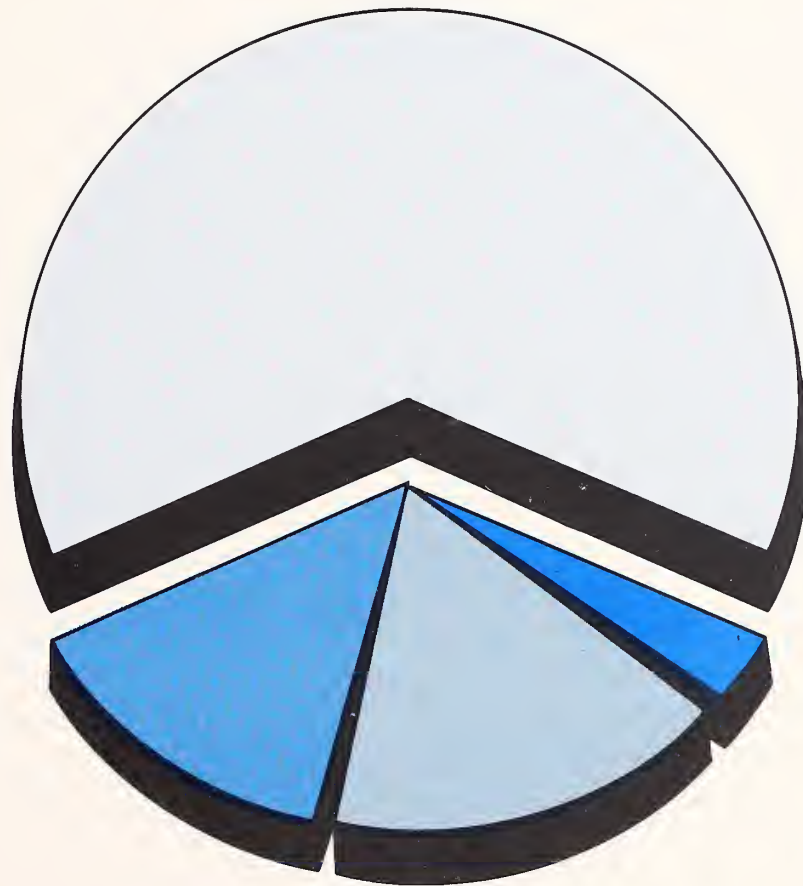


INPUT[®]

Information Services Cross-Industry Markets



● Processing Services

● Software Products

● Turnkey Systems

● Professional Services

**Market Analysis and
Planning Service (MAPS)**

Enclosed is part of the Industry Markets portion of the Market Analysis and Planning Service (MAPS) Program to which you subscribe. Enclosed are five (5) sections for inclusion in the U.S. Information Services Vertical Markets, 1984-1989 loose-leaf binder shipped to you earlier. These sections are for the following industries: Medical, Process Manufacturing, State and Local Government, Transportation, and Utilities. Also enclosed is a loose-leaf binder for forthcoming sections relating to cross-industry information services markets, 1984-1989.

A loose-leaf format for the industry series is provided as a convenient way to maintain in one place all information produced by INPUT related to a particular industry segment. Thus, as INPUT provides updates to these analyses in 1985, you can insert them next to the previously published reports on the same topic.

Since much important information about these markets was also contained in last year's information services markets series (which were hardbound), we have taken the liberty of including in this year's loose leaf sections portions from last year's analysis that we feel are worthy of reemphasis.

Note also that in the vertical markets sections we have added new information related to the budgets, plans, and concerns of information systems executives. Since these individuals are having increasing impact on information services of all kinds, we felt you would want to be kept abreast of their attitudes and outlooks.

During the next several weeks you will be receiving the following: the cross-industry markets sections; a complete data base containing the entire set of market forecasts for each year (1984-1989) and for every section in the vertical and cross-industry markets series; and an Executive Summary for vertical and cross-industry markets.

Please keep us informed concerning how you feel about this new approach to the industry markets series.

Best regards,



Jack Keen
 Vice President, Director of
 Client Programs

JK:ml

Enclosures

M-MAR
 1984
 C.1

AUTHOR	
INFORMATION SERVICES	
TITLE	
CROSS-INDUSTRY MARKETS	
DATE LOANED	BORROWER'S NAME



Information Services Cross-Industry Markets

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U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
INTRODUCTION

U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
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I INTRODUCTION

- This Industry Markets series of reports is produced as part of INPUT's Market Analysis and Planning Service (MAPS) program.
- INPUT conducts ongoing research into the information services industry, studying a variety of issues and trends that affect industry participants.

A. PURPOSE OF THE REPORTS

- The information services industry is one of the premier performers in the U.S. economy. Although this industry was practically nonexistent 25 years ago, user expenditures of \$39 billion in 1984 will explode to \$107 billion by 1989, representing a 22% average annual growth rate (AAGR).
- The information services industry is experiencing turbulent times that are seeing major changes in technology, structure, economics, buying criteria, and competitive strategies. In spite of all of this, the overall industry will enjoy excellent health through the remainder of this decade.
- This Industry Markets series is a two-volume set that profiles, analyzes, and forecasts this changing character of the information services markets in the U.S. The purpose of these two volumes is to present a comprehensive overview of the industry in 1986 and to provide forecasts for market size and growth over the next five years.

- The first volume analyzes vertical (industry-specific) opportunities and is entitled U.S. Information Services Vertical Markets, 1984-1989.
- The second volume, which you are now reading, profiles cross-industry-related markets.
- These two volumes emphasize identifying market trends, analyzing their driving forces (including competitive, technological, and economic factors), and examining the impact of these trends on market size and growth through 1989.
- Specific challenges and opportunities for information services vendors are noted, as are hazards and areas of low growth or high risk. When appropriate, specific recommendations related to business strategy are presented.
- These reports are designed to assist vendor executives in:
 - Identifying new market and product opportunities.
 - Assessing risk.
 - Allocating scarce resources.
 - Obtaining insights into market-related developments that can impact business profitability.
- These reports are also designed to help information services industry investors and observers to:
 - Understand the major trends affecting market health.
 - Identify emerging opportunities at an early stage.

- These two volumes are organized as explained below.

B. SCOPE OF THE REPORTS

I. VERTICAL MARKETS

- The Vertical Markets volume addresses markets that focus on the unique industry-specific requirements of 14 major industry segments in the U.S. economy. Segments analyzed are:
 - Banking and finance.
 - Discrete manufacturing.
 - Distribution (retail and wholesale).
 - Education.
 - Federal government.
 - Insurance.
 - Medical.
 - Process manufacturing.
 - Services.
 - State and local government.

- Telecommunications.
 - Transportation.
 - Utilities.
 - Other industries.
- Industry analyses are supplemented by demographic profiles of each industry based on the latest U.S. government data.
 - This year's volume has been expanded to include lower level "sector" forecasts for several industries. This has been done to give clients a more detailed view of important components that comprise the overall segment. Expanded forecasts and analyses are given for the following markets:
 - Banking and finance.
 - Discrete manufacturing.
 - Insurance.
 - Medical.
 - Education.

2. CROSS-INDUSTRY MARKETS

- The Cross-Industry Markets volume addresses markets that have common requirements across multiple-industry segments. Markets analyzed are:
 - Accounting.

- Education and training.
- Engineering and scientific.
- Human resources.
- Planning and analysis.
- Systems software.
- Utility processing.
- Value-added networks.
- Other cross-industry applications.

3. DELIVERY MODES FORECASTED

- The following delivery modes, when applicable, are included in the forecasts for both industry-specific and cross-industry markets:
 - Processing services.
 - Remote computing services.
 - Batch processing.
 - Processing facilities management.
- Software products.
 - Applications software.

- Mainframe/minicomputer software.
 - Microcomputer software.
- Systems software.
 - Application development tools.
 - Systems control.
 - Data center management.
- Professional services.
- Turnkey systems.
- Comprehensive analyses of delivery modes can be found in forthcoming INPUT reports titled:
 - Processing Services and Turnkey Systems Market Analysis and Forecast, 1984-1989.
 - Software Products and Professional Services Market Analysis and Forecast, 1984-1989.
 - Personal Computer Software Products Market Analysis and Forecast, 1984-1989.
- The information services industry forecasts developed by INPUT for these reports are for U.S. user expenditures for noncaptive business (i.e., excluding business derived from a firm's parent or affiliated organization). Forecasting user expenditures rather than vendor revenues eliminates double-counting from the reselling of services.

C. METHODOLOGY

- The process of forecasting is a continuous one. This year's report represents the eighth year INPUT has studied the information services industry in its entirety. Two fundamental and complementary approaches are used to analyze the industry.
 - The first is a "bottom up" approach. Thousands of interviews are conducted with buyers of information services in each of the industries analyzed.
 - Target interviewees are typically division managers or higher, usually holding purchase or budget authority for at least one type of information service. Both end users and information systems professional managers are interviewed.
- On the other side, INPUT conducts an annual census of revenues and growth for all information services industry vendors having annual revenues greater than \$10 million. Stratified random sampling techniques are employed to estimate the size and change in that portion of the industry represented by firms having less than \$10 million in revenue.
- At the convergence of these two processes, INPUT researchers analyze industry size, composition, change, direction, etc. to generate the forecasts included in these two volumes.
- All forecast numbers presented are in current dollars (i.e., including inflation impacts). Inflation is assumed to show a 6% annual increase over the forecast period.

D. REPORT ORGANIZATION

- Following the introduction is an executive summary of key observations, forecasts, and conclusions from the entire volume. The executive summary is provided in a presentation format complete with script so that readers may quickly and easily communicate these findings to appropriate groups.
- The subsequent sections are arranged alphabetically by segment and constitute the main body of the text. Each segment is examined for key issues, trends, and events. In most cases, application and competitive analyses and recommendations are made.
- Appendix A contains a definition of terms and parameters used to structure the research.
- Appendix B contains a comprehensive data base of statistical market forecasts from which the textual references and exhibits are drawn.
- Although data in the data base are presented at the single-digit level of precision, this is the result of the calculation procedure used. In the text, forecasts are rounded to 10 millions to prevent implying a level of precision that does not exist.
- Appendix C contains a reconciliation of this year's forecasts with last year's.
- Appendix D contains a list of related INPUT reports.
- INPUT always welcomes comments, inquiries, and suggestions relating to our report content and structure.

U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
EXECUTIVE SUMMARY



U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
EXECUTIVE SUMMARY

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II EXECUTIVE SUMMARY

A. TOOLS CONTINUE TO LEAD CROSS-INDUSTRY GROWTH OF INFORMATION SERVICES MARKET

- The entire information services marketplace will grow at an impressive 22% annual growth for the next five years. The combined user expenditures for both cross-industry and industry-specific applications will grow from a 1984 base of \$39 billion to \$107 billion by 1989. The cross-industry and related portion of this huge market also is, in the aggregate, growing at a 22% clip. From a 1984 combined user expenditure base of \$25 billion, this market will expand to \$66 billion by 1989.
- As was true last year, products and services, which essentially are tools, comprise the four fastest growing segments--education and training, VANs, systems software, and planning and analysis. These offerings are not ends unto themselves but are productivity tools to help people accomplish other tasks.
- This year, the education and training segment outshines all others by a wide margin, with a 40% average annual growth rate for this five-year period. The growth of the education and training market segment is being heavily stimulated by the explosive acceptance of end-user computing with its attendant training demands on millions of participants.

TOOLS CONTINUE TO LEAD CROSS-INDUSTRY GROWTH OF INFORMATION SERVICES MARKET

SEGMENT	1984-1989 MARKET GROWTH	1989 MARKET (\$ Billions)
Education and Training	40%	\$ 1.0
VANs	31%	1.1
Systems Software	29%	16.7
Planning and Analysis	26%	5.6
On-Line Data Bases	23%	2.1
Other	22%	4.5
Professional Services	20%	21.7
Engineering and Scientific	19%	2.4
Accounting	18%	5.5
Human Resources	13%	2.7
Utility Processing	8%	2.8

0 10 20 30 40 50%

Average Annual Growth Rate of User Expenditures

B. MULTIPLE CAUSES EXIST FOR GROWTH RATE VARIANCES

- Significant variances exist between the five-year growth rates for various segments. There are six factors that may contribute to variances in growth rates.
- Rapid advances in technology have had especially significant impacts on segments such as value-added networks (VANs), on-line data base services, and turnkey engineering and scientific markets.
- Deregulation and changing regulations have created new systems requirements, thus benefiting cross-industry segments such as accounting, human resources, and planning and analysis.
- Upheavals in areas such as technology and regulations often alter the basic economics of certain parts of the economy. Cross-industry-related segments receiving a positive stimulus from these changes include accounting and planning and analysis.
- Potentially formidable vendors may become more aggressive in certain markets. In the engineering and scientific market, firms such as IBM and Hewlett-Packard have recently exhibited such changing competitive patterns.
- New distribution options contribute to growth rate variances. The on-line data base market is benefiting enormously, for example, from the proliferation of millions of microcomputer workstations. The emergence of value-added remarketers provides new opportunities to segments such as accounting and human resources.
- Helping to make scarce and costly electronic engineers productive is a major incentive to acquire certain engineering and scientific applications. Similar appeals exist in many cross-industry segments.

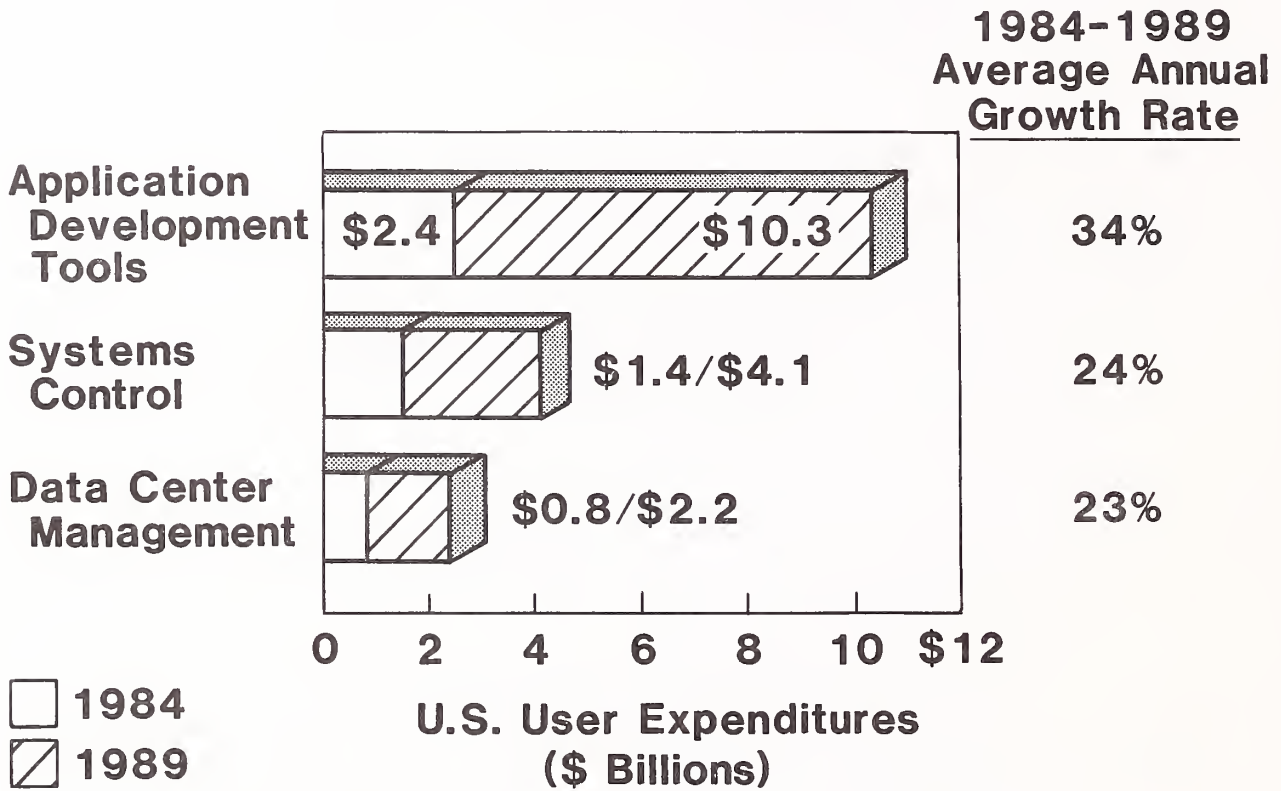
MULTIPLE CAUSES EXIST FOR GROWTH RATE VARIANCES

- **Technology Impact**
- **Regulatory Changes**
- **Cost Structure Changes**
- **New Competitive Patterns**
- **New Distribution Options**
- **Leverage from Solutions**

C. SYSTEMS SOFTWARE: \$17 BILLION BY 1989

- Systems software continues to represent one of the largest and fastest growing segments within the entire information services marketplace. From a base of \$4.6 billion in 1984, this segment will grow 29% annually to become \$16.7 billion by 1989.
- All three sectors of this market are doing well. Applications development tools are growing the fastest (34%) and will become a \$10.3 billion market by 1989. This sector is benefiting from numerous factors including:
 - The continuing rapid acceptance of DBMSs as the foundation for integrated software systems, and the evolution of DBMSs into manipulation of text and images as well as data.
 - The popularity of fourth-generation languages, which are providing millions of end-users with direct access to needed information.
- Systems control software, which is expanding at 24% annually, is being stimulated by the emergence of distributed systems with their attendant requirements for systems and network control, the increased concern over security of both data and software, and the expansion of operating systems functions into new areas such as windowing.
- The data center management software market will almost triple in size to \$2.2 billion by 1989. This marketplace is benefiting from the increase in the number of data centers, due in part to the popularity of departmental systems. The requirements for improved storage management systems and the need to enhance scheduling productivity of larger centers are also important factors driving data center management software growth.

SYSTEMS SOFTWARE: \$17 BILLION BY 1989



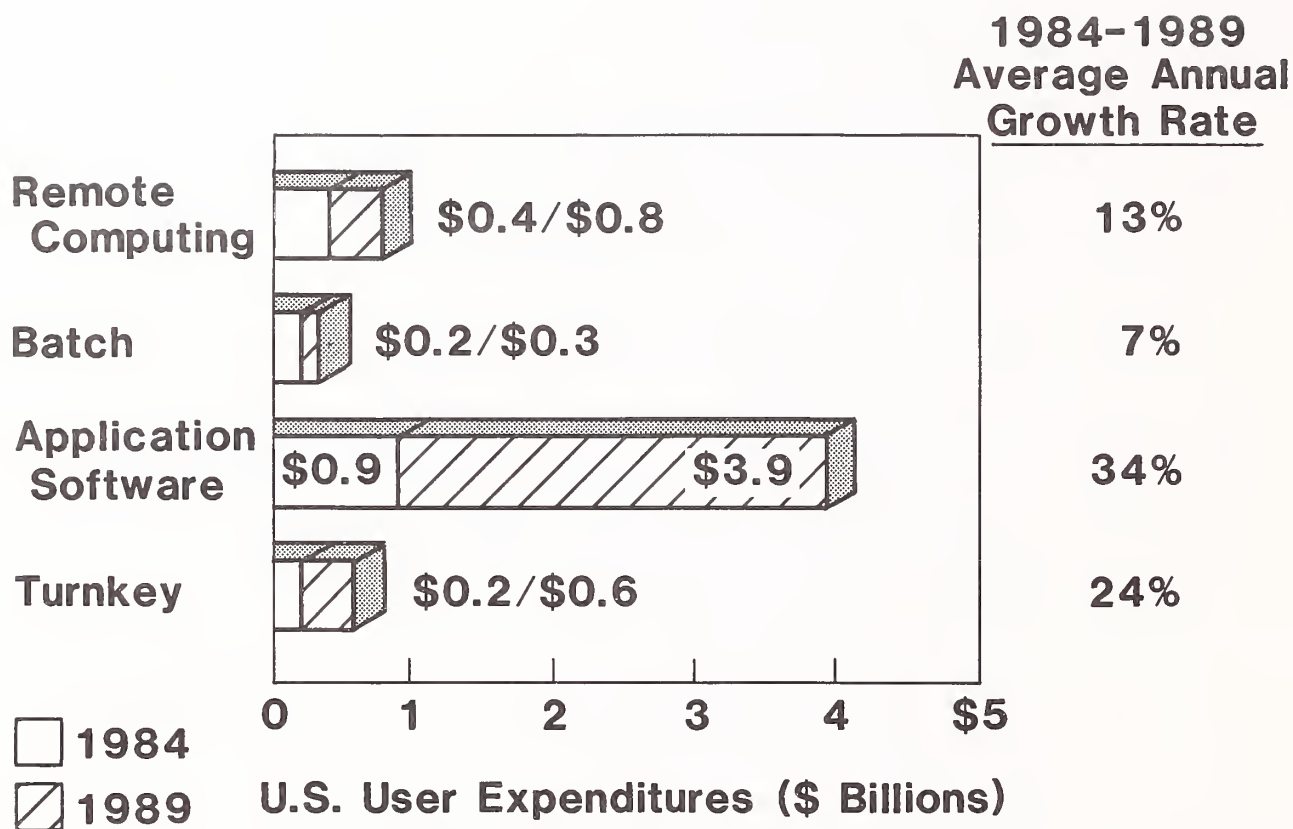
- **Stimulants Include**

- DBMS
- Fourth-Generation Languages
- Distributed Systems
- Resource Management

D. PLANNING AND ANALYSIS: A MAJOR SOFTWARE MARKET

- Planning and analysis, at \$900 million for 1984, is the second largest applications software products market (accounting is currently first at \$1.2 billion). However, by 1989 planning and analysis software will overtake accounting software in size and, at \$3.9 billion, will be in a dead heat with banking and finance as the largest applications software products market in the U.S.
- As the installed base of business micros increases from over 3.5 million in 1984 to 24 million by 1989, planning and analysis will continue to be one of the most common applications.
- A number of technology trends will serve to stimulate planning and analysis use. Trends include increased micro-to-mainframe sophistication (thus allowing more complex analysis) as well as improved fourth-generation language and relational DBMS implementations (thereby encouraging more end users to readily access and manipulate data).
- An increase in the number of information centers from 2,000 in 1984 to more than 5,000 by 1989 will further stimulate planning and analysis applications by making it easier for the end user to directly access needed computer resources.
- Although most planning and analysis systems are currently cross-industry, the next five years will bring frequent integration of such systems into industry-specific applications.

PLANNING AND ANALYSIS: A MAJOR SOFTWARE MARKET

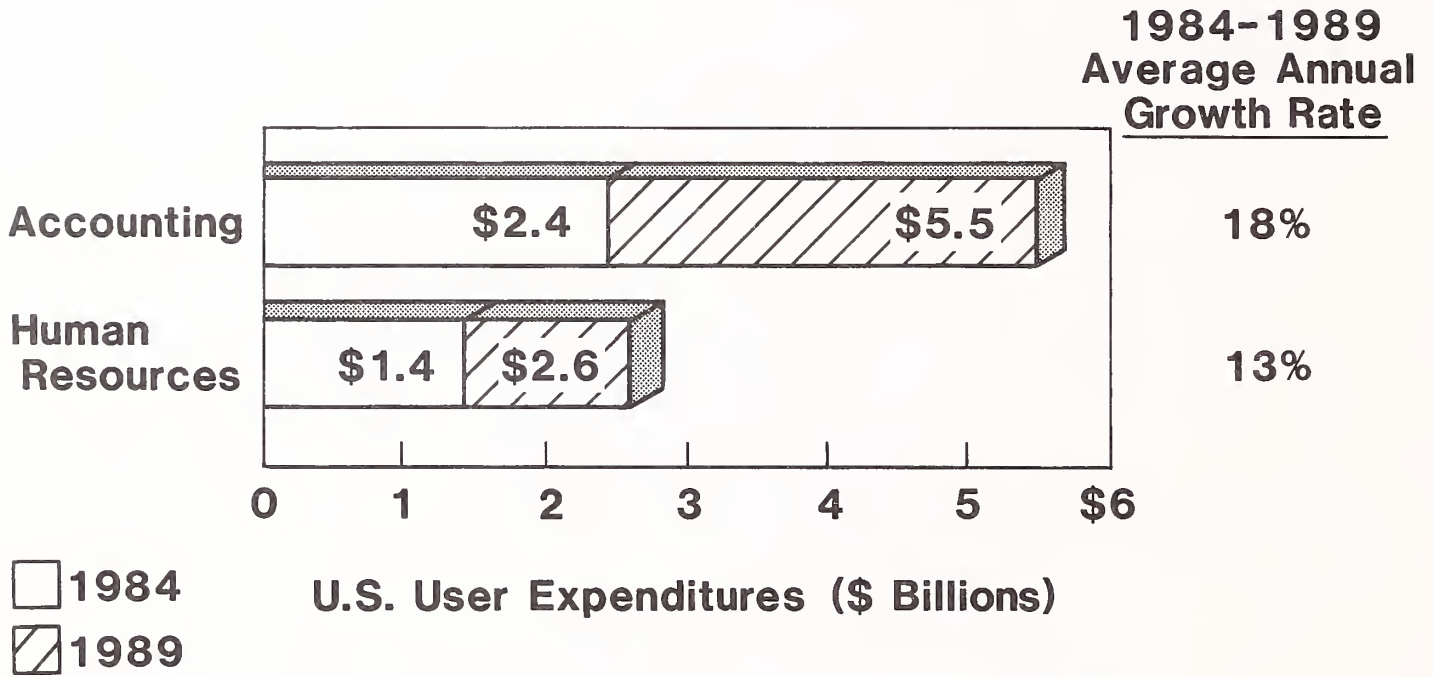


- Stimulated by
 - 24 Million Micros by 1989
 - FGL, DBMS Acceptance
 - Micro-Mainframe, Information Center Growth

E. ACCOUNTING AND HUMAN RESOURCES: AT THE CENTER OF THE ACTION

- Although accounting and human resources represent two of the oldest and largest cross-industry market segments, they will more than double in size by 1989 to \$5.5 and \$2.6 billion respectively.
- Software will become the largest mode for both segments by 1986 as older systems are replaced and as first-time users install these traditionally "first" applications.
- As the desire to integrate multiple applications gathers momentum, accounting and human resources become prime candidates because they provide information central to the organization's management requirements.
- Both accounting and human resources will also benefit from the restructuring of the U.S. economy due to a continued high level of deregulation, merger, and acquisition activity.
- Payroll is an especially bright spot for processing services vendors, since the complexities of government-related requirements of this application discourage a "do-it-yourself" approach.

ACCOUNTING AND HUMAN RESOURCES: AT THE CENTER OF THE ACTION



- **Software to Be Dominant Mode**
- **Applications are Central to Integration**
- **Payroll Processing to Stay Strong**

**U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
ACCOUNTING SEGMENT**

U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
ACCOUNTING SEGMENT

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U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
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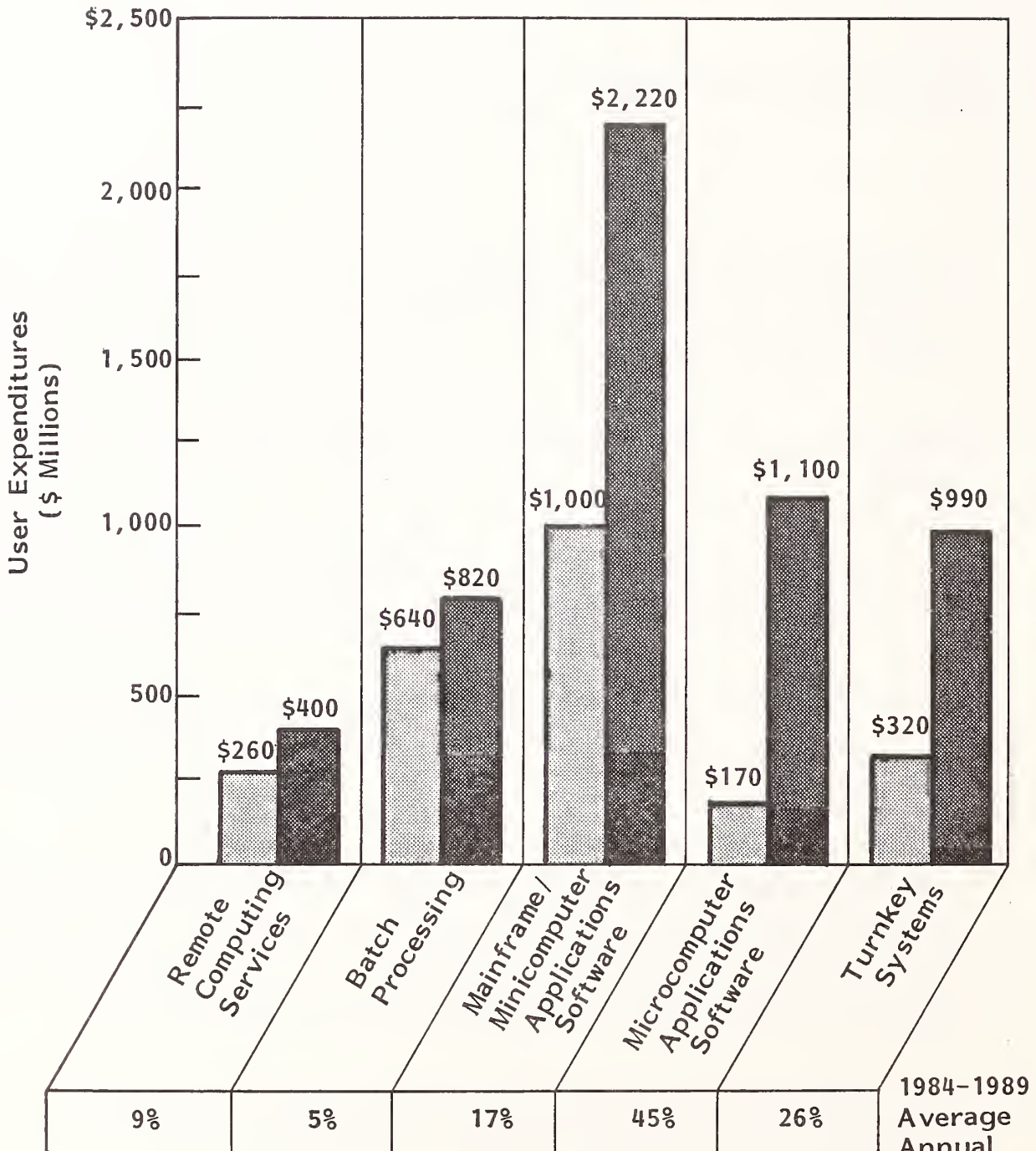
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I MARKET SIZE AND GROWTH

- The accounting segment, at \$2.4 billion in user expenditures in 1984, is the third largest of the 24 major-market segments analyzed by INPUT as part of its annual industry market series.
- Powerful dynamics in this segment are increasing demand for information services.
 - The healthy growth of the economy is helping to obsolete order systems as firms expand and thus put new demands on their accounting systems.
 - Deregulation, and acquisition and divestiture activities are especially significant forces that mandate changing approaches to internal accounting.
- As shown in Exhibit I-1, while the accounting segment will be growing overall at a respectable 18% annually for the next five years, the growth rate for individual delivery modes varies significantly, from a low of 5% for batch services to a high of 45% for microcomputer applications software.
- Remote computing services and batch processing will continue to lose market share to in-house accounting systems. Remote processing of accounting applications will grow at barely a fourth the rate of accounting software products growth.

EXHIBIT I-1

ACCOUNTING SEGMENT FORECAST
CROSS-INDUSTRY INFORMATION SERVICES, 1984-1989



Year	Total User Expenditures (\$ Millions)	1984-1989 Average Annual Growth Rate
1984	\$2,380	18%
1989	\$5,520	

Note: All dollars are rounded to the nearest \$10 million.

- The ability to use data communications, graphics, modeling and DSS packages, and data bases through vendors continues to provide the impetus to use remote computing services for some accounting niches.
- Demand for accounting software packages remains strong and is buttressed by new features being added by vendors. The next chapter elaborates.
- Appendix AC contains the accounting segment market size data base by delivery mode for each year from 1983 to 1989.

II ISSUES AND TRENDS

- Demand for financial detail to feed analytical systems is increasing. The need to record data and indicative codes for all revenue and costs will increase pressure to use automated general ledger, accounts receivable, accounts payable, payroll, and other accounting systems.
- Technological developments--particularly in software--are breathing excitement into accounting application software.
- Micro-mainframe connections are proliferating. By 1988, approximately one-fourth of all software products will come from products that address the micro-mainframe environment. (See INPUT's report Micro-Mainframe: Personal Computer Market Opportunities.)
- At the same time, accounting software will increase its level of integration, both between formerly discrete accounting applications and between various applications and DBMSs.
 - Integration with DBMSs leads to elimination of data redundancy, the sharing of data between applications, and synchronization of different applications.
 - INPUT projects that the market for integrated applications software of all types running on mainframe DBMSs will grow from \$160 million in 1984 to \$3.3 billion in 1989. (See INPUT's report Integrated DBMS-Application Software.)

- These developments can be expected to have major impact on demand for accounting software.
 - The replacement market will be spurred by the additional capabilities provided by these new systems. Many users will scrap their conventional systems earlier than planned in order to take advantage of these new products.
 - In addition, this software will cannibalize sales of conventional main-frame and mini-only products.

III COMPETITIVE ANALYSIS

- RCS vendors are experiencing a significant turnover in customers.
 - Many firms that are using RCS for accounting applications are moving in-house.
 - New RCS customers will continue to be found, however.
 - Many will be smaller firms wanting to automate manual systems.
 - Other new customers will be firms planning to use DBMS, data communications, graphics, or other capabilities in combination with accounting packages. Companies that want to aggregate data from several operations into reports (some using graphics) have found RCS to be an expedient service.
- Some turnkey systems vendors are introducing smaller customers to their systems via RCS. Vendors have found that this is a low-risk way for these small companies to be exposed to computing; vendors expect that turnkey systems sales will follow when customers outgrow RCS.
- Most major RCS vendors (including GEISCO, Dun & Bradstreet, ADP, and Tymshare) and a number of smaller firms are now marketing accounting software, either directly or through subsidiaries.

- Many RCS firms now offer interactive processing of accounting work, providing input from work areas by means of prompts to aid in controlling and editing data input.
- Most RCS accounting processing remains remote batch, however.
- A few major RCS firms, such as ADP, and many smaller firms still offer batch accounting processing. A segment of this work is tied to input media, which facilitates the use of batch processing.
- As the accounting RCS market matures, vendors are growing more sophisticated in their use of marketing techniques.
 - Sales approaches (including seminars, advertising, and in some cases sales campaigns by phone) are being employed to encourage first-time users to take advantage of accounting packages at a computer service company, thereby avoiding the problems of in-house hardware and software.
 - ADP uses radio advertising to bring attendees into these seminars.
 - Many local and regional processors use the same approach to encourage first-time users to try RCS.
 - Other vendors are using flexible pricing to gain the loyalty of customers—for example, by fixing charges for the months when customers are going through their budgeting processes.
 - Accounting RCS vendors are also starting to combine external and internal data bases in advanced marketing systems designed to help allocate and track sales territories. (See INPUT's report Marketing Methods That Boost Sales.)

- Some traditional RCS firms are offering integrated turnkey systems with accounting applications on PCs.
 - ADP, IBM, and GEISCO are among the firms providing such services.
 - Several of these vendors have developed strategies to offer packages of software on PCs, including accounting modules, through banks to mid-sized and smaller companies.

- Although there are hundreds of software developers and thousands of packages being offered in the marketplace, the most successful vendors of packages primarily have been the older, more established vendors that introduced their original packages eight or more years ago, as shown in Exhibit III-1, thus establishing a solid customer base. However, these vendors are now taking aggressive actions to enhance their technical capability (e.g., witness MSA's and McCormack & Dodge's recent joint marketing arrangement with Applied Data Research's DBMS package.

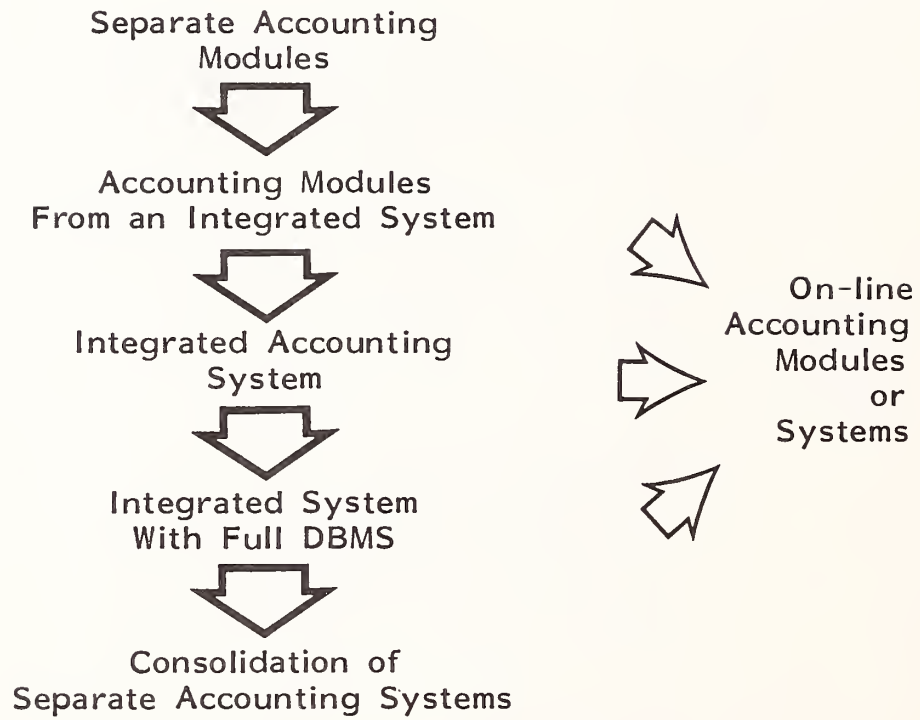
- Accounting packages for mini- and microcomputers are more recent, of course.
 - New firms and hardware vendors (such as IBM, NCR, Burroughs, and Nixdorf) are actively introducing these packages.
 - Firms that have marketed accounting packages for mainframes have also introduced packages for smaller computers. MSA was one of the first to do so via their acquisition of Peachtree Software, which offers PC-based software products. (However, MSA is now planning to sell Peachtree because of its belief that managing a retail-based business in the volatile microcomputer software market requires skills not sufficiently complementary to their efforts in the mainframe and minicomputer arena.)
 - Several RCS firms, such as ADP and GEISCO, also offer such packages.

IV RECOMMENDATIONS

- RCS vendors interested in cross-industry accounting applications should consider strategies to attract first-time users.
 - First-time users can be attracted by marketing approaches that emphasize the avoidance of hardware and software issues through the use of RCS.
 - First-time users who must experiment with a series of on-line accounting modules in order to automate their accounting systems may find it easier to work with an RCS firm than to implement such a system on a newly acquired computer.
- RCS vendors should consider supporting users who want to move in-house. By assisting users to move in-house or by supplying software or turnkey systems, RCS firms can achieve additional revenue when customers make such a decision.
- Software vendors that offer cross-industry accounting applications must consider the progression of demand that is taking place in the marketplace, as shown in Exhibit IV-1.
 - There is demand for standalone accounting modules, but many users of these modules will want to integrate them with other accounting work in the future.

EXHIBIT IV-1

PROGRESSION OF ACCOUNTING NEEDS



- Flexible Report Generation
- Financial Modeling
- DSS

- Data base capabilities will become necessary to feed reporting or modeling needs.
- A need for consolidation capabilities will occur after separate corporate entities automate their accounting.
- The needs of various corporations differ, however, and software vendors should be prepared to offer different sets of modules.
 - Many, but not all, corporations will be interested in on-line accounting modules to reduce input and other work.
 - Subsets of data may have to be produced from data bases or through consolidations to meet reporting or modeling needs.
- Software vendors should also actively upgrade their use of application generation and fourth-generation language capabilities in accounting applications in order to allow applications to be tailored more rapidly to meet customer needs.

APPENDIX AC: FORECAST DATA BASE: ACCOUNTING SEGMENT

- This appendix contains the following forecast information:
 - Market size by delivery mode for each year 1983-1989.
 - Market growth rate for 1983-1984.
 - Average annual growth rate (AAGR) for each delivery mode for the five-year period 1984-1989.

EXHIBIT AC-1

ACCOUNTING SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	237	8%	257	282	307	334	363	395	9%
BATCH PROCESSING SERVICES	588	9%	643	691	729	765	797	818	5%
APPLICATION SOFTWARE									
MAINFRAME/MINI	784	27%	995	1223	1445	1682	1937	2215	17%
MICRO	110	57%	172	258	373	524	756	1098	45%
TOTAL APPLICATION SOFTWARE	894	30%	1166	1480	1818	2206	2693	3313	23%
TURNKEY SYSTEMS	248	27%	315	406	513	639	790	993	26%
CROSS-INDUSTRY TOTAL	1967	21%	2382	2859	3367	3945	4644	5519	18%

U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
EDUCATION AND TRAINING SEGMENT

U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
EDUCATION AND TRAINING SEGMENT

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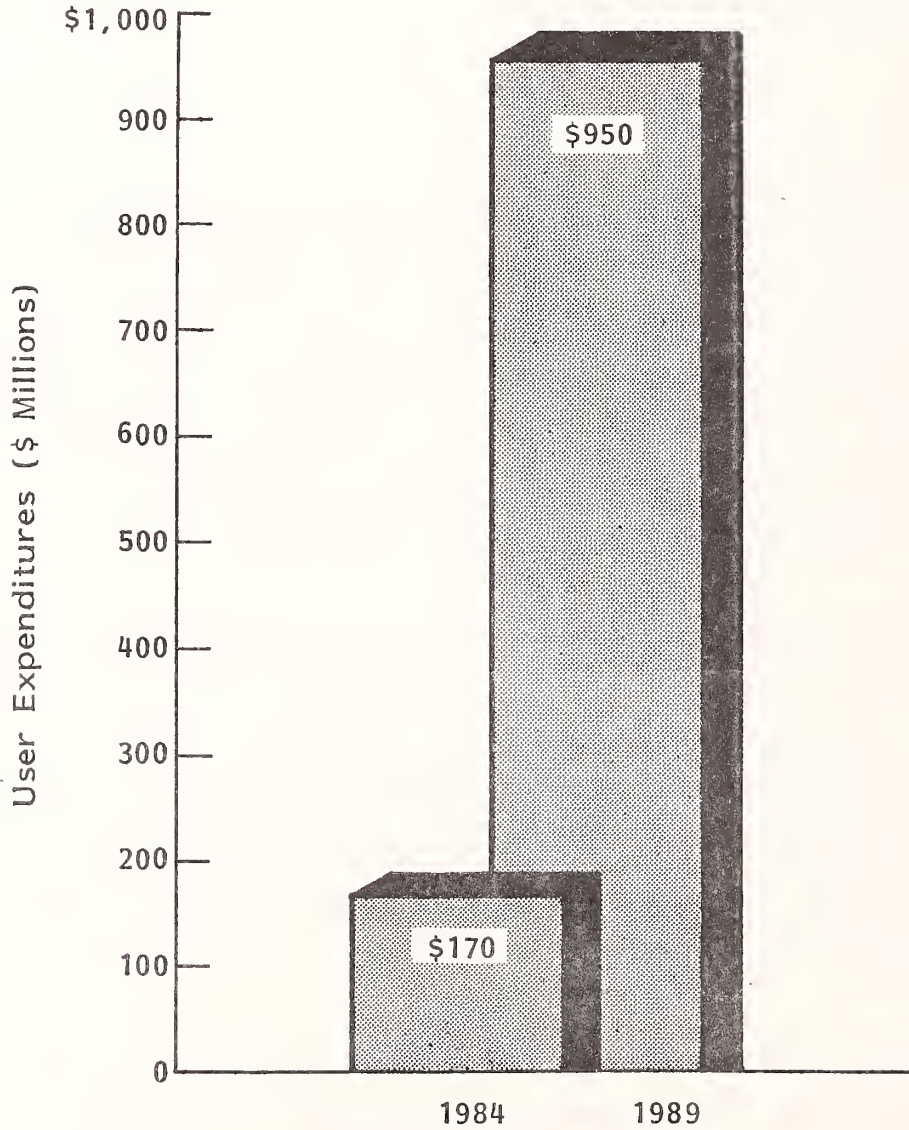
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I MARKET SIZE AND GROWTH

- The Education and Training segment encompasses activities that are conducted within organizations whose primary purpose is other than education. For example, education and training services performed by firms involved in manufacturing, banking, retail, transportation, and so on are included in this segment. Education that occurs in educational institutions (i.e., schools) is forecast in the Education Industry-Specific segment, found in the report U.S. Information Services Vertical Markets, 1984-1989.
- INPUT estimates that by 1989 over 50% of all white-collar workers will use a computer on the job. With fewer than one in five white-collar personnel currently using computers, a major opportunity exists to train new users. Advanced training of information systems professionals has until now been the primary market for computer-based training (CBT), but the major growth area over the next five years will be in training new end users such as executives, managers, and secretaries.
- Blue-collar workers will also have access to computers, largely in the form of terminals tied into networks, such as on automated factory floors. The largest growth in this market will not be in training blue-collar workers how to use computers; rather, it will be in using computers to train workers in procedures and techniques not related to computing.
- Total user expenditures in this market (excluding education and training professional services) will grow from \$174 million in 1984 to \$953 million by 1989. Market size and growth rates are shown in Exhibits I-1 and I-2.

EXHIBIT I-1

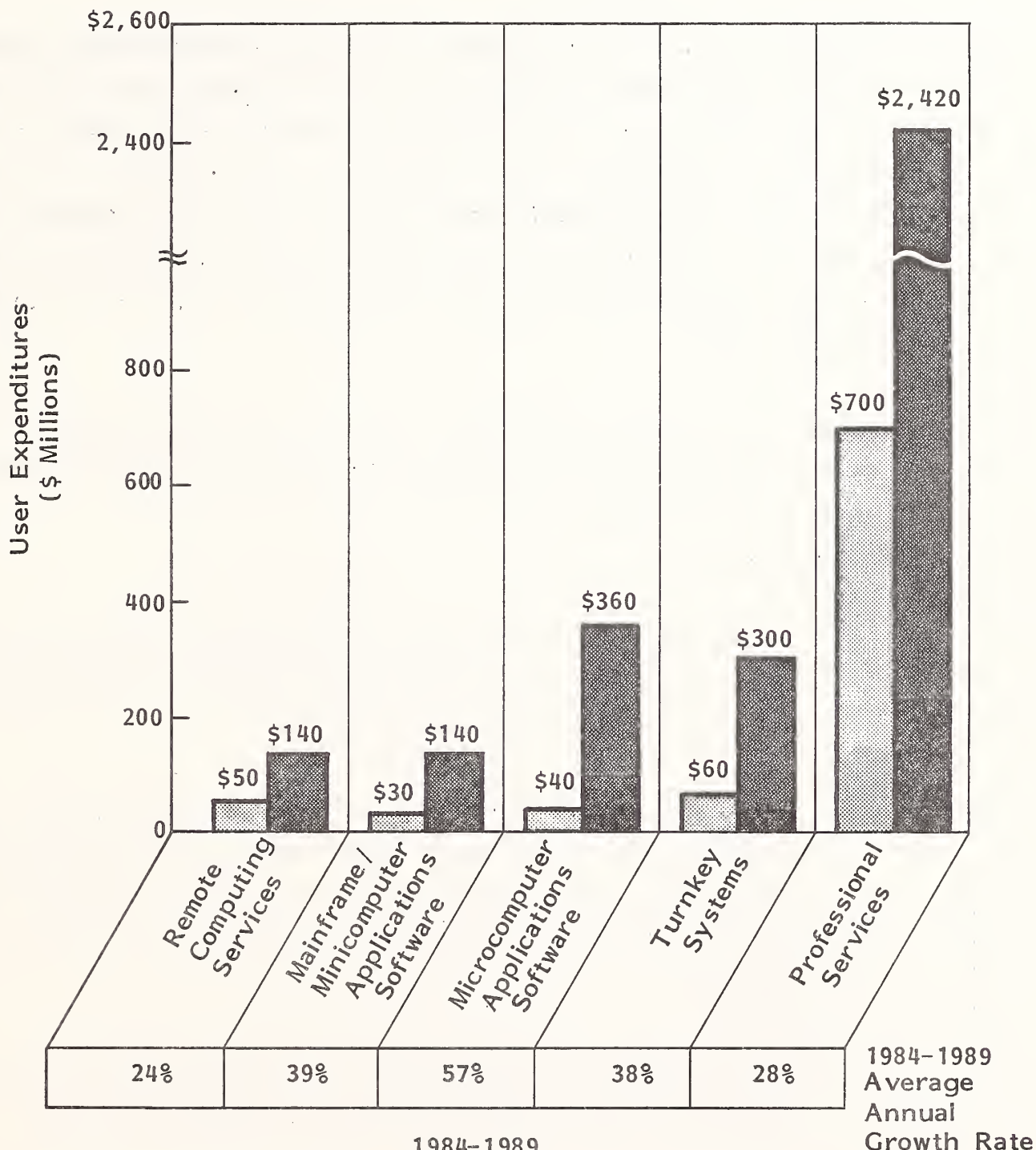
EDUCATION AND TRAINING SEGMENT MARKET FORECAST
INDUSTRY-SPECIFIC INFORMATION SERVICES, 1984-1989



Average Annual Growth Rate: 41%

EXHIBIT I-2

EDUCATION AND TRAINING SEGMENT FORECAST
INDUSTRY-SPECIFIC INFORMATION SERVICES, 1984-1989



	Total User Expenditures* (\$ Millions)	1984-1989 Average Annual Growth Rate
1984	\$170	41%
1989	\$950	

Note: All dollars are rounded to the nearest \$10 million.

*Does not include professional services.

- Microcomputer software will experience the fastest growth, rising at a 57% average annual growth rate.
- Professional services for education and training--which include consulting, live instruction, and video instruction--is by far the largest delivery mode, totaling \$700 million in 1984 and will increase to \$2.4 billion by 1989, reflecting a 28% annual growth rate. (For the purposes of this report, "education and training professional services" refers only to training relating to computers and computing. Other modes--such as software and processing services--include training relating to other subjects in addition to computers and computing.)
- Mainframe software, traditionally the largest computer-based training delivery mode, has now been surpassed by the microcomputer CBT market.
- Definitions:
 - The education and training segment includes both training users how to use computer systems, as well as using computers to train workers in all subjects, including non-computer topics.
 - Computer-based training (CBT) refers to any training activity in which computers are used to either a) present material that is to be learned, b) provide practice activities or tests on material presented through other media, or c) manage the administration of courses using computers.
 - For the purposes of our forecasts, CBT includes both CAI (computer-assisted instruction) and CMI (computer-managed instruction).
 - Training conducted in elementary, secondary, and trade schools (as well as in colleges and universities) is not included. These are defined as

industry-specific applications and services and are discussed in the companion volume to this report, U.S. Information Services Vertical Markets, 1984-1989.

- Internal training, although a sizeable portion of the market, is not included in the forecasts. Only services or applications purchased from outside vendors are counted.
- Appendix ET contains data for market sizes by delivery mode for each year 1983-1989.

II ISSUES, TRENDS, AND EVENTS

A. COMPUTER-BASED TRAINING (CBT)

- By far the largest education and training segment growth will be realized by vendors who use computers to deliver or aid in the delivery of instruction.
- In 1982, there were almost no CBT courses ("courseware") for end users to run on mainframes, minicomputers, or microcomputers. Today, however, major training suppliers, small start-up companies, hardware manufacturers, and software companies are all beginning to offer end-user CBT courses.
- CBT is used primarily to teach:
 - Data processing skills.
 - Technical skills.
 - Use of software applications.
- In the future, CBT will be used to teach a wider range of topics. CBT is expected to experience increased use in:
 - End-user training in systems and procedures—e.g., bank tellers, accounting clerks, mechanics, and repairpeople.

- Technical training--e.g., engineers, computer operators, programmers, systems analysts, word processors.
- CBT systems can be used to present text, graphics, practice activities, simulations, questions, and to provide feedback.
- The advantages of CBT include:
 - Reduced costs of providing instruction.
 - Increased flexibility in presenting instructional material.
 - Convenience.
 - Uniformity.
- The limitations of microcomputer applications software for training and education include:
 - Limited hardware capacity.
 - Low software quality.
 - Limited availability of good instructional designers.
- The training market's growth is largely due to the increased number of new users who need to be trained on computers. However, after users master the machines, they can use computers for all-purpose educational courses for everything from management training to stress management.
- The goal of end-user training is to develop computer literacy: a basic awareness of computers, skill in operation of hardware and software, and an ability to adapt new technology to business needs on an ongoing basis.

- Courseware for end users is sold in two forms--packaged and custom. The hot area in CBT these days is packaged courseware, because of its cost-effectiveness.
- CBT courses are normally distributed to users in one of two ways: via terminals connected to a mainframe, or by standalone microcomputers. (Terminals connected to mainframes are still the primary delivery mode, but microcomputers are a close second and are closing fast.)
- Microcomputer applications software will be the fastest growth area in this sector. Factors stimulating the market include the declining cost of both hardware and software, the availability of microcomputers in large numbers, and the tremendous need for hands-on computer training.
- Due to the increased availability of presentation systems, ASI, a leading education training vendor, anticipates delivering courses via telecommunications in the near future. They expect to download courses from their mainframe to customers' microcomputers. Micro-to-mainframe links should significantly improve courseware offerings, due to the increased power provided by a mainframe.
- Plato (from CDC) started as a mainframe-based package that was downloaded to terminals, but recently the packages have been rewritten to run on microcomputers.
- Many types of training can be accomplished by CBT, not just computer-oriented instruction. CDC's PLATO, for example, has more courses in non-computer subjects than in computer ones.
- CDC has developed a turnkey system for its PLATO courseware and authoring system. Turnkey systems are also available from Hazeltine, Regency Systems, WICAT, and a host of other vendors. As hardware manufacturers

search for niches, turnkey instructional systems will undoubtedly become more popular.

- Although growth will be strong in this delivery mode, there is real concern that dedicated systems may duplicate other multipurpose hardware, especially microcomputers, that are coming into place. There will be some resistance to multiple-machine approaches.

B. LIVE INSTRUCTION

- Data processing instruction provided by instructors in classroom settings will experience the slowest growth during this period and its share of total training revenue will decrease.
- Whereas this type of instruction, usually provided by professional services companies, can have the smallest cost per student, it has often proven to be least effective in terms of development and retention of technical skills. And when instruction is provided at a remote site, the additional travel costs make the cost of other instructional modes much more economical.
- Most data processing training is currently live (60%), but there is a great deal of interest on the part of users in interactive video.

C. VIDEO INSTRUCTION

- Video instruction (as provided by companies such as Deltak, Advanced Systems, Inc. (ASI), and Edutronics/McGraw-Hill) will also lose some of its share of the total education and training market. This mode will continue to be a significant mode of instruction, however--especially for lower level, semitechnical skills.

- It is unlikely that vendors with single video courses or vendors that acquire significant numbers of courses will seriously erode the market share of the front runners. The cost of developing courses in this medium is a major deterrent to new entry.

III COMPETITIVE CONSIDERATIONS

- The suppliers of end-user training vary in quality and in the training techniques they use. The major sources of training are hardware and software manufacturers, training services and training package vendors, and in-house resources. Each of these sources has value.
 - The manufacturer knows the product (for training on computers).
 - The training vendor knows how to train.
 - The in-house resources know the company and the end-user needs and applications.
- Both Advanced Systems and Deltak have expanded their product lines by contracting to market and distribute training courses designed by other manufacturers. Advanced Systems has an agreement with American Training International; Deltak has linked with Cdex Corp.
- Telelearning Systems, Inc. launched an "electronic university" in 1983 to offer courses on a variety of subjects to students on their microcomputers over a telephone line link-up.
- A listing of the leading vendors for authoring systems and courseware offerings is shown in Exhibits III-1 and III-2.

EXHIBIT III-1

LEADING VENDORS OF AUTHORIZING SYSTEMS

AUTHORIZING SYSTEM	VENDOR
<u>Microcomputer-based</u>	
Authority	Interactive Training Systems
Ghostwriter	Cavri Systems
Interact	Ashton, Inc.
Professional Authoring	Bell and Howell
Software System	
Video Courseware Development	Bell and Howell
System	
<u>Mainframe-Based</u>	
Interactive Instructional Systems	IBM
Phoenix	Goal Systems International
Plato	Control Data Corp.
Scholar/Teach 3	Boeing Computer Services

EXHIBIT III-2

LEADING VENDORS OF COURSEWARE

Microcomputer-Based

Cdex Corp.

Knoware

American Training International

Micro Mentor

Mainframe-Based

Crwth Computer Courseware

Control Data Corp.

Boeing Computer Services

Multi-Media Training

Advanced Systems, Inc.

Deltak (subsidiary of Prentice-Hall)

Interactive Training Systems

**APPENDIX ET: FORECAST DATA BASE: EDUCATION AND TRAINING
SEGMENT**

- This appendix contains the following forecast information:
 - Market size by delivery mode for each year 1983-1989.
 - Market growth rate for 1983-1984.
 - Average annual growth rate (AAGR) for each delivery mode for the five-year period 1984-1989.

EXHIBIT ET-1

EDUCATION AND TRAINING SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	37	25%	47	58	72	89	110	136	24%
APPLICATION SOFTWARE									
MAINFRAME/MINI	18	49%	27	39	54	75	104	143	39%
MICRO	22	70%	38	62	97	152	233	362	57%
TOTAL APPLICATION SOFTWARE	40	60%	65	100	151	226	337	504	51%
TURNKEY SYSTEMS	41	55%	63	91	127	170	229	313	38%
CROSS-INDUSTRY TOTAL	118	47%	174	249	349	485	675	953	40%
PROFESSIONAL SERVICES*	538	30%	700	910	1173	1502	1922	2422	28%

*Education and Training professional services data are not included as part of the total for the Education and Training segment because they are included instead in the Total Professional Services, Exhibit B-11 in Appendix B. The Education and Training data in that exhibit are identical to the professional services forecast in this exhibit.





U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
HUMAN RESOURCES SEGMENT

U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
HUMAN RESOURCES SEGMENT

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U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
HUMAN RESOURCES SEGMENT

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I MARKET SIZE AND GROWTH

- The cross-industry human resources segment includes the following applications: payroll, payroll tax, benefits, personnel, and human resource management systems. Details are shown in Exhibit I-1.
- This relatively mature segment will experience the slowest growth of all the cross-industry segments--with an AAGR of 13%. The market will grow from \$1.4 billion in 1984 to \$2.7 billion by 1989, as shown in Exhibit I-2.
- The fastest growing mode of service in the human resource market is micro-computer applications software with a 28% AAGR, as shown in Exhibit I-3. The growth of this type of applications software revenue will occur over a wide range of vendors and types of human resource applications.
 - Payroll systems are being marketed by MSA, IBM, Burroughs, NCR, and a number of other large (and small) vendors.
 - Personnel and human resource management systems are being marketed by a smaller number of firms, several of which are dedicated primarily to the human resource market.
- One of the forces behind applications software growth is the demand for new benefit options or capabilities, such as direct deposit to payroll. The desire to provide more services for employees as well as to control the cost of services provides the basis for this demand.

EXHIBIT I-1

EXAMPLES OF HUMAN RESOURCES APPLICATIONS

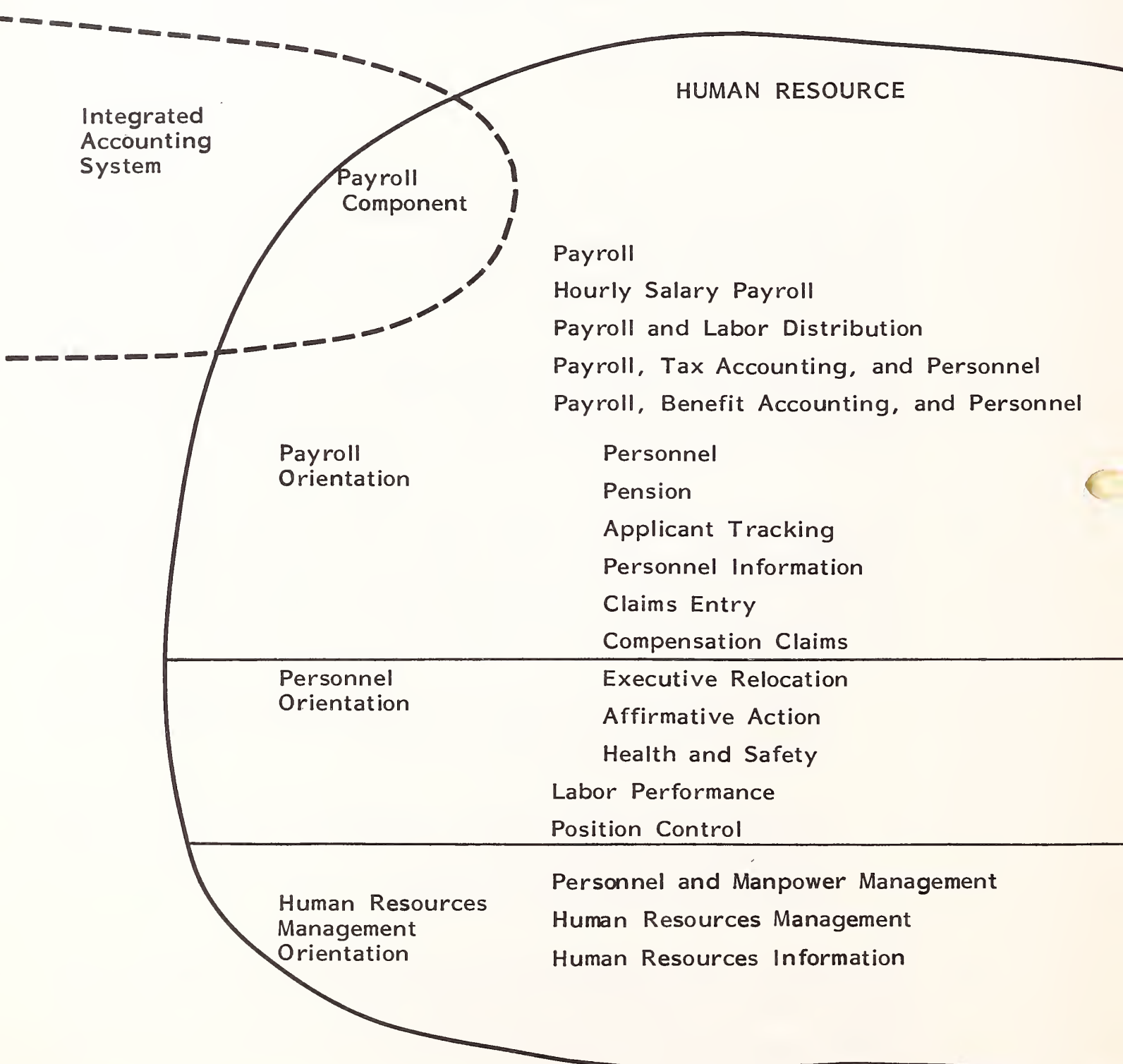
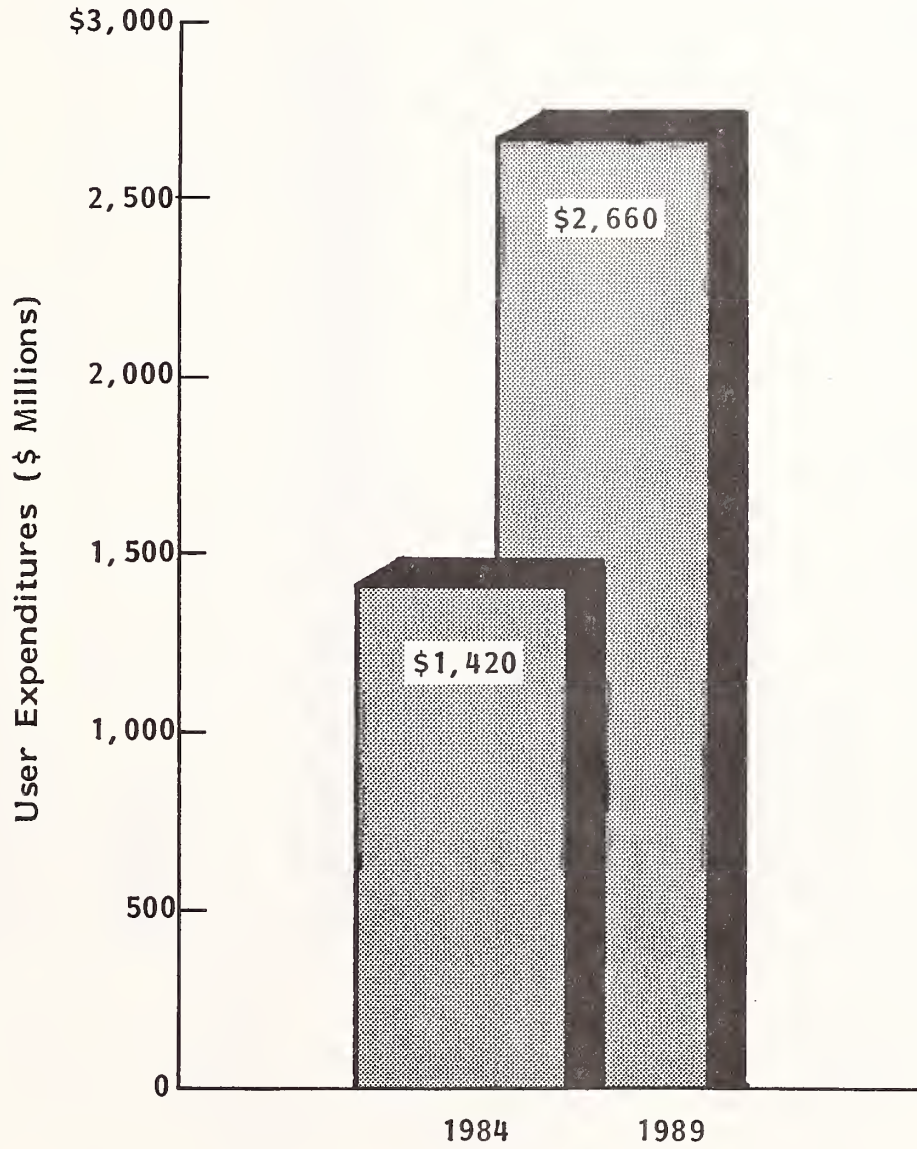


EXHIBIT I-2

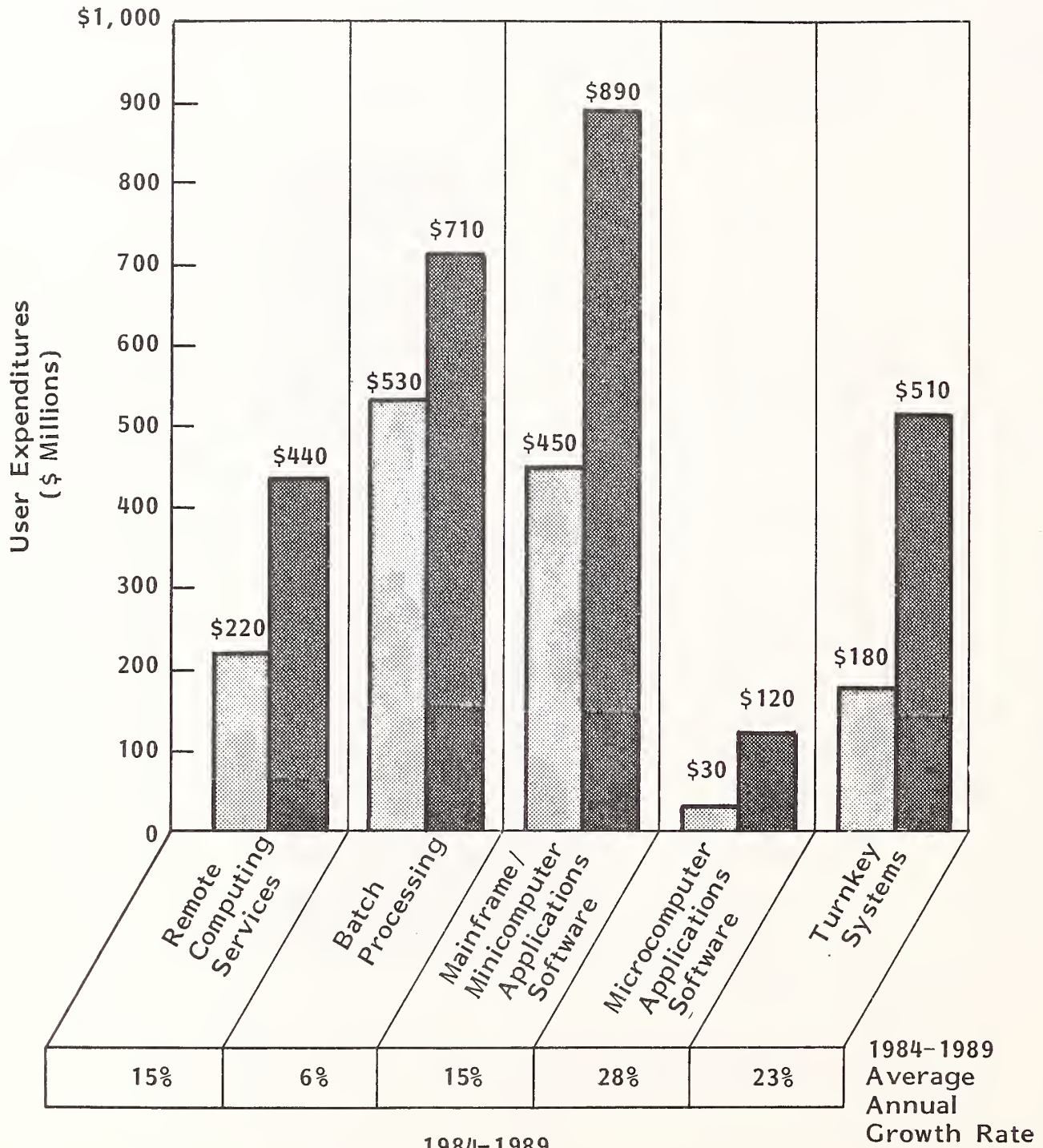
HUMAN RESOURCES SEGMENT MARKET FORECAST
INDUSTRY-SPECIFIC INFORMATION SERVICES, 1984-1989



Average Annual Growth Rate: 13%

EXHIBIT I-3

HUMAN RESOURCES SEGMENT FORECAST
INDUSTRY-SPECIFIC INFORMATION SERVICES, 1984-1989



	Total User Expenditures (\$ Millions)	1984-1989 Average Annual Growth Rate
1984	\$1,420	13%
1989	\$2,660	

Note: All dollars are rounded to the nearest \$10 million.

- The development of payroll applications software for PCs is another factor in this growth.
 - Microcomputers offer many smaller companies (or subsidiaries of large companies) an opportunity to move payroll processing in-house.
 - Some large firms, such as MSA and Micro Business Software, have a considerable number of installations on PCs. The latter has over 10,000 packages installed.
- Remote processing services used for human resource applications will continue to increase at an AAGR of 15%.
 - Payroll services will increase in dollar volume for existing customers as more benefit capabilities are added.
 - Customers of payroll services may also add personnel information capabilities to their processing work.
 - In addition, many new payroll customers are being converted to RCS, especially among very small (less than 50 employees) businesses.
- Batch processing work will also increase as work is added to existing customers' payroll applications and new customers find batch payroll to be an easy entry system. These systems will, however, be increasingly converted to remote batch offerings.
- Appendix HR contains forecasts of human resources market size by delivery mode for each year from 1983 to 1989.

HR-6

II ISSUES, TRENDS, AND EVENTS

- Key marketplace factors affecting human resource application systems include:
 - Use of human resource management systems to increase worker productivity, which is a major cost factor in most industries.
 - The need for greater linkage between sources of personnel information, a need that has promoted the use of DBMSs with personnel and human resource management systems. McCormack and Dodge, Information Science, and other firms have successfully capitalized upon the use of a DBMS with human resource systems.
 - The need to link payroll with accounting information for the purpose of consolidating and analyzing costs. The GENAP system of Data General and the payroll module of the Sperry ACS system address these needs.
- With the government as well as managers requiring more detailed reporting and employees seeking more information on promotion opportunities and benefits, payroll and personnel departments are being swamped with work. Human Resource Management Systems provide the necessary information to deal with these reports.
- Benefit systems are occasionally being separated from payroll and other human resource systems because of new options and complexities offered as

benefits (choices of savings, insurance, investment, and even banking capabilities).

- Some companies are using or developing CMA-like (cash management account) capabilities to allow personnel to choose and manage their own benefits.
 - Firms specializing in payroll processing such as ADP are developing capabilities that could be used to meet this need.
 - In general, separate benefit systems will likely be reintegrated with human resource systems over a one- to three-year period.
- Personal computers will continue to be vehicles for many smaller firms to automate payrolls in-house.
 - As the capabilities of PC systems increase, larger firms will use them to bring payroll in-house.
 - More powerful PCs will also provide a vehicle for offering human resources applications with more features to small- and medium-sized companies. Several vendors are preparing plans for this type of market offering.
 - Counterbalancing this trend is the increasing complexity and volatility of payroll taxes and government reporting requirements. This factor tends to encourage users to use a services vendor that can keep up with changes in an economical manner.
 - An issue noted by several large users is the desirability of having the human resource systems address both current and former employees.

- Studies on the effect of benefit packages or analyses of personnel changes require a common data base.
- Handling of rehires is simplified with such an approach.

III APPLICATIONS ANALYSIS

- Today's human resources management departments are demanding more functions from automated payroll/personnel systems. They are looking for systems to serve as manpower planning tools.
- The number of capabilities offered by human resource systems will continue to grow.
 - A factor that continues to be important is the analysis of personnel information to meet more complex work needs or to support productivity planning.
 - A more recent factor of importance is the need to support "flex" or cafeteria benefit programs. These plans offer tax benefits to employers and employees.
 - A tabulation of the capabilities offered by 25 vendors is shown in Exhibit III-1. (This exhibit does not include the use of a graphics package or DBMS query capability, both of which most vendors provide.)
- According to users, a major factor in the decision process for human resource systems is the range of capabilities available with the system, as shown in Exhibit III-2.

EXHIBIT III-1

FEATURES OFFERED BY TWENTY-FIVE VENDORS OF
HUMAN RESOURCES SYSTEMS

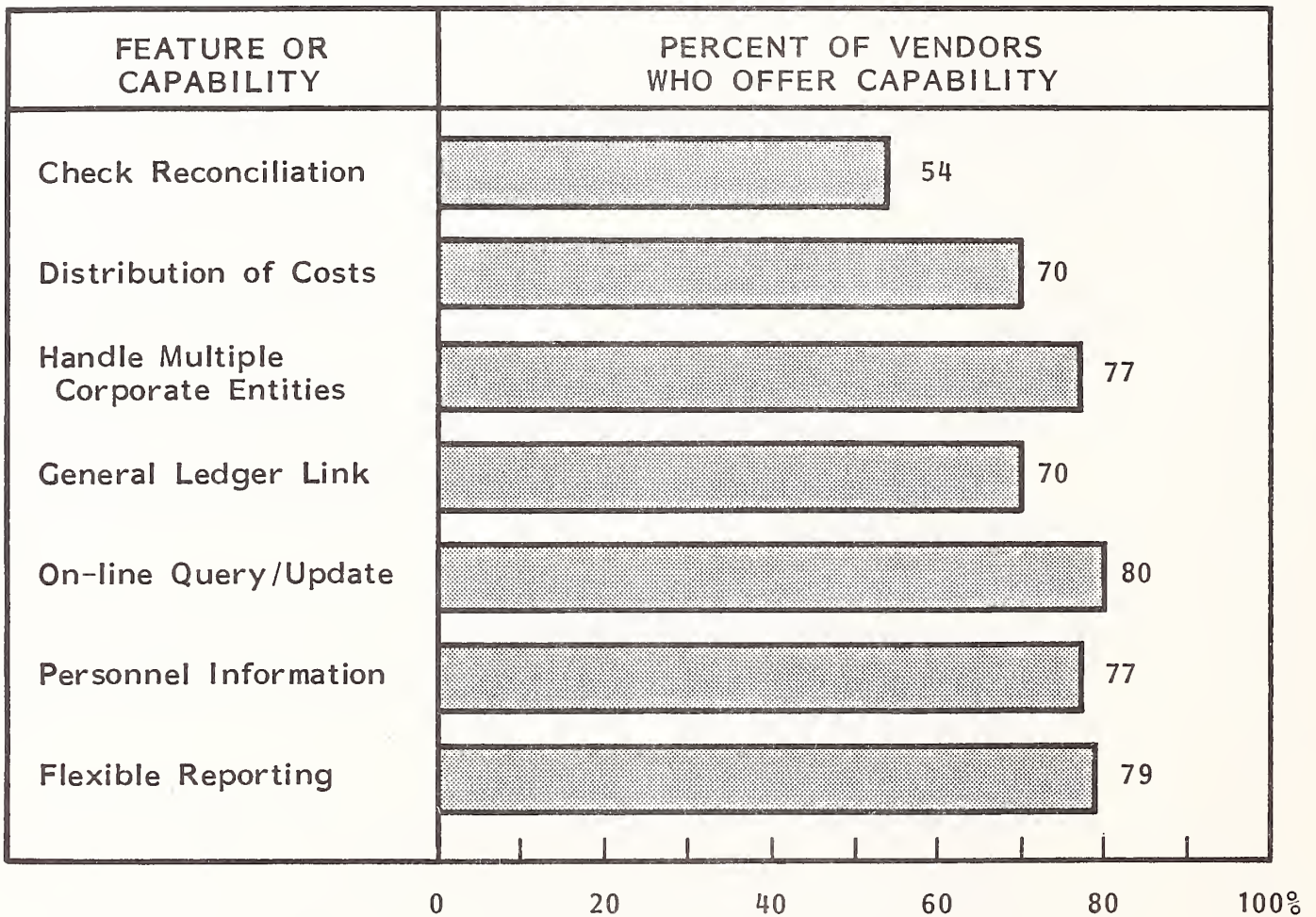
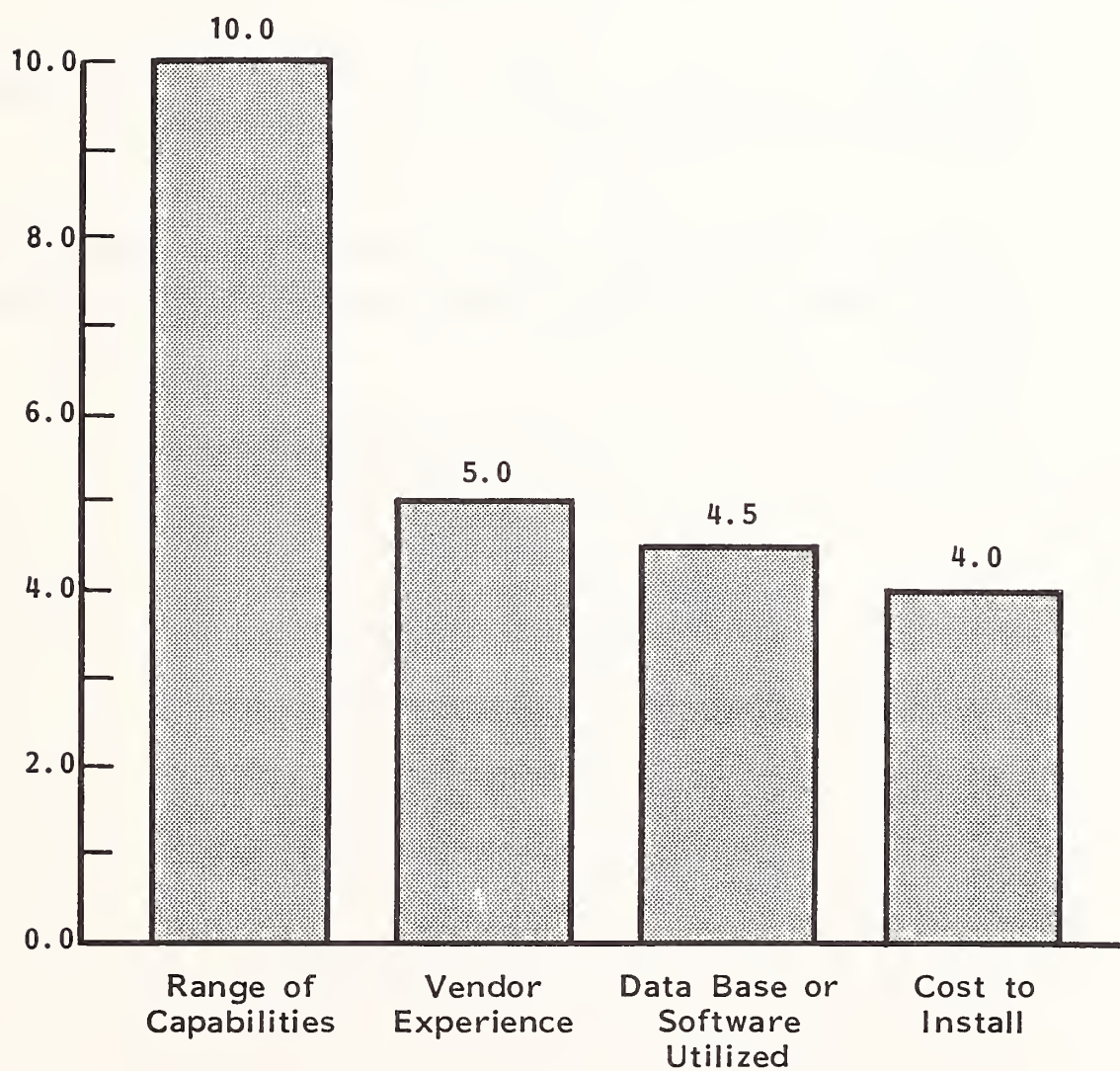


EXHIBIT III-2

RELATIVE IMPORTANCE OF DECISION FACTORS FOR
HUMAN RESOURCES MANAGEMENT SYSTEMS



- The growing complexity of human resource systems makes the selection of systems much more difficult. Vendors must be able to demonstrate the use of systems to meet simple payroll and personnel functions, as well as to prepare complex analytical reports.
- Most of the new human resource packages integrate information about payroll and personnel, and there is a wide enough range of packages to meet just about any level of company sophistication.
- With better information available, managers can improve scheduling of employee benefits and payments.
- In some cases, the packages even help managers save money. Armed with current relevant information, managers can apply tighter controls over the high costs of salaries and benefits.
- Examples of leading vendors are shown in Exhibit III-3.

EXAMPLES OF
LEADING VENDORS IN HUMAN RESOURCES

(Includes Payroll, Personnel, and Human Resource Management Systems)

Mainframe Software:

MSA

IBM

Genesys Software Systems

Cyborg Systems

Minicomputer Software:

IBM

Software International

MCBA

DEC

Microcomputer Software:

Peachtree Software (subsidiary of MSA)

IBM

BPI Systems

Software Publishing Corp.

Remote Computing Services:

ADP

Bank of America

CSC

InSci (Information Science Inc.)

Paychex

IV COMPETITIVE CONSIDERATIONS

- Payroll systems are an area of intense competition in human resource applications.
- There are a small number of nationwide processors (e.g. ADP and BankAmerica) in the business. Both of the above firms continue to aggressively expand their presence.
 - During 1983, BankAmerica enhanced its Eastern capabilities with the acquisition of Managistics from CitiCorp.
 - In addition to several smaller acquisitions, ADP acquired a unit of Computer Sciences that offered payroll services.
- The arrangement that Information Science has made with Chemical Bank to supply payroll processing services will increase its presence as a national supplier.
- Many medium-sized and small firms (including banks) offer regional and local processing services.
 - The banks may use processing services or software packages from other vendors to provide their services.

- Price competition and payroll packages on PCs have caused a number of regional and local providers to drop this service or sell their business to other payroll processors during the past few years.
- Price competition is appearing, in the form of low-cost batch and remote batch services, from such providers as ADP, BankAmerica, and Computer-cords, Inc. (GENPAY).
- Payroll packages that run on PCs are being offered by major software firms such as MSA, as well as by many firms specializing in PC software such as Micro Business Software and Carpal.
- A number of computer vendors, including IBM, NCR, Burroughs, and Microdata (MCAUTO), also offer payroll systems on small business computers that can be used to move payroll processing in-house.
- ADP and other payroll processing vendors are prepared to move processing work in-house as well.
- Information Sciences, MSA, McCormack & Dodge, and Wang are among the vendors offering more complex payroll/personnel systems. There are fewer vendors involved in this marketplace segment than in the area of payroll previously discussed.
- More competition is appearing in the marketplace for human resource systems.
- A range of capabilities is important to potential users.
- A DBMS or fourth-generation language capability is very desirable to meet this need.

- Graphics output is also desirable since data may have to be presented to a number of groups for their review.

V CONCLUSIONS AND RECOMMENDATIONS

- Some processing services and software packages do not provide timely information for CMA-like benefits planning. This need should be considered since it will become an increasingly important factor in the selection of a new system.
- Once payroll and limited personnel systems are operational on PCs, users will want to expand information available for employees as well as expand reporting capabilities.
 - Vendors should be prepared to expand system capabilities.
 - Add-on systems could be developed for popular payroll systems.
- PC software packages should be provided that allow departments and small organizational units to maintain local records in conformance with the personnel and human resource information systems used at corporate level.
- To aid planning and personnel analysis studies, personnel and human resource information systems should be able to include past as well as current employees.

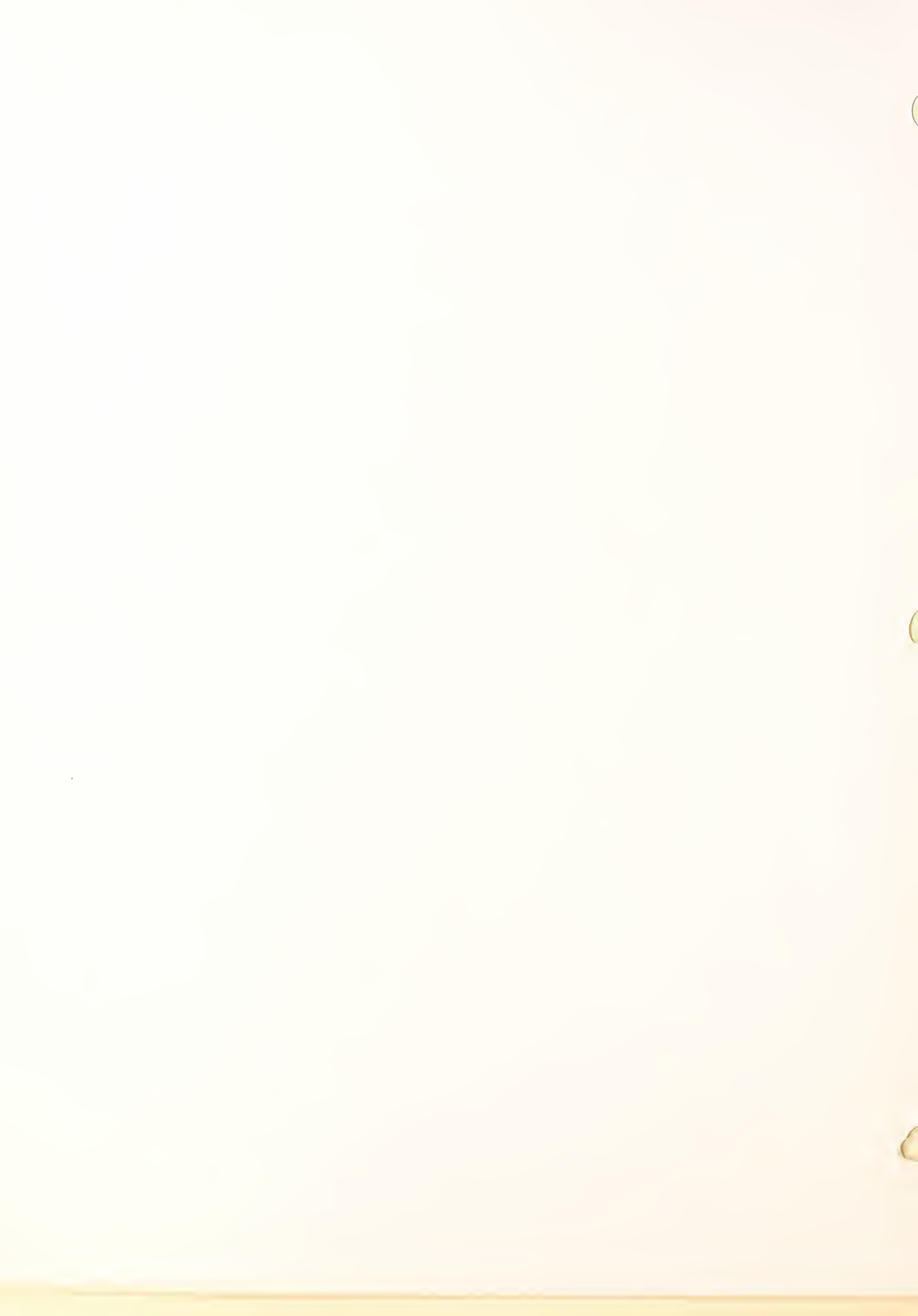
APPENDIX HR: FORECAST DATA BASE: HUMAN RESOURCES SEGMENT

- This appendix contains the following forecast information:
 - Market size by delivery mode for each year 1983-1989.
 - Market growth rate for 1983-1984.
 - Average annual growth rate (AAGR) for each delivery mode for the five-year period 1984-1989.

EXHIBIT HR-1

HUMAN RESOURCES SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	197	12%	220	249	286	332	383	442	15%
BATCH PROCESSING SERVICES	489	9%	533	579	624	661	688	706	6%
APPLICATION SOFTWARE									
MAINFRAME/MINI	359	25%	447	536	623	710	797	887	15%
MICRO	25	36%	34	46	58	73	92	118	28%
TOTAL APPLICATION SOFTWARE	384	25%	482	582	681	783	889	1005	16%
TURNKEY SYSTEMS	146	25%	183	228	283	345	415	508	23%
CROSS-INDUSTRY TOTAL	1216	17%	1418	1639	1874	2120	2375	2662	13%



**U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
PLANNING AND ANALYSIS SEGMENT**

U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
PLANNING AND ANALYSIS SEGMENT

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U.S. INFORMATION SERVICES MARKETS, 1984-1989
CROSS-INDUSTRY APPLICATIONS
PLANNING AND ANALYSIS SEGMENT

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	-2	Planning and Analysis Segment Forecast: Industry- Specific Information Services, 1984-1989	PA-3
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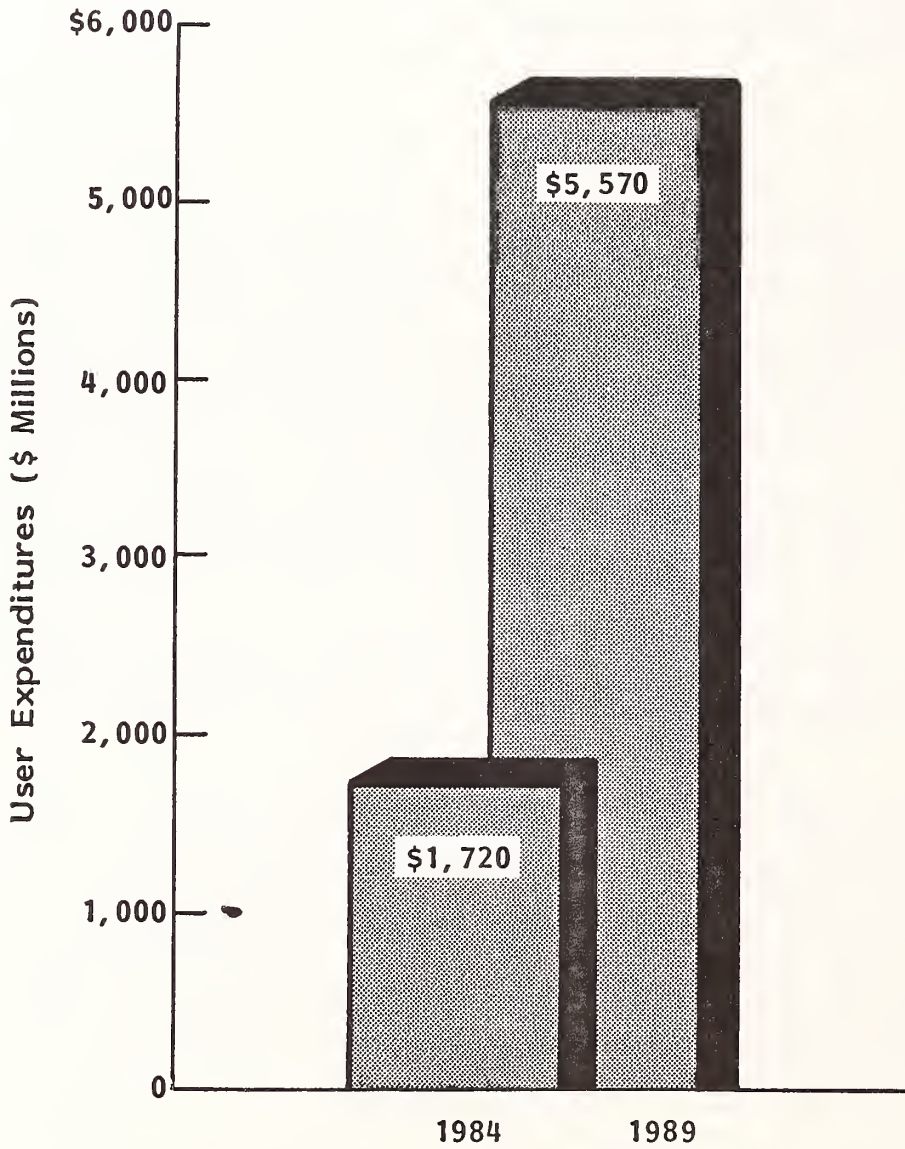


I MARKET SIZE AND GROWTH

- The applications included in the Planning and Analysis Segment are: budgeting, financial planning, forecasting, project management, modeling, spreadsheets, and integrated analysis packages (i.e., Framework, Symphony). The planning and analysis applications INPUT has forecast in this segment include most cross-industry decision support systems (DSS). This segment does not include industry-specific DSS-type applications. (They are forecast as a part of each vertical industry's user expenditures.)
- Excluded from this segment are analysis systems related to design (e.g., CAD/CAM) and/or engineering and scientific activities.
- Planning and analysis is the second fastest growing cross-industry market for information services vendors. (Only education and training cross-industry applications are growing faster and they are expanding from a 1984 base one-tenth the size.) As shown in Exhibit I-1, user expenditures for planning and analysis applications will increase from \$1.7 billion in 1984 to \$5.6 billion in 1989, a 26% AAGR.
- Planning and analysis is a major cross-industry market for a number of delivery modes.
 - It is one of the fastest growing microcomputer computer applications software markets, with a 42% AAGR, as shown in Exhibit I-2.

EXHIBIT I-1

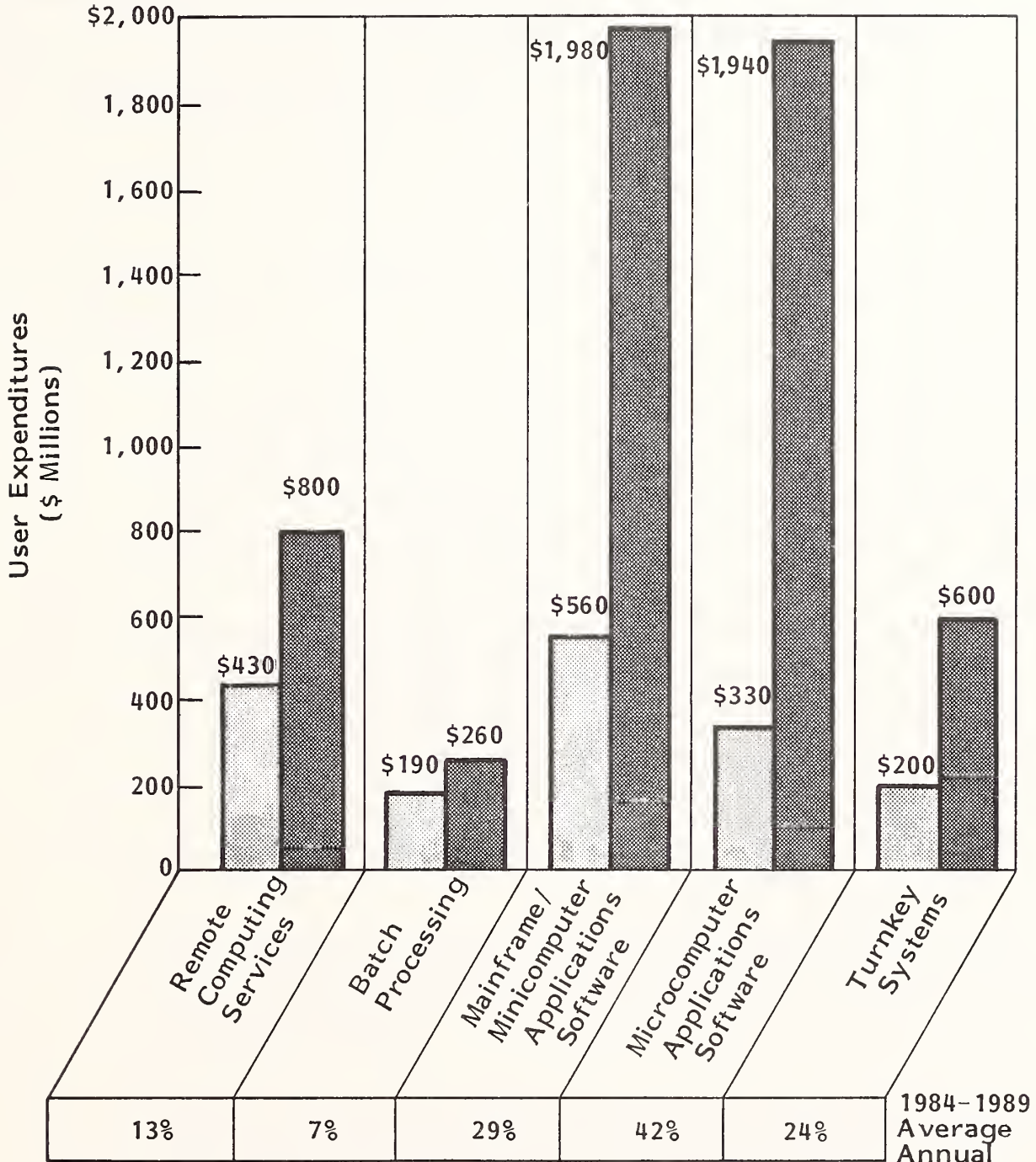
PLANNING AND ANALYSIS SEGMENT MARKET FORECAST
INDUSTRY-SPECIFIC INFORMATION SERVICES, 1984-1989



Average Annual Growth Rate: 26%

EXHIBIT I-2

PLANNING AND ANALYSIS SEGMENT FORECAST
INDUSTRY-SPECIFIC INFORMATION SERVICES, 1984-1989



1984-1989
Average
Annual
Growth
Rate

	Total User Expenditures (\$ Millions)	1984-1989 Average Annual Growth Rate
1984	\$1,720	26%
1989	\$5,570	

Note: All dollars are rounded to the nearest \$10 million.

- At 29% AAGR, it is the second fastest growing cross-industry market for mainframe/mini applications software products.
- Appendix PA contains the forecast data base, which includes market size by delivery mode for each year 1983 to 1989.

II ISSUES, TRENDS, AND EVENTS

- A number of factors are contributing to the health of the planning and analysis sector.
 - The target market for planning and analysis applications is the manager/professional. Productivity improvements directed at this group offer much promise, since this category of employee accounts for as much as two-thirds of the cost of a typical office.
 - Technology advances in both hardware and software are enabling previously simple planning/analysis systems to evolve into not only decision support systems, but also into decision-making systems. Continued advances in artificial intelligence techniques will enable both knowledge-based and expert systems to become increasingly commonplace by the late 1980s.
 - The emergence of improved organizational approaches to computing, such as information centers, is encouraging greater computer involvement for end users.
 - Software advances, such as fourth-generation languages and relational data base systems, are providing a friendlier interface.
 - The market success of cleverly integrated software packages, such as Lotus 1-2-3, Symphony, and Framework, attracts manager/professional

people to the computer, and then whets their appetites for more sophisticated analyses.

- User demand for PC-to-mainframe links has resulted in numerous hardware and software offerings that make it easier to extract data from a central data base and download it to a PC for local analysis.

III COMPETITIVE ANALYSIS

- In order to rapidly exploit the interest in PC-based planning and analysis, a number of vendors have entered into joint marketing and/or development arrangements. For example, McCormack & Dodge is cooperating with Lotus Development Corporation to tie their financial systems to the popular Lotus 1-2-3 integrated software system.
- MSA was one of the first financial systems vendors to see the PC's potential. They developed Executive Peachpak to enable clients to download mainframe financial data to PCs.
- Most major vendors of financial planning software are offering PC versions in order to take advantage of the increasing power and popularity of PCs. Examples include Focus (Information Builders), IFPS (Execucom Systems), and System W/Micro W (Comshare).

IV RECOMMENDATIONS

- Vendors anxious to more aggressively participate in planning and analysis market growth should include the following strategies:
 - Monitor advancements planned by leading PC systems software vendors that relate to improved analysis techniques. Make decisions early in the product life cycle in order to include their developments. Examples include Windows by Microsoft and Topview from IBM.
 - Try to avoid in-house development of any system that can more quickly and economically be obtained via joint ventures with third parties. Time is of the essence in this marketplace.
 - Find ways to integrate transactions systems with analysis systems, and vice versa. The best-accepted systems in the future will have these linkages.
 - Incorporate fourth-generation languages and DBMS in systems upon which you will be dependent for important revenues during the next several years.

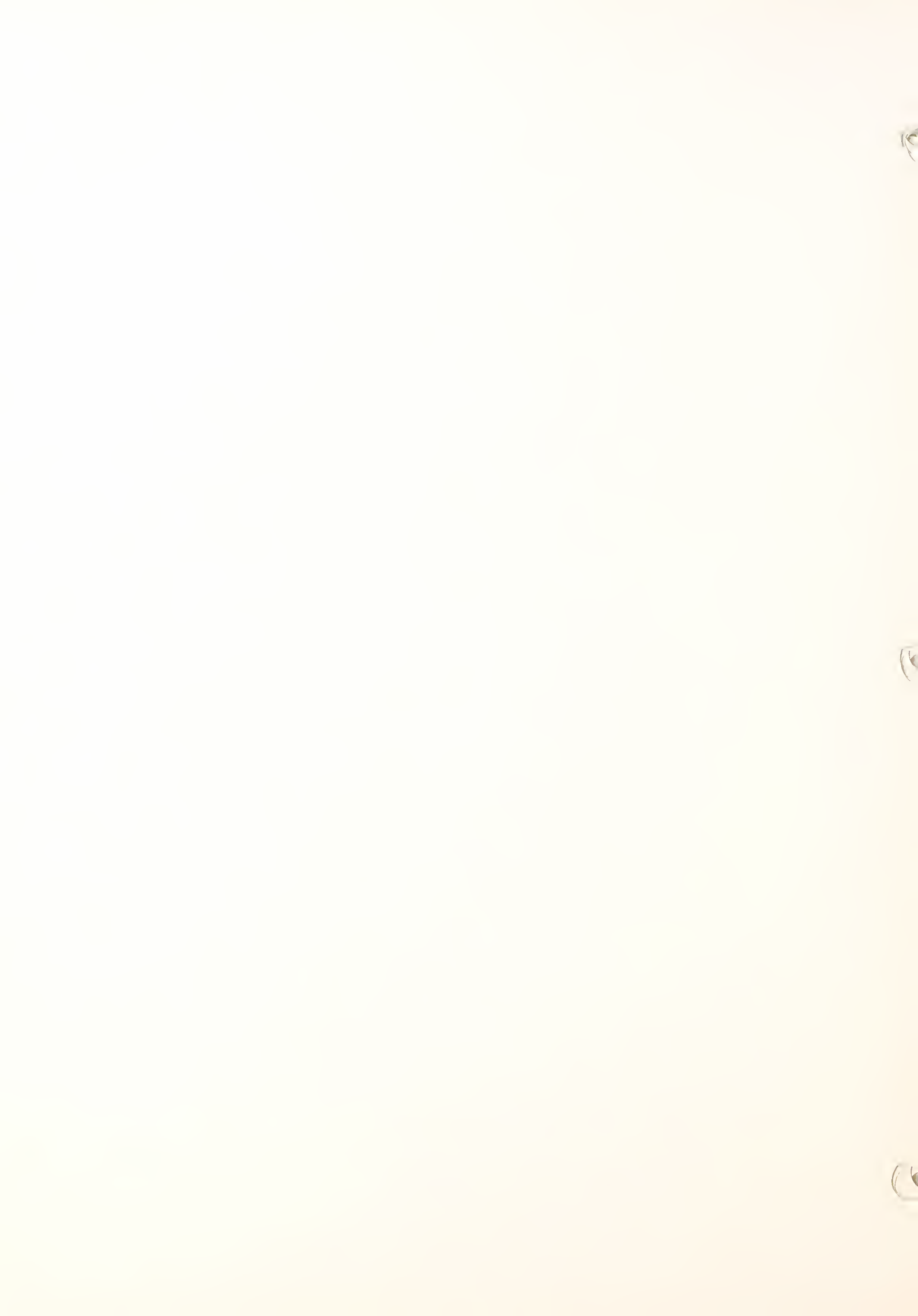
**APPENDIX PA: FORECAST DATA BASE: PLANNING AND ANALYSIS
SEGMENT**

- This appendix contains the following forecast information:
 - Market size by delivery mode for each year 1983-1989.
 - Market growth rate for 1983-1984.
 - Average annual growth rate (AAGR) for each delivery mode for the five-year period 1984-1989.

EXHIBIT PA-1

PLANNING AND ANALYSIS SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	379	13%	431	487	548	618	702	797	13%
BATCH PROCESSING SERVICES	174	9%	190	204	218	234	249	261	7%
APPLICATION SOFTWARE									
MAINFRAME/MINI	403	40%	564	756	981	1257	1582	1978	29%
MICRO	194	73%	334	520	745	1034	1412	1940	42%
TOTAL APPLICATION SOFTWARE	597	51%	899	1276	1726	2291	2994	3918	34%
TURNKEY SYSTEMS	162	26%	203	253	315	389	477	595	24%
CROSS-INDUSTRY TOTAL	1312	31%	1722	2220	2807	3531	4422	5572	26%



U.S. INFORMATION SERVICES, 1984-1989
CROSS-INDUSTRY APPLICATIONS
SYSTEMS SOFTWARE SEGMENT



U.S. INFORMATION SERVICES, 1984-1989
 CROSS-INDUSTRY APPLICATIONS
 SYSTEMS SOFTWARE SEGMENT

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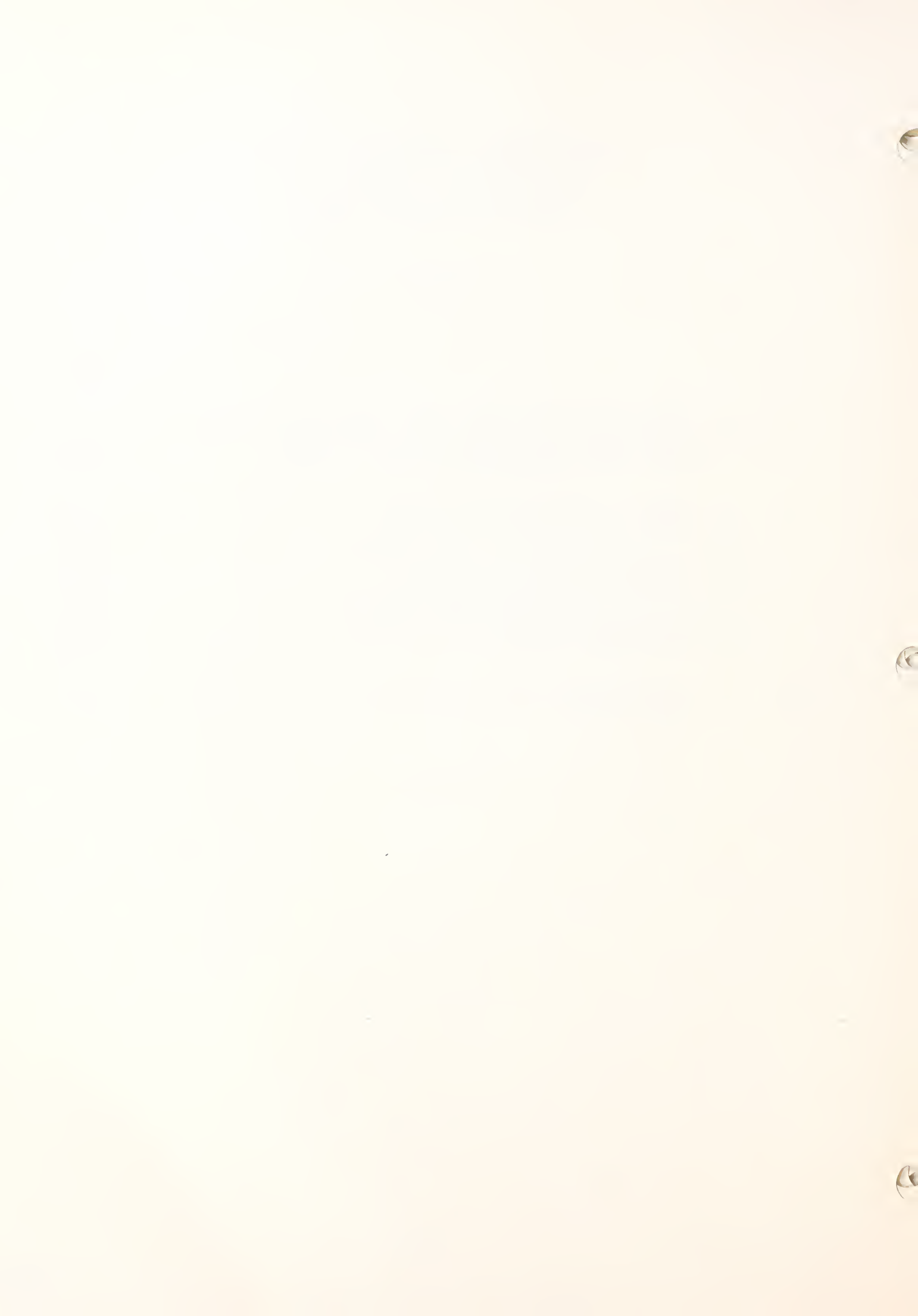
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B. Systems Control Software	SS-6
C. Data Center Management Software	SS-6
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U.S. INFORMATION SERVICES, 1984-1989
CROSS-INDUSTRY APPLICATIONS
SYSTEMS SOFTWARE SEGMENT

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I MARKET SIZE AND CHARACTERISTICS

- As shown in Exhibit I-1, systems software is used to control computers, manage data centers and networks, and develop applications. Expansion of user expenditures in the systems software area remains high, with an average annual growth rate (AAGR) of 29% projected to 1989. The overall market will increase from a 1984 base of \$4.6 billion to a \$16.7 billion opportunity by 1989, as shown in Exhibit I-2.
- There have been and will continue to be definitional problems in the systems software area as the functional boundaries and capabilities of information systems continue to change. For example, as integrated applications (i.e., a combination of DBMSs and associated application(s)) become increasingly important, identifying technical and market boundaries will become more difficult. Currently INPUT classifies spreadsheet-graphics-word processing-DBMS types of systems (e.g., Symphony and Framework) as cross-industry applications software within the Planning and Analysis market segment since this is the primary use of this type of system.

A. APPLICATIONS DEVELOPMENT TOOLS

- As shown in Exhibits I-2 and I-3, applications development tools (ADTs) is by far the largest of the three systems software sectors and will continue to increase its share. From a base of \$2.4 billion (52% of the total systems

EXHIBIT I-1

SYSTEMS SOFTWARE PRODUCTS
MARKET STRUCTURE

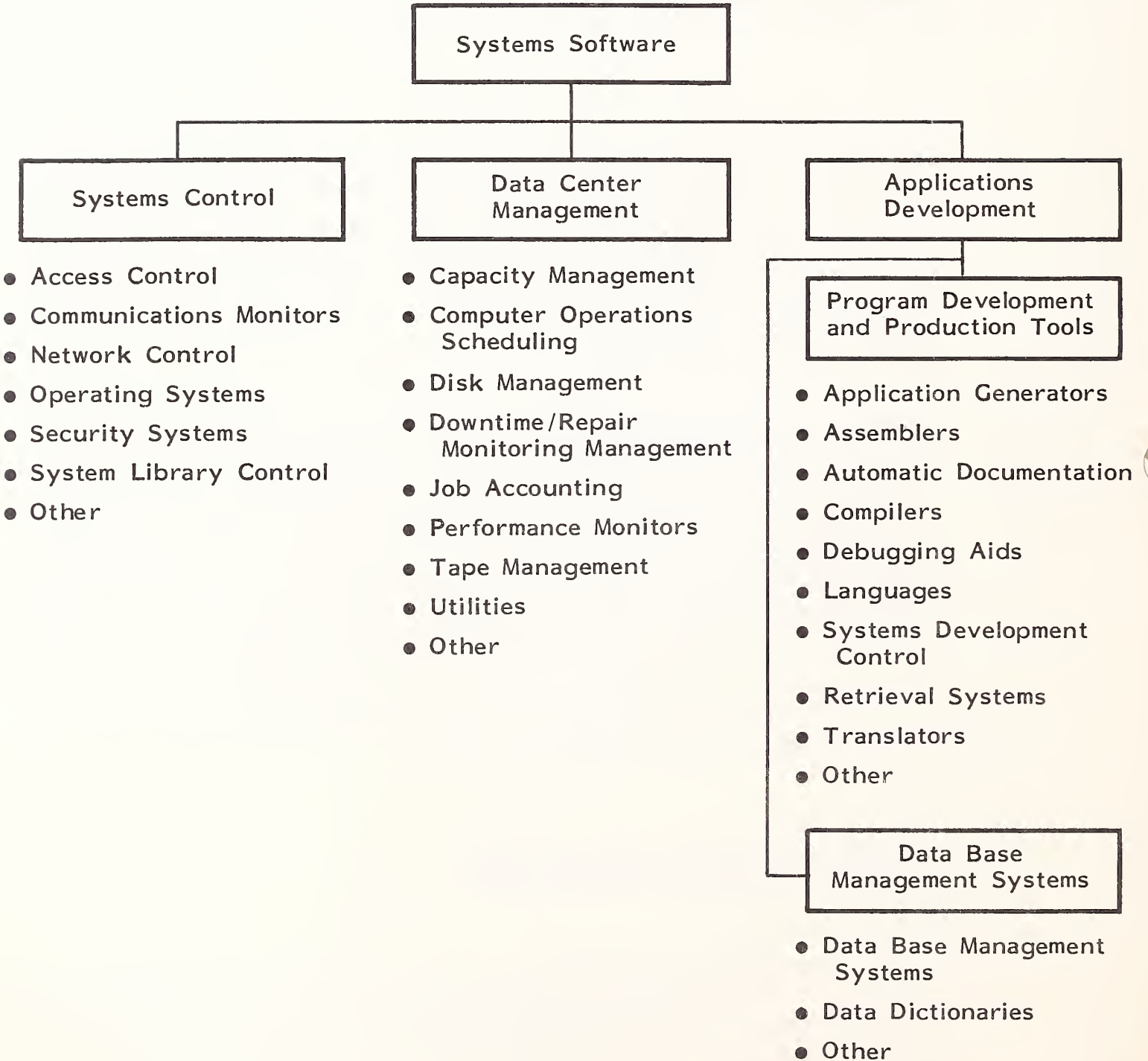
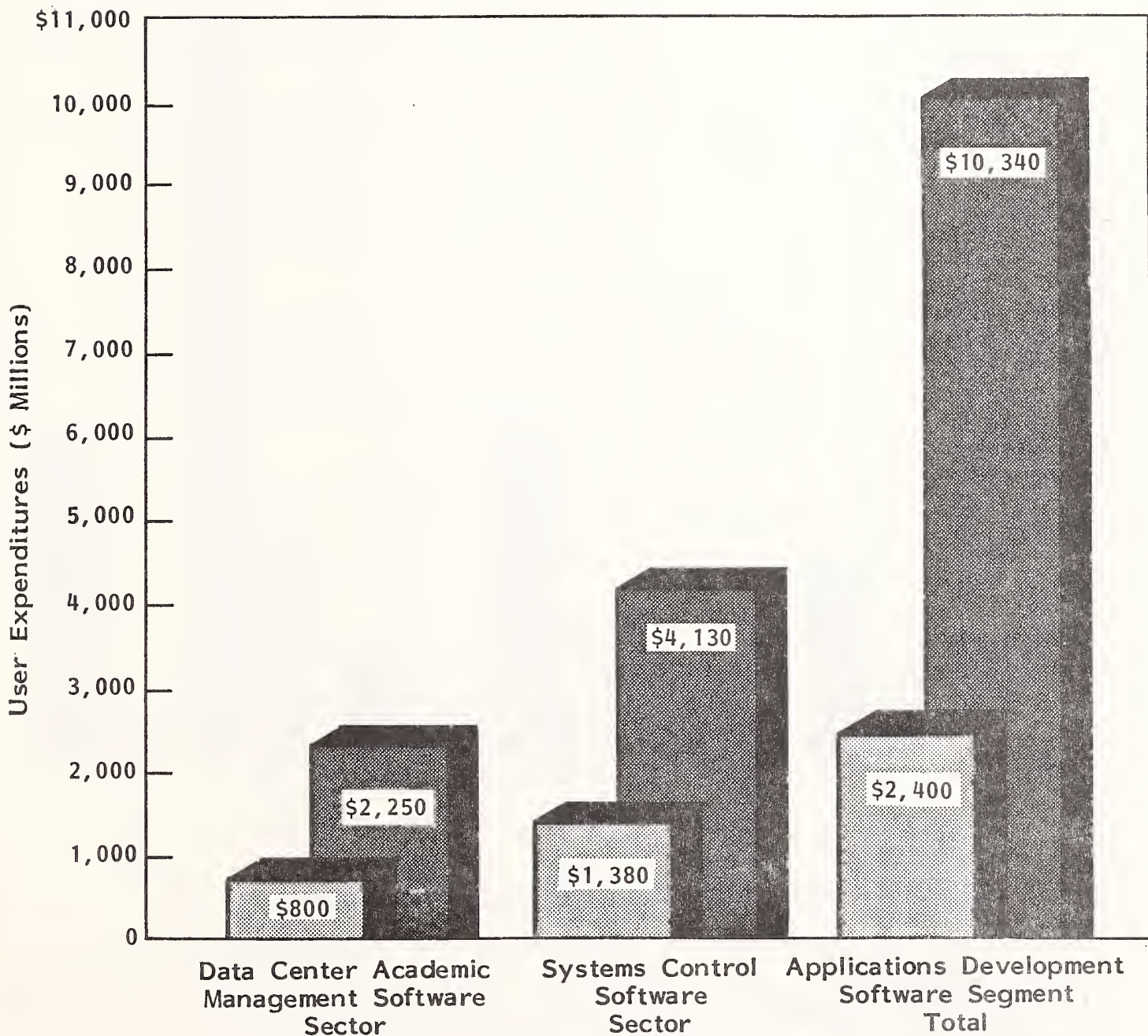


EXHIBIT I-2

SYSTEMS SOFTWARE SEGMENT MARKET FORECAST COMPARISON
CROSS-INDUSTRY INFORMATION SERVICES, 1984-1989



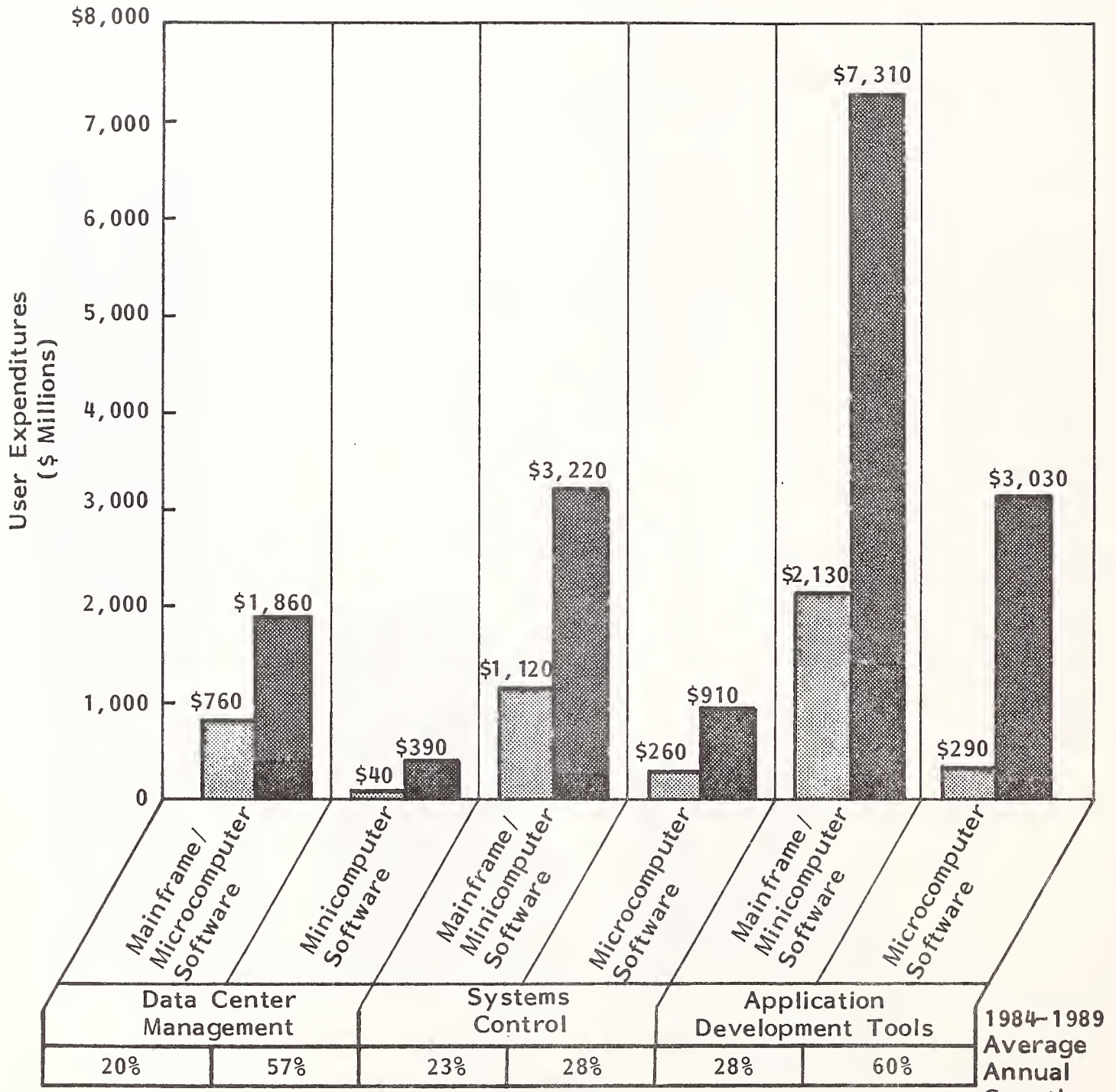
Average Annual Growth Rate	23%	24%	34%
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	Total User Expenditures (\$ Millions)	1984-1989 Average Annual Growth Rate
1984	\$ 4,600	29%
1989	\$16,700	

SS-3

EXHIBIT I-3

SYSTEMS SOFTWARE BY SECTOR FORECAST,
1984-1989



		1984-1989 Average Annual Growth Rate	
	Total User Expenditures (\$ Millions)		
1984	\$4,600	29%	
1989	\$16,710		

Note: All dollars are rounded to the nearest \$10 million.

software market) in 1984, ADT will grow to \$10.3 billion in 1989 (62% of all systems software expenditures).

- The ADT market (with its DBMS and inquiry systems focus) benefits from a number of very powerful forces that stand in the mainstream of computing trends during the next five years.
 - DBMS products comprise the heart of the migration toward integrated applications for which users are clamoring. DBMSs will evolve into increasingly comprehensive (and appealing) functions that can handle not only data but text and images with ease.
 - The popularity of fourth-generation languages (with their ability to link end users directly into much of the data processing mainstream) will continue unabated throughout the rest of the decade.
 - User demands for more powerful micro-to-mainframe links enhance the need for development tools that can handle this more complex environment.
- Personal computers have an especially heavy impact on this sector, with user expenditures of \$290 million growing to \$3 billion by 1989.
 - The personal computer software portion, at 60% AAGR, is the fastest growing delivery mode.
 - ADT personal computer software has the largest share (29% in 1989) of its sector.

B. SYSTEMS CONTROL SOFTWARE

- By 1989 the systems control segment will account for \$4.1 billion in user expenditures as a result of a 24% average annual growth rate. This will make the systems control sector in 1989 nearly as large as the entire systems software segment is in 1984.
- Factors that serve to stimulate systems control software growth include:
 - The resurrection of distributed data processing with its attendant requirement for enhanced network control.
 - The emergence of PC-based multiuser systems, which by 1989 will account for over one-third of all installed business-oriented microcomputer units.
 - The expansion of operating system functions to include such features as concurrent viewing of data and data transfer between multiple applications.
 - More demand for security systems that can more effectively protect data in an increasingly on-line world.

C. DATA CENTER MANAGEMENT SOFTWARE

- Data center management software will grow at an average annual growth rate of 23% for the next five years. From a 1984 base of \$800 million, this sector will expand to \$2.2 billion by 1989.
- A number of end-user-computing-based phenomena are driving this market:

- The requirement for ever-larger storage systems in order to service insatiable data base needs. This stimulates sales of storage management and capacity planning systems.
 - The evolution of the micro-mainframe environment, which requires ever more sophisticated scheduling and performance-monitoring approaches.
 - The increase in the number of new computing sites as organizations embrace turnkey systems (growing 27% annually) and other department-oriented solutions.
- Appendix SS contains market sizes (by systems software sector) for each year between 1984 and 1989.

II ISSUES, TRENDS, AND EVENTS

- Of the top 50 independent software companies, 18 are primarily systems software companies, as shown in Exhibit II-1.
 - These firms account for over 40% of the revenues of the top 50 companies.
 - Three of these vendors--Microsoft, Digital Research, and Ashton-Tate--are primary microsoftware vendors.

A. PRODUCT LINE DIRECTIONS

- Because the systems software sector will become a \$17 billion giant by 1989, there exists significant opportunities for vendors with well-conceived strategies. Indeed, systems software companies like Cullinet, Cincom, Computer Associates, and Applied Data Research (ADR) are pointing the way toward business approaches that rely on a large customer base and a broad but integrated set of software products.
- There are several factors that enhance the viability of this strategy:
 - The heyday of the small, independent systems software company making products for IBM mainframes may be drawing to a close. In the

EXHIBIT II-1

LEADING SYSTEM SOFTWARE COMPANIES

Company Name	Estimated 1983 Domestic Revenues (\$ Millions)
Cullinet Software, Inc.	\$92
Applied Data Research, Inc.	57
UCCEL Corp.	56
Microsoft Corporation	51
Digital Research, Inc.	46
Cincom Systems, Inc.	43
Computer Associates Intl. Inc.	35
Pansophic Systems, Inc.	35
Software AG Systems Group Inc.	34
Ashton-Tate	32
Information Builders, Inc.	26
Candle Corporation	24
Mathematica, Inc.	20
Syncsort	20
Boole & Babbage, Inc.	17
Morino Associates	15
On-Line Software International	13
Computer Corporation of America	13
Total	\$629

past, a "garage" company could put together a system utility, data management, or other type of standalone package and sell it with reasonable efficiency (and often very profitably).

- However, in the future only exceptionally better mousetraps will be able to go the route of independent companies because:
 - Short-term venture capitalists are now wary of software start-ups.
 - In the longer term there are already too many "me-too" systems software products with little, if any, significant differentiation.
 - As customer systems become more complex, it will be increasing difficult to easily fit in independently developed software. This has always been an IBM advantage and is becoming a Cullinet, Cincom, Computer Associates, and ADR advantage.
 - As the cost of marketing increases, it makes more and more sense to give each salesperson a more complete line of products. Many firms like Cullinet, Cincom, and ADR, for example, can potentially sell \$500,000 to \$750,000 in products to a single account (not counting additional copies).
- Cullinet and Cincom have done more to make their product offerings both broader and deeper than have any other independent software vendors, as shown in Exhibit II-2.
- Building on an initial DBMS offering dating from the early 1970s, each company added associated system software (data dictionary, teleprocessing monitors, etc.), then development tools and, more recently, applications.

EXHIBIT II-2

CULLINET AND CINCOM PRODUCT SUITES

PRODUCT	CULLINET	CINCOM
DBMS		
- First Generation	IDMS	Total
- Second Generation	IDMS/R	TIS
Data Dictionary	X	X
TP Monitor	IDMS/DC	ENVIRON / 1
Programmer Development Tools	ADS	MANTIS
End-User Development Tools	X (*)	X
Network Manager		X (Lic.)
Micro-Mainframe Link	X	X
PC Products		
- Systems Software	Partial (*)	
- Productivity Applications	X (*)	X (Lic.)
- Industry Applications		
Data Center Management Application Products		
- Financial (Cross-Industry)	X (*)	Partial
- Human Resources	X (*)	
- Banking	Bob White (Acq.)	
- Discrete Manufacturing	X (*)	X
Other		
- UNIX DBMS Environment		X
- Graphics Turnkey	Computer Pictures (Acq.)	
- Audit Software	X (*)	

Notes: (*) = Source code purchased and modified.
 (Lic.) = Marketing rights
 (Acq.) = Company acquired

- Recent additions include PC-related products for both, as well as such specialized products as a graphics turnkey systems (Cullinet) and a UNIX data base environment (Cincom).
- Conceptually, the progression of the system software product evolution of these two companies looks very much like that in Exhibit II-3.
 - The only products not being offered now are those that would tie together applications across a dispersed, micro-mainframe environment. This will be technically difficult, but it is a challenge for which a DBMS-oriented company is particularly suited.
 - This evolution is in line with INPUT's forecasts of the future structure of the software products industry. These forecasts are in Exhibit II-4.
 - It is interesting to note that the flow is not only that of systems software companies into application software:
 - Both McCormack and Dodge ("Millenium") and Hogan Systems ("The Umbrella System") have begun to market their internally developed system development tools.
 - These products, in essence, sidestep much of the DBMS focus inherent in the Cincom and Cullinet approaches.
- As shown in Exhibit II-5, both Cincom and Cullinet offer the option for customers to build their own applications ("A" in Exhibit II-5) or to purchase certain vendor-supplied applications ("B" in Exhibit II-5); MSA, in conjunction with ADR, also offers this option.
 - The Hogan or McCormack and Dodge approach (shown as "C" in Exhibit II-5) changes these priorities, even dispensing with traditional DBMSs, if desired.

EXHIBIT II-3

SYSTEMS SOFTWARE COMPANY PRODUCT EVOLUTION

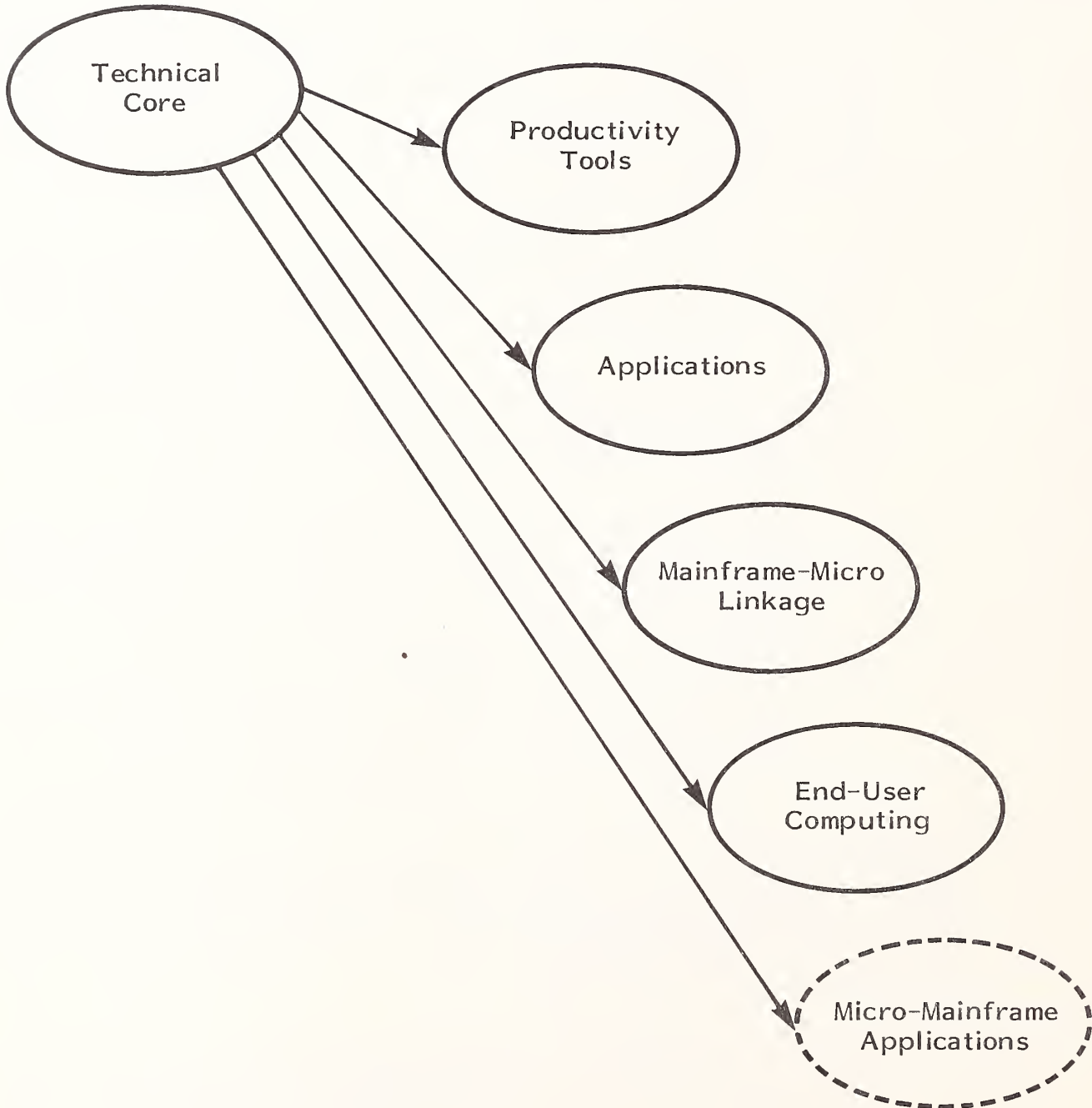
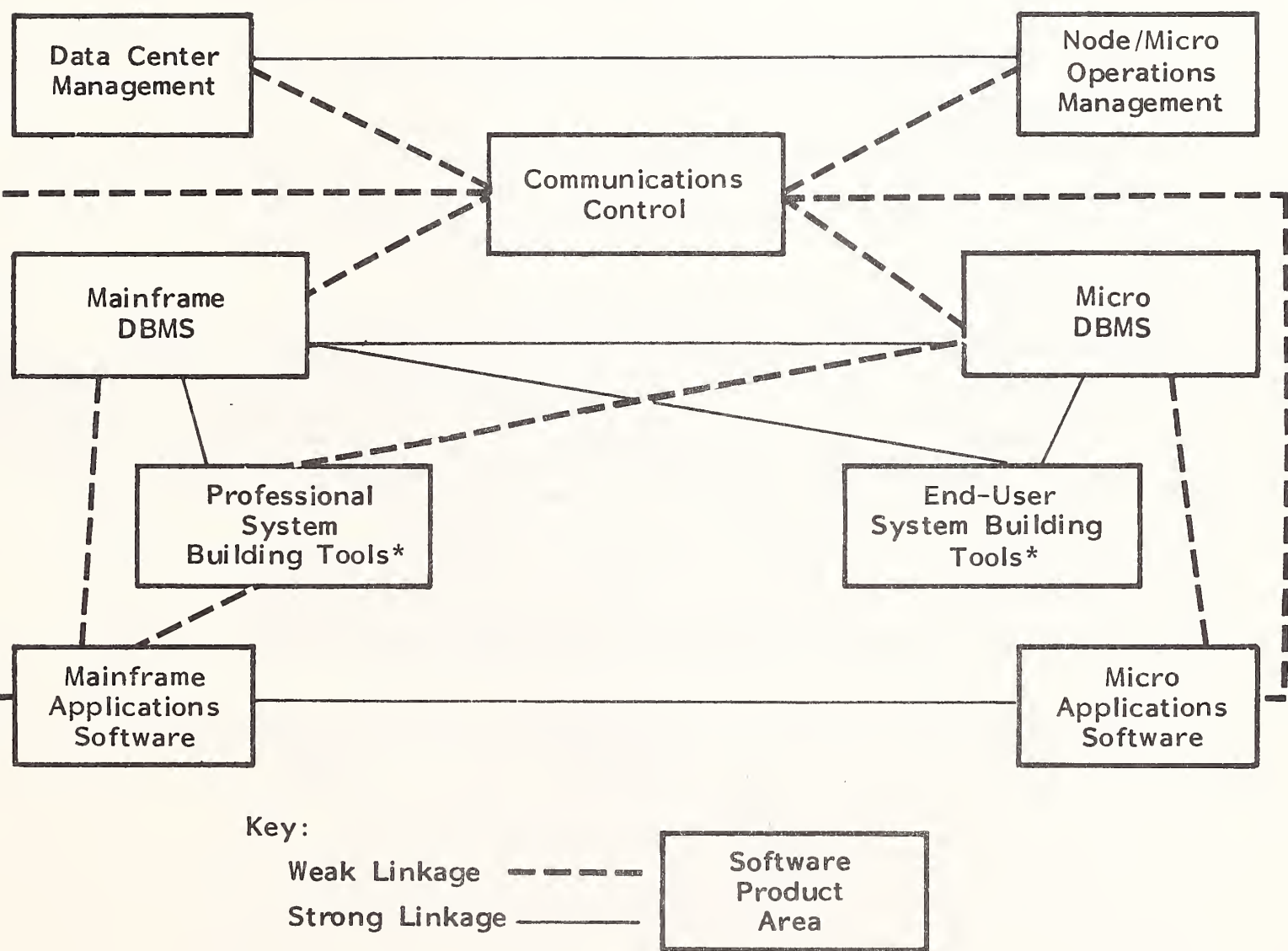


EXHIBIT II-4

SYSTEMS SOFTWARE: FUTURE STRUCTURE



* Includes Application Generators and Languages

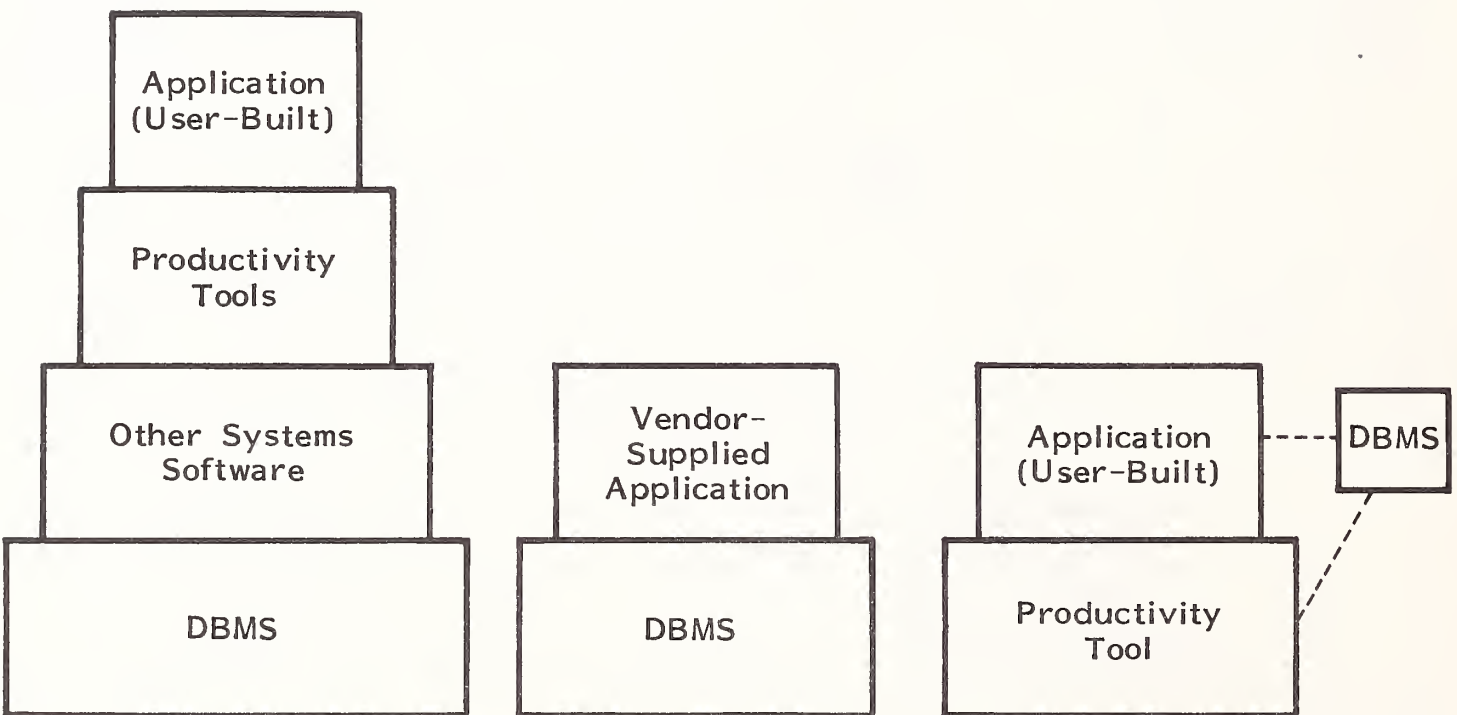
EXHIBIT II-5

CONTRASTING APPLICATIONS SOURCING ALTERNATIVES

(A)

(B)

(C)



Cullinet, Cincom

Cullinet, Cincom
ADR/MSA

McCormack & Dodge
Hogan

- However, a generation of systems designers has grown used to thinking in traditional DBMS terms, so it is unlikely that the productivity-tools-as-foundation approach will make many inroads in the short run.
- More illuminating is the MSA/ADR association, recently made more formal. The technical depth of this applications-DBMS association is unclear, but is in one sense immaterial: Both parties feel the need for at least the appearance of a DBMS/application association.
 - As a short-run expedient, this kind of association is adequate.
 - However, in the long run, pressures will build up concerning product and market strategy, product characteristics and investment, and overall account control.
 - These issues are discussed in more detail in INPUT's Integrated DBMS-Application Software report.
- The evolution into applications is not without pain and difficulty:
 - Cullinet, for example, has had only modest success in the banking applications area, with about a dozen customers. Over the years, Cullinet has made four efforts to enter the market:
 - By licensing an IDMS customer's software for banks.
 - By modifying acquired source code.
 - In a joint venture with ANACOMP.
 - Most recently, through Cullinet's acquisition of Bob White Computing and Software.

- On-line Software, primarily a systems software company, recently wrote off its foray into manufacturing software.
- The reasons for this slow penetration are not hard to find:
 - On the tactical level, the same salesperson cannot easily sell both systems and application software, due to differences in the type of buyer and required level of product knowledge.
 - Strategically, prospects usually still view vendors as being in "Category S (Systems)" or "Category A (Applications)." Since even IBM is not immune to this kind of classification, it will obviously take a great deal of missionary work for any vendor to convince customers that it can offer good systems software as well as good applications software.
 - It may also be difficult for a nonspecialist vendor to be sure that it has an acceptable product or to identify the right partner. Cullinet has gone some way to solve its problem by acquisition.
 - There is also the internal "noise" factor. In a company that is strong in systems software, the management and the "culture" will be systems software oriented. With the best intentions in the world it will take some time to change this type of predisposition.
- Notwithstanding these problems, systems software houses, especially DBMS firms, will be under increasing pressure to expand and diversify:
 - The impact of integrated applications will make it increasingly difficult to remain solely a systems software vendor.
 - Perhaps even more important is the need for systems software vendors to put distance between themselves and the "Blue Giant of Armonk."

- The recent burst of growth of Cullinet's manufacturing software shows that it can be done.

B. THE IBM FACTOR

I. PRODUCT PROTECTION

- IBM's hardware competitors have definitely begun to feel the heat of an IBM free of antitrust suits. Software competitors have a different and, for the most part, brighter future, as analyzed extensively in INPUT's recent Market Impacts of IBM Software Strategies report.
 - However, vendors offering applications and user tools are viewed much more benignly by IBM, since:
 - IBM has little position to lose in these areas.
 - Even IBM does not have the resources, especially the knowledge resources, to do well in these areas.
 - Most importantly, these kinds of products increase (sometimes astronomically) the need for more hardware.
 - Vendors offering systems software are in a different position:
 - They often compete against established IBM products.
 - More importantly, much of the historic marketing emphasis by competitive vendors has been on their products' relative efficiency compared to IBM. This reduces the need for more hardware.

- While it is unlikely that IBM will place more extensive amounts of its systems software into microcode or hardware implementations, just the pressure and "safeness" of IBM products can wear away competitive vendors--witness ADR's recent withdrawal of its teleprocessing monitor product.
 - This must have been a painful decision for ADR, given its desire to offer a full line of system software products.
 - However, the dominance of CICS (almost to the point of setting standards) made ADR's position costly and increasingly untenable. Even if the ADR offering were better, it would have to be significantly better to compete effectively.
 - Unfortunately for other vendors (and not just vendors of TP monitors), the ADR move will provide, at the least, an implicit sales argument for IBM that will be compelling in many situations.

- If IBM were, for example, to announce an IMS successor that would eliminate real and perceived IMS disabilities, this would have a profound impact on the independent DBMS vendors.
 - As a kind of rehearsal for this, it will be useful to track the effects of IBM's much-promoted new sort package on SYNCSORT, an essentially one-product company.
 - Cincom and especially Cullinet are much better positioned than SYNCSORT, since the former two companies never sold their products on the exclusive basis of technical performance. However, the high growth and profitability that they (and the investment community) have grown to expect could be considerably shaken.

- One way to conceptualize the relationship between IBM and the other software vendors is to view IBM as the center of its own universe with different types of satellites revolving around it. This is shown schematically in Exhibit II-6.
 - The vendors offering IBM-compatible operating systems (or SNA-like products, since SNA is becoming more and more identified with the operating system) are in danger of seeing their entire product area sucked into the IBM "sun" and disappearing.
 - At the other extreme, applications have only a fraction of the IBM gravitational pull.
 - Teleprocessing monitors and utilities are example of products slightly more at risk.

2. OPERATING SYSTEMS

- The IBM operating system issue and the strategic importance of the operating system to IBM is made clear by IBM's evolving position on microcomputer operating systems, which is shown in Exhibit II-7.
 - In the rush to get out the original PC, IBM had to settle for a "foreign" operating system. Microsoft was made supreme because of this.
 - The Microsoft-IBM relationship has worked out remarkably well, given the fact that both firms feel they are the captive of the other.
 - The de facto standard and dominance that has resulted has been extremely satisfactory to IBM. However, the fact that, ultimately, MS-DOS is not under IBM's control and can be the vehicle for other hardware manufacturers puts IBM in an uncomfortable strategic, if not tactical, position.

EXHIBIT II-6

DO NOT FLY TOO CLOSE TO THE IBM "SUN"

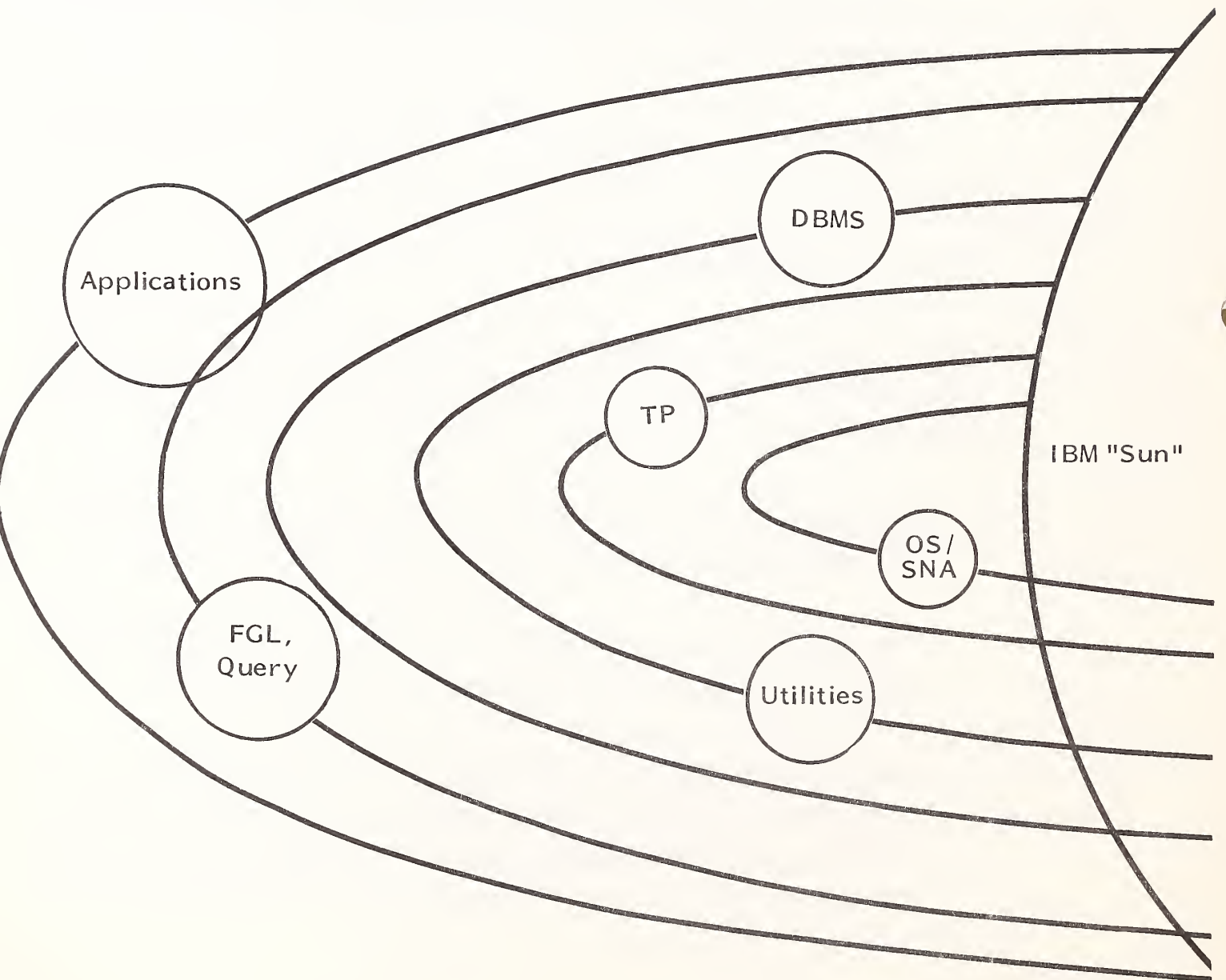
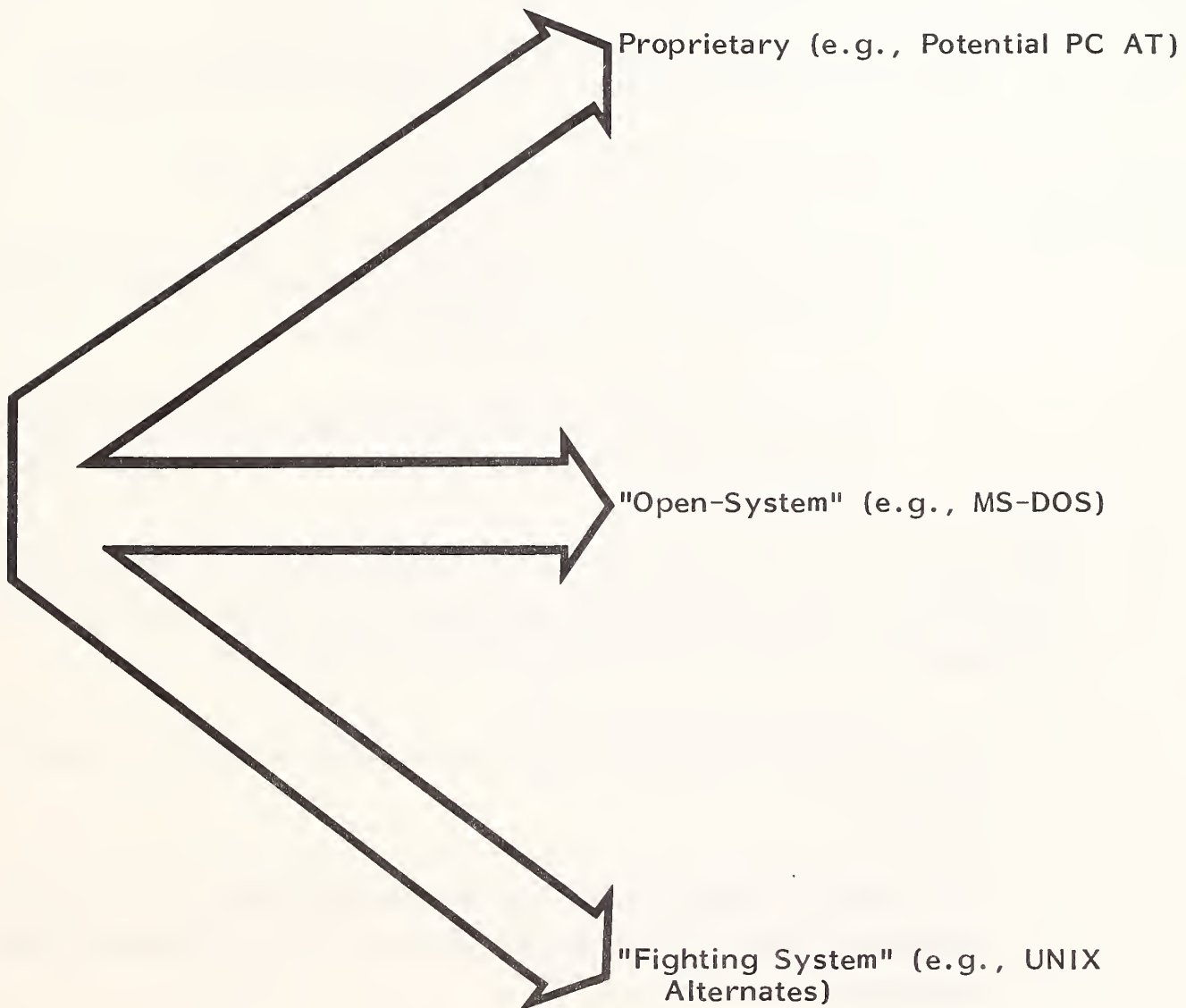


EXHIBIT II-7

IBM MICRO OPERATING SYSTEM DIRECTIONS



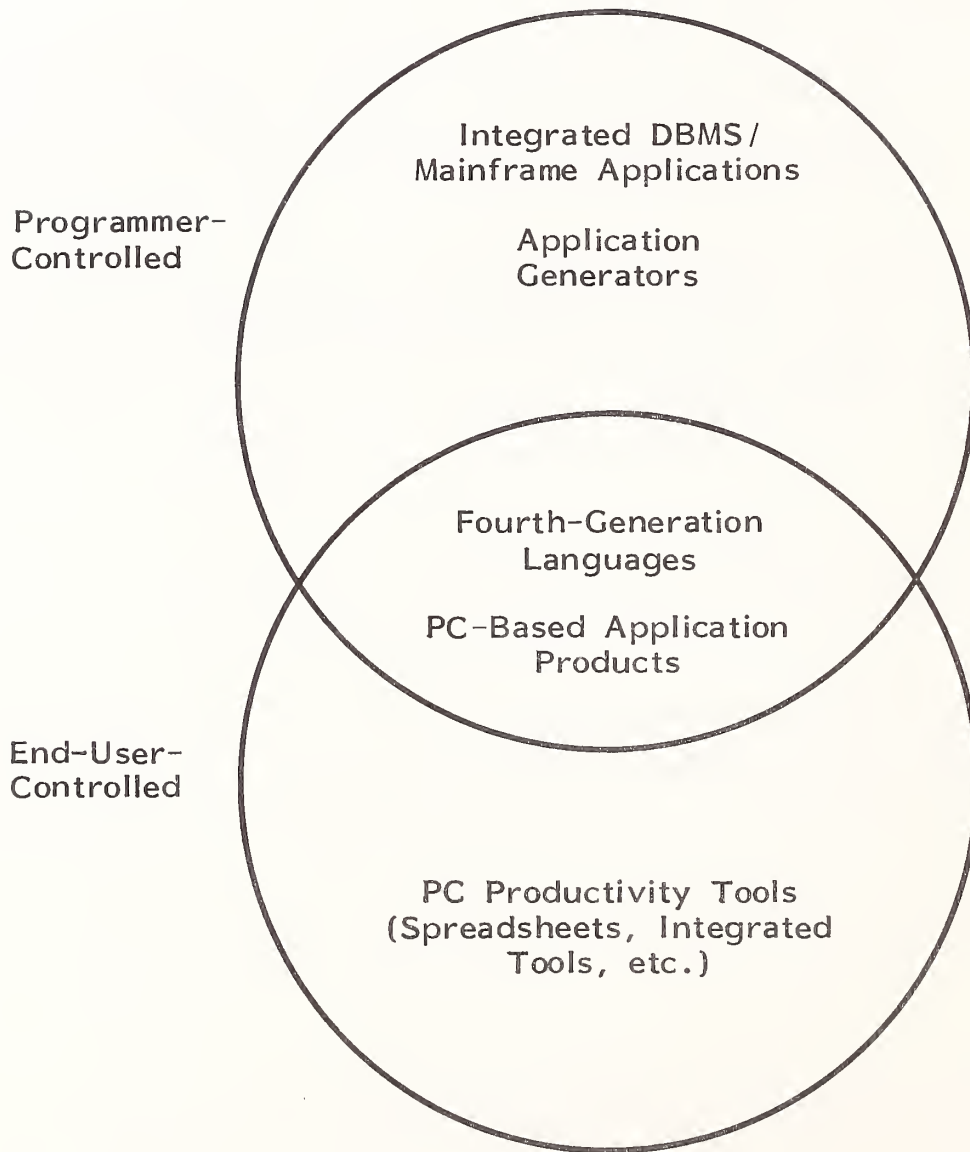
- However, the MS-DOS situation is far preferable to the UNIX situation where the operating system would be primarily under another (major) competitor's control.
 - Perhaps IBM has launched a number of UNIX-like products in order to prevent the establishment of a single UNIX standard (AT&T has responded by launching a multimillion-dollar campaign that says "nothing but UNIX").
 - IBM will probably win this battle by preventing AT&T from winning:
 - IBM's "UNIX-but-not-UNIX" will confuse the issue.
 - The profusion of commercial UNIX variants from other vendors will add further confusion and disruption.
 - Last, and not least, the technical failings and voids in UNIX will ultimately prevent it from displacing other operating systems.
- IBM's biggest opportunity for being able to establish long-term control will be to establish its own proprietary operating system (most likely using the AT as an excuse/vehicle). There will be several factors behind this:
 - The multiuser environment does not yet have a dominant operating system.
 - The needs of larger PC users/systems will be best met by a micro operating system that has built-in hooks to IBM mainframe operating systems.
 - IBM, of course, will nominate itself as being the most suitable organization for making this linkage.

C. SELLING TO END-USER-CONTROLLED ENVIRONMENTS

- A key opportunity for system software vendors is to move away from selling products in "programmer-controlled" environments and toward selling in end-user-controlled environments. Exhibit II-8 shows this altered strategy from a product standpoint.
 - However, up until now the established Fourth-Generation Language (FGL) vendors (Information Builders, D&B, Mathematica, etc.) have not been among the most centrally positioned system software vendors.
 - FGL- and PC-based application products are the "bridge" products and, as such, should receive considerable attention from established systems software vendors.

EXHIBIT II-8

PRODUCT CONTROL FOCUS



APPENDIX SS: FORECAST DATA BASE: SYSTEMS SOFTWARE SEGMENT

- This appendix contains the following forecast information:
 - Market size for each year 1983 to 1989 by delivery mode.
 - Market growth rate for 1983-1984.
 - Average annual growth rate (AAGR) for each delivery mode for the five-year period 1984-1989.

EXHIBIT SS-1

SYSTEMS SOFTWARE USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
APPLICATION DEVELOPMENT TOOLS									
MAINFRAME/MINI	1647	29%	2125	2754	3554	4560	5820	7308	28%
MICRO	148	95%	289	509	851	1351	2063	3029	60%
TOTAL APPLICATION DEVELOPMENT	1796	34%	2414	3263	4405	5911	7884	10337	34%
SYSTEMS CONTROL									
MAINFRAME/MINI	903	24%	1123	1403	1745	2159	2658	3220	23%
MICRO	161	61%	260	377	516	662	803	909	28%
TOTAL SYSTEMS CONTROL	1064	30%	1382	1779	2261	2821	3461	4129	24%
DATA CENTER MANAGEMENT									
MAINFRAME/MINI	630	21%	762	925	1116	1337	1591	1858	20%
MICRO	22	89%	41	71	116	180	270	389	57%
TOTAL DATA CENTER MANAGEMENT	651	23%	803	996	1232	1517	1861	2247	23%
TOTAL MAINFRAME/MINI	3180	26%	4010	5082	6415	8056	10070	12386	25%
TOTAL MICROCOMPUTER	331	78%	590	956	1482	2193	3136	4327	49%
GRAND TOTAL	3511	31%	4600	6038	7897	10249	13206	16713	29%



U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
UTILITY PROCESSING SEGMENT



U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
UTILITY PROCESSING SEGMENT

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U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
UTILITY PROCESSING SEGMENT

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I MARKET SIZE AND GROWTH

- Sales of utility processing services will be nearly \$2.0 billion in 1984 and will grow to \$2.8 billion in 1989, representing an average annual growth rate of 8%, as shown in Exhibit I-1.

- The utility processing services market includes:
 - The use of raw computer time for program development and/or debugging by the customer. The vendor provides facilities that support programming languages, software capabilities, and program libraries.

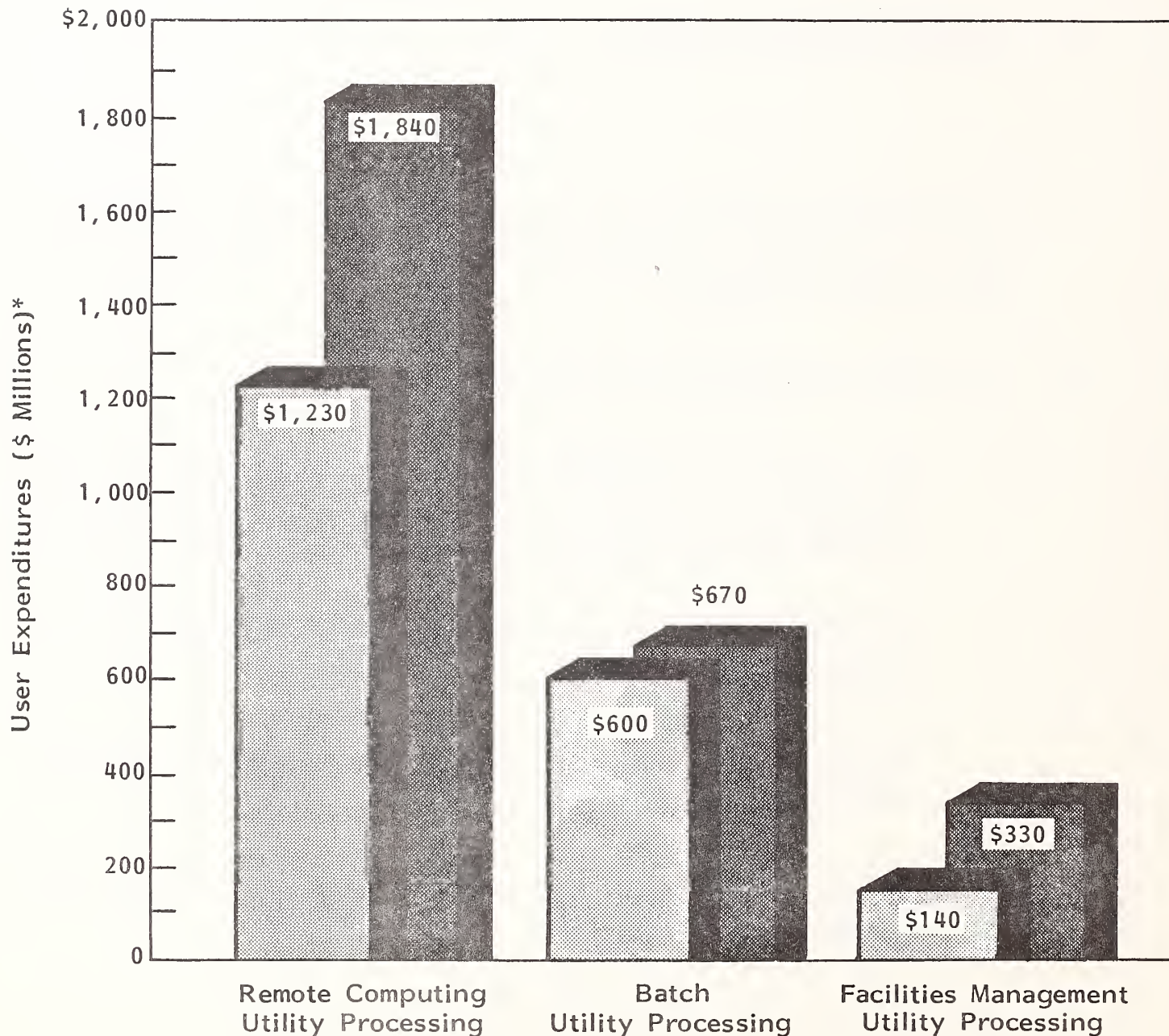
 - The processing of user-owned programs that are difficult to accommodate in-house.

 - Portions of large network applications that use vendor-written software and user-written programs.

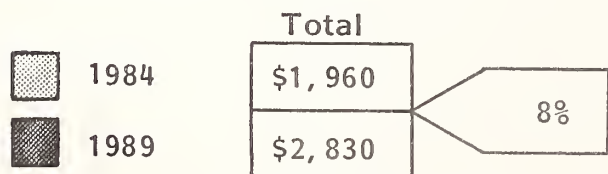
 - Back-up services related to customer peak-load demands and/or disaster recovery.

EXHIBIT I-1

UTILITY PROCESSING SEGMENT MARKET FORECAST COMPARISON
INFORMATION SERVICES, 1984-1989



Average Annual Growth Rate	8%	2%	19%
----------------------------	----	----	-----



Note: Some sectors included in the segment total are not broken out.

* All dollars are rounded to the nearest \$10 million.

II ISSUES, TRENDS, AND EVENTS

- Although this market is not growing rapidly, it is a good size market that many vendors endeavor to maintain. Utility-type services are advantageous to vendors because:
 - Utility processing can add to the bottom line without substantially increasing the use of resources or support services.
 - Resulting revenue is obtained from existing customers, which in most cases reduces sales costs to a minimum.
 - This increased revenue possibility can improve the profitability of current customers. The presence of in-house vendor capabilities such as systems software expertise and a library of applications that can be used to access or manipulate data bases enhance this revenue potential.
- For both large and small RCS vendors, ingenuity in sales techniques, creative customer support staffs, and inventive software personnel have been combined to generate utility processing revenues.
- As competition for utility-processing-type work has developed, product mixes have changed. GEISCO, for example, has seen a decrease in program development work but a strong growth in fixed capacity service. GEISCO provides a fixed amount of processing and storage for a set monthly fee.

- RCS vendors can provide utility processing that consolidates processing done on other systems and/or at various user sites.
 - This may be the first step in:
 - Bringing up a new system.
 - Moving work to new hardware.
 - In addition, it could be part of a development program. This consolidation capability could also support micro-mainframe interfaces.
- Major RCS vendors such as GEISCO, MCAUTO, BCS, ADP, and IBM are offering a wide range of utility processing services that encourages customer usage. The use of on-site hardware by ADP, GEISCO, BCS, and others has resulted in utility processing revenues for network use and software development.
- Utility processing must continually be replenished if it is to remain viable.
 - This type of effort is transient in nature; short-term requirements are often replaced by other short-term requirements.
 - Many applications move from a utility processing mode to a permanent home on micros, minis, or other mainframes.
 - Some utility processing is related to new networking requirements that move in-house when permanent solutions are created.
- Having high-level software, application, and/or technical specialists on staff to assist users (at a fee) develop and support complex applications is an important technique that is used to generate and maintain utility processing revenues.

- The combination of proprietary software provided by the vendor and expensive specialist expertise tied into user-supplied programs can help make it difficult or too costly to move jobs in-house.

- Some non-RCS firms that have contributed to the growth of utility processing in the past recently have moved in-house. Examples are:
 - General consultants and public accounting firms that run their own specialized business models and analytical systems.

 - Engineering firms that have developed systems that are based on their own expertise and that are used to study client problems.

- The Big Eight CPA firms have increasingly begun to see microcomputers as a better solution to the problem, but they still see RCS as a reasonable alternative for their smaller users. Arthur Young and Deloitte, Haskins and Sells are both proponents of smaller financial organizations using RCS services.

III COMPETITIVE DEVELOPMENTS

- A competitive element that significantly affects utility processing services is the microcomputer.
- The decreases in both hardware and software prices have encouraged the use of microcomputers by more end users for more application work.
 - RCS vendors receive minimal notice of cancellation.
 - Integrated software packages such as Lotus 1-2-3 have been successfully received by users who will do planning-type activities on the micro instead of with the RCS vendor.
 - More applications are being moved to the micro, eliminating dependence upon service vendors in some cases.
- In response, however, RCS vendors have developed frontend and output programs for PCs that would make it attractive to run utility processing on their services. These programs edit input, format output, and handle some processing, thereby reducing RCS costs.
 - GEISCO has developed a strategy for PC use that will promote RCS work, including utility processing.

- Vendors are also developing and introducing PC systems that will aid remote development of RCS jobs.
- Vendors are also working with users to develop programs on PCs that will allow the user to access powerful capabilities (only when needed) from a large mainframe and to use a PC for the rest of the work.
 - This approach could provide an alternative to using an in-house mainframe for certain types of work.
 - The user could address a mainframe job when only a PC is available to handle processing.

IV OPPORTUNITIES

- Although the overall growth potential for utilities processing services is not great, vendors should consider retaining this work as an incremental source of revenue and profits. Utility processing should not be the cornerstone of vendors' business strategy, but vendors should take advantage of market opportunities as an adjunct to their main business.
 - The low costs involved with these services make it an attractive market to pursue.
 - The use of these services in a customer environment enhances the total intercompany relationship, making it less likely for the customer to quickly and arbitrarily close off the business.
- Selected opportunities include:
 - Presentation of micro-mainframe interface capabilities and other tools that facilitate micro users' access of a vendor's system.
 - Increased implementation of tools that can be used to access data bases, manipulate data, and support application-specific needs.
 - Increased overall support capabilities of in-house staff to encourage customers to use this expertise for program development and consulting.

- Vendors are encouraged to:
 - Consider offering fixed service at a fixed price. With such an arrangement, the vendor can provide a full "computer" without the user needing to hire staff and without the need for a facilities management service.
 - Work with the information center personnel to discourage them from going into competition with you. Present yourself as another tool they can use, rather than as an adversary.

APPENDIX UP: FORECAST DATA BASE: UTILITY PROCESSING

- This appendix contains the following forecast information:
 - Market size for each year 1983 to 1989 by delivery mode.
 - Market growth rate for 1983-1984.
 - Average annual growth rate (AAGR) for each delivery mode for the five year period 1984-1989.

EXHIBIT UP-1

UTILITY PROCESSING SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
DELIVERY MODE									
REMOTE COMPUTING SERVICES	1141	7%	1225	1332	1444	1565	1697	1840	8%
BATCH PROCESSING SERVICES	575	5%	603	625	640	648	649	666	2%
FACILITIES MANAGEMENT	118	16%	136	159	187	224	272	329	19%
TOTAL	1834	7%	1964	2115	2272	2437	2617	2834	8%

U.S. INFORMATION SERVICES MARKETS, 1984-1989
1984-1989
VALUE-ADDED NETWORKS



U.S. INFORMATION SERVICES MARKETS, 1984-1989
VALUE-ADDED NETWORKS

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U.S. INFORMATION SERVICES MARKETS, 1984-1989
VALUE-ADDED NETWORKS

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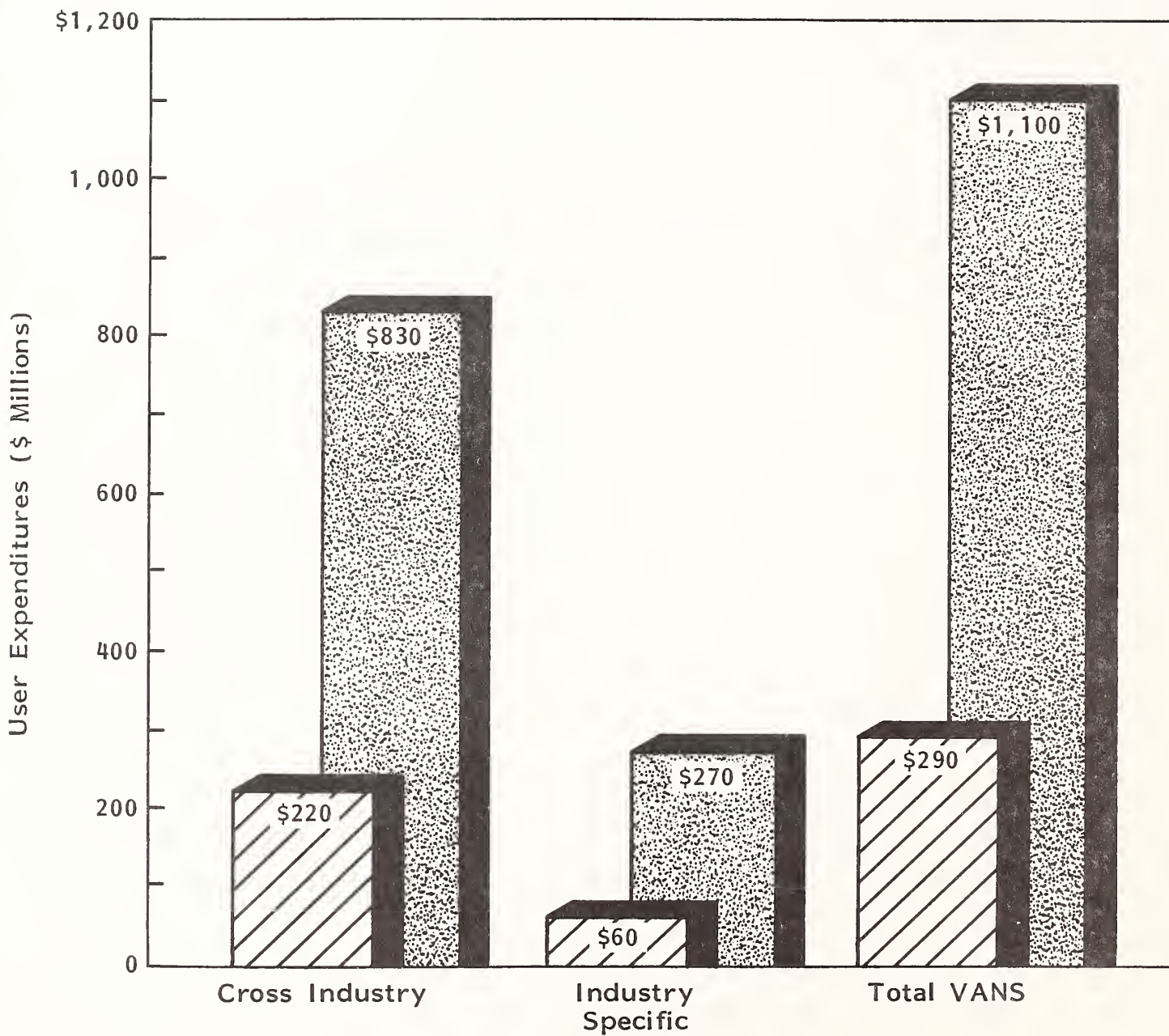


I MARKET SIZE AND GROWTH

- In 1984, the market for value added network (VAN) services will grow 25% over the 1983 level. 1984 VAN revenues are expected to reach \$288 million, as shown in Exhibit I-1. From these levels growth is expected to accelerate, reaching a 31% average growth rate through the forecast period ending in 1989.
- Since intense price competition for these commodity services is expected, traffic volumes will grow at a rate higher than revenue growth during the forecast period. Certain specialized applications of VAN technology, such as intercompany communications and automatic teller machine networks, are expected to grow somewhat faster than the market as a whole but will command only a moderate 25% of the total market of \$1.1 billion in VAN revenues in 1989.
- Competition in this market is expected to intensify very materially. Existing VANs will be attacked from the high end by hardware vendors offering packet switches for private networking to large-volume VAN customers. These are being offered at apparently significant potential cost savings. Vendors of these switches--such as Bolt, Beranek & Newman; Northern Telecommunications; Siemens; and others--are riding a price-performance curve similar to that found in mainframes and minicomputers. This implies that, as the forecast period progresses, private packet networks will become cost-effective for smaller and smaller VAN users. Although existing VANs such as Telenet and Tymnet also offer private networks, it must be remembered that most

EXHIBIT I-1

VALUE-ADDED NETWORKS (VANS) MARKET FORECAST,
1984-1989



Average Annual Growth Rate

29%	35%	31%
-----	-----	-----

1984

1989

domestic sales result in revenue losses and are essentially sacrificial in nature.

- Competition will further intensify as a result of telephone company post-divestiture activity. At this writing, 14 Bell Operating Companies (BOCs) have applied for permission to operate local packet networks of an intra-LATA (Local Access Transport Area) nature. More significantly, BOCs propose to offer these services bundled--that is, with protocol conversion and without employing a fully separated subsidiary (FSS). If these requests are approved by the FCC, BOCs will become extremely potent competitors in the VAN market, with a "new" service to be sold by existing field organizations alongside existing services such as data private lines.
- Services to provide inter-LATA connections may arise from a number of sources, not the least of which is AT&T's recently tariffed Accunet Packet Service (APS). Even though an accurate picture of the pricing for these combined services has yet to emerge, it remains distinctly possible that a combination of the BOC intra-LATA packet and the AT&T inter-LATA packet will be significantly less expensive than the services of existing VANs. If this scenario unfolds as expected, vastly greater competitive intensity can be expected in the VAN market.

II ISSUES, TRENDS, AND EVENTS

- In addition to the extremely important issue of BOC entrants to the VAN market, there are a number of other significant issues, some of which are of a financial nature. A significant characteristic of the VAN market of 1983 and 1984 has been the absence of major price increases on the part of the market leaders, Telenet and Tymnet. This may be due in part to some softening of demand, since 1983 results for Telenet showed a continuing (but reduced) loss position and Tymnet margins decayed from the previous year to a much more moderate growth rate.
- INPUT believes that a significant portion of the reduced revenue growth can be traced directly to the absence of material price increases. A secondary factor is the somewhat reduced traffic growth, since RCS users of VANs continued to have slow growth and information systems uses of VANs slowed under the general curtailment of budget increases in many industries. A third factor may be the widespread availability of VAN services in secondary and tertiary markets. In effect this removes "new territory" as a source of growth. Although it would be correct to refer to the VAN market as maturing, future growth is expected to shrink from the levels of the last five years.
- INPUT believes that the window for "opportunistic" entry (through the spinning off of RCS networks) has closed. In fact, the success of early spin-offs from ADP, Comuserve, and others in the primary VAN market for low-speed asynchronous communications is limited at best. As far as can be

determined, the second-tier vendors have not wrested shares from Telenet or Tymnet to any material extent. INPUT believes that with the entry of the Bell Operating Companies' intra-LATA packet (which will ultimately be connected inter-LATA) the days of opportunistic VAN entries will be gone completely.

- To be viable in the future, VAN competitors should be extremely well capitalized, able to sustain multiple years of operating losses and be at home with the marketing of commodity services. INPUT believes that the majority of information services firms are not financially equipped to deal with transmission markets. Consequently, INPUT recommends a re-evaluation of the opportunity, for any firm not currently holding a major share.
- Possible exceptions to the above may exist in the case of "specialized" services in the form of point of sale (POS) systems, electronic data interchange, and the market for bisync or international communications. These, however, comprise very little of the VAN revenue at present, and the major territory of low-speed asynchronous service seems well protected by the share advantages of the dominant vendors.
- Micro-to-mainframe communications is another possible growth area but remains, at present, a low-speed marketplace. Longer-term, micro-to-mainframe communications would seem vulnerable to local area network (LAN) developments, should that market stabilize. Direct communications to mainframes via VANs may prove to be a transitional step in the development of network hierarchies in which a user accesses a LAN that, by any of a variety of channels, accesses a mainframe data base.

III COMPETITIVE DEVELOPMENT

A. TELENET

- Although Telenet did not achieve profitability during 1983, the company did succeed in achieving break-even status during the final part of the year. In the first half of 1984, break-even status was again achieved. 1984 growth has accelerated over the lower levels experienced in 1983. Telenet appears to be focusing on a perceived opportunity in microcomputer communications requirements and has announced:
 - The Microcom Networking Protocol (MNP), which extends error corrections to the micro itself and offers speeds to 1,200 bps. MNP is currently available in only six cities for IBM PCs and clones. The Telenet goal is to propagate MNP as a de facto standard for uploading and downloading programs and data.
 - A two-key encryption system has been made available. It can be loaded into IBM PCs and clones for electronic mail services to and from PCs. At \$600 per installed machine on a purchase basis, this system seems suitable for only the most sensitive applications.
- Electronic mail appears to be growing well at Telenet. In 1983 a 70% increase in E-mail traffic was logged over 1982. The number of clients had increased much more modestly, suggesting that traffic expansion was occurring primarily with existing clients as opposed to new clients.

- Telenet announced a new packet switch (the 4200) with four times the capacity of the older 4000 switch (at approximately the same price). A co-processing configuration for these switches permits handling of up to 10,000 packets per second, a genuinely immense capacity. The improved price-performance of the 4200 switch may help stave off incursions into the Telenet base by providers of private packet switches.
- Telenet has assumed what appears to be a new militancy in the regulatory arena and has played a leading role in questioning the tariffs for the AT&T Accunet Packet Service and the protocol conversion requests of the BOCs. More recently, Telenet appealed a decision to permit AT&T Information Services (ATT-IS) to resell the regulated transmission services of AT&T Communications (ATT-COM). Readers should make their own inferences from these activities.

B. TYMNET

- Tymnet growth during 1983 slowed radically from 1982, and a simultaneous drop in profits was also experienced. The pre-acquisition turbulence at the parent company (Tymshare) was responsible for personnel costs and probably for orderly product development expenses. During the first half of 1984, Tymnet announced minor changes in its price schedule, with the primary impact in the area of long-term agreements.
- Network capabilities were improved during 1984:
 - Asynchronous outdial was added in high- and medium-density locations. This was a functional addition needed to support the transmission of certain documents such as bills of lading.

- A higher speed (2,400 bps) async service was introduced at selected locations.
- A new asynchronous terminal concentrator was introduced with four times the price-performance of the previous device. The new device concentrates a maximum of eight terminals to two lines at speeds of up to 9,600 bps.
- Historically, Tymnet has experienced declining profit margins and increased capital investment requirements. It remains to be seen if, under new ownership and in an increasingly turbulent competitive environment, these trends will be reversed.

C. IBM I/N SERVICE

- The IBM I/N service does not currently appear to be a focused effort in terms of the total company. The basic approach is one of facilities management to provide customers with a "turnkey" network. The fact that it is available in only 16 cities may inhibit many applications. Basic service does not include access lines and modems, but these are available under an arrangement called Extended Network Attachment.
- In general, the use of this network appears to be relatively expensive, and the lack of volume discounts is a notable feature of the price schedule. Only IBM protocols are directly supported (both bisync and SNA), but a Telenet gateway is available for "off-net" locations. In its current incarnation and pricing, this network seems to appeal primarily to only the most committed IBM users.

D. RCA CYLIX

- This network continues to grow rapidly and has apparently solved its earlier service problems. A mid-year change in pricing was made to improve the network's attractiveness to large users. Cylix sells heavily on price comparisons to AT&T services and promotes "end-to-end" service. Having divested itself of the prior Burroughs-based broadcast applications foundation, Cylix appears well positioned to focus on the opportunities provided by its IBM-oriented satellite network.

E. COMPUSERVE

- In addition to its asynchronous traffic, CompuServe has identified a niche in POS verification. Currently operating a POS system for VISA, CompuServe has installed special software for "expedited messages" in about 60 locations to handle this service. Other POS projects are also in progress.

F. CSC INFONET

- A late 1983 arrival in the VAN marketplace, CSC Infonet has grown rapidly from a very small base through a combined emphasis on 3270/3780 devices and international services. A unique feature of this arrangement is its single invoice denominated in U.S. dollars. With this approach, an offshore user dials up an Infonet node or obtains a private line to one. CSC maintains a line from this node offshore to the U.S. via an International Record Carrier. All net management is handled by Infonet. The service is currently offered in 19 countries.

- Simplicity in the form of uniform pricing and a "turnkey" approach to network management appear to be key features of the CSC offering (along with apparently competitive prices). CSC's market approach is a clever one for a late entrant.

G. UNITED TELECOM UNINET

- The earliest of the second-tier entrants, Uninet relied heavily on traffic generated by its RCS affiliates (now sold to Control Data). As a result, total network traffic fell very substantially. As of mid-1984 Uninet was completely overhauled and repriced. Whereas prior pricing was extremely low and was free for character transmission in the conventional manner, new Uninet pricing has been substantially revised to the conventional form and prices have been increased as well. Uninet currently claims dial-up access in 336 cities (up from 170 in 1982) and also claims access from 41 countries. It remains to be seen whether the "new" Uninet will succeed in capturing a greater market share from the leaders, Telenet and Tymnet.

IV CONCLUSIONS AND RECOMMENDATIONS

- INPUT has two recommendations:
 - For those companies lacking a significant market position at present, a thorough evaluation is recommended of the ability to compete against well-capitalized firms in a commodity marketplace.
 - For those having some market position at present, INPUT recommends negotiating access to BOC networks as they become available. Companies are also urged to identify niche markets (to the extent such markets are possible).
- In sum, INPUT expects substantial changes in the nature of competition in this market during the next five years. The new entrants will have an abundance of capital, a strong position in related markets, longevity, considerable technological sophistication, and long planning horizons.
- Although the market for VAN services is expected to continue to grow relatively fast, the dynamics of the market have changed and will continue to change in a fashion that rewards well-capitalized, orderly participants and discourages the opportunistic activities that the market has tolerated in the past.

APPENDIX VA: FORECAST DATA BASE: VALUE-ADDED NETWORKS

- This appendix contains the following forecast information:
 - Market size for each year 1983 to 1989 by delivery mode.
 - Market growth rate for 1983-1984.
 - Average annual growth rate (AAGR) for the five-year period 1984-1989.

EXHIBIT VA-1

VALUE-ADDED NETWORK SEGMENT USER EXPENDITURE FORECAST,
1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
VANS (CROSS-INDUSTRY)	190	20%	228	289	371	477	627	826	29%
VANS (INDUSTRY-SPECIFIC)	40	50%	60	79	107	145	200	274	35%
VANS (TOTAL)	230	25%	288	368	478	622	827	1100	31%



U.S. INFORMATION SERVICES MARKETS, 1984-1989
"OTHER" CROSS-INDUSTRY SEGMENT



U.S. INFORMATION SERVICES MARKETS, 1984-1989
"OTHER" CROSS-INDUSTRY SEGMENT

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U.S. INFORMATION SERVICES MARKETS, 1984-1989
"OTHER" CROSS-INDUSTRY SEGMENT

EXHIBITS

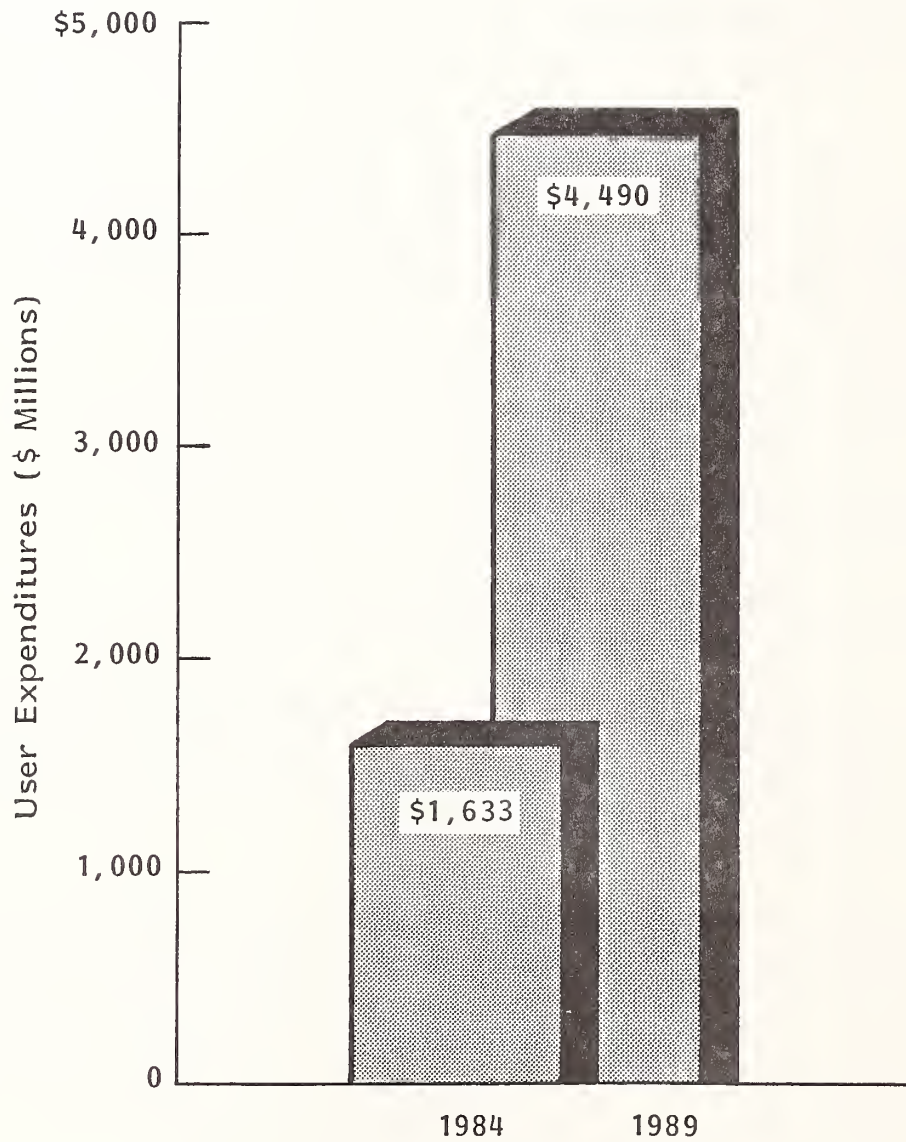
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I MARKET SIZE AND GROWTH

- The "other" cross-industry applications segment consists of applications such as the following:
 - Word processing.
 - Business graphics.
 - Sales, marketing, and distribution.
- As shown in Exhibit I-1, the total "other" cross-industry applications market will grow from a base of \$1.63 billion in 1984 at an average annual growth rate of 22% to reach \$4.49 billion by 1989.
- Sales, marketing, and distribution applications will continue to take hold in corporate America, rising to \$2.3 billion by 1989. Increasing price/performance ratios in desktop systems (e.g., IBM PC AT) will erode the RCS market for these applications, while at the same time stimulating the market for applications software, particularly mini and micro systems.
- Turnkey systems will be one of the fastest growing delivery modes for the "other" cross-industry segment, due to increased demand for executive workstations integrating business graphics, electronic voice/mail, and electronic spreadsheets, as well as transparent support features such as communications and data base management. Turnkey systems will grow from \$955 million in 1984 to \$3.03 billion by 1989, as shown in Exhibit I-2.

EXHIBIT I-1

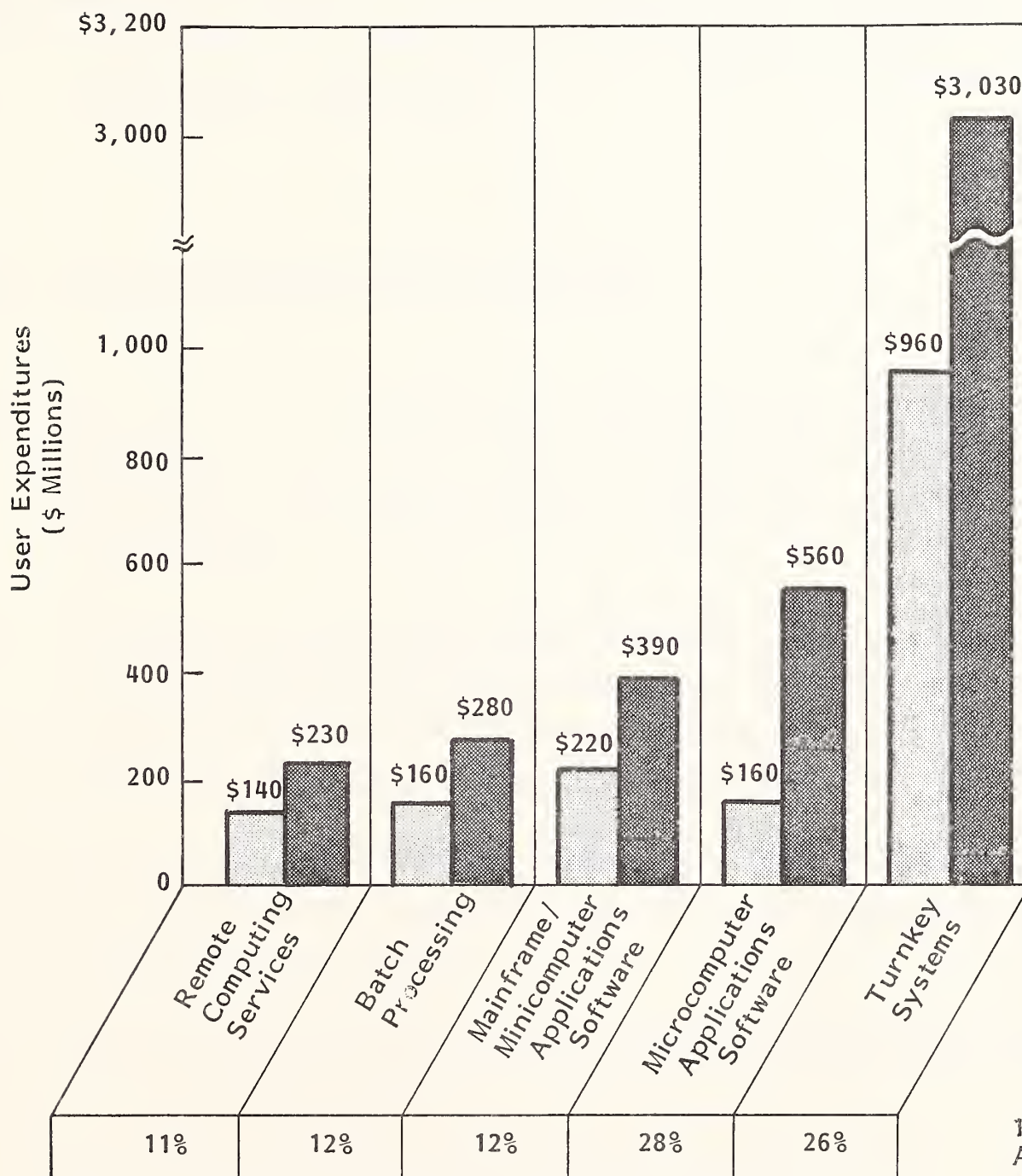
"OTHER" SEGMENT MARKET FORECAST
CROSS-INDUSTRY INFORMATION SERVICES, 1984-1989



Average Annual Growth Rate: 22%

EXHIBIT I-2

"OTHER" SEGMENT FORECAST
CROSS-INDUSTRY INFORMATION SERVICES, 1984-1989



1984-1989
Average
Annual
Growth
Rate

	Total User Expenditures (\$ Millions)	1984-1989 Average Annual Growth Rate
1984	\$1,630	22%
1989	\$4,490	

Note: All dollars are rounded to the nearest \$10 million.

- Filling the gap in the short-run, applications software will be the next fastest growing delivery mode for this segment, growing from \$380 million in 1984, at an average annual rate of 20%, to reach \$950 million by 1989. Applications software for micros will actually grow faster than turnkey systems, at 28% average annual growth.

II ISSUES, TRENDS, AND EVENTS

A. SALES, MARKETING, AND DISTRIBUTION

- Currently, there are approximately 4 million marketing, advertising, and sales professionals in the U.S. The 1984 information services market for these applications is \$807 million; this equals to roughly \$200 per year per professional employee.
- Established RCS and software vendors such as ADP, CSC, UCCEL (formerly UCC) and American Software are clearly aware of the recent surge of growth in this segment and are harnessing new users through product development and through marketing targeted at sales, marketing, and distribution professionals.
- Smaller vendors such as Arlington Software and Systems as well as Executive Data Systems have also entered this market and are aggressively taking advantage of the opportunities.
- Exhibit II-1 contains a list of vendors and their applications by delivery mode.

EXHIBIT II-1

SALES, MARKETING, AND DISTRIBUTION:
 MODES OF SERVICE VERSUS
 APPLICATIONS GROUPS FOR SELECTED VENDORS

APPLICATIONS GROUPS	MODES OF SERVICE				
	RCS	SOFTWARE PRODUCTS	PC WITH RCS OR SOFTWARE (Planned or Released)	INTEGRATED SYSTEMS	PROFESSIONAL SERVICES
Marketing	- D&B - CDC - ADP - CSC	- IBM - American Software - UCCEL - NCR	- CSC - American Software - UCCEL		- Coopers and Lybrand
Sales	- D&B - CDC - ADP - CSC - Cross Information Systems	- IBM - American Software - UCCEL - NCR - Cross Information Systems	- UCCEL	- Executive Data Systems - Arlington Software - Old Dominion Data Systems	- CAP - Coopers and Lybrand
Order Writing, Entry or Processing	- ADP - CDC	- IBM, NCR - American Software		- CSI - Ultimate Corporation	- CAP - Coopers and Lybrand - Partners
Distribution	- ADP - CDC - CSC	- IBM - DMS - NCR	- CSC	- CSI - Ultimate Corporation	- Coopers and Lybrand - Partners

B. GRAPHICS

- Approximately 12 million managers and executives are potential users of information managing tools like graphics.
- The acceptance of integrated analysis systems such as Lotus 1-2-3 into the corporate environment has given managers the ability to massage data in graphics form. This has raised managers' interest in graphics for business analysis and their desire to produce presentation quality graphics.
- RCS vendors are developing microcomputer interfaces for their services to take advantage of the installed PC base. For example, Integrated Software Systems Corporation (ISSCO) is selling the IBM PC Interface, which allows IBM PC owners to use their PCs as graphics workstations. Other vendors offering PC-to-mainframe links and their products are:
 - Cullinet, Information Database.
 - Informatics, Answer/DB.
 - Management Science America, PeachLink.
 - McCormack & Dodge, Interactive PC Link.
 - Micro Tempus, Tempus-Link.
 - OnLine Software International, Omnilink.
- The distribution channels of successful microcomputer graphics software marketers is changing from mass retailing to national corporate account selling through OEMs. Graphic Communications Inc. has OEM agreements with Digital Equipment Corporation, Hewlett-Packard, Burroughs Corporation, Exxon Office Systems, NEC Information Systems, and IBM.

- Assimilation of standards in the business graphics marketplace is beginning to take hold.
 - The Graphic Kernel System (GKS) by Nova Graphics International Corporation has been proposed by the American National Standards Institute (ANSI) as an American standard. A different version of GKS has been proposed by the International Standards Organization (ISO).
 - Also, the North American Presentation Level Protocol Syntax (NAPLPS) has been proposed by ANSI in conjunction with the Canadian Standards Association.
 - Microsoft Inc. has been working closely with Graphic Communications Inc. to implement the Virtual Device Interface (VDI) standard, as outlined in GKS, into MS-Windows.
- Exhibit II-2 lists selected graphics software vendors, their installations, and their major business graphics packages designed for end users.
- Exhibit II-3 lists selected RCS vendors and their leading business graphics applications packages.

C. WORD PROCESSING

- Microcomputer software for word processing now rivals traditional turnkey dedicated systems. The manufacturers of dedicated systems are responding by adding new functionality, for instance data processing, to their existing systems.

EXHIBIT II-2

SELECTED BUSINESS GRAPHICS SOFTWARE VENDORS

COMPANY	PRODUCT	# OF FIRMS SOLD (Est.)
<u>Mainframe/Mini Software</u>		
Aztek Digital Equipment Corp. Execucom Systems Corporation Hewlett-Packard I.P. Sharp Assoc., LTD. ISSCO Information Builders International Business Machines Para Research, Inc. Ross Systems SAS Institute, Inc. SPSS, Inc. (est)	Slidegraphic II DECgraph IFPS/Graphics Business Graphics Package Superplot Tell-A-Graf FOCUS Graphics Graphpak Full-Screen Interface Paraplot MAPS/Graph SAS/Graph SPSS/Graph	168 190 800 400 175 70 2,250 200
# OF USERS (Est.)		
<u>Dedicated Micro Software</u>		
Aztek Business & Professional Software Decision Resources Digital Research, Inc. Executec Corporation Fox and Geller, Inc. Ganesa Group International, Inc. Graphic Communications, Inc. Redding Group Softel, Inc. Softkey, Inc. Software Publishing, Inc. Strobe, Inc. Transparent Data Systems	PC Chart BPS Business Graphics Chart-Master DR Graph Execu/PLOT dGraph Graphics Graphwriter GrafTalk Videogram KeyChart PFS:Graph Enhanced Business Graphic UGraf	10,000 10,000 1,000 250 5,000 1,060 1,600 25,000 4,000 15
<u>Integrated Micro Software</u>		
Ashton-Tate Chang Laboratories, Inc. LOTUS Development Corp.	Framework GraphPlan 1-2-3, Symphony	Recently Released 600,000+

EXHIBIT II-3

SELECTED BUSINESS GRAPHICS RCS VENDORS

VENDOR	PRODUCT
Computer Sciences Corp.	Tell-A-Graf, Encore
DTSS Inc.	Grafmaker CG, DI-300
GEISCO	SAS/Graphics, Tell-A-Graf
National CSS	Tell-A-Graf
Ross Systems	MAPS/Graph
I.P. Sharp	Superplot
Sun Information Systems	Tell-A-Graf
Boeing Computer Systems	Tell-A-Graf
ADP	Cybergraph
Statistical Tabulating Corp.	SAS/Graphics
Informatics	
Rapidata	Graphics

- In a recent survey of 321 information systems executives, 85% had word processing systems installed in their organizations and 96% expected to have word processing systems running by the end of 1984. This level of penetration indicates that the market is heavily driven by both replacement and add-on sales to existing customers.
- Organizations are seeking the integration of text and data access in one system. Supply of such systems is hindered by the complexity of development. Voice-data communications requirements, data security, and data storage requirements conducive to rapid access of raw as well as summarized data are all factors complicating integration.

III CONCLUSIONS AND RECOMMENDATIONS

- RCS vendors of sales, marketing, and distribution and graphics applications should take advantage of the large installed base of microcomputers by developing hardware and software interfaces to these smaller machines. Microcomputers receive much more attention from potential marketing or business graphics users than do terminals or workstations already connected to mainframes. RCS vendors can profit from the micro mind set that management prospects now have.
- Software vendors should develop marketing methods by which they can personalize presentations for end-user prospects.
 - Keeping in mind that the excitement for these packages still resides with non-information-systems management, benefits should be demonstrated vividly to sales, marketing, finance, and administrative professionals in their own language.
 - Frontends that reduce the amount of technical knowledge and time required to learn how to use the application should be developed. The "seat of one's pants" manager is waiting for this to happen.
- The business graphics market is still in its infancy. New sales opportunities abound for those vendors who can capture the awe of business professionals with:

- Product demonstrations on their own turf, with examples that hit close to home.
 - Software that is compatible with a variety of devices (i.e., using standards).
 - Applications that make use of the installed base of personal computers. Integrating applications for end-users is essential for RCS vendors. This is especially true in graphics where most users prefer to download data to micros for inexpensive interactive graphics manipulation.
- Independent business graphics vendors can gain strength by forming marketing arrangements with peripheral manufacturers that have established client bases.

**APPENDIX OX: FORECAST DATA BASE: "OTHER" CROSS-INDUSTRY
SEGMENT**

- This appendix contains the following forecast information:
 - Market size for each year 1983 to 1989 by delivery mode.
 - Market growth rate for 1983-1984.
 - Average annual growth rate (AAGR) for each delivery mode for the five year period 1984-1989.

EXHIBIT OX-1

"OTHER" CROSS-INDUSTRY SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	125	10%	138	152	169	188	209	233	11%
BATCH PROCESSING SERVICES	143	11%	159	178	202	226	253	278	12%
APPLICATION SOFTWARE									
MAINFRAME/MINI	188	17%	220	250	282	315	351	388	12%
MICRO	118	37%	162	213	274	346	439	559	28%
TOTAL APPLICATION SOFTWARE	306	25%	382	464	556	661	789	948	20%
TURNKEY SYSTEMS	747	28%	955	1229	1555	1976	2428	3031	26%
CROSS-INDUSTRY TOTAL	1321	24%	1633	2024	2483	3051	3679	4490	22%

U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX A: DEFINITIONS

U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX A: DEFINITIONS

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U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX A: DEFINITIONS

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APPENDIX A: DEFINITIONS

- INFORMATION SERVICES--Computer-related services involving one or more of the following:
 - Processing of computer-based applications using vendor computers (called "processing services").
 - Services that assist users in performing functions on their own computers or vendor computers (called "software products" and/or "professional services").
 - Services that utilize a combination of hardware and software, integrated into a total system (called "turnkey systems").

A. USER EXPENDITURES

- All user expenditures reported are "available" (i.e., noncaptive, as defined below).
- NONCAPTIVE INFORMATION SERVICES USER EXPENDITURES - Expenditures paid for information services provided by a vendor that is not part of the same parent corporation as the user.

- CAPTIVE INFORMATION SERVICES USER EXPENDITURES - Expenditures received from users who are part of the same parent corporation as the vendor.

B. DELIVERY MODES

- PROCESSING SERVICES - This category includes remote computing services, batch services, processing facilities management, and value-added networks (VANs).
 - REMOTE COMPUTING SERVICES (RCS) - Providing computer processing to a user by means of terminal(s) at the user's site(s) connected by a data communications network to the vendor's central computer. There are five submodes of RCS, including:
 - Interactive - Characterized by the interaction of the user with the system, for the purpose of problem-solving data entry and/or transaction processing. The user is on-line to the program/files. Computer response is usually measured in seconds or fractions of a second.
 - Remote Batch - A service in which the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements. Computer response is usually measured in minutes or hours.
 - Data Base - Characterized by the retrieval and processing of information from a vendor-provided data base. The data base may be owned by the vendor or a third party.

- . User Site Hardware Services (USHS) - Offerings provided by RCS vendors that place programmable hardware on the user's site (rather than in the vendor's computer center). USHS offers access to a communications network, access through the network to the RCS vendor's larger computers, and significant software as part of the service.

- BATCH SERVICES - This includes computer processing performed at vendors' sites of user programs and/or data that are physically transported (as opposed to electronically by telecommunication media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include those expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.

- PROCESSING FACILITIES MANAGEMENT (PFM) (also referred to as "resource management" or "systems management") - The management of all or a major part of a user's data processing functions under a long-term contract (more than one year). This would include both remote computing and batch services. To qualify as PFM, the contractor must directly plan, control, operate, and own the facility provided to the user, either on-site, through communications lines, or in a mixed mode.

- VALUE-ADDED NETWORKS (VANs) - VANs typically involve common carrier network transmission facilities that are augmented with computerized switching. These networks have become associated with packet-switching technology because the public VANs that have received the most attention (e.g., Telenet and TYMNET) employ packet-switching techniques. However, other added data service features such as store-and-forward message switching, terminal interfacing, error detection and correction, and host computer interfacing are of equal importance.

- Processing services are further differentiated as follows:
 - Cross-industry services involve the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but that cut across industry lines. Most general ledger, accounts receivable, payroll, and personnel applications fall into this category. Cross-industry data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are included in this category. General-purpose tools such as financial planning systems, linear regression packages, and other statistical routines are also included. However, when the application, tool, or data base is designed for specific industry use, then the service is industry-specific (see below).
 - Industry-specific services provide processing for particular functions or problems unique to an industry or industry group. Specialty applications can be either business or scientific in orientation. Industry-specific data base services, for which the vendor supplies the data base and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry specialty applications are seismic data processing, numerically controlled machine tool software development, and demand deposit accounting.
 - Utility services are those for which the vendor provides access to a computer and/or communications network with basic software that enables users to develop and/or process their own systems. These basic tools often include terminal-handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

- SOFTWARE PRODUCTS - This category includes users' purchases of applications and/or systems software that is sold by vendors as standard products intended for use by different organizations. Included as user expenditures are lease and purchase expenditures, as well as fees for work performed by the vendor to implement and maintain the package (when such fees are either bundled as part of the product price or offered on an annual subscription basis). Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself. There are several subcategories of software products, including:
 - APPLICATIONS SOFTWARE PRODUCTS - Software that performs a specific function directly related to solving a business or organizational need. Applications software provides information directly for use by the end user. Applications software products classifications are:
 - Cross-Industry Products - Used in multiple user industry sectors. Examples are payroll, inventory control, and financial planning.
 - Industry-Specific Products - Used in a specific industry sector such as banking and finance, transportation, or discrete manufacturing. Examples are demand deposit accounting, airline scheduling, and materials resource planning.
 - SYSTEMS SOFTWARE PRODUCTS - Software that enables the computer/communications system to perform basic functions, which are interim steps to providing the end user with "answers" sought. Systems software product classifications are:
 - Systems Control Products - These products function during applications program execution to manage the computer system

resource. Examples include operating systems, communication monitors, and emulators.

- Data Center Management Products - These products are used by operations personnel to manage the computer system resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.
- Application Development Products - These products are used to prepare applications for execution by assisting in design, programming, testing, and related functions. Examples include languages, sorts, productivity aids, data dictionaries, data base management systems, report writers, and retrieval systems.

- PROFESSIONAL SERVICES - This category is made up of services in the following categories:

- SOFTWARE DEVELOPMENT - This service develops a software system on a custom basis. It includes one or more of the following: user requirements, system design, contract, and programming.
- EDUCATION AND TRAINING SERVICES - These services help people acquire new skills, techniques or knowledge related to computers. This definition does not include services to educational institutions. (This latter market is included in the education (industry-specific) segment.)
- CONSULTING SERVICES - Consultants advise clients on computer-related issues that are usually management oriented. Feasibility studies and computer audits are examples of services provided.
- PROFESSIONAL SERVICES FACILITIES MANAGEMENT (PSFM) - This is counterpart to processing facilities management, except that in this

case the computers are owned by the client, not the vendor; the vendor provides human resources to operate and manage the client facility.

- TURNKEY SYSTEMS (also known as Integrated Systems) - A turnkey system is an integration of systems and applications software with hardware, packaged as a single entity. The value added by the vendor is primarily in the software. Most CAD/CAM systems and many small business systems are turnkey systems. This does not include specialized hardware systems such as word processors, cash registers, or process control systems. Nor does it include Embedded Computer Resources for military applications. Turnkey systems are available either as custom or packaged systems.
 - Turnkey systems revenue is divided into two categories.
 - Industry-Specific systems--that is, systems that serve a specific function for a given industry sector such as automobile dealer parts inventory, CAD/CAM systems, or discrete manufacturing control systems.
 - Cross-Industry systems--that is, systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, or personnel management systems.
 - Revenue includes hardware, software, and support functions.

C. OTHER CONSIDERATIONS

- When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorized according to what users perceive they are buying.

- The standard industrial classification (SIC) codes are used to define the economic activity contained in generic sectors such as process manufacturing, insurance, or transportation.
- The specific industries (and their SIC codes) included under these generic industry sectors are detailed in Exhibit A-1.

EXHIBIT A-1

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Discrete Manufacturing	23	Apparel
	25	Furniture
	27	Printing
	31	Leather
	34	Metal
	35	Machinery
	36	Electronics
	37	Transportation
	38	Scientific and Control Instruments
	39	Miscellaneous Manufacturing
Process Manufacturing	10	Metal Mining
	11	Anthracite Mining
	12	Coal Mining
	13	Oil and Gas Extraction
	14	Mining/Quarrying of Non-Metallic Minerals, except Fuels
	20	Food Products
	21	Tobacco
	22	Textile Products
	24	Lumber and Wood Products
	26	Paper Products
	28	Chemicals
	29	Petroleum
	30	Rubber and Plastics
	32	Stone, Glass, Clay
33	Primary Metals	

Continued

EXHIBIT A-1 (Cont.)

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Transportation	40	Railroads
	41	Local Transit
	42	Motor Freight
	43	U.S. Postal Service
	44	Water Transportation
	45	Air
	46	Pipelines
	47	Transportation Services
Utilities	49	Electric, Gas, and Sanitary
Telecommunications	48	Communications
Wholesale Distribution	50	Durable Goods
	51	Nondurable Goods
Retail Distribution	52	Building Materials, Hardware
	53	General Merchandise
	54	Food
	55	Automotive and Gas Stations
	56	Apparel
	57	Furniture
	58	Eating and Drinking
	59	Miscellaneous Retail

Continued

EXHIBIT A-1 (Cont.)

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Banking and Finance	60	Banks
	61	Credit Agencies
	62	Security and Commodity Brokers
	67	Holding and Investment Offices
Insurance	63	Insurance (Life, Health, Etc.)
	64	Insurance Agents
Medical	80	Health Services
Education	82	Educational Services
Services	73	Business Services (excluding information services companies themselves)
	89	Miscellaneous Services
Federal Government	N/A	As Appropriate
State and Local Government	N/A	As Appropriate

Continued

EXHIBIT A-1 (Cont.)

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Other Industries	01-09	Agriculture, Forestry, and Fishing
	15-17	Construction
	65	Real Estate
	66	Combinations of Real Estate, Insurance, Loans, Law Offices
	70	Hotels, Rooming Houses, Camps, and Other Lodging Places
	72	Personal Services
	75	Automotive Repair, Services, and Garages
	76	Miscellaneous Repair Services
	78	Motion Pictures
	79	Amusement and Recreation Services, Except Motion Pictures
	81	Legal Services
	83	Social Services
	84	Museums, Art Galleries, Botanical and Zoological Gardens
86	Membership Organizations	

U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX B: DATA BASE

**U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX B: DATA BASE**

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APPENDIX B: CROSS-INDUSTRY MARKETS DATA BASE

- This section contains the data base used in the report, U.S. Information Services Cross-Industry Markets. In addition to the 1983 base year data, forecasts are given for all years from 1984 to 1989.
- None of the individual numbers have been rounded, as they have been in the main body of the report. (The reader should not, however, assume a higher degree of accuracy for these data than for those in the main body of the report.)
- The forecasts are broken down by totals, delivery mode, segment, and sector.
- The segments are in alphabetical order, with "Other Cross-Industry" segments at the end.
- Forecasts are of user expenditures, not vendor revenues.
- On-line Data Bases are described in the following ways this year:
 - Cross-Industry On-line Data Bases have been extracted from Remote Computing Services and are listed on a separate line (see Exhibit B-4).
 - Industry-specific On-line Data Base forecasts are embedded in the Remote Computing Services industry-specific segment forecasts (see Exhibit B-4).

- A more detailed breakout of On-line Data Bases is shown in Exhibit B-19.
- The Federal Government Professional Services Forecast in Exhibit B-11 is also embedded in the Grand Total line of the Professional Services forecast in the same exhibit.
- Please note that the Total Professional Services delivery mode forecast (Exhibit B-11) includes a component called Education and Training. This is not to be confused with the Education industry-specific segment.
- This year, when user expenditures for an industry-specific segment are listed, only industry-specific applications are included in the forecast; all cross-industry and utility processing applications are listed elsewhere in the appropriate sections.

EXHIBIT B-1

TOTAL INFORMATION SERVICES USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	1864	25%	2339	3048	3806	4816	6131	7817	27%
PROCESS MANUFACTURING	1105	19%	1313	1574	1873	2234	2690	3266	20%
TRANSPORTATION	328	27%	417	533	683	874	1125	1463	29%
UTILITIES	159	17%	186	222	264	308	357	413	17%
TELECOMMUNICATIONS	229	22%	280	338	410	499	610	749	22%
DISTRIBUTION	1155	20%	1383	1684	2055	2507	3083	4129	24%
BANKING AND FINANCE	3359	19%	4000	4820	5940	7333	9096	11200	23%
INSURANCE	895	21%	1086	1330	1606	1937	2329	2795	21%
MEDICAL	943	24%	1166	1456	1808	2220	2731	3371	24%
EDUCATION	157	14%	178	201	228	262	301	398	17%
SERVICES	985	22%	1198	1467	1802	2207	2700	3329	23%
FEDERAL GOVERNMENT	200	54%	307	403	539	665	872	1031	27%
STATE AND LOCAL GOVERNMENT	104	18%	122	143	167	194	228	267	17%
OTHER INDUSTRY-SPECIFIC	467	17%	547	642	750	886	1050	1254	18%
SUB-TOTAL	11951	22%	14521	17861	21933	26943	33304	41481	23%
CROSS-INDUSTRY SEGMENTS									
PLANNING AND ANALYSIS	1312	31%	1722	2220	2807	3531	4422	5572	26%
ACCOUNTING	1967	21%	2382	2859	3367	3945	4644	5519	18%
HUMAN RESOURCES	1216	17%	1418	1639	1874	2120	2375	2662	13%
ENGINEERING/SCIENTIFIC	852	19%	1016	1211	1441	1699	2008	2385	19%
EDUCATION/TRAINING	118	47%	174	249	349	485	675	953	40%
ON-LINE DATA BASE (CROSS)	620	19%	739	909	1107	1362	1684	2082	23%
OTHER CROSS-INDUSTRY	1321	24%	1633	2024	2483	3051	3679	4490	22%
SUB-TOTAL (**N/PFM)	7460	23%	9139	11167	13484	16250	19545	23720	21%
UTILITY PROCESSING	1834	7%	1964	2115	2272	2437	2617	2834	8%
SYSTEMS SOFTWARE	3511	31%	4600	6038	7897	10249	13206	16713	29%
PROFESSIONAL SERVICES	7171	20%	8584	10291	12332	14862	17940	21653	20%
VANS	230	25%	288	368	478	622	827	1100	31%
GRAND TOTAL	32157	22%	39096	47840	58396	71363	87439	107501	22%

** Cross-industry Processing Facilities Management user expenditures are not broken down by application and are included only in the cross-industry sub-total and grand total.

EXHIBIT B-2
TOTAL INFORMATION SERVICES USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
DELIVERY MODE									
REMOTE COMPUTING SERVICES									
INDUSTRY SPECIFIC	3338	16%	3866	4536	5317	6236	7311	8516	17%
CROSS INDUSTRY	2122	15%	2439	2842	3297	3843	4507	5296	17%
UTILITY PROCESSING	1141	7%	1225	1332	1444	1565	1697	1840	8%
SUBTOTAL	6601	14%	7530	8710	10058	11644	13514	15651	16%
BATCH PROCESSING SERVICES									
INDUSTRY SPECIFIC	2386	8%	2579	2755	2937	3092	3231	3322	5%
CROSS INDUSTRY	1394	9%	1525	1652	1772	1885	1987	2063	6%
UTILITY PROCESSING	575	5%	603	625	640	648	649	666	2%
SUBTOTAL	4355	8%	4707	5032	5350	5626	5866	6051	5%
FACILITIES MANAGEMENT									
INDUSTRY SPECIFIC	1260	15%	1453	1693	1989	2341	2761	3244	17%
CROSS INDUSTRY	53	4%	55	56	57	57	57	57	1%
UTILITY PROCESSING	118	16%	136	159	187	224	272	329	19%
SUBTOTAL	1431	15%	1644	1909	2233	2622	3090	3630	17%
TOTAL PROCESSING SERVICES									
INDUSTRY SPECIFIC	6983	13%	7898	8985	10243	11669	13303	15082	14%
CROSS INDUSTRY	3570	13%	4019	4551	5127	5786	6551	7417	13%
UTILITY PROCESSING	1834	7%	1964	2115	2272	2437	2617	2834	8%
VANS	230	25%	288	368	478	622	827	1100	31%
TOTAL	12617	12%	14169	16018	18120	20514	23297	26433	13%
SOFTWARE PRODUCTS									
APPLICATION SOFTWARE PRODUCTS									
INDUSTRY SPECIFIC	2016	36%	2792	3858	5264	7107	9576	13097	35%
CROSS INDUSTRY	2366	28%	3176	4128	5213	6514	8134	10224	20%
SUBTOTAL	4383	36%	5969	7986	10477	13621	17710	23321	31%
SYSTEMS SOFTWARE	3511	31%	4600	6038	7897	10249	13206	16713	29%
TOTAL SOFTWARE	7894	34%	10569	14024	18374	23870	30916	40034	31%
PROFESSIONAL SERVICES	7171	20%	8584	10291	12332	14862	17940	21653	20%
TURNKEY SYSTEMS									
INDUSTRY SPECIFIC	2952	30%	3830	5019	6427	8168	10426	13302	28%
CROSS INDUSTRY	1524	28%	1944	2488	3144	3949	4860	6079	26%
TOTAL TURNKEY SYSTEMS	4476	29%	5775	7507	9571	12117	15286	19381	27%
GRAND TOTAL	32157	22%	39096	47840	58396	71363	87439	107501	22%

XB-4

EXHIBIT B-3
TOTAL PROCESSING SERVICES USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	618	15%	711	832	948	1088	1261	1475	16%
PROCESS MANUFACTURING	693	11%	773	867	962	1064	1179	1294	11%
TRANSPORTATION	139	12%	156	176	199	224	253	285	13%
UTILITIES	103	14%	117	136	160	186	211	240	15%
TELECOMMUNICATIONS	115	17%	135	156	180	210	244	285	16%
DISTRIBUTION	648	8%	700	780	877	977	1095	1225	12%
BANKING AND FINANCE	2346	15%	2690	3080	3580	4163	4834	5540	16%
INSURANCE	488	10%	539	603	676	759	853	955	12%
MEDICAL	672	15%	771	889	1020	1167	1338	1531	15%
EDUCATION	60	8%	64	68	74	81	88	94	8%
SERVICES	629	14%	714	810	912	1021	1130	1247	12%
FEDERAL GOVERNMENT	54	14%	61	71	82	95	109	126	15%
STATE AND LOCAL GOVERNMENT	50	12%	56	62	68	73	82	91	10%
OTHER INDUSTRY-SPECIFIC	366	12%	410	455	505	562	626	694	11%
SUB-TOTAL	6983	13%	7898	8985	10243	11669	13303	15082	14%
VANS (INDUSTRY-SPECIFIC)	40	50%	60	79	107	145	200	274	35%
CROSS-INDUSTRY SEGMENTS									
PLANNING AND ANALYSIS	553	12%	620	691	766	851	950	1058	11%
ACCOUNTING	825	9%	900	973	1036	1099	1160	1213	6%
HUMAN RESOURCES	686	10%	753	828	910	992	1071	1149	9%
ENGINEERING/SCIENTIFIC	527	15%	608	705	808	921	1056	1211	15%
EDUCATION/TRAINING	37	25%	47	58	72	89	110	136	24%
ON-LINE DATA BASES	620	19%	739	909	1107	1362	1684	2082	23%
OTHER CROSS-INDUSTRY	268	11%	297	331	371	414	462	511	12%
SUB-TOTAL (*W/PFM)	3570	13%	4019	4551	5127	5786	6551	7417	13%
UTILITY PROCESSING	1834	7%	1964	2115	2272	2437	2617	2834	8%
VANS (CROSS-INDUSTRY)	190	20%	228	289	371	477	627	826	29%
VANS (TOTAL)	230	25%	288	368	478	622	827	1100	31%
GRAND TOTAL	12617	12%	14169	16018	18120	20514	23297	26433	13%

* Cross-industry Processing Facilities Management user expenditures are not broken down by application and are included only in the cross-industry sub-total and grand total.

EXHIBIT B-4

REMOTE COMPUTING SERVICES USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	485	17%	567	677	781	909	1069	1268	17%
PROCESS MANUFACTURING	94	20%	113	136	164	194	230	272	19%
TRANSPORTATION	81	17%	94	108	126	146	169	195	16%
UTILITIES	91	16%	105	123	147	173	198	227	17%
TELECOMMUNICATIONS	91	21%	110	131	156	186	221	263	19%
DISTRIBUTION	453	7%	487	562	651	749	863	992	15%
BANKING AND FINANCE	1021	18%	1200	1410	1670	1993	2374	2770	18%
INSURANCE	115	16%	133	155	180	209	241	278	16%
MEDICAL	228	18%	270	325	390	464	551	652	19%
EDUCATION	13	13%	14	16	18	21	23	26	13%
SERVICES	386	16%	450	522	606	699	801	915	15%
FEDERAL GOVERNMENT	53	14%	60	70	81	94	108	124	16%
STATE AND LOCAL GOVERNMENT	16	15%	19	21	24	27	32	36	14%
OTHER INDUSTRY-SPECIFIC	211	16%	244	280	322	371	430	497	15%
SUB-TOTAL	3338	16%	3866	4536	5317	6236	7311	8516	17%
VAN (INDUSTRY-SPECIFIC)	40	50%	60	79	107	145	200	274	35%
CROSS-INDUSTRY SEGMENTS									
PLANNING AND ANALYSIS	379	13%	431	487	548	618	702	797	13%
ACCOUNTING	237	8%	257	282	307	334	363	395	9%
HUMAN RESOURCES	197	12%	220	249	286	332	383	442	15%
ENGINEERING/SCIENTIFIC	527	15%	608	705	808	921	1056	1211	15%
EDUCATION/TRAINING	37	25%	47	58	72	89	110	136	24%
OTHER CROSS-INDUSTRY	125	10%	138	152	169	188	209	233	11%
ON-LINE DATA BASES	620	19%	739	909	1107	1362	1684	2082	23%
SUB-TOTAL	2122	15%	2439	2842	3297	3843	4507	5296	17%
VAN (CROSS-INDUSTRY)	190	20%	228	289	371	477	627	826	29%
UTILITY PROCESSING	1141	7%	1225	1332	1444	1565	1697	1840	8%
VAN (TOTAL)	230	25%	288	368	478	622	827	1100	31%
GRAND TOTAL (W/O VAN)	6601	14%	7530	8710	10058	11644	13514	15651	16%

EXHIBIT B-5

BATCH PROCESSING SERVICES USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	102	6%	108	113	118	121	124	127	3%
PROCESS MANUFACTURING	567	10%	622	682	741	800	867	925	8%
TRANSPORTATION	35	7%	38	42	45	47	50	53	7%
UTILITIES	11	4%	11	12	11	11	12	12	2%
DISTRIBUTION	163	7%	175	182	186	185	185	183	1%
BANKING AND FINANCE	721	7%	770	810	870	920	960	980	5%
INSURANCE	114	10%	126	136	144	150	154	155	4%
MEDICAL	210	9%	230	244	258	268	277	281	4%
EDUCATION	31	8%	33	35	36	38	38	38	3%
SERVICES	240	9%	262	284	303	318	324	326	4%
STATE AND LOCAL GOVERNMENT	27	12%	30	32	35	37	40	42	7%
OTHER INDUSTRY-SPECIFIC	148	6%	158	167	174	182	185	186	3%
SUB-TOTAL *	2386	8%	2579	2755	2937	3092	3231	3322	5%
CROSS-INDUSTRY SEGMENTS									
PLANNING AND ANALYSIS	174	9%	190	204	218	234	249	261	7%
ACCOUNTING	588	9%	643	691	729	765	797	818	5%
HUMAN RESOURCES	489	9%	533	579	624	661	688	706	6%
OTHER CROSS-INDUSTRY	143	11%	159	178	202	226	253	278	12%
SUB-TOTAL	1394	9%	1525	1652	1772	1885	1987	2063	6%
UTILITY PROCESSING	575	5%	603	625	640	648	649	666	2%
GRAND TOTAL	4355	8%	4707	5032	5350	5626	5866	6051	5%

* Sub-total includes Telecommunications and Federal Government.

EXHIBIT B-6

PROCESSING FACILITIES MANAGEMENT USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	31	16%	36	42	49	58	68	80	17%
PROCESS MANUFACTURING	32	18%	38	48	58	69	82	96	21%
TRANSPORTATION	23	5%	24	26	28	31	34	37	9%
DISTRIBUTION	32	18%	38	36	39	43	47	50	6%
BANKING AND FINANCE	604	19%	720	860	1040	1250	1500	1790	20%
INSURANCE	259	8%	280	313	351	400	458	523	13%
MEDICAL	233	16%	271	320	372	434	511	598	17%
EDUCATION	16	5%	17	18	20	22	26	30	12%
STATE AND LOCAL GOVERNMENT	7	6%	8	8	9	9	11	12	10%
OTHER INDUSTRY-SPECIFIC	7	6%	8	8	9	9	10	11	7%
SUB-TOTAL *	1260	15%	1453	1693	1989	2341	2761	3244	17%
CROSS-INDUSTRY									
UTILITY PROCESSING	53	4%	55	56	57	57	57	57	1%
	118	16%	136	159	187	224	272	329	19%
GRAND TOTAL	1431	15%	1644	1909	2233	2622	3090	3630	17%

* Sub-total includes Utilities, Telecommunications, Services and Federal Government

EXHIBIT B-7
TOTAL SOFTWARE PRODUCTS USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
APPLICATIONS SOFTWARE									
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	294	41%	416	577	801	1102	1513	2077	38%
PROCESS MANUFACTURING	92	43%	131	183	251	346	479	661	38%
TRANSPORTATION	75	55%	116	169	238	332	464	646	41%
UTILITIES	21	27%	27	35	44	54	67	82	25%
TELECOMMUNICATIONS	28	43%	40	52	68	90	118	156	31%
DISTRIBUTION	277	39%	384	516	678	893	1182	1868	37%
BANKING AND FINANCE	568	32%	750	1040	1480	2070	2883	3950	39%
INSURANCE	306	34%	409	545	696	884	1109	1376	27%
MEDICAL	151	58%	239	358	507	683	908	1196	38%
EDUCATION	30	30%	39	50	62	78	99	125	26%
SERVICES	67	40%	94	129	170	227	300	373	32%
FEDERAL GOVERNMENT	14	33%	18	26	33	40	48	58	26%
STATE AND LOCAL GOVERNMENT	23	29%	30	39	49	60	72	86	23%
OTHER INDUSTRY-SPECIFIC	69	42%	98	138	185	248	332	443	35%
SUB-TOTAL	2016	38%	2792	3858	5264	7107	9576	13097	36%
CROSS-INDUSTRY SEGMENTS									
PLANNING AND ANALYSIS	597	51%	899	1276	1726	2291	2994	3918	34%
ACCOUNTING	894	30%	1166	1480	1818	2206	2693	3313	23%
HUMAN RESOURCES	384	25%	482	582	681	783	889	1005	16%
ENGINEERING/SCIENTIFIC	145	26%	183	226	281	347	431	535	24%
EDUCATION/TRAINING	40	60%	65	100	151	226	337	504	51%
OTHER CROSS-INDUSTRY	306	25%	382	464	556	661	789	948	20%
SUB-TOTAL	2366	34%	3176	4128	5213	6514	8134	10224	26%
TOTAL APPLICATIONS SOFTWARE	4383	36%	5969	7986	10477	13621	17710	23321	31%
SYSTEMS SOFTWARE									
APPLICATION DEVELOPMENT	1796	34%	2414	3263	4405	5911	7884	10337	34%
SYSTEMS CONTROL	1064	30%	1382	1779	2261	2821	3461	4129	24%
DATA CENTER MANAGEMENT	651	23%	803	996	1232	1517	1861	2247	23%
TOTAL SYSTEMS SOFTWARE	3511	31%	4600	6038	7897	10249	13206	16713	29%
GRAND TOTAL	7894	34%	10569	14024	18374	23870	30916	40034	31%

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EXHIBIT B-8

MAINFRAME/MINI APPLICATION SOFTWARE USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	269	41%	378	521	718	980	1336	1820	37%
PROCESS MANUFACTURING	84	41%	119	165	225	307	421	573	37%
TRANSPORTATION	70	52%	107	155	215	298	412	567	40%
UTILITIES	19	30%	25	32	40	49	60	73	24%
TELECOMMUNICATIONS	28	32%	37	48	62	79	102	132	29%
DISTRIBUTION	249	36%	338	446	574	742	966	1556	36%
BANKING AND FINANCE	528	27%	670	920	1300	1800	2478	3350	38%
INSURANCE	282	32%	373	491	620	780	968	1185	26%
MEDICAL	138	57%	216	320	447	597	786	1020	36%
EDUCATION	15	20%	18	22	26	31	37	45	20%
SERVICES	62	37%	85	114	148	192	249	300	29%
FEDERAL GOVERNMENT	13	35%	17	24	30	36	42	50	23%
STATE AND LOCAL GOVERNMENT	21	32%	28	35	44	53	63	75	22%
OTHER INDUSTRY-SPECIFIC	64	39%	89	121	159	209	273	354	32%
SUB-TOTAL	1842	36%	2500	3415	4608	6153	8195	11099	35%
CROSS-INDUSTRY SEGMENTS									
PLANNING AND ANALYSIS	403	40%	564	756	981	1257	1582	1978	29%
ACCOUNTING	784	27%	995	1223	1445	1682	1937	2215	17%
HUMAN RESOURCES	359	25%	447	536	623	710	797	887	15%
ENGINEERING/SCIENTIFIC	127	24%	157	191	232	279	338	406	21%
EDUCATION/TRAINING	18	49%	27	39	54	75	104	143	39%
OTHER CROSS-INDUSTRY	188	17%	220	250	282	315	351	388	12%
SUB-TOTAL	1880	28%	2411	2995	3618	4318	5108	6017	20%
GRAND TOTAL	3722	32%	4910	6410	8226	10471	13304	17116	28%

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EXHIBIT B-9

MICROCOMPUTER APPLICATION SOFTWARE USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	25	50%	38	56	83	121	177	257	47%
PROCESS MANUFACTURING	7	60%	12	18	27	39	58	88	50%
TRANSPORTATION	4	104%	9	14	23	34	52	79	56%
DISTRIBUTION	28	62%	46	70	104	151	216	312	47%
BANKING AND FINANCE	40	100%	80	120	180	270	405	600	50%
INSURANCE	24	50%	36	54	76	105	141	191	39%
MEDICAL	14	72%	24	38	60	86	123	176	50%
EDUCATION	15	40%	21	28	36	47	62	80	31%
SERVICES	5	83%	10	15	23	35	51	74	50%
OTHER INDUSTRY-SPECIFIC	5	83%	10	17	26	40	59	89	56%
SUB-TOTAL *	174	68%	293	443	656	953	1380	1998	47%
CROSS-INDUSTRY SEGMENTS									
PLANNING AND ANALYSIS	194	73%	334	520	745	1034	1412	1940	42%
ACCOUNTING	110	57%	172	258	373	524	756	1098	45%
HUMAN RESOURCES	25	36%	34	46	58	73	92	118	28%
ENGINEERING/SCIENTIFIC	18	44%	26	35	49	68	93	129	38%
EDUCATION/TRAINING	22	70%	38	62	97	152	233	362	57%
OTHER CROSS-INDUSTRY	110	37%	162	213	274	346	439	559	28%
SUB-TOTAL	487	57%	765	1133	1595	2197	3026	4207	41%
GRAND TOTAL	661	60%	1058	1576	2251	3150	4406	6206	42%

* Sub-total includes Utilities, Telecommunications, Federal Government, and State and Local Government.

EXHIBIT B-10

SYSTEMS SOFTWARE USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
APPLICATION DEVELOPMENT TOOLS									
MAINFRAME/MINI	1647	29%	2125	2754	3554	4560	5820	7308	28%
MICRO	148	95%	289	509	851	1351	2063	3029	60%
TOTAL APPLICATION DEVELOPMENT	1796	34%	2414	3263	4405	5911	7884	10337	34%
SYSTEMS CONTROL									
MAINFRAME/MINI	903	24%	1123	1403	1745	2159	2658	3220	23%
MICRO	161	61%	260	377	516	662	803	909	28%
TOTAL SYSTEMS CONTROL	1064	30%	1382	1779	2261	2821	3461	4129	24%
DATA CENTER MANAGEMENT									
MAINFRAME/MINI	630	21%	762	925	1116	1337	1591	1858	20%
MICRO	22	89%	41	71	116	180	270	389	57%
TOTAL DATA CENTER MANAGEMENT	651	23%	803	996	1232	1517	1861	2247	23%
TOTAL MAINFRAME/MINI	3180	26%	4010	5082	6415	8056	10070	12386	25%
TOTAL MICROCOMPUTER	331	78%	590	956	1482	2193	3136	4327	49%
GRAND TOTAL	3511	31%	4600	6038	7897	10249	13206	16713	29%

EXHIBIT B-11

PROFESSIONAL SERVICES USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
SOFTWARE DEVELOPMENT	5063	20%	6075	7290	8748	10585	12808	15498	21%
CONSULTING	1004	17%	1175	1387	1636	1931	2298	2757	19%
EDUCATION AND TRAINING	538	30%	700	910	1173	1502	1922	2422	28%
FACILITIES MANAGEMENT	566	12%	634	704	775	844	912	976	9%
GRAND TOTAL	7171	20%	8584	10291	12332	14862	17940	21653	20%

Federal Government Professional Services Forecast*
By Type of Service, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
PROFESSIONAL SERVICES									
SOFTWARE DEVELOPEMENT	696	21%	842	1020	1230	1482	1787	2157	21%
CONSULTING	274	13%	310	351	398	455	518	590	14%
EDUCATION & TRAINING	167	25%	209	268	340	425	532	669	26%
FACILITY MANAGEMENT	453	13%	512	578	650	732	826	933	13%
SYSTEMS INTEGRATION	500	20%	600	720	864	1036	1244	1493	20%
TOTAL	2090	18%	2473	2937	3482	4130	4907	5842	19%

* This Data is Included in Above Figures.

EXHIBIT B-12

TURNKEY SYSTEMS USER EXPENDITURE FORECAST
BY MARKET SEGMENT, 1984-1989

	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY-SPECIFIC SEGMENTS									
DISCRETE MANUFACTURING	951	27%	1212	1639	2057	2626	3358	4265	29%
PROCESS MANUFACTURING	320	28%	409	524	660	825	1032	1312	26%
TRANSPORTATION	114	27%	145	188	246	318	408	532	30%
UTILITIES	35	19%	41	50	60	69	79	91	17%
TELECOMMUNICATIONS	86	22%	105	130	161	200	248	308	24%
DISTRIBUTION	230	30%	299	388	501	637	806	1036	28%
BANKING AND FINANCE	445	26%	560	700	880	1100	1379	1710	25%
INSURANCE	101	37%	138	182	234	294	367	464	28%
MEDICAL	120	31%	157	209	281	370	484	644	33%
EDUCATION	67	12%	75	83	92	103	114	178	19%
SERVICES	289	35%	389	529	720	959	1270	1709	34%
FEDERAL GOVERNMENT	132	72%	227	306	424	530	714	847	30%
STATE AND LOCAL GOVERNMENT	31	17%	36	42	50	61	74	90	20%
OTHER INDUSTRY-SPECIFIC	32	23%	39	49	60	75	93	117	25%
SUB-TOTAL	2952	30%	3830	5019	6427	8168	10426	13302	28%
CROSS-INDUSTRY SEGMENTS									
PLANNING AND ANALYSIS	162	26%	203	253	315	389	477	595	24%
ACCOUNTING	248	27%	315	406	513	639	790	993	26%
HUMAN RESOURCES	146	25%	183	228	283	345	415	508	23%
ENGINEERING/SCIENTIFIC	180	25%	225	280	352	430	520	639	23%
EDUCATION/TRAINING	41	55%	63	91	127	170	229	313	38%
OTHER CROSS-INDUSTRY	747	28%	955	1229	1555	1976	2428	3031	26%
SUB-TOTAL	1524	28%	1944	2488	3144	3949	4860	6079	26%
GRAND TOTAL	4476	29%	5775	7507	9571	12117	15286	19381	27%

EXHIBIT B-13

ACCOUNTING SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	237	8%	257	282	307	334	363	395	9%
BATCH PROCESSING SERVICES	588	9%	643	691	729	765	797	818	5%
APPLICATION SOFTWARE									
MAINFRAME/MINI	784	27%	995	1223	1445	1682	1937	2215	17%
MICRO	110	57%	172	258	373	524	756	1098	45%
TOTAL APPLICATION SOFTWARE	894	30%	1166	1480	1818	2206	2693	3313	23%
TURNKEY SYSTEMS	248	27%	315	406	513	639	790	993	26%
CROSS-INDUSTRY TOTAL	1967	21%	2382	2859	3367	3945	4644	5519	18%

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EXHIBIT B-14

EDUCATION AND TRAINING SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	37	25%	47	58	72	89	110	136	24%
APPLICATION SOFTWARE									
MAINFRAME/MINI	18	49%	27	39	54	75	104	143	39%
MICRO	22	70%	38	62	97	152	233	362	57%
TOTAL APPLICATION SOFTWARE	40	60%	65	100	151	226	337	504	51%
TURNKEY SYSTEMS	41	55%	63	91	127	170	229	313	38%
CROSS-INDUSTRY TOTAL	118	47%	174	249	349	485	675	953	40%
PROFESSIONAL SERVICES	538	30%	700	910	1173	1502	1922	2422	28%

EXHIBIT B-15

ENGINEERING AND SCIENTIFIC SEGMENT, USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	527	15%	608	705	808	921	1056	1211	15%
APPLICATION SOFTWARE									
MAINFRAME/MINI	127	24%	157	191	232	279	338	406	21%
MICRO	18	44%	26	35	49	68	93	129	38%
TOTAL APPLICATION SOFTWARE	145	26%	183	226	281	347	431	535	24%
TURNKEY SYSTEMS	180	25%	225	280	352	430	520	639	23%
CROSS-INDUSTRY TOTAL	852	19%	1016	1211	1441	1699	2008	2385	19%

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EXHIBIT B-16

HUMAN RESOURCES SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AA6R 84-89
REMOTE COMPUTING SERVICES	197	12%	220	249	286	332	383	442	15%
BATCH PROCESSING SERVICES	489	9%	533	579	624	661	688	706	6%
APPLICATION SOFTWARE									
MAINFRAME/MINI	359	25%	447	536	623	710	797	887	15%
MICRO	25	36%	34	46	58	73	92	118	28%
TOTAL APPLICATION SOFTWARE	384	25%	482	582	681	783	889	1005	16%
TURNKEY SYSTEMS	146	25%	183	228	283	345	415	508	23%
CROSS-INDUSTRY TOTAL	1216	17%	1418	1639	1874	2120	2375	2662	13%

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EXHIBIT B-17

PLANNING AND ANALYSIS SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	379	13%	431	487	548	618	702	797	13%
BATCH PROCESSING SERVICES	174	9%	190	204	218	234	249	261	7%
APPLICATION SOFTWARE									
MAINFRAME/MINI	403	40%	564	756	981	1257	1582	1978	29%
MICRO	194	73%	334	520	745	1034	1412	1940	42%
TOTAL APPLICATION SOFTWARE	597	51%	899	1276	1726	2291	2994	3918	34%
TURNKEY SYSTEMS	162	26%	203	253	315	389	477	595	24%
CROSS-INDUSTRY TOTAL	1312	31%	1722	2220	2807	3531	4422	5572	26%

XB-19

EXHIBIT B-18

OTHER CROSS-INDUSTRY SEGMENT USER EXPENDITURE FORECAST
BY DELIVERY MODE, 1984-1989

DELIVERY MODE	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	AAGR 84-89
REMOTE COMPUTING SERVICES	125	10%	138	152	169	188	209	233	11%
BATCH PROCESSING SERVICES	143	11%	159	178	202	226	253	278	12%
APPLICATION SOFTWARE									
MAINFRAME/MINI	188	17%	220	250	282	315	351	388	12%
MICRO	118	37%	162	213	274	346	439	559	28%
TOTAL APPLICATION SOFTWARE	306	25%	382	464	556	661	789	948	20%
TURNKEY SYSTEMS	747	28%	955	1229	1555	1976	2428	3031	26%
CROSS-INDUSTRY TOTAL	1321	24%	1633	2024	2483	3051	3679	4490	22%

EXHIBIT B-19

ON-LINE DATA BASE INFORMATION SERVICES
USER EXPENDITURE FORECAST, 1984-1989

MARKET SECTOR	(\$M) 1983	83-84 GROWTH	(\$M) 1984	(\$M) 1985	(\$M) 1986	(\$M) 1987	(\$M) 1988	(\$M) 1989	84-89 AAGR
INDUSTRY SPECIFIC									
SECURITIES	368	20%	442	552	690	869	1078	1337	20%
CREDIT	200	11%	222	244	269	293	319	348	9%
TEXT/BIBLIOGRAPHY	120	17%	140	168	207	257	321	402	25%
NEWS	34	40%	48	66	91	125	168	225	36%
ECONOMIC/OTHER	280	32%	370	480	620	793	1008	1280	27%
SUBTOTAL	1002	22%	1221	1511	1877	2338	2894	3590	24%
CROSS INDUSTRY									
SECURITIES	90	22%	105	130	163	202	250	310	24%
CREDIT	200	20%	234	271	306	345	390	440	13%
TEXT/BIBLIOGRAPHY	80	13%	90	107	128	160	200	250	22%
NEWS	130	25%	160	206	264	340	439	560	28%
ECONOMIC/OTHER	120	26%	150	194	246	315	405	522	27%
SUBTOTAL	620	19%	739	909	1107	1362	1684	2082	23%
COMBINED TOTAL									
SECURITIES	458	19%	547	682	853	1071	1328	1647	25%
CREDIT	400	14%	456	516	575	638	709	788	12%
TEXT/BIBLIOGRAPHY	200	15%	231	275	335	417	521	652	23%
NEWS	164	27%	208	273	355	465	607	785	30%
ECONOMIC/OTHER	400	30%	520	674	866	1109	1413	1802	28%
GRAND TOTAL	1622	21%	1961	2420	2984	3700	4578	5672	24%

XB-21



U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX C: RECONCILIATIONS



U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX C: RECONCILIATIONS

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U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX C: RECONCILIATIONS

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APPENDIX C: RECONCILIATIONS

A. INTRODUCTION

- Each year INPUT reviews its forecasts in light of new information obtained from all sources that contribute to the process. These sources include:
 - Thousands of interviews with end users and information systems department managers.
 - Hundreds of interviews with information services vendors, including an annual census of all firms with sales in excess of \$10 million annually.
 - Relevant industry trends as reported in annual reports, 10K reports, announcements, press releases, etc.
 - INPUT's CAMP directory data base of over 4,000 industry vendors.
- The exhibits in this appendix compare past and present forecasts. The data include:
 - Comparison of 1983 market size as forecast last year, versus that reported this year.

- Comparison of 1989 estimated market size, as derived from last year's forecast, with the estimated 1989 market size forecast this year.
- Comparison of the growth rates that were forecast to occur over the overlapping 1983-1988 and 1984-1989 time periods.
- In addition to being presented for the industry as a whole, data are presented on an industry-by-industry basis.

B. DEFINITIONAL CHANGES

- A number of definitional changes were made this year in order to further improve the usefulness of the forecasts and market analyses. These changes include:
 - The focus within vertical markets for this year's forecasts is on industry-specific applications--that is, those applications that are unique to a particular market segment. Examples include demand deposit accounting for the banking and finance segment, and manufacturing resources planning (MRP II) for the manufacturing segment. Excluded from the forecasts are applications that are not unique to a given vertical market (such as accounting systems that can be sold virtually unchanged to a number of industry segments).
 - The utilities segment in last year's analysis combined the traditional utility SICs (such as electric, gas, etc.), along with telecommunications firms. In this year's analyses, telecommunications firms are split out of utilities and are forecast as a separate market segment.
 - The distribution market segment includes both retail and wholesale distribution firms. Forecasts continue to be provided for retail and wholesale as individual markets, however.

- The term "integrated systems," which was used in past reports, has been replaced with the term "turnkey systems." This was done to avoid confusion with the increasingly visible software products category, often called "integrated software systems," such as Lotus 1-2-3, Symphony, Framework, etc. Turnkey systems involve the offering of both hardware and software packaged as a single entity.

C. CROSS-INDUSTRY MARKETS

- Exhibits C-1 through C-7 provide the reconciliation analysis for cross-industry markets.
- The 1983 market sizes for accounting application software, as shown in Exhibit C-1, have been increased by \$55 million (6%) to take into account increased user expenditures related to systems that integrate accounting (via a DBMS) with other cross-industry as well as industry-specific applications.
- The overall five-year growth rate for microcomputer applications software has been reduced five percentage points to 45%. This downward revision still leaves this mode as the second largest and second fastest growing of all cross-industry segments. The slightly slower growth rate is attributable to the large base attained by the late 1980s, as well as to the anticipated longer installed life of accounting systems, due to improved "flexibility for change" that is being built into the systems.
- The education and training cross-industry market, as shown in Exhibit C-2, is now set at \$656 million for 1983, up 14% from last year's forecast. The five-year growth rate has been increased to 33%, up seven percentage points. The continued explosive growth of end-user computing of all types lends increased urgency to training as the key step toward systems success. The five-year

EXHIBIT C-1

ACCOUNTING SEGMENT - DATA BASE RECONCILIATION
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1983 MARKET			1989 MARKET			83-88	84-89
	1983	1984	VARIANCE	1983	1984	VARIANCE	AAGR	AAGR
	FORECAST	REPORT	AS % OF	FORECAST	FORECAST	AS % OF	IN '83	IN '84
	(\$M)	(\$M)	'84 RPRT	(\$M)	(\$M)	'84 FCST	(%)	(%)
REMOTE COMPUTING SERVICES	241	237	2%	408	395	3%	9%	9%
BATCH PROCESSING SERVICES	551	588	-6%	608	818	-26%	2%	5%
APPLICATION SOFTWARE								
MAINFRAME/MINI	735	784	-6%	2372	2215	7%	22%	17%
MICRO	104	110	-5%	1097	1098	0%	50%	45%
TOTAL APPLICATION SOFTWARE	839	894	-6%	3469	3313	5%	27%	23%
TURNKEY SYSTEMS	244	248	-2%	785	993	-21%	22%	26%
CROSS-INDUSTRY SEGMENT TOTAL	1874	1967	-5%	5270	5519	-5%	21%	20%

EXHIBIT C-2

EDUCATION AND TRAINING SEGMENT - DATA BASE RECONCILIATION
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1983 MARKET			1989 MARKET			83-88	84-89
	1983	1984	VARIANCE	1983	1984	VARIANCE	AAGR	AAGR
	FORECAST	REPORT	AS % OF	FORECAST	FORECAST	AS % OF	FORECAST	FORECAST
	(\$M)	(\$M)	'84 RPRT	(\$M)	(\$M)	'84 FCST	IN '83	IN '84
			(%)				REPORT	REPORT
			(%)				(%)	(%)
REMOTE COMPUTING SERVICES	38	37	2%	138	136	2%	24%	24%
APPLICATION SOFTWARE								
MAINFRAME/MINI	17	18	-6%	149	143	4%	44%	39%
MICRO	15	22	-32%	285	362	-21%	64%	57%
TOTAL APPLICATION SOFTWARE	32	40	-21%	434	504	-14%	55%	51%
TURNKEY SYSTEMS	40	41	-2%	250	313	-20%	37%	38%
PROFESSIONAL SERVICES	456	538	-15%	1430	2422	-41%	21%	28%
TOTAL	566	656	-14%	2252	3375	-33%	26%	33%

EXHIBIT C-3

ENGINEERING AND SCIENTIFIC SEGMENT - DATA BASE RECONCILIATION
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1 9 8 3 M A R K E T			1 9 8 9 M A R K E T			83-88	84-89
	1983	1984	VARIANCE	1983	1984	VARIANCE	AAGR	AAGR
	FORECAST	REPORT	AS % OF	FORECAST	FORECAST	AS % OF	IN '83	IN '84
	(\$M)	(\$M)	'84 RPRT	(\$M)	(\$M)	'84 FCST	(%)	(%)
REMOTE COMPUTING SERVICES	536	527	2%	1238	1211	2%	15%	15%
APPLICATION SOFTWARE								
MAINFRAME/MINI	119	127	-6%	424	406	4%	24%	21%
MICRO	17	18	-5%	134	129	4%	42%	38%
TOTAL APPLICATION SOFTWARE	136	145	-6%	558	535	4%	26%	24%
TURNKEY SYSTEMS	177	180	-2%	528	639	-17%	24%	23%
CROSS-INDUSTRY SEGMENT TOTAL	849	852	0%	2324	2385	-3%	18%	19%

EXHIBIT C-4

HUMAN RESOURCES SEGMENT - DATA BASE RECONCILIATION
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1983 MARKET			1989 MARKET			83-88	84-89
	1983	1984	VARIANCE	1983	1984	VARIANCE	AAGR	AAGR
	FORECAST	REPORT	AS % OF	FORECAST	FORECAST	AS % OF	FORECAST	FORECAST
	(\$M)	(\$M)	'84 RPRT	(\$M)	(\$M)	'84 FCST	IN '83 (%)	IN '84 (%)
REMOTE COMPUTING SERVICES	200	197	2%	453	442	2%	15%	15%
BATCH PROCESSING SERVICES	458	489	-6%	520	706	-26%	3%	6%
APPLICATION SOFTWARE								
MAINFRAME/MINI	336	359	-6%	927	887	4%	19%	15%
MICRO	24	25	-5%	124	118	5%	32%	28%
TOTAL APPLICATION SOFTWARE	360	384	-6%	1051	1005	5%	20%	16%
TURNKEY SYSTEMS	144	146	-2%	408	508	-20%	19%	23%
CROSS-INDUSTRY SEGMENT TOTAL	1161	1216	-5%	2432	2662	-9%	13%	14%

EXHIBIT C-5

PLANNING AND ANALYSIS - DATA BASE RECONCILIATION
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1983 MARKET			1989 MARKET			83-88	84-89
	1983	1984	VARIANCE	1983	1984	VARIANCE	AAGR	AAGR
	FORECAST	REPORT	AS % OF	FORECAST	FORECAST	AS % OF	IN '83	IN '84
	(\$M)	(\$M)	'84 RPRT	(\$M)	(\$M)	'84 FCST	(%)	(%)
REMOTE COMPUTING SERVICES	386	379	2%	816	797	2%	13%	13%
BATCH PROCESSING SERVICES	163	174	-6%	193	261	-26%	3%	7%
APPLICATION SOFTWARE								
MAINFRAME/MINI	378	403	-6%	2065	1978	4%	33%	29%
MICRO	184	194	-5%	2033	1940	5%	51%	42%
TOTAL APPLICATION SOFTWARE	562	597	-6%	4098	3918	5%	42%	34%
TURNKEY SYSTEMS	159	162	-2%	477	595	-20%	20%	24%
CROSS-INDUSTRY SEGMENT TOTAL	1269	1312	-3%	5584	5572	0%	28%	29%

EXHIBIT C-6

OTHER CROSS-INDUSTRY SEGMENT - DATA BASE RECONCILIATION
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1983 MARKET			1989 MARKET			83-88	84-89
	1983 FORECAST (\$M)	1984 REPORT (\$M)	VARIANCE AS % OF '84 RPRT	1983 FORECAST (\$M)	1984 FORECAST (\$M)	VARIANCE AS % OF '84 FCST	AAGR FORECAST IN '83 (%)	AAGR FORECAST IN '84 REPORT (%)
REMOTE COMPUTING SERVICES	127	125	2%	239	233	3%	11%	11%
BATCH PROCESSING SERVICES	134	143	-6%	204	278	-27%	7%	12%
APPLICATION SOFTWARE								
MAINFRAME/MINI	176	188	-6%	405	388	4%	15%	12%
MICRO	110	118	-7%	580	559	4%	32%	28%
TOTAL APPLICATION SOFTWARE	286	306	-6%	985	948	4%	23%	20%
TURNKEY SYSTEMS	797	747	7%	2568	3031	-15%	22%	26%
CROSS-INDUSTRY SEGMENT TOTAL	1344	1321	2%	3996	4490	-11%	17%	22%

EXHIBIT C-7

DATA BASE RECONCILIATION OF TOTAL INFORMATION SERVICES
 USER EXPENDITURE FORECAST BY DELIVERY MODE, 1984-1989

DELIVERY MODE	1983 MARKET			1989 MARKET			83-88	84-89
	1983	1984	VARIANCE	1983	1984	VARIANCE	AAGR	AAGR
	FORECAST (\$M)	REPORT (\$M)	AS % OF '84 RPRT	FORECAST (\$M)	FORECAST (\$M)	AS % OF '84 FCST	IN '83 (%)	IN '84 REPORT (%)
REMOTE COMPUTING SERVICES								
INDUSTRY SPECIFIC	3339	3338	0%	8392	8516	-1%	18%	17%
CROSS INDUSTRY	2159	2122	2%	6271	5296	18%	18%	17%
UTILITY PROCESSING	1161	1141	2%	1883	1840	2%	9%	8%
SUBTOTAL	6659	6601	1%	16546	15651	6%	16%	16%
BATCH PROCESSING SERVICES								
INDUSTRY SPECIFIC	2316	2386	-3%	2977	3322	-10%	5%	5%
CROSS INDUSTRY	1306	1394	-6%	1516	2063	-27%	3%	6%
UTILITY PROCESSING	540	575	-6%	470	666	-29%	-2%	2%
SUBTOTAL	4162	4355	-4%	4963	6051	-18%	3%	5%
FACILITIES MANAGEMENT								
INDUSTRY SPECIFIC	1320	1260	5%	3640	3244	12%	19%	17%
CROSS INDUSTRY	60	53	12%	75	57	32%	5%	1%
UTILITY PROCESSING	132	118	12%	433	329	32%	22%	19%
SUBTOTAL	1512	1431	6%	4148	3630	14%	18%	17%
TOTAL PROCESSING SERVICES								
INDUSTRY SPECIFIC	6975	6983	0%	15009	15062	0%	14%	14%
CROSS INDUSTRY	3525	3570	-1%	7862	7417	6%	13%	13%
UTILITY PROCESSING	1833	1834	0%	2786	2834	-2%	7%	8%
VANS	277	230	20%	1652	1100	50%	35%	31%
TOTAL	12610	12617	0%	27309	26433	3%	13%	13%
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE PRODUCTS								
INDUSTRY SPECIFIC	1942	2016	-4%	13539	13097	3%	39%	36%
CROSS INDUSTRY	2226	2366	-6%	10612	10224	4%	30%	26%
TOTAL APPLICATIONS SOFTWARE	4168	4383	-5%	24151	23321	4%	34%	31%
TOTAL SYSTEM SOFTWARE	3534	3511	1%	15648	16713	-6%	29%	29%
TOTAL SOFTWARE	7702	7894	-2%	39799	40034	-1%	32%	31%
PROFESSIONAL SERVICES	6938	7171	-3%	18483	21653	-15%	18%	20%
TURNKEY SYSTEMS								
INDUSTRY SPECIFIC	2849	2952	-3%	11725	13302	-12%	27%	28%
CROSS INDUSTRY	1492	1524	-2%	4938	6079	-19%	22%	26%
TOTAL TURNKEY SYSTEMS	4341	4476	-3%	16663	19381	-14%	25%	27%
GRAND TOTAL	31591	32157	-2%	102254	107501	-5%	21%	22%

growth rate for the education and training portion of professional services has been increased to 28% this year, up seven percentage points. The dominance of this mode is the primary contributor to increased growth in the education and training segment.

- Exhibit C-4, the human resources market segment reconciliation, shows a four-percentage-point increase (to 23%) in the five-year outlook for turnkey systems, and a corresponding four-point decrease to 16% of the applications software market. While a healthy software market will still exist throughout this decade, personnel departments will more eagerly embrace the lower cost turnkey solutions in order to have the most control over their unique and security-sensitive business function. Turnkey systems will evolve from being 38% of the size of the software applications market in 1983, to 50% by 1989.
- The five-year growth rate for planning and analysis markets (as shown in Exhibit C-5) for turnkey systems has been increased four points to 24%. The turnkey systems growth rate increase reflects the use of lower priced dedicated hardware/software combinations for serving such departments as finance, accounting, and marketing with their increased analytical needs. The applications software market growth has been decreased six points to 34%. This adjustment reflects the slowdown required due to limits on the volume of installed hardware and due to increases being derived from larger base numbers. In spite of this growth rate downward adjustment, by 1987 planning and analysis will become the largest market of all application software.

D. INFORMATION SERVICES INDUSTRY

- The industry as a whole is forecast to grow at 22% per year for the period 1984-1989, as shown in Exhibit C-7. This compares with last year's 21% per year forecast for the 1983-1988 timeframe. The one percentage point difference can be attributed to the net effect of downward revisions to the average

annual growth rates (AAGRs) of applications software products and facilities management, and to the upward revisions of growth rates for batch processing, professional services, and turnkey systems. Reasons for these revisions are discussed in the delivery mode reconciliation sections below.

- The 1984 estimate of the 1983 market was decreased by 2%. This is primarily due to decreases in the reported sizes of the 1983 batch processing and applications software markets. Discussions detailing reasons for these changes, as well as for other delivery-mode-related changes, are found in the respective sections below.

E. ANALYSIS BY DELIVERY MODE

- The comments below refer to figures contained in Exhibit C-7.

I. PROCESSING SERVICES

- Batch services' five-year average annual growth rates were increased this year by three and four percentage points, respectively, for cross-industry and utility services. This can be attributed primarily to a strength that remains in many "basic" applications--including payroll, tax processing, and direct mail.
- In this year's report VANs have been separated out from remote computing services (RCS), as shown on a separate line under Total Processing Services. The VANs' 1983 market size was lowered \$47 million (20%) in this year's report due to the failure of leading VANs vendors to grow as rapidly as was anticipated a year ago. Reasons for this include the interrelated factors of lack of major price increases and softening of demand.
- The five-year growth rate for VANs was lowered to 31% this year, in contrast to 35% in last year's report. This change was due in large part to the intensi-

fying of competition that is expected to take effect over the next several years. Existing VANs will be assaulted from the high end by hardware vendors offering packet switching for private networking at significant savings. In addition, VANs vendors will likely encounter a combination of Bell Operating Company intra-LATA, and AT&T inter-LATA packet services offered at significantly less cost to users.

2. SOFTWARE PRODUCTS

- Applications software products have, at 31%, the largest major-market five-year growth rate in the entire information services industry. This rate represents, however, a decrease of three percentage points from last year's report.
 - As we near the end of the decade, applications development tools (which INPUT classifies as systems software) will become so powerful and so widespread that the market for "prepackaged" applications software will be affected, as shown in the exhibit.
 - In addition, this decrease reflects the difficulty of sustaining a large annual increase on a very large base. As the total applications software market exceeds \$20 million annually in the late 1980s, the population of installed computers establishes an upper limit on possible increases. This phenomenon will affect both industry-specific and cross-industry applications software.

3. PROFESSIONAL SERVICES

- The 1983 market for professional services was increased by 3% (\$233 million) in this year's report. This was the result of a stronger than expected economic rebound, which released more pent-up demand for custom-developed systems.

- To recognize a brighter long-term outlook for this mode, the five-year average annual growth rate for professional services was increased two percentage points to 20%. Factors stimulating this marketplace include user management's increasing recognition that information systems serve as strategic competitive weapons in the marketplace (thus placing an urgency on systems development), the emergence of national vendors to serve multi-site firms in a more cost-effective manner, the breakup of AT&T (which has created a large demand for new systems within telecommunications firms), and the interest among applications software products buyers to modify those systems to best fit their environments.

4. TURNKEY SYSTEMS

- INPUT has raised the turnkey systems five-year average annual growth rate by two percentage points to 27%. The market for turnkey systems continues to improve. Hardware prices are decreasing faster than anticipated as software functionality increases, thereby expanding the turnkey market to an even broader base of customers. Another factor contributing to this healthy marketplace is the increased willingness of manufacturers to embrace CAD/CAM/CIM solutions in order to enhance their ability to compete in national and world markets.

U.S. INFORMATION SERVICES
CROSS-INDUSTRY MARKETS, 1984-1989
APPENDIX D: RELATED INPUT REPORTS

APPENDIX D: RELATED INPUT REPORTS

ANNUAL REPORTS

- U.S. Information Services Vertical Markets, 1984-1989
- U.S. Information Services Markets, 1983-1988
 - Volume I - Industry-Specific Markets
 - Volume II - Cross-Industry Markets
- U.S. Information Services Markets, 1982-1987
 - Volume I - Processing Services and Integrated Systems
 - Volume II - Software Products and Professional Services
- ISIP 1981 Annual Report
- ISIP 1980 Annual Report
- ISIP 1979 Annual Report
- ISIP 1978 Annual Report
- ISIP 1977 Annual Report
- ISIP 1976 Annual Report

INDUSTRY SURVEYS

- Eighteenth Annual ADAPSO Survey of the Computer Services Industry - 1984
- Seventeenth Annual ADAPSO Survey of the Computer Services Industry - 1983

- Sixteenth Annual ADAPSO Survey of the Computer Services Industry - 1982
- Fifteenth Annual ADAPSO Survey of the Computer Services Industry - 1981
- Fourteenth Annual ADAPSO Survey of the Computer Services Industry - 1980
- Thirteenth Annual ADAPSO Survey of the Computer Services Industry - 1979
- Twelfth Annual ADAPSO Survey of the Computer Services Industry - 1978

1984 MAPS REPORTS

- Acquisition Strategies for Information Services Firms

PROCESSING AND TURNKEY SYSTEMS MARKET

- Processing and Turnkey Systems Markets: 1984-1989
- On-Line Data Base Markets, 1984-1989
- Strategies for New Telecommunications Opportunities
- Personal-Computer-to-Mainframe Market Opportunities
- Successful RCS Strategies for the 1980s
- Systems versus Services for Small Organizations:
New Decision Criteria

SOFTWARE MARKETS

- Software Products and Professional Services Markets, 1984-1989
- Market Impacts of IBM Software Strategies
- Impact of New Software Productivity Techniques
- Integrated DBMS-Applications Software
- New Trends and Opportunities in Fourth-Generation Languages
- Professional Services Opportunities for Software Product Implementation

PERSONAL COMPUTER MARKETS

- Personal Computer Software Markets, 1984-1989
- Personal-Computer-to-Mainframe Market Opportunities
- Market Opportunities for Applications Transfer to Personal Computers
- Supporting Personal Computer Software Profitably
- Pricing and Distribution of Personal Computer Software
- Software and Services for the Home Computer

OTHER 1984 REPORTS

- Annual Information Systems Planning Report, 1984

CORPORATE SYSTEMS PLANNING

- Corporate Systems Annual Planning Report
- Integrating Information Systems with Corporate Strategic Planning
- Organizing the IS Department for End-User Computing
- Data Administration Experiences and Outlook
- Large-Scale Systems Directions
 - Residual Values, Peripherals
 - Residual Value, Mid-Year Update
 - Residual Values, Mainframes

END-USER SYSTEMS PLANNING

- Office Systems Annual Planning Report
- End-User Micro-Mainframe Needs
- Executive Workstation Acceptance
- Techniques for Training and Supporting End Users
- Update on Information Centers: Value and Future Directions
- Office Systems Implementation: Approaches That Work
- Organizing End-User Departments for Information Systems

SOFTWARE PLANNING

- Software Annual Planning Report
- New Opportunities for Software Productivity Improvements
- Integrated Software Systems: Experiences and Outlook
- Impacts and Challenges of Decision Support Systems (DSS)
- Protecting the Corporate Software Investment
- Future Skill Requirements for Software Development
- End-User Software Needs and Requirements

TELECOMMUNICATIONS PLANNING

- Telecommunications Annual Planning Report
- Micro-to-Mainframe: Telecommunications
- LAN/CBX Traditional Communications: Which Approach?
- Local Area Networks: Directions and Opportunities
- Strategic and Tactical Planning Methodologies for Telecommunications
- SNA Networks: Challenges and Opportunities
- Telecommunications Interfaces for the Mid-1980s

1983 ISIP REPORTS

- Personal Computer Opportunities for RCS Vendors
- Opportunities for Engineering and Scientific Remote Computing Services Vendors
- Trends in Processing Services and Integrated Systems Pricing
- Trends in Software Products and Professional Services Pricing
- Successful Marketing Methods That Boost Sales
- Opportunities in Sales, Marketing, and Distribution Applications

OTHER 1983 REPORTS

- End-User Experiences with Fourth-Generation Languages
- Relational Data Base Management Developments
- Intercompany Electronic Information Distribution
- Application and Use of Personal Computers in Offices

1982 REPORTS

- Personal Computer Software Market Opportunities
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- Opportunities for Business Graphics Services and Software
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- Information Systems Planning (ISP)
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