IT 2000

INPUT

Information Services Markets 1995-2000

Cross-Industry Markets

U.S. Market Analysis Program

Information Services Markets
1995-2000

Cross-Industry Markets

Forecast Update
January 1996

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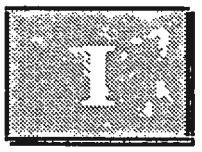


Introduction

A
Purpose and Organization

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

1. Purpose

The objectives of this report are to:

- Forecast user expenditures on information services during the next five years for each of 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 in each of the cross-industry sectors

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

- Understand the forces shaping their markets
- Develop internal market-based corporate financial projections
- Identify new markets and product and services opportunities
- Assess the competitive trends
- Determine potential market directions

2. Organization

This report is organized as follows:

- Chapters II through VIII contain individual analyses and forecasts for each of the seven cross-industry sectors. Within each chapter there are four sections.
  - Section A, *Sector Definition*, introduces and defines each of the cross-industry sectors.
  - Section B, *Key Trends and Issues*, identifies the relevant developments and resulting trends affecting each cross-industry market.
  - Section C, *Information Services Market Forecast*, provides the information services market forecast by product/service sector for each cross-industry market.
  - Section D, *Conclusions and Recommendations*, contains market-specific conclusions and recommendations for vendors and users in each cross-industry market.
- Appendix A—*Forecast Database and Reconciliation*—presents numerical tables with detailed 1995-2000 forecasts for each cross-industry market, as well as a reconciliation of the market forecast values noted in 1994 with those in this report.

3. Scope and Methodology

This report addresses the U.S. information services industry in seven cross-industry sectors. It includes only noncaptive user expenditures (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.

B
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 vertically oriented. For example, accounting, planning and analysis are functions that are similar enough across all industries to be considered markets in their own right for nonvertical 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

These sectors or markets involve multi-industry applications rather than industry-specific applications such as wholesale or retail sales, or insurance.

This year INPUT has prepared one report encompassing all seven sectors, rather than seven individual reports. The reason for this change is that the cross-industry sectors all tend to be affected in a similar way 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 future potential.

C
Product/Service Market Definitions

Cross-industry information services and products are delivered via applications software products, turnkey systems and transaction processing services. Other information services, such as systems operations, systems integration, professional services, information delivery services and systems software, are excluded from cross-industry consideration because they tend to be industry-specific in their application.

For a more complete discussion of INPUT's information services industry structure and market sector definitions, please refer to the separate publication, INPUT's *Definition of Terms, found* in the Volume I binder of the 1995 Market Analysis Program reports.

D
Methodology

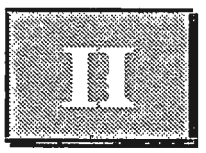
INPUT collected much of the data for this report through interviews with selected vendors and users. The INPUT corporate library in Mountain View, California supplied the bulk of the secondary research, and was used for general trend identification and verification, and event analysis. Other INPUT reports on key aspects of the information services industry also contributed to the analyses for the forecasts contained in this report.

E
Related Reports

The following reports will provide readers with additional information related to the cross-industry sectors. They are published annually and include:

- *Applications Software / Turnkey Systems*
- *Processing Services*
- *On-line / Internet Services*

Data on specific vendors is available from INPUT's Vendor Analysis Program (VAP). In many cases, INPUT has produced a detailed profile for a vendor as part of the Vendor Analysis Program.



Accounting

A
Sector Definition

By INPUT's definition, the accounting cross-industry sector consists of products and services purchased by multiple industries to serve functions including the following:

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

Related applications covered in other sectors include:

- Financial modeling (see the Planning and Analysis chapter in this report)
- Sales management and order entry (see the Sales and Marketing chapter in this report)
- Payroll and personnel (see the Human Resources chapter in this report)

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

B
Key Trends and Issues

In the 1990s, the major trend in accounting systems is the movement toward client/server technology. According to Deloitte & Touche's *1995 Annual Financial Systems and Accounting Systems Survey*, accounting systems implemented on client/server platforms increased from an installed base of 17% in 1993 to an installed base of 41% in 1995. In this same period, the survey revealed that the installed base for accounting systems on mainframes declined from 68% to 35%. Respondents to this survey indicated that 64% of the accounting systems they will implement in the next two years will be client/server-based.

There is also a fundamental shift occurring in the accounting cross-industry sector away from custom systems, toward packaged solutions. As INPUT reported last year, most users have realized that in-house, custom development is extremely expensive, time-consuming and increasingly impractical. The Deloitte & Touche survey indicates that 81% of respondents plan to select and implement packaged accounting systems software in the next two years. The increasingly reliable nature of vendor-provided client/server systems has made possible what might have been called a "leap of faith" several years ago.

So with the questions of residency and custom development rapidly becoming academic, client/server implementation has become a virtual standard. The real issue now is what vendor or service provider has the best client/server technology for a given user's accounting systems needs.

Client/server technology has really become the focus for vendors in this market. The bigger players include PeopleSoft, Inc., SAP America, Inc., J.D. Edwards & Company, Dun & Bradstreet Software Services, Inc., and Lawson Associates, Inc. All of these companies have focused on basing their existing and future product offerings on client/server architectures.

In early 1995, for example, PeopleSoft introduced its PeopleSoft Financials 3.0 integrated accounting application suite. With integrated billing, project costing, accounts payable, accounts receivable, general ledger and asset management modules, this accounting software system is typical of the types of client/server products available in this market. In this case, PeopleSoft has focused its technology equally on the client and server system components, to enhance product performance and mitigate criticism that the company's products have historically been "fat" on the client end.

As INPUT noted in the last report on this market, it is premature, even in this increasingly client/server-based market, to consider the mainframe obsolete. Historically, the mainframe has been the vast central repository for accounting applications and data, but user demands for speed and flexibility have shifted the mainframe's role in today's systems. Nevertheless, the "mainframe as server" concept is of great value in the accounting market. Companies such as SAP America, which has ported its R/3 financial package to LotusNotes, IBM mainframes and PowerPC systems, take a broad-based approach to client/server implementation. Legacy mainframe-based systems are often heavily or fully depreciated and, to the accountant, costs are minimal. As a result, the sheer cost of discarding legacy systems in favor of distributed systems remains a strong inhibiting factor that favors using mainframes for as long as they are effective.

As with most other market segments, the Internet has become a factor and a selling point in the accounting market, but largely at the single-user or household level. Perhaps the best example of this is Intuit's new Quicken Deluxe, the latest version of the best-selling PC-based accounting software package. Quicken Deluxe offers users direct Internet access to their bank, and includes the abilities to download bank statements and update electronic checkbooks. The product also offers users regular Internet access. Microsoft's Money for Windows 95 also has on-line banking features, but only offers Internet access through the Microsoft Network, which is integrated into Windows 95. For larger systems, the Internet is still relatively new. Nevertheless, vendors are making accounting applications Internet-compatible. For example, in May 1995, SBT Accounting Systems, Inc. introduced a module for its Pro Series 3.1 accounting package that allows users to post order forms on the World Wide Web and get orders returned via Internet E-mail. Dubbed WebTrader, this SBT product is among the first of its kind, and is considered a logical development in the business of Internet accounting.

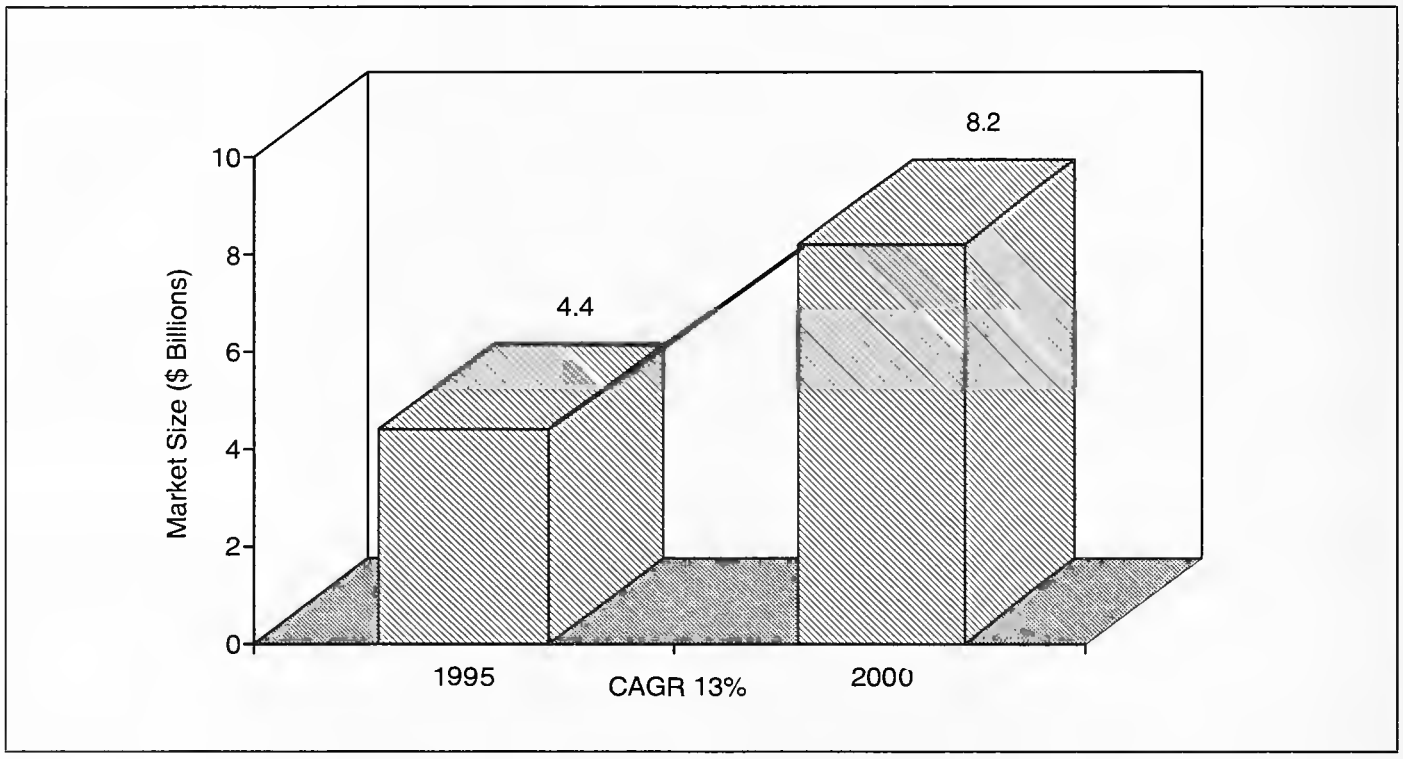
C

Information Services Market Forecast

INPUT has adjusted its 1995 forecast (from the previous year) to reflect user expenditures that were slightly higher than those predicted in 1994. The overall forecast for the accounting cross-industry sector is presented in Exhibit II-1.

Exhibit II-1

Accounting Cross-Industry Sector—Information Services Market, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

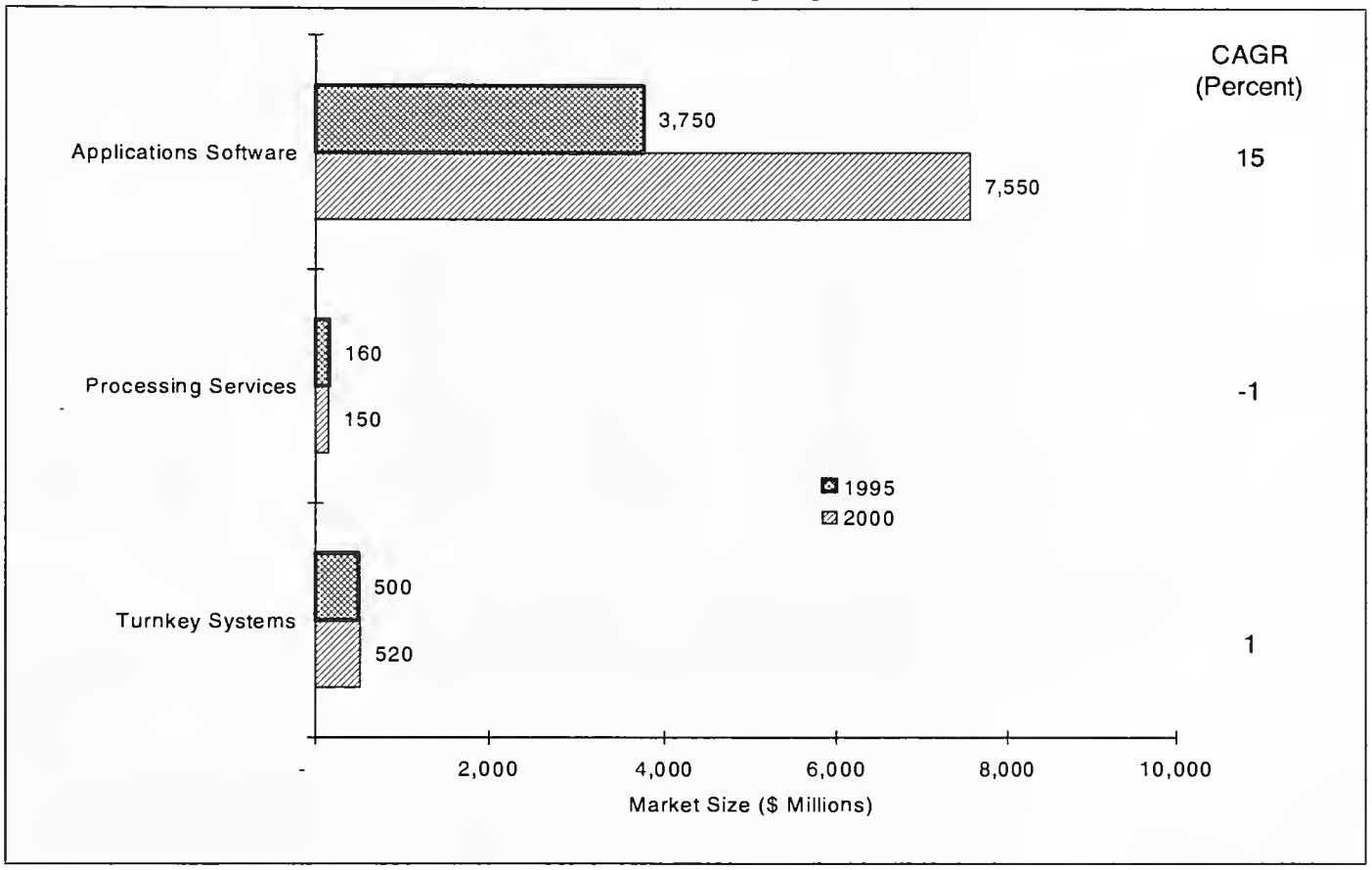
An overall reconciliation of the 1994-1999 cross-industry forecast is presented in Appendix A. An analysis of the accounting sector product/service market follows. Exhibit II-2 shows the current and forecast size of each product/service category in the accounting cross-industry sector.

1. Applications Software Products

Of the three product/service markets in this sector, applications software products is not only the largest, but will experience the healthiest growth rate over the next five years. Exhibit II-3 shows the growth expected for accounting cross-industry applications software products by platform size.

Exhibit II-2

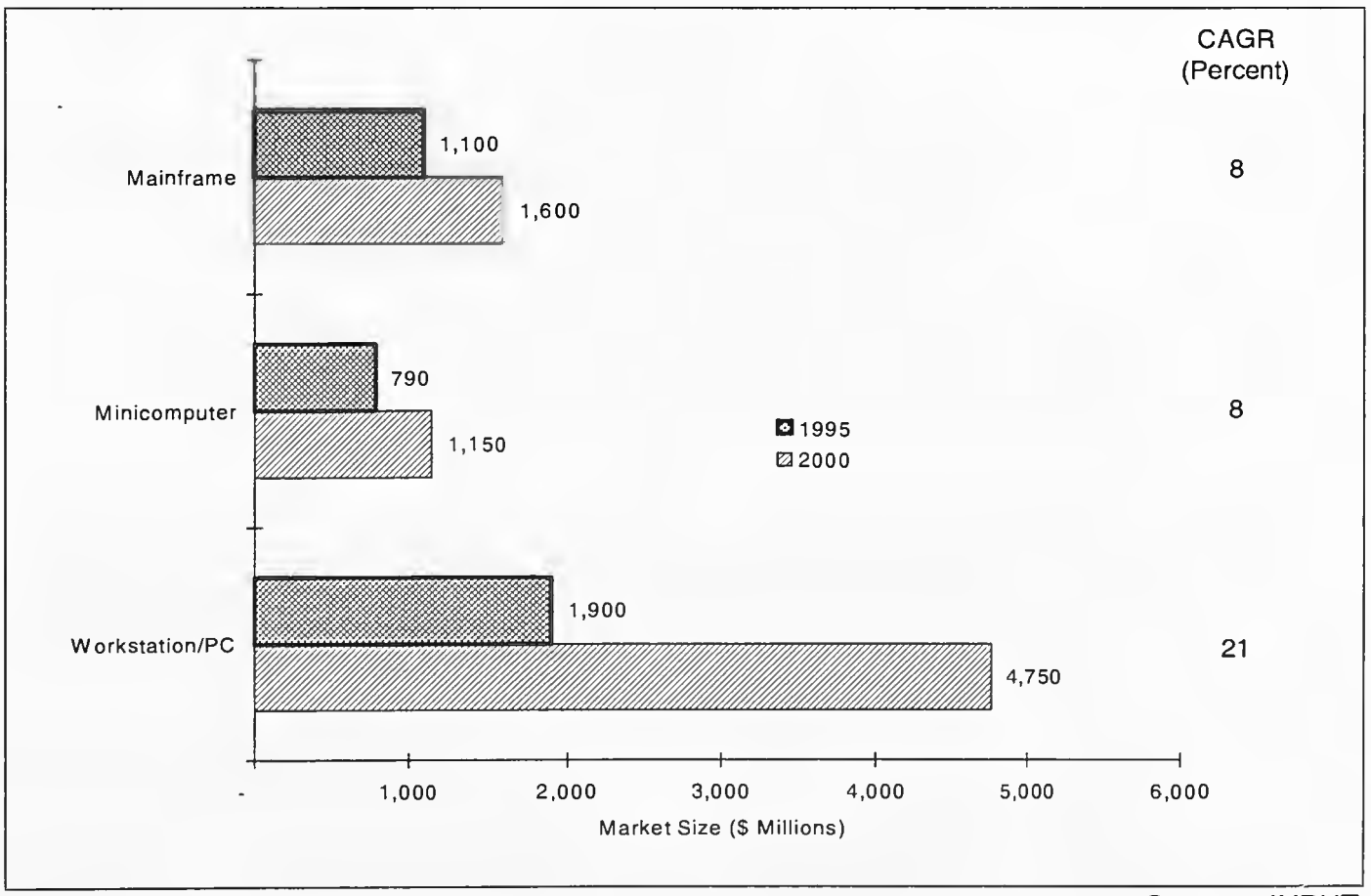
Accounting Cross-Industry Sector—Market Size by Product/Service Category, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

Exhibit II-3

Accounting Cross-Industry Sector—Applications Software Products Market by Platform Size, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

User expenditures on mainframe-based accounting packages increasingly focus on flexibility, ease of use and client/server capability. Consistent with last year, as the forecast period progresses, users will decrease their expenditures on upgrades and increase spending on migrations and client/server products. However, mainframe applications spending will remain relatively stable as second- and third-tier users maintain their legacy systems, or upgrade them for incorporation into client/server networks.

As with mainframes, minicomputer-based accounting applications software products will continue to experience moderate growth (an 8% CAGR, the same as for mainframes), at a somewhat lower spending level than for mainframes. Users have made considerable investments in midrange hardware over the last five years. Consequently, these platforms are better positioned to perform within client/server configurations and eventually will be further downsized.

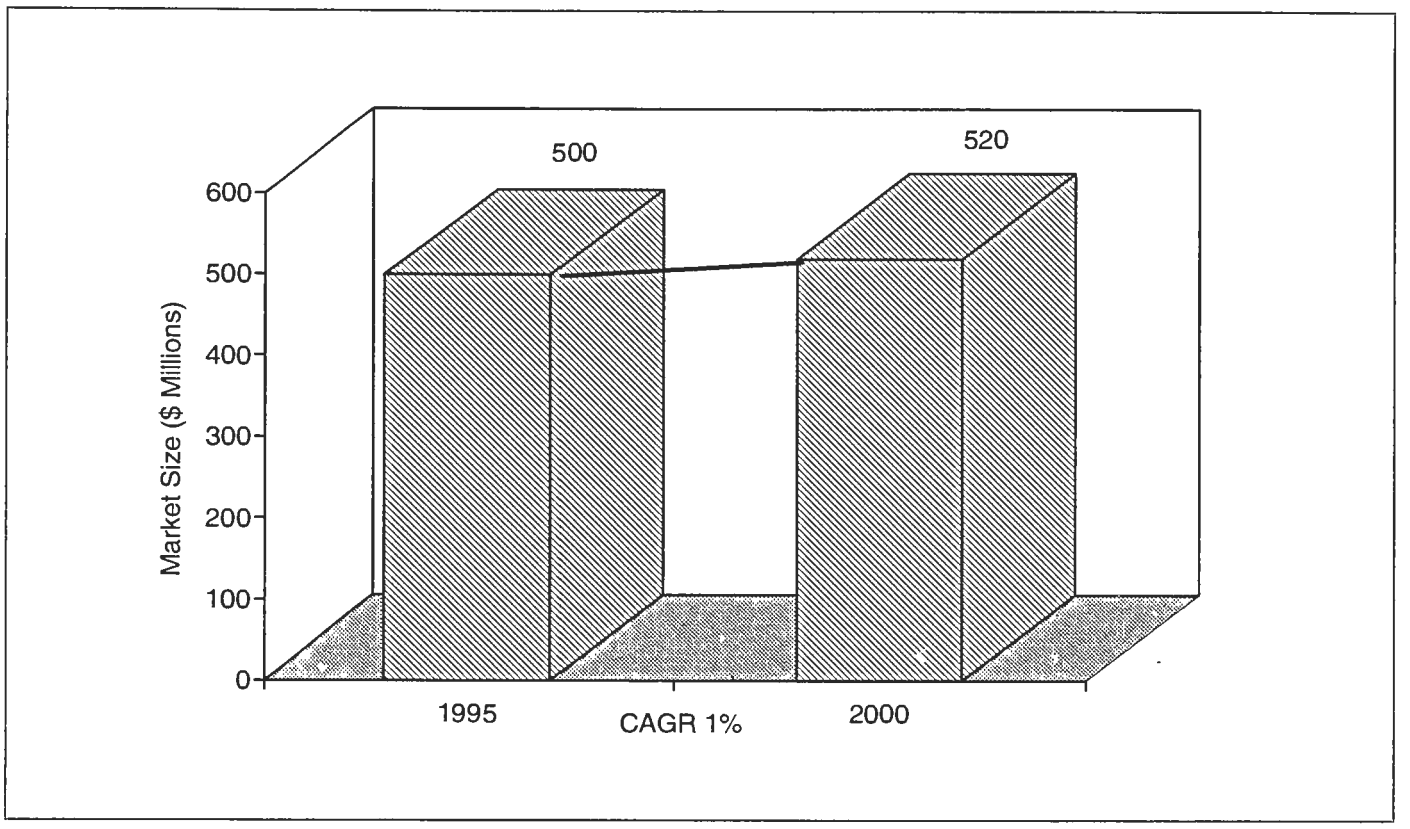
The popular and increasingly pragmatic shift toward client/server and downsized architectures has made the workstation/PC segment the most viable one for accounting applications software. As the practical differences between platforms continue to erode, INPUT forecasts the strongest growth for this segment. User preferences for Windows and comparable graphical user interface (GUI) technologies have made the workstation/PC platform the technology of choice for small to midsize companies and corporate user departments that prefer the flexibility, relative economy and ease of use this platform offers. Products from Intuit, Microsoft and other PC-based vendors such as Lotus and Peachtree will continue to benefit from growth in this segment.

2. Turnkey Systems

Exhibit II-4 presents the expected growth in accounting cross-industry turnkey systems.

Exhibit II-4

Accounting Cross-Industry Sector—Turnkey Systems Market, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

INPUT believes that this market will continue to show very little growth for the forecast period, and will continue at the same 1% CAGR reported for 1994-1999. The growth is due to the small but consistent need of many specialized industries, such as construction, forestry and agriculture for industry-specific accounting applications.

Turnkey vendors and VARs sell accounting systems predominantly to small and midsize businesses with annual sales of $25 million or less. For these users, turnkey vendors are still an affordable alternative to the hardware and software vendors and systems integrators used by larger companies. However, the accounting turnkey systems market remains small. Vendors and VARs in this segment often start with an existing accounting package and configure it with industry-specific operational solutions, ultimately creating an integrated solution with little cross-industry applicability.

INPUT believes the market for turnkey systems is still respectable, albeit industry specific, but the availability of solutions in the retail market or in cross-industry accounting packages for PCs is overpowering the need for the more expensive turnkey solution.

3. Processing Services

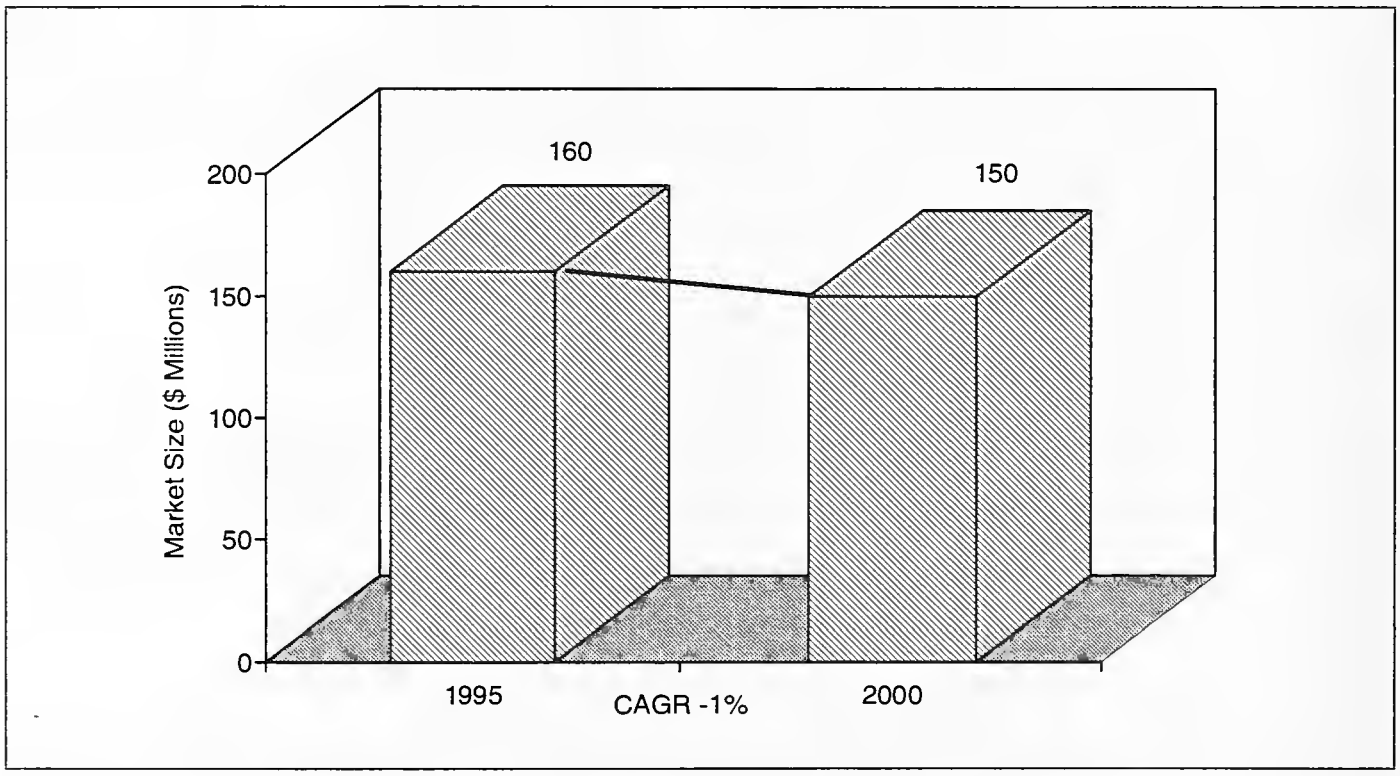
Exhibit II-5 presents the forecast growth in the accounting cross-industry sector processing services market.

Accounting cross-industry processing services do not include tax processing services sold to accounting firms, nor do they include payroll processing services (which is a human resource function) or processing services that support banking and finance functions, such as back-office banking, electronic funds transfer and retail point-of-sale applications.

Although a market for accounting data entry will continue to exist, it is still considered an industry-specific transaction processing service. In fact, no processing services firms exist today that perform all aspects of the corporate accounting function, though many firms offer parts of the function.

Exhibit II-5

Accounting Cross-Industry Sector—Processing Services Market, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

Therefore, accounting processing services are a small and declining segment of the entire processing services industry. Accounting was among the first functions that corporations computerized and it is relatively static compared to functions like payroll processing. And because packaged applications software products that run on personal computers and workstations are readily available, large and small firms can do their own accounting and related processing.

Ultimately, the only real source of new expenditures in accounting processing services is with companies that are downsizing and need some form of transition management to off-load applications that may include accounting applications software.

D
Conclusions and Recommendations

1. Conclusions

- Although accounting is a core application, it is becoming an increasingly client/server-based function due to user demands for faster, more flexible access to information.

- However, mainframe-based accounting activity is still important and viable, even though PC-based use is growing faster and will far surpass mainframe application market size by 2000.

- There remains a need, and an opportunity, for turnkey-based accounting applications, particularly in specialized industries like construction and agriculture, where terminology and inventory commodities remain industry-specific.

2. Recommendations

- User demand has driven the migration to client/server systems, and vendors have answered the call quite well. However, users must understand that a client/server migration must be done gradually, with all technological components assessed for usefulness and performance.

- PC-based applications are the largest and fastest growing segment in the accounting market. Development efforts for accounting applications should concentrate on the PC platform, if there are no compelling reasons for selecting other, larger platforms.

- Successful vendors in this area are, and will continue to be, those with modular, scaleable products, such as those noted above. Products of this nature give users more options and guarantee their ability to control expenses for software by making it easier for them to buy what they need as the need arises.

INPUT's overall accounting forecast shows higher growth in this sector between 1994 and 1995 than noted the previous year. This is due to the nearly explosive demand increase for PC-based applications software. As the largest single platform segment in accounting, PC software growth will be driven by the need for multiplatform client/server applications.

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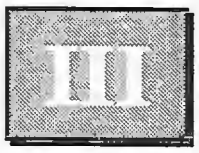


Education and Training

A
Industry Definition

Definition—As defined by INPUT, the education and training cross-industry sector consists of education and training delivered to business users as a software product, turnkey system or through processing services—courseware delivery techniques collectively described as computer-based training (CBT). Training for instructor-led businesses is not considered in this report, nor is the educational courseware used in K-12, college and university, or community education academic programs.

CBT—CBT consists of authoring systems and courseware. Courseware is what the student actually sees and interacts with at a terminal, while authoring systems provide toolkits or "shells" for courseware development. CBT is not limited to training related to information systems subjects, although initially CBT concentrated on the IS technical area. Today, CBT is offered for almost any category of employment on any subject. Examples of other major application areas include training for sales and marketing, safety, health awareness and basic skills (such as adult literacy).

B
Key Trends and Issues

1. Overview

It has been noted by some statisticians that, in today's and tomorrow's economic and business environment, an individual can expect to experience anywhere from three to five career changes, and hold four to 25 jobs in a lifetime. This reality has been recognized by most corporations, where the "no guarantees" admonition is applicable not only to the less well-trained or unskilled labor force, but also to all work force classifications: executive, management, professional, technical, administrative, clerical, craftsmen and others. The message is clear: times have changed, and the full employment practices of the past are no longer possible or rational in today's labor environment of downsized work forces, productivity improvements, technology alternatives and global competition.

Businesses, however, have not lost sight of the value of a skilled, well-trained work force, and are aggressively pursuing education and training programs for their employees as a means of improving productivity and achieving corporate profit objectives. One technique for the cost-effective and efficient delivery of education and training courses that is growing rapidly in popularity is computer-based training (CBT), or non-instructor-led training (non-ILT).

CBT education and training can be divided into two broad categories: (1) IS-related education and training and (2) other technical, business, trade and general skills education and training.

IS-Related Training and Education is the instructor-led portion of the training spectrum, delivered primarily by professional services vendors such as Andersen Consulting and Ernst & Young. Although typically a professional services function, and therefore not covered by this report, such IT training that is delivered via CBT is considered.

Other Technical, Business, Trade and General Skills Education and Training is the "all other" category of CBT that is other than CBT-delivered IT training. Companies such as DPEC and NETG offer courses in general business skills in addition to IT-specific courses and CD-ROM-based courseware, such as The Software Toolworks' *Mavis Beacon Teaches Typing,* which are very popular for business and personal use.

2. Factors Affecting Growth

There are a number of key factors driving the growth of cross-industry CBT-based education and training. They are consistent with last year's report, and include:

Lower Training Costs—There is some question, generally, as to the actual value of CBT when its results are measured against the possible time and expense wasted to procure and implement such programs. However, overall, CBT offers lower costs than comparable seminar-based training, and is rapidly becoming more comprehensive through the use of on-line and satellite-based resources.

Work Force Changes—As noted above, the U.S. business climate can no longer guarantee lifetime employment, and even highly skilled professionals can end up changing jobs as often as semesters change in college. Through CBT, professionals at every skill and salary level can improve upon their existing capabilities or acquire the new skills necessary for a different career in a quick, cost-effective manner.

Technology—The diminishing cost of PC and CD-ROM technology has greatly improved the accessibility and affordability of CBT. Perhaps the biggest advantage of such inexpensive technology is that CBT no longer has to occur in a centralized environment. Training or retraining can occur at the employee's desktop, making it more convenient and accessible, and eliminating the need for classrooms or training halls.

3. Key Trends

The following are the most significant trends in the use of cross-industry education and training for American industry.

Use of CD-ROMs—When Microsoft shipped its Windows 95 upgrade in August 1995, users had the option of loading it using 13 floppy disks or one CD-ROM. The CD-ROM upgrade took advantage of faster, more reliable data transfer technology, and also included a lot of extra software excluded from the floppy disk version. The point is that, with cost of multimedia coming down and the quality going up, the CD-ROM has become the most cost-effective means per byte to deliver virtually any form of software.

Multimedia—Because of the increased use of multimedia for software tutorials, on-line help databases and Video for Windows or QuickTime presentations, CD-ROMs are the only medium that currently offers a low-cost, high-capacity source for truly effective CBT. Multimedia also provides the means to improve simulation- and stimulation-based instruction. Programs with a purpose, incorporating a well-designed simulation of the task to be learned, Video for Windows, QuickTime or MPEG clips to stimulate visual response and functional attributes that allow user control of the learning process are the rapidly growing next generation of CBT-based leaning tools. For a fast-growing number of these courseware offerings, the multimedia delivery vehicle will be a CD-ROM.

Need to Reduce Education and Training Costs—As noted above, there are some concerns about the cost effectiveness of CBT. Overall, though, CBT is a cost-sensitive alternative that delivers many of the required benefits while eliminating instructor and travel costs and optimizing the use of student time.

Structured Approach to Education and Training—A growing number of companies are recognizing the need for different types of training for IS and non-IS subjects, and the need for a structured approach to education and training as opposed to letting each user department do its "own thing." Lotus, for example, started building its Lotus Authorized Education Center (LAEC) in early 1995. The LAEC is an educational network focusing on Lotus Notes training on a global basis. Its goal is to provide customers with consistent training on Notes deployment, development, certification and geographical deployment.

Vendor Unbundling—Technical support is not the free resource it used to be. For software, support (which often includes education and training) is typically limited to 90 days of phone support through an 800 number—if the company offers one. With vendor- or VAR-provided CBT, users have a cost-effective training and technical support resource which is usually more convenient and timely than dialing a phone or sending a fax.

4. Key Issues

Significant issues concerning the use of cross-industry education and training resources include the following:

Upgrading Multimedia Systems—In last year's report, INPUT stated that the expenditures required to upgrade older PCs to multimedia readiness could be considerable. INPUT currently believes that the shrinking costs of multimedia systems make it more affordable and, in the long run, cost-effective to invest in new multimedia PCs rather than upgrade old machines.

The remaining problem, however, is the rapid increases in the performance capabilities of multimedia PCs and related software. For example, with the existence of quad-speed and 6X-speed CD-ROM drives, developers are able to ship software that runs on the faster drives, but makes triple- and double-speed drives virtually obsolete. The increasing demand that new software keeps putting on CPU and RAM requirements is also an area in which upgrading a multimedia PC can get expensive. A PC with a 486 50Mhz DX processor and 8 MB of RAM would have been capable of running between 75% and 90% of the retail software products available in late 1994. In late 1995, however, much new multimedia software performs best with CPU and RAM resources that are significantly higher. These are areas in which cost concerns must be taken into account.

User Preferences for Help *Support*—In the past, the typical corporation had a computer support department or help desk to assist department and division- or corporate-level professionals with hardware or software problems. Unfortunately, the response time of the average support employee was almost always directly proportional to the number of support calls in the queue on a given day. As a result of this climate, and the increase in effective manuals and on-line software support, many users who became independent troubleshooters out of frustration have been getting better support by doing it themselves. This has fueled the preference for CBT and on-line help as ways of cost effectively gaining training and solving problems.

Continuing Education: Who's Responsible?—As noted in the Overview of this section, employees and professionals at all levels must continually improve existing skills and learn new ones as company and career demands dictate. The question, posed last year by INPUT, is who is responsible?

Increasingly, corporations have answered this question by saying "We are." Although downsizing became at first a cliché, then a dirty word, companies that trim costs by trimming personnel have become increasingly sensitive to the obligation they have to employees who may eventually leave. But providing training is not necessarily a means to prepare an employee for downsizing. Quite often a company must also retrain personnel due to a shift in the company's business, its focus or goals, or as a result of a merger or acquisition.

For the past several years, INPUT's analysis has indicated that employees tend to underuse company-sponsored training. In 1995, however, in the wake of U.S. Naval base closures and shake-ups at IBM and General Motors, reality has descended upon more of the U.S. work force. Therefore, INPUT believes, CBT and other forms of education and training are gaining wider acceptance and usage.

C
Information Services Market Forecast

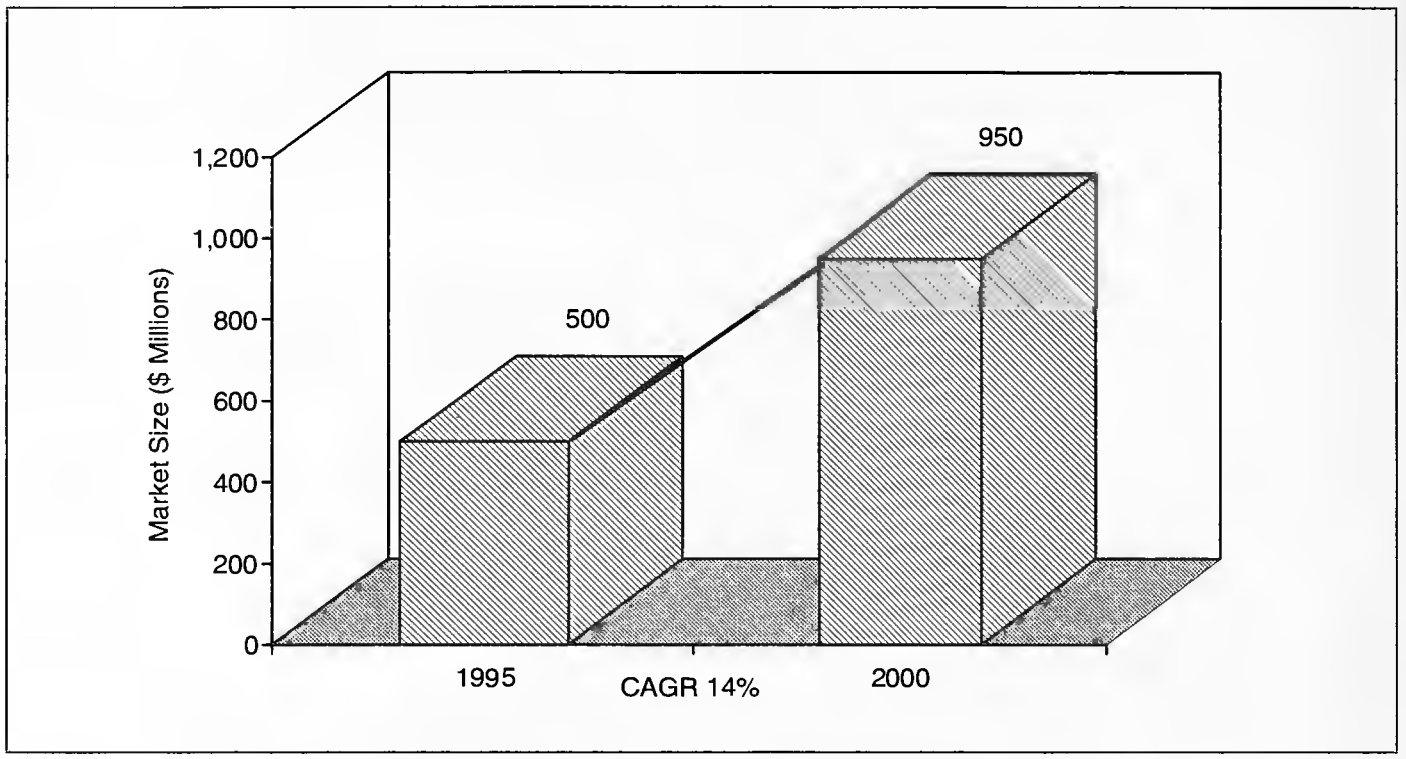
1. Market Overview

Total information services expenditures for the U.S. cross-industry education and training market grew to $443 million in 1994—$11 million (and 3%) more than the amount forecast in the 1994-1999 report.

INPUT has sized the 1995 information services segment of the education and training cross-industry market at slightly less than $500 million in 1995, and expects growth through 2000 at a 14% compound annual growth rate (CAGR) to almost $950 million. This growth is diagrammed in Exhibit III-1. The 14% overall five-year CAGR for 1995-2000 is up one percentage point from the 13% forecast in 1994 for the period 1994-1999. The increase is due primarily to the strong growth predicted for the workstation/PC segment of the applications software category. This growth, in turn, is largely due to the diminishing costs of multimedia PC technology, the growth of multimedia use in CBT, and the simple growth of the number of quality multimedia software products available.

Exhibit III-1

Education and Training Cross-Industry Sector Information Services Market, 1995-2000



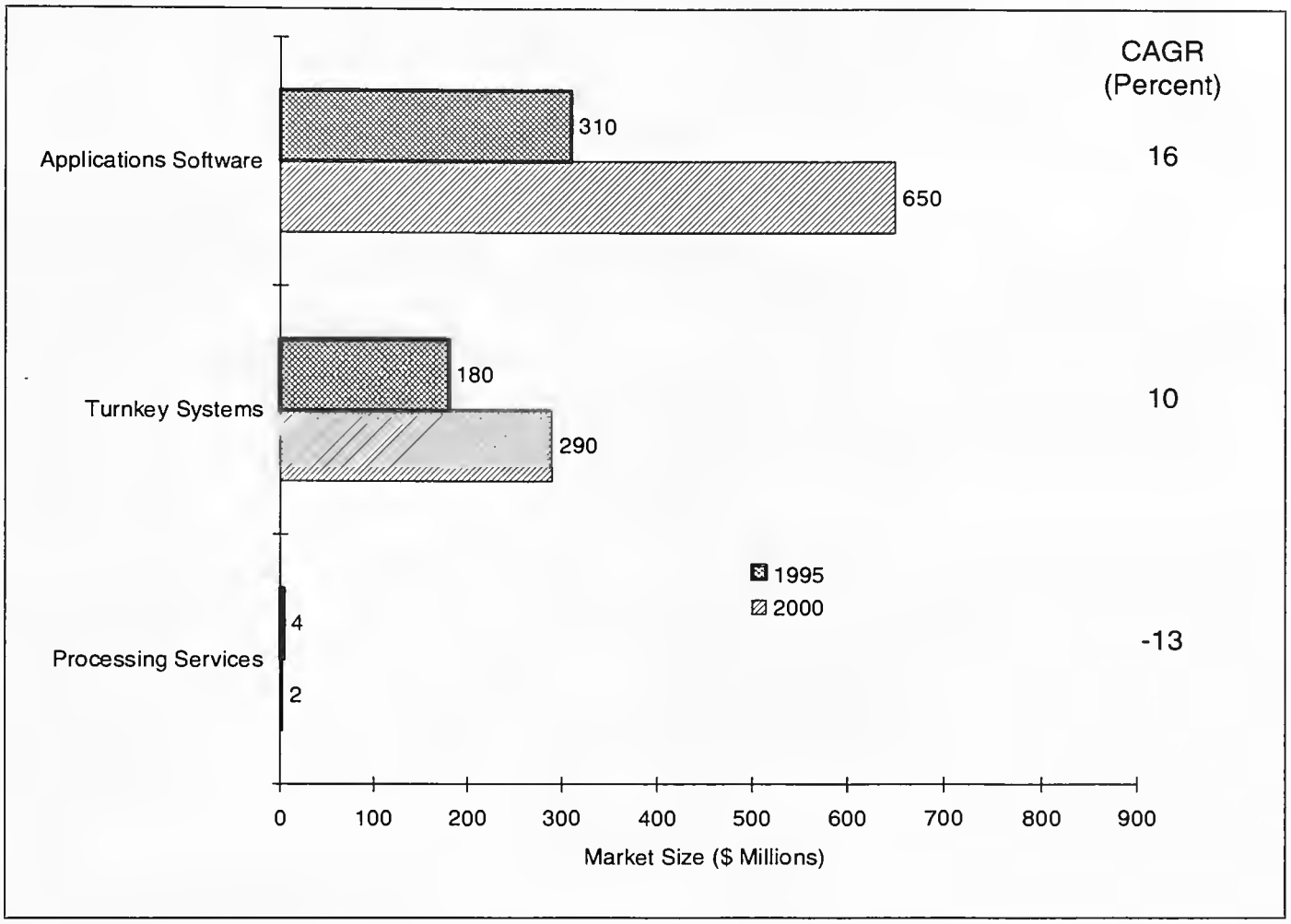
Note: Numbers have been rounded. *Source: INPUT*

2. Product/Service Market Sectors

The 1995-2000 forecast of market size by product/service sector in the cross-industry education and training market is shown in Exhibit III-2. Analyses of the various product/service markets follow the exhibit.

Exhibit III-2

Education and Training Cross-Industry Sector—Market Size by Product/Service Sector, 1995-2000

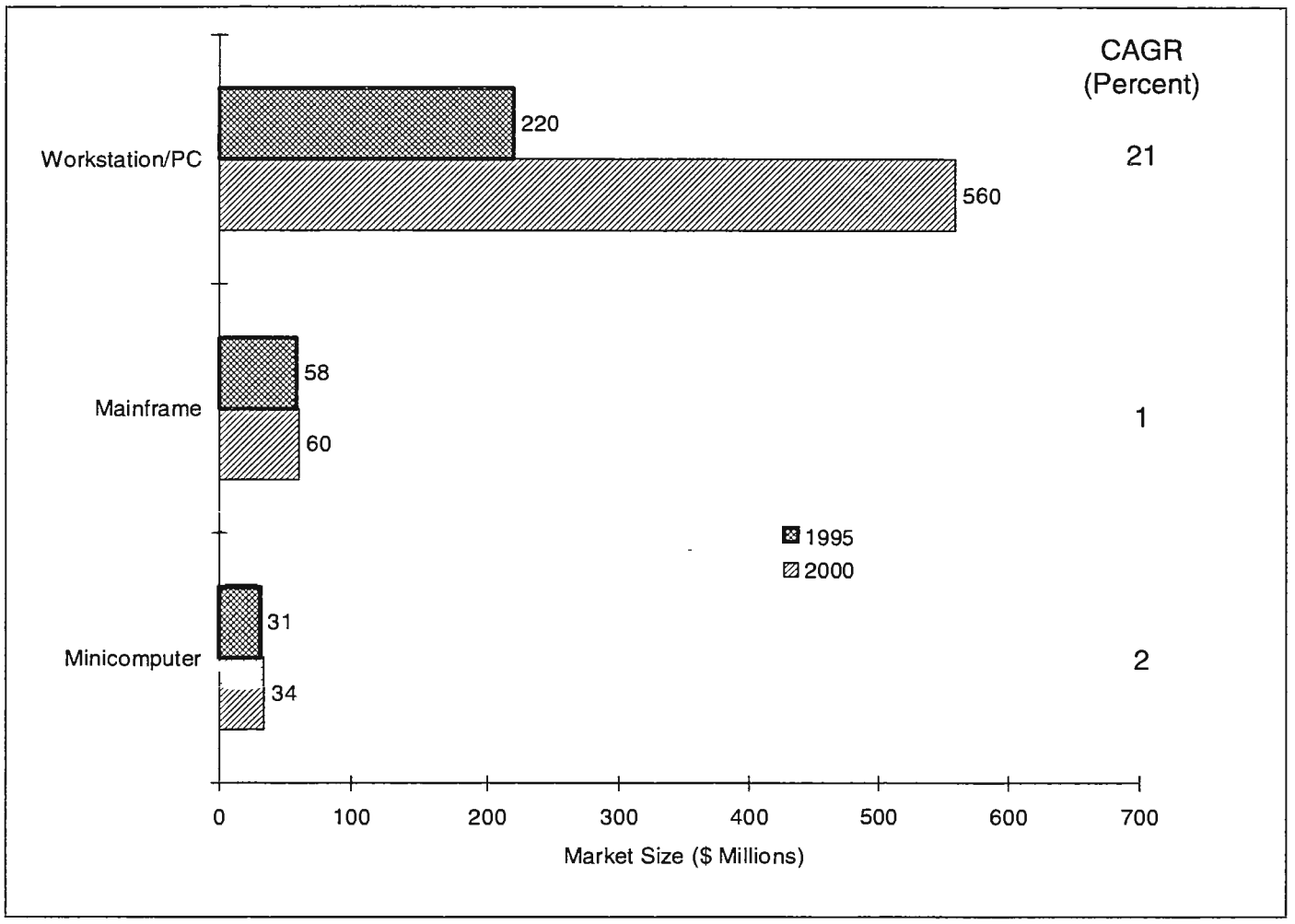


Note: Numbers have been rounded. *Source: INPUT*

Applications Software—Driven by a growing appreciation of the value of well-designed, well-presented, CD-ROM-based, multimedia education and training courseware, the applications software market will grow at a strong 16% CAGR through 2000, from nearly $310 million to more than $650 million over the five-year period. As noted in Exhibit III-3, this growth will be fueled almost exclusively by the growth in workstation/PC-based courseware. Authoring systems for platform-independent education and training applications will also contribute to this growth.

Exhibit III-3

Education and Training Cross-Industry Sector Applications Software Products Market by Platform Size, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

In almost all training situations, the use of PCs or LAN-based workstations will continue to be more convenient and less costly than providing terminals connected to general-purpose mainframes or minicomputers. As a result, mainframe and minicomputer applications software growth will be minimal, at a 1% and 2% rate, respectively. As more time passes, however, and the independent or LAN-based population of PCs with multimedia capability grows, the size of the mainframe and minicomputer market will diminish, and growth will turn negative, as it has with processing services.

Much of the new courseware will take advantage of multimedia presentation attributes, and old noninteractive courseware is being rewritten or upgraded to include audio and visual capabilities and repackaged for CD-ROM delivery. Although applications versions for users without multimedia or CD-ROM capability will continue to be offered, the most significant enhancements can be expected in the multimedia environment—a technology uniquely suited to education and training applications.

Turnkey Systems—Growth in this product/service sector will be from more than $180 million in 1995 to $290 million in 2000—a five-year CAGR of 10%. Turnkey solutions, like LAN-based PCs, are a popular training alternative, because complete systems can be offered that incorporate CD-ROMs, video disks and other equipment to provide a complete standalone education and training resource. For instance, a turnkey solution might allow CD-ROM courseware to be delivered without requiring separate CD-ROM readers at each terminal.

Mirroring the use of turnkey systems in other industries and application areas, the most significant five-year growth (12%) will be in the use of professional services supporting the system. Software product growth will be at 10%—a result of the expanding library of new and revised courseware and education and training applications. Equipment growth will be at 8%, constrained by the decreasing cost of hardware. (See Exhibit A-3 for these subsectors.)

Processing Services—The use of processing services, with their pay-as-you-go usage-sensitive cost basis, will continue at a slow but steady decline, from $4 million in 1995 to only $2 million in 2000. This market has been severely affected by the growing capabilities of standalone and networked PCs, with their lower connection costs and expanding libraries of education and training courseware.

D
Conclusions and Recommendations

This section summarizes INPUT's conclusions regarding the education and training cross-industry marketplace and offers recommendations regarding competitive strategies and courses of action for users and vendors of education and training information services products.

1. Conclusions

The following are INPUT's conclusions regarding the education and training marketplace and the information services products sold to this cross-industry market segment. They are consistent with those drawn in the 1994 report.

- Education and training for employees is a practical solution to contemporary business needs and a socially responsible corporate activity. These conditions can be expected to continue for the balance of this decade.

- Given the estimates of the number of career changes the average worker can expect in years to come, company-sponsored education and training programs are now and will continue to be a major corporate tool for facilitating career and work force changes. The availability of such programs will be viewed as highly desirable benefits by labor unions, professionals, clerical staff and other members of the labor force.

- The education and training platforms of choice will be workstations and PCs (using a variety of architectures and operating environments), simply because they are ubiquitous and cost effective. Workstations and PCs will be either standalone units or networked as part of client/server implementations.

- Although many IS departments are being downsized as such groups decentralize to user and departmental staffs, IS-related education and training will be even more important for users, so they can assume a more active role in the management of their own resources.

- Multimedia is the most effective delivery vehicle for CBT. Costs were high, but they continue to decline, especially as more PCs are sold with CD-ROMs to accommodate applications software and documentation distribution preferences.

- CD-ROMs will be the education and training multimedia delivery vehicles of the future. There is simply no better alternative technology at this time. Most desktop applications software vendors agree.

- Centralized corporate education and training departments will continue to identify training resources and pay the cost of such training. The employee, however, still has the ultimate responsibility to take advantage of the resources offered and effectively apply the knowledge or skills gained.

2. Recommendations

INPUT offers the following recommendations to vendors and users. Like the conclusions above, they are consistent with the 1994 report.

- Users:

  - *Facilitate Change*—Recognize the economic trends and realities that are now becoming visible and prepare your employees for change by helping them enhance their skill sets through well-defined, well-thought-out corporate-sponsored education and training programs.

  - *Leverage Existing Investments*—CBT offers the potential for very cost-effective leveraging of workstation/PC investments made for other business purposes. Use instructor-led training where appropriate, but optimize the CBT alternatives.

  - *Quantify* All *the Costs*—Consider and quantify CBT technology requirements when considering the costs of implementing CBT. Include the appropriate CD-ROM, sound board, sound driver, speaker, video accelerator, high-resolution video monitor, processor speed and

other costs necessary to take advantage of sophisticated multimedia courseware. Recognize, however, that these resources are easier to install and cheaper to buy when they are ordered with a new system.

- *Stress the Value of Education*—Treat education and training as a valuable corporate resource and promote it that way—especially basic skills training, which might lack the panache of advanced engineering or programming courses.

- Vendors:

  - *Multimedia Is Key*—INPUT believes that multimedia is the key to the future for cross-industry computer-based education and training, because development and authoring tools are more sophisticated and prevalent and less costly. Concentrate efforts on multimedia courseware development, a technique that educators are now starting to describe as "educating the whole brain."

  - *CD-ROMs Are the Way to Go*—The CD-ROM is a cheap, effective way to deliver multimedia courseware, large databases, applications software and reference material such as manuals and user guides. INPUT believes that CD-ROMs are already the distribution vehicle of preference, and that within the forecast period, CD-ROMs will be the *only* widely used software distribution medium.

  - *Application Suites*—Where possible and practical, develop an integrated suite of education and training applications software that can be marketed as a package—a total solution to a definable subset of educational needs, such as basic business skills, literacy or computer programming. Such packaging enhances the opportunity for initial and add-on courseware sales and demonstrates the vendor's comprehensive ability to address educational needs. The Lotus LAEC example noted earlier is a high-end example of the comprehensive systems users will prefer.

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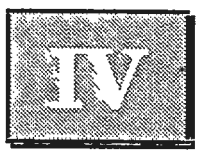


Engineering and Scientific

A
Industry Definition

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

CAD and CAE—Only nonindustry-specific CAD and CAE activities are considered in this report. Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from this document, since it is specific to the discrete and process manufacturing industries. CAD or CAE that is dedicated to integrated circuit design is also excluded because it is specific to the electronics industry.

Structural Analysis—Structural analysis (or finite element analysis) helps engineers in a number of industries analyze the structural integrity and thermal adequacies of components. A relatively new and developing market is electromagnetic field analysis, which analyzes the interaction between electrical fields.

Statistics / Mathematics / Operations Research—Statistical and mathematical analysis applications encompass all forms of sample and survey analysis for market research and product testing, including such diverse applications as personnel evaluation, decision support, health care analysis, computer performance evaluation and operations research.

GIS and Mapping—Geographic information systems (GISs) and desktop mapping capabilities 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. Examples of commercial applications include demographic market analysis to help retailers decide where to locate new stores, tax assessment programs for municipalities, and emergency vehicle routing for rapid response to critical situations.

B
Key Trends and Issues

1. Overview

Although the complexity of some high-end engineering and scientific tools (such as the systems NASA used to capture the recent Hubble telescope image of a massive stellar incubator) still require the computing power of mainframes, the availability of Pentium and PowerPC processors has put an increasing number of engineering and scientific applications on the desktop, in the hands of novices and experts alike. This is an overall trend, which has remained constant for the last several years. With Intel's next-generation processor—the P6—on the horizon, the power to use more complex engineering and scientific software tools will only increase. As a result, engineering and scientific activity, as a functional cross-industry capability, is becoming a more practical and cost-effective resource available to broader horizontal and vertical ranges of users.

2. Key Trends

The following are the key trends driving the engineering and scientific cross-industry market, including specific consideration of technology and applications trends. They are consistent with the 1994 report.

Platforms—The growth in the population of workstation/PCs in the business environment continues to be meteoric. Much of this growth is the result of the continuing drop in prices for PCs which, in turn, has resulted from a continuing reduction in processor chip prices. This has been particularly noticeable during 1995, as Intel's shipments of Pentium processors has increased, driving down prices for its 486 chips. (The 386 chip is no longer the standard processor used in any of the PC systems sold in retail stores or through mail-order houses). And, as expected, the variety of clock speeds available have made Pentium processors rated at 100 MHz and lower more affordable than faster chips.

Yet no other market segment was as adversely affected by the discovery, in late 1994, that as many as two million Pentium processors were flawed by bad floating-point units (FPUs). Because of this flaw, highly complex computations typically performed only by high-level engineering and scientific users produced errors that should not have been mathematically possible. Intel suffered some public-relations embarrassment before finally agreeing to a "no-questions-asked" chip-for-chip exchange, whether a given chip had exhibited the FPU fault or not.

Nevertheless, Intel-based PCs remain the most cost-effective platform for a growing number of complex engineering and scientific applications. This market, as noted in the next section, is more than twice the size of the mainframe market, even though applications like the NASA example mentioned above still drive the need for larger computers.

Downsizing and Decentralization—As in other markets, downsizing also affects engineering and scientific employees. Government spending cutbacks, including the November 1995 government shutdown, threaten the job security of both public-sector engineering and scientific professionals and their private-sector colleagues who rely on government contracts. An analysis is being conducted by the National Academy of Science to determine how immigration, foreign student enrollments, multinational business practices and overseas outsourcing are affecting U.S. engineering and scientific jobs.

Technological downsizing has occurred due to the growing expense many users have encountered in maintaining and upgrading legacy systems kept for engineering or scientific purposes. Cost-effective PCs and more affordable LAN and WAN technology will continue to drive decentralization of systems in this market.

GUIs—The popularity and population of graphic user interfaces (GUIs), such as Microsoft's Windows, Windows NT and Windows for Work Groups, are improving the quality and ease of use of PC-based engineering and scientific applications. Yet, on the server side, UNIX is still the operating system of choice, with vendors such as HP, Sun Microsystems, and The Santa Cruz Operation pushing for a standard UNIX interface in an effort to take market share from Windows NT. The much-touted release of Windows 95 in August, 1995 has yet to make a measurable impact on the engineering and scientific market.

Client / Server—As noted previously in this and other chapters, client/server technology has survived the hype and become a true technology focus in the engineering and scientific market. In a sense, the Hubble image example given earlier is an illustration of how powerful truly distributed client/server systems have become in this market. During research for this report, INPUT used a Mosaic Web browser, the client application, to access a NASA homepage, the server, to obtain an image of a stellar cloud cluster. It is clear that client/server architecture is here to stay, and that many engineering and scientific applications will be candidates for this production environment.

Applications Trends—This section summarizes significant applications trends in the areas of CAD and CAE; structural analysis; statistics, mathematics, and operations research; and geographic information systems (GISs) and mapping.

- *CAD and CAE*—Traditionally, most CPU-intensive CAD/CAE work has been done on UNIX workstations with 64-bit paths, on minicomputers or on mainframes. Intel's Pentium processor, with its 64-bit architecture and less expensive workstations with more power, offers a new, cost-effective resource for CAD/CAE applications. Hewlett-Packard and Sun Microsystems remain leaders in the high-end UNIX workstation market, particularly for engineering and scientific applications.

- These new platforms can effectively run many computer-aided design and engineering software tools. The result of this availability of power has been the migration of more processing resources closer to the user. This, as noted previously, has stimulated a migration to the workstation/PC environment for applications previously only available on mainframes or minicomputers.

- *Structural Analysis*—As with CAD/CAE, structural analysis applications are benefiting from the growing availability of more powerful workstation/PCs in the workplace. Although 32-bit processors have been capable of handling many structural analysis applications, analyses of greater complexity or with larger data arrays still perform much better in a 64-bit environment. With 64-bit workstations and PCs, a viable, cost-effective alternative to mainframes exists, and INPUT expects to see more and more sophisticated structural analysis applications offered on micro-based platforms.

- *Statistics / Mathematics / Operations Research*—No matter what the industry or product, statistical analysis, mathematical routines and operations research (OR) techniques and evaluation are useful tools and generally function without industry-specific modifications. As with CAD, CAE and structural analysis, the availability of powerful new workstation/PC platforms provides the opportunity to move many of the more sophisticated mathematical analyses from larger minicomputers and mainframes to smaller platforms in the hands of the user.

- *Geographic Information Systems / Mapping*—Mapping is no longer simple cartography. It is least-cost routing for shipments, trip planning for vacationers, territory planning for sales managers, property tax boundaries for municipalities and demographic representation and analysis for governments at all levels—local, state and federal.

Because of the size of the databases typically used to analyze geographic data, most geographic information systems (GISs) have run on mainframes, and it is only with the proliferation of powerful PCs that such applications have been able to move to a smaller platform. In addition, RISC-based workstations have proven quite popular for GIS work. Currently, the U.S. Bureau of Land Management and the Defense Mapping Agency use RISC workstations to conduct massive surveying and mapping projects.

GIS technology is useful for more than just mapping. Utility companies use GISs to maintain information for service areas, telecommunications firms manage data related to land-lines and wireless (cellular) on GIS, and the commercial sector is developing many uses, including inventory management and demographic analysis. With advances in satellite tracking and global positioning systems (GPSs) already in mail-order catalogs and automobile dashboards, the importance of GIS technology as a provider of industrial and consumer market opportunities keeps growing.

3. Key Issues

Because of the basic nature of the functions performed in the engineering and scientific cross-industry market, it tends to be less issue-oriented than most other cross-industry or vertical industry markets tracked by INPUT. Whereas other markets typically have a number of topics or issues upon which opponents have strongly differing positions or opinions, the engineering and scientific market is inclined to see rational alternatives, each with pros and cons, to which due consideration should be given.

There are two significant issues, from an information services viewpoint. They are the continuing viability of CAD and CAE as a distinct cross-industry market and the suitability and cost effectiveness of various platforms for engineering and scientific applications. Each of these issues is discussed below.

The Cross-Industry CAD/CAE Market—Computer-aided design and engineering products are used in virtually all manufacturing industries. As generic design and engineering tools become more accepted by, and hence more useful to, an industry such as automotive or small electronics, there is a vendor tendency to refine them and either make them industry-specific or offer industry-specific versions of the original generic product. When this occurs, the design or engineering tool is no longer a cross-industry resource; it is a useful, industry-specific design or engineering tool—and is now counted by INPUT as an applications software product used by the specific industry.

Platforms—INPUT maintains that most of the growth to occur in the engineering and scientific cross-industry market will be driven by the availability of the smaller, more powerful workstation/PC platforms using

high-end processors such as Intel's Pentium systems and the growing family of PowerPC engines. These powerful desktop platforms offer users a new processing alternative designed to meet their personal computing and analysis needs, and vendors will have an expanding market in which to sell existing or improved products.

Many scientific and engineering applications will continue to run on large mainframes and minicomputers for the foreseeable future. They either have processing requirements or data manipulation needs so massive that no other platforms are viable. This necessity is reflected in the 6% CAGR reported in the next section for the mainframe component of engineering and scientific applications software expenditures.

C
Information Services Market Forecast

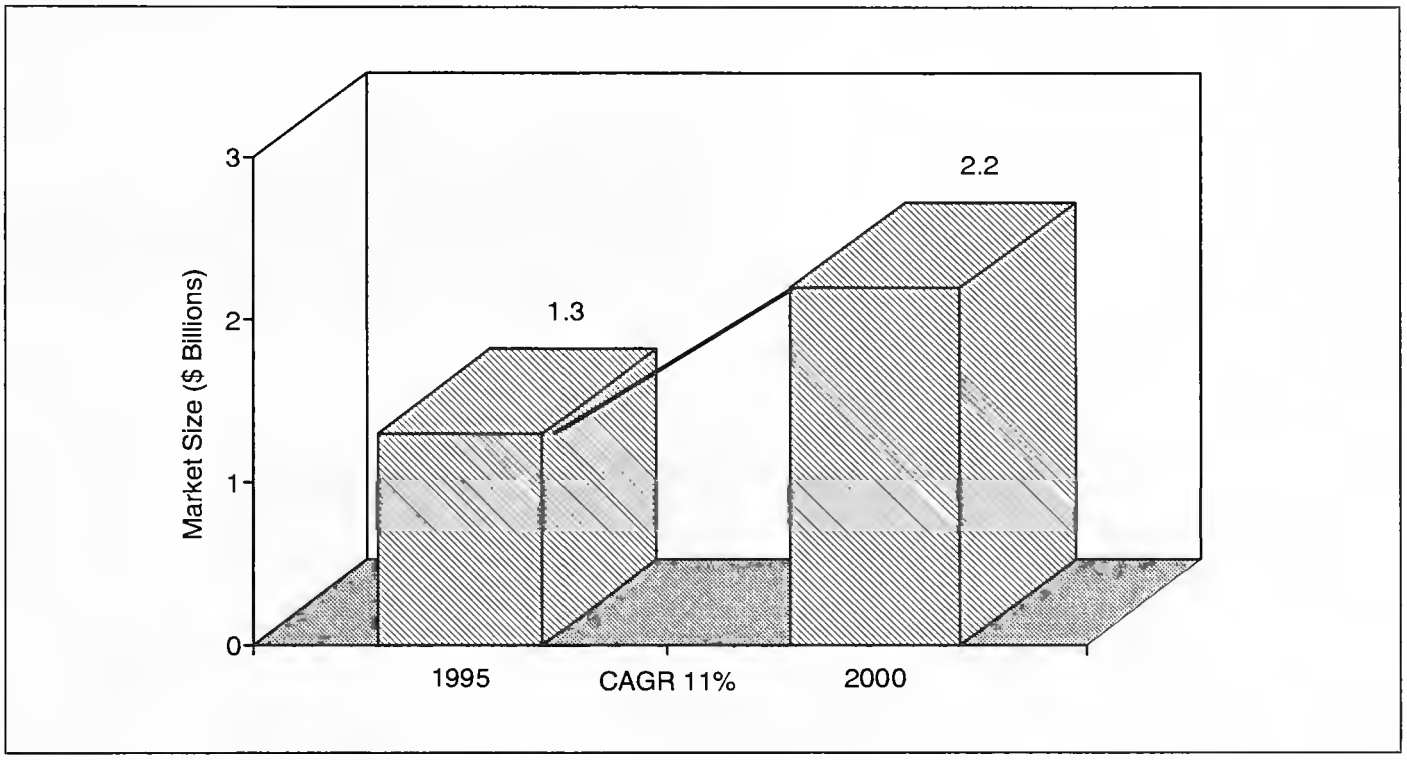
1. Market Overview

Total information services expenditures for the U.S. cross-industry engineering and scientific market grew to $1.2 billion in 1994—$14 million more than the amount forecast in the 1994-1999 report. The 1% variation between the 1994 forecast and actual values was due to continued growth in the workstation/PC portion of the applications software market segment.

INPUT has sized the 1995 information services segment of the engineering and scientific cross-industry market at slightly more than $1.3 billion in 1995, and expects growth through 2000 at an 11% CAGR to $2.2 billion. This growth is shown in Exhibit IV-1. The 11% overall five-year CAGR for 1995-2000 is 1% higher than that forecast in 1994 for the period 1994-1999. There is a slight change, however, in where that growth is occurring, as will be noted in the following section.

Exhibit IV-1

Engineering and Scientific Cross-Industry Sector Information Services Market, 1995-2000



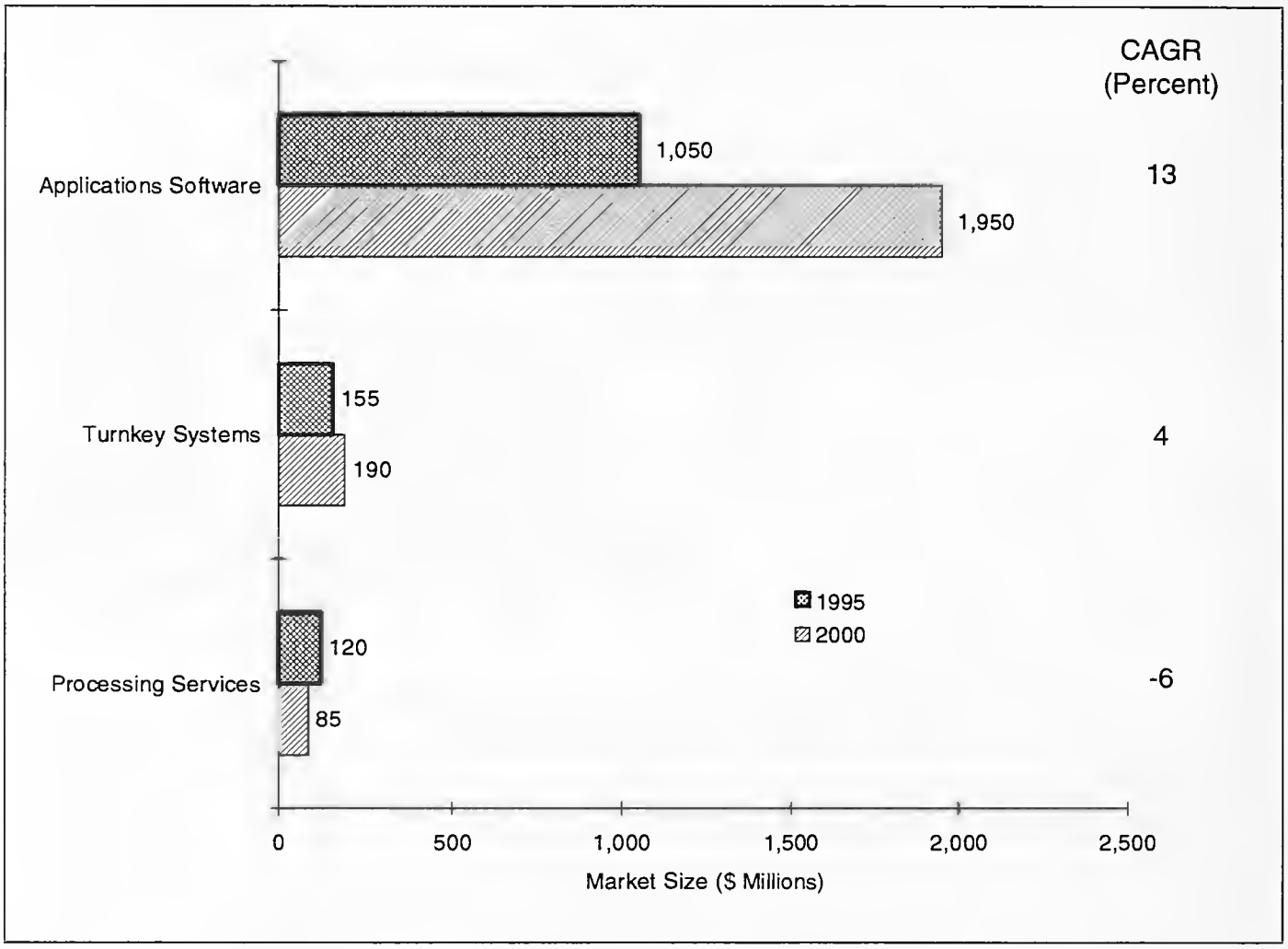
Note: Numbers have been rounded. *Source: INPUT*

2. Product/Service Market Sectors

The 1995-2000 forecast of market size by product/service market sector in the cross-industry engineering and scientific market is shown in Exhibit IV-2. Analyses of the various product/service markets follow the exhibit.

Exhibit IV-2

Engineering and Scientific Cross-Industry Sector Market Size by Product/Service Sector, 1995-2000

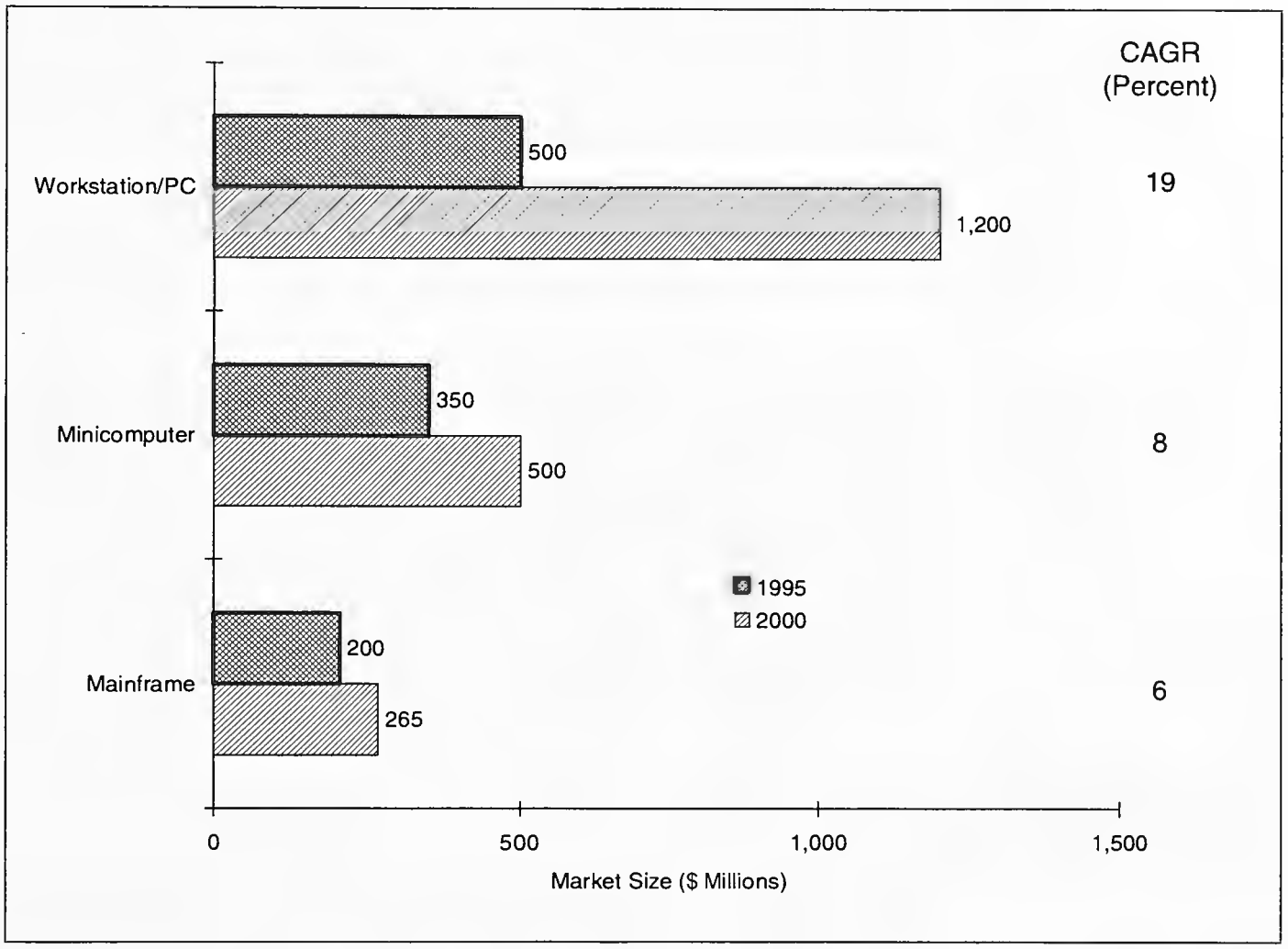


Note: Numbers have been rounded. *Source: INPUT*

Applications Software—The strongest growth in the engineering and scientific cross-industry market will occur in the area of applications software. This growth is fueled by the continuing migration of computer-intensive applications from the traditional mainframe or dedicated minicomputer environment to the growing families of high-performing, high-end workstation/PC platforms. As noted in Exhibit IV-2, the 1995 market for applications software is more than $1 billion, growing to nearly $2 billion in 2000—a five-year CAGR of 13%. Exhibit IV-3 shows where, by platform, the growth is occurring.

Exhibit IV-3

Engineering and Scientific Cross-Industry Sector Applications Software Products Market by Platform Size, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

From this exhibit, it is clear that computer-intensive applications, given a low-cost, high-performance alternative, are migrating to smaller platforms—specifically to the workstation/PC platform–where user expenditures are expected to grow at a very respectable 19% CAGR through 2000, from almost $500 million in 1995 to nearly $1.2 billion.

The mainframe and minicomputer applications software market growth rates have been reduced a percentage point each for this year's forecast. The reason is the growth in the population of Sun, Digital, Hewlett-Packard, MIPs and other RISC processors, as well as the new PowerPC-driven RISC micros and Pentium-based PCs. These cost-effective alternatives are becoming more popular by the fiscal quarter.

Many expenditures that might have gone to mainframe- or mini-based applications are now being directed toward products for the smaller platforms. This trend does not mean that, in time, there will no longer be scientific or engineering applications on mainframes and minicomputers. It simply means that there is a viable alternative for those applications that can benefit from or take advantage of smaller computing platforms.

Turnkey Systems—Growth in this product/service sector will go from $155 million in 1995 to almost $190 million in 2000—a CAGR of 4%.

Although the majority of the turnkey systems (including those supplied by VARs) in this industry are for CAD and CAE applications, some GIS turnkey solutions are also available. As with all other product/service markets in the cross-industry market sector, growth tends to be limited by most businesses' tendency to require industry-specific functionality.

Processing Services—INPUT estimates the 1995 engineering and scientific market for transaction processing services at almost $120 million. There will be a continuing decline in the size of this market—averaging -6% per year—to $85 million by 2000.

The growing population of high-performance (relatively) low-cost workstations and PCs and the growing availability of engineering and scientific applications software for these platforms, have had a dramatic effect on the processing services sector. Over the past few years, more and more users have off-loaded their cost-sensitive transaction processing applications to in-house micros, mainframes, or minicomputers. The advent of more client/server applications, coupling PC clients to larger platforms (servers), will continue this slow but steady migration.

D

Conclusions and Recommendations

This section summarizes INPUT's conclusions regarding the engineering and scientific cross-industry marketplace and offers recommendations regarding competitive strategies and courses of action for users and vendors of engineering and scientific information services products.

1. Conclusions

Steady Growth—Growth rates by specific application and application subset will vary widely, but overall, the use of CAD, CAE, structural analysis, and mathematical and statistical routines and operations research techniques is increasing with the resurgence of growth in American business. The 13% overall growth rate for this cross-industry product/service sector reflects the importance of these applications areas and their fundamental value to engineering and scientific activities.

GIS Growth—Geographic information systems (GISs) are expanding at a more rapid rate than other engineering and scientific application areas by growing existing markets and identifying new ones for GISs. For instance, domestic applications are being expanded to include global modules; one can now buy PC software with street maps and automobile routing programs for most of the world's major cities. INPUT believes that this segment of the engineering and scientific market will continue to experience strong growth in this cross-industry market.

Platform Shift Continues—The migration of applications from larger to smaller platforms is continuing, driven by the ever-increasing population of powerful, functional, cost-effective workstation and PC platforms such as those systems using Pentium, PowerPC, and high-performance RISC processors offered by Hewlett-Packard, Digital, Sun and others. Many applications are offered in scaleable versions to suit the user's processor of choice, and some run in DOS and Windows operating environments, while others are more popular and effective in UNIX. Although many applications, by choice or by necessity, will continue to run on mainframes and minicomputers, the number and variety of low-end platform options is increasing (and can be expected to continue to increase) dramatically.

The Affects of Downsizing—Though downsizing is clearly a motivator to push applications outward in the IT/enterprise hierarchy, INPUT believes that cost, control and functionality will be stronger influences on the movement of cross-industry engineering and scientific processing away from the mainframe and centralized IT functions and nearer to departments or users.

Client / Server—Although not a technical requirement for most scientific and engineering applications, the growing trends of cooperative and concurrent design and the use of object-oriented databases favors client/server architecture. Coordination, performance and distribution benefits will encourage more developers to design engineering and scientific applications, especially CAD/CAE, for the client/server environment, and within the next five years, INPUT believes most popular applications will offer that capability as a platform option.

2. Recommendations

INPUT offers the following recommendations to vendors and users.

- Users:
  - *Workstation / PC Costs*—The price of standalone micros and their performance characteristics improve weekly. Use these devices as cost-effective solutions where usage needs dictate, but do not ignore mainframe and minicomputer options that may offer attributes beyond workstation/PC capabilities.
  - *Client / Server Options*—For many application areas and industries, this environment is the *de facto* standard for application deployment. Identify your enterprise's client/server needs to determine if there is an opportunity for the effective use and control of engineering and scientific applications and activities, through client/server implementation. Identify vendors who offer client/server platform/architecture options and evaluate their solutions for your needs.

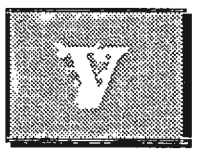
  - *Geographic Information Systems (GIS)*—Whatever your business, consider if a GIS can help you to better deliver your products, target your prospects or run your enterprise.

- Vendors:

  - *Applications Software*—Workstation/PCs are the distributed platform of the future. Continue to target applications software toward this popular and cost-effective environment. Also, give users options for scaleable software systems that can run on multiple platforms. If you do not already offer a client/server delivery option, move rapidly in this direction, because this architecture has already become the processing environment of choice for the majority of businesses.

  - *Processing Services Vendors*—Your market is getting smaller, but it is still in the $100 million range. Develop compatible turnkey or applications software options and determine how to migrate your users to the new production environment as their needs dictate. If you do not offer a clear migration path, you run the risk of losing customers to other processing options that do not have usage-sensitive pricing.

  - *Geographic Information Systems (GISs)*—This is becoming an area of significant growth. Perhaps the best avenue to gaining market share in this market segment is to make GISs affordable and useful in more day-to-day uses, such as road travel, high school and college geography education, and international travel. If a software firm could bring GISs into everyday life in the way that Timex brought NASA illumination technology to watch faces, the opportunities would be substantial.



Human Resources

A
Industry Definition

Definition—The human resources cross-industry sector, as defined by INPUT, consists of applications software products, turnkey systems and processing services purchased by multiple industry sectors to serve the functions of human resources (HR) management and payroll. Examples of specific applications within these two major functions are:

- HR Information Systems
- Applicant Tracking
- EEO/Affirmative Action Administration
- Benefits Administration
- Compensation Planning and Administration
- Human Resources Planning
- Position Tracking
- Labor/Employee Relations
- Health and Safety
- Training and Management Development
- Organizational Development
- Payroll Processing
- Attendance/Timekeeping

B
Key Trends and Issues

1. Overview

The human resource/payroll systems marketplace continues to experience rapid technological and structural change. Systems and software vendors, information systems (IS) professionals and users are continuing to embrace and take full advantage of the evolving technology.

At the same time, continued dramatic changes in the corporate business climate and government regulatory environment have led to a strong continuing demand from systems users for more integrated products with greater functionality, flexibility, ease of use and cost/benefit. This is particularly true in the human resource benefits administration and reporting areas, where emphasis is placed on the national effort to gain some measure of control over spiraling costs of employee benefits programs.

The rapidly evolving marketplace for human resource systems has led to significant changes in the vendor community over the past two years. For instance, there has been a noticeable maturing of the marketplace. Significant vendor consolidations have taken place in almost all segments of the human resource systems marketplace as a result of acquisitions by major players. For large-scale, comprehensive human resource/payroll systems, this consolidation has resulted in fewer primary vendor choices for customers. In addition, the introduction of new or revamped products taking advantage of client/server architecture and graphical user interfaces (GUIs) is a driving force for most of the existing vendors regardless of whether their products are mainframe-, midrange- or PC-based.

2. Major Trends

The most significant overall trends in human resources and information services are noted below.

- *Vendor Product Preference*—Vendor-provided products are strongly preferred to in-house human resource/payroll system development in most environments.

- *Downsizing Pressures*—Corporate downsizing and restructuring has put pressure on human resource departments' ability to deliver services to clients. As companies scale back their middle management ranks and smaller staffs are available to handle human resource-related matters, more emphasis is being placed on automation of human resource record keeping and reporting. With smaller staffs to attend to human resource systems, client/server-based systems are of crucial importance because of the need to integrate and centrally manage numerous host-based applications that may be scattered throughout a given organization.

- *Reengineering HR*—"Reengineering" the human resource function to increase efficiency and effectiveness of operations with fewer staff members is now a popular theme. However, according to a December 1994 reader survey conducted by *Midrange Systems* magazine, reengineering and restructuring are generally perceived as negative moves if done solely as ways to cut costs. For example, the survey indicated that training costs can increase due to turnovers and an insecure employee population that takes experience to other companies when leaving a perceived threatening work environment.

- *Health Care Concerns*—As INPUT reported in 1994, the ongoing Clinton administration battle with House Republicans over reforms to Medicare, Medicaid and other types of health coverage and the lack of a clearly defined national health care reform program have created a climate of some concern and uncertainty about the state of health care in the 1990s. This was personified in October and November 1995, when senior citizens protested in Washington, D.C. and other government locations because of health care benefit cuts and coverage changes proposed by House Speaker Gingrich and other prominent legislators.

- *Increased Importance of HR*—The human resource function has grown in importance and visibility as corporations struggle to cope successfully with changing work force demographics, increasing recruitment difficulties for highly skilled workers, worker training, productivity and quality improvement efforts and—of particular significance—health care and benefit-cost containment. The critical need for management access to timely and accurate data on all aspects of the corporate work force for planning, analysis and forecasting of business plans and activities has propelled human resource systems into a more important role in most organizations.

3. Technology Trends

Trends in the human resource/payroll system area clearly cut across all industry sectors. The significance of the industry trends described below are affected to one extent or another by the size of the company.

Client / Server Architecture—This is by far the most significant driving force in the human resources (HR) systems marketplace today. All major vendors are bringing some form of client/server functionality to the marketplace. Notable leaders in this market segment include PeopleSoft, SAP America, Oracle and Computer Associates.

Downsizing—The trend toward downsizing of the mainframe and off-loading applications to midrange or networked systems is continuing unabated from last year. For larger operations, wider availability of viable client/server-

based products will accelerate off-loading in the human resource/payroll systems area. However, large corporations with mainframe-based payroll systems will want to keep the payroll on the mainframe.

Networking—Due to the independence and control that a local-area network (LAN) provides users, human resource operations continue to migrate to this option as a preferred automation alternative.

Applications Integration—As mentioned above, the continued existence of host-based, standalone or networked PC-based human resource/payroll applications has resulted in serious data redundancy and integrity problems as well as duplication-of-effort issues in many organizations. In more and more cases, the duplication of human effort is particularly crippling due to the aforementioned staff downsizing. Therefore, desire persists to have fully integrated software so that HR, payroll, and subsystems share the same master file of current and historical data.

GUI—Another strong trend is toward graphical user interfaces for human resource/payroll systems. The appeal is undeniable, as shown by the success and positive press received by PeopleSoft's GUI products. All the major vendors are developing GUI products in conjunction with their client/server offerings.

Database Technology—Systems using true relational database technology continue to have strong appeal to human resource operations that must frequently modify their databases to keep pace with constant organizational and government-mandated changes.

Open Systems—From a technical standpoint, portability, interoperability and scalability of systems are becoming increasingly important—especially in enterprisewide computing environments with a variety of heterogeneous databases. Several leading HR vendors, including Oracle, PeopleSoft and Marcam Corp., have formed the Open Applications Group (OAG), which is developing standards to allow the interoperability of client/server-based human resources and financial applications. The goal is to give users an environment in which they can use application modules from different vendors in a seamlessly integrated, distributed human resources system.

4. Key Applications

The growth in the availability of human resource/payroll system software applications over the last several years has been remarkable. The bulk of this expansion of products has occurred in the PC marketplace. INPUT research indicates that the number of programs available has increased from 275 programs in 1986 to more than 1,700 estimated for 1995. Fully 75-80% of the available software has been written for the PC platform. The strong, continued growth of PC-based human resource software applications has

been driven by the availability of relatively inexpensive, but very powerful relational database technology and advanced software development tools. These tools have allowed developers to bring sophisticated products to the marketplace much faster and at a significantly lower cost than typically has been the case for midrange- and mainframe-based software.

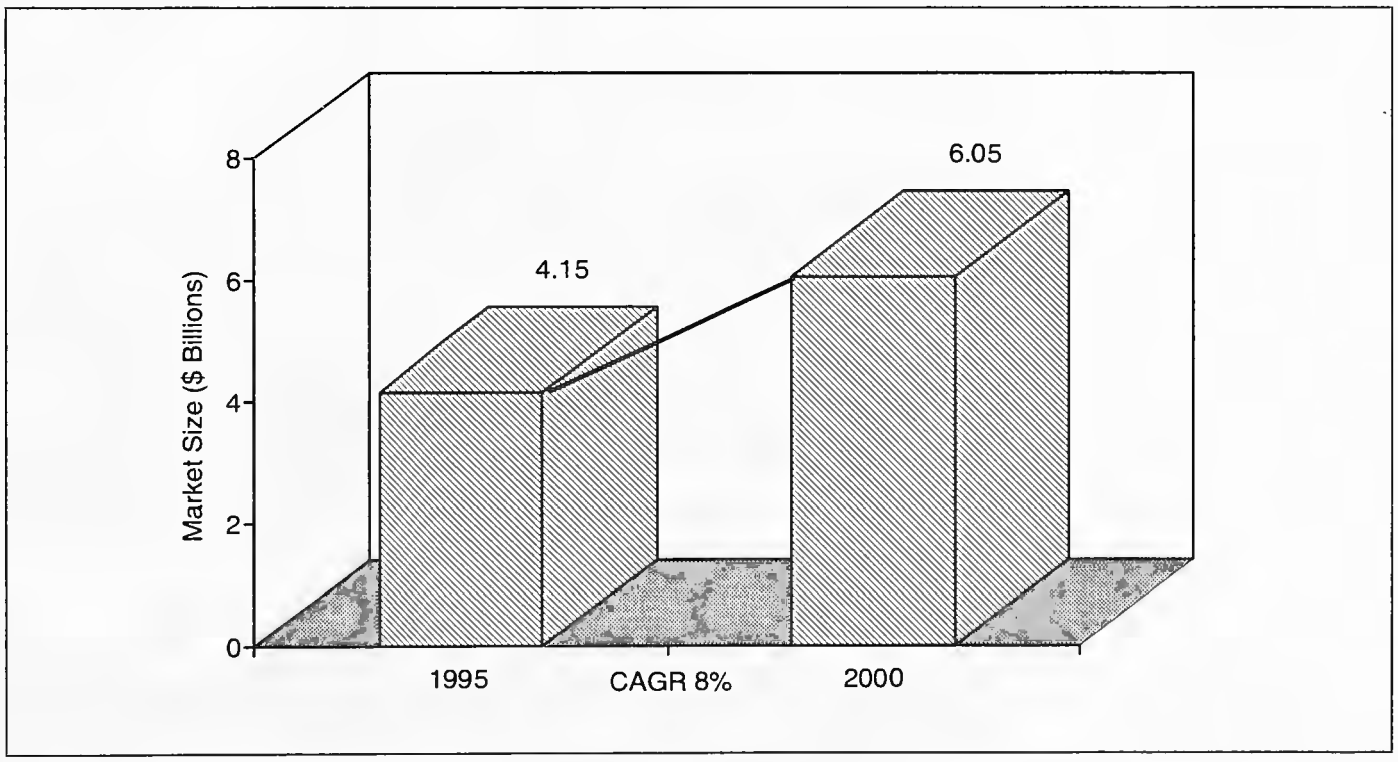
C
Information Services Market Forecast

1. Market Overview

The human resources information services market will continue to show moderate 8% growth during the five-year forecast period, from more than $4 billion in 1995 to $6 billion in 2000, as shown in Exhibit V-1, below. The market for human resources cross-industry services has been well established for some time, and to the extent that any market segment of information services may be so described, it is "mature."

Exhibit V-1

Human Resources Cross-Industry Sector Information Services Market, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

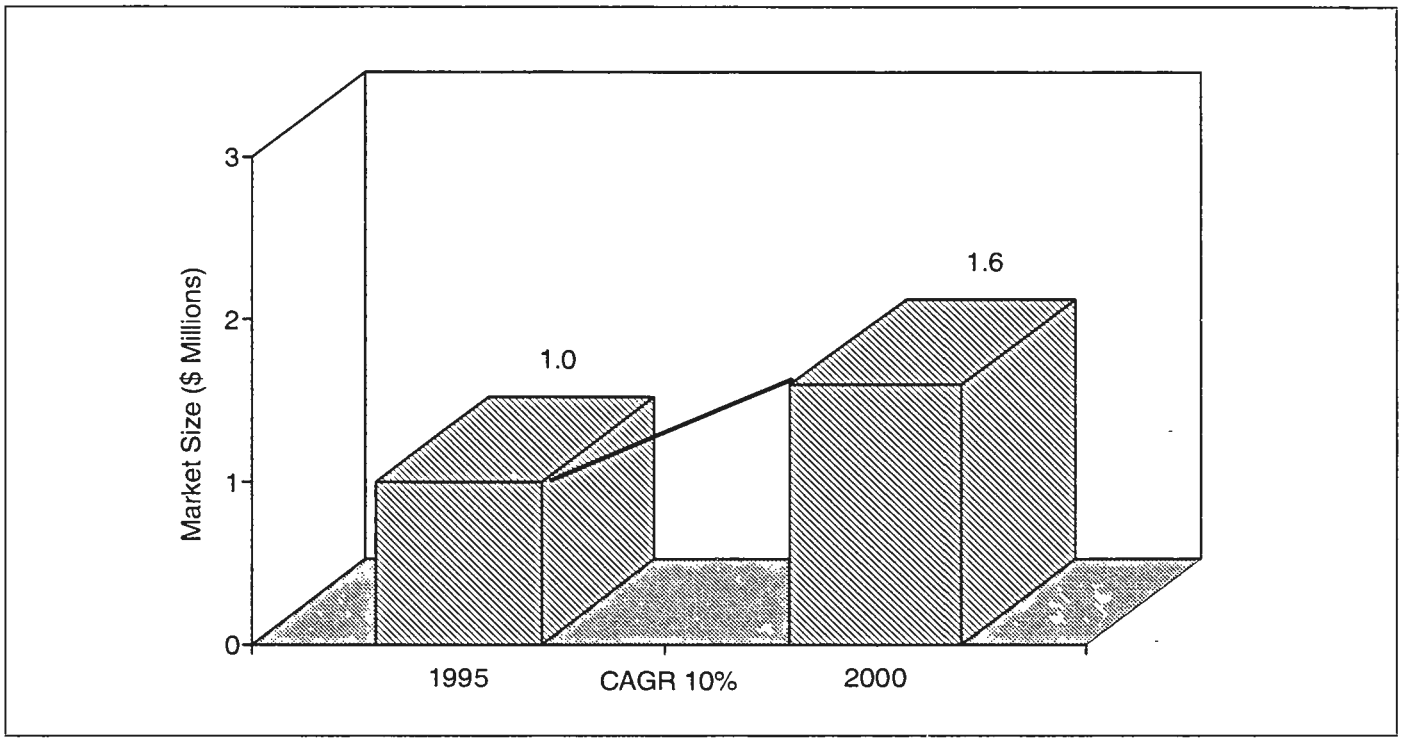
The largest growth factor will be the continuing strength in PC/workstation-based applications software products, while the largest single sector will remain the payroll/HR processing services sector. These are discussed in more detail in the sections that follow.

2. Applications Software Products

The overall applications software products market will grow at a rate of 10% over the next five years, as shown in Exhibit V-2.

Exhibit V-2

Human Resources Cross-Industry Sector
Applications Software Products Market, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

Mainframe software products—The trend toward downsizing and outsourcing of mainframe systems and applications shows no signs of diminishing. Also, the strong migration patterns of new and existing applications to client/server architectures should continue over the next few years. Combined, these two circumstances will reduce growth in this market sector to a 4% CAGR, which is consistent with the 1994 report. For the most part, expenditures on mainframe products will be for maintenance fees and licensing of software upgrades for installed products.

Minicomputer software products—As with mainframe products, minicomputer software products are being diluted by the growing popularity of PC-LAN solutions. With the exception of the IBM AS/400, no real penetration with midrange platforms has been achieved in this market. However, in large multisite enterprises, minicomputers are finding use as file servers to PC LAN users, or as gateways to host-based mainframe corporate systems. INPUT forecasts a modest growth rate of 6% over the next five years for products for this platform category.

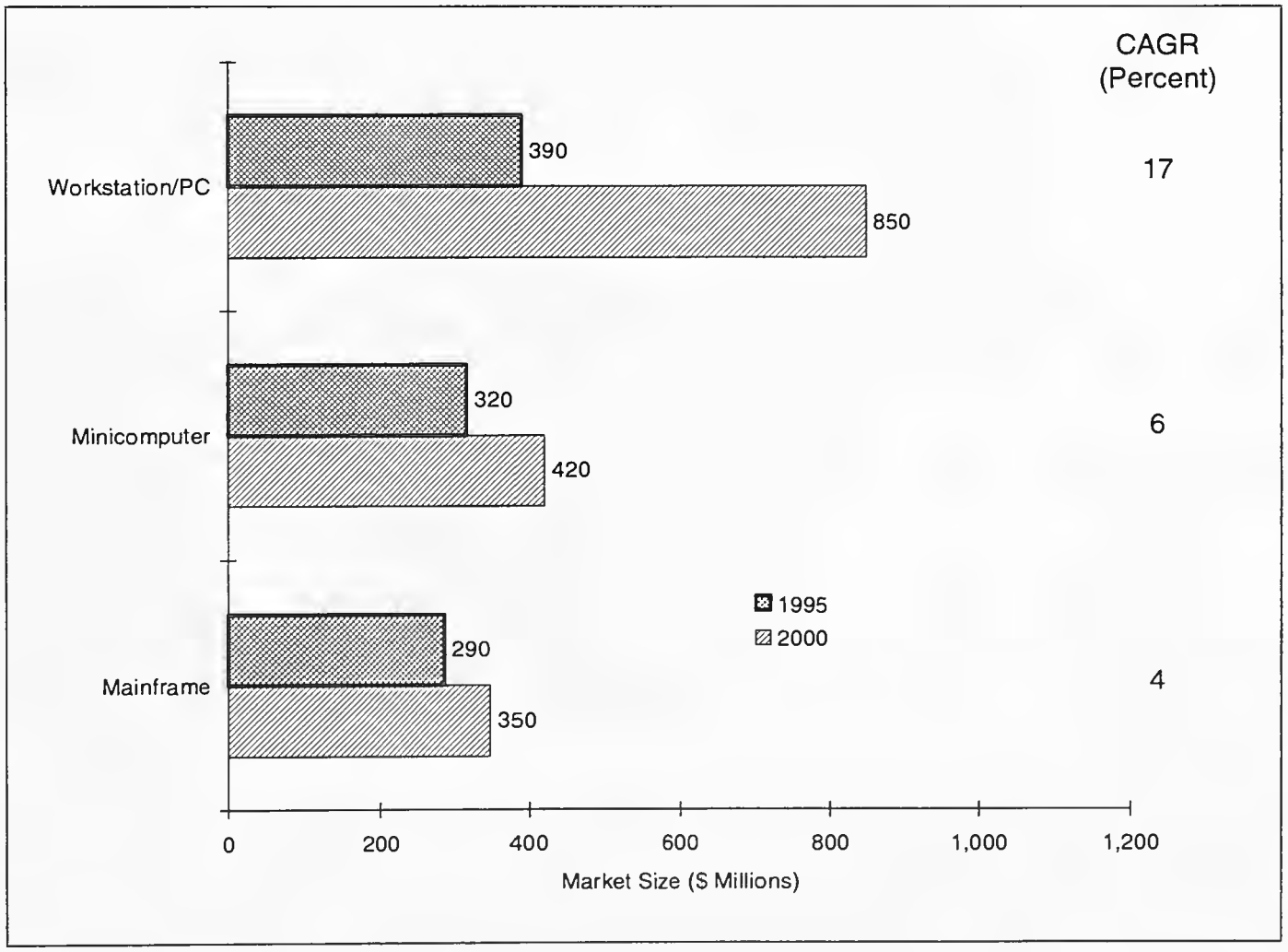
Workstation / PC software products—All of the real growth in the applications software products market is occurring here. Vendors such as PeopleSoft are growing rapidly, based on their broad PC-resident applications capabilities and user-friendly GUIs. The movement toward client/server systems is also helping growth in this segment, as complex solutions move into desktop-based client/server environments, especially for larger companies with multiple locations.

INPUT's 1994 human resources report projected a 17% CAGR for this market, which has been maintained in this forecast. Even with this same growth outlook, however, the workstation/PC software market will be more than double the size of the next largest software market in 2000, with a 52% market share.

The market forecasts for the three platform-oriented HR software product categories are summarized in Exhibit V-3.

Exhibit V-3

Human Resources Cross-Industry Sector Applications Software Products Market by Platform Size, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

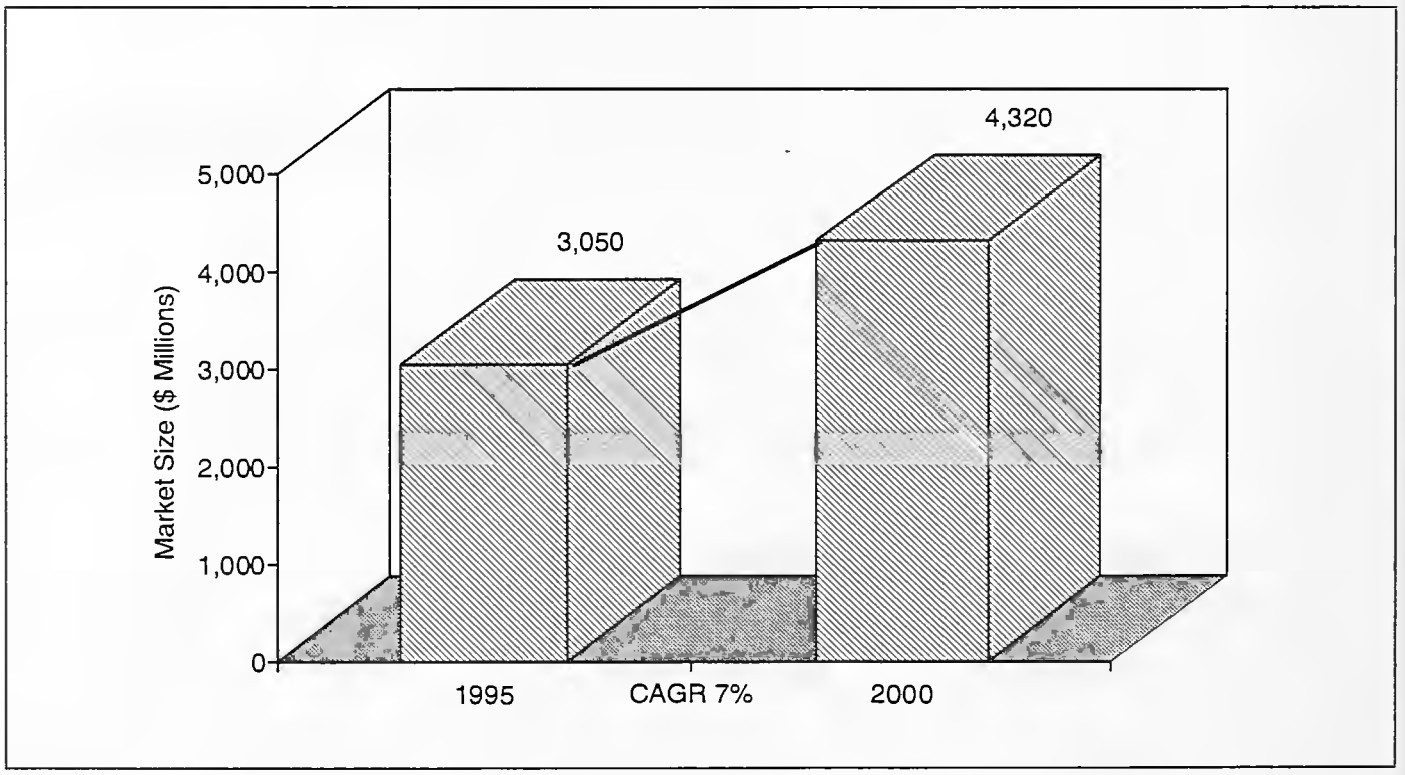
3. Processing Services

The HR processing services market is the largest product/service category in this cross-industry market, and is driven by the long-term steady growth rate in the payroll processing services market. This market is dominated by ADP, with Ceredian and Paychex also having significant market shares. In fact, these three vendors continue to control nearly 70% of the market, with the balance being shared by regional and local vendors, including many banks. In April 1995, ADP announced its intention to move further into human resources by introducing its Client Server Series (CSS) 6.0 integrated management software system. It is designed to link ADP's traditional payroll services with software modules that manage human resources and benefits administration.

The processing services market grew at 9% during 1994, as the gradual U.S. economic recovery generated more payroll checks, and is expected to grow at the same rate in 1995. The longer-term forecast is for growth at an 7% CAGR, as employment levels stabilize. The forecast is summarized in chart form in Exhibit V-4, below.

Exhibit V-4

Human Resources Cross-Industry Sector Processing Services Market, 1995-2000



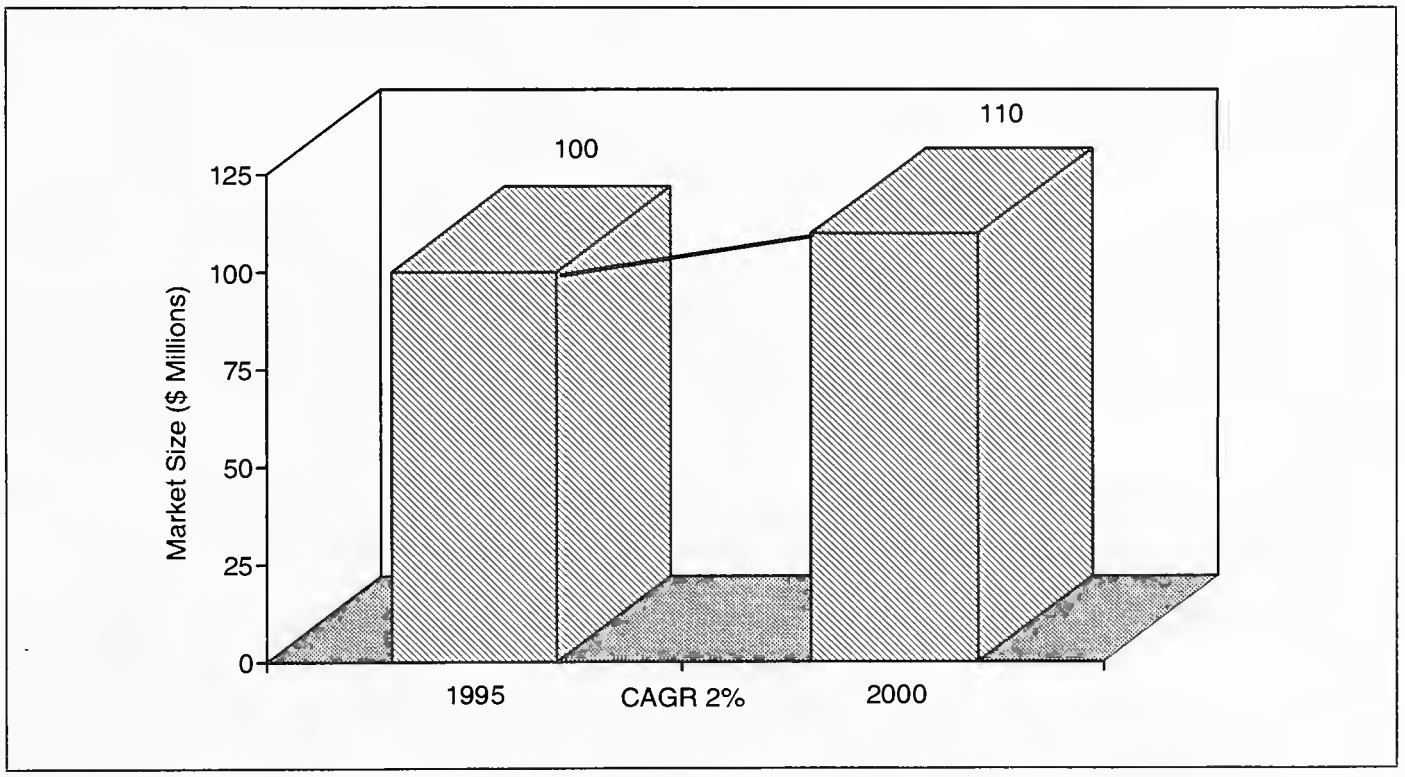
Note: Numbers have been rounded. *Source: INPUT*

4. Turnkey Systems

This is the smallest and least dynamic of the product and service categories, and is estimated to grow at only 2% during the forecast period, as shown in Exhibit V-5. Most software vendors have chosen not to deliver low-margin PC equipment as part of a bundled solution, hence the much stronger growth in the software products market. With the increasing commoditization of hardware, there is limited motivation for software companies to even try to become value-added resellers. There is more appeal in providing VAR/turnkey vendor delivery of midrange systems, where HP, Digital and IBM, with the AS/400, are key players.

Exhibit V-5

Human Resources Cross-Industry Sector
Turnkey Systems Market, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

D
Conclusions and Recommendations

1. Conclusions

The human resources sector is a relatively mature information services cross-industry sector, with moderate growth forecast for the future. Downsizing of many corporate work forces has diminished the demand for many transaction-oriented HR services, but there are new requirements for more sophisticated, fully integrated HR systems.

Within that stable framework, there is one dynamic submarket that offers significant potential—the workstation/PC applications software products sector. Here, the availability of new, user-friendly, lower-cost applications will continue to drive significant growth. New entrants are most likely to be seen here, as pervasive networking and client/server architectures provide a technical framework for many new applications products to be introduced, especially in specific, narrowly targeted functional areas.

Vendors considering entry into the human resources market are best advised to focus on desktop-based applications software products, and associated professional services and systems integration services, as a means of penetrating this sector.

2. Recommendations

Following are INPUT's user and vendor recommendations.

a. User Recommendations

Recommendations for users of human resources products are as follows:

- *Internal Audit*—Initiate internal systems audit to assess functionality and adequacy of existing manual and automated HR systems, and the existing staff's ability to manage and maintain these systems.

- *Strategy*—Develop a coherent strategy for short-term and long-term HR systems development and implementation.

- *Interact with IS*—Establish a dialogue with corporate IS regarding computing directions and policies; define and clarify roles and responsibilities for system acquisition, implementation and management. This assures that any HR IS-related plans and activities don't inadvertently isolate all or portions of the HR function from the enterprisewide IS.

- *Consider Changes*—Consider necessary organizational changes and staffing changes to achieve tighter integration of human resource and payroll functions and responsibilities.

- *Develop Internal Resources*—If the company's size and "culture" permit, identify and develop dedicated internal resources to manage HRMS system development, implementation and administration.

b. Vendor Recommendations

Recommendations for vendors are summarized below:

- *Customization*—Provide for a high level of user customization to meet unique organizational requirements for human resource/payroll processing and reporting.

- *Relational Databases*—Incorporate advanced relational database technology into all HR products.

- *Improve Tools*—Improve power, flexibility and functionality of *ad hoc* reporting and database inquiry tools.

- *Staff Time*—Develop interactive voice response (IVR) and image processing applications for HR/payroll functions such as employment, benefits enrollment, personnel transaction processing, and other HR/payroll areas. IVR systems, in particular, can free employees from repetitive tasks that involve dialogues on, formatting or accessing data on a human resource system.

- *Consulting Services*—Focus on enhancing vendor-provided consulting services to help ensure that products are fully implemented and that customers have access to competent technical assistance for system customization and modification.

- *Customer Training*—Expand vendor-provided customer training to include advanced user and technical training in system implementation, database manipulation, programming, system customization and modification.

- *Integrate Product Lines*—Fully integrate product lines to eliminate or reduce the need for costly and inefficient HR/payroll and subsystem interfaces.

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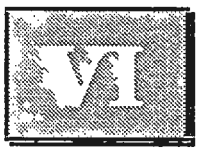


Office Systems

A
Industry Definition

Office systems is the definitive cross-industry application. Because the majority of office tasks are generic in nature, office systems are almost exclusively purchased from outside vendors rather than developed in-house. For that reason, INPUT believes that office systems will never become industry-specific. Accessibility to vertical applications software products will be available through, and integrated with, office systems, however. INPUT divides the office systems sector into six application areas: integrated office systems, word processing, desktop publishing, electronic publishing, graphics and document imaging software.

1. Integrated Office Systems (IOSs)

IOSs integrate the applications that perform common office tasks. Typically, these tasks include the following core applications, all of which are accessed from the same terminal, microcomputer or workstation:

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

IOSs enable office workers to use applications that are resident on a number of hosts or servers, thus creating a corporate communication environment through integrating line-of-business software with personal software productivity tools. 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.

Workflow and groupware products are also included within the IOS definition.

2. Word Processing

Word processing is the most common PC application and is a basic application within the office systems sector. Word processing addresses several levels of functionality, from the production of simple correspondence to large document generation in which many people within different departments have input.

3. Desktop Publishing (DTP)

Desktop publishing refers to the page-design software programs that allow small and midsize organizations to publish printed documents (brochures, catalogs, newsletters, reports, etc.) from the desktop. The primary functions of DTP software include the manipulation of the following:

- Layout and design of columns
- Text manipulation (font type)
- Graphic manipulation
- Print control (color type, paper type)

4. 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. Depending upon the delivered product, the end result can be a multimedia product or something as new to U.S. companies as a page on the World Wide Web.

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 somewhat less functional product residing on a personal computer.

5. Graphics

Graphics packages that are used for presentations or freehand drawings and/or are ancillary to desktop publishing are part of office systems.

Thus, the graphics component of the office systems sector includes the following elements:

- Presentation graphics 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.
- Paint and line art drawing programs are used for illustrations.
- Page layout programs integrate the text from word processing programs with illustrations.
- Electronic form programs allow users to create and print forms in-house. Some applications work with scanners, allowing users to scan pictures and logos directly onto the forms.

6. Document Imaging Software

Document imaging software allows users to manipulate (store, retrieve, or print) images that have been scanned from paper documents. Full text retrieval, document management and database management are applications that can use document imaging software. Hardware components of imaging systems include scanners, image servers, workstations, optical drives, printers and storage devices. Companies such as Canon and Ricoh have introduced devices that integrate scanning, printing and faxing into one desktop device that is typically the size of a laser printer.

B
Key Trends and Issues

In the last ten years, American business has seen the office system go from several typewriters, perhaps one computer, a fax machine and copier, to local area networks (LANs) connecting numerous high-powered PC s, each supporting common applications that allow them to do most of the traditional office tasks, without the user ever having to leave the desk. Not every office is so configured, at least not yet; but improvements in local-area connectivity, the increased affordability of powerful PC-based client/server technology and significant improvements in office software have made the completely "wired" office merely a matter of planning, finances and necessity.

At the heart of the new office is client/server technology. The efficiency of the modern office and its systems has been greatly boosted by server-based systems, which remove the primary application residence burden from the individual PC and place it on a common server. This increases consistency, uniformity in training and education, and system performance. As it has been for the last several years, the LAN is the primary backbone for the modern office system. Using LAN-based applications such as Lotus Notes or Microsoft Office, numerous PCs and portable laptops can connect to share files, synchronize schedules and interact with such things as knowledge or "best practices" databases.

As client/server products gain momentum, relational database management system (RDBMS) companies are entering the market. For example, Oracle now has its own electronic mail and word processing packages. Applications software products within these environments will not be limited to office products, but can include other industry-specific functions as well, integrated through the operating system. Many office systems vendors are attempting to meet user demands for integration and enterprisewide solutions by porting their products to Windows, developing client/server solutions and beginning to provide groupware and workflow solutions.

In recent years, INPUT notes, changing network architectures have caused a blurring of the functionality between network operating systems (NOS) and PC operating systems (OS). Developers of operating systems (MAC OS, Apple Computer; OS/2, IBM; Windows NT and Windows 95, Microsoft; as well as UNIX-based systems) are closing in on the NOS market by increasing the sophistication of their products to include functions that address the network as well as the desktop. New operating services are now designed for the following network-related elements: security, integrated Internet services (best displayed by Windows 95), and databases.

Lotus also continues to change the competitive nature within the office systems sector with its groupware product, Lotus Notes. Lotus Notes is the most successful groupware product so far, and one of the first truly distributed systems. 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. Since IBM acquired Lotus during the middle of 1995, the worlds largest computer company has made Notes the core E-mail and groupware offering in its own product line, as well as for internal use.

In addition to the IOS segment, vendors are increasing the level of software sophistication within other office systems segments. The sophistication of word processing packages is now enabling these applications to encroach upon the domain of desktop publishing packages. The most recent Microsoft Word and WordPerfect versions, both designed for Windows 95, include more sophisticated graphic image importing utilities, graphical page previews, support for multiple type sizes and styles, detailed page layout controls, and drivers for high-end output devices.

The distinction between graphics-based word processing and 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. Corel has been extremely successful with its midangle to high-end graphics and publishing products. The company has demonstrated the power that can reside on the desktop; its newest graphics and animation product requires at least 16 MB of RAM and recommends a 486 60Mhz or Pentium processor for optimum performance.

As organizations reengineer their business processes, INPUT believes that issues pertaining to workflow automation keep escalating in importance. Imaging is a vital component of workflow automation and an important factor in the migration from a paper-*laden* to a paper*less* office. The core of the workflow automation philosophy is the concept that the network is the most expedient vehicle for document filing, routing, and management. Forms routing is an example of a workflow automation application that prompts the user correctly to complete and forward particular documents (such as expense reports and loan origination forms). Moving the fax machine into the PC from the copy or mail room, and combining it with reliable imaging software, is another step toward making the paperless office a reality.

Perhaps the biggest step in this direction is being made by companies that are integrating Internet access into their office system products. There is Windows 95 with its Microsoft Network icon right on the desktop (or World Wide Web icon if one purchases the Plus! for Windows 95). There are also companies like FTP Software, Quarterdeck Office Systems and The Wollongong Group, which have introduced integrated products that allow users to send E-mail from existing applications, access the Web, and view and print received documents without having the original application with which they were created. Quarterdeck is also developing a product called WebAuthor, word processing add-on for Web page creation. Microsoft announced in mid-1995 that it also will introduce a Web authoring tool, called Internet Assistant for Word.

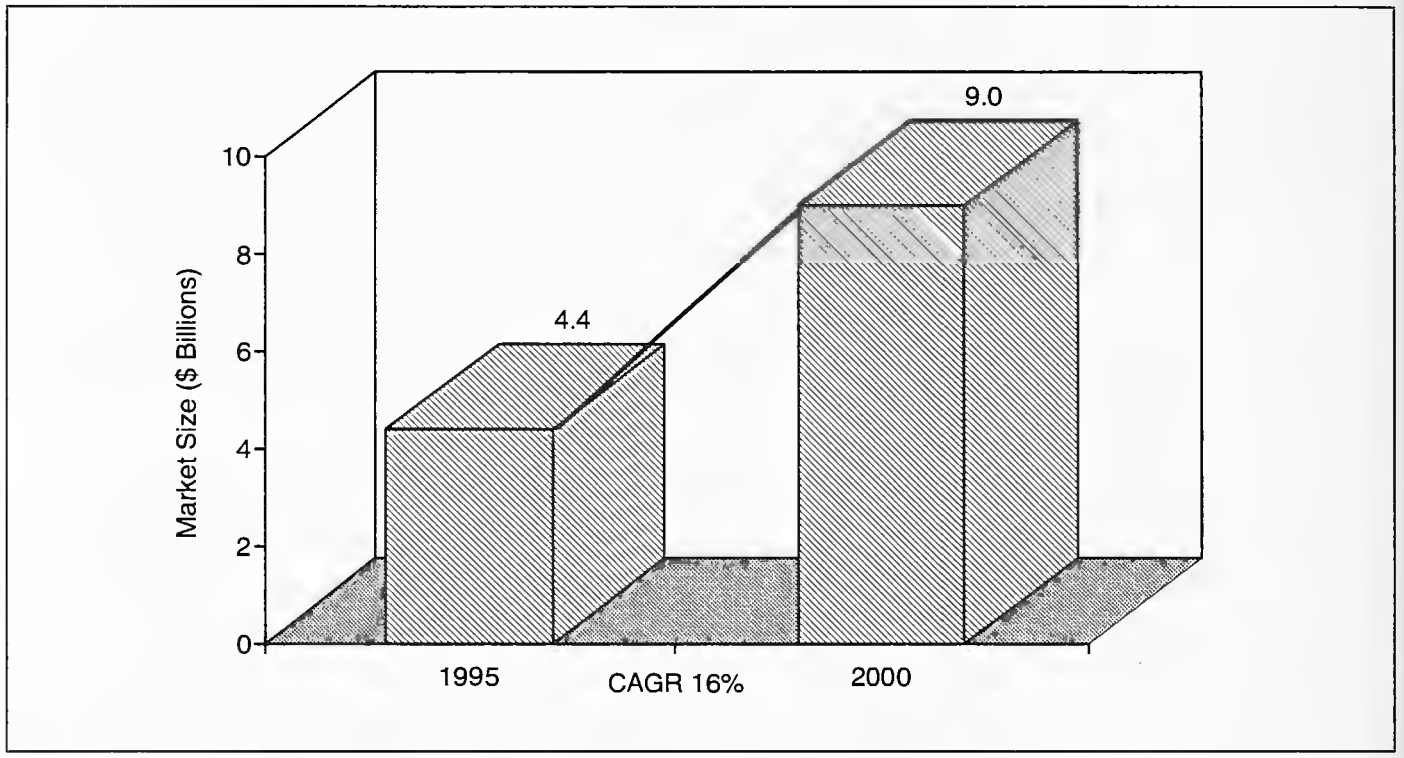
INPUT believes that the increasing interrelationship between innovative data communications technology and changing business practices is having a dramatic effect on the office systems cross-industry sector. As a result of these market forces, the office systems sector is becoming intensely competitive—which, ultimately, translates into improved solutions and pricing for the user.

C
Information Services Market Forecast

INPUT estimates that the 1995 aggregate size of the office systems cross-industry sector, in terms of user expenditures, amounted to $4.4 billion (see Exhibit VI-1).

Exhibit VI-1

Office Systems Cross-Industry Sector Information Services Market, 1995-2000

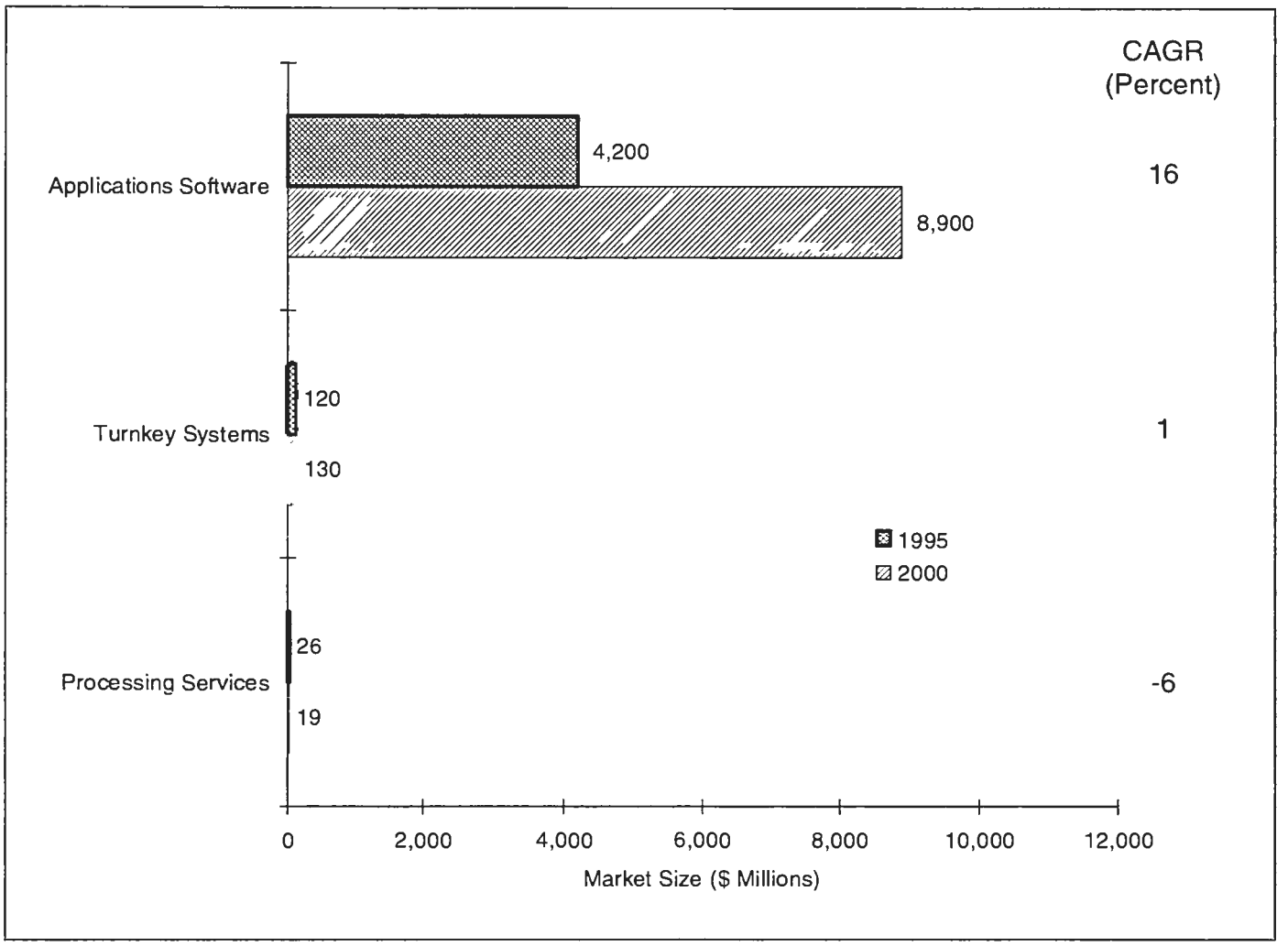


Note: Numbers have been rounded. *Source: INPUT*

INPUT forecasts that innovative technology, business reengineering, innovative service offerings, and vendor alliances/mergers will drive aggregate user expenditures for office systems from $4.4 billion in 1995 to more than $9 billion in 2000, a CAGR of 16%. The applications software component of the office systems sector amounted to $3.6 billion in 1994, followed in size by turnkey systems and processing services. This product/service market ranking is duplicated in both 1995 and 2000 (see Exhibit VI-2).

Exhibit VI-2

Office Systems Cross-Industry Sector Information Services Market by Product/Service Category, 1995-2000



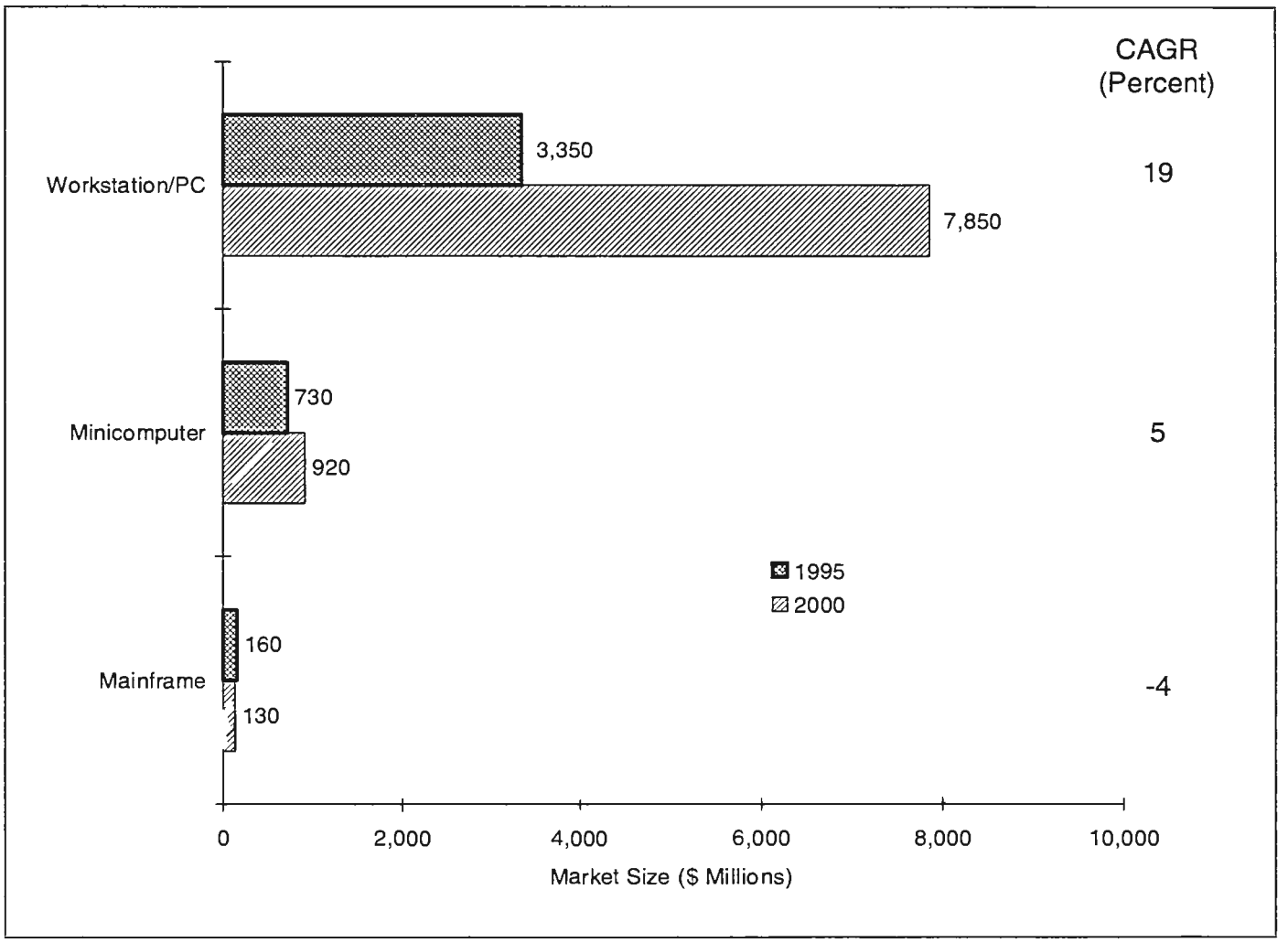
Note: Numbers have been rounded. *Source: INPUT*

1. Applications Software Products

Exhibit VI-3 offers INPUT's user expenditure forecast for office systems applications software products by platform size. The dominant contributor to the applications software product/service market in 1995, representing nearly 79% of the total, is user expenditures for workstation/PC applications. INPUT forecasts that user expenditures for applications pertaining to the workstation/PC platform will amount to more than $3.3 billion in 1995 and will grow to better than $7.8 billion in 2000, a CAGR of 19%.

Exhibit VI-3

Office Systems Cross-Industry Sector Applications Software Products Market by Platform Size, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

INPUT believes that the most significant factor driving the growth of aggregate applications software expenditures is the changing information systems model. As companies downsize, implement enterprise computing and embrace GUIs, the need for applications to support these technologies is critical.

The ever-voracious demand for new products and solutions will continue to drive growth in the workstation/PC platform segment. As new operating systems such as Windows 95 are introduced, the market for applications compatible with them will increase.

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

2. Turnkey Systems

INPUT estimates that user expenditures on the turnkey systems product/service market will grow from more than $120 million in 1995 to almost $130 million by 2000, a CAGR of 1%. The growth is due to the 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. As vendors like Microsoft and WordPerfect offer more functions and features in their shrink-wrapped suites, growth in the turnkey market will further slow and turn negative.

Turnkey growth is slowing for electronic publishing as well, because that market is not large enough to sustain a large number of VARs. The merger of Adobe and Aldus in early 1995 may pump more life into this segment, however.

3. Processing Services

INPUT forecasts that processing services expenditures will decrease from $26 million in 1995 to $19 million in 2000. The most important factor eroding this market is the current price/performance of PCs/workstations and the increased availability of software. Microcomputer technology has become more affordable, even to the smallest of businesses.

The processing services portion of the office systems information services market consists largely of presentation graphics services performed by outside service bureaus. However, PC-based software and equipment for this application area has become so inexpensive and usable that outside graphics support is decreasing more rapidly than forecast last year. It is conceivable that processing services may become irrelevant in office systems during the current forecast period.

D
Conclusions and Recommendations

1. Conclusions

- *Applications Software Dominance*—Applications software products will continue to be the largest, most important category of the office systems segment. The declining cost and increased power of the personal computer has brought applications to desktops and networks in a more cost-efficient way than ever before.

- *Network Access to Applications*—Innovative, powerful products such as Lotus Notes and Windows 95 lead the market because they offer network access to suites of applications operating in an integrated fashion. This makes it easier and more appealing for users who demand increased functionality and ease of use.

- *Alliances and Partnerships*—Vendors are pursuing alliances and partnerships to offer wider ranges of word processing, spreadsheet and publishing applications to the office systems market. This is because of demand and the strategic benefits for smaller vendors.

2. Recommendations

- *Applications Suites*—The importance of PCs to the office environment will continue to demand that vendors provide cost-effective, integrated product suites to the market.

- *Value of Smaller Vendors*—Larger vendors must realize that their primary product offerings also require the support of products from smaller vendors in order to give users the desktop- or network-based functionality they continue to demand.

- *Importance of Network Access*—Microsoft Office and other office system suites are increasingly tied to networks. This is crucial, as the network becomes more and more important in the office systems environment. In addition, Internet access has become a key feature in office systems technology. As the modern office starts to use less paper and more E-mail, the Internet is a portent of what may become the virtual office of the future.

Planning and Analysis

A
Industry Definition

The planning and analysis industry, as defined by INPUT, consists of four applications areas: spreadsheets, project management, executive information systems (EISs) and financial modeling and other types of generic decision support solutions.

The planning and analysis applications software products market is one of the fastest growing applications software markets. This reflects changes in product functionality, hardware platform support and ease-of-use factors in recent years.

Although spreadsheets have long been a general-purpose planning tool, project management and financial modeling, until recently, have been more the domain of job specialists. Also, many of the financial modeling and project management tools historically required larger processors, such as mainframes and minicomputers, for their computation-intensive and multi-user requirements.

Over the past few years, the dramatic improvement in the price/performance of workstation/PC platforms has encouraged the migration of most planning and analysis tools to lower cost platforms. The workgroup usage requirements of many of these tools also made them early candidates for LAN- and client/server-based solutions. The GUI of the client/server environments and the increasing incorporation of object-oriented feature enhancements have also greatly increased the ease of use of many of these tools.

Most tools and products in the planning and analysis industry are now workstation- or PC-based and many can be used in a client/server environment. Planning and analysis, as a functional cross-industry capability, is now a cost-effective resource available to users at multiple levels of business activity.

B
Key Trends and Issues

1. General Trends and Issues

a. Reengineering the Corporation

The fluctuations in the U.S. economy in the mid-1990s have caused many companies to reassess their traditional approaches to doing business, with an emphasis on increasing overall operational efficiencies. Many are applying the concept of reengineering to improve traditional corporate work processes. This is also being done to address the much more competitive global marketplace.

The use of planning and analysis tools is central to analyzing the efficiencies of current work processes, planning and implementing more efficient work process alternatives and for ongoing work process efficiency measurement.

b. Client/Server Architectures

Recent INPUT surveys of a number of U.S. corporations showed that more than 50% of the respondents are making significant commitments to client/server computing.

Planning and analysis tools have been among the earliest applications implemented using client/server architecture. They are a natural fit for the distributed processing model, since many such tools can extract data from a number of corporate database platforms. A GUI-based client interface, which simplifies the ability to access and manipulate data, has been a very important facilitator for the very high rate of adoption of such products by desktop users.

Decision support has been a major application area for client/server computing, and planning and analysis tools are used for many of the more sophisticated decision support applications.

c. Workgroup Applications

Corporate reengineering has often resulted in the reduction of middle management layers and a transition to team management as a way of addressing the inefficiencies of the older hierarchical management structure.

Such changes have helped foster the growth of the workgroup applications software products industry in recent years. Workgroup applications have also been a natural application area for LAN and client/server-based IS

architectures. Workgroup applications run the gamut from E-mail workflow image and document routing, E-mail enabled application routing and integrated project management planning to multimedia desktop conferencing. The most popular product in this category is the groupware product Lotus Notes, which has been widely deployed as a communications and information database access tool for companies with geographically distributed employees. The popularity of Notes has made it the model for the so-called workgroup environment of the near future.

2. Applications Trends

a. Project Management Applications

Project management, over the last several years, has migrated outward from specialized industry-specific applications for construction and engineering and centralized IS software development to more generalized departmental user functionality.

Related to this is the use of project management applications in the structuring of workflow management systems within the corporation and for providing an infrastructure for enterprisewide planning, budgeting, management and evaluation. The structured methodology of traditional project management systems can thus be brought to a number of corporate functional areas.

As with the other planning and analysis applications, the facilitator of this migration is the proliferation, growing power and ease of use of PCs and workstations. Project management software is now available for platforms of all sizes, and user-friendly applications are making it easier for users at all levels effectively to utilize this planning tool.

The focus of newer project management applications is on high-end, multi-user systems that are designed to share databases in distributed environments, with a focus being the management of every aspect of company resource deployment. Among these is Primavera Systems' Project Planner, which is designed for use in both DOS and Windows. Primavera's product, P/X, is the latest in a wave of PC-based systems that offer more flexible reporting, cost tracking and scheduling than previous mainframe and VAX-based systems. The popularity of Microsoft Project has created a niche market for vendors that offer add-on modules to extend this product's capabilities. Among these modules are project ToolBox from adRem Technologies, which supports reverse engineering and modeling based upon the diversity of employee skills; and Risk+ from Program Management Solutions, which uses risk-simulation technology to more realistically respond to possible project management and scheduling scenarios.

b. Financial Modeling and Planning

As noted in the 1994 report, financial modeling more often require a generic decision support software (DSS) tool rather than a specific application-based tool for calculating "the answer." Financial modeling tools provide such functions as time series analysis and forecasting, econometrics forecasting and risk management. The leading-edge products also use a variety of artificial intelligence technologies such as neural networks or "fuzzy logic."

Generally, such programs are more attuned to users who work with mathematical models. The financial services market continues to have strong demand for the more exotic financial modeling tools.

In the past, the most sophisticated modeling programs were mainframe based, primarily for access to the processing power required by the application. Many financial modeling applications still function best in the mainframe environment, but the growing power and cost effectiveness of workstation/PC platforms has encouraged application migration to the micro environment. However, for the more sophisticated user who creates models with complex modeling languages and multiple databases, the cost/benefits can be significant for the more expensive applications software packages, which easily integrate these various elements.

c. Executive Information Systems (EISs)

An EIS is a specialized version of a decision support system, which is programmed to provide data, perform analyses or solve problems in particular areas of interest for corporate management users.

In general, an EIS is a tool used to make decisions based upon available data, while spreadsheets allow users to assemble data and manipulate it in order to evaluate various outcomes. Using an EIS, users can analyze all facets of a business to ascertain the factors that boost performance or productivity to gain new opportunities. Among the information groups provided by the typical EIS are performance indicators, market share, demographics, growth or expansion trends and the impact of past marketing or promotion efforts. Other factors an EIS will track for decision support purposes are gross margins, discounts and/or returns for sales planning and yield analysis, failure prediction based on past history, quality control and scheduling information. Human resources managers can use EISs to track and analyze skills, employee performance, salaries and benefit costs.

By synthesizing and offering decision support alternatives based upon historical or frequently gathered hard data, the EIS has become a powerful tool in the planning and analysis sector. It is more likely to produce a realistic indication of future action than a hypothetical spreadsheet model.

One example of the current trend in EISs is offered by Comshare, Inc., whose client/server-based "Detect and Alert" suite of software "agents" supports financial and retail planning, as well as analysis and reporting applications. "Detect and Alert" is comprised of software robot servers, intelligent alert objects and a newspaper-like desktop client GUI. The software agents monitor user-selected databases for changing trends, values, etc., that match the user's defined objective, and alert the user via electronic mail to changes that may affect decision support.

d. Spreadsheets

Many of the most successful spreadsheets now offer import/export capability, in recognition of the fact that users may work both with other spreadsheets and increasingly with a variety of broader applications and/or modular enhancements. Interoperability and common standards, a theme noted elsewhere in this report, are as important as ever in this product segment.

Other significant changes have been in ease of use and an increasing number of built-in functions, including: data-modeling tools for working with data with more than two variables, publishing tools, statistical analysis, presentation-quality charting, drag-and-drop capabilities, and Wizards for enhancing on-line support.

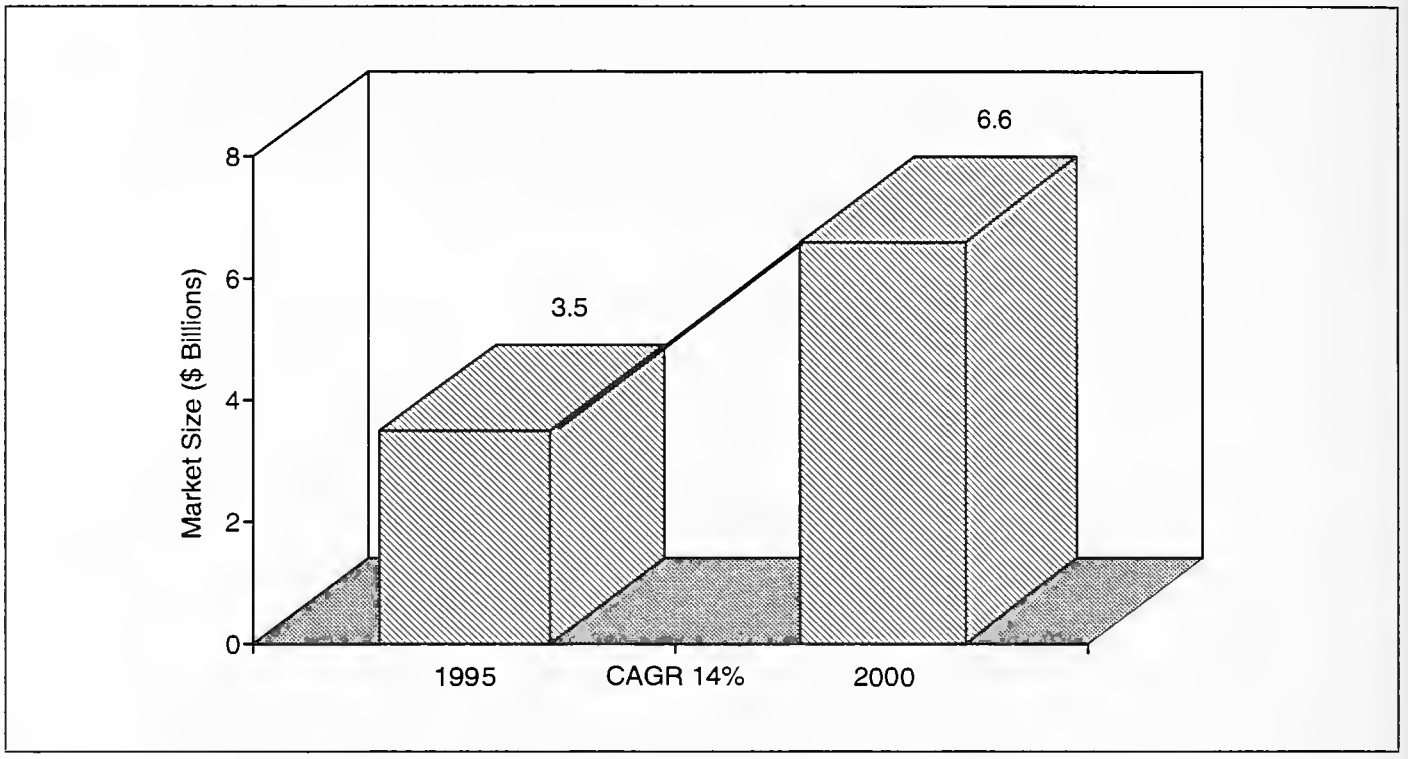
C
Information Services Market Forecast

1. Overview

The size and compound annual growth rate (CAGR) of the U.S. planning and analysis cross-industry information services market from 1995 to 2000 is noted in Exhibit VII-1.

Exhibit VII-1

Planning and Analysis Cross-Industry Sector Information Services Market, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

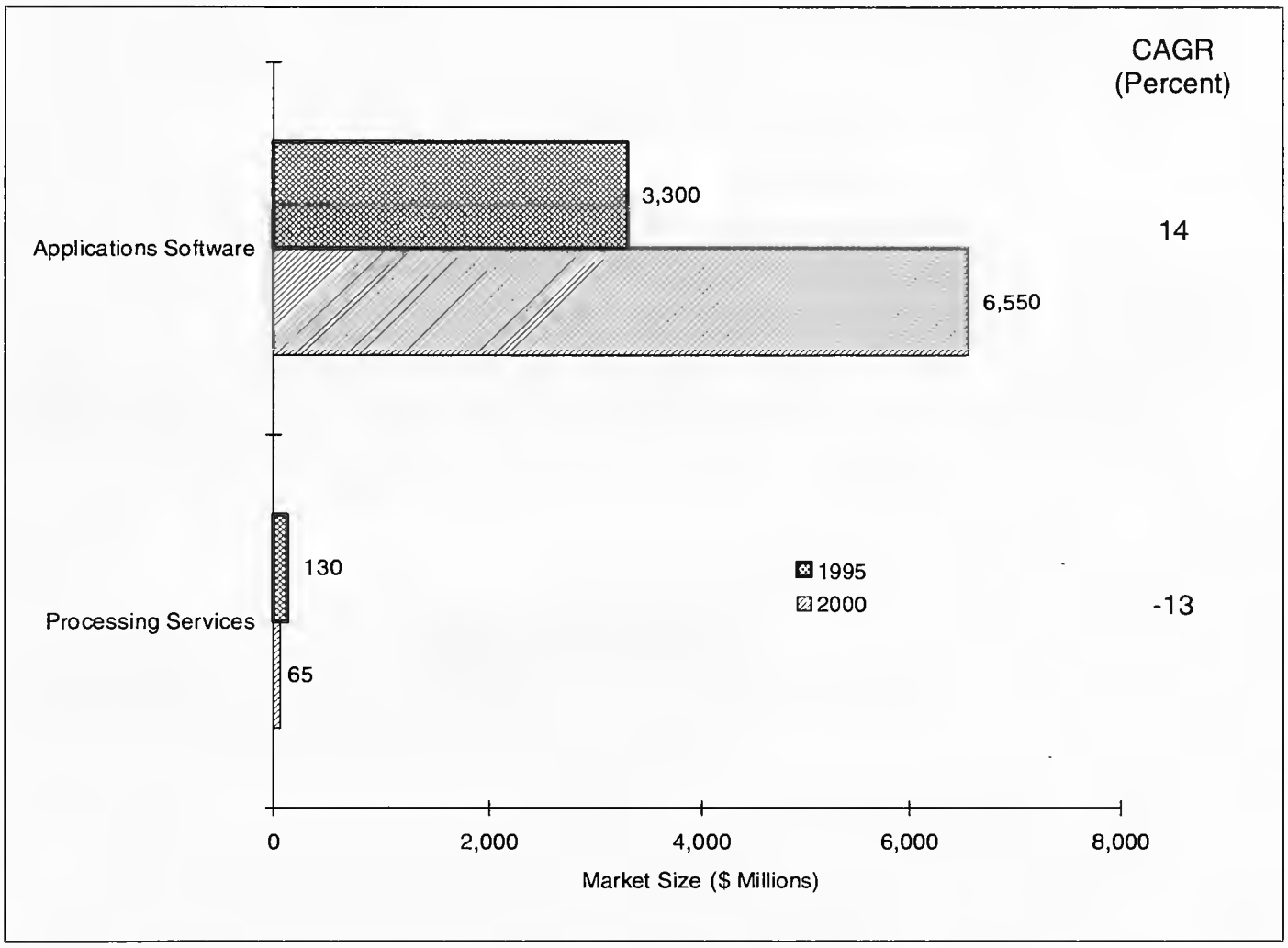
1995 revenues for this market totaled almost $3.5 billion will grow at a 14% compound annual growth rate to more than $6.6 billion in 2000. The 1% downward revision in five-year growth rate outlook from 1994 for this market primarily reflects pricing pressures in the PC/workstation packaged software area, coupled with dramatic drops in hardware prices in these platforms over the past year. However, INPUT believes this cross-industry segment will be one of the stronger growth applications software product markets, particularly in unit sales, because these products can be used to increase productivity in nearly all functional areas of a corporation, including budgeting, procurement, sales, marketing and production. Tool ease of use is also expanding their acceptance rate throughout the corporation.

2. Product/Service Market Analysis

Exhibit VII-2 shows the planning and analysis cross-industry sector market growth by product/service category.

Exhibit VII-2

Planning and Analysis Cross-Industry Sector Information Services Market by Product/Service Category, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

a. Applications Software

Applications software products dominate the size and growth rate of the planning and analysis market. This market sector will grow at a compound annual rate of 14%, from approximately $3.3 billion in 1995 to more than $6.5 billion in 2000. This reflects the strong and continuing interest in planning and analysis software as a viable business tool, the improvements in ease of use, the expansion in number of specific applications, and the cost effectiveness of the workstation/PC computing environment.

b. Processing Services

INPUT estimates the 1995 market for processing services at $130 million, down 12% from $147 million in 1994. Annual revenues are forecast to decrease further to $65 million by 2000, at a compound annual rate of -13%. This sharp decline is due to two factors. First, planning and analysis applications are typically used strategically to improve business performance and competitiveness. As such, there is little incentive, for security reasons, to

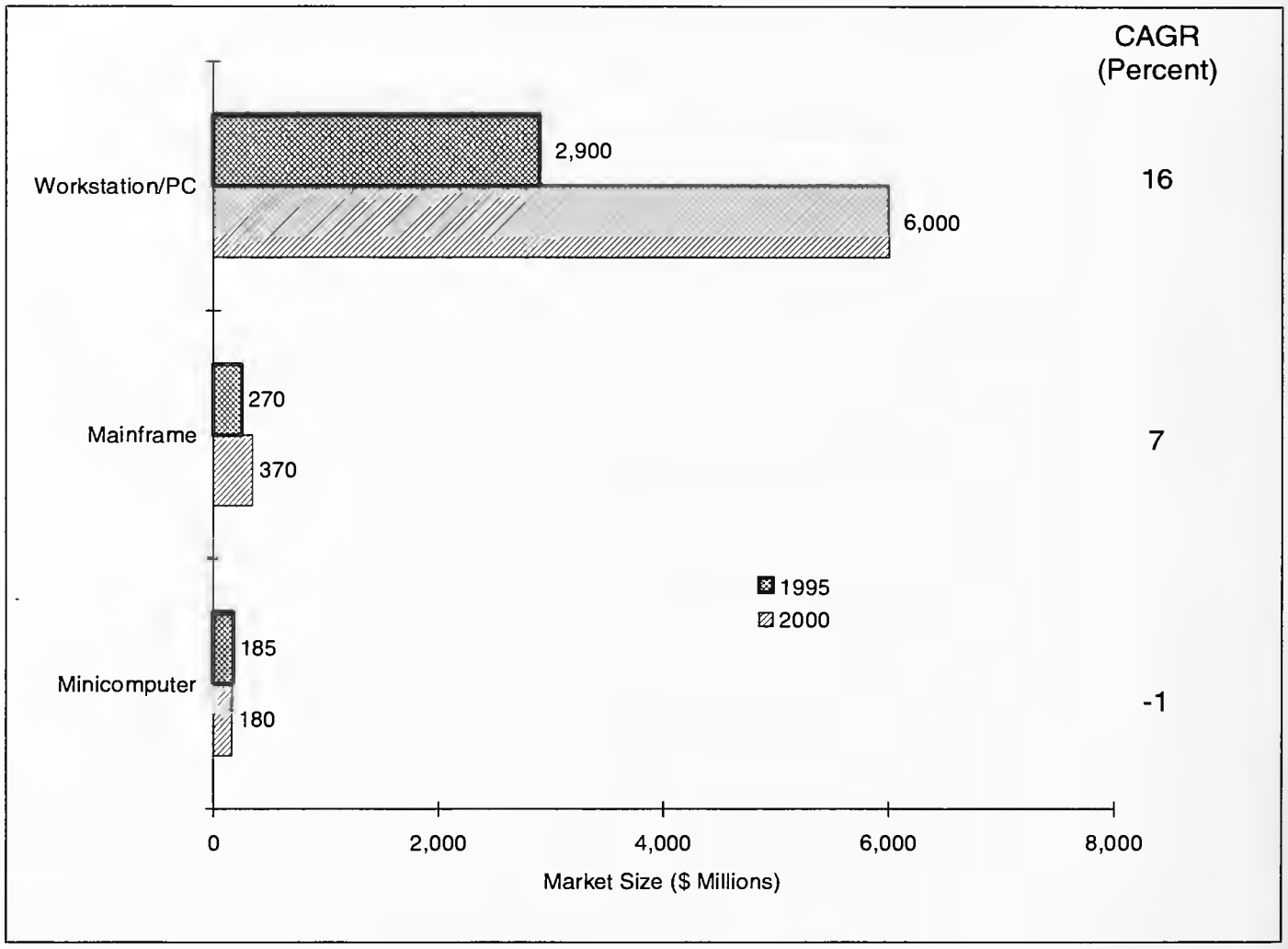
think about using a processing services provider for planning and analysis work. Second, due to the highly confidential nature of planning and analysis data, and the increased availability of PC-based systems to store this data, users have few reasons to go to outside providers for planning and analysis assistance.

3. Platform Analysis

Exhibit VII-3 summarizes projected 1995-2000 applications software revenues by delivery platform.

Exhibit VII-3

Planning and Analysis Cross-Industry Sector Applications Software Products Market by Platform Size, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

Workstations/PCs—The planning and analysis market is essentially driven by the growth in sales of applications software for workstations/PCs. In 1995, expenditures for applications software using these platforms is forecast at almost $2.9 billion. This reflects the growth of applications for planning and analysis in the corporate environment with easy-to-use GUI-based interfaces.

Mainframes—Mainframes will continue to be a repository for large, complex databases. For many applications requiring massive computing resources they are still the only logical platform, and in a client/server environment they have the resources and connectivity to function as an enterprisewide server. INPUT forecasts that 1995 applications software revenues for this platform will be $270 million and believes there will be continuing growth in complex enterprise planning activities that are best suited to a mainframe platform.

Minicomputers—INPUT estimates 1995 expenditures for minicomputer-based applications software at $185 million, representing 0% growth from 1994. Planning and analysis software does not have a strong midsize platform orientation, and although there will always be some applications that function best in that environment, the server-enhanced workstation/PC platform is expected to function as the principal departmental database server of the future.

D
Conclusions and Recommendations

1. Conclusions

- *Reengineering*—The U.S. planning and analysis industry is a major beneficiary of the corporate reengineering movement. Planning and analysis applications are used to assess current work processes as well as to implement more efficient workgroup approaches to enhance departmental and corporate operational integration.

- *Data Access*—These applications complement the trend of creating relational database structures to improve the ease of access to data by multiple levels of corporate decision makers.

- *Project Management*—Project management applications are expected to be the fastest growing subsector of the planning and analysis market. The low cost and ease of use of newer project management applications, plus their changing function in relation to a more general purpose work group management solution, will accelerate growth in this area.

2. Recommendations

- *Incorporate Planning and Analysis Modules*—Companies providing applications solutions should incorporate planning and analysis as modules or elements in more general industry-specific applications. By including such modules in standard packages, vendors both add value by providing additional function and block competitors or vendors of other software products who could become competitors.

- *Standards*—Work with object-oriented *de facto* standards to increase the interoperability of planning and analysis applications and emphasize value-added enhancements to current products with market share leadership.

- *Partnerships*—Establish partnerships with vendors sho offer products in a particular planning and analysis subsector. Seek to provide enhanced product benefits. Such relationships can produce strong market presence without the necessity for an in-house development effort which, from a market viewpoint, could produce a product with little functional differentiation.

Sales and Marketing

A
Industry Definition

Sales and marketing information services include the following applications areas and activities:

- *Sales Productivity Aids*—These activities include list processing, creating form letters, contact management, tracking and forwarding leads, ranking prospects, monitoring lengthy sales cycles and the creation and use of prompting scripts for telemarketing.

- *Sales Analysis*—Activities include the creation and analysis of monthly history and sales summary files, analysis of invoice details, tracking of sales month-to-date or year-to-date and the analysis of sales by branch, sales territory, customer and product.

- *Marketing Management*—The primary activity is the generation and analysis of reports tailored to specific management requirements. These reports address such areas as 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*—These models are used for selecting the (geographic) location of stores, outlets, and companies. The basic model cuts across multiple industries, but may require customization for some business areas 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. Beyond the basic functions of storing data for mailings and list processing, additional functions and features vary widely. These activities are often closely integrated with accounting, inventory control, purchasing and order-entry software. Products range from standalone personal productivity tools to LAN-based multiuser systems and host-based systems.

A major portion of marketing and sales software is industry specific and is, therefore, not considered in the user expenditure forecasts for this cross-industry sector. Vertical-industry sectors with emphasis on the selling and distribution functions—such as wholesale sales, retail sales, and the manufacturing industries—are the most active users of marketing and sales software. Examples of specific applications include hotel and airline reservation systems, which are fully customized for their specific markets.

B
Key Trends and Issues

1. Background

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 vertically focused packages such as inventory control and purchasing, which are used predominantly in the manufacturing, retail and wholesale sales, and packaged consumer goods industries.

Sales and marketing attributes and functions are often incorporated into other cross-industry applications software products in add-on modules. Thus, companies that sell sales and marketing cross-industry sector applications software products are likely to sell other products as well.

For marketing and sales applications, 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 and databases will continue to be an important selling point for most application areas.

2. Trends and Events

This section notes the trends and events that are affecting the sales and marketing cross-industry information services marketplace. They are consistent with those reported in 1994.

a. Customer Satisfaction and Contact Management

Total Quality Management principles (TQMP), customer service, quality, and customer satisfaction are some of the many terms now used to describe U.S. industry's growing concern for the quality of its products and services, and its desire to satisfy customer requirements at all levels. Driven by the realities of a global marketplace (increased foreign competition), and the recognition that good service supporting good products is good business, most firms are now paying close attention to all aspects of customer relations.

The sales staff is the primary point of contact with clients and prospects, and many new sales tools have been developed to record, track and act upon such external interactions. In addition, some companies now track all external contacts, not just sales-related clients and prospects. The need to assure a high level of quality and service is the primary motivator for such close contact tracking. The intent is to be certain that clients, prospects, and others receive prompt and satisfactory responses to their needs. This is a move away from traditional scenarios of the past, in which the sales and marketing departments did not communicate adequately with each other regarding contacts, often leaving customers between two departments whose sole focus was either generating the lead or closing the deal, but not necessarily helping clients or prospects with their problems.

b. Sales Force Automation (SFA)

Sales force automation has now become almost a standard business requirement. Effective account and territory management (or management of a sales or marketing group) requires time, careful planning, and the optimum use of resources.

Today's primary SFA tool is a laptop or notebook computer equipped with E-mail and contact management software, standardized office applications software, and a modem for network access. The key to success for this tool is not just handing it to a sales person and expecting that person to use it effectively—successful use requires a focused, planned set of goals for the use of SFA tools, and instruction on how they can effectively enhance employee performance.

However, implementing an effective SFA program is a complex process and requires careful planning, the support of top management, a clear definition of information needs, a concern for "people" issues, a thorough pilot or beta test to identify problem areas, and strong training and support programs. Sales groups are also finding that automating an existing, but flawed, system creates more problems than it solves. Regardless of these caveats, however, sales force automation is here to stay.

c. Laptops

Truly portable computing is a new reality in field sales activity. As a result of this technology, the field sales force and sales management now have a powerful tool to facilitate the sales process and sales administration and accounting. For sales agents, maintaining and reporting contact and prospect activity has become more practical and effortless. For sales management, assessing performance and identifying where sales efforts should be focused has become more effective and productive.

As laptops become more sophisticated in their display capabilities and abilities to support multimedia, INPUT expects the nature of the traditional sales call to change. It has become more costeffective, and indeed more profitable, to present sales proposals that are computer-based, with many of the "bells and whistles" and some of the entertainment value of a movie or high-powered infomercial. Multimedia has already become an enabling agent for more creative, thoughtful and, ultimately, effective computer use for the typical sales person.

d. Telemarketing

Telemarketing is generally recognized as the fastest growing marketing channel and should be receiving the most attention during the balance of this decade. Telemarketing offers the key attributes of cost effectiveness and productivity and is most effective when used in conjunction with other sales programs.

As with other sales activities, telemarketing has benefited from the application of computer and telecommunications technology, and the concepts and principles of sales force automation are being applied effectively to this sales channel. A broad range of applications programs for such functions as contact management, lead tracking, and automated literature distribution, including fax-on-demand, are now aimed specifically at the telemarketing department.

In a hyper-competitive economy, concerns for profitability drive increases in business efficiency, and sales cost reduction is motivating many businesses to consider alternative channels, such as value-added resellers, distributors, catalog sales and telemarketing.

A component of this particular trend is the new ability for vendors and retailers to let the customer come to them by phone via the Internet. For the more technologically savvy consumer or user, it is becoming more convenient and comfortable to access the World Wide Web in search of consumer goods or information services-related product news. From Microsoft and Digital to Tower Records and Robert Redford's Sundance catalog, the Web is becoming the middle ground between the marketer and the user.

e. Pricing

The price of sales and marketing applications software has dropped significantly, just as the size of the platform on which it runs has become smaller and less costly, and this trend shows every indication of continuing.

Sales and marketing software can either be off-the-shelf (shrink-wrapped), such as SYMANTEC's ACT!, or customized by the vendor to meet specific company needs. Shrink-wrapped software is generally less expensive, but for a sales force with many users, the customer will pay for either a multiuser product version or multiple copies of a single-user version. Many vendor packages are now easily modified and scaleable—that is, can be sized to run in different operating environments and on different platforms. In some cases, modifications are applied by the user as installation parameters; in others, the vendor modifies the software for the user. With Microsoft Windows 95, for example, the user can select the level of installation depending upon the nature and size of the target platform. By selecting the Portable option for a laptop, a sales person can install the operating system in a compact form that optimizes storage resources for a portable computer.

In most cases, although low-priced software packages are available, they generally lack what most larger users consider necessary capabilities—e.g., relational databases. Prices for single-user sales and marketing packages can be less than $100, but although useful to a single salesperson or in a simple sales environment, such packages are not normally used in a corporate sales force automation program.

Finally, although price is important, function is critical, and buyers have typically placed their emphasis first on getting needed function and then on price.

f. Linkages to Other Applications

Interoperability and file sharing among applications is crucial in today's sales and marketing environment. Full compatibility or good file conversion technology between programs such as Quicken and Excel, or Word and WordPerfect, are important for sales and marketing personnel who deal with customers having different applications, but need vendor-generated data on disk to help with evaluation and decision support.

Internally, groupware products such as Lotus Notes have been implemented by vendor companies to provide a common corporate platform for information and file exchange.

g. Enterprisewide Systems

As sales and marketing software products prove themselves in division and unit environments, their success has generated momentum toward enterprise-wide sales and marketing systems, integrating multiple sales unit information into a single database of customer contacts, and sales tracking and support information. This trend is no longer new, having become established over the last several years as the benefits-to-costs ratio of client/server implementation has greatly improved.

h. International Expansion

As in most other industry or cross-industry sectors, opportunities for growth outside the U.S. offer an attractive alternative, or complement, to the very competitive and relatively mature U.S. market. (Only in the world of information technology could a fifteen-year history be considered "mature.") While the Japanese recession of 1994 and 1995 caused major problems in information services growth abroad, the picture is brightening in Taiwan, South Korea and mainland China and will steadily improve in Europe. Home office sales and marketing analysis of offshore sales activity may require different data elements than those used with domestic data—e.g., duties, currency conversion, taxes, or a different regional/country sales segmentation.

i. Consulting Services

As software complexity grows, and users' requirements for fully integrated solutions become more prevalent, the market for professional services will also move ahead in healthy fashion. Although INPUT does not track professional services in cross-industry markets (they are forecast as part of the vertical market identity of the buyer), it is important for software providers to realize that additional revenue streams, profits and competitive advantage will come through the capability of delivering professional services. Custom programming, systems design and integration, training and implementation services will all place the providing vendor in a stronger position.

3. Issues

This section notes issues of concern to the sales and marketing cross-industry sector.

a. Are Sales Forces Necessary?

This question revolves around the timely congruence of just-in-time (JIT) production techniques, focused advertising, telemarketing, timely and cheap overnight delivery services, direct sales by the manufacturer, growing catalog sales, and video sales (such as QVC). For business and individual users, these sales channels are typically supported by liberal vendor return, exchange and service policies, and strong product guarantees. Given the user acceptance of such sales and marketing techniques, is there really any longer a need for a face-to-face sales force?

The simplest counter to the *no sales force* position is the argument that consumer (and virtually all other) products are not bought, they are *sold*. This viewpoint holds that all products of real value that satisfy real needs

(and cost *real* money) will have competent competitors whose offerings will have slight variations in function, feature and price. Such differences are not easily analyzed and evaluated by a user with limited access to counsel and guidance. A vendor who does not offer experienced and competent sales assistance, especially if competitive products offer such support (usually in the form of a sales staff that makes direct contact with the prospect), will be at a competitive disadvantage.

Countering the arguments for a large, structured sales force, however, is the success of such on-line facilitators as Prodigy, America Online and CompuServe, the growing acceptance of the Internet as a viable marketing channel, and the increasing computer literacy of businesses and individuals. Currently, however, these on-line services are more directly aimed at the home consumer, while the World Wide Web has a higher degree of information services and solutions support content. Although almost all critics of unnecessary sales middlemen agree that *some* outside sales force is necessary, many feel that it will eventually be limited to retail sales and sales support for complex and sophisticated business products.

INPUT believes there will always be some requirement for wholesale sales, but such needs will diminish in the highly efficient global marketplace of the future. Retail sales (and sales people) will certainly be affected by alternative sales channels, but there will always be some need for businesses and individuals to deal directly with a knowledgeable sales person, especially for the sale of high-cost, complex or highly specialized equipment and services.

b. Sales Force Computer Literacy

Traditional sales forces have, until recently, been reluctant to embrace computer technology. They either lack computer literacy or feel that personal contact is the most important sales tool. The computer literacy issue can be addressed through proper motivation and training, and the demonstrated benefits of sales force automation (SFA) are so significant that, once understood, they are generally used and supported by sales and marketing staff at all levels.

C
Information Services Market Forecast

1. Overview

This section provides the U.S. forecast for the sales and marketing cross-industry information services market sector. Total market and three product/service segment forecasts are offered.

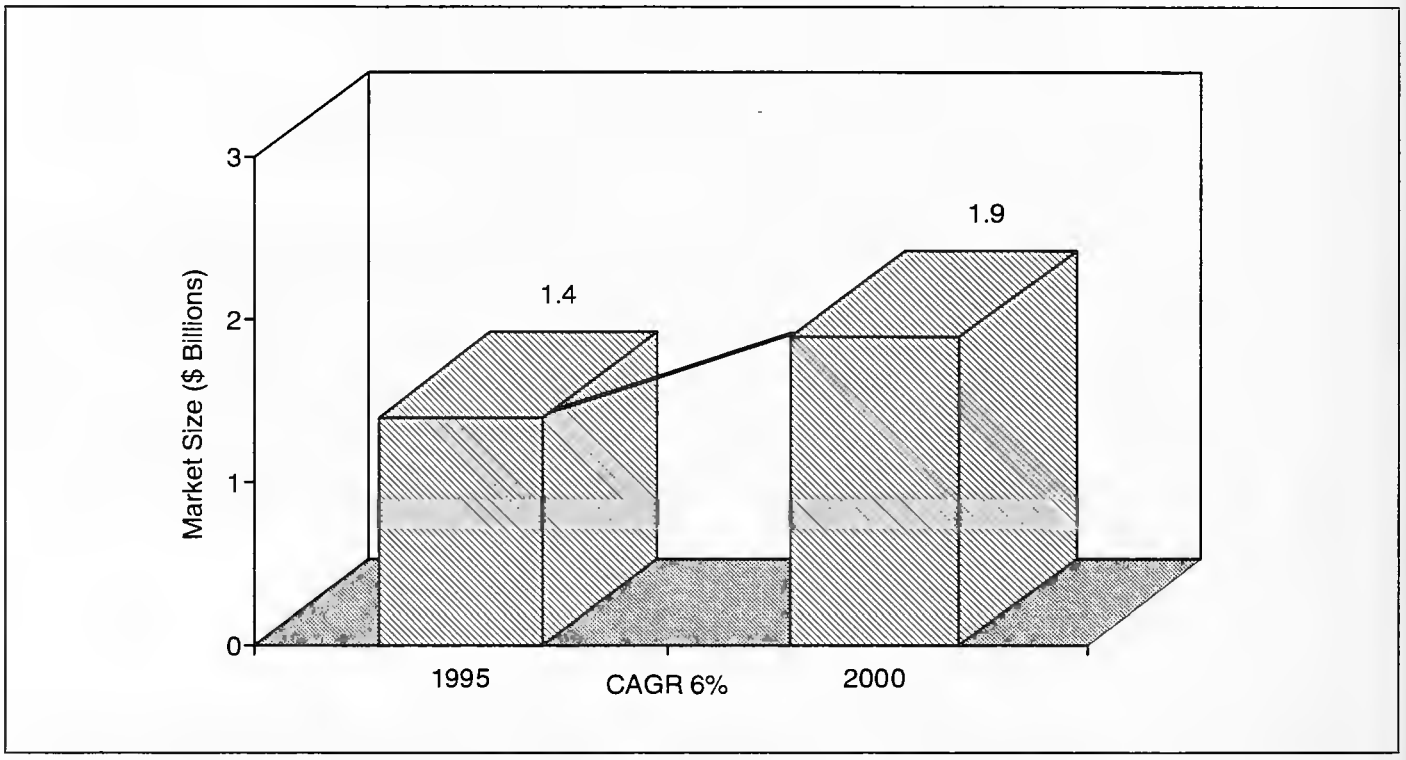
INPUT defines cross-industry markets as being served by only the applications software, processing services and turnkey systems segments, since other product/service markets are only meaningful in an industry-specific context.

2. Information Services Market

The size and compound annual growth rate (CAGR) of the sales and marketing cross-industry information services market from 1995 to 2000 is noted in Exhibit VIII-1.

Exhibit VIII-1

Sales and Marketing Cross-Industry Sector Information Services Market, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

INPUT forecasts total 1995 sales and marketing revenues to be slightly more than $1.4 billion, growing at a compound rate of 6% to in excess of $1.9 billion in 2000.

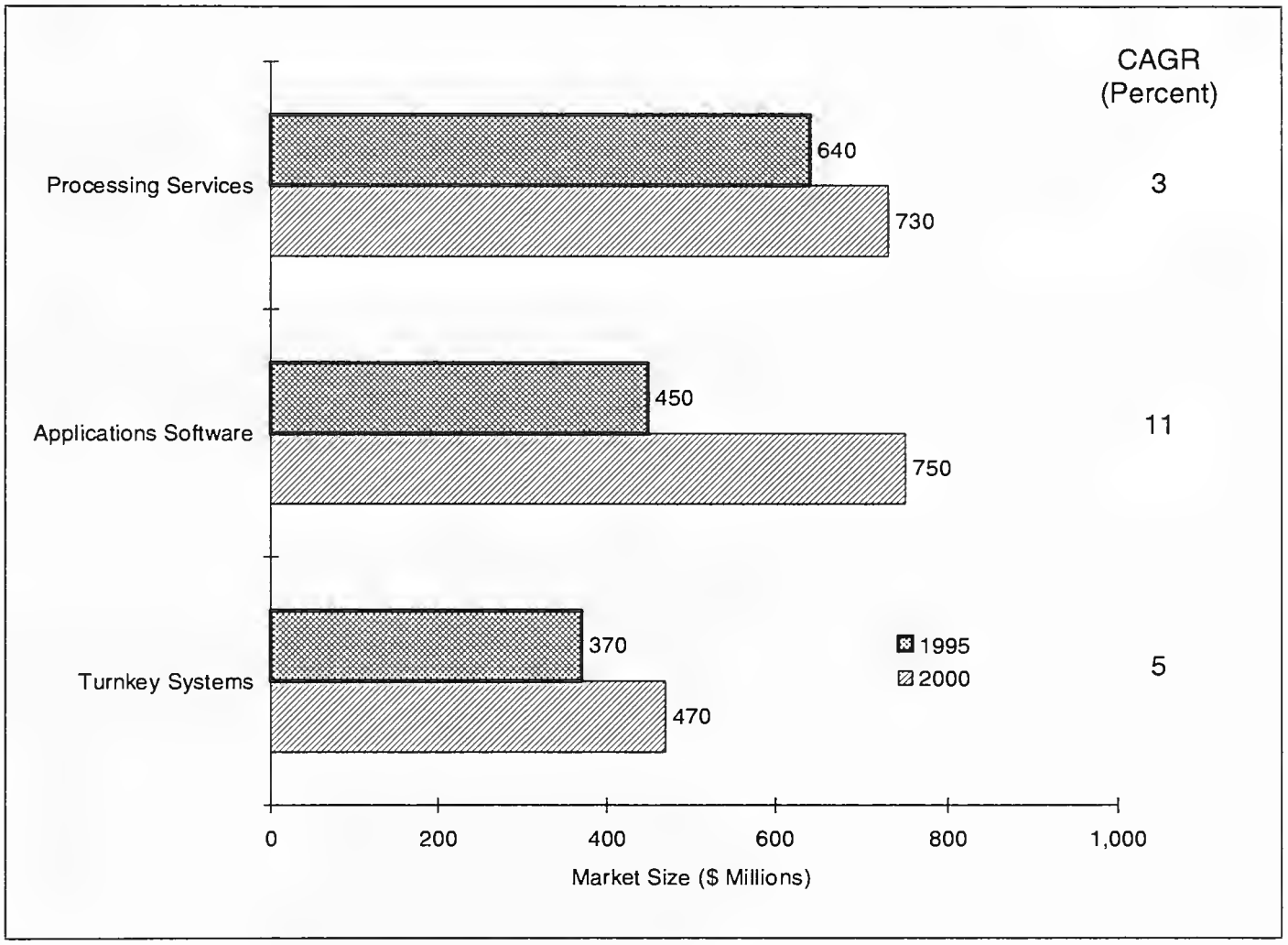
The five-year compound growth rate is the same as that in the 1994 report, reflecting INPUT's belief that information services growth will continue at a moderate but steady pace in this marketplace, but will be constrained by a growing number of industry-specific sales distribution channel alternatives. Also, continuing pressure on software product and equipment prices will keep average sales prices from increasing significantly.

3. Product/Service Category Analysis

Exhibit VIII-2 offers the sales and marketing cross-industry sector market growth forecast by product/service category.

Exhibit VIII-2

Sales and Marketing Cross-Industry Sector Information Services Market by Product/Service Category, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

a. Processing Services

INPUT measured a modest 4% growth in 1994 expenditures for processing services. This growth will taper off slightly over the five-year forecast period, however, yielding a 3% 1995-2000 CAGR and expenditures of $730 million in 2000. The 3% CAGR, although modest, reflects this industry's steady demand for processing services. User expenditures are primarily for list processing or prospect demographic data, such as that supplied by large national firms like R.R. Donnelly and other, smaller regional firms.

This demand is notable in that many markets analyzed by INPUT are experiencing a leveling off of the demand for processing services as this form of information services, so important in the 1970s and 1980s, sees market

share migrating to other processing alternatives. For example, many of the tasks that used to be performed using general-purpose timesharing networks are now being run on powerful workstations and PCs.

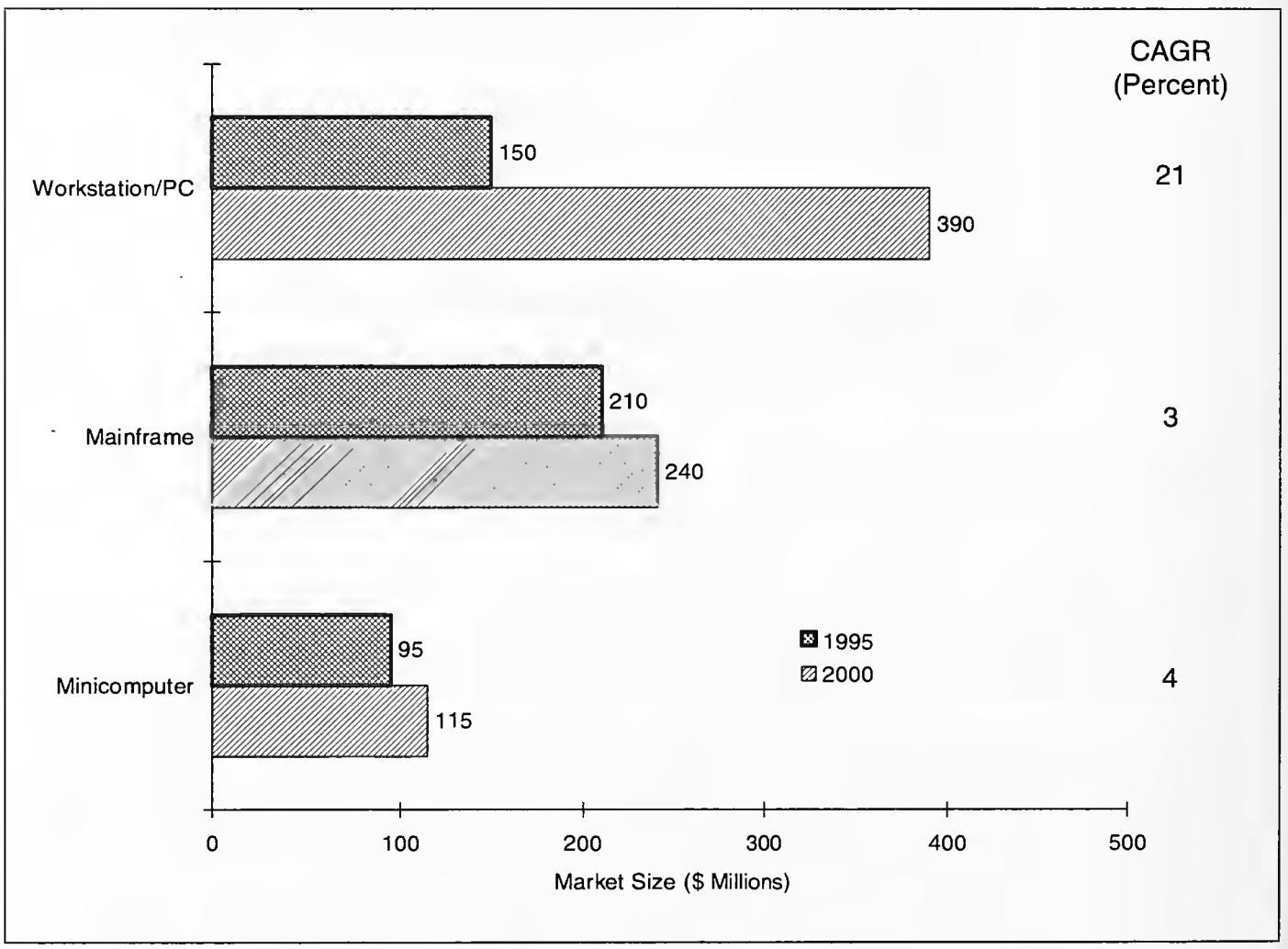
b. Applications Software

INPUT forecasts the sales and marketing cross-industry applications software market to grow 10%, to $450 million, in 1995. The five-year CAGR will be 11%, resulting in total user expenditures of almost $750 million in 2000.

Exhibit VIII-3 indicates how the user expenditures will be distributed among the three platform groupings—mainframes, minicomputers and workstation/PCs.

Exhibit VIII-3

Sales and Marketing Cross-Industry Sector Applications Software Products Market by Platform Size, 1995-2000



Note: Numbers have been rounded. *Source: INPUT*

Workstation/PC—Although five-year applications software growth, overall, is projected by INPUT at a brisk 11%, the most significant market increase will occur in products for the workstation/PC platform. User expenditures in this

market are expected to grow at a CAGR of 21% over the forecast period, reflecting the strong and growing impact of the new generation of powerful, light, inexpensive and easy-to-use desktop and portable computers, as well as related SFA products and devices. By 2000, expenditures for workstation/PC applications software products will be greater than for mainframes and minicomputers combined.

Mainframe—Enterprise SFA programs, interwoven with other corporate programs such as accounting or inventory systems, will continue to function best in a mainframe environment. INPUT projects a CAGR of 3% from 1995 to 2000 for mainframe applications software products. Business acquisitions and consolidations tend ultimately to reduce the number of large platforms and thus reduce hardware-dependent sales revenues and licensing fees. As with other cross-industry markets, most revenues are likely to come from upgrades to existing licenses and software maintenance fees.

Minicomputer—Minicomputer expenditures for sales and marketing cross-industry applications software will grow 6% from 1994 to 1995 to $95 million. Over the five-year period, 1995-2000, the growth is expected to decline to a 4% CAGR and yield a market of slightly less than $115 in 2000.

Many vendors in this platform category believe there is a low penetration of minicomputer sites for sales and marketing applications. In fact, one observation notes that of an estimated 50,000 AS/400 sites in the United States, less than 1,000 have installed sales and marketing applications software. Such a low penetration of the most popular minicomputer platform is partially the result of recent constrained business conditions and not an indictment of either the platform or the application. However, as business conditions continue to improve, product sales for this very large installed base will also improve, but many new sales and marketing solutions will be implemented on lower cost desktop units, not on minicomputers.

c. Turnkey Systems

Turnkey systems expenditures for the sales and marketing cross-industry sector are forecast to grow at 6% in 1995. Over the five-year forecast period, 1995-2000, the sales and marketing turnkey systems expenditure CAGR of 5% represents a slight decline in growth as fewer general-purpose integrated platforms are used.

The cross-industry five-year growth of 5% is lower than the growth of the more dynamic overall U.S. (industry-specific) turnkey systems market, which is growing at a 9% CAGR for the same period. For instance, although a substantial number of VARs provide integrated marketing and sales systems to specific industries, such as wholesale and retail trade, far fewer provide cross-industry integrated marketing and sales systems. In general, the VARs

supplying cross-industry software products deliver them on a variety of platforms and can provide customization and integration services. Although just-in-time (JIT) manufacturing techniques limit inventory requirements, a VAR still must stock a minimum number of platforms—a significant cost item.

D
Conclusions and Recommendations

1. Conclusions

- *Steady Growth*—Sales and marketing cross-industry information services growth will continue at an unspectacular but steady rate during the forecast period.

- *Workstation / PC Platforms*—Desktop software applications products (workstation and PC platforms) will produce most of the applications software products growth opportunities in this industry. Portable computing/communicating devices and software will extend the reach of sales and marketing solutions into many more remote sales applications and selling environments. To the extent that these tools achieve broad acceptance, the forecast U.S. growth rate of a 6% CAGR may be conservative.

- *Function / Access Requirements*—Demand will grow for more sophisticated, integrated and enterprisewide sales and marketing information products/services.

- *International Markets*—International expansion will be attractive to vendors with the resources to address foreign markets.

2. Recommendations to Vendors

- *Offer Scaleable Open Systems*—Software products suppliers should concentrate resources on delivering open systems-based solutions on multiple desktop equipment platforms.

- *Create Compatible Linkages*—Link existing software packages to complementary systems such as word processors, groupware, the Internet and other electronic communications systems.

- *International Markets*—Carefully evaluate expansion into overseas markets. There is opportunity for both domestic sales and marketing program/product modules that analyze and track offshore business activity, and products dedicated to specific foreign markets. Be aware that both of these product categories will require additional program or service elements to meet the added data needs for the international market (e.g., currency conversion, tariffs, duties).

- *Portability / Communications*—Incorporate portable device computer/communicator interfaces into product/service solutions to better serve remote and mobile users of sales applications.

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Forecast Database and Reconciliation

This appendix contains the forecast databases and reconciliations for each of the seven cross-industry market sectors:

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

A
Accounting

INPUT's overall accounting forecast shows a 1% higher growth in this sector between 1994 and 1995 than indicated in the previous year. This is due to the increased demand for PC-based applications software. As the largest single segment in accounting, PC software growth will be driven by the need for multiplatform client/server applications.

Exhibit A-1 presents INPUT's accounting cross-industry sector user expenditure forecast for 1995-2000. Exhibit A-2 presents a reconciliation of the 1994 and 1999 forecasts. There is minimal variance—1% or less—in the 1994 and 1999 figures and the five-year growth rates.

Exhibit A-1

Accounting Cross-Industry Sector
U.S. Market Forecast by Product/Service Sector, 1995-2000

Product/Service Markets	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-00 (%)
Cross-Industry Total	3,981	11	4,420	4,936	5,559	6,286	7,157	8,222	13
Processing Services	158	-1	156	154	152	150	148	146	-1
- Transaction Processing	158	-1	156	154	152	150	148	146	-1
Applications Software	3,324	13	3,760	4,272	4,892	5,618	6,489	7,555	15
- Mainframe	1,005	9	1,092	1,185	1,285	1,390	1,504	1,623	8
- Minicomputer	739	7	791	850	912	988	1,070	1,163	8
- Workstation/PC	1,580	19	1,877	2,237	2,695	3,240	3,915	4,769	21
Turnkey Systems	499	1	504	510	515	518	520	521	1
- Equipment	209	-1	206	202	199	195	191	186	-2
- Software Products	191	2	195	199	203	208	212	216	2
- Professional Services	99	4	103	109	113	115	117	119	3

Source: INPUT

Exhibit A-2

Accounting Cross-Industry Sector
1995 MAP Database Reconciliation

Product/ Service Market	1994 Market: 1994 Market (Forecast) ($M)	1994 Market: 1995 Report (Actual) ($M)	1994 Market: Variance From 1994 Forecast ($M)	1994 Market: Variance From 1994 Forecast (%)	1999 Market: 1994 Market (Forecast) ($M)	1999 Market: 1995 Report (Forecast) ($M)	1999 Market: Variance From 1994 Forecast ($M)	1999 Market: Variance From 1994 Forecast (%)	94-99 CAGR per data '94 Rpt (%)	94-99 CAGR per data '95 Rpt (%)
Total	3,967	3,981	14	0	7,075	7,157	82	1	12	12
Processing Services	159	158	-1	-1	149	148	-1	-1	-1	-1
Applications Software	3,307	3,324	17	1	6,402	6,489	87	1	14	14
Turnkey Systems	501	499	-2	0	524	520	-4	-1	1	1

Source: INPUT

B
Education and Training

Exhibit A-3 provides the detailed five-year forecast for education and training. Exhibit A-4 contains the reconciliation of INPUT's 1994 and 1995 market forecasts for the education and training cross-industry market. The dollar variance for the total 1994 market was $11 million, with a range of no change to $11 million for individual product and service sectors. The maximum variance was a 3% 1994 understatement of applications software product spending, a result of stronger-than-anticipated growth in this market area due to both the burgeoning popularity of client/server systems and multimedia courseware, and the growing need for CBT as companies face increased education and training demands resulting from continuing work force changes.

Variances for 1999 reflect a continuation of increased demand for CBT, a trend most noticeable in the strong growth now forecast for the workstation/PC segment of the applications software sector. The growth of expenditures for products designed for these platforms will, in effect, drive the strong growth forecast for this cross-industry market. Five-year CAGRs have remained consistent.

Exhibit A-3

Education and Training Cross-Industry Sector
U.S. Market Forecast by Product/Service Sector, 1995-2000

Product/Service Markets	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-00 (%)
Cross-Industry Total	443	12	497	555	628	716	822	946	14
Processing Services	4	0	4	3	3	3	2	2	-13
- Transaction Processing	4	0	4	3	3	3	2	2	-13
Applications Software	274	13	309	350	405	472	555	653	16
- Mainframe	57	2	58	58	59	59	60	60	1
- Minicomputer	30	3	31	31	32	32	33	34	2
- Workstation/PC	187	18	220	261	314	381	462	559	21
Turnkey Systems	165	12	184	202	220	241	265	291	10
- Equipment	67	9	73	79	84	90	97	105	8
- Software Products	65	12	73	80	88	97	108	120	10
- Professional Services	33	15	38	43	48	54	60	66	12

Source: INPUT

Exhibit A-4

Education and Training Cross-Industry Sector
1995 MAP Database Reconciliation

Product/ Service Market	1994 Market				1999 Market				94-99 CAGR per data '94 Rpt (%)	94-99 CAGR per data '95 Rpt (%)
	1994 Market (Forecast) ($M)	1995 Report (Actual) ($M)	*Variance From 1994 Forecast* ($M)	(%)	1994 Market (Forecast) ($M)	1995 Report (Forecast) ($M)	*Variance From 1994 Forecast* ($M)	(%)		
Total	432	443	11	3	797	822	25	3	13	13
Processing Services	4	4	0	0	2	2	0	0	-13	-13
Applications Software	266	274	8	3	533	555	22	4	15	15
Turnkey Systems	162	165	3	2	262	265	3	1	10	10

Source: INPUT

C

Engineering and Scientific

The five-year forecast is detailed in Exhibit A-5. Exhibit A-6 contains the reconciliation of INPUT's 1994 and 1995 market forecasts for the engineering and scientific cross-industry market. The dollar variances are small for both the 1994 and 1999 markets, reflecting the essential stability of this market. Variances for 1994 numbers were only 1%, while 1999 variations were either 2% or 3%—both variances well within the range of normal forecast variances. Overall five-year growth is increased by 1% in 1999, the result of the strong workstation/PC applications software products market.

The engineering and scientific cross-industry sector is a stable market with a structured hierarchy of products, a good portion of which are steadily and predictably migrating to smaller, more powerful and cost-effective platforms. The migration pattern is relatively clear—with most uncertainties related to the speed with which the migration to smaller platforms takes place.

Exhibit A-5

Engineering and Scientific Cross-Industry Sector
U.S. Market Forecast by Product/Service Sector, 1995-2000

Product/Service Markets	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-00 (%)
Cross-Industry Total	1,200	10	1,317	1,449	1,598	1,777	1,981	2,231	11
Processing Services	123	-5	117	111	104	98	91	85	-6
- Transaction Processing	123	-5	117	111	104	98	91	85	-6
Applications Software	930	12	1,045	1,176	1,325	1,504	1,709	1,959	13
- Mainframe	184	8	199	212	225	239	252	265	6
- Minicomputer	320	8	347	373	403	434	469	505	8
- Workstation/PC	426	17	499	591	697	831	988	1,189	19
Turnkey Systems	147	5	155	162	169	175	181	187	4
- Equipment	60	2	61	61	62	62	63	63	1
- Software Products	58	7	62	66	70	74	77	81	5
- Professional Services	29	10	32	35	37	39	41	43	6

Source: INPUT

Exhibit A-6

Engineering and Scientific Cross-Industry Sector
1995 MAP Database Reconciliation

Product/ Service Market	1994 Market: 1994 Market (Forecast) ($M)	1994 Market: 1995 Report (Actual) ($M)	1994 Market: Variance From 1994 Forecast ($M)	1994 Market: Variance From 1994 Forecast (%)	1999 Market: 1994 Market (Forecast) ($M)	1999 Market: 1995 Report (Forecast) ($M)	1999 Market: Variance From 1994 Forecast ($M)	1999 Market: Variance From 1994 Forecast (%)	94-99 CAGR per data '94 Rpt (%)	94-99 CAGR per data '95 Rpt (%)
Total	1,186	1,200	14	1	1,928	1,981	53	3	10	11
Processing Services	124	123	-1	-1	94	91	-3	-3	-5	-6
Applications Software	917	930	13	1	1,657	1,709	52	3	13	13
Turnkey Systems	145	147	2	1	177	181	4	2	4	4

Source: INPUT

D
Human Resources

Exhibit A-7 offers the detailed 1995-2000 human resources forecast.

Exhibit A-8, the database reconciliation, reflects the increase in the 1994 processing services market from $2.7 billion to $2.8 billion. The reason for this increase is the more precise definition of the roughly 30% share of the market attributed to regional and local payroll processing vendors. The dominant national vendors—ADP, Ceredian and Paychex—account for over $1.8 billion annually, and the total market is estimated to be 30% larger than the revenues of those leading vendors. This growth will diminish slightly in 1999, resulting in the 3% variance in that year, and the 1% decline in the overall CAGR.

Turnkey systems growth was 2% greater than expected in 1994 and this variance will carry through to 1999. The five-year growth rate remains unchanged at a modest 2%.

The applications software products market actual 1994 expenditures showed little variance from last year's forecast and the 1999 numbers are down by 6% as the growth in all platform categories flattens toward the end of the forecast period. Five-year CAGRs for the overall market, processing services and applications software products (for the period 1994-1999) are reduced by 1% each, to reflect the slowing growth of employment-related drivers of this market. Growth in the final year of the 1995-2000 forecast reflects the optimism of the business community regarding the millennium and, as a result, the 1994-1999 and 1995-2000 CAGRs are essentially the same.

Exhibit A-7

Human Resources Cross-Industry Sector
U.S. Market Forecast by Product/Service Sector, 1995-2000

Product/Service Markets	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-00 (%)
Cross-Industry Total	3,801	9	4,156	4,509	4,897	5,258	5,638	6,052	8
Processing Services	2,805	9	3,050	3,290	3,555	3,795	4,045	4,325	7
- Transaction Processing	2,805	9	3,050	3,290	3,555	3,795	4,045	4,325	7
Applications Software	896	12	1,003	1,113	1,234	1,355	1,483	1,616	10
- Mainframe	275	5	290	303	316	329	340	350	4
- Minicomputer	298	7	320	340	360	380	400	420	6
- Workstation/PC	323	22	393	470	558	646	743	846	17
Turnkey Systems	100	3	103	106	108	108	110	111	2
- Equipment	41	-2	40	38	35	31	28	25	-9
- Software Products	37	5	39	42	45	47	49	51	6
- Professional Services	22	9	24	26	28	30	33	35	8

Source: INPUT

Exhibit A-8

Human Resources Cross-Industry Sector
1995 MAP Database Reconciliation

Product/ Service Market	1994 Market: 1994 Market (Forecast) ($M)	1994 Market: 1995 Report (Actual) ($M)	1994 Market: Variance From 1994 Forecast ($M)	1994 Market: Variance From 1994 Forecast (%)	1999 Market: 1994 Market (Forecast) ($M)	1999 Market: 1995 Report (Forecast) ($M)	1999 Market: Variance From 1994 Forecast ($M)	1999 Market: Variance From 1994 Forecast (%)	94-99 CAGR per data '94 Rpt (%)	94-99 CAGR per data '95 Rpt (%)
Total	3,773	3,801	28	1	5,481	5,258	-223	-4	8	7
Processing Services	2,780	2,805	25	1	3,930	3,795	-135	-3	7	6
Applications Software	895	896	1	0	1,445	1,355	-90	-6	10	9
Turnkey Systems	98	100	2	2	106	108	2	2	2	2

Source: INPUT

E
Office Systems

Exhibit A-9 presents the 1995-2000 forecast for the office systems cross-industry market. Exhibit A-10 reconciles the 1994 and 1995 forecasts for this industry's information services expenditures.

Variances in the 1994 market estimates versus actuals are minimal, at a maximum of 1%. The 1999 market is understated by 5% to 6% in all categories except turnkey systems, where growth is forecast to decrease by 2% from prior estimates. The positive variances (larger markets) for 1999 are also reflected in the slightly improved CAGRs for all product/service categories except turnkey systems, where growth is almost flat. In general, this market overall is growing at a slightly faster rate than anticipated, reflecting corporate America's acceptance of the computer and workstation/PCs as valuable office tools.

Exhibit A-9

Office Systems Cross-Industry Sector
U.S. Market Forecast by Product/Service Sector, 1995-2000

Product/Service Markets	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-00 (%)
Cross-Industry Total	3,799	15	4,360	5,058	5,847	6,737	7,838	9,037	16
Processing Services	27	-4	26	25	24	23	21	19	-6
- Transaction Processing	27	-4	26	25	24	23	21	19	-6
Applications Software	3,649	15	4,211	4,907	5,695	6,586	7,689	8,891	16
- Mainframe	159	-2	156	152	147	141	134	126	-4
- Minicomputer	680	7	730	775	810	845	880	915	5
- Workstation/PC	2,810	18	3,325	3,980	4,738	5,600	6,675	7,850	19
Turnkey Systems	123	0	123	126	128	128	128	127	1
- Equipment	51	-2	50	49	48	46	44	42	-3
- Software Products	47	2	48	50	51	52	53	53	2
- Professional Services	25	0	25	27	29	30	31	32	5

Source: INPUT

Exhibit A-10

Office Systems Cross-Industry Sector
1995 MAP Database Reconciliation

Product/ Service Market	1994 Market				1999 Market				94-99 CAGR per data '94 Rpt (%)	94-99 CAGR per data '95 Rpt (%)
	1994 Market (Forecast) ($M)	1995 Report (Actual) ($M)	*Variance From 1994 Forecast* ($M)	*Variance From 1994 Forecast* (%)	1994 Market (Forecast) ($M)	1995 Report (Forecast) ($M)	*Variance From 1994 Forecast* ($M)	*Variance From 1994 Forecast* (%)		
Total	3,759	3,799	40	1	7,397	7,838	441	6	14	16
Processing Services	27	27	0	0	20	21	1	5	-6	-5
Applications Software	3,610	3,649	39	1	7,247	7,689	442	6	15	16
Turnkey Systems	122	123	1	1	130	128	-2	-2	1	1

Source: INPUT

F

Planning and Analysis

Exhibit A-11 presents the detailed 1994 actual and 1995-2000 forecast of the planning and analysis cross-industry market sector.

Exhibit A-11

Planning and Analysis Cross-Industry Sector
U.S. Market Forecast by Product/Service Sector, 1995-2000

Product/Service Markets	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-00 (%)
Cross-Industry Total	2,987	16	3,460	3,945	4,495	5,117	5,790	6,610	14
Processing Services	147	-12	130	115	100	87	75	65	-13
- Transaction Processing	147	-12	130	115	100	87	75	65	-13
Applications Software	2,840	17	3,330	3,830	4,395	5,030	5,715	6,545	14
- Mainframe	250	8	270	290	310	330	350	370	7
- Minicomputer	185	0	185	185	185	180	180	180	-1
- Workstation/PC	2,405	20	2,875	3,355	3,900	4,520	5,185	5,995	16
Turnkey Systems	0	0	0	0	0	0	0	0	0
- Equipment									
- Software Products									
- Professional Services									

Source: INPUT

Exhibit A-12 offers a reconciliation of the 1994 and 1995 forecasts for the planning and analysis cross-industry sector.

Exhibit A-12

Planning and Analysis Cross-Industry Sector
1995 MAP Database Reconciliation

Product/ Service Market	1994 Market				1999 Market				94-99 CAGR per data '94 Rpt (%)	94-99 CAGR per data '95 Rpt (%)
	1994 Market (Forecast) ($M)	1995 Report (Actual) ($M)	*Variance From 1994 Forecast* ($M)	*Variance From 1994 Forecast* (%)	1994 Market (Forecast) ($M)	1995 Report (Forecast) ($M)	*Variance From 1994 Forecast* ($M)	*Variance From 1994 Forecast* (%)		
Total	2,940	2,987	47	2	5,800	5,790	-10	0	15	14
Processing Services	150	147	-3	-2	80	75	-5	-6	-12	-13
Applications Software	2,790	2,840	50	2	5,720	5,715	-5	0	15	15
Turnkey Systems	0	0	0	0	0	0	0	0	0	0

Source: INPUT

There were minor differences between the 1994 projection for 1994 expenditures and the actual amounts noted in the 1995 report. The maximum variances were a 2% understatement of 1994 total and applications software spending and a 2% overstatement of the market for processing services.

The 6% overstatement of the 1999 processing services market reflects the continued migration of outside processing activity to powerful in-house fixed-cost workstations and PCs. The 1% variances in the five-year growth rates for the period 1994-1999 are minor, and indicate a slight decrease in the pace of growth for this cross-industry market sector.

G
Sales and Marketing

Exhibit A-13 presents the detailed 1994 actual and 1995-2000 forecast of the sales and marketing cross-industry market sector.

Exhibit A-13

Sales and Marketing Cross-Industry Sector
U.S. Market Forecast by Product/Service Sector, 1995-2000

Product/Service Markets	1994 ($M)	Growth 94-95 (%)	1995 ($M)	1996 ($M)	1997 ($M)	1998 ($M)	1999 ($M)	2000 ($M)	CAGR 95-00 (%)
Cross-Industry Total	1,375	6	1,461	1,553	1,646	1,742	1,846	1,948	6
Processing Services	615	4	640	665	685	700	715	730	3
- Transaction Processing	615	4	640	665	685	700	715	730	3
Applications Software	410	10	450	495	547	608	677	745	11
- Mainframe	195	5	205	215	223	230	236	241	3
- Minicomputer	90	6	95	100	104	108	111	114	4
- Workstation/PC	125	20	150	180	220	270	330	390	21
Turnkey Systems	350	6	371	393	414	434	454	473	5
- Equipment	143	3	147	152	157	162	167	171	3
- Software Products	141	8	152	163	173	183	193	203	6
- Professional Services	66	9	82	87	84	89	94	99	7

Source: INPUT

Exhibit A-14 offers a reconciliation of the 1994 and 1999 forecasts for the sales and marketing cross-industry sector.

Exhibit A-14

Sales and Marketing Cross-Industry Sector
1995 MAP Database Reconciliation

Product/ Service Market	1994 Market				1999 Market				94-99 CAGR per data '94 Rpt (%)	94-99 CAGR per data '95 Rpt (%)
	1994 Market (Forecast) ($M)	1995 Report (Actual) ($M)	*Variance From 1994 Forecast* ($M)	(%)	1994 Market (Forecast) ($M)	1995 Report (Forecast) ($M)	*Variance From 1994 Forecast* ($M)	(%)		
Total	1,387	1,375	-12	-1	1,816	1,846	30	2	6	6
Processing Services	625	615	-10	-2	735	715	-20	-3	3	3
Applications Software	416	410	-6	-1	627	677	50	8	9	11
Turnkey Systems	346	350	4	1	454	454	0	0	6	5

Source: INPUT

Forecast variances for the 1994 market were minimal, ranging from a 2% market overstatement for processing services to a 1% understatement of the turnkey systems market. Variances for 1999 were in a slightly larger range—8% to -3%—reflecting the slightly slower than anticipated growth in the use of outside services for list processing or demographic data, and the increased use of laptop- and desktop-based sales and marketing applications software products. Workstation/PC-based software products alone showed a five-year growth increase (CAGR) from 18% for 1994-1999 to 21% for 1995-2000—accounting for the 2% overall increase in the 1994-1999 growth rates contained in the 1995 report.

Turnkey systems' CAGR has been reduced to 5% for the period 1994-1999, down from the 6% noted in last year's report. This is primarily due to the continuing downward pressure on prices, plus the move of a number of former turnkey providers, especially at the desktop platform level, into a more industry-focused role as software providers.