U.S. PROCESSING SERVICES AND TURNKEY SYSTEMS MARKETS, 1984 - 1989

INPUT

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U.S. PROCESSING SERVICES AND TURNKEY SYSTEMS MARKETS, 1984-1989

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ABSTRACT

This annual report provides analysis and forecasts of U.S. processing services and turnkey systems markets for 1984 to 1989.

Markets analyzed include remote computing services (RCS), on-line data bases, batch services, facilities managements, and value-added networks (VANs).

Over 40 industry-specific and cross-industry markets are covered, as well as utility processing markets.

The factors behind the demand for these products and services are identified. The fastest growing and largest markets are highlighted and analyzed. Key issues, trends, and developments are provided together with business and market strategy recommendations.

This report contains 92 pages, including 35 exhibits.

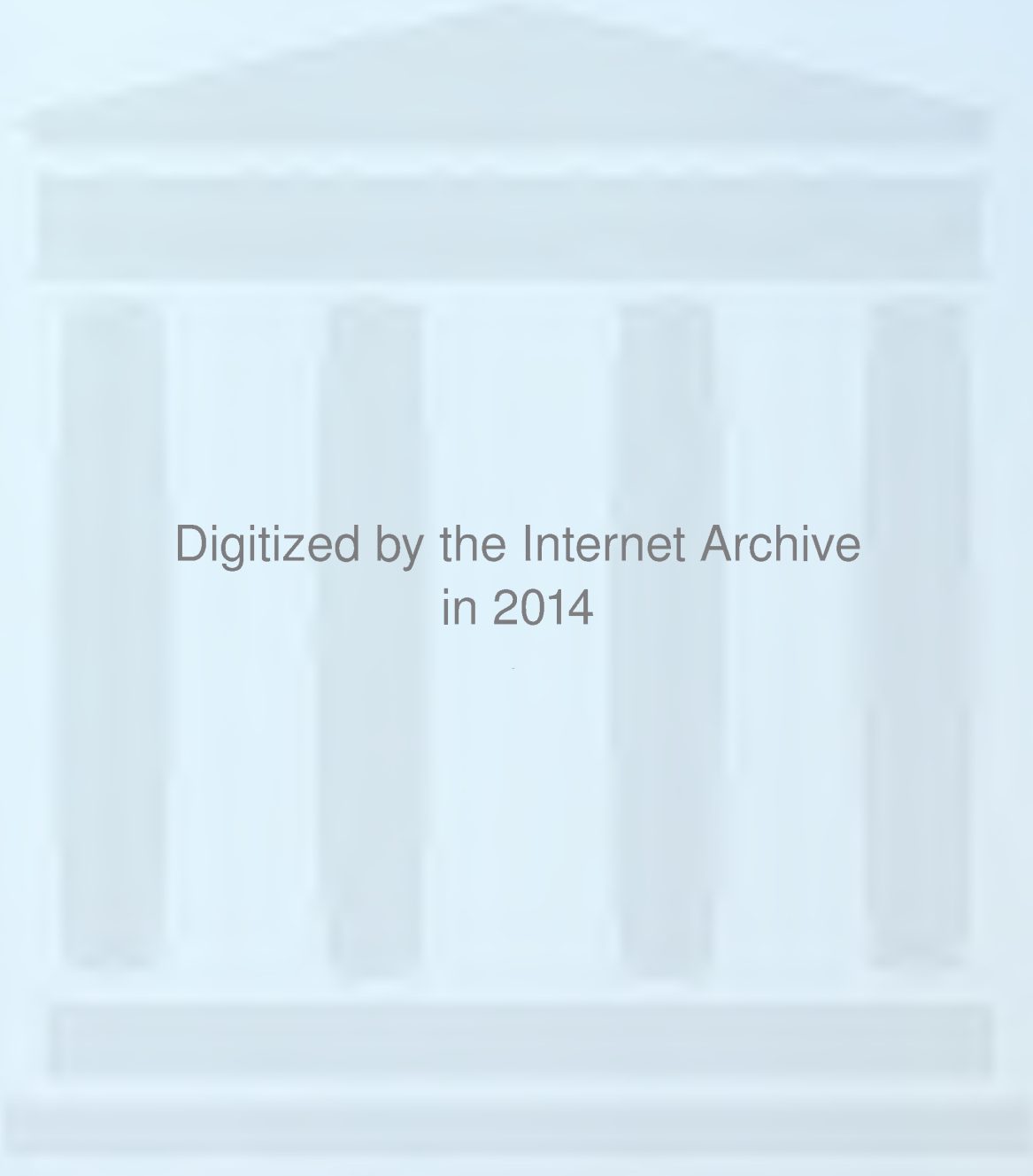
U.S. PROCESSING SERVICES AND TURNKEY SYSTEMS MARKETS, 1984-1989

CONTENTS

U.S. PROCESSING SERVICES AND TURNKEY SYSTEMS MARKETS, 1984-1989

EXHIBITS

1 INTRODUCTION



I INTRODUCTION

- This report is produced as one of a series of reports in INPUT's Processing and Systems Program, part of the Market Analysis and Planning Service (MAPS) for the Information Services industry.

A. PURPOSE OF THIS REPORT

- This report reviews and analyzes two key components of the information services market:
  - Processing services.
  - Turnkey systems.
- This report is designed to assist vendors in:
  - Identifying new markets and product opportunities.
  - Assessing product and marketing risk exposure.
  - Allocating R&D and operations resources.

- Obtaining insights into market-related developments that impact profitability.

B. SCOPE

- This report focuses on U.S. markets and analyzes user expenditures that are noncaptive (i.e., expenditures on products and services provided by organizations outside the buyer's own corporate structure).

- This report is organized as follows:

  - Chapter II is an executive summary provided in presentation format, complete with script.

  - Chapter III forecasts and analyzes processing services in terms of opportunities, challenges, issues and events. Market sizes and growth rates are provided for the 1984-1989 timeframe for over 60 different major industry-specific and cross-industry market segments related to remote computing services, batch services, facilities management, and value-added networks (VANs).

  - Chapter IV provides market forecasts and analysis of turnkey systems markets. Included is a discussion of key issues and trends; market sizes and growth rates of numerous key market segments are identified.

  - Appendix A contains a set of definitions relevant to this report.

  - Appendix B contains a complete data base of the market sizes and growth rates discussed in this report. It includes statistics for each year from 1983 through 1989.

- Appendix C lists other INPUT reports relevant to the topics discussed in this report.

- Readers of prior INPUT reports in this series will note that the delivery mode previously termed "integrated systems" is now called "turnkey systems." (INPUT made this name change to avoid confusion with similar terms like "integrated software systems," which addresses multiple software applications that interface with each other and which, when sold by a vendor, may not necessarily include hardware.)

- Exhibit I-1 on the following page profiles the classification scheme used by INPUT to structure software application areas. Readers will find this chart helpful in understanding which applications are included in the processing services and turnkey systems market segment forecasts contained in chapters III and IV.

C. METHODOLOGY

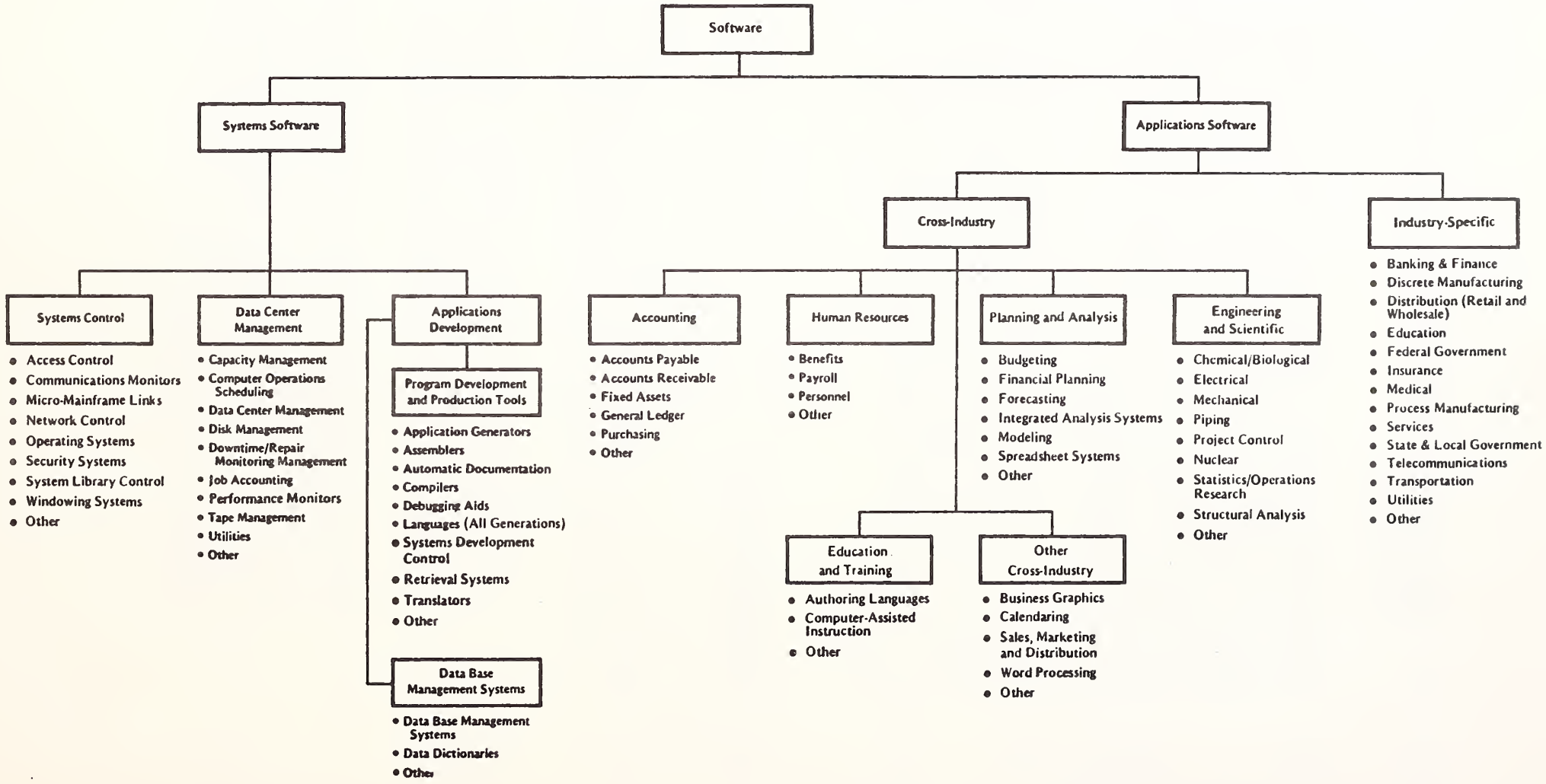
- The process of forecasting is a continuous one. Two fundamental and complementary approaches are used to analyze the industry.

  - The first approach requires a constant interface, through formal and informal interviews and contacts, with buyers of processing services and turnkey systems in each of the industries surveyed.

  - The second approach requires an ongoing monitoring of all processing and turnkey systems vendors with 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 smaller firms.

EXHIBIT I-1

SOFTWARE MARKET STRUCTURE



- At the convergence of these two processes, INPUT researchers analyze industry size, composition, change, direction, etc. to generate the forecasts included in this report.

- All forecast numbers presented are in current dollars (i.e., 1989 market sizes are in 1989 dollars). Inflation is assumed to be an annual 6% for the 1984-1989 period.

- INPUT always welcomes comments, inquiries, and suggestions relating to report contents and structure.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- This chapter summarizes key forecasts, issues, and trends discussed in greater detail in the remainder of the report.

- This executive summary is prepared in a presentation format, i.e., the exhibits are set in larger type for ease of use with an overhead projector and the text is in script form. The script for each exhibit is contained on the left-hand page opposite the exhibit.

A. PROCESSING SERVICES TO DOUBLE, TURNKEY SYSTEMS TO TRIPLE IN SIZE

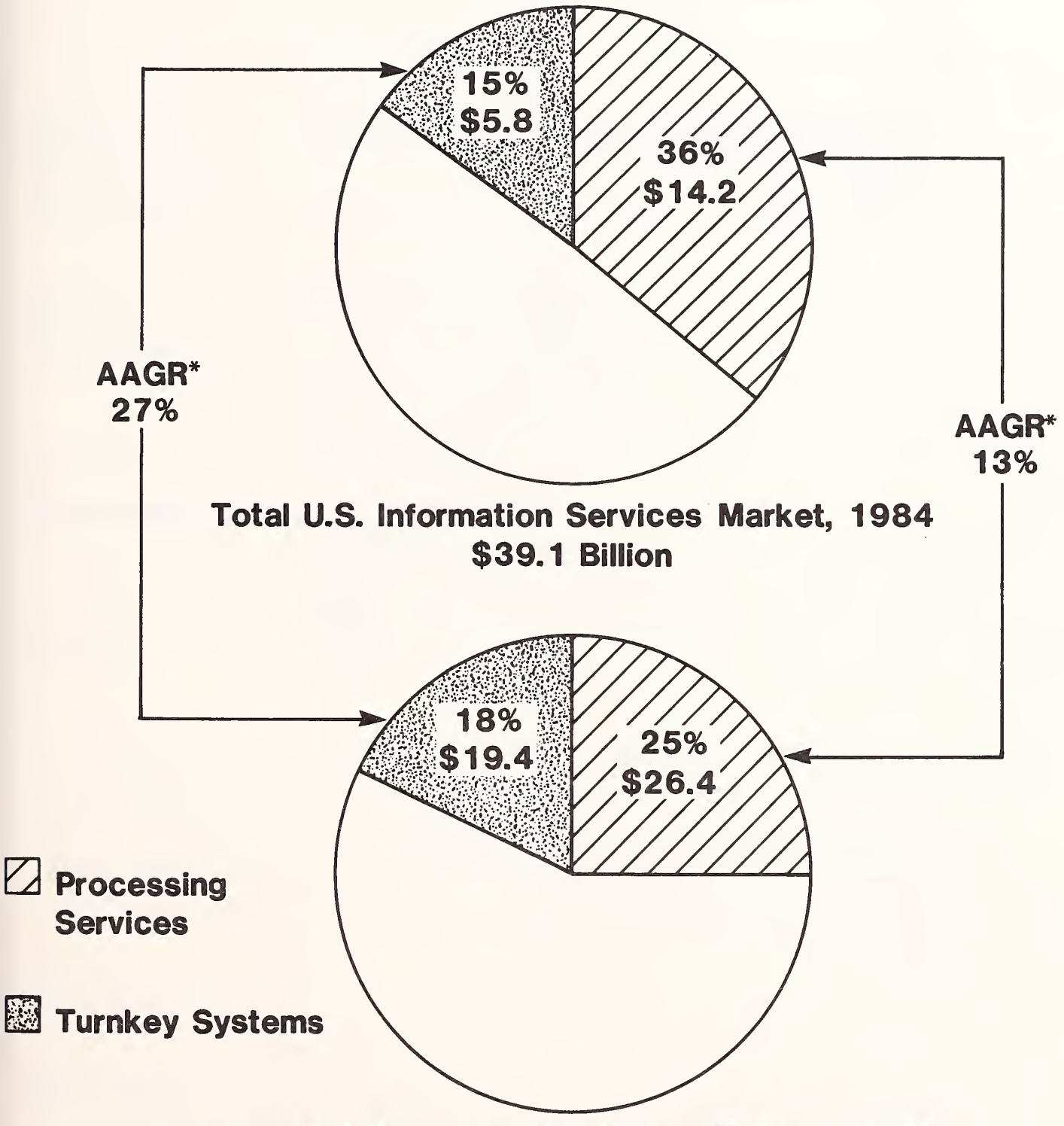
- Processing services and turnkey systems are similar in that they both involve the user's decision to rely upon an external source for both software and hardware. This is in contrast to software products and professional services, which utilize hardware obtained in most cases from a vendor other than the software supplier.

- Processing services, stimulated by rapid growth of specialized applications, on-line data bases, network-related services, and system integration, will nearly double in size between 1984 and 1989. User expenditures will grow from a 1984 base of $14.2 billion to a 1989 figure of $26.4 billion, representing an average annual increase of 13%.

- Processing services' share of the total information services market will, however, decline from 36% to 25% during this five-year period. This is due to high user preference for solutions involving a more "economical" processing on a local basis and/or the need to be operationally integrated with other in-house systems. These needs tend to favor turnkey systems, software products, or professional services. Many processing services vendors are responding to these user needs by expanding into offerings incorporating these other delivery modes.

- The turnkey systems market will more than triple during the next five years. With a 27% annual growth rate, user expenditures will increase from $5.8 billion in 1984 to $19.4 billion by 1989. The turnkey market is being stimulated by a healthy economy, computer price-performance improvements, and end-user computing demand for solutions involving local control and integration characteristics mentioned above.

PROCESSING SERVICES TO DOUBLE, TURNKEY SYSTEMS TO TRIPLE IN SIZE



*Average Annual Growth Rate

B. THERE IS MUCH VARIABILITY WITHIN PROCESSING SERVICES

- Although processing services in the aggregate will grow 13% annually, the four primary components of processing services show much variability in terms of size and growth rates.

- Remote computing services are growing 16% annually and will emerge as a $15.7 billion market by 1989. Aspects of this mode that are especially strong are industry-specific markets and on-line data bases.

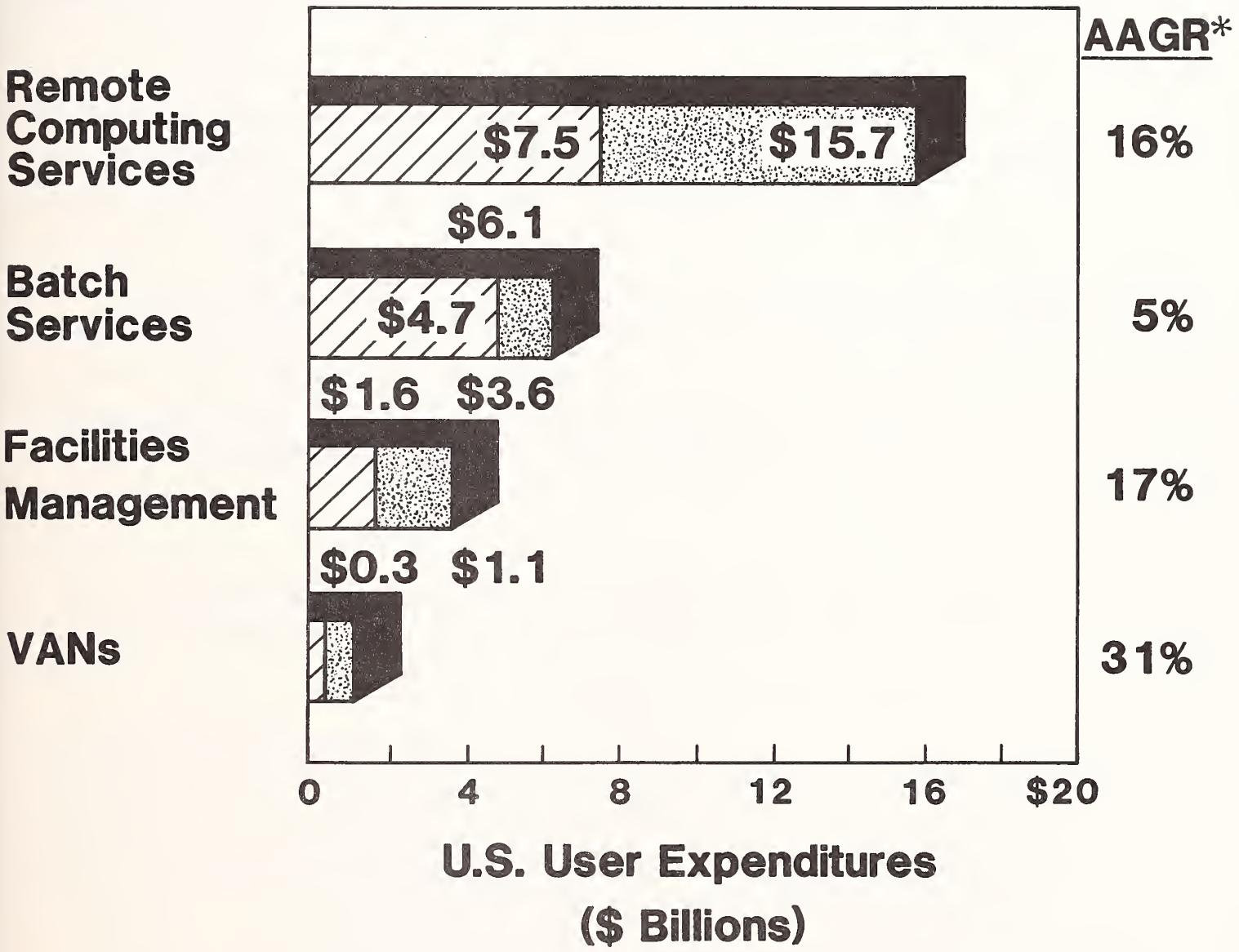
- Batch services in the composite will show the slowest growth of the four modes, going from $4.7 billion in 1984 to $6.1 billion in 1989--reflecting an average growth rate of 5%. Several specialty areas of batch--such as payroll, tax processing, and direct mail--will do much better, however. The boundaries between batch and RCS are blurring as more applications become communications oriented, which is happening with payroll systems.

- Processing facilities management (FM) will grow steadily throughout the rest of the decade. It will average a 17% annual growth and will more than double from a $1.6 billion base in 1984 to $3.6 billion by 1989. The traditionally FM oriented industries such as banking, insurance, medical, and government will continue to provide the bulk of the revenues.

- Value-added networks (VANs) will show the most rapid growth, with a 31% annual increase. From a relatively small base of $300 million in 1984, the VANs market will more than triple, to $1.1 billion by 1989. The applications outlook is bright, but competition will be fierce as existing VANs battle Bell operating companies, AT&T, and private networks for a share of the user's dollar.

EXHIBIT II-2

THERE IS MUCH VARIABILITY WITHIN PROCESSING SERVICES



1984

1989

*Average Annual Growth Rate

C. PROCESSING SERVICES SHOULD EMPHASIZE PROPRIETARY DATA BASES AND COMMUNICATIONS-BASED SOLUTIONS

- Increased user interest in proprietary information combined with a desire for communications-based network solutions that serve widely dispersed locations are catalysts that are helping processing services vendors to retain existing markets and to open new ones. For example:

  - The on-line data base portion of RCS is growing at a 23% annual rate and will reach $5.7 billion by 1989. Its share of the RCS market will increase from 26% in 1984 to 36% in 1989. Fast-growing sectors include news (30%) and marketing (31%) data base services.

  - The distinction between batch and RCS is blurring as users respond positively to solutions that convert formerly batch-oriented, centralized processor functions (such as data entry, editing, and printing) into local user processing via vendor-provided on-line data transfer facilities.

  - RCS vendors are putting more emphasis on multiple-site services such as remote site data consolidations and supplier-manufacturer order/status/inventory systems.

- User interest in network-based services places a premium on both applications knowledge and communications expertise. Vendors that recognize the strategic importance of these two areas will be able to operate from a position of strength for the remainder of the decade.

EXHIBIT II-3

PROCESSING SERVICES SHOULD EMPHASIZE PROPRIETARY DATA BASES AND COMMUNICATIONS-BASED SOLUTIONS

- Catalyst for Market Retention/Expansion
- On-Line Data Bases Growing 23% Annually
- RCS-Batch Distinction Blurring
- RCS Emphasizing Multiple-Site Services
- Keys Are
  - Data Availability
  - Communications Capability

D. TURNKEY'S IMPRESSIVE GROWTH IS FUELED IN NUMEROUS WAYS

- Turnkey systems, expected to grow at a 27% average annual rate for the next five years, is the second fastest growing delivery mode within the information services marketplace.

- This impressive growth is in sharp contrast to vendor/user disenchantment of earlier years when growth was erratic and profit margins elusive.

- Today's growth is being stimulated by the emergence of powerful low-end (micro-based) and high-end (supermini-based) systems; the trend toward decentralization of information systems (especially prevalent in manufacturing firms); changes in the economics of processing services (such as increased communications costs); the appeal of a system with a fixed, rather than a variable, operational cost; and the user's desire for local control and integration of systems.

- Large turnkey markets with high growth include discrete manufacturing (29% annually, with growth to $4.2 billion by 1989), services and "other industries" (34% to $1.8 billion), and banking and finance (25% to $1.7 billion).

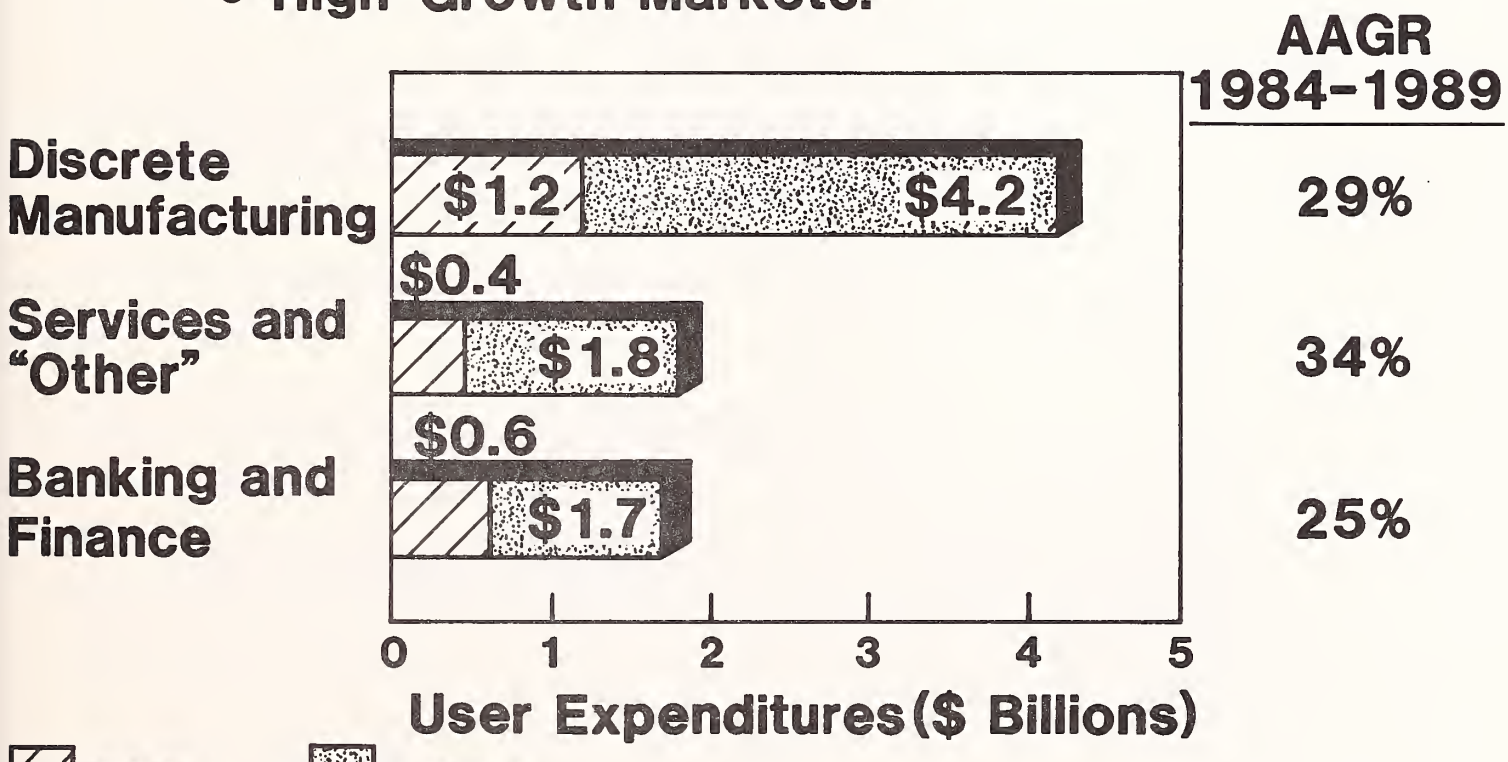
  - Discrete manufacturers are especially receptive to CAD/CAM systems and to MRP II applications with computer-integrated manufacturing (CIM) potential.

  - Services and "other industries" are prime candidates for turnkey systems, because this segment is populated by numerous small units (lawyers, accountants, hotels/motels, etc.), many of which are consolidating, thus creating demand for computer power previously difficult to justify.

  - Banking and finance firms place a high priority on turnkey solutions related to personal and corporate trust as well as to loan management.

TURNKEY'S IMPRESSIVE GROWTH IS FUELED IN NUMEROUS WAYS

- Second Fastest Growing Mode at 27%
- Stimulants
  - More Powerful Hardware
  - Decentralization
  - Changing Economics
  - Users' Desire for Fixed Costs, Local Control, Integrated Systems
- High-Growth Markets:



*Average Annual Growth Rate

E. SERVICES EXPANSION PROVIDES NEW OPPORTUNITIES FOR TURNKEY VENDORS

- Important turnkey systems vendor opportunities are found in the expansion of services beyond traditional boundaries. Turnkey systems vendors eager to enhance their competitive edge are urged to offer complementary "non-turnkey" services and aggressively implement innovative hardware/software support service policies.

- "Non-turnkey" services involve the provision of other information services delivery modes such as processing services, professional services, and software products. For example, ASK Computer Systems offers its MRP applications via RCS in order to sign customers who would otherwise postpone a turnkey decision.

- Professional services offerings help increase client successes by ensuring that the system and/or its implementation is tailored to the customer's environment. Turnkey vendors averaged an increase in their professional services revenues of 50% during last year alone.

- Innovative support and service is another important opportunity area. INPUT surveys reveal that the two highest areas of post-sales concern to users--hardware maintenance and software support--are also the two areas wherein they are the most dissatisfied. Over one-half the users surveyed indicated disappointment in these areas.

- INPUT suggests vendors investigate new ways to provide a higher quality hardware and software support service in a more cost-effective manner. Areas to be considered include remote support, i.e., on-line interaction with the system, customer self-support for software (must include proper incentives to the user) and electronic support (two-way vendor/customer on-line interaction).

EXHIBIT II-5

SERVICES EXPANSION PROVIDES NEW OPPORTUNITIES FOR TURNKEY VENDORS

- "Non-Turnkey" Services to Have High Appeal
  - Processing Services Hook Customers Early
  - Professional Services Increase Customer Satisfaction
- Use Innovative Hardware/Software Support Services to Enhance Uniqueness
  - Remote Support
  - Customer Self-Support
  - Electronic Support

III PROCESSING SERVICES

III PROCESSING SERVICES

A. OVERVIEW

1. MARKET SIZE AND GROWTH

- Processing services is composed of four modes: remote computing services, batch services, facilities management (FM), and value-added networks (VANs).

- Processing services will grow from $14.2 billion in 1984 to $26.4 billion by 1989--an average increase of 13% annually, as shown in Exhibit III-1.

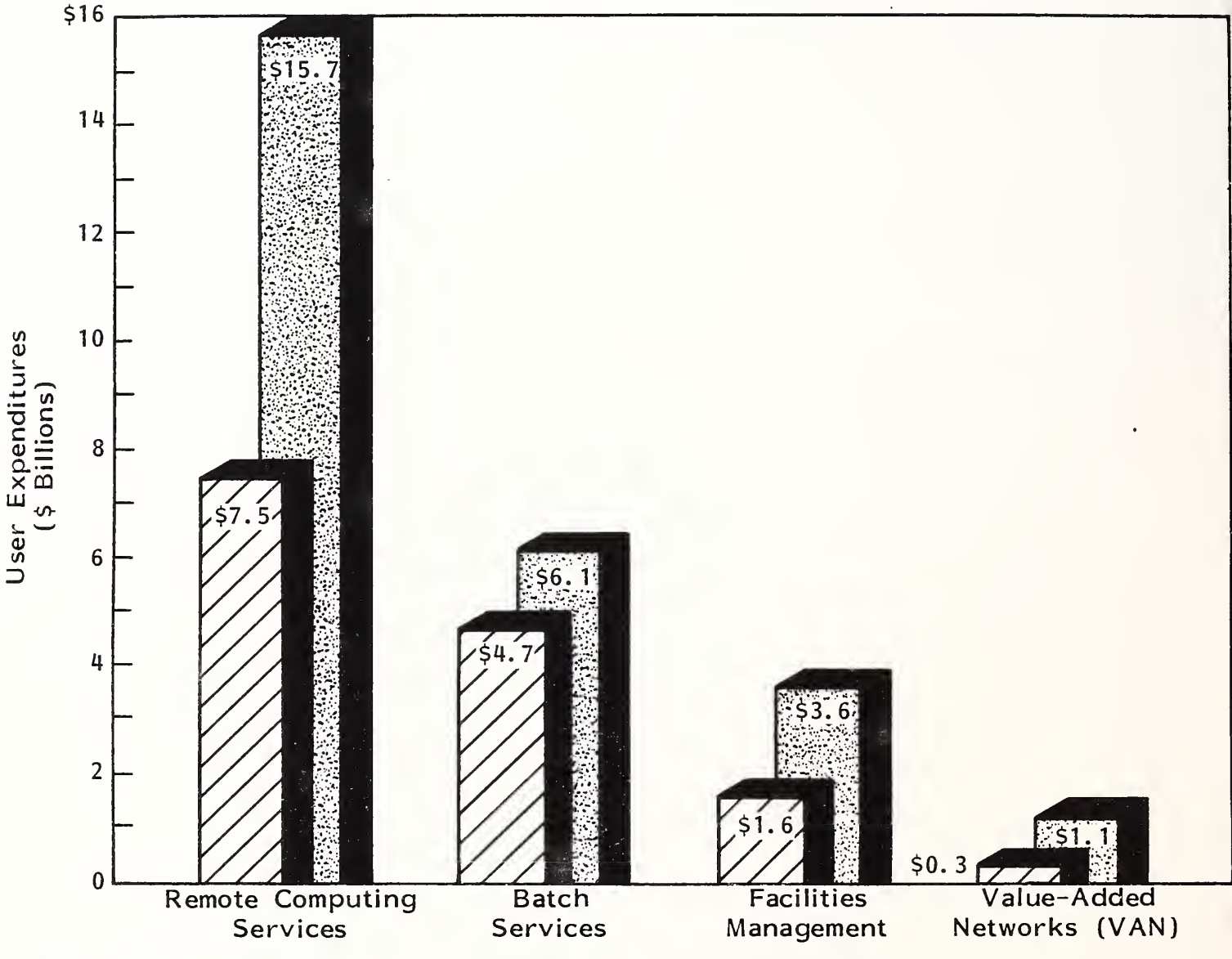
- RCS growth is being helped considerably by the strength of the on-line data base market, which will increase its portion of the RCS market from 26% ($2 billion) in 1984 to 36% ($5.7 billion) by 1989.

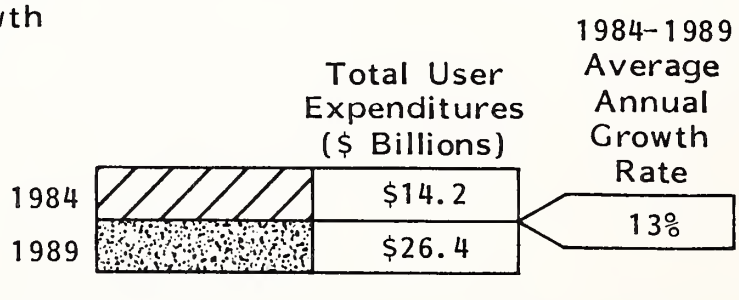
- FM growth will continue to be derived primarily from regulated, standardized industries such as banking, insurance, medical industry, and government.

- The VANs mode will double its share of the processing services market, from 2% to 4% during the forecast period. VANs will benefit from the critical role that well-designed and strategically located networks will play in connecting not only diverse units of a given business (intra-company) but also multiple suppliers and/or dealers to a manufacturer (inter-company).

EXHIBIT III-1

PROCESSING SERVICES MARKETS, 1984-1989





Note: All dollar amounts are rounded to the nearest $10 million.

2. COMPETITIVE TRENDS

- Exhibit III-2 shows four publicly held processing services vendors that are considered growth stars. They are highlighted because they outperformed all other similar vendors in revenue and net income growth during a recent nine-month period.

  - Numerax provides an on-line data base of tariff rates for use by companies eager to reduce their shipping costs. In addition, it provides data base information related to areas like tariff filings.

  - Comdata provides a nationwide electronic funds transfer service for those needing on-the-spot cash and/or purchase authorizations. Comdata's primary market has been truckers. As truckers travel cross-country, they receive cash and fuel purchase authorizations at any one of 2,500 truckstops. Comdata's data base of trucker, trucking firm, and bank information is the cornerstone of its service. Comdata is now expanding into other markets that can leverage its network and expertise. Two of its newest markets include payment authorizations for travelers at motels and casinos.

  - Paychex has become successful by focusing on the lowest end of the payroll processing marketplace: those firms employing one to 50 employees. Most of its customers have 15 or fewer employees. Paychex's leverage point is its possession of tax and government reporting information, combined with its reliable pickup and delivery services.

  - Quotron provides price and transaction information concerning stocks, bonds, and commodities. It has captured the desktops of investment brokers, traders, and others heavily involved in stock and commodities market developments. Recently it expanded offerings to include office automation services grouped around an enhanced terminal product,

EXHIBIT III-2

PUBLICLY HELD PROCESSING SERVICES GROWTH STARS

PUBLIC PROCESSING FIRMS	REVENUE GROWTH*	NET INCOME GROWTH*	ANNUAL REVENUES† ($ Millions)
Numerax	33%	78%	$32 (5/84)
Comdata	55	28	$63 (12/83)
Paychex	31	36	$32 (5/84)
Quotron	29	28	$153 (12/83)

* Percentage increase for nine-month period ending June 1984, versus the same period a year earlier.

† For fiscal year ending month shown in parentheses.

which it also supplies. IBM's recently announced venture with Merrill Lynch, however, offers a potentially major competitive challenge to Quotron's future.

- Although these four rapidly growing processing services companies target different markets with different applications, they all rely on their possession of information as the basis of their added value. In addition, they are expanding their services on the basis of the information and technology that they have already developed.

3. THE FUTURE

- Processing services companies primarily provide computers and communications resources through a network. They also offer software and human resource support. The purpose of these groups is to understand customer needs and to apply the appropriate communications, computer, and software technology to those needs.

- Whereas the emphasis by vendors in the past has been on computers, the focus in future will be on networks in which computers are simply components. This is a major change in outlook and direction from previous years. Successful vendors will fully understand and apply this approach.

- The ultimate goal of the processing services business is to convince the customer that buying computers is an inadequate solution.

  - Computer ownership brings various problems including control. obsolescence, and security.

  - The better business approach is to buy a network-based solution, wherein the computer is part of the "black box."

- An implication of this vision of the future is that communications companies, e.g. AT&T, can become strong competitors by offering to replace the customer's computer facilities.

B. REMOTE COMPUTING SERVICES

1. MARKET SIZE, ISSUES, AND TRENDS

- Both industry-specific and cross-industry components of RCS will grow at similar rates, as shown in Exhibit III-3.

- The character of the RCS market will change rapidly throughout the next five years. Factors forcing this change include:

  - Increasing power and price-performance of the personal computer.

  - High levels of user interest in micro-mainframe solutions.

  - The popularity of the information center as a viable end-user computing resource.

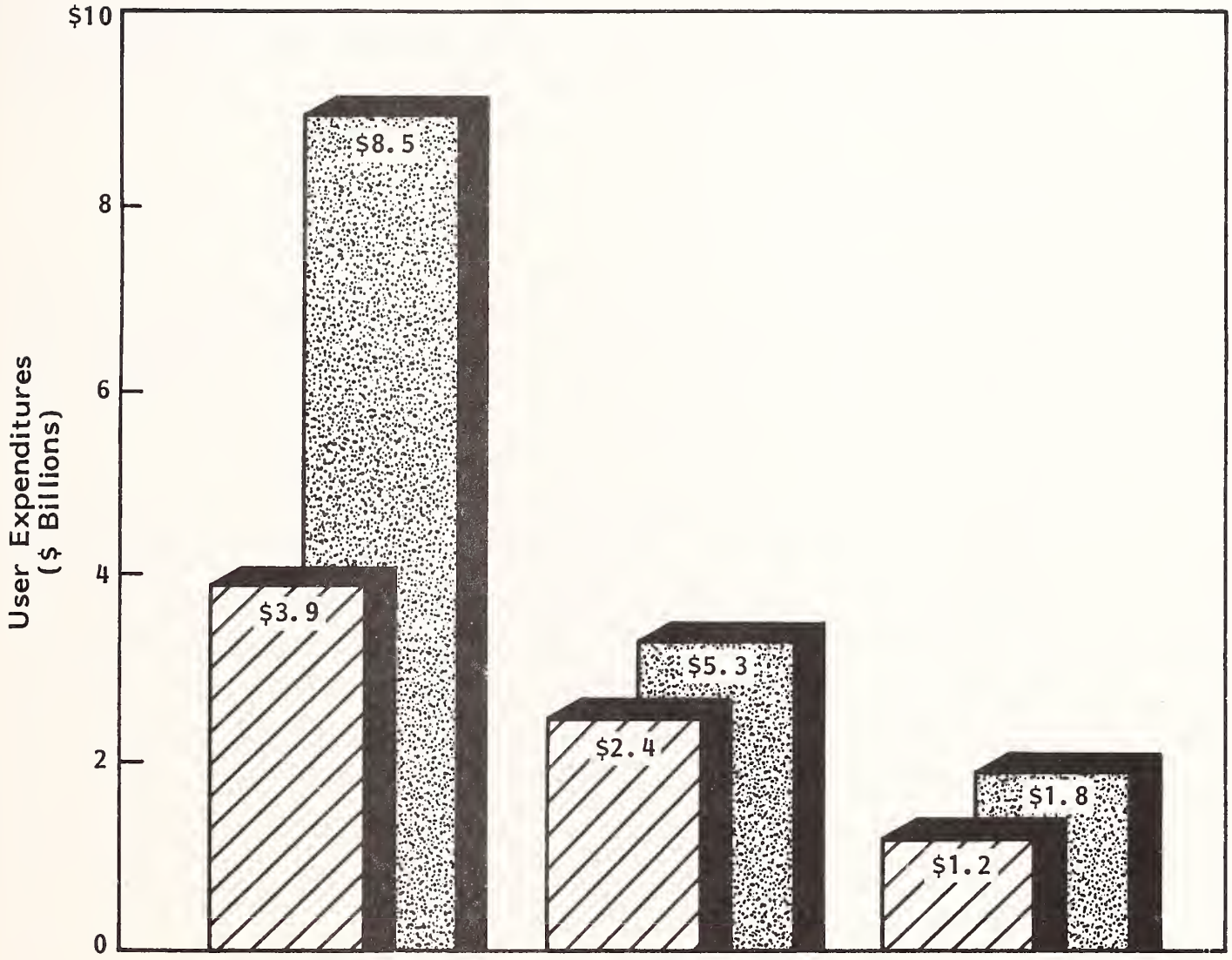
  - The movement toward electronic data interchange (EDI) and electronic information interchange (EII).

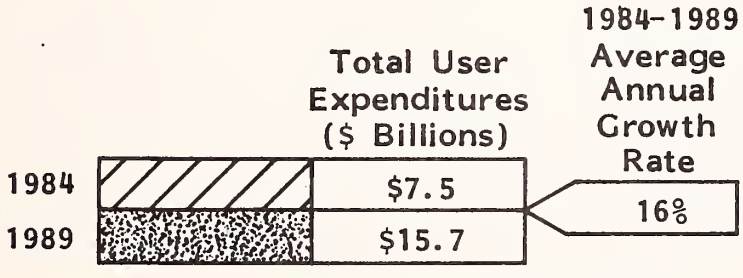
  - The merging of batch and remote batch service offerings for other general applications, such as payroll.

- Factors such as those identified above will bring increased demand for integrating user-site systems with network support, e.g. user-site hardware services (USHS).

EXHIBIT III-3

REMOTE COMPUTING SERVICES MARKET
BY SEGMENT TYPE, 1984-1989





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

- Thus, successful RCS vendors of the future will expand their offerings to include turnkey systems, network processing, on-line support, and software product alternatives. In general terms, the RCS industry will evolve from an historical orientation toward single-site analytical processing to a future emphasis on multiple-site services involving analytical and transaction processing, as shown in Exhibit III-4. This multiple-site orientation puts a premium on skills in providing network-based services of all types.

2. SEGMENT ANALYSIS

- The four largest industry-specific RCS markets in 1984 (banking and finance, discrete manufacturing, distribution, and services) will maintain their relative positions throughout this five-year timeframe, as shown in Exhibit III-5.

- Banking and finance will continue to be more than twice the size of the next largest segment --discrete manufacturing. With a growth rate of 18% (second highest of all the segment profiled), banking and finance will emerge by 1989 as a $2.8 billion market. As deregulation fuels this marketplace for the next several years, obsolete systems will be upgraded. Application areas showing higher than average five-year growth within this segment include commercial banking applications such as corporate banking (20% annual growth), personal trust (20%), corporate trust (19%), automated consumer services (21%), and financial inquiry services for securities and commodities firms (21% annual RCS growth).

- Vendors of RCS services to discrete manufacturers are benefiting from the strong demand for information services of all types within this industry segment. This demand is being driven by manufacturers' use of automation as a keystone in their push to enhance productivity in order to compete in national and world markets. Whereas discrete manufacturing averages only about 15% of all RCS expenditures, the market is a large one. From a 1984 base of $570 million, this market will increase to $1.3 billion by 1989--an average annual growth of 17%. CAD/CAM applications are strong for large-

EXHIBIT III-4

CHANGING RCS MARKET FOCUS

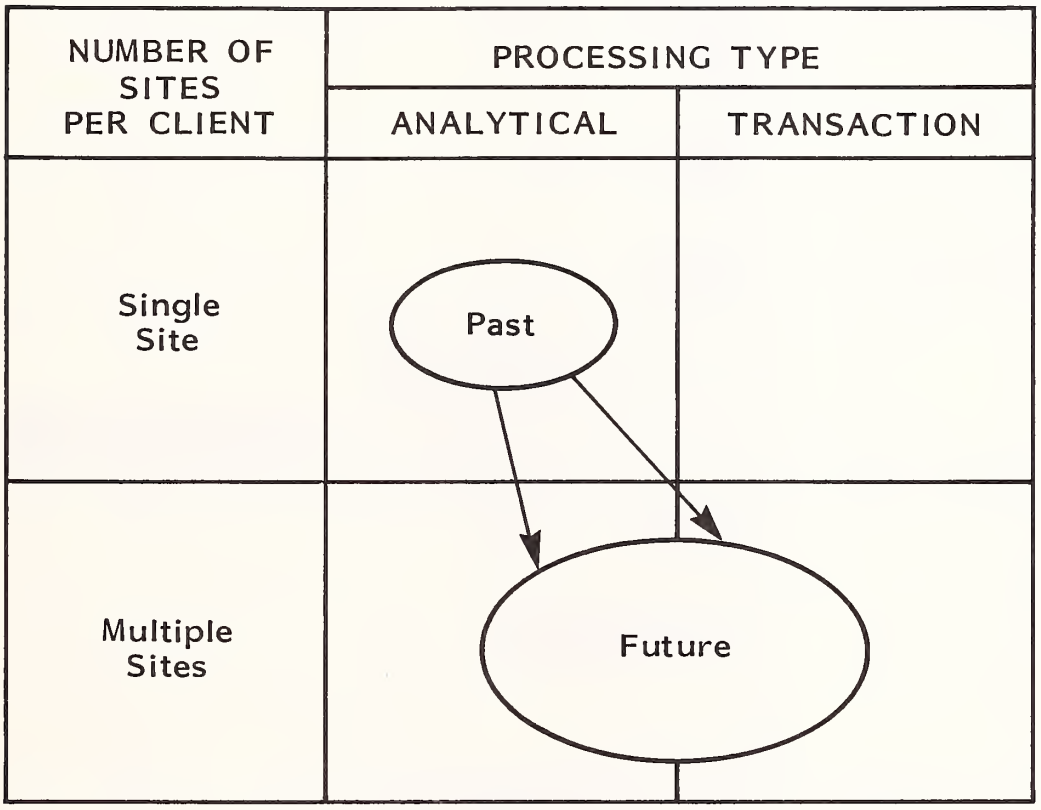
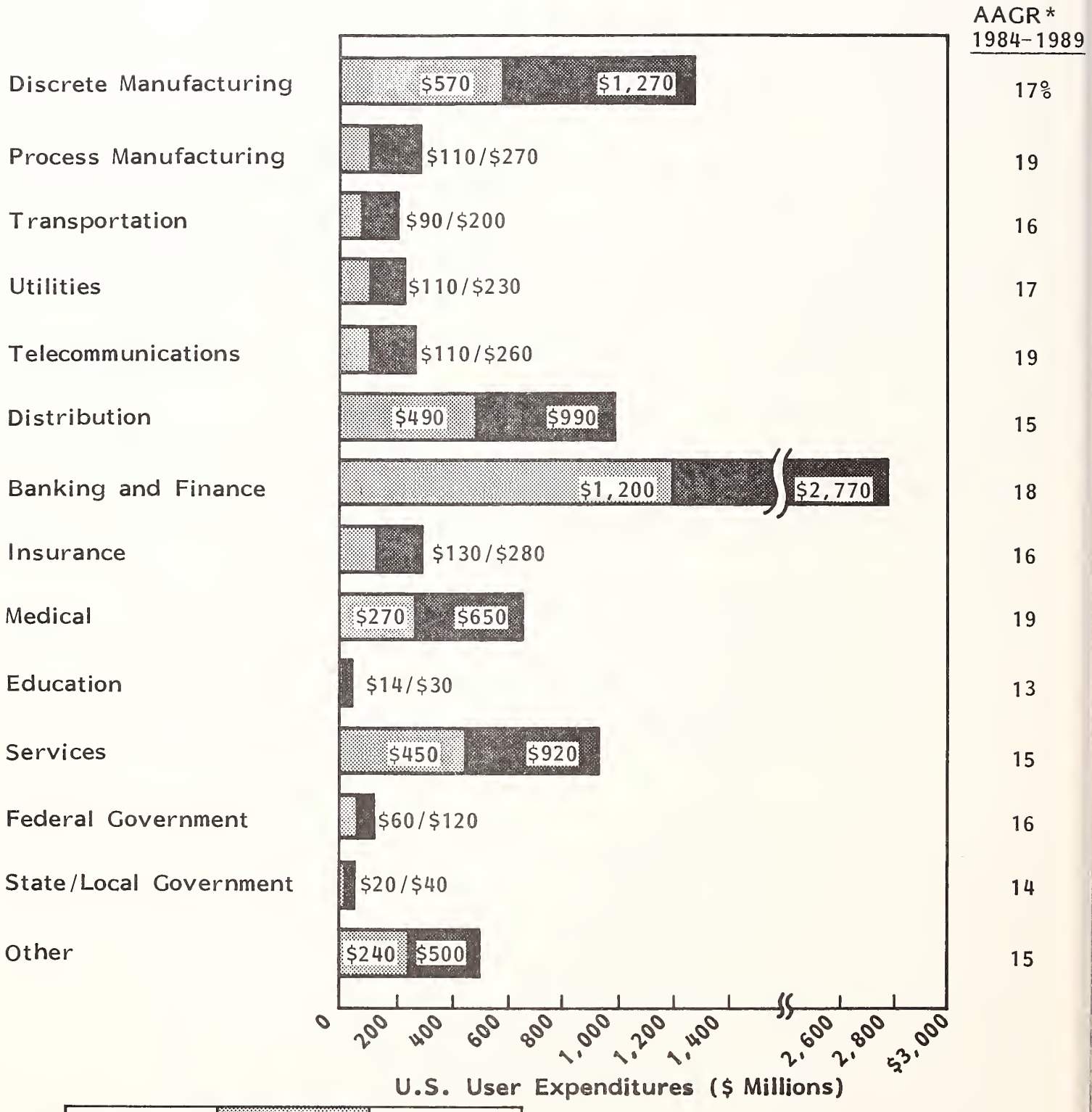
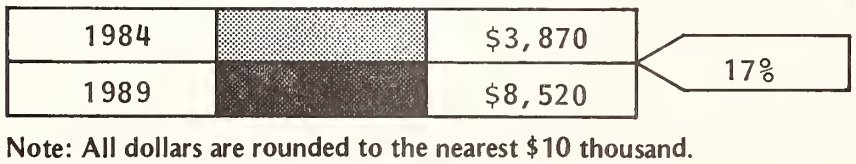


EXHIBIT III-5

REMOTE COMPUTING SERVICES
INDUSTRY-SPECIFIC APPLICATIONS MARKETS, 1984-1989





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

*Average Annual Growth Rate

scale simulation, dynamic analysis and QA, especially in transportation, aerospace, and defense-related industries.

- The distribution segment represents the third largest RCS market. It will grow from a 1984 base of $490 million to become a $990 million opportunity by 1989.

  - Retail and wholesale firms will benefit from suppressed demand, now that consumers have replenished their personal financial assets after the last recession.

  - This RCS industry will grow twice as fast--15% annually--as the sales of retailers and wholesalers themselves during the next several years. This is due to increased use of services such as EDI, point of sale (POS), and on-line credit authorization systems.

  - (Note: INPUT has adjusted downward by 22% the 1983 distribution segment of the RCS market size, from $553 million to $453 million. This has been done to reflect the slower than expected 1983 recovery from the recent economic recession, especially among food stores--which comprise 23% of all retail activity. This adjustment also reflects a reclassification of revenue normally connected with certain types of general distribution applications as revenue more properly related to distribution functions of manufacturers and other nonretail/wholesale firms. However, it is important to emphasize that, although the five-year growth rate has dropped two percentage points from last year, it is still a positive 17% due to the factors outlined above.)

- Cross-industry markets for RCS vary considerably in terms of size and growth rate.

- The largest application-specific, cross-industry markets, as shown in Exhibit III-6, are engineering, and scientific applications, which will reach the $1.2 billion level by 1989. RCS vendors can anticipate that pricing pressures from larger users will increase as their computing alternatives become more varied and cost-effective.

- Although many vendors have recently experienced disappointing revenue trends in the RCS engineering and computing arena, several positive factors exist that will help revive future sales. These include:

  - Integrated delivery mode services: This approach makes RCS more appealing by combining its availability with complementary professional services, software, and turnkey services. Customers can thus look to vendors for total solutions instead of one-dimensional services.

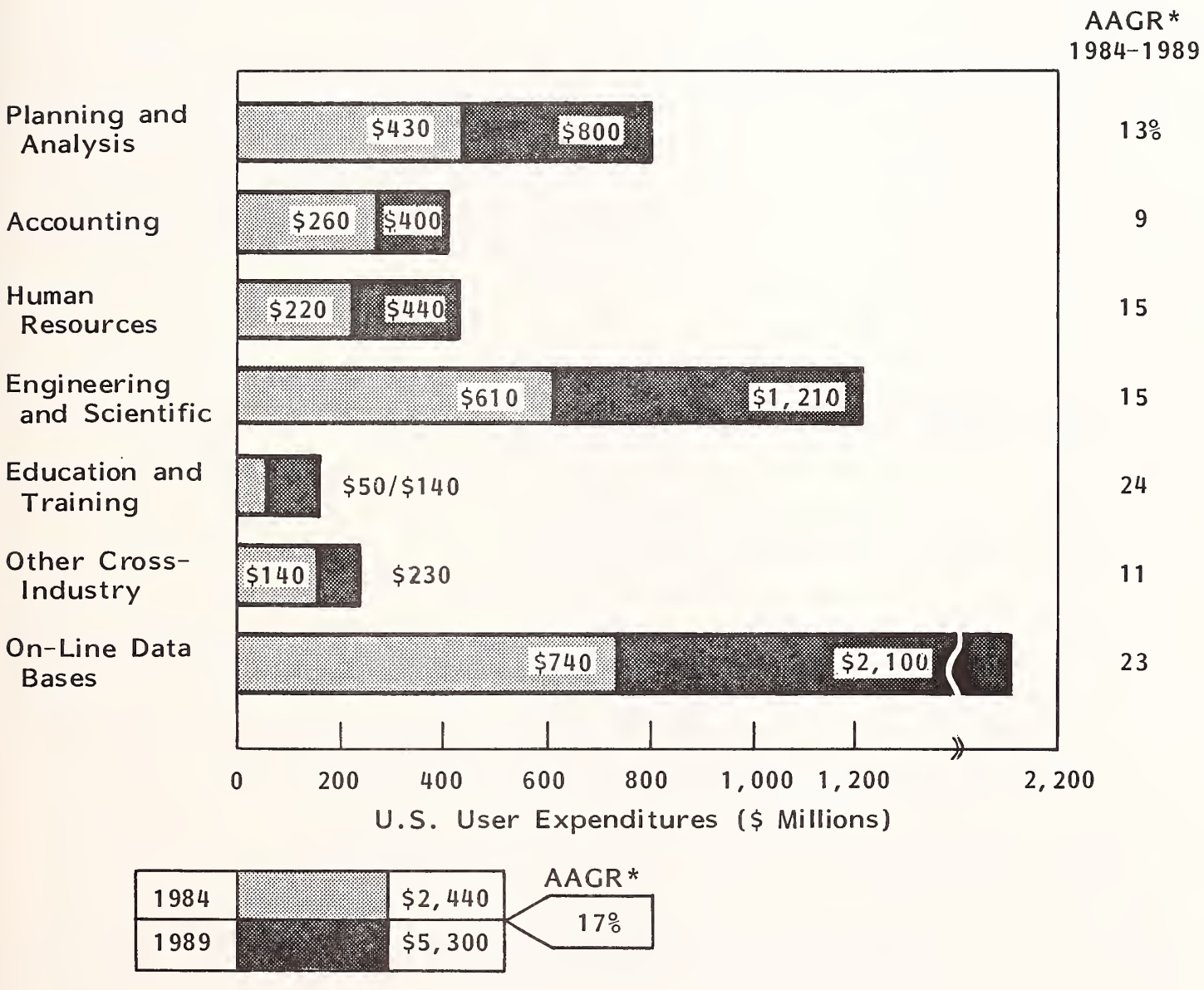
  - Expanded on-line data bases: Scientific and engineering on-line data bases increase productivity by providing rapid access to crucial technical information. Scientific abstracts are an important component of text and bibliographic data bases (the latter will grow 17% annually through 1989). An example of these increasingly important data base services is Bionet, which provides molecular biology scientists with biological research information funded by the National Institute of Health.

  - Front-end services: As scientific hardware sales increase, RCS vendors will benefit from increased demand for front-end RCS services that precede hardware installation.

- Planning and analysis, formerly the mainstay segment for RCS vendors, is now one of the slowest growing segments, with a 13% annual five-year growth rate. Its share of the market, however, is still one of the largest among the cross-industry segments, with $430 million in user expenditures for 1984, increasing to $800 million by 1989.

EXHIBIT III-6

REMOTE COMPUTING SERVICES
CROSS-INDUSTRY APPLICATIONS MARKETS,
1984-1989



- Large, sophisticated modeling and budgeting applications, for example, must still rely on large-systems resources.

- These applications are expanding in scope due to factors such as the large-scale economic restructuring taking place within numerous industries and the heightened interest in computer analysis stimulated by managers' success with more limited microcomputer applications.

o Human resources RCS markets will grow 15% annually, reaching $440 million by 1989. Payroll services are a firmly entrenched aspect of the human resources market. Several leading payroll vendors are enjoying 20%+ annual growth as users demonstrate their preference for leaving this time-critical, complex reporting application to specialty vendors with processing economies of scale.

C. ON-LINE DATA BASE SERVICES

1. MARKET SIZE, ISSUES, AND TRENDS

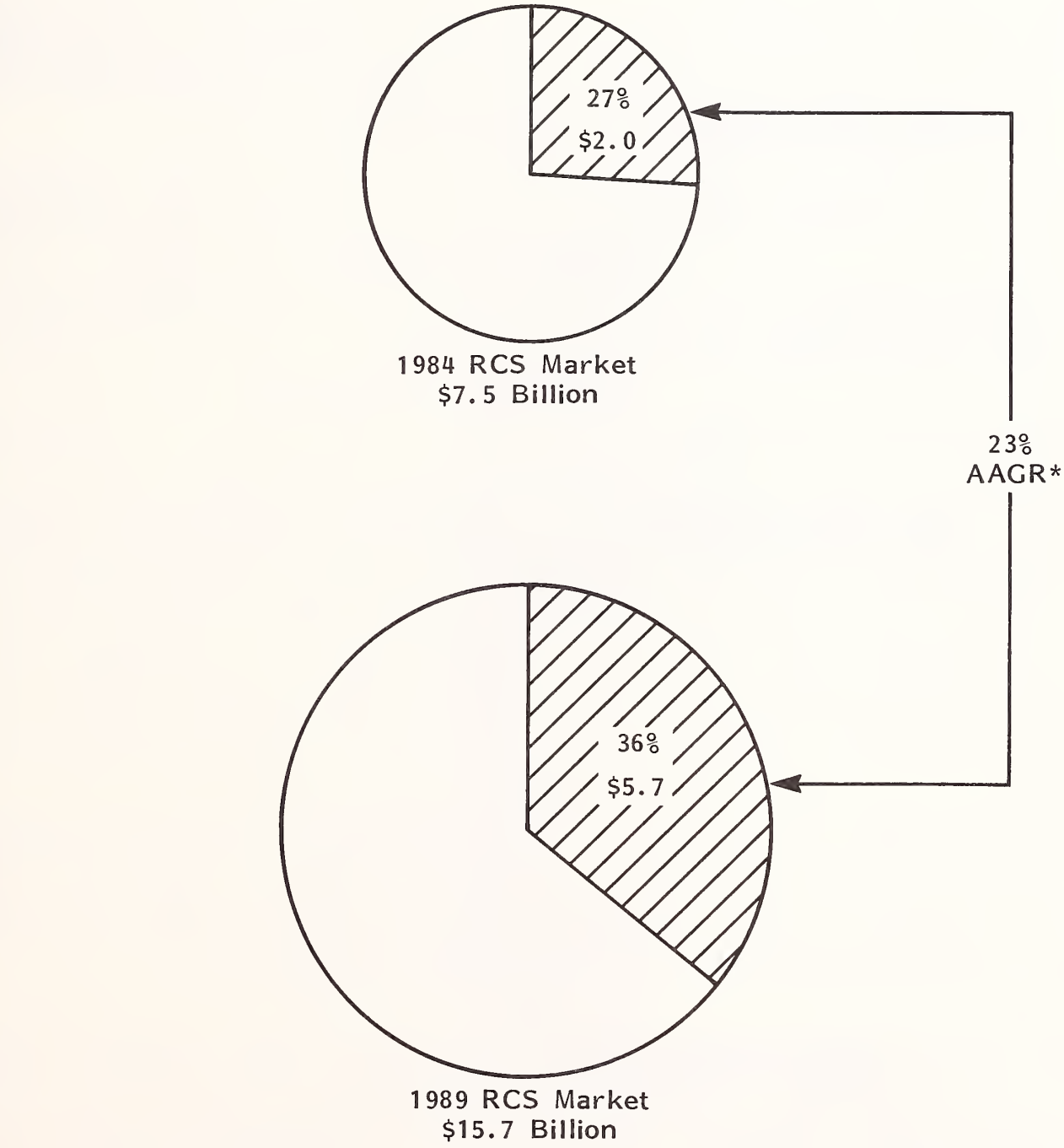
- An important contributor to the growth of the RCS mode is on-line data bases. As shown in Exhibit III-7, on-line data bases will increase their share of the RCS market from 27% ($2 billion) in 1984 to 36% ($5.7 billion) in 1989. This represents a very healthy 23% average annual growth rate.

- Factors stimulating the on-line data base market include:

  - The explosion of microcomputers at the workplace. The micro population will increase from a 1983 base of 3.6 million to 23.5 million by 1989, thus providing a more than sixfold increase in potential users of on-line data base services.

EXHIBIT III-7

ON-LINE DATA BASE SERVICES MARKET SHARE,
1984-1989



*Average Annual Growth Rate

- Price-performance advances in memory technology. Billions of bytes of on-line storage will become commonplace in the next few years, thereby enabling vendors to support massive data bases.

- Emergence of text-oriented data base management systems. This relatively new category will greatly enhance the appeal of data bases that are primarily text.

- Aggressiveness of software vendors in offering friendly data base interfaces. In-Search by Menlo Corporation, for example, is a software product that has greatly simplified the task of accessing and using Lockheed's Dialog data base services.

2. SEGMENT ANALYSIS

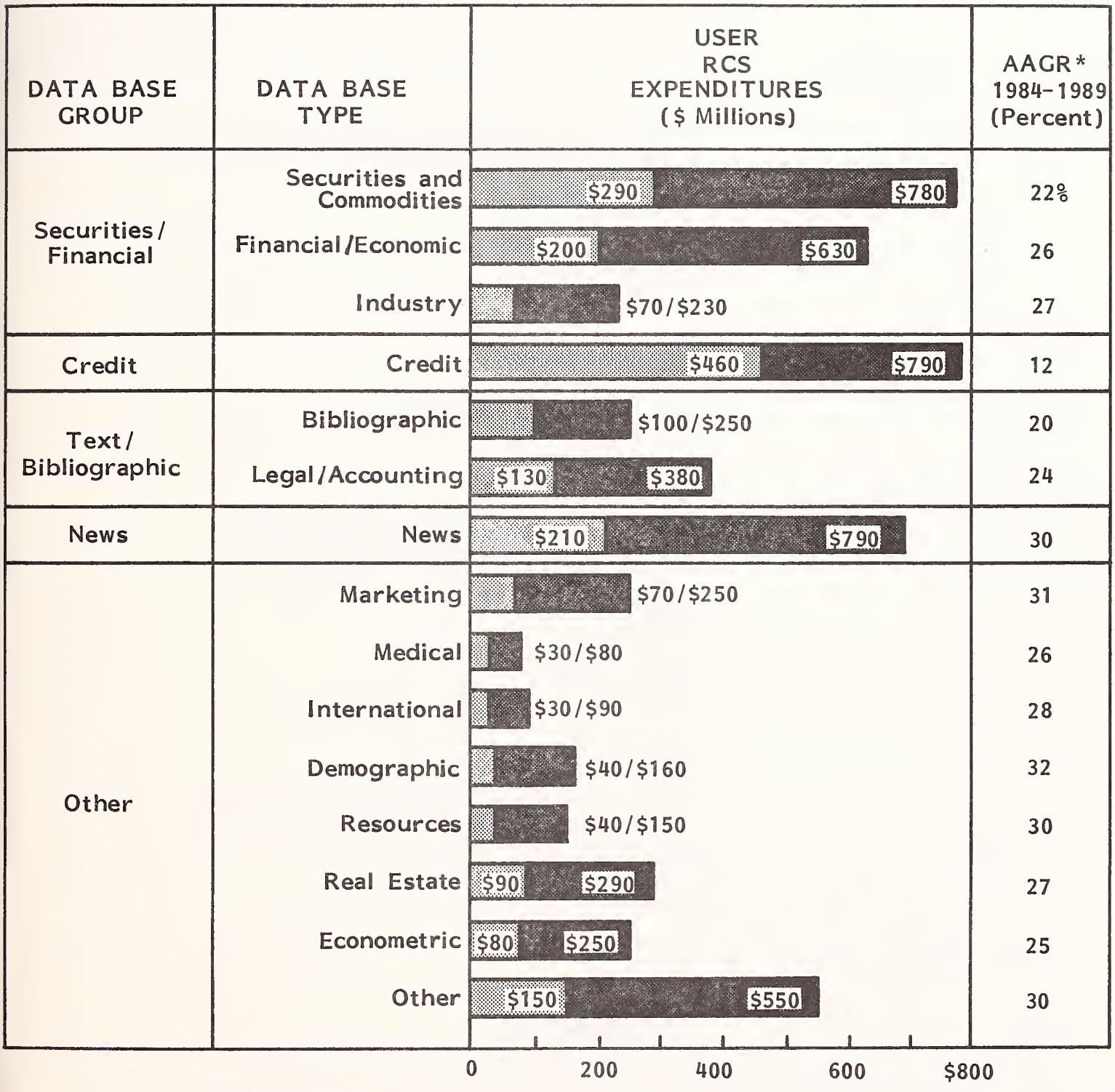
- Fifteen major data base sectors and their growth rates are shown in Exhibit III-8. The five-year growth rates range from a low of 12% (credit) to a high of 31% (marketing). Consumer credit services is a relatively saturated market, although growth opportunities still exist in areas such as business credit. Marketing data base services will benefit from expanded automated data collection and integration of data bases with processing services applications.

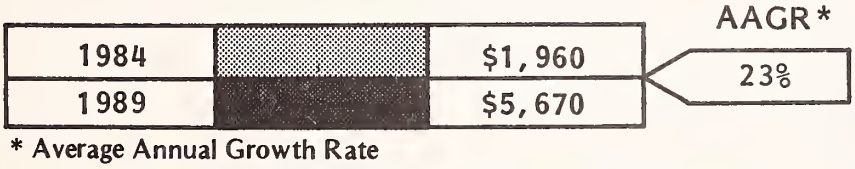
- The major data base sectors all reflect user thirst for information that has a bearing on dollars-and-cents decisions in an increasingly complex and volatile economy. Even the news market is oriented toward financially-related news such as that provided by the Dow Jones Information Service.

- The appeal of on-line data base services to various industry segments is shown in Exhibit III-9. The largest industry segments are also the largest RCS markets. Users are already equipped for terminal-based services with terminal/workstations and trained personnel.

EXHIBIT III-8

ON-LINE DATA BASE MARKETS BY DATA BASE TYPE,
1984-1989



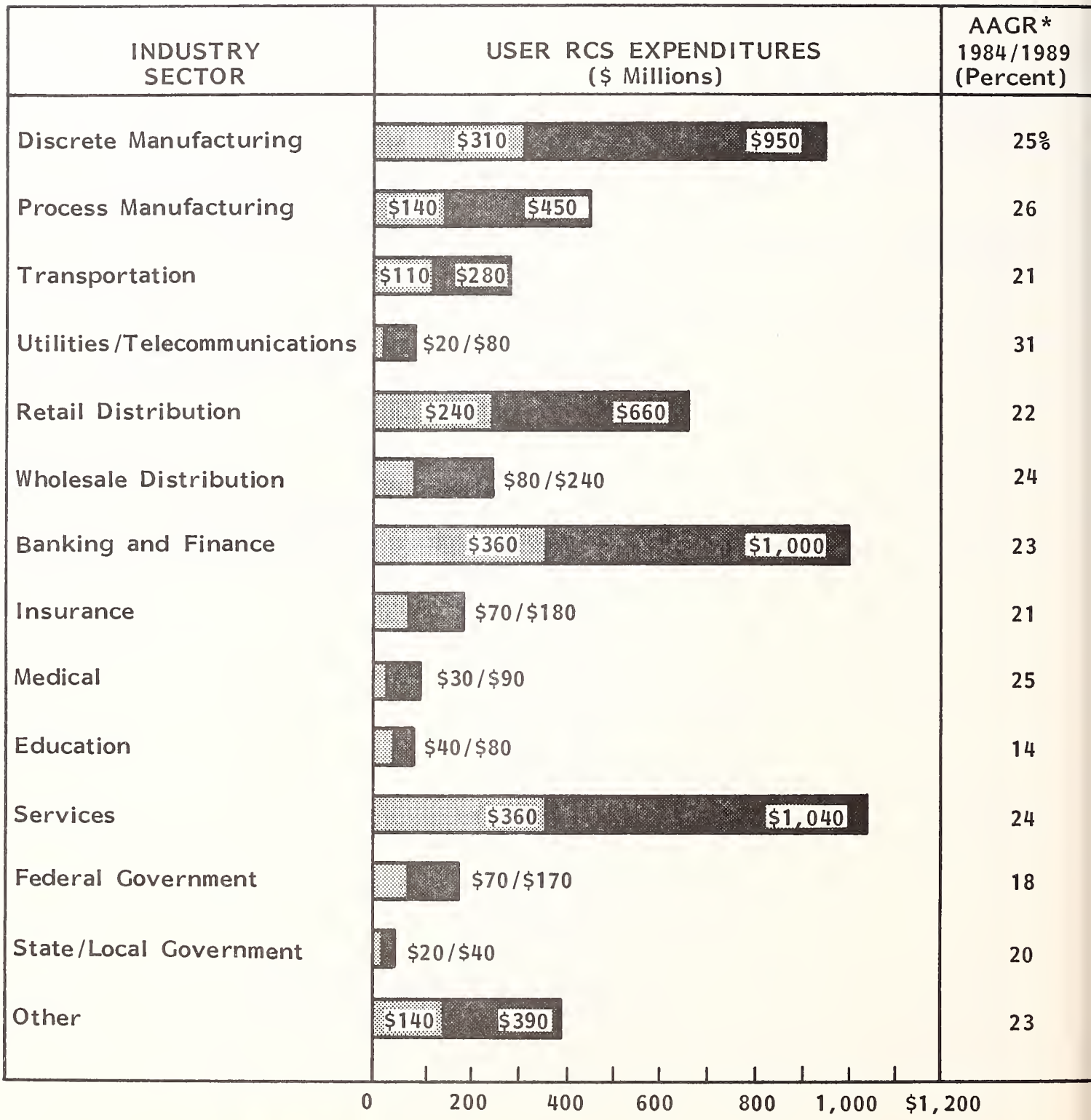


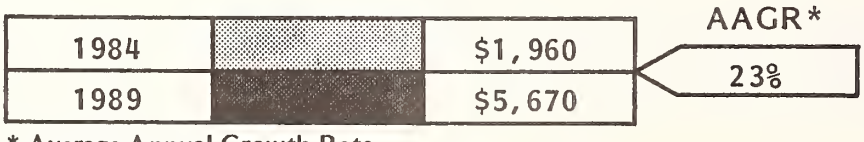
* Average Annual Growth Rate

Note: Dollar amounts are rounded to the nearest $10 thousand.

EXHIBIT III-9

ON-LINE DATA BASE MARKETS BY INDUSTRY SEGMENT,
1984-1989





* Average Annual Growth Rate
Note: Dollar amounts are rounded to the nearest $10 thousand.

D. BATCH SERVICES

1. MARKET SIZE, ISSUES, AND TRENDS

- In the aggregate, batch services will grow 5% annually for the next five years. From a base of $4.7 billion in 1984 these services will expand to become a $6.1 billion market by 1989, as shown in Exhibit III-10.

- The batch area includes a wide variety of very diverse applications, listed in Exhibit III-11. A number of these applications will do much better than the 5% average for batch services.

  - Payroll services, for example, is one of the bastions of processing services vendor offerings. Complex tax and government reporting requirements make this one of the applicaiton areas most resistant to in-house migration. It is important to note that although payroll services are growing, they are changing from a purely batch service to a mixture of batch and remote batch.

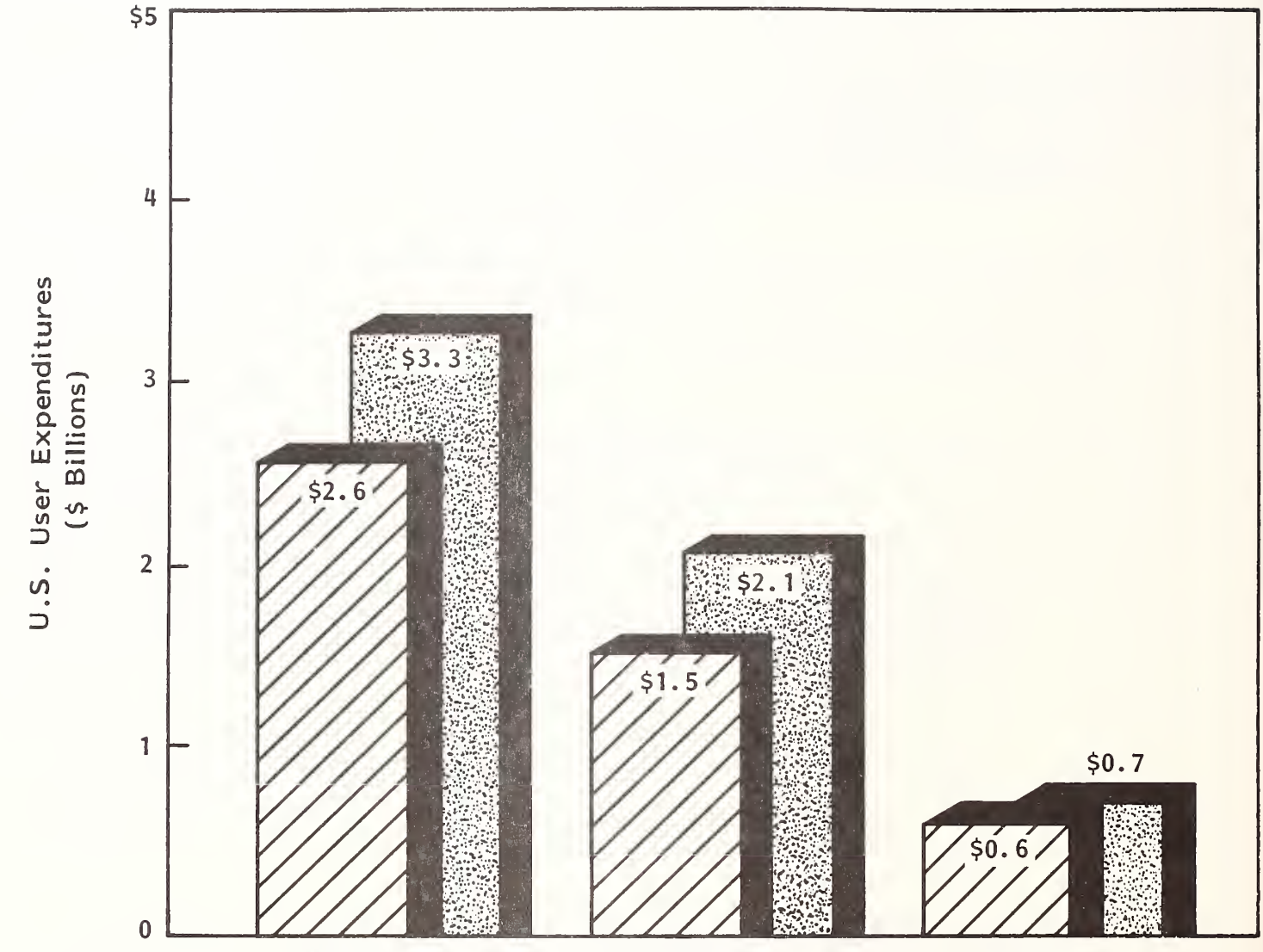
  - Other formerly all-batch areas are also evolving into combinations of batch and remote batch. These include tax processing, check processing, and insurance claims processing.

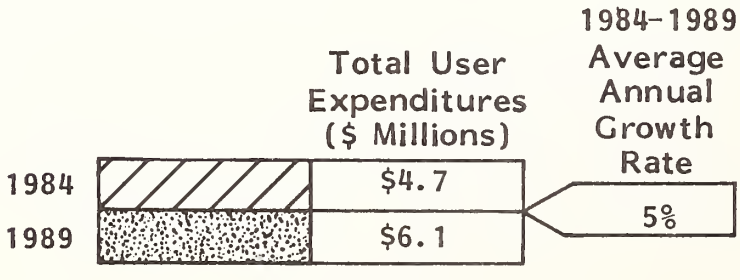
- Many of the batch applications involve paper transactions. In future, paper will decline in importance and will be replaced by electronic transactions. This trend provides opportunities for vendors to become providers of communications-based services, including the supplying of turnkey systems at customer sites.

- For some applications, such as credit card, check processing, and insurance claims processing, these communications-based services can be extended into major facilities management contract opportunities.

EXHIBIT III-10

BATCH SERVICES MARKET BY SEGMENT TYPE, 1984-1989





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

EXHIBIT III-11

BATCH SERVICES APPLICATION EXAMPLES

APPLICATION TYPE	EXAMPLES
Specialized	
Cross-Industry	Payroll
	Accounting
	Taxes
	Direct Mail
Industry-Specific	Geophysical
	Geochemical
	Credit Card
	Check Processing
	Insurance Claims Processing
Utility	Overflow Processing
	Disaster Recovery
	Computer Output Microfilm (COM)
	Data Entry
	Laser Printing

2. SEGMENT ANALYSIS

- Banking and finance industry-specific services is the largest of all batch segments, as shown in Exhibit III-12. The application areas related to correspondent banking will do well as smaller banks, struggling under the impact of deregulation, seek processing help from larger banks with whom they feel comfortable.

- Process manufacturers are benefiting from the resurgence of the economy, especially suppliers to the automotive industry, such as plastics and rubber manufacturers. Important application areas in the processing manufacturing category include raw material analysis and bleeding analysis. For energy companies, exploration analysis is an important long-term application.

- Exhibit III-13 shows the batch services cross-industry markets categorized by key market segments.

  - Accounting systems related to batch services are especially appealing to smaller businesses. However, this segment will not grow as fast as the rate of inflation, due to its vulnerability to in-house migration on mini- or microcomputers.

  - The human resources segment includes payroll as well as personnel- and benefits-related applications. As mentioned earlier, payroll will continue to be a strong services application but will evolve into a combination of RCS, batch, and even turnkey services.

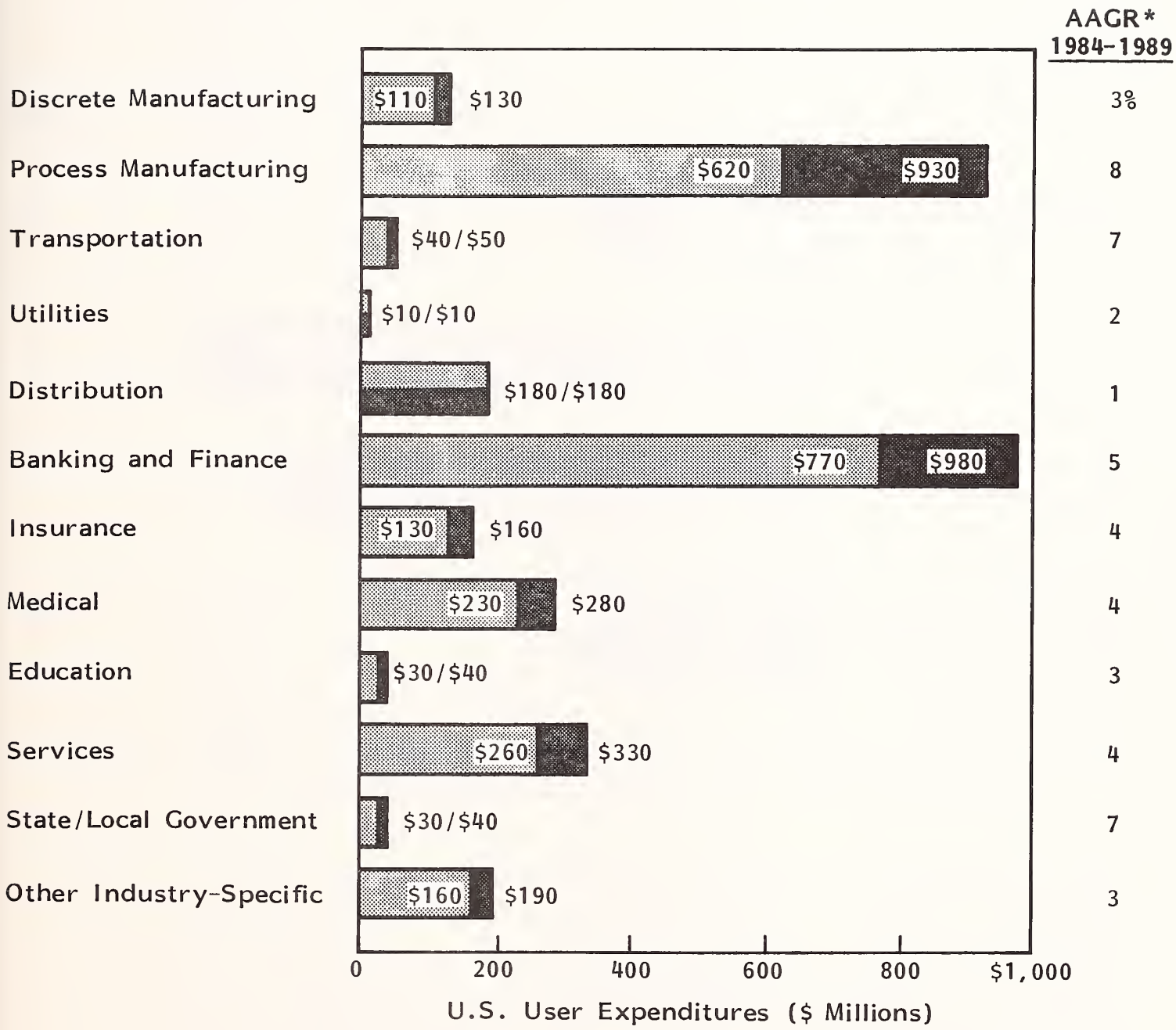
3. UTILITY SERVICES

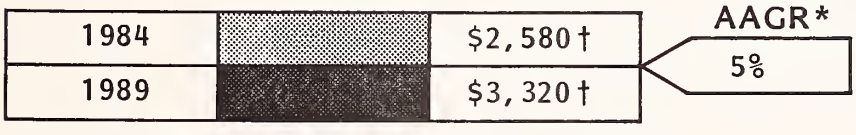
- Batch utility processing services will grow 2% annually during the next five years, rising from a 1984 base of $603 million to a 1989 level of $666 million. Although growth is not great, this aspect of the market still constitutes almost 15% of the total batch marketplace.

EXHIBIT III-12

BATCH SERVICES

INDUSTRY-SPECIFIC APPLICATIONS MARKETS, 1984-1989





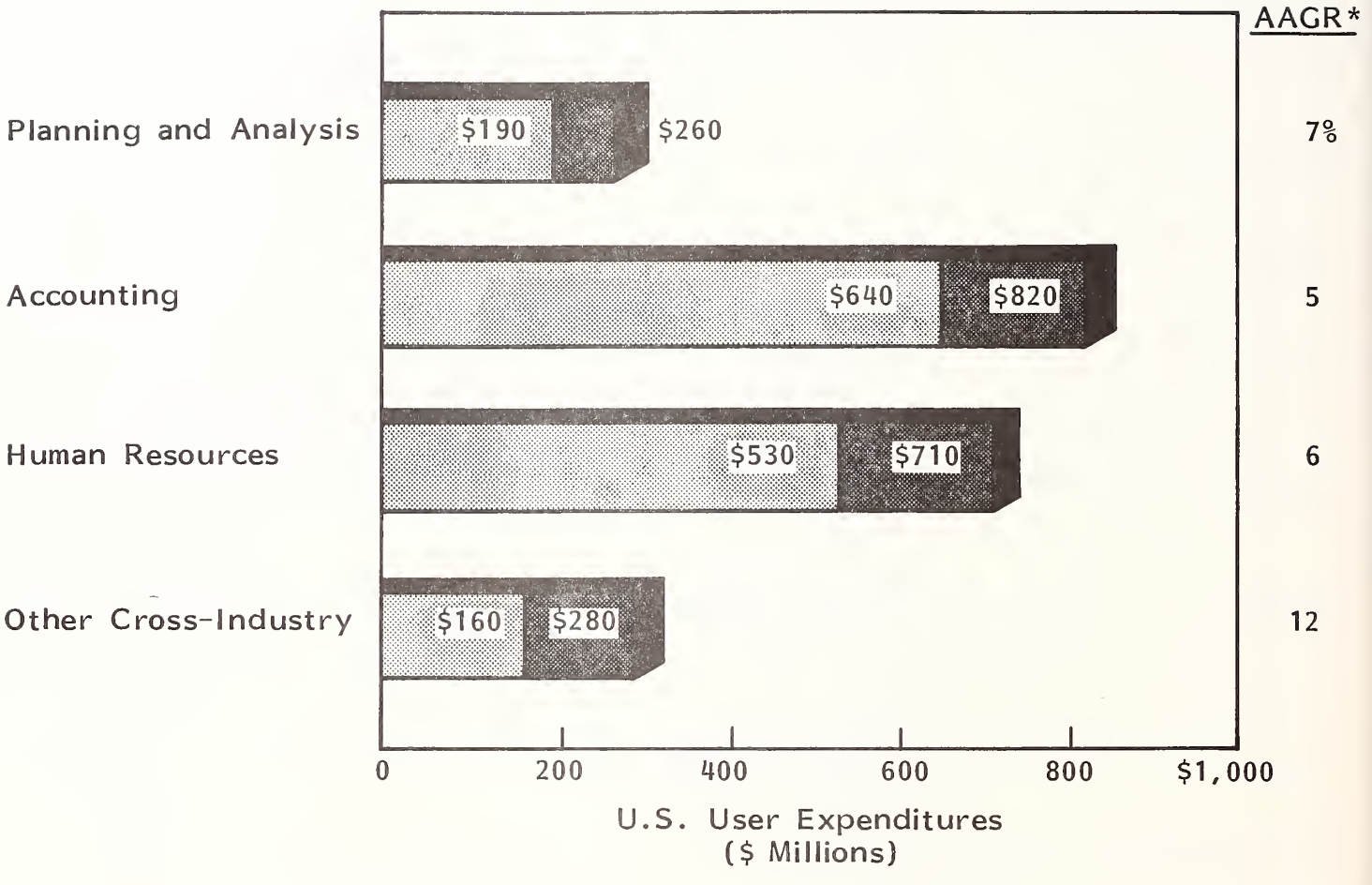
Note: All dollars are rounded to the nearest $10 million.

*Average Annual Growth Rate

†Figure also includes telecommunications and federal government.

EXHIBIT III-13

BATCH SERVICES
CROSS-INDUSTRY APPLICATIONS MARKETS, 1984-1989



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

*Average Annual Growth Rate

- Utility services have the advantage of providing potential profit opportunities with little incremental investment. Opportunities worth considering as add-on services (especially to existing customers for whom sales costs would be minimized) include fixed processing capacity services (where a pre-established amount of processing and storage is provided for a fixed monthly fee) and consolidation of processing previously done at multiple client sites.

- Application areas with utility processing potential include micro-mainframe interface capabilities and data base access and manipulation tools.

E. VALUE-ADDED NETWORKS (VANS)

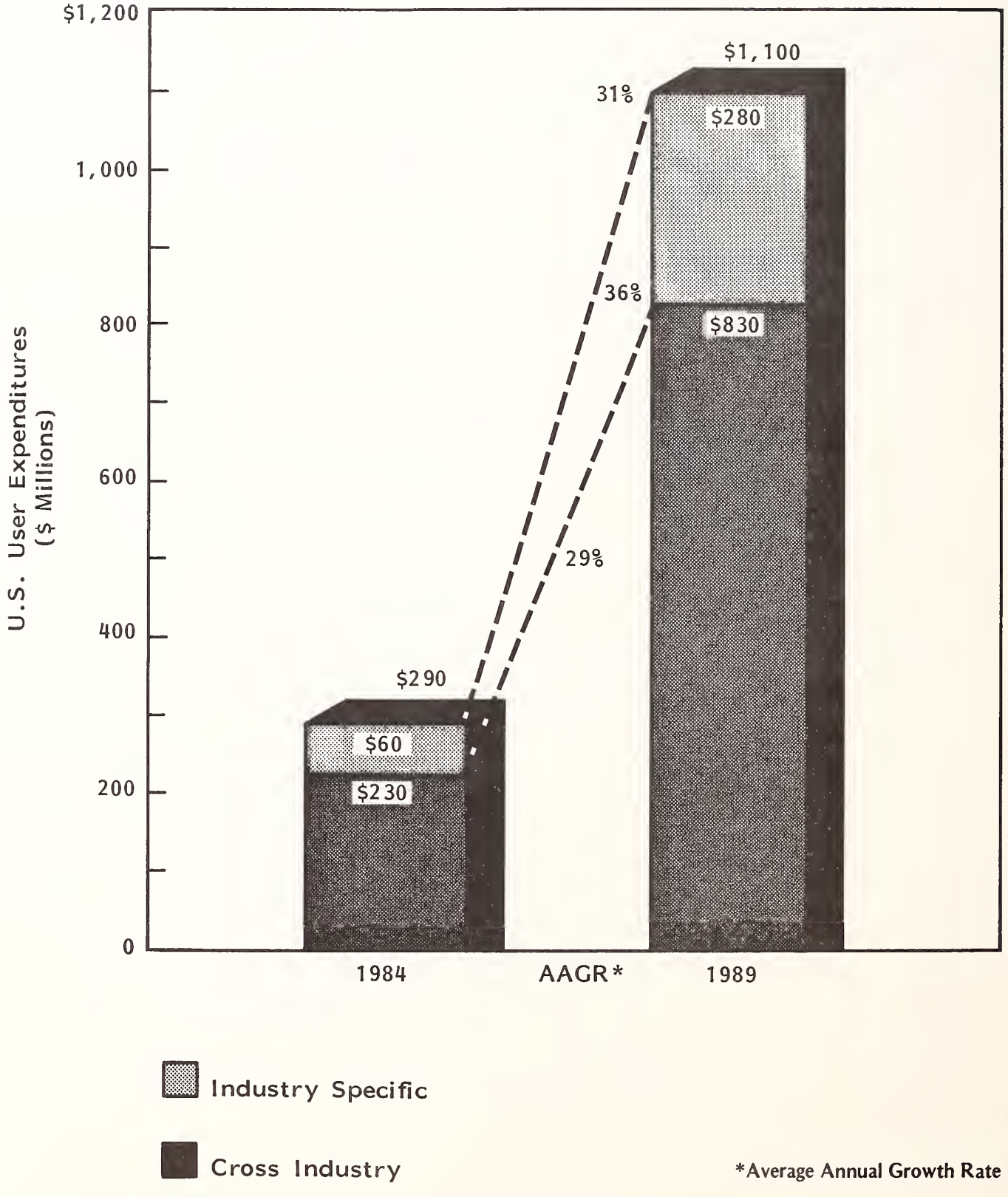
1. MARKET SIZE, ISSUES, AND TRENDS

- As shown in Exhibit III-14, cross-industry-oriented VANs will continue to comprise the bulk of the expenditures during this forecast period, although industry-specific networks will grow faster. In addition to the current IVANS network now being established by IBM and the Institute for Insurance Research (IIR) for the use of property and casualty agents, other industry-oriented VANs will emerge in industries such as medical and banking.

- The entire market for interindustry and intraindustry networks will grow significantly during the remainder of the decade. In addition to the above mentioned industries, others such as transportation (especially as related to the distribution function) will emerge as important markets, as will manufacturing-distributor-retailer networks. The size, complexity, and importance of network applications will dictate an industry-customized approach.

EXHIBIT III-14

VALUE-ADDED NETWORKS MARKET FORECAST, 1984-1989



2. COMPETITIVE TRENDS

- Competition is intensifying in the VANs market. Aggressive hardware vendors will be offering packet switches for private networking to VAN customers with high-volume activity. In addition, Bell operating companies (BOCs) and AT&T are pursuing intra-LATA (Local Area Transport Area) and inter-LATA packet network opportunities that will further generate significant competition in the VANs area.

- On balance, INPUT recommends that vendors that currently have less than a significant market share reassess their ability to compete in the generalized VANs marketplace in the long term. Even though the VANs market will grow relatively rapidly, the underlying structure and driving forces of the market will continue to change during the next five years. These changes will favor well-capitalized and technologically sophisticated vendors.

- Vendors eager to establish a VANs market position should look closely at industry-specific networks, which leverage increasing user interest in applications designed to improve one's competitive edge.

F. FACILITIES MANAGEMENT

- The processing services facilities management (FM) marketplace will more than double in the next five years, as Exhibit III-15 shows.

- Throughout this period, the four major industry markets that comprise the bulk of the expenditures--banking and finance, medical, insurance, and federal government--will remain the same, according to Exhibit III-16. These regulated, standardized industries will continue to be targeted by vendors specializing in these areas.

PROCESSING SERVICES FACILITIES MANAGEMENT MARKET,
1984-1989

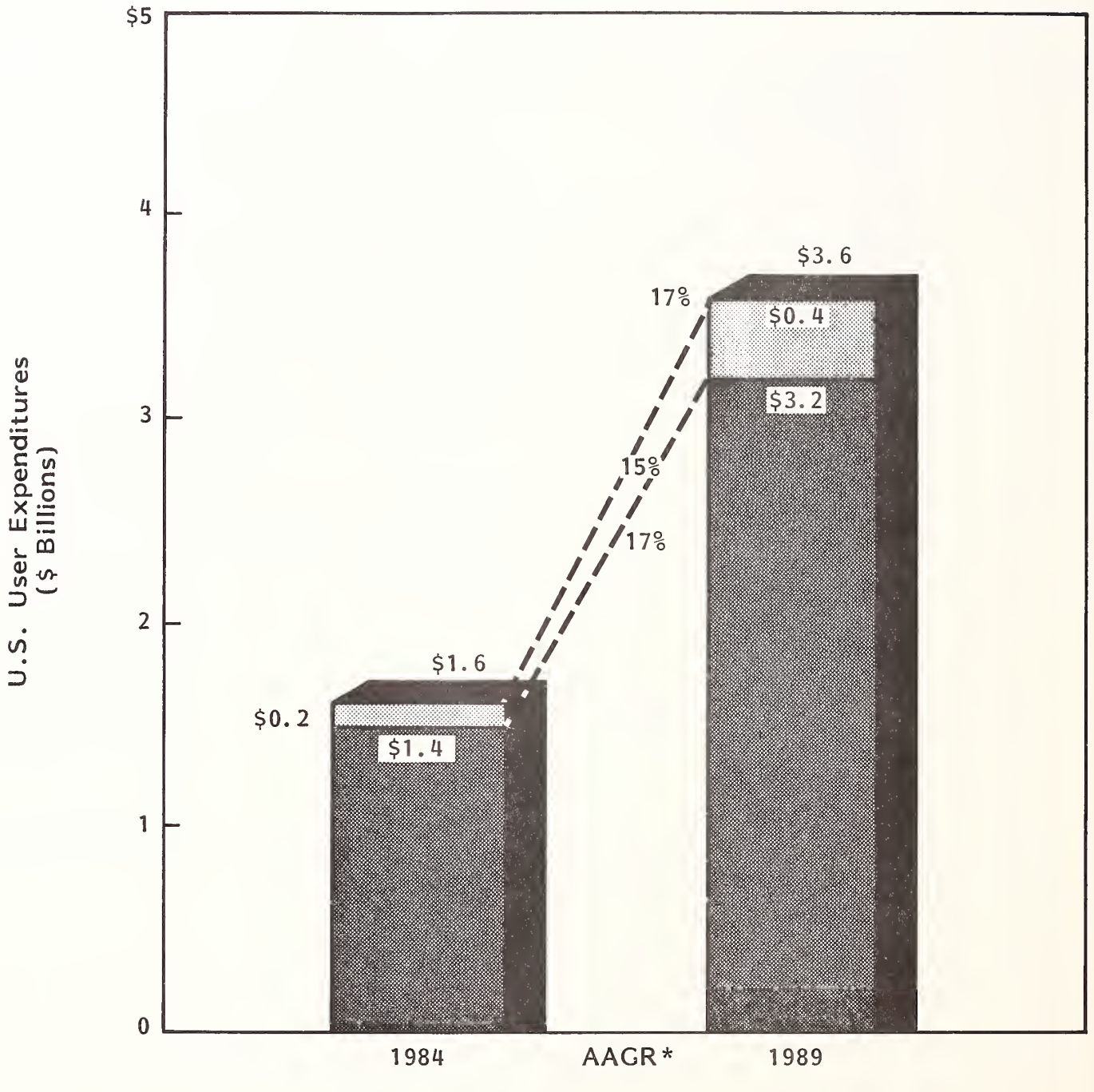
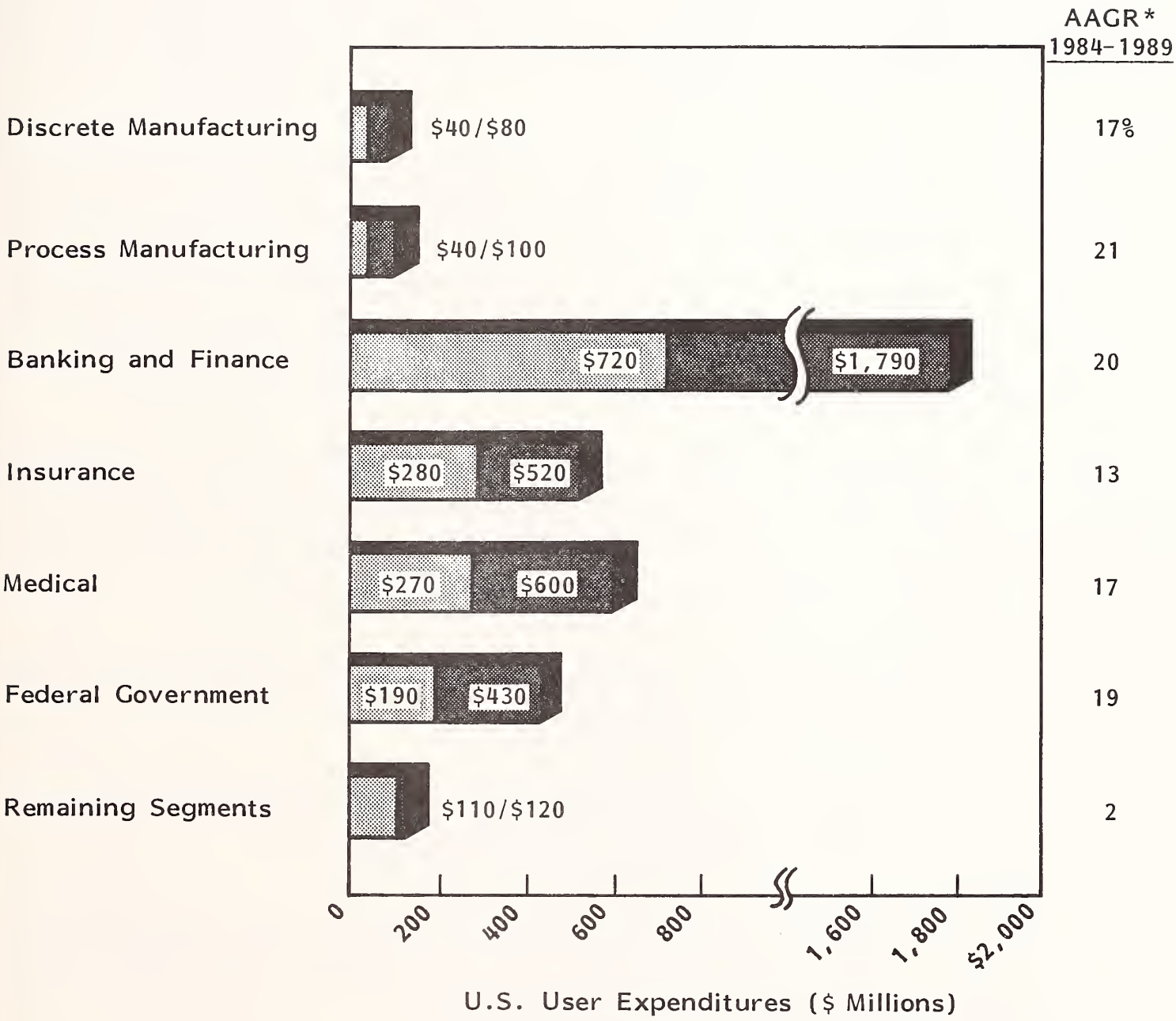
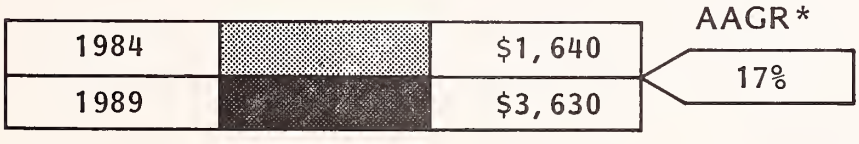


EXHIBIT III-16

PROCESSING SERVICES FACILITIES MANAGEMENT INDUSTRY, 1984-1989





*Average Annual Growth Rate

Note: Dollar amounts are rounded to the nearest $10 thousand.

- INPUT believes that FM will continue to be attractive primarily to the medium-sized firms. FM for these organizations is especially attractive because the prospective client is continually fighting the problem of losing good people throughout the firm to either larger or more specialized companies. As a result, it cannot change systems easily and thus becomes attracted to the FM approach.

- Smaller firms are hesitant about FM, primarily because they are ignorant of the complexities of information systems processing. It is only after they have invested in on-site hardware of their own that they discover the complexities. By then they are locked into long-term expenditures that they are reluctant to discontinue, for financial and/or emotional reasons. FM vendors should offer a way for users to break out of these situations.

- The gateway to FM contracts with large firms often starts with assuming responsibility for processing of a major system, such as credit cards or checks for banks, or claims for insurance firms. Once vendor credibility is established, the likelihood of closing an FM contract increases.

- The favorable outlook for federal government for this market segment is due to a number of factors including:

  - Pressures from the federal deficit. These pressures encourage cost-effective approaches such as those offered via FM.

  - Staffing needs for implementation of data centers already approved. These needs will exceed government personnel availability, thereby opening the door for FM alternatives.

  - Emergence of new technology, especially central processing units. These new offerings will encompass systems networking and distributed processing, which are complex undertakings that are well suited to some FM vendors.

- The processing, services facilities management market for the federal government is approximately one-half the size of its counterpart--professional services facilities management. Both types of FM are discussed in considerable detail in INPUT's report, Federal ADP Facilities Management Market, 1985-1990.

IV TURNKEY SYSTEMS

IV TURNKEY SYSTEMS

A. MARKET TRENDS

- Turnkey systems market growth is accelerating. The 1984-1989 period will reflect a 27% annual growth rate, making turnkey systems the second fastest growing mode in the information services industry, as shown in Exhibit IV-1. The turnkey systems rebound from the 1982 recession is now complete.

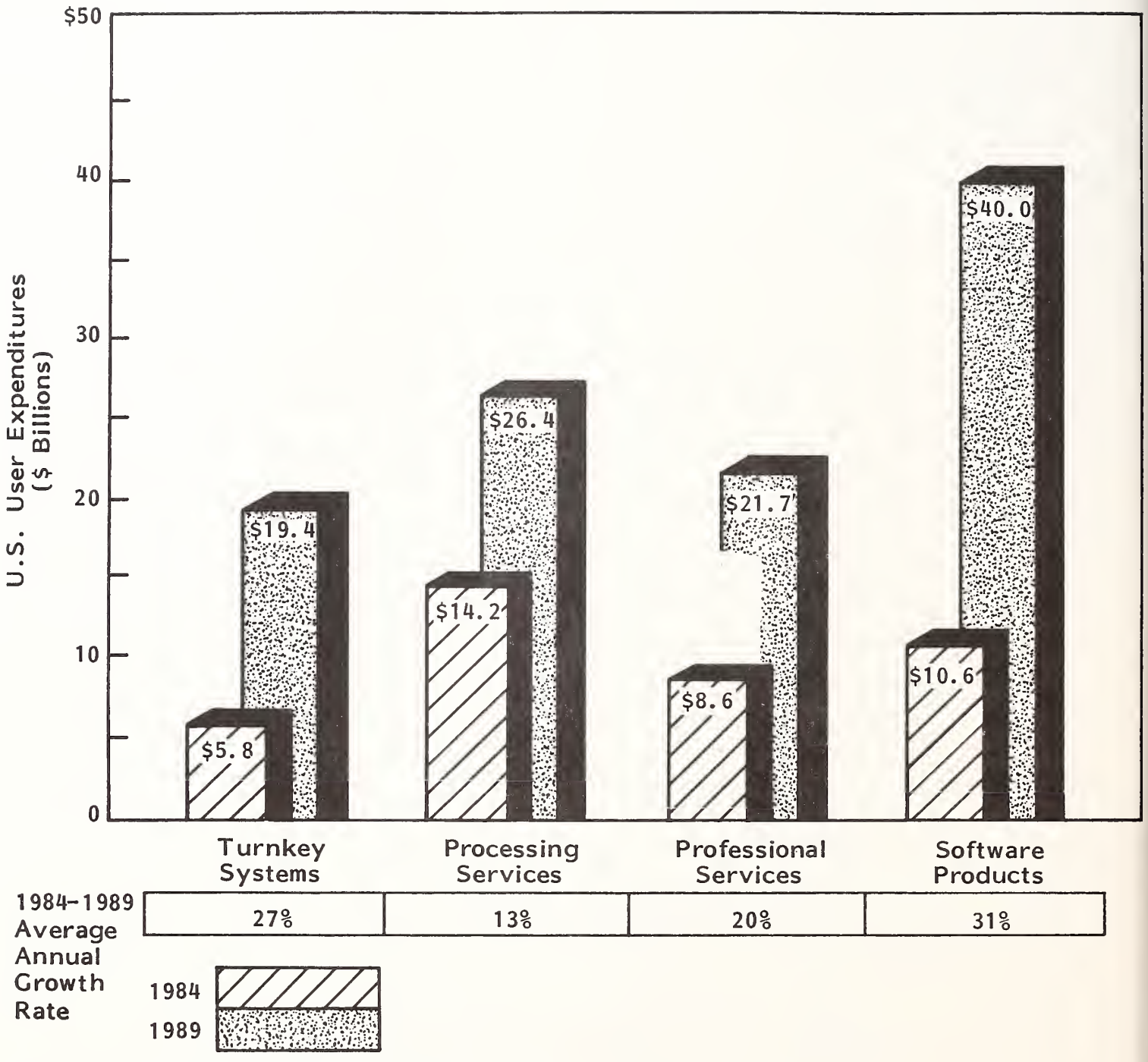
- The appeal of a complete hardware/software system over which the user has direct control is especially alluring in this age of end-user computing. For the rest of the decade, turnkey systems vendors will benefit from users' active search for total solutions and ongoing support. The overall market will increase 27% annually, more than tripling in five years. However, the "hardware" component will decrease relative to the total system price. Thus, the software and services component of this impact will grow even more rapidly than software products.

- The entire turnkey systems market is deriving its strength from a number of sources.

  - The economic recovery has enabled businesses to increase their capital expenditures. Turnkey systems are perceived as important tools in the ongoing race for improved productivity.

EXHIBIT IV-1

TURNKEY SYSTEMS MARKET SIZE COMPARISON



Note: Dollar amounts are rounded to the nearest $10 million.

- Improved microcomputer technology has brought significantly more power per hardware dollar. Thus, turnkey systems vendors have been able to open new markets by offering useful systems at prices often one-third or less of those from a few years ago.

- The availability of "supermini" hardware has enhanced this market. On the high end, minicomputer hardware has become powerful enough to challenge the functionality of mainframe systems. This has enabled vendors to provide departmental turnkey solutions in place of large-scale, centralized corporate systems.

B. COMPETITIVE DEVELOPMENTS

- A number of turnkey systems vendors are performing exceptionally well. Exhibit IV-2 lists INPUT's "growth stars," i.e., those publicly held turnkey systems firms that have grown the fastest recently in terms of both revenue and net income.

  - Two of the three vendors are CAD/CAM suppliers--Daisy Systems and Intergraph. The former focuses on supermicro-based systems for electronic engineers, and the latter emphasizes mechanical design support using minicomputers.

  - The third growth star--ASK Computer Systems--specializes in MRP-related applications for manufacturers. Now entering its 11th year, the company is expanding its coverage of Hewlett-Packard systems to include DEC-based systems as well as computer-integrated manufacturing (CIM) applications.

EXHIBIT IV-2

TURNKEY SYSTEMS GROWTH STARS

VENDOR	REVENUE GROWTH*	NET INCOME GROWTH*	ANNUAL REVENUES† ($ Millions)
Daisy Systems	366%	775%	$69 (9/84)
Intergraph	69	116	$252 (12/83)
ASK Computer	63	67	$65 (6/84)

* Percentage increase for nine-month period ending June 1984 versus the same period a year earlier.

† For fiscal year ending month shown in parentheses.

C. SEGMENT GROWTH

- The healthy growth of turnkey markets is widespread. All of the sixteen industry-specific segments forecasted in Exhibit IV-3 have growth rates of 19% or more. Eleven of the sixteen have annual increases of at least 25%.

- The largest segment, discrete manufacturing, accounts for over 20% of the entire market throughout this five-year period. CAD/CAM/CIM applications are especially strong as manufacturers aggressively implement these automation tools to enhance their competitiveness in U.S. and world markets.

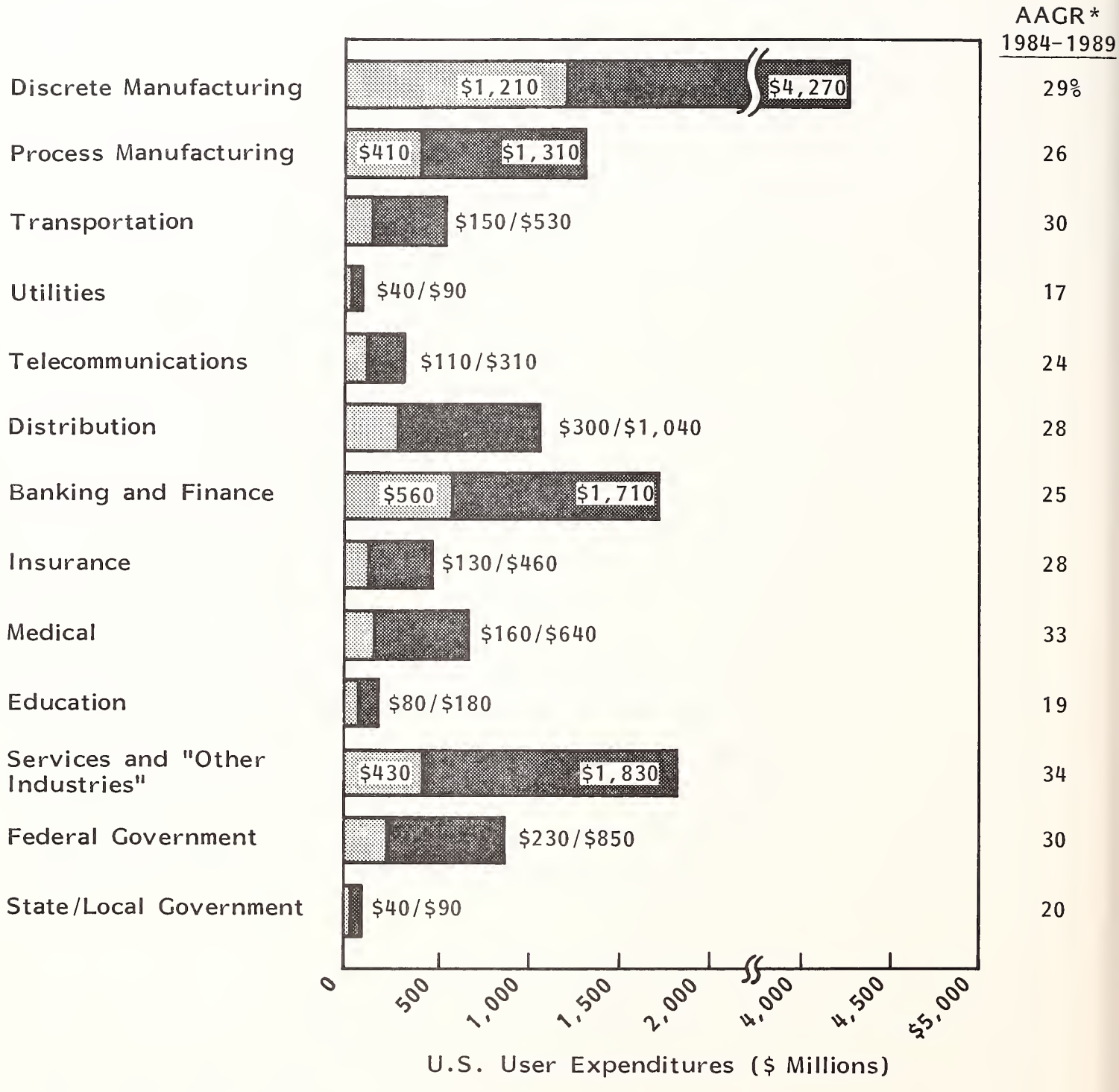
- Banking and finance offers attractive opportunities in a wide variety of areas. Within commercial banks, turnkey systems are especially popular for personal trust systems (small to medium-sized banks), KEOGH and small employee-benefit plans, investment management, corporate trust, and branch banking. S&Ls have high interest in turnkey systems for mainline processing as well as for loan origination, loan documentation, construction, and real estate management.

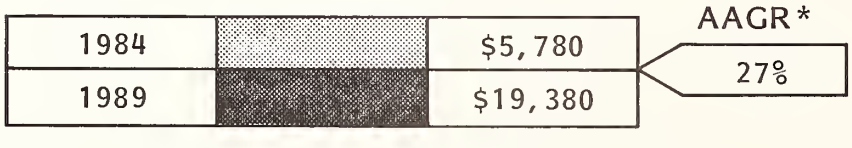
- Retail and wholesale distribution systems will grow at an impressive 28% annually (accounting for expenditures of $1 billion in 1989) to become one of the five largest turnkey markets in 1989. This market forecast includes a 23% downward adjustment in the 1983 market size to $230 million (from $282 million for 1983 in last year's INPUT analysis). However, it also includes an upward adjustment of three percentage points in the five-year, 28% growth rate (from 25% forecasted a year ago).

- The 1983 market size change reflects that the impact of the recession on key turnkey vendors, such as Triad Systems, was greater than anticipated. The slowdown from a year ago has now been more than compensated as retailers and wholesalers enhance their competitiveness via automated turnkey solutions.

EXHIBIT IV-3

TURNKEY SYSTEMS
INDUSTRY-SPECIFIC APPLICATIONS MARKETS, 1984-1989





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

*Average Annual Growth Rate

D. ISSUES AND TRENDS

1. EXTENT OF SPECIALIZATION

- Turnkey systems vendors tend to be more specialized than vendors focusing on other modes of delivery. INPUT's mid-1984 survey of over 500 information services vendors in the U.S. revealed that of those specializing in turnkey systems, on the average only 11% of their revenue came from modes other than turnkey (i.e., from processing services, professional services, or software products). This was in contrast to vendors of other delivery modes, such as processing services; for these vendors, 17% of their revenue came from modes other than processing.

- INPUT believes this proportion must and will change in the future as turnkey systems vendors become more adept at understanding and responding to their clients' special needs. More turnkey vendors will follow the lead of firms such as ASK Computer, which aggressively offers remote computing services to customers too small, or as yet unprepared to convert to a turnkey product.

2. VAR/VAD OUTLOOK

- Value-added remarketers (VARs) and value-added dealers (VADs) will play an important role in the marketplace during the next five years. These primarily local and regional vendors are adept at carving out market niches too specialized for larger organizations. VAR and VAD vendors work very closely, usually via formal agreements, with major hardware vendors in terms of sales, lead exchange, sales strategy, and most importantly, ongoing post-sale support.

- IBM, as well as other major hardware suppliers, will continue to become more aggressive in their support of the VAR/VAD concept. IBM has publicly stated its intention to be an innovator in this area, because it recognizes the limitations of an in-house sales force in reaching specialty markets.

- The VAR/VAD concept will also continue to extend to large corporations. Just as Delta Airlines provides IBM-based systems to travel agents and Aetna offers Series-1-based computers to insurance agents, so will other Fortune 500 firms become active in areas they are uniquely equipped to serve.

3. PERCEIVED THREATS

- INPUT surveys reveal that the intensification of competition and general economic conditions are of uppermost concern to turnkey vendors. The former reflects the impact of micro-based systems, which offer price-performance levels of significant challenge to low-end minicomputer-based offerings. Anxiety over economic conditions is a leftover from the recession of two years ago, which heavily impacted turnkey vendors.

- Turnkey systems vendors are less vulnerable now to economic downturns, because they have systems with lower entry-level prices and they have a larger customer base and revenue stream, which helps provide stability in times of adversity.

4. SERVICE AND SUPPORT

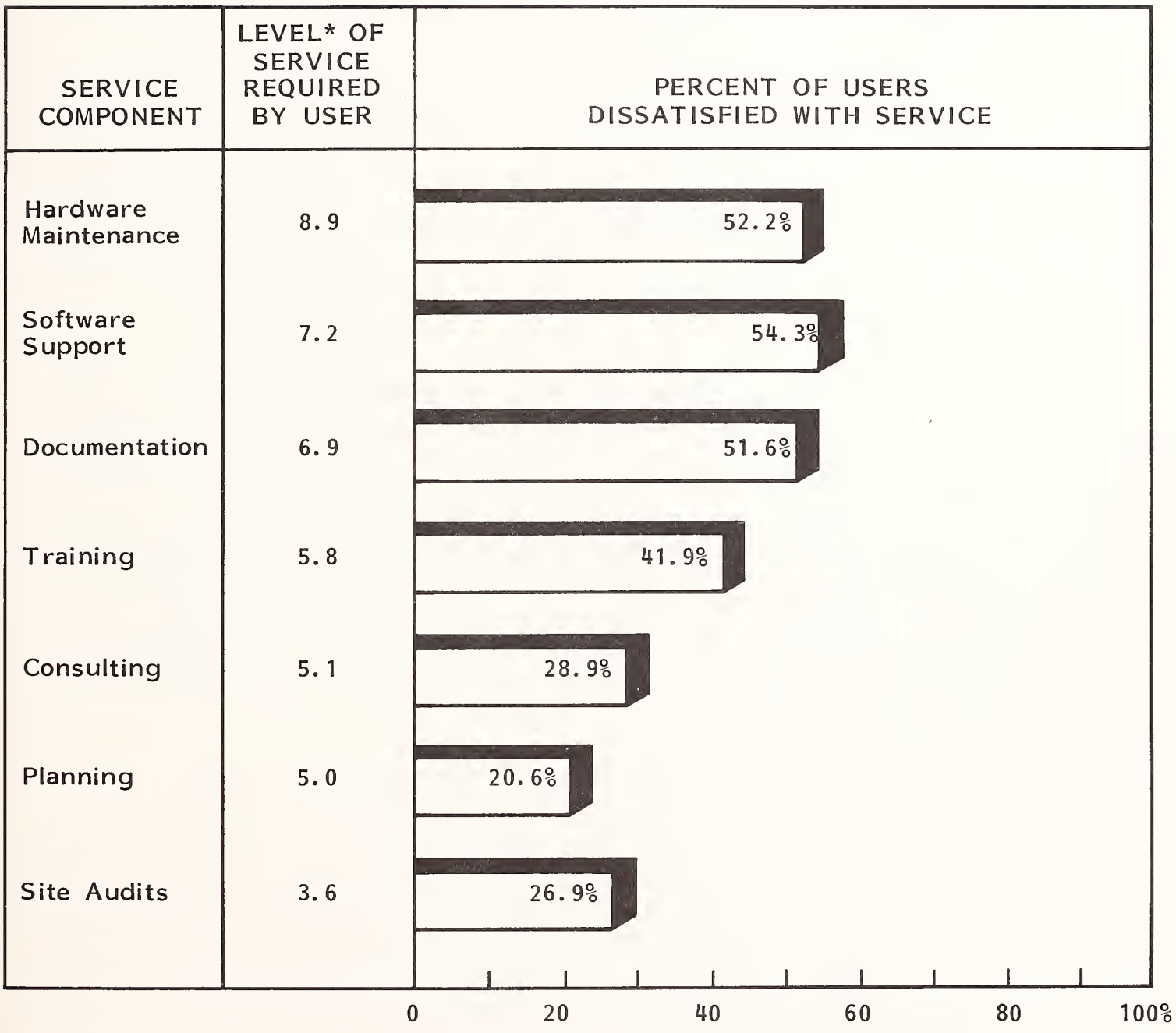
- As competition intensifies in the turnkey systems marketplace, vendors are searching for strategies to enhance their competitive edge. INPUT's research indicates that hardware and software post-sale service and support is a major opportunity.

- Exhibit IV-4, which is based on a recent INPUT survey of minicomputer users, indicates that hardware and software maintenance are major areas of dissatisfaction. This user dissatisfaction can be employed to the advantage of the turnkey systems vendor that upgrades such services to a point that is demonstrably better than competitors' offerings.

EXHIBIT IV-4

MINICOMPUTER USER POST-SALE SERVICE REQUIREMENTS

SERVICE COMPONENT	LEVEL* OF SERVICE REQUIRED BY USER	PERCENT OF USERS DISSATISFIED WITH SERVICE
Hardware Maintenance	8.9	52.2%
Software Support	7.2	54.3%
Documentation	6.9	51.6%
Training	5.8	41.9%
Consulting	5.1	28.9%
Planning	5.0	20.6%
Site Audits	3.6	26.9%



*Rating: 1 = Low, 10 = High.

Source: INPUT Customer Service Program Report.

- There exist numerous opportunities to improve the quality of customer service as well as the profit received from such an activity. Exhibit IV-5 profiles the average customer service expense breakdown for vendors offering such service. With labor constituting almost half of revenue, opportunities for productivity gains via labor-saving devices are abundant. For example, in the software maintenance and support area, options include:

  - Remote support: There is much interest and planning among vendors of "remote support," i.e., automatic downloading, remote diagnostics, and remote fixes. Over 25% of minicomputer vendors use these types of services. INPUT urges turnkey vendors to seriously investigate these services but to keep in mind that many customers remain somewhat skeptical, since it is not clear what tangible benefits result.

  - Customer self-support: Eighty percent of minicomputer customers interviewed by INPUT see more self-support occuring in the future. In fact, most are currently very active in undertaking such activities. For example, they are installing initial releases of software as well as subsequent releases. In addition, at least half of the customers sometimes modify packages or fix errors and/or have internal "help desks" established. It is encouraging to note that over half the customers interviewed would like to be given additional incentives to undertake more self-support.

  - Electronic support: This type of support will be important for improving the customer's perception of value. Electronic support should be two-way, with customer initiation (in contrast to downloading of fixes and/or remote diagnostics). For example, a combination of a vendor data base summarizing software problems and their solutions, and a natural language query interface to the data base for the customer would provide such support.

EXHIBIT IV-5

AVERAGE VENDOR PROFIT PROFILE FOR CUSTOMER SERVICES

ITEM	1983 PERCENT OF REVENUE	
Labor		
Direct, Hardware	24%	
Direct, Software	10	
Remote Support	3	
Total Labor	37%	49%
Management/Supervision	6%	
Benefits	6%	
Parts		
Usage	16%	
Inventory Depreciation	3	
Total Parts	19%	34%
Travel/Other	7%	
Overhead/Miscellaneous	8%	
Net before Tax Profit		17%
Total		100%

APPENDIX A: DEFINITIONS

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.

- SYSTEMS INTEGRATION - Services associated with systems design, integration of computing components, installation and acceptance of computer/communication systems. Systems integration can include one or more of the major information services delivery modes--professional services, turnkey systems and software products. System components may be furnished by separate vendors (not as an integrated system by one vendor, called the prime contractor); services may be furnished by a vendor or by a not-for-profit

organization. Integration services may be provided with related engineering activities, such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

C. HARDWARE/HARDWARE SYSTEMS

- HARDWARE - Includes all computer communications equipment that can be separatedly acquired, with or without installation by the vendor, and not acquired as part of a system.

  - PERIPHERALS - Includes all input, output, communications, and storage devices, other than main memory, that can be locally connected to the main processor and generally cannot be included in other categories, such as terminals.

  - INPUT DEVICES - Includes keyboards, numeric pads, card records, bar-code readers, lightpens and trackballs, tape readers, position and motion sensors, and A-to-D (analog-to-dialog) converters.

  - OUTPUT DEVICES - Includes printers, CRTs, projection television screens, microfilm processors, digital graphics, and plotters.

  - COMMUNICATION DEVICES - Modems, encryption equipment, special interfaces, and error control.

  - STORAGE DEVICES - Includes magnetic tape (real, cartridge, and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

- TERMINALS - There are three types of terminals:

  - USER PROGRAMMABLE (also called "intelligent terminals"):

    . Single-station or standalone.

    . Multistation-shared processor.

    . Teleprinter.

    . Remote batch.

  - USER NONPROGRAMMABLE:

    . Single-station.

    . Multistation-shared processor.

    . Teleprinter.

  - LIMITED FUNCTION - Originally developed for specific needs, such as POS (point of sale), inventory data collection, controlled access, etc.

- HARDWARE SYSTEMS - Includes all processors, from microcomputers to super (scientific) computers. Hardware systems require type- or model-unique operating software to be functional, but the category excludes applications software and peripheral devices, other than main memory and processor or CPUs not provided as part of an integrated (turnkey) system.

  - MICROCOMPUTER (or personal computer or PC) - Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip, in the form of:

- Integrated circuit package.

- Plug-in board with more memory and peripheral circuits.

- Console--including keyboard and interfacing connectors.

- Personal computer with at least one external storage device directly addressable by CPU.

- MINICOMPUTER - Usually a 12-, 16- or 32-bit computer, which may be provided with limited applications software and support, and may represent a portion of a complete large system.

  - Personal business computer.

  - Small laboratory computer.

  - Nodal computer in a distributed data network, remote data collection network, connected to remote microcomputers.

- MAINFRAME - Typically a 32- or 64-bit computer, with extensive applications software and a number of peripherals in standalone or multiple CPU configurations for business (administrative, personnel, and logistics) applications; also called a general-purpose computer.

  - Large computer mainframes are presently centered around storage controllers but are likely to become bus-oriented and to consist of multiple processors (CPUs) or parallel processors; they are intended for structured mathematical and signal processing, and are generally used with general-purpose Von Neumann-type processors for system control.

. Supercomputer mainframes are high-powered processors with numerical processing throughout that is significantly greater than the largest general-purpose computers, with capacities in the 10-50 MFLOPS (million floating point operations per second) range, in two categories:

- REAL TIME - Generally used for signal processing.

- NONREAL TIME - For scientific use, with maximum burst-mode (but sustained speed) capacities of up to 100 MFLOPS, in one of three configurations:

  . Parallel processors.

  . Pipeline processors.

  . Vector processors.

- Newer supercomputers--with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-three gigabyte class--are also becoming more common.

- EMBEDDED COMPUTER - Dedicated computer system designed and implemented as an integral part of a weapon or weapon system, or platform, that is critical to a military or intelligence mission, such as command and control, cryptological activities, or intelligence activities. Characterized by MIL SPEC (military specification) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. May vary in capacity from microcomputers to parallel-processor computer systems. Information services forecasts in this report do not include applications for this type of computer.

D. TELECOMMUNICATIONS

- NETWORKS - Interconnection services between computing resources. Provided on a leased basis by a vendor, to move data and/or textual information from one or more locations to one or more locations.

  - COMMON CARRIER NETWORK (CCN) - Provided via conventional voice-grade circuits and through regular switching facilities (dial-up calling) with leased or user-owned modems (to convert digital information to voice-grade tones) for transfer rates between 150 and 1,200 baud.

  - VALUE-ADDED NETWORK (VAN) - (See listing under Section B, Delivery Modes.)

  - LOCAL-AREA NETWORK (LAN) - Restricted limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. One of the two types:

    . BASEBAND - Voice bandwidth at voice frequencies (same as telephone, teletype system) limited to a single sender at any given moment and limited to speeds of 75 to 1,200 baud, in serial mode.

    . BROADBAND - Employs multiplexing techniques to increase carrier frequency between terminals, to provide:

      - Multiple (simultaneous) channels via FDM (Frequency Division Multiplexing).

- Multiple (time-sequenced) channels via TDM (Time Division Multiplexing).

- High-speed data transfer rate via parallel mode at rates of up to 96,000 baud (or higher, depending on media).

- TRANSMISSION MEDIA - Varies with the supplier (vendor) and with the distribution of the network and its access mode to the individual computing resource location.

  - MODE - may be either:

    . ANALOG - Typified by the predominantly voice-grade network of AT&T's DDD (Direct Distance Dialing) and by operating telephone company distribution systems.

    . DIGITAL - Where voice, data, and/or text are digitized into a binary stream.

  - MEDIA varies with distance, availability, and connectivity:

    . WIRE - Varies from earlier single-line teletype networks, to two-wire standard telephone (twisted pair) and balanced line, to four-wire full-duplex balanced lines.

    . CARRIER - Multiplexed signals on two-wire and four-wire networks to increase capacity by FDM.

    . COAXIAL CABLE - HF (High Frequency) and VHF (Very High Frequency), single frequency, or carrier-based system that requires frequent reamplification (repeaters) to carry the signal any distance.

- MICROWAVE - UFH (Ultra High Frequency) multichannel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- OPTICAL FIBER - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers, and using TDM for multichannel applications.

- SATELLITES - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- CELLULAR RADIO - Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units; each radio serves a small area called a cell. The computer switches service connection to the mobile unit from cell to cell as the unit moves among the cells.

E. 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

APPENDIX B: FORECAST DATA BASE

EXHIBIT B-1

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%

EXHIBIT B-2

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-3

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-4

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%

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	53	4%	55	56	57	57	57	57	1%
UTILITY PROCESSING	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

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%

APPENDIX C: RELATED INPUT REPORTS

APPENDIX C: RELATED INPUT REPORTS

ANNUAL REPORTS

- U.S. Information Services Vertical Markets, 1984-1989
- U.S Information Services Cross-Industry Markets, 1984-1989
- U.S. Software Products and Professional Services Markets, 1984-1989
- U.S. Personal Computer Software Products Markets, 1984-1989
- U.S. Information Services Markets, 1983-1988
  - Volume I - Industry-Specific Markets
  - Volume II - Cross-Industry Markets

INDUSTRY SURVEYS

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

1984 MAPS REPORTS

- Acquisition Strategies for Information Services Firms

PROCESSING AND TURNKEY SYSTEMS MARKETS

- 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

MULTICLIENT STUDIES

- Decision Support Systems and Beyond
- Third-Party Maintenance: Vendor Services and Markets: 1984-1989
- Opportunities in Financial Planning Systems Markets: 1982-1987

OTHER INPUT SUBSCRIPTION PROGRAMS

- Company Analysis and Monitoring Program (CAMP) for the Information Services Industry
- Customer Service Programs (CSP)
- Information Systems Planning (ISP)
- Federal Information Systems and Services Program (FISSP)