priority. It also confirms the traditional centralized mainframe orientation of the sales and marketing sector.

Respondents for all cross-industry sectors were also asked to rank the technologies and trends in terms of importance five years from now. For the sales and marketing sector, networking and applications integration will increase in importance, so that by 1997 their ratings will be about the same as the ratings given to these technologies for all cross-industry sectors combined.

All technologies for all cross-industry sectors increase in importance over the five-year period. INPUT has elected not to show these ratings because we believe they indicate that respondents, although they have the general sense that all of the technologies will become more important, do not really know the extent to which they will be implementing them or be impacted by them in 1997.

E
Vendors and Competitive Environment

1. Vendor Characteristics and Trends

Marketing and sales applications are a natural complement to other cross-industry packages such as accounting and office systems. They are also a natural addition to vertical packages such as inventory control and purchasing, which are used predominantly in the manufacturing, retail and wholesale distribution, and packaged consumer goods industries.

Thus, sales and marketing is often incorporated into another cross-industry applications software product as an add-on module. For example, Armor Systems' Customer Information/Data Base Management software is one of fifteen modules within its overall Excalibur+ Premier Business Management System.

Thus, companies that sell sales and marketing cross-industry sector applications software products are likely to sell other products as well.

Also, as mentioned previously, all marketing and sales systems are not alike. Except for the basic functions of storing data for mailings and list processing, additional functions and features vary widely. This variety reflects not only the multifaceted nature of marketing and sales, but also the relative immaturity of this cross-industry sector.

For marketing and sales information services, ease of customization is particularly important to accommodate user variation in methods of managing and tracking data and company-specific forms and documents. Ease of integration with other applications as well as data bases will continue to be an important selling point for both application areas.

2. Leading and Emerging Vendors

The applications software products market players in sales and marketing are:

- The largest independent software vendors—such as Computer Associates, Dun & Bradstreet Software, and Lotus—and the largest systems vendors—such as Control Data, Digital Equipment, Hewlett-Packard and IBM. Many of them have host/DBMS-based client tracking/list processing products.

- Dozens of small niche vendors sell marketing and sales software, primarily for personal computer platforms. Examples of such vendors are Sales Technologies, Modatech, Phoenix and Epsilon. Many of them are vertically oriented.

- Independent DBMS companies have extended their product lines to include marketing and sales software. For example, Computer Corporation of America's MarketPulse product is an extension of its original data base product, Model 204.

- Companies whose main product is an EIS or decision support tool. For example, Information Resources, Inc. has a Sales Management System that works in conjunction with its decision support software product, EXPRESS. The Sales Management System is used by sales managers to track and analyze sales performance for territory management. The system can perform rankings, draw comparisons, highlight exceptions and identify trends. EXPRESS is available to end users on a timesharing or direct license basis.

- Numerous, largely regional companies offer computerized lettershop operations and direct mail processing services.

- Although there are some VARs and turnkey vendors focused exclusively on sales and marketing, the majority of VARs and turnkey vendors sell marketing and sales software as one of several bundled products for industry-specific markets.

3. Vendor Profiles

This section contains profiles of a sampling of leading marketing and sales or electronic publishing information services vendors to show the diversity of types of companies and approaches.

a. Acxiom Corporation

Acxiom provides custom-designed marketing data bases, list processing and enhancement services, turnkey in-house fulfillment systems to catalog vendors, and personalized printing and lettershop services. In addition, during the last two years, Acxiom has begun to offer outsourcing (systems operations) services and subscription fulfillment software to the publishing industry.

Acxiom provides various electronic information services and processing services for direct marketers, including storage, retrieval, and enhancement.

Marketing data base services are provided on a custom basis to assist direct marketing organizations in developing targeted marketing lists.

The company's primary vehicle for these services is its data communications network through which direct marketing customers receive authorized access to lists and data bases housed in the company's corporate headquarters data center. Customers are connected to the network through either company-owned terminals leased to the customer or through customer-owned equipment.

Acxiom serves any company involved in direct marketing.
In early 1990, five companies merged with Acxiom. These five companies are BSA, Inc., CCX Network, Modern Mailers, Marketlead Services, and Southwark Computer Services, Ltd. With this consolidation, Acxiom considers itself the leading marketing services company.

In October 1991, Acxiom and Advo-System, Inc. formed a joint venture, Info-base Services, to develop direct marketing data bases and technology to extract data from directories and other printed materials by optical scanning. The companies will be equal partners in the venture. Advo is a direct-mail company that distributes coupons and flyers to households.

Revenue for the fiscal year ending March 1991 was $97.7 million, a 9% increase over fiscal 1990 revenue.

b. Early, Cloud & Co.

Early, Cloud & Company (ECC) provides software that automates telephone business functions such as customer service, account management and teleservicing. The Telephone Delivery System (TDS) supports both inbound and outbound calling, and can handle them concurrently. TDS is also suitable for environments that are not telephone oriented but require workflow and connectivity support. For example, an application such as loan approval, which is characterized by the need to process a customer file in multiple steps through a number of departments, can be automated with TDS.

TDS runs on IBM MVS, VSE and AS/400 platforms. ECC recently announced enhancements of its TDS products to embrace a client/server model. The TDS architecture will be expanded to allow message-based processing, which provides the framework for TDS to function as a host-based server.

ECC recently announced new functionality for its MVS product that enables the user to extract data from multiple disparate data bases, reformat the data and/or enhance it. It allows a user to present a single systems image to the operators without modifying the back-end systems.

ECC is currently developing a PC front end for its MVS product, which it will announce later in 1992. The PC front-end product will also be available for Tandem and IBM midrange systems.

ECC also recently announced availability of an interface between TDS software and Tandem Call Applications Manager (CAM) software in the AT&T and Northern Telecom environments. CAM is an application enabler that allows TDS software to receive data from private branch exchanges or automatic call distribution.

ECC, founded in 1981, was the first company to provide call center automation in support of telemarketing.

c. Sales Technologies, Inc.

Sales Technologies (ST) designs, develops and integrates tailored software applications to help companies maximize national/international sales activities. ST systems meet the needs of mobile sales forces.

ST's software product consists of five core application modules: Territory Management, Electronic Mail, Electronic Forms, Electronic Reports Distribution and Spreadsheets. All are DOS based.

Although it sells its products across all industries, much of the company's success has been in the consumer goods, pharmaceutical, and oil and gas industries.

In late 1991, Sales Technologies acquired Snap Software Inc. for approximately $5 million. Snap Software developed and marketed a sales management package for strategic selling relationships. The product is prevalent in the financial services and manufacturing sectors.

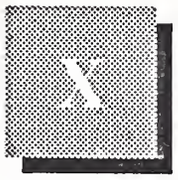
Sales Technologies recently introduced a new family of products—Medallion—for the pharmaceutical industry. Medallion is a decision support tool and is the first product that ST has targeted to sales managers rather than sales reps. The product integrates sales results with budgets, quotas and syndicated industry data. ST has also introduced a new optical document storage and retrieval product called ST-Oprx, which directly addresses the need pharmaceutical firms have expressed to cut down on paper storage.

Sales Technologies' products run in DEC VAX and DOS. A mainframe-based UNIX solution is under development.

Other development efforts under way include:

- A bar code optical storage system for sampling
- Pen-based signature capture
- Windows-based products

In 1991, Sales Technologies merged with Compumark, which provides a coordinated approach to field sales, services, and marketing information systems.



Conclusions

A
Overall Impressions of Cross-Industry Sectors

At the core of cross-industry sector markets and information services is a set of common user needs and the provision of a common set of products and/or services that is equally suitable for multiple industries.

Some cross-industry sectors are more "cross-industry" than others. For example office systems, which include products like word processing, desktop publishing and graphics, is truly a cross-industry or generic sector. The engineering and scientific sector, however, is very highly fragmented, consisting of hundreds of different kinds of engineering and scientific disciplines.

Regardless of what the cross-industry sector is and how "cross-industry" it really is, in order to appeal to multiple industries a product or service must obviously be flexible enough to meet varying needs of diverse environments. This implies that not only must flexibility and customization be built into the offering, but also that the function must lend itself to standardization.

The three delivery modes under consideration provide varying degrees of flexibility and customization. Applications software products are the most flexible, as they can be purchased to run on multiple hardware platforms and can be modified with a certain degree of ease with applications development tools.

Turnkey systems, on the other hand, are typically tied to one or only a few hardware platforms and represent a prescribed solution to any given need. Processing services provide the least amount of flexibility and are used for the most standard of applications.

Vendors serving the cross-industry markets are under increasing pressure to provide industry- and company-specific functionality. It is therefore no surprise that cross-industry turnkey systems and processing services are growing considerably slower than industry-specific turnkey systems and processing services. INPUT also anticipates that some of the cross-industry sectors for applications software products will be affected by this trend.

One option available to vendors is to add specific functionality modules to their products. In so doing, although overall expenditures may remain essentially the same, the cross-industry sector markets are diminished. Another option, of course, is to continue to expand and provide easy-to-use applications development tools to customers. INPUT believes that the demand for specific functionality will continue to slowly make inroads into cross-industry sector markets for all three delivery modes.

B

Cross-Industry Sector Market Forecasts

Cross-industry sector information services markets will grow from $13.1 billion in 1992 to $22.5 billion by 1997, a compound annual growth rate of 11%.

- Applications software products is by far the largest delivery mode, representing over half of all cross-industry sector expenditures. It is also the fastest growing.

- Turnkey systems and processing services will experience compound annual growth rates of 5% and 3% over the five-year period, while expenditures on applications software products will continue at a respectable 14% CAGR.

- Cross-industry sector markets' share of total expenditures on turnkey systems and processing services will continue their decline. The availability of affordable computer equipment is cause to bring in-house much of what was originally purchased by outside timesharing firms.

- Cross-industry sector markets for applications software products are expected to continue to account for about 40% of total expenditures on applications software products over the next five years. Nonetheless, INPUT notices a softening of some of the cross-industry applications software products markets where the needs for industry-specific functionality will eventually cause declining growth.

C
Cross-Industry Sector Similarities and Differences

In general, all seven cross-industry sectors are impacted by a similar set of driving forces. These driving forces are:

- Constrained short-term economic growth
- Market saturation
- Need for industry-specific functionality
- Product upgrades
- The adoption of new technologies
- Lower prices

Additionally, user department directions are similar across the seven cross-industry sectors. These directions generally tend to fall into the following categories of endeavor:

- Network implementation
- Data access, analysis, presentation and sharing
- Applications and data integration

User efforts in these areas are consistently for the purpose of reducing redundancies and speeding up the process of work.

Likewise, the impacts of trends and technologies such as networking, GUIs, client/server and downsizing, are similar across all seven sectors.

Nonetheless, each sector creates a story of its own. Their unique qualities are summarized below:

Accounting

- First function to be computerized and largest cross-industry sector
- Cuts across multiple functions within a corporation
- Large corporations wait for new products but are slow to adopt new technology
- Products targeted to small companies face price erosion

Human Resources

- Social and regulatory changes create need for continuous product upgrades

- Self-contained—does not cut across multiple functions within a corporation
- Relatively quick to adopt new technologies
- Changing pricing structures not expected to have negative impact on vendor revenues

Education and Training

- Multimedia still too expensive, untested
- Authoring systems availability and acceptance still at a minimum
- Industry- and company-specific needs will persist

Engineering and Scientific

- Product categories are saturated
- Lower prices threaten vendor profitability
- User departments under budget constraints
- Urgent needs to more effectively extract and present large amounts of data
- "Network implementation bottleneck" will inhibit growth of information services for this sector
- Very fragmented; industry- and company-specific needs will persist

Office Systems

- Word processing market driven by the need for upgrades
- Steep price discounts will have adverse effects
- Users unwilling to embrace integrated corporate-wide solutions, e.g., integrated office systems, groupware, workflow products

Planning and Analysis

- Spreadsheet market driven by the need for upgrades
- Steep price discounts will have adverse effects
- Other planning and analysis product categories, such as project management, face market saturation

- Blurring of distinctions between executive information systems and integrated office systems
- Other product categories, such as office systems and sales and marketing products, to limit planning and analysis sector expenditures

Sales and Marketing

- One of the last cross-industry functions to be automated
- Large potential market
- Laptop and pen-based computer availability will fuel the market

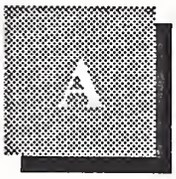
D
Vendor Challenges

Vendors are beginning to respond to users' expressed needs with new products and technologies. These new products and technologies include client/server and downsized products, more closely integrated product suites, GUI-based products, and the merging of functions within a single product.

Migration to new products and services will require vendors to meet the following challenges:

- In-depth knowledge of new technologies, including networking
- Assurance that their products work well together and with other vendors' products
- New sales and marketing strategies, including new pricing structures
- Continuing movement toward cross-platform and multivendor product strategies
- More emphasis on provision of support services to assure that users are capitalizing on functionality of new products
- Formation of new alliances with vendors of complementary products and services
- Continuing efforts to grow the existing categories that are reaching saturation

The implications of these changes are that vendors' product development and marketing and sales costs will be higher, their products may potentially be lower priced, and their markets will be more competitive. Because of these challenges, room exists for new vendors as existing vendors struggle with change.



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.

For 1992 INPUT has added one delivery mode and defined three new submodes to its Information Services Industry Structure:

- *Equipment Services* has been added as the ninth delivery mode. INPUT has forecasted the equipment maintenance, support and related services market through its Customer Services Programs for a number or years. Starting in 1992, the equipment services portion of the customer services market will be included in the total information services industry as defined by INPUT. Other portions of this market (such as software support) are already included.

- Two new submodes have been defined in the *Systems Operations* delivery mode - *desktop services* and *network management*. They are defined on pages 5 and 6.

- A fourth submode has been defined within the Professional Services delivery mode—*applications management*. This change reflects a shift in the way some software development and maintenance services are purchased. A complete definition is provided on page 6.

A series of definitions for computer equipment have also been added.

Changes from the 1991 INPUT *Definition of Terms* are indicated with a ☆.

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:

- Use of vendor-provided computer processing services to develop or run applications or provide services such as disaster recovery or data entry (called *Processing Services*)
- A combination of computer equipment, packaged software and associated support services which will meet an application systems need (called *Turnkey Systems*)
- Packaged software products, including 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*)
- The combination of products (software and equipment) and services where the vendor assumes total responsibility for the development of a custom integrated solution to an information systems need (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 that support the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange (called *Network Applications*)
- Services that support the access and use of public and proprietary information such as on-line data bases and news services (called *Electronic Information Services*)
- Services that support the operation of computer and digital communication equipment (called *Equipment Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is 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., electronic data interchange services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

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

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 nine delivery modes defined by INPUT, six are considered primary products or services:

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

The remaining three delivery modes represent combinations of these products and services, combined 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 buyers of 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. Trading Communities

Information technology is playing a major role in re-engineering, not just companies but the value chain or *Trading Communities* in which these companies operate. This re-engineering is resulting in electronic commerce emerging where interorganizational electronic systems facilitate the business processes of the trading community.

- A trading community is the group or organizations—commercial and non-commercial—involved in producing a good or services.

- Electronic commerce and trading communities are addressed in INPUT's EDI and Electronic Commerce Program.

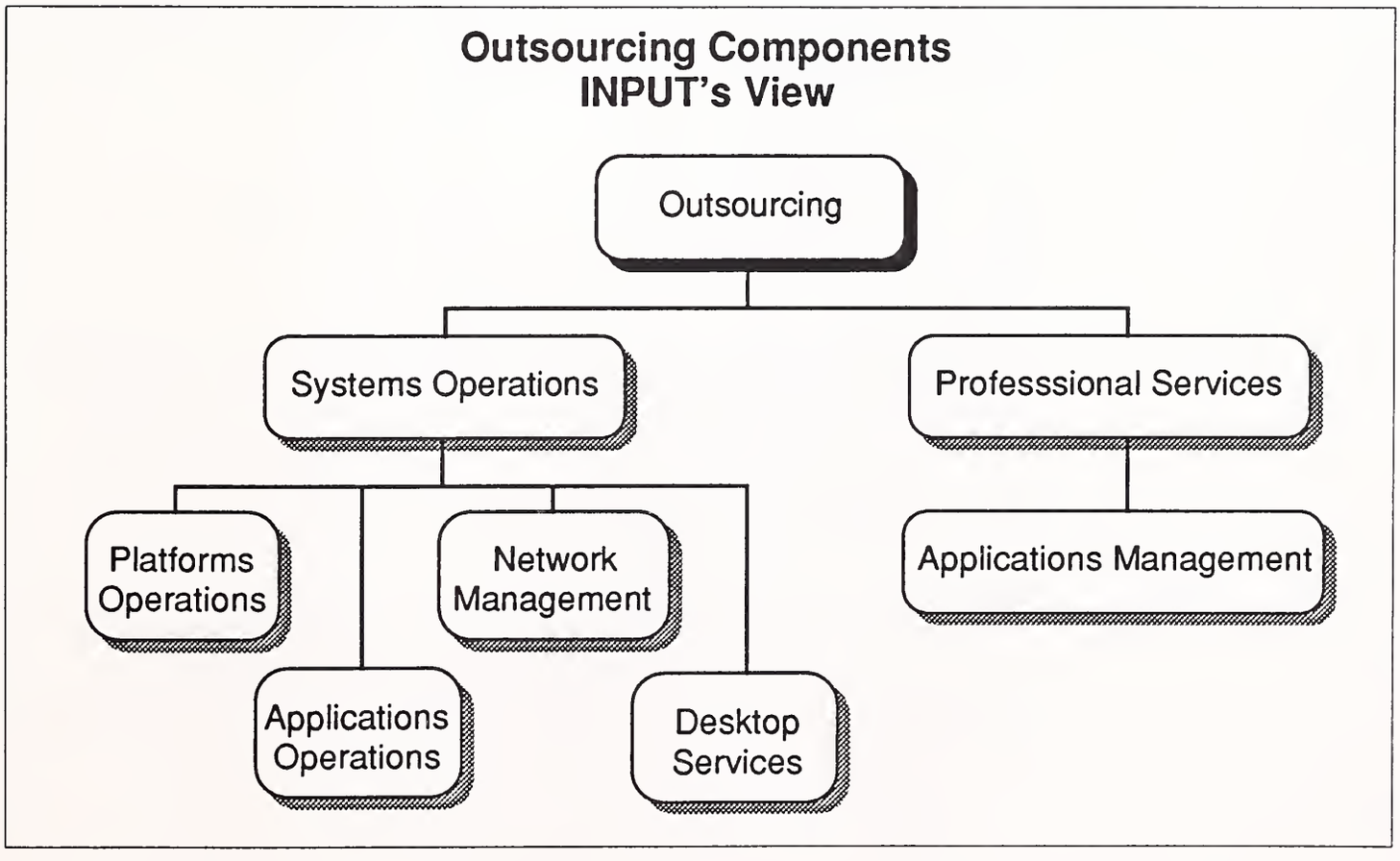
6. Outsourcing

Over the past few years a major change has occurred in the way clients are buying some information services. The shift has been labeled *outsourcing*.

INPUT views outsourcing as a change in the form of the client/vendor relationship. Under an outsourcing relationship, all or a major portion of the information systems function is contracted to a vendor in a long-term relationship. The vendor is responsible for the performance of the function.

INPUT considers the following submodes to be outsourcing-type relationships and in aggregate to represent the outsourcing market. See Exhibit A-1. Complete definitions are provided in Section C of this document. INPUT provides these forecasts as part of the corresponding delivery modes.

EXHIBIT A-1



- *Platform Systems Operations* - The vendor is responsible for managing and operating the client's computer systems.

- *Applications System Operations* - The vendor is responsible for developing and/or maintaining a client's applications as well as operating the computer systems.

☆*Network Management* - The vendor assumes full responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client.

☆*Applications Management/Maintenance* - The professional services vendor has full responsibility for developing and/or maintaining some or all of the applications systems that a client uses to support business operations. The services are provided on a long-term contractual basis.

☆*Desktop Services* - The vendor assumes responsibility for the deployment, maintenance, and connectivity between the personal computers and/or intelligent workstations in the client organization. The services may also include performing the help-desk function. The services are provided on a long-term contractual basis.

C

Delivery Modes and Submodes

Exhibit A-2 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.

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 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 part of the software pricing, is also included here.

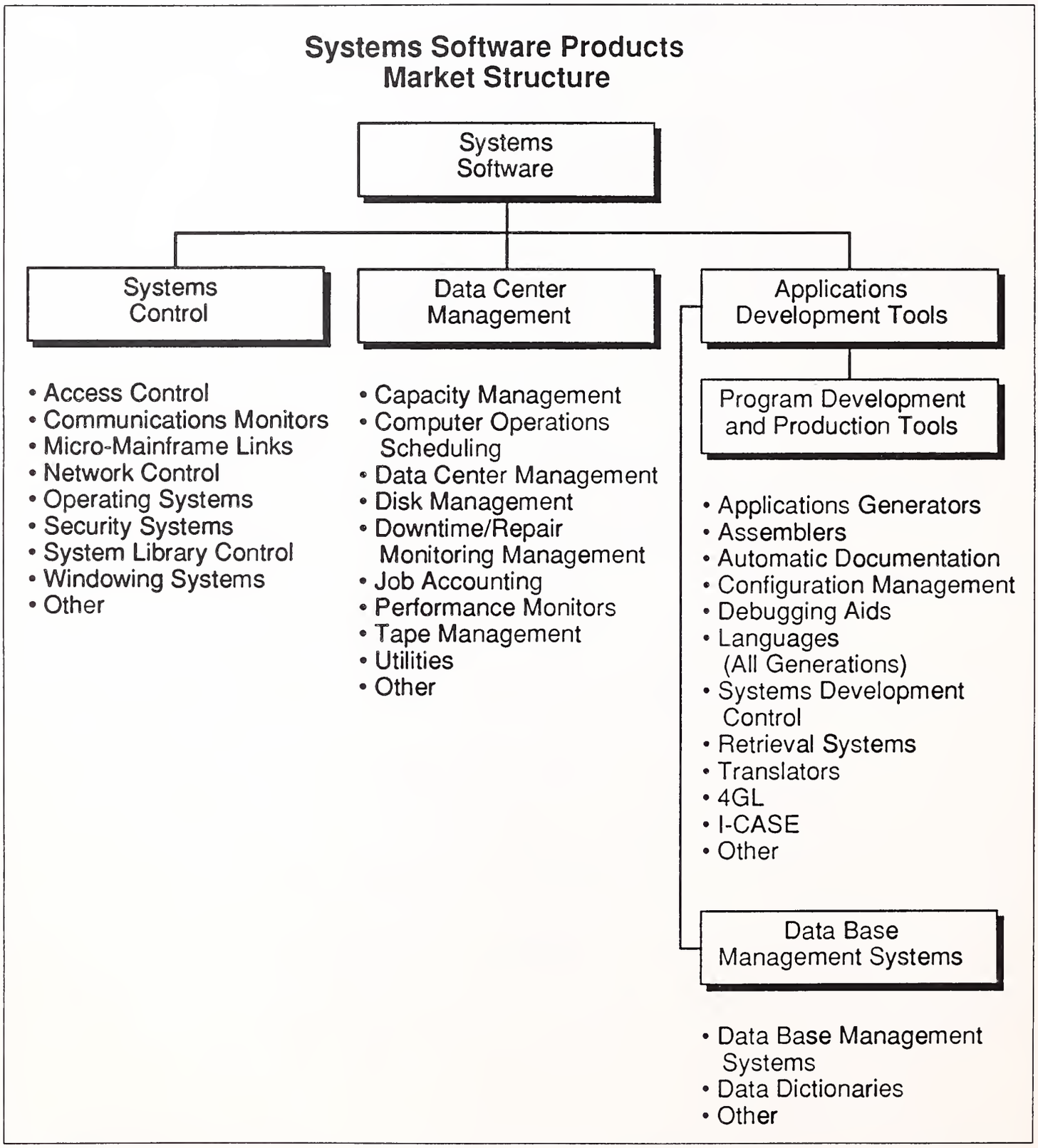
Expenditures for work performed by organizations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are also counted as professional services, provided such fees are charged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

EXHIBIT A-2

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. See Exhibit A-3.

EXHIBIT A-3



- *Systems Control Products* - Software programs that manage computer system resources and control the execution of programs. 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.

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

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 groups of market sectors. (See Exhibit A-4.)

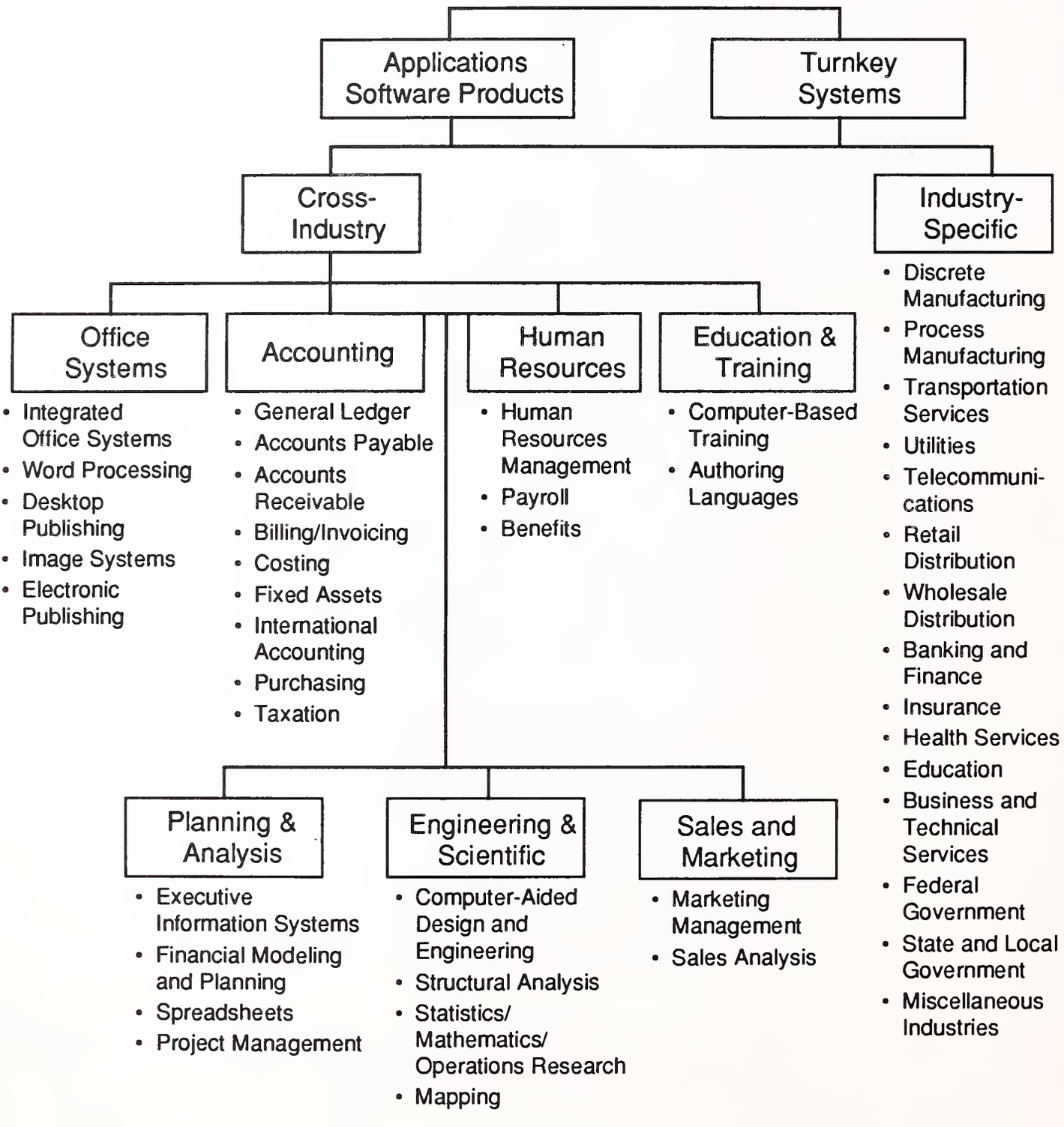
- *Industry Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile 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.

EXHIBIT A-4

Application Products and Turnkey Systems



2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged applications 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 professional services provided. INPUT categorizes turnkey systems into two groups of market sectors as it does for applications software products. (See Exhibit A-4.)

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.

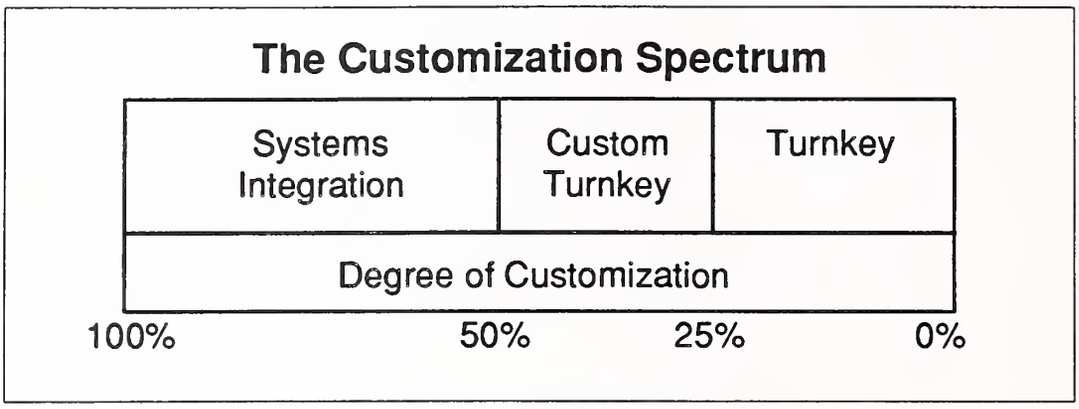
- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such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

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

Exhibit A-5 contrasts turnkey systems with systems integration. Turnkey systems are based on available software products that a vendor may modify to a modest degree.

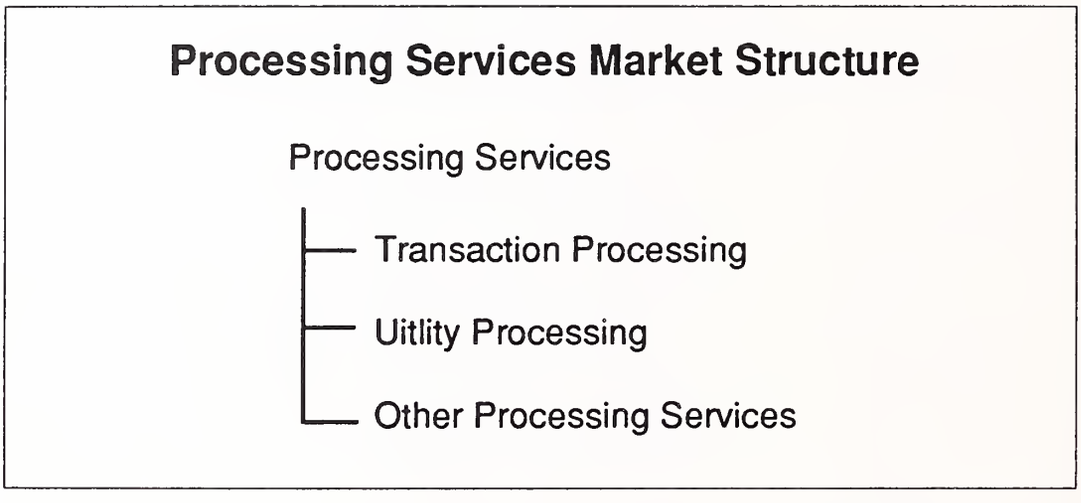
EXHIBIT A-5



3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing, and "other" processing services. See Exhibit A-6.

EXHIBIT A-6



- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process specific applications and update client data bases. The application software is typically provided by the vendor.

- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), enabling clients to develop and/or operate 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.

4. Systems Operations

Systems operations as a delivery mode was introduced in the 1990 Market Analysis and Systems Operations programs. Previously called Facilities Management, this delivery mode was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1992 the submodes have been defined as follows.

Systems operations involves the operation and management of all or a significant part of the client'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, to perform the client's business functions, without taking responsibility for the client's application systems.

- *Applications systems operations* - The vendor manages and operates the computer systems to perform the client's business functions, and is also responsible for maintaining, or developing and maintaining, the client's application systems.

☆*Network Management* - The vendor assumes responsibility for operating and managing the client's data communications systems. This may also include the voice communications of the client. A network management outsourcing contract may include only the management services or the full costs of the communications services and equipment plus the management services.

☆*Desktop Services* - The vendor assumes responsibility for the deployment, maintenance, and connectivity among the personal computers and/or workstations in the client organization. The services may also include performing the help-desk function. Equipment as well as services can be part of a desktop services outsourcing contract.

Note: This type of client service can also be provided through traditional professional services where the contractual criteria of outsourcing are not present.

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 client's information systems environment (equipment, networks, applications systems), either at the client's site or the vendor's site.

Note: 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).

5. Systems Integration (SI)

Systems integration is a vendor service that provides a complete solution to an information system, networking or automation development requirement through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price. (Refer to Exhibit A-7.)

The components of a systems integration project are the following:

- *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, implement, 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 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.

EXHIBIT A-7

Products/Services in Systems Integration Projects

Equipment

- Information systems
- Communications

Software Products

- Systems software
- Applications software

Professional Services

- Consulting
  - Feasibility and trade-off studies
  - Selection of equipment, network and software
- Program/project management
- Design/integration
  - Systems design
  - Installation of equipment, network, and software
  - Demonstration and testing
- Software development
  - Modification of software packages
  - Modification of existing software
  - Custom development of software
- Education/training and documentation
- Systems operations/maintenance

Other Miscellaneous Products/Services

- Site preparation
- Data processing supplies
- Processing/network services
- Data/voice communication services

6. Professional Services

This category includes four submodes: consulting, education and training, software development, and applications management. Exhibit A-8 provides additional detail.

- *Consulting:* Services include management consulting (related to information systems), information systems re-engineering, 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:* Services that provide training and education or the development of training materials related to information systems and services for the information systems professional and the user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation. Education and training provided by school systems are not included. General education and training products are included as a cross-industry market sector.

- *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.

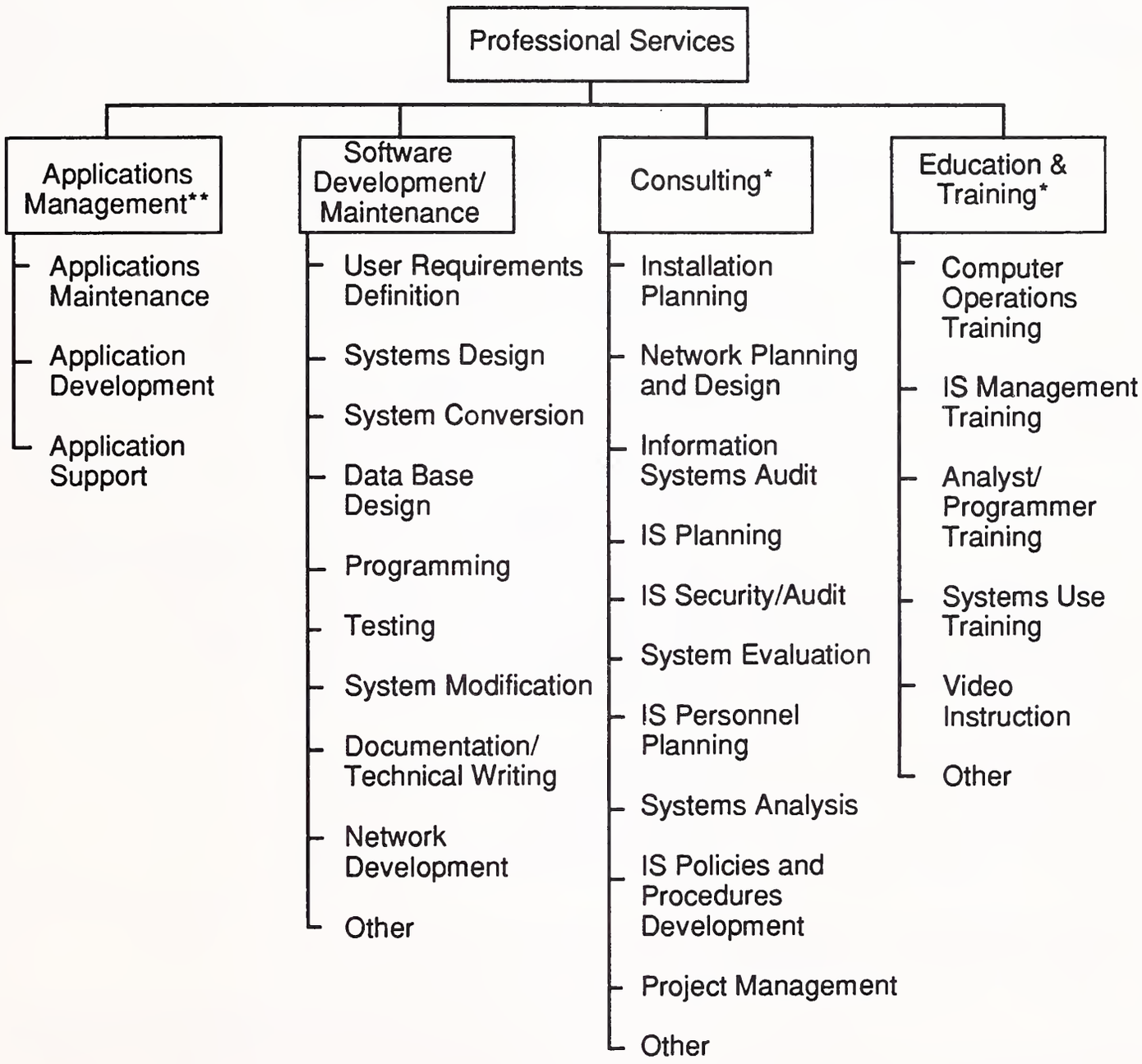
☆*Applications Management*: The vendor has full responsibility for maintaining and upgrading some or all of the application systems that a client uses to support business operations and may develop and implement new application systems for the client.

An applications management contract differs from traditional software development in the form of the client/vendor relationship. Under traditional software development services the relationship is project based. Under applications management it is time and function based.

These services may be provided in combination or separately from platform systems operations.

EXHIBIT A-8

Professional Services Market Structure



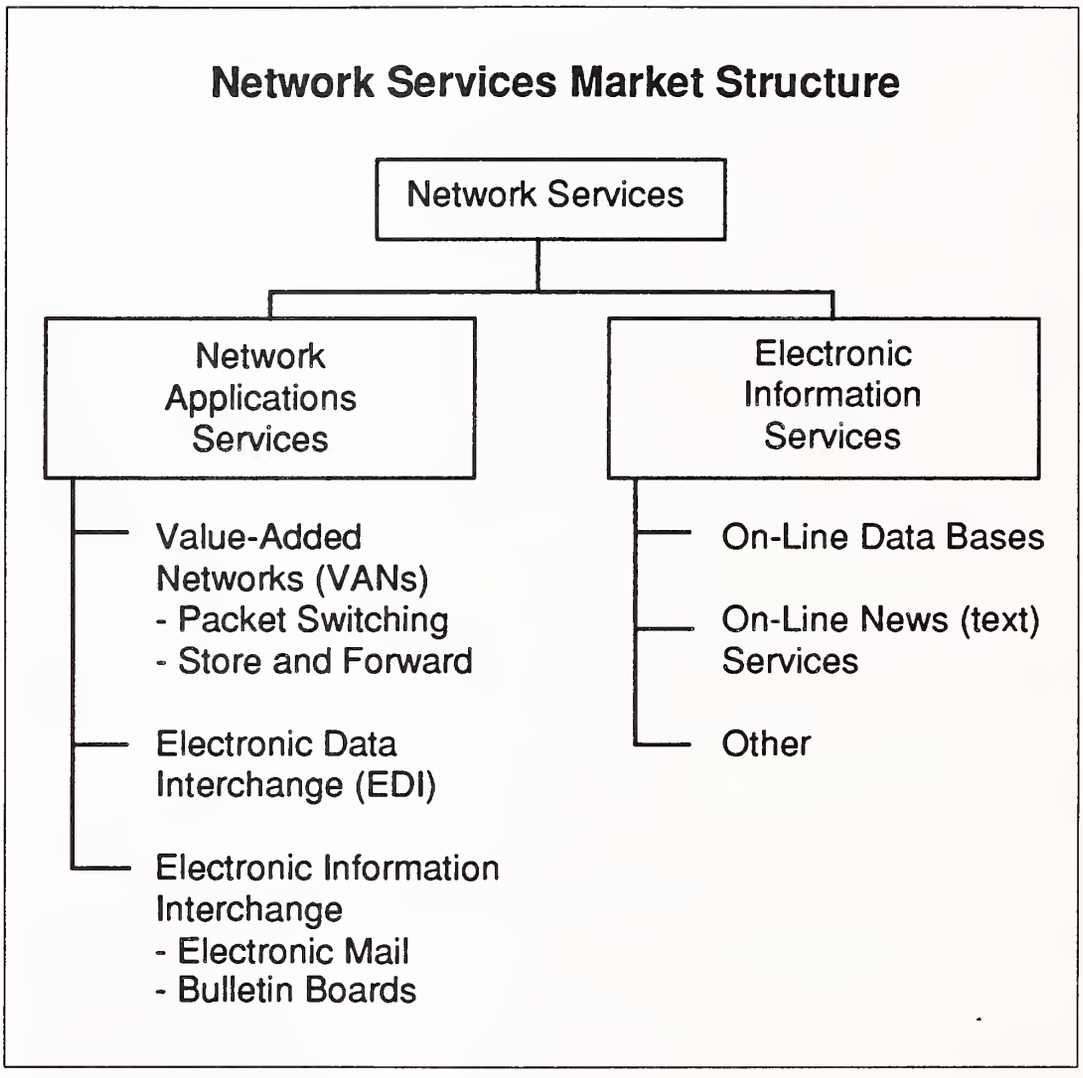
*Related to computer systems, topics, or issues

**Vendor assumes full responsibility on contracted longer term basis

7. Network Services

Network services are a variety of telecommunications-based functions and operations. Network service includes two submodes, as shown in Exhibit A-9.

EXHIBIT A-9



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 inquire into and extract information from the data bases. They may load extracted data into their own computer systems; the vendor does not provide data processing or manipulation capability as part of the electronic information service and users cannot update the vendor's data bases. However, the vendor may offer other services (network applications or processing services) that do offer processing or manipulation capability.

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.

- Unstructured, primarily textual information on people, companies, events, etc. These are often news services.

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.

Electronic Data Interchange (EDI) - Application-to-application electronic exchange of business data between trade partners or facilitators using a telecommunications network.

Electronic Information Interchange- The transmission of messages across an electronic network managed by a services vendor, including electronic mail, voice mail, voice messaging, and access to Telex, TWX, and other messaging services. This also includes bulletin board services.

8. Equipment Services

☆The equipment services delivery mode includes two submodes. Both deal with the support and maintenance of computer equipment.

☆*Equipment Maintenance* - Services provided to repair, diagnose problems and provide preventive maintenance both on-site and off-site for computer equipment. The costs of parts, media and other supplies are excluded. These services are typically provided on a contract basis.

☆*Environmental Services* - Composed of equipment and data center related special services such as cabling, air conditioning and power supply, equipment relocation and similar services.

D
Computer Equipment

☆These definitions have been included to provide the basis for market segmentation in the software products markets.

☆*Computer Equipment* - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system. Unless otherwise noted in an INPUT forecast, computer equipment is only included where it is part of the purchase of services or software products (e.g., turnkey systems and systems integration).

☆*Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be channel connected to a processor, and generally cannot be included in other categories such as terminals.

☆*Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

☆*Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters

☆*Communication Devices* - Includes modem, encryption equipment, special interfaces, and error control

☆*Storage Devices* - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories

☆*Computer Systems* - Includes all processors from personal computers to supercomputers. Computer systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices and processors or CPUs not provided as part of an integrated (turnkey) system.

☆*Personal computers* - Smaller computers using 8-, 16-, or 32-bit computer technology. Generally designed to sit on a desktop and are portable for individual use. Price generally less than $5,000.

☆*Workstations* - High-performance, desktop, single-user computers often employing Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as data base access, file storage and back-up, remote communications, and peripheral support. These products usually cost from $5,000 to $15,000.

☆*Minicomputer or midsize computers* - Minicomputers are generally priced from $15,000 to $350,000. Many of the emerging client/server computers are in this category.

☆*Mainframe or large computers* - Traditional mainframe and supercomputers costing more than $350,000.

E
Sector Definitions

1. Industry Sector Definitions

INPUT structures the information services market into 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 industry sectors are detailed in Exhibit A-10.

INPUT includes all delivery modes except systems software products and equipment services in industry market sectors. See Exhibit A-9 and section E-3 (Delivery Mode Reporting by Sector).

Note: SIC code 88 is Personal Households. INPUT does not currently analyze or forecast information services in this market sector.

EXHIBIT A-10

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)

EXHIBIT A-10 (CONT.)

Industry Sector Definitions

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

EXHIBIT A-10 (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

2. Cross-Industry Sector Definitions

INPUT has identified seven cross-industry 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.

- INPUT only includes the turnkey systems, applications software products, and transaction processing services in the cross-industry sectors.

The seven cross-industry markets are:

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

- General ledger
- Financial management
- 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 delivered as a software product, turnkey system or through processing services. The market for computer-based training tools for the training of any employee on any subject is also included.

Office Systems consists of the following:

- Integrated office systems (IOS)
- Word processing
- Desktop publishing
- Electronic publishing
- Image systems

- 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.

- 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.

Engineering and Scientific encompasses the following applications:

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

- 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

Sales and Marketing encompasses marketing management and sales analysis application solutions.

- Sales and marketing includes:

  - Sales analysis
  - Marketing management
  - Demographic market planning models

3. Delivery Mode Reporting by Sector

This section describes how the delivery mode forecasts relate to the market sector forecasts. Exhibit A-11 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 forecasted in total market in the general market sector.

- *Turnkey systems* - Turnkey systems is forecasted for the 15 industry and 7 cross-industry sectors. Each component of turnkey systems is forecasted in each sector.

- *Applications software products* - The applications software products delivery mode 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* - Each of the systems operations submodes is forecasted for each of the 15 industry sectors.

- *Systems integration* - Systems integration and each of the components of systems integration are forecasted for each of the 15 industry sectors.

- *Professional services* - Professional services and each of the submodes is forecasted for each of the 15 industry sectors.

EXHIBIT A-11

Delivery Mode versus Market Sector Forecast Content

Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	General
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
Equipment Services				X

- *Network services* - The network applications submode of network services forecasted for each of the 15 industry sectors.

  Industry and cross-industry electronic information services are forecast in relevant market sectors. The remainder of electronic information services is forecasted in total for the general market sector.

- *Systems software products* - Systems software products and its submodes are forecasted in total for the general market sector. Each submode forecast is broken down by platform level: mainframe, mini-computer and workstation/PC.

- *Equipment services* - Equipment services and its submodes are forecasted in total in the general market sectors.

F

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. INPUT defines and forecasts the information services market in terms of user expenditures. 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 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., ComputerLand).

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 distribution channels. To capture the valued added through these distribution channels, adjustment factors are used to convert estimated information services vendor revenues to 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. Turnkey vendors incorporate purchased software into the systems they sell to users.

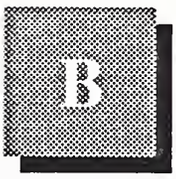
To account for such intra-industry transactions, INPUT uses conversion ratios to derive the estimate of end-user expenditures.

Exhibit A-12 summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to user expenditure (market size) figures for each delivery mode.

EXHIBIT A-12

Vendor Revenue to User Expenditure Conversion

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



Forecast Data Base

EXHIBIT B-1

Applications Software Products
User Expenditure Forecast by Cross-Industry Sector, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Delivery Mode Total Cross-Industry Sectors	8,151	61	9,083	10,163	11,526	12,977	14,961	17,647	14
Accounting	2,250	8	2,440	2,650	2,920	3,200	3,570	4,200	11
Education and Training	201	6	213	223	241	263	295	331	9
Engineering and Scientific	651	14	740	840	960	1,095	1,260	1,445	14
Human Resources	694	10	765	850	950	1,060	1,215	1,400	13
Office Systems	2,400	11	2,671	2,995	3,433	3,844	4,510	5,439	15
Planning and Analysis	1,620	17	1,894	2,213	2,592	3,040	3,577	4,210	17
Sales and Marketing	335	7	360	392	430	475	534	621	12

EXHIBIT B-2

Applications Software Products
1992 MAP Data Base Reconciliation by Cross-Industry Sector

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Delivery Mode Total Cross-Industry Sectors	8,948	8,151	-797	-9	17,387	14,961	-2,426	-14	14	13
Accounting	2,250	2,250	0	0	3,992	3,570	-422	-11	12	10
Education and Training	242	201	-41	-17	558	295	-263	-47	18	8
Engineering and Scientific	651	651	0	0	1,344	1,260	-84	-6	16	14
Human Resources	694	694	0	0	1,242	1,215	-27	-2	12	12
Office Systems	2,250	2,400	150	7	4,552	4,510	-42	-1	15	13
Planning and Analysis	2,375	1,620	-755	-32	4,756	3,577	-1,179	-25	15	17
Sales and Marketing	486	335	-151	-31	943	534	-409	-43	14	10

EXHIBIT B-3

Turnkey Systems
User Expenditure Forecast by Cross-Industry Sector, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Delivery Mode Total Cross-Industry Sectors	1,143	9	1,201	1,260	1,325	1,385	1,472	1,569	5
Accounting	435	3	450	460	475	490	505	520	3
Education and Training	110	9	120	130	140	155	170	200	5
Engineering and Scientific	123	5	129	136	142	140	157	167	2
Human Resources	84	1	85	90	90	90	90	95	9
Office Systems	116	3	120	120	125	125	130	130	2
Planning and Analysis	0	0	0	0	0	0	0	0	0
Sales and Marketing	275	8	297	324	353	385	420	457	11

EXHIBIT B-4

Turnkey Systems
1992 MAP Data Base Reconciliation by Cross-Industry Sector

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Delivery Mode Total Cross-Industry Sectors	1,411	1,143	-268	-19	1,911	1,472	-439	-23	6	5
Accounting	435	435	0	0	504	505	1	0	3	3
Education and Training	182	110	-72	-40	293	170	-123	-42	10	9
Engineering and Scientific	123	123	0	0	173	157	-16	-9	7	5
Human Resources	84	84	0	0	92	90	-2	-2	2	1
Office Systems	66	116	50	76	74	130	56	76	2	2
Planning and Analysis	50	0	-50	-100	50	0	-50	-100	0	0
Sales and Marketing	471	275	-196	-42	725	420	-305	-42	9	9

EXHIBIT B-5

Processing Services
User Expenditure Forecast by Cross-Industry Sector, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Delivery Mode Total Cross-Industry Sectors	2,746	3	2,827	2,919	3,018	3,127	3,227	3,342	3
Accounting	150	3	155	160	165	170	175	180	3
Education and Training	10	-40	6	4	3	2	2	2	-20
Engineering and Scientific	128	2	130	130	125	120	110	100	-5
Human Resources	1,676	5	1,760	1,850	1,940	2,040	2,140	2,250	5
Office Systems	36	-3	35	30	30	30	25	25	-6
Planning and Analysis	190	-12	165	145	130	115	100	85	-12
Sales and Marketing	556	4	576	600	625	650	675	700	4

EXHIBIT B-6

Processing Services
1992 MAP Data Base Reconciliation by Cross-Industry Sector

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Delivery Mode Total Cross-Industry Sectors	2,831	2,746	-85	-3	3,636	3,227	-409	-11	5	3
Accounting	150	150	0	0	175	175	0	0	3	3
Education and Training	95	10	-85	-89	68	2	-66	-97	-6	-28
Engineering and Scientific	128	128	0	0	131	110	-21	-16	0	-3
Human Resources	1,676	1,676	0	0	2,460	2,140	-320	-13	8	5
Office Systems	36	36	0	0	26	25	-1	-4	-6	-7
Planning and Analysis	190	190	0	0	100	100	0	0	-12	-12
Sales and Marketing	556	556	0	0	676	675	-1	0	4	4

INPUT has lowered its forecast this year for workstation- and PC-based accounting applications software products because we believe that user reluctance to migrate to new solutions, new pricing schemes and the need for industry-specific functionality will have stronger negative impacts during the first few years of the forecast period.

EXHIBIT B-7

Accounting Cross-Industry Sector
User Expenditure Forecast by Delivery Mode, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Sector Total	2,835	7	3,045	3,270	3,560	3,860	4,250	4,900	10
Processing Services	150	3	155	160	165	170	175	180	3
- Transaction Processing	150	3	155	160	165	170	175	180	3
Turnkey Systems	435	3	450	460	475	490	505	520	3
Applications Software Products	2,250	8	2,440	2,650	2,920	3,200	3,570	4,200	11
- Mainframe	757	4	790	820	850	890	920	1,000	4
- Minicomputer	560	6	600	630	670	710	750	800	6
- Workstation/PC	933	13	1,050	1,200	1,400	1,600	1,900	2,400	18

EXHIBIT B-8

Accounting Cross-Industry Sector
1992 MAP Data Base Reconciliation by Delivery Mode

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Sector Total	2,835	2,835	0	0	4,671	4,250	421	-9	11	8
Processing Services	150	150	0	0	175	175	0	0	3	3
- Transaction Processing	150	150	0	0	175	175	0	0	3	3
Turnkey Systems	435	435	0	0	504	505	1	0	3	3
Applications Software Products	2,250	2,250	0	0	3,992	3,570	-422	-11	12	10
- Mainframe	757	757	0	0	920	920	0	0	4	4
- Minicomputer	560	560	0	0	750	750	0	0	6	6
- Workstation/PC	933	933	0	0	2,322	1,900	-422	-18	20	15

This year's forecast for payroll and human resources processing services has been lowered based on additional forecast data obtained from vendors that indicates a lower expenditure outlook for the next five years. None of the driving forces have changed.

EXHIBIT B-9

Human Resources Cross-Industry Sector User Expenditure Forecast by Delivery Mode, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Sector Total	2,454	6	2,610	2,790	2,980	3,190	3,445	3,745	7
Processing Services	1,676	5	1,760	1,850	1,940	2,040	2,140	2,250	5
- Transaction Processing	1,676	5	1,760	1,850	1,940	2,040	2,140	2,250	5
Turnkey Systems	84	10	85	90	90	90	90	95	2
Applications Software Products	694	1	765	850	950	1,060	1,215	1,400	13
- Mainframe	265	6	280	295	310	325	340	360	5
- Minicomputer	256	7	275	295	320	345	375	400	8
- Workstation/PC	173	21	210	260	320	390	500	640	25

EXHIBIT B-10

Human Resources Cross-Industry Sector
1992 MAP Data Base Reconciliation by Delivery Mode

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Sector Total	2,454	2,454	0	0	3,794	3,445	-349	-9	9	7
Processing Services	1,676	1,676	0	0	2,460	2,140	-320	-13	8	5
- Transaction Processing	1,676	1,676	0	0	2,460	2,140	-320	-13	8	5
Turnkey Systems	84	84	0	0	92	90	-2	-2	2	1
Applications Software Products	694	694	0	0	1,242	1,215	-27	-2	12	12
- Mainframe	265	265	0	0	338	340	2	1	5	5
- Minicomputer	256	256	0	0	376	375	-1	0	8	8
- Workstation/PC	173	173	0	0	528	500	-28	-5	25	24

INPUT has lowered its processing services forecast for the education and training sector due to new information that indicates that expenditures on the Plato-based family of products (essentially the only processing services available for this sector) are lower than what INPUT had estimated last year.

Current and future expenditures on applications software products were also overstated by INPUT last year.

EXHIBIT B-11

Education and Training Cross-Industry Sector User Expenditure Forecast by Delivery Mode, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Sector Total	321	6	339	357	384	420	467	533	9
Processing Services	10	-40	6	4	3	2	2	2	-20
- Transaction Processing	10	-40	6	4	3	2	2	2	-20
Turnkey Systems	110	9	120	130	140	155	170	200	11
Applications Software Products	201	6	213	223	241	263	295	331	9
- Mainframe	55	2	56	56	58	60	61	62	2
- Minicomputer	26	2	27	27	28	28	29	29	2
- Workstation/PC	120	8	130	140	155	175	205	240	13

EXHIBIT B-12

Education and Training Cross-Industry Sector
1992 MAP Data Base Reconciliation by Delivery Mode

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Sector Total	519	321	-198	-38	919	467	-452	-49	12	8
Processing Services	95	10	-85	-89	68	2	-66	-97	-6	-28
- Transaction Processing	95	10	-85	-89	68	2	-66	-97	-6	-28
Turnkey Systems	182	110	-72	-40	293	170	-123	-42	10	9
Applications Software Products	242	201	-41	-17	558	295	-263	-47	18	8
- Mainframe	40	55	15	38	46	61	15	33	3	2
- Minicomputer	26	26	0	0	36	29	-7	-19	7	2
- Workstation/PC	176	120	-56	-32	476	205	-271	-57	22	11

INPUT has lowered the processing services forecast for the engineering and scientific sector for the second year in a row. More affordable hardware platforms cause user organizations to continue to bring applications in-house; also, INPUT expects large research projects to continue to be curtailed over the short term due to the uncertainty of the economy.

EXHIBIT B-13

Engineering and Scientific Cross-Industry Sector User Expenditure Forecast by Delivery Mode, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Sector Total	902	11	999	1,106	1,227	1,365	1,527	1,710	11
Processing Services	128	2	130	130	125	120	110	100	-5
- Transaction Processing	128	2	130	130	125	120	110	100	-5
Turnkey Systems	123	5	129	136	142	150	157	165	5
Applications Software Products	651	14	740	840	960	1,095	1,260	1,445	14
- Mainframe	146	8	158	170	185	200	215	230	8
- Minicomputer	241	10	265	290	320	350	390	425	10
- Workstation/PC	264	15	304	350	400	460	530	610	15

EXHIBIT B-14

Engineering and Scientific Cross-Industry Sector
1992 MAP Data Base Reconciliation by Delivery Mode

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Sector Total	902	902	0	0	1,648	1,527	-121	-7	13	12
Processing Services	128	128	0	0	131	110	-21	-16	1	0
- Transaction Processing	128	128	0	0	131	110	-21	-16	1	0
Turnkey Systems	123	123	0	0	173	157	-16	-9	7	5
Applications Software Products	651	651	0	0	1,344	1,260	-84	-6	16	14
- Mainframe	146	146	0	0	214	215	1	0	8	8
- Minicomputer	241	241	0	0	415	390	-25	-6	11	10
- Workstation/PC	264	264	0	0	714	530	-184	-26	22	20

Electronic publishing turnkey systems and applications software products have been added to this sector this year.

INPUT reduced its estimate of expenditures on minicomputer-based office systems because we believe it was overstated in the past. Minicomputer-based vendors are aggressively introducing integrated office systems (IOSs) to run on smaller platforms.

EXHIBIT B-15

Office Systems Cross-Industry Sector
User Expenditure Forecast by Delivery Mode, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Sector Total	2,552	11	2,826	3,145	3,588	3,999	4,665	5,594	15
Processing Services	36	-3	35	30	30	30	25	25	-6
- Transaction Processing	36	-3	35	30	30	30	25	25	-6
Turnkey Systems	116	3	120	120	125	125	130	130	2
Applications Software Products	2,400	12	2,671	2,995	3,433	3,844	4,510	5,439	15
- Mainframe	163	2	166	170	173	176	180	184	2
- Minicomputer	565	8	610	660	710	768	830	895	8
- Workstation/PC	1,672	13	1,895	2,165	2,550	2,900	3,500	4,360	18

EXHIBIT B-16

Office Systems Cross-Industry Sector
1992 MAP Data Base Reconciliation by Delivery Mode

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Sector Total	2,352	2,552	200	9	4,652	4,665	13	0	15	13
Processing Services	36	36	0	0	26	25	-1	-4	-6	-7
- Transaction Processing	36	36	0	0	26	25	-1	-4	-6	-7
Turnkey Systems	66	116	50	76	74	130	56	76	2	2
Applications Software Products	2,250	2,400	150	7	4,552	4,510	-42	-1	15	13
- Mainframe	163	163	0	0	176	180	4	2	2	2
- Minicomputer	634	565	-69	-11	1,190	830	-360	-30	13	8
- Workstation/PC	1,453	1,672	219	15	3,186	3,500	314	10	17	16

INPUT has lowered its estimated applications software products expenditures for 1991 and subsequent years as these expenditures were overstated for mainframe- and minicomputer-based products.

Workstation- and PC-based applications software products expenditures have been lowered for the first few years of the forecast period because products are unavailable to meet customers' demands and customers are unable to rapidly incorporate the new products into existing environments.

EXHIBIT B-17

Planning and Analysis Cross-Industry Sector User Expenditure Forecast by Delivery Mode, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Sector Total	1,810	15	2,084	2,358	2,722	3,155	3,677	4,295	16
Processing Services	190	-12	165	145	130	115	100	85	-12
- Transaction Processing	190	-12	165	145	130	115	100	85	-12
Turnkey Systems	0	0	0	0	0	0	0	0	0
Applications Software Products	1,620	17	1,894	2,213	2,592	3,040	3,577	4,210	17
- Mainframe	200	8	216	233	252	270	287	300	7
- Minicomputer	170	5	178	180	180	180	180	180	0
- Workstation/PC	1,250	20	1,500	1,800	2,160	2,590	3,110	3,730	20

EXHIBIT B-18

Planning and Analysis Cross-Industry Sector
1992 MAP Data Base Reconciliation by Delivery Mode

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Sector Total	2,615	1,810	-805	-31	4,906	3,677	-1229	-25	13	15
Processing Services	190	190	0	0	100	100	0	0	-12	-12
- Transaction Processing	190	190	0	0	100	100	0	0	-12	-12
Turnkey Systems	50	0	-50	-100	50	0	-50	-100	0	0
Applications Software Products	2,375	1,620	-755	-32	4,756	3,577	-1179	-25	15	17
- Mainframe	447	200	-247	-55	627	287	-340	-54	7	7
- Minicomputer	353	170	-183	-52	526	180	-346	-66	8	1
- Workstation/PC	1,575	1,250	-325	-21	3,603	3,110	-493	-14	18	20

Based on vendor and user interview data, INPUT believes expenditures for the sales and marketing cross-industry sector were overstated in the past.

EXHIBIT B-19

Sales and Marketing Cross-Industry Sector User Expenditure Forecast by Delivery Mode, 1991-1997

Delivery Modes	1991 ($ M)	Growth 90-91 (%)	1992 ($ M)	1993 ($ M)	1994 ($ M)	1995 ($ M)	1996 ($ M)	1997 ($ M)	CAGR 92-97 (%)
Sector Total	1,166	6	1,232	1,316	1,408	1,510	1,629	1,778	8
Processing Services	556	4	575	600	625	650	675	700	4
- Transaction Processing	556	4	575	600	625	650	675	700	4
Turnkey Systems	275	8	297	324	353	385	420	457	9
Applications Software Products	335	5	360	392	430	475	534	621	12
- Mainframe	190	6	200	213	225	240	254	270	6
- Minicomputer	75	6	80	84	90	95	100	106	6
- Workstation/PC	70	15	80	95	115	140	180	245	25

EXHIBIT B-20

Sales and Marketing Cross-Industry Sector
1992 MAP Data Base Reconciliation by Delivery Mode

Delivery Modes	1991 Market				1996 Market				91-96 CAGR per data 91 rpt (%)	91-96 CAGR per data 92 rpt (%)
	1991 Report (Fcst) ($ M)	1992 Report (Actual) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)	1991 Report (Fcst) ($ M)	1992 Report (Fcst) ($ M)	Variance from 1991 Report ($ M)	Variance from 1991 Report (%)		
Sector Total	1,513	1,166	-192	-13	2,344	1,629	-715	-31	9	7
Processing Services	556	556	0	0	676	675	-1	0	4	4
- Transaction Processing	556	556	0	0	676	675	-1	0	4	4
Turnkey Systems	471	275	-196	-42	725	420	-305	-42	9	9
Applications Software Products	486	335	-151	-31	943	534	-409	-43	14	10
- Mainframe	191	190	-1	-1	268	254	-14	-5	7	6
- Minicomputer	129	75	-54	-42	208	100	-108	-52	10	6
- Workstation/PC	166	70	-96	-58	467	180	-287	-61	23	21