

U.S. INFORMATION SERVICES MARKETS, 1983-1986

INDUSTRY-SPECIFIC MARKETS VOLUME I

INPUT

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INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, and office products and services.

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff members analyze and interpret the research data, then make recommendations and innovative ideas.

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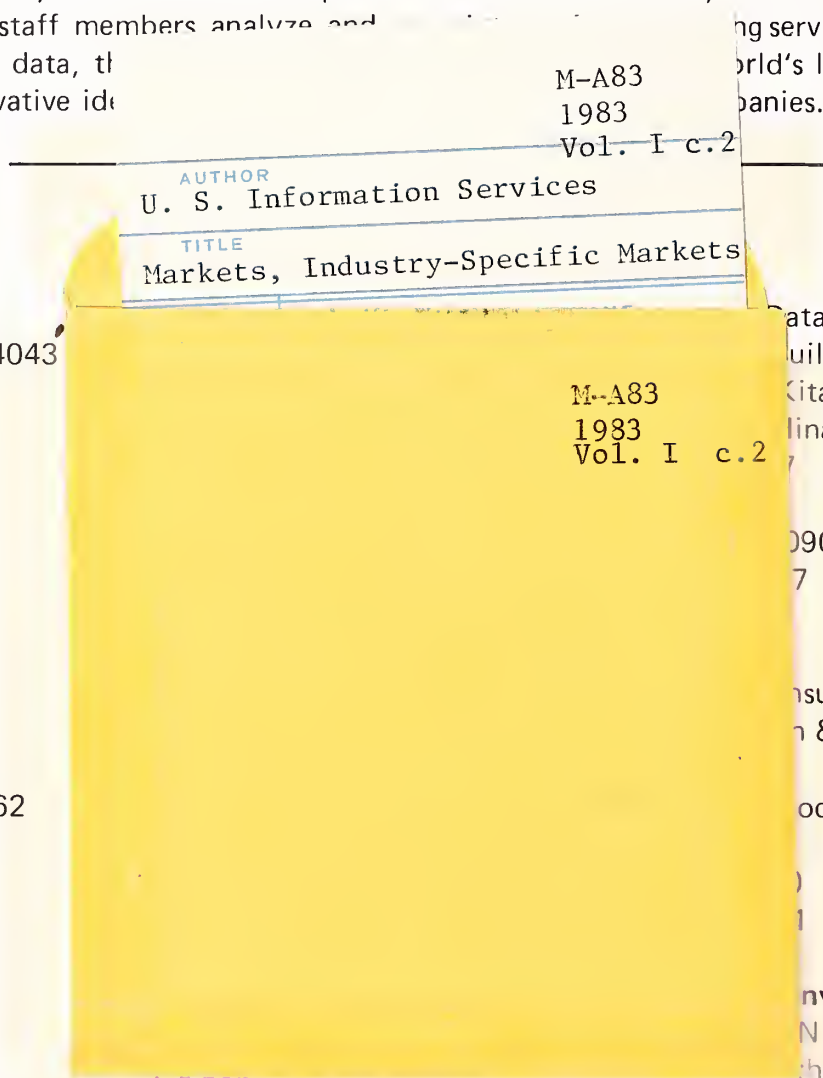
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# INPUT

Planning Services for Management

**U.S. INFORMATION SERVICES MARKETS,  
1983-1988  
VOLUME I  
INDUSTRY-SPECIFIC MARKETS**

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U.S. INFORMATION SERVICES MARKETS, 1983-1988  
VOLUME I - INDUSTRY-SPECIFIC MARKETS

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# U.S. INFORMATION SERVICES MARKETS, 1983-1988

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## I INTRODUCTION





## I INTRODUCTION

- This report is produced as one of a series of reports in INPUT's Information Services Industry Program (ISIP).
- INPUT conducts ongoing research into the information services industry, studying a variety of issues and trends that affect industry participants.

### A. PURPOSE OF THIS REPORT

- The information services industry is now firmly entrenched as a star performer in the U.S. economy. Practically nonexistent 25 years ago, user expenditures of \$31 billion in 1983 will explode to \$81 billion by 1988, a 21% average annual growth rate (AAGR). This is five to six times faster than even optimistic forecasts for the economy as a whole.
- What originally began as an ill-organized scattering of a few small, under-financed start-up firms is now comprised of over 6,000 organizations. These firms are becoming increasingly interlinked via joint development and marketing arrangements. Many of the world's largest and most technically sophisticated firms are now either participating in this industry or are eyeing it with increased interest.

- However, all is not riches and fame. The information services industry is being enveloped in a whirlwind of change that is making obsolete previously successful strategies at an alarming rate. Technology is accelerating. The basic business economics are changing. Competitors are getting stronger and buyers are becoming more discerning.
- This volume is one of a two-volume set that profiles, analyzes, and forecasts the changing character of the information services markets in the U.S. economy. The purpose of these two reports is to present a comprehensive overview of the industry in 1983 and to provide forecasts for market size and growth over the next five years.
- Throughout these two volumes emphasis is placed on identifying market trends, analyzing their driving forces (including competitive, technological, and economic factors), and examining their impact on market size and growth through 1988.
- Specific challenges and opportunities for information services vendors are noted, as are hazards and areas of low growth or high risk. Where appropriate, specific recommendations related to business strategy are presented.
- These reports are designed to assist vendor executives in:
  - Identifying new market and product opportunities.
  - Assessing risk.
  - Allocating scarce resources.
  - Obtaining insights into market-related developments that can impact business profitability.

- These reports are also designed to help information services industry investors and observers to:
  - Understand the major trends affecting market health.
  - Identify emerging opportunities at an early stage.

## B. SCOPE OF THE REPORTS

- These two reports are organized as follows:
  - Volume I: Industry-Specific Markets, addresses markets that focus on the unique requirements of 14 major industry sectors in the U.S. economy. Industries analyzed are:
    - 1 . Banking and finance.
    - 11 . Discrete manufacturing.
    - 3 . Education.
    - 8 . Federal government.
    - 2 . Insurance.
    - 7 . Medical.
    - 12 . Process manufacturing.
    - 4 . Retail distribution.

- 8 . Services.
- 9 . State and local government.
- 10 . Transportation.
- 13 . Utilities.
- 5 . Wholesale distribution.
- 14 . Other.

- Industry analyses are supplemented by demographic profiles of each industry based on the latest U.S. government data.
- Certain industries have been targeted for in-depth examination of key issues, trends, and events. They include:
  - Banking and finance.
  - Insurance.
  - Transportation.
  - Medical.
  - Federal government.
- Reasons for these special treatments vary.
  - An industry may be a very large purchaser of information services, e.g., banking and finance.

- The industry may be an especially dynamic marketplace for information services, e.g., medical.
- The industry may be a source of stable, sustained growth, but a tough market to crack, e.g., federal government.
- Volume II: Cross-Industry Markets addresses markets that have common requirements across multiple-industry segments. Markets analyzed in Volume II are:
  - . Accounting.
  - . Education and training.
  - . Engineering and scientific.
  - . Human resources.
  - . On-line data bases.
  - . Planning and analysis.
  - . Systems software.
  - . Utility processing.
  - . Value-added networks.
  - . Other.
- The following delivery modes are included in the forecasts.
  - Processing services.

- . Remote computing services.
- . Batch processing.
- . Processing facilities management.
- Software products.
  - . Applications software.
    - Mainframe/minicomputer software.
    - Personal computer software.
  - . Systems software.
    - Applications development tools.
    - Systems control.
    - Data center management.
- Professional services.
- Integrated (turnkey) systems.
- The information services industry forecasts developed by INPUT for these reports are for U.S. user expenditures for noncaptive business (i.e., business derived from a firm's parent or affiliated organization is excluded).

## C. METHODOLOGY

- The process of forecasting is a continuous one. This year's report represents the seventh year INPUT has studied the information services industry in its entirety. Two fundamental and complementary approaches are used to analyze the industry.
  - The first is a "bottom up" approach. Thousands of interviews are conducted with buyers of information services in each of the industries analyzed.
  - Target interviewees are typically division managers or higher, usually holding purchase or budget authority for at least one type of information service. Both end-user as well as information systems professional managers are interviewed.
- On the other side, INPUT conducts an annual census of revenues and growth for all information services industry vendors 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.
- At the convergence of these two processes, INPUT researchers analyze industry size, composition, change, direction, etc., to generate the forecasts included in these two volumes.
- All forecast numbers presented are in current dollars (i.e., inflation impacts are included). Significant assumptions include:
  - GNP over the next five-year period will grow at 3% per year.

- Inflation is assumed to show a six percent annual increase over the forecast period.

#### D. REPORT ORGANIZATION FOR VOLUME I: INDUSTRY-SPECIFIC MARKETS

- Chapter II provides an executive summary of key observations, forecasts, and conclusions from the volume. The summary is provided in a presentation format complete with script so that readers may quickly and easily communicate these findings to appropriate groups.
- Chapter III provides a concise overview of the entire information services industry.
  - Industry-specific as well as cross-industry sales are included in comparisons of market size and growth for each of the four primary delivery modes.
  - The top 20 vendors in each delivery mode are also listed together with their revenue growth over the past two full calendar years.
- Chapter IV constitutes the main body of the text. Here industries are examined in detail for key issues, trends, and events. In most cases application analyses are included and, where appropriate, competitive analyses and recommendations are made.
  - Several industries, mentioned above, have received in-depth treatment.
  - Though emphases vary, the treatment overall provides a good snapshot of important information services markets.



- Appendix A contains a definition of terms and parameters used to structure the research.
- Appendix B contains a comprehensive data base of statistical market forecasts from which the textual references and exhibits are drawn. The data base is arranged in two sections:
  - The first section shows market size and growth by mode of delivery.
  - The second section displays the same data but arranged according to industry sector.
- Though data in the data base are presented at the single-digit level of precision, this is the result of the calculation procedure used. In the text, forecasts are rounded to ten millions so as not to imply a level of precision that does not exist.
- Appendix C contains a reconciliation of this year's forecasts with last year's.
- Appendix D contains a list of related reports.
- INPUT always welcomes comments, inquiries, and suggestions relating to our report content and structure.



## II EXECUTIVE SUMMARY



## II EXECUTIVE SUMMARY

- This executive summary is designed in a presentation format in order to:
  - Help the busy reader quickly review key research findings.
  - Provide a ready-to-go executive presentation, complete with a script, to facilitate group communication.
- The key points of the entire report are summarized in Exhibits II-1 through II-15. On the left-hand page facing each exhibit is a script explaining its contents.

## A. U.S. INFORMATION SERVICES MARKETS 1983-1988

- This is one of a two-volume report series by INPUT analyzing information services markets in the U.S. This is the seventh year INPUT has analyzed the U.S. market as a whole.
- The overall market in the U.S. for the information services stands at \$31.6 billion. Over the past five years it has grown at the rate of 25% per year, from \$10.4 billion in 1978. INPUT forecasts that the market will grow at a 21% yearly rate through 1988, reaching \$83 billion.
- Within the overall market, many submarkets exist. These include specific industry markets as well as cross-industry applications. Growth of these more focused industry markets varies, from a low of 13% to a high of 28%.
- This report addresses 14 primary industry markets, looking at their industry-specific applications.
- Four information services delivery modes and several submodes are analyzed. Altogether some 400 individual forecast series were generated to produce the five-year projections in this report.
- The companion volume to this report, Cross-Industry Markets, addresses applications such as accounting and human resources, tools such as system software and utility processing, and vehicles such as value-added networks and on-line data bases.

# **U.S. INFORMATION SERVICES MARKETS: 1983-1988 INDUSTRY-SPECIFIC MARKETS**

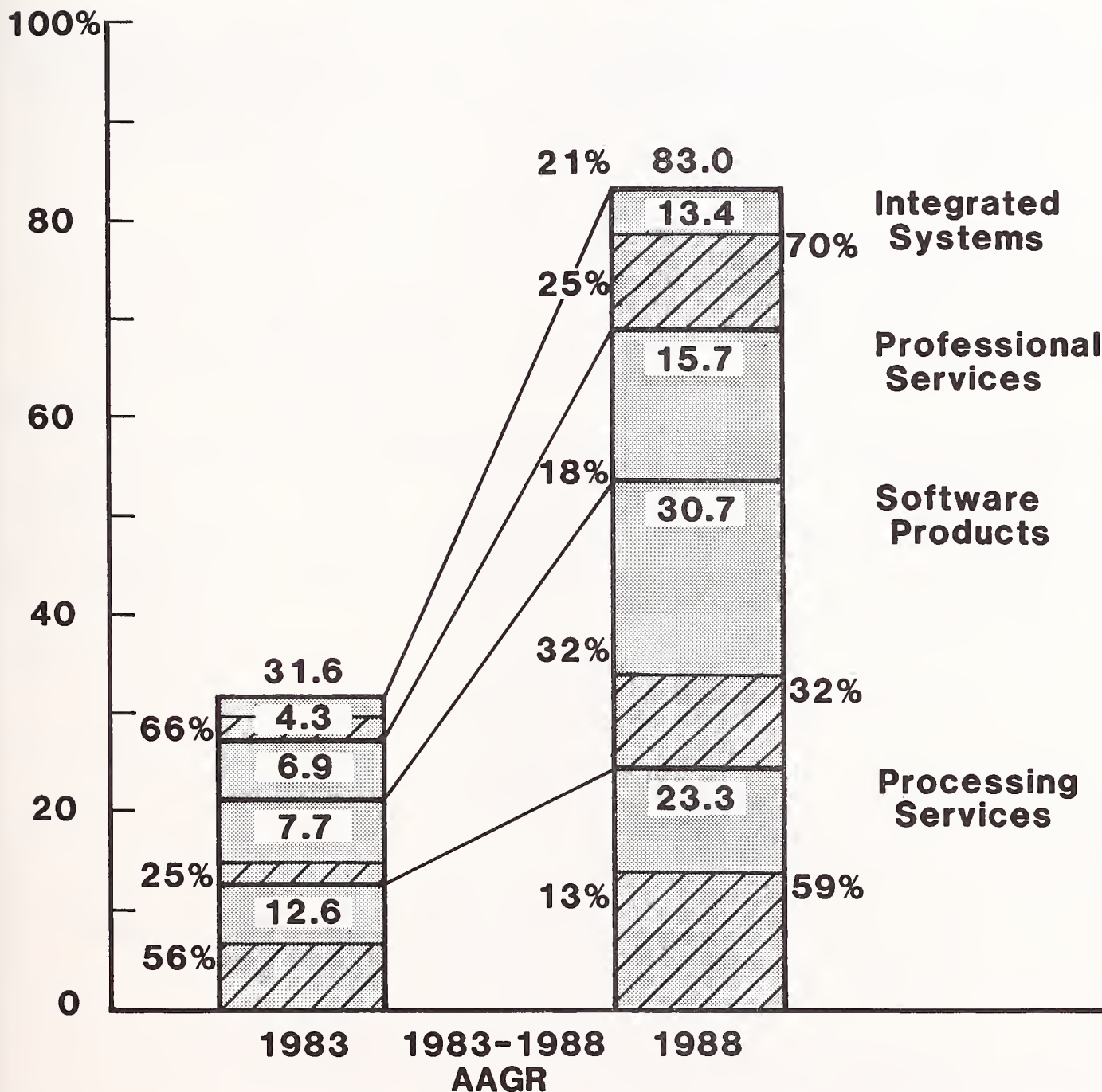
- **Industry Healthy Overall (21% Per Year Growth Through 1988)**
- **Different Markets' Growth Varies Widely (13-28%)**
- **Scope**
  - **14 Primary Industry Sectors**
  - **4 Primary Delivery Modes**
  - **400 Forecast Series: 1983-1988**
- **Companion Volume Addresses Cross-Industry Markets**


## B. DELIVERY MODE FORECAST

- The four primary delivery modes are shown here.
- In 1983 processing services make up about 40% of the entire industry. That is down from 42% last year and 46% the year before. By 1988 processing services will represent less than a third of the industry.
- This rapid decline in relative importance is due to the much faster growth of the other delivery modes, most notably software.
- By 1988 software should be the largest delivery mode - more than a \$30 billion market.
- Note that the industry-specific component of all types of services are increasing in importance. In other words, they are growing at a faster rate than the service as a whole and faster than cross-industry services.
- Integrated systems is already the most industry-specific service and will become even more industry specific. While software products as a whole will grow at 32% over the next five years, industry-specific software should grow by 39% a year.
- Professional services are not treated according to the industry-specific/cross-industry distinction. This is because the bulk of professional services revenue is earned in "company-specific" environments.



# DELIVERY MODE FORECAST 1983-1988 (\$ Billions)



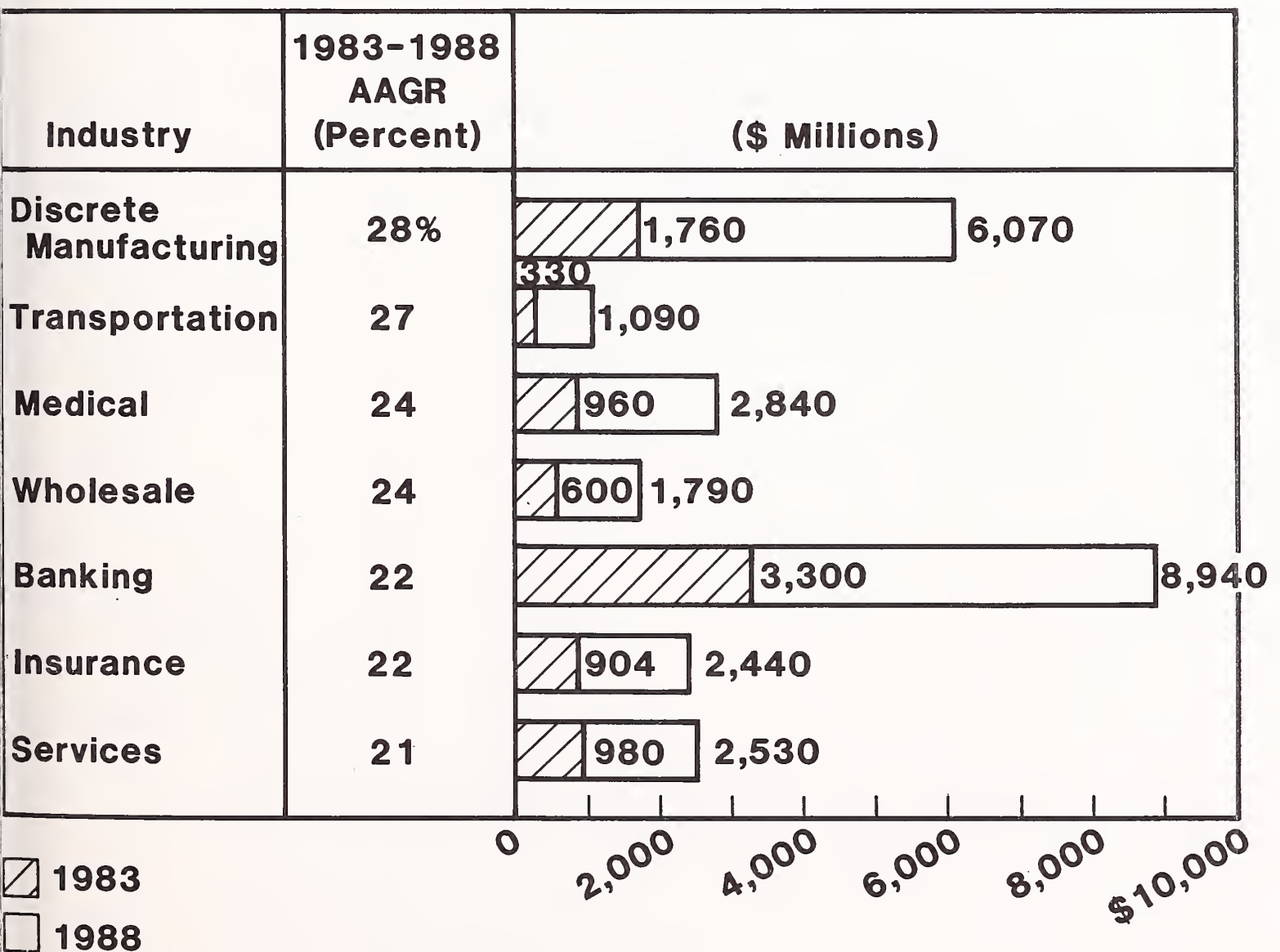
 Percent Industry - Specific

## C. INDUSTRY-SPECIFIC MARKET GROWTH VARIES

- The demand for information services varies widely from one industry to the next.
- Discrete manufacturing will be the fastest growing market for industry-specific services, with demand increasing at a forecast rate of 28% per year. By comparison, in education, the slowest growing industry sector, demand will grow only about 15% a year.
- Even minor differences in growth rates can make a big difference because of compounding. In these two examples, a 15% growth rate in education will result in the market doubling in five years. At 28%, the discrete manufacturing market size will increase three and one-half times over the same period.
- The average rate of increase for demand by all industries is 23% per year.
- Reasons for variable growth rates between industries in the demand for information services are many and are detailed in the main body of the report. They include such factors as:
  - Deregulation, affecting banking and transportation.
  - Changing cost structures, an important factor for process manufacturing and utilities.
  - New production techniques, such as point-of-sale in retail and robotics in discrete manufacturing.
  - Changing competitive patterns or markets - factors in the buoyancy of insurance and medical demand.
- Faster growing industry markets are typically impacted by all of these forces and more.

# INDUSTRY-SPECIFIC MARKET GROWTH VARIES

## SEVEN FASTEST GROWING INDUSTRY-SPECIFIC MARKETS RANKED BY 1983-1988 GROWTH



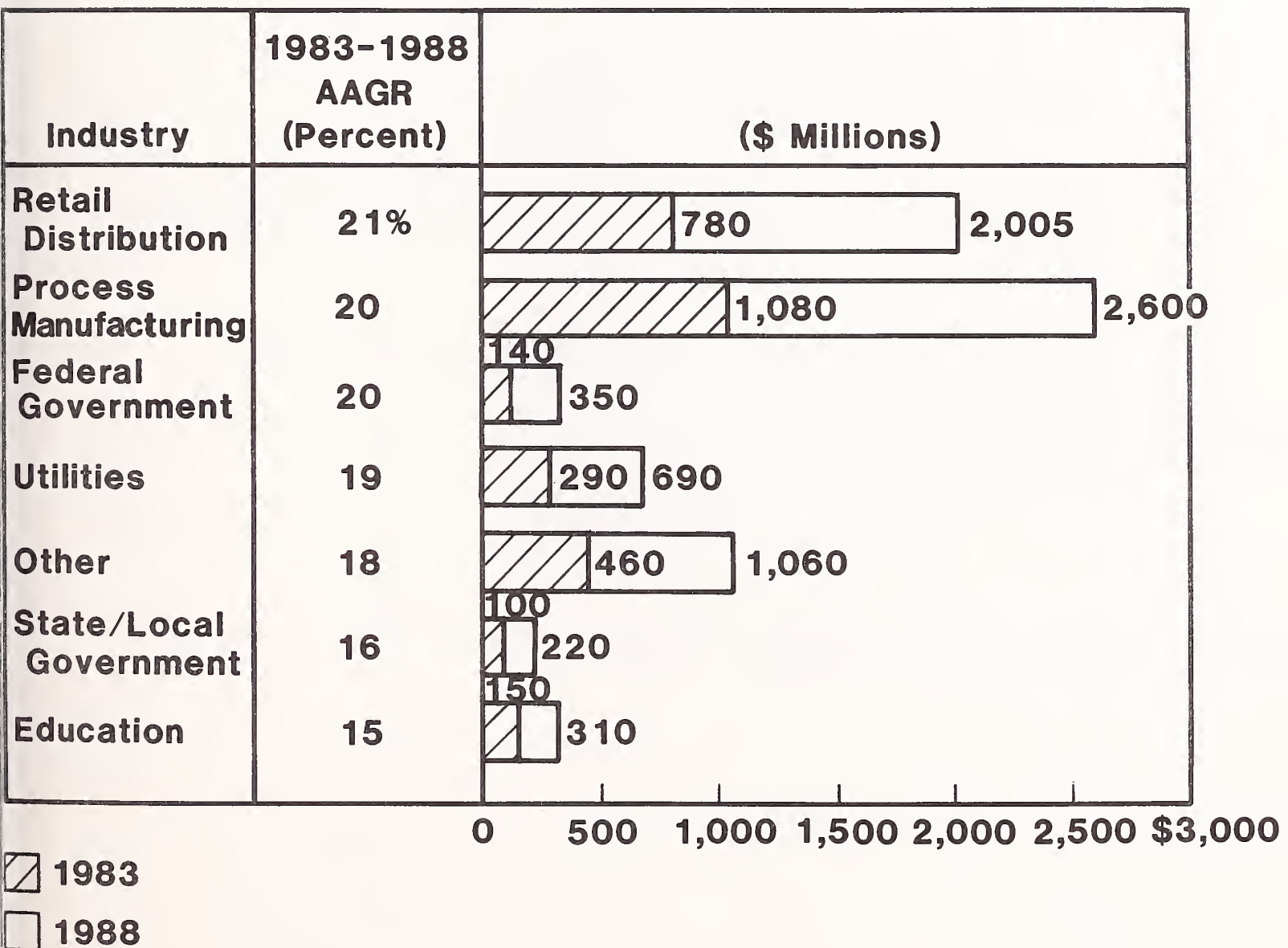
D. INDUSTRY-SPECIFIC MARKET GROWTH VARIES (continued)

- As a whole, the industry-specific marketplace will grow from \$11.8 billion in 1983 to \$33 billion in 1988.
- Many of the slower growing sectors - education, government, and utilities - are those where budgets and revenues are set by fiat rather than market forces.
- Even for these slow-growth industries, though, yearly increases of 15-20% in demand are enviable when compared with other parts of the economy.
- Process manufacturing is dominated by oil exploration and chemicals, both suffering worldwide over capacity. In addition, a large component of this sector's demand is for batch oil well processing, which will grow very slowly.

## EXHIBIT II-4

# INDUSTRY-SPECIFIC MARKET GROWTH VARIES (Continued)

## SLOWER GROWING INDUSTRY-SPECIFIC MARKETS RANKED BY 1983-1988 GROWTH

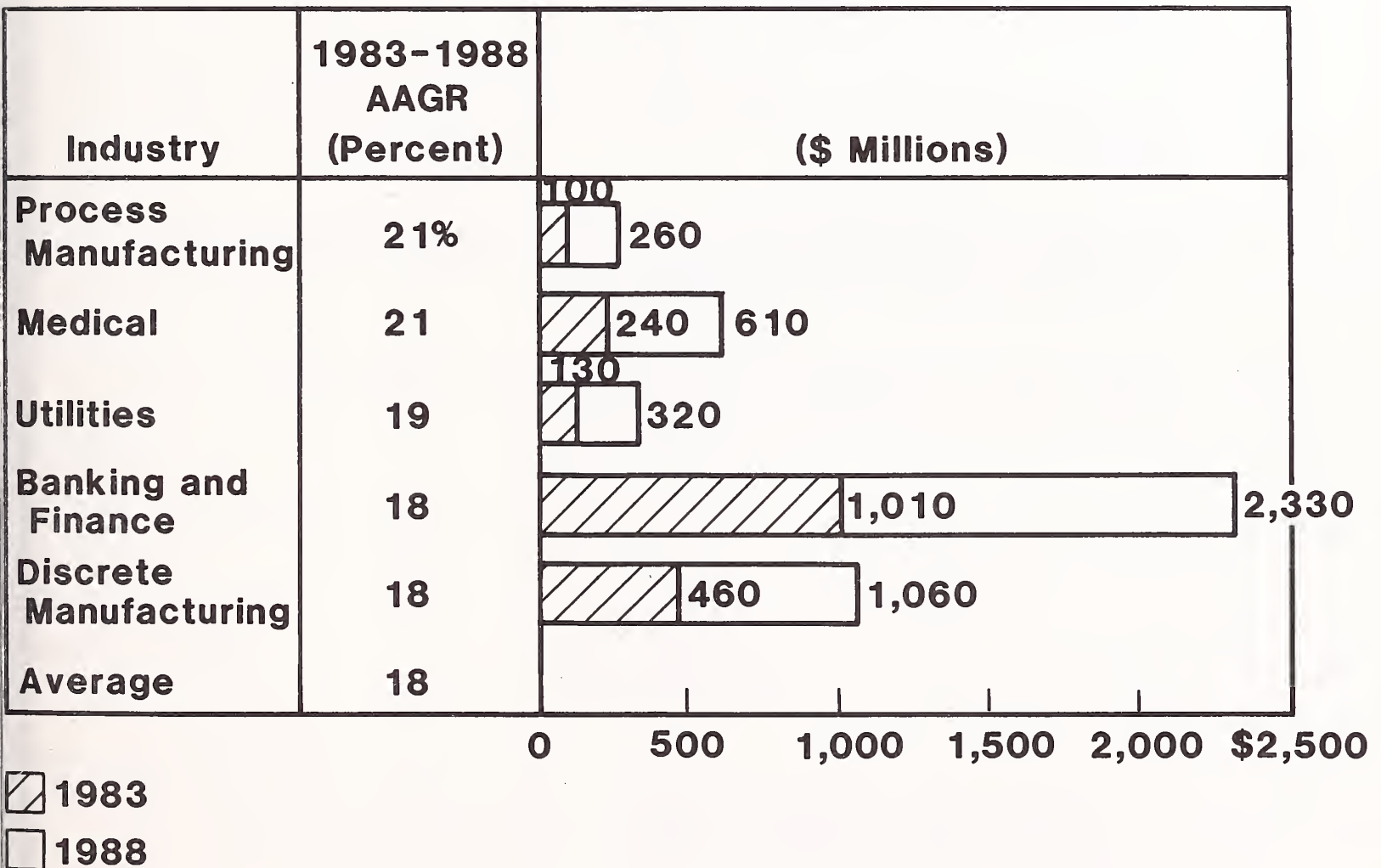


## E. WEIGH SIZE AND GROWTH IN CHOOSING RCS MARKET

- Much of the oil well processing business will move from batch to RCS, making process manufacturing the fastest growing market, albeit small, for industry-specific RCS services.
- Also, the increased use of geologic data bases, on-line, is a big factor here.
- The big news is the size of the banking and finance market and its continued healthy growth.
- By 1988 banking and finance will consume almost a third of all industry-specific RCS services, \$2.3 out of \$7.8 billion.
- Important factors are the growth of POS and ATM, the rise of interstate financial services, increasing use of on-line data bases, and the rise of the financial supermarket.
- Growth in demand from utilities, though high, comes from a small base.

# WEIGH SIZE AND GROWTH IN CHOOSING RCS MARKETS

## INDUSTRY-SPECIFIC RCS MARKETS 1983-1988 (\$ Millions)



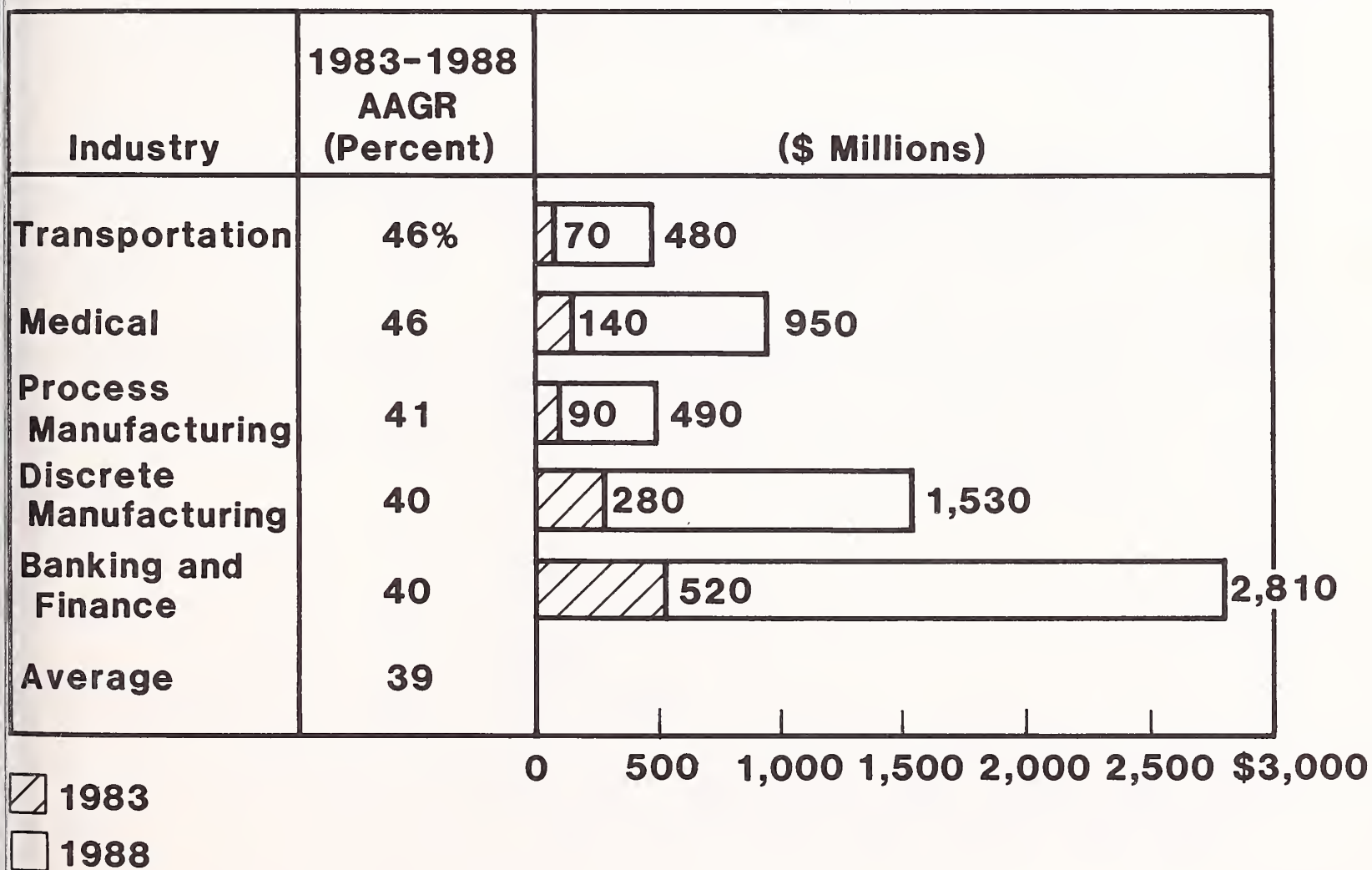
## F. SAME INDUSTRIES ARE HIGH-GROWTH SOFTWARE PRODUCTS MARKETS

- By and large, the fastest growing software products markets are the same as the RCS markets that are fastest growing.
- The total market for industry-specific application software packages stands in 1983 at \$1.94 billion.
- It is expected to grow over the next five years at a vigorous 39% annual rate, reaching \$9.9 billion in 1988.
- This is the fastest growing single delivery mode in the information services industry.
- Its 1988 size will be third, following only system software and software development by professional services organizations.
- Again, note the large size of the banking and finance market, double the next largest market, discrete manufacturing.



# SAME INDUSTRIES ARE HIGH-GROWTH SOFTWARE PRODUCTS MARKETS

## INDUSTRY-SPECIFIC APPLICATION SOFTWARE MARKETS 1983-1988 (\$ Millions)

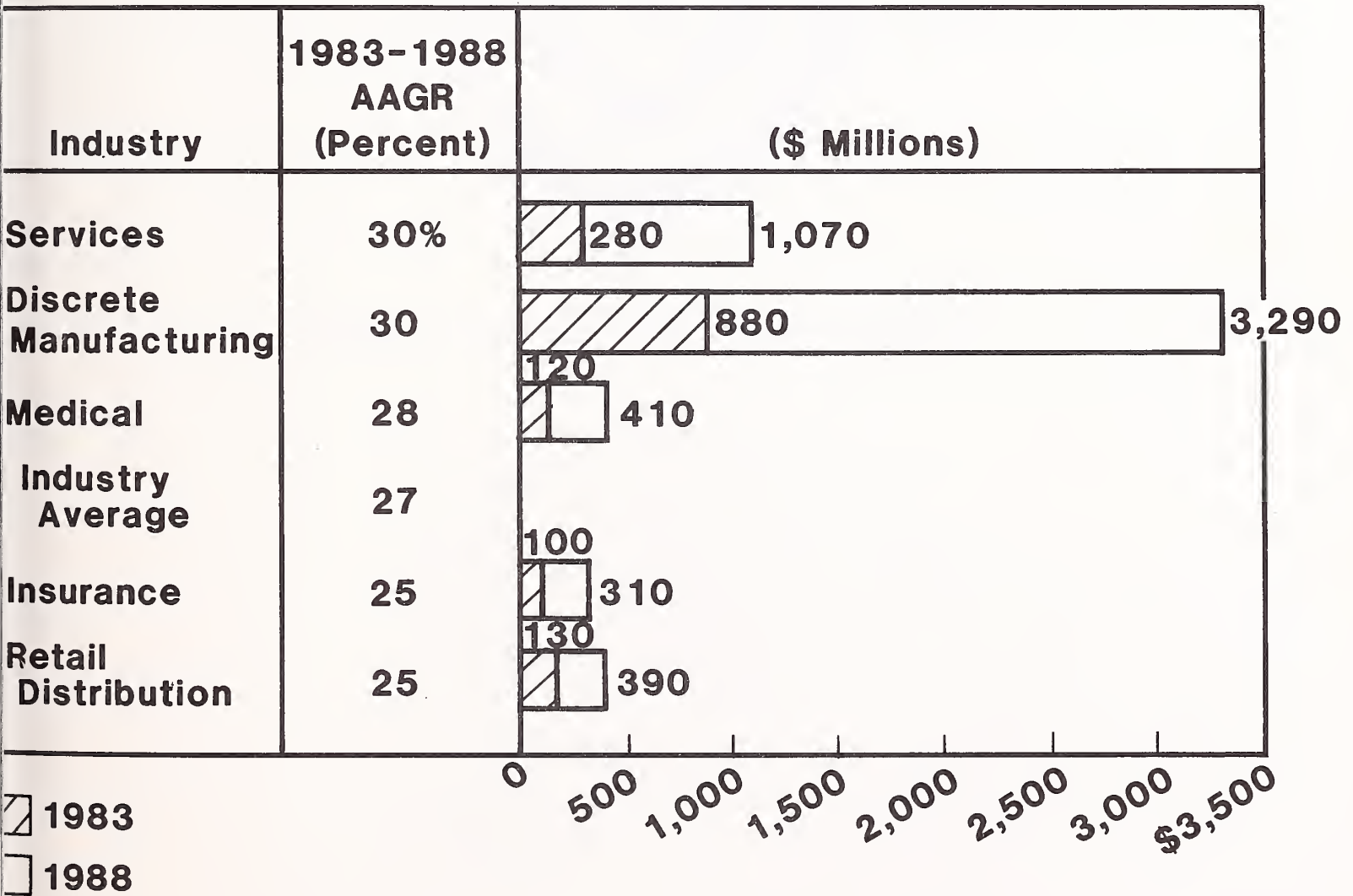


## G. INTEGRATED SYSTEMS GROWTH - HIGH UNIT VOLUME MARKETS

- The total market in 1983 for industry-specific integrated systems is \$2.8 billion.
- It is forecast to grow at 27% per year through 1988, reaching \$9.3 billion.
- This marketplace is dominated by the discrete manufacturing industry, which buys many units at relatively high prices.
- With this exception, all of the leading growth industry marketplaces for integrated systems are characterized by many buyers of relatively low-priced units.
- Services, led by attorneys, accountants, architects, and engineers, holds the potential for an integrated system in virtually every office. There are more than 340,000 service establishments in the U.S.
- The medical market is somewhat similar, with over 200,000 physicians and dentists' offices. The 5,000+ hospitals represent a larger sale. Outpatient facilities and other types of health practices are growing rapidly, fueling a 28% annual increase in demand.

# INTEGRATED SYSTEMS GROWTH - HIGH UNIT VOLUME MARKETS

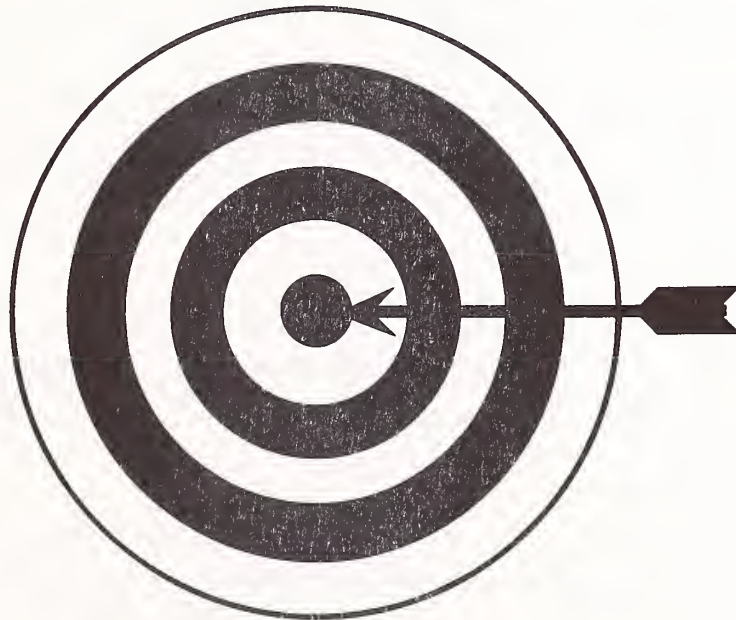
## INDUSTRY-SPECIFIC INTEGRATED SYSTEMS MARKETS 1983-1988 (\$ Millions)



## H. MAJOR MARKETS HOLD MAJOR OPPORTUNITIES

- The next few exhibits discuss some major markets.
- Several of these were selected by INPUT for special development in the text of the report.
- In all cases, the key to success is a well-focused market strategy.

# MAJOR MARKETS HOLD MAJOR OPPORTUNITIES, BUT . . .



## Pick Your Target(s) Carefully

- **Banking and Finance**
- **Discrete Manufacturing**
- **Federal Government**
- **Insurance**
- **Medical**

## I. BANKING AND FINANCE - ONWARD THE REVOLUTION

- No industry is undergoing greater upheaval than banking and finance.
- Deregulation continues to result in new forms of organization, new types of competition, dissolving geographic restrictions, and the possible demise of entire subsectors of the industry.
- Deregulated interest rates have spawned a gaggle of new products to attract depositors. They have also significantly narrowed the spreads on banks' lending/borrowing practices.
- The growth of nationwide ATM systems and the emergence of bank-linked point-of-sale machines promise continuing opportunities. Home banking holds perplexing possibilities.
- Banks themselves are becoming major competitors for information processing business.
- Opportunities exist for linking different applications: for example, retail banking with personal trust, or commercial banking with corporate trust applications.
- On-line communications are becoming increasingly important and should be a mainstay of new products and services.
- Provision and support of PCs for banks and their customers for electronic reporting, query, transfer, and other applications is a major opportunity.
- Vendors should attempt to capture data having a high resale potential for adaptation into proprietary data bases.
- Banks, not traditionally marketing driven, can use help in defining new products, finding prospective markets, and in selling to customers.

# **BANKING AND FINANCE - ONWARD THE REVOLUTION**

- **Major Structural Changes Require Careful Planning**
- **New Products/Technologies Open Opportunities**
- **Recommendations**
  - **Link Applications**
  - **Facilitate Communications**
  - **Distribute Processing**
  - **Move Applications to On-Line**
  - **Look for Data Resale Opportunities**
  - **Help Clients Market, Prospect**

## J. DISCRETE MANUFACTURING - JEWELS IN THE JUNGLE

- The discrete manufacturing marketplace for information services will approach \$16 billion by 1988.
- Much plant and equipment is old or obsolete. Outside of the largest producers, real automation is rare. Potential demand for information services is huge.
- The market, however, is very fractured, with large differences in size, nature, and complexity of the participants and their processes.
- No vendors have a significant share of the marketplace, though large CAD/CAM vendors tend to dominate their delivery mode.
- Several applications are beginning to converge to produce computer integrated manufacturing (CIM). They are CAD/CAM, MRP, Robotics, and factory automation.
- Here, the CAD/CAM vendors have taken the lead, basing their products on integrated, interactive DBMS software. This will prove the foundation of CIM.
- With manufacturing applications among the most technically demanding of all industry-specific applications, requirements for expertise are high. The discrete manufacturing market should not be approached without major commitments to the acquisition and/or development of application-specific expertise.
- The many diverse niches, each with different processes, require a carefully focused approach to product development.



## **DISCRETE MANUFACTURING - JEWELS IN THE JUNGLE**

- **Huge Market: \$5.2 Billion Growing at 25%**
- **Tremendous Diversity of Participants  
Complicates Marketing**
- **No Dominant Vendors**
- **Convergence of Common Applications**
- **Recommendations**
  - **Build Around DBMS**
  - **Design for Real-Time, Interactive  
Environments**
  - **Develop Networked Mini-based  
Applications**
  - **Build, Borrow, or Buy Expertise**
  - **Focus Your Resources on Well-defined  
Subsectors**

## K. FEDERAL GOVERNMENT - USHERING IN THE MID-70S

- The federal government marketplace as a whole grew 19% in 1983 over 1982, to \$3.5 billion. It should continue to grow at 20% through 1980, reaching \$8.6 billion. This is a major facilities management marketplace.
- Updating systems has become essential. Ninety percent of pre-1980 hardware was based on early 60s architectures. Software, too, is slated for widespread modernization.
- Important is the emphasis on smaller systems: minicomputers, office systems, and personal computers. The GSA has just opened a test PC computer store in Washington with others planned in the future.
- Major growth areas are actually for cross-industry applications, with word processing, graphics, payroll, and accounting applications leading.
- A big push is on for management computer literacy.
- INPUT's Federal Information Systems and Services Program (FISSP) assists vendors who are serious about penetrating this large and stable, but labyrinthine market.

## **FEDERAL GOVERNMENT - USHERING IN THE MID-70s**

- **Major Push to Update Old Systems**
- **Distributed Minicomputer-based Networks Planned**
- **Emphasis on Commercial Software**
- **Largest Professional Services Marketplace - \$2.1 Billion**
- **But Changing**
  - **Old : Custom Code Marketplace**
  - **New: Package Modification**
    - : **Converting Old Applications**
    - : **Training Middle Management for Computer Literacy**
- **Large Market for PCs, PC Software**

## L. INSURANCE - COVER YOURSELF

- This is really at least two markets, property and casualty, and life and health.
- Property & casualty is having real problems with continuing underwriting losses and worldwide overcapacity.
- Also, new competition from self-insurers and benefits consultants makes growth prospects dim.
- Life and health is fairing a little better but faces tough competition from financial institutions.
- Mergers in both areas as well as shrinkage of agency networks are in the works.
- Fewer, larger players reduce buying points, and increase the tendency to move in-house.
- Competition is visible, knowledgeable, and well established.
- Scout this market carefully. IVANS interfaces provide numerous opportunities for firms willing and able to seek out niches.
- Commercial lines markets are not yet well exploited, though insurance continues to cover more types of business risks. Thoughtful integration of these and other financial applications for tapping the corporate financial super-market is a fruitful opportunity.
- More large policy holders are self-insuring or aided by benefits consultants, thus creating opportunities for those vendors who carefully target this market.

# **INSURANCE - COVER YOURSELF**

- **Sizable Market**
  - **1983: \$2.2 Billion**
  - **1983-1988 Growth - 21%**
  - **But . . .**
- **Industry under Siege**
- **Consolidations Likely**
- **Well-entrenched Competition**
- **Recommendations**
  - **Sell IVANS Interfaces**
  - **Consider Commercial Lines Marketplace**
  - **Service Self-Insurers, Benefits Consultants**
  - **Integrate "Financial Supermarket" Applications**

## M. MEDICAL - A HEALTHY PROGNOSIS

- The medical marketplace will buy \$960 million of industry-specific information services in 1983. By 1988 that figure will increase to \$2.8 billion on 24% annual growth.
- Only two other markets - manufacturing and transportation - will grow faster. Medical will be the leader in the growth of demand for RCS (21% per year), facilities management (21% per year), and application software (40% per year).
- The medical sector now accounts for 11% of GNP and is increasing at 15% per year. Almost everyone but the practitioners want relief.
- This is still a heavily regulated industry, with licenses, hospital locations, bed counts, and a bevy of other operational considerations subject to some level of government decision making.
- Reimbursement mechanisms are under review by insurers (Blue Cross/Shield) and the government (Medicare/Medicaid).
- A case-mix scheme will emerge, classifying patients into over 450 diagnosis-related groups (DRGs) upon which fixed payments will be made.
- Existing competitors know their markets well and are well known within them.
- Reimbursement mechanisms are in a state of flux. Intimate knowledge of these is essential to success in this market.
- Successful competitors will provide applications that can link internal departments, outside participants (physicians, labs, etc.), and patients. Hospitals are becoming more aggressive at marketing. Help them.

## **MEDICAL - A HEALTHY PROGNOSIS**

- **Top Growth in 3 of 6 Delivery Modes (Up to 46%/Year)**
- **Historic Revenue Growth Under Attack**
- **Competition Well Established**
- **Recommendations**
  - **Understand the Regulatory Environment**
  - **Integrate Marketing, Financial Modeling, Operations**
  - **Supply Internal Communications**
  - **Assist Customers in Marketing/Prospecting**

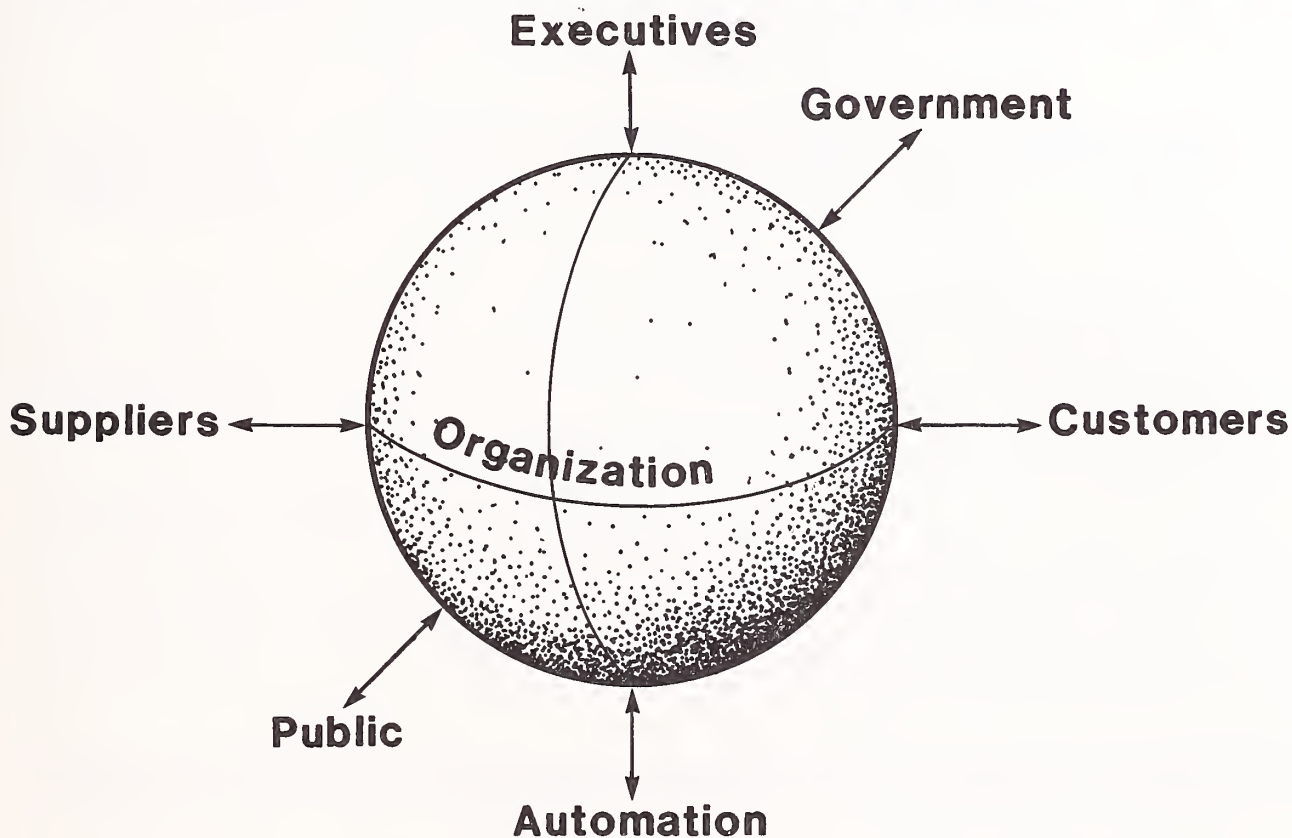
## N. WATCH THE ENVIRONMENT

- Computing is becoming ubiquitous, pulled by demand, pushed by competitive necessity. It will soon permeate most organizations.
- Especially important is that this will be end-user computing - 80% of all computing by 1990.
- Computing is becoming "right now" oriented, with:
  - More on-line applications demanded.
  - More real-time applications demanded.
  - More simultaneous participation by more users.
- Seen in the New York Times: "You buy the software, we'll give you the PC." This is the future.
- Data, too, becomes a commodity, if public. Rapid evolution quickly makes low-cost software obsolete.
- Users want it all:
  - Applications for all of their job functions.
  - Full application integration.
  - Ease of use.
  - Low cost.
- They'll get it.



## WATCH THE ENVIRONMENT

- The “Reach” of Computing is Expanding Rapidly



- More and More Instant Feedback Demanded
- Prices of Technology-based Products Erode Quickly
- Applications Are “Enveloping” Users

## O. RECOMMENDATIONS

- Target industry knowledge is essential: know and anticipate applications; link them end to end (from supplier through to consumer); understand industry's direction and dynamics.
- Computing will continue to diffuse. Assist your clients in this process. You will gain visibility, credibility, and intimate industry knowledge.
- No one tool does it all. Provide a range of delivery modes to solve problems. Distribute and support PCs. Modularize software. Design for transportability.
- It is not possible to be all things to all people. Carefully define marketing strategy to limit the markets to be served, applications to be supported and channels to be maintained. Focus on markets where you have clear strengths.
- Simplify user interfaces. Use common commands for as many applications as possible. Implement fourth-generation languages. Hereafter, new users are computer-ignorant or computer-hostile. Baby them.
- Provide full system communications. Departmental, same-site, remote internal, remote external. Include data base access. Again, transparent interfaces are best.
- Sell service.

## RECOMMENDATIONS

- **Know Your Target Industry Intimately**
- **Work with Industry Participants to Expand Computing**
- **Provide a Range of Delivery Modes to Targeted Markets**
- **Sharpen Market Focus**
- **Integrate, Simplify Application Interfaces**
- **Incorporate Communication Wherever Possible**
- **Service Will Endure When All Else Becomes a Commodity**



### III MARKET OVERVIEW



### III MARKET OVERVIEW

- This chapter provides a high-level overview of the entire economy's purchases of information services, detailed by industry sector and by mode of delivery.
- This level is next in detail to that in the Executive Summary and provides a concise look at interindustry demand for the four primary types of information services.
- Both the industry-specific and the cross-industry components of services are included in the data here.
- Most of the information is presented in graphic form for quick identification of major relationships and trends.
- Also identified are the leading information services vendors within each delivery mode, ranked according to 1982 noncaptive U.S. revenues.
- The next level of detail below this - intra-industry comparisons of demand - is presented in Chapter IV.

## A. INFORMATION SERVICES MARKETS

- The total U.S. market for information services stands at \$31.6 billion in 1983. It is forecast to grow at an average rate of 21% per year over the next five years, reaching \$83.0 billion by 1988, as shown in Exhibit III-1.
- Discrete manufacturing will be the largest market in 1988, reaching almost \$16 billion, triple its 1983 size. Its yearly growth of 25% over this period puts it in a second place tie with the medical sector for fastest growth. Considering its size, this rate of growth is all the more dramatic.
- Transportation, the fastest growing industry sector, is presently only one-sixth the size of the discrete manufacturing marketplace. At 27% annual growth, transportation should reach \$2.8 billion by 1988.
- Of the largest industry sectors, only the federal government is expected to experience below average growth in demand, 20% per year over the forecast period.
- An indicator of the growth of the industry as a whole is that in 1981, 207 vendors posted revenues in excess of \$10 million. In 1982, 243 vendors had passed that mark.
- In 1981 these firms accounted for 57% of total industry revenues. By 1982 they had boosted their share to 58%.

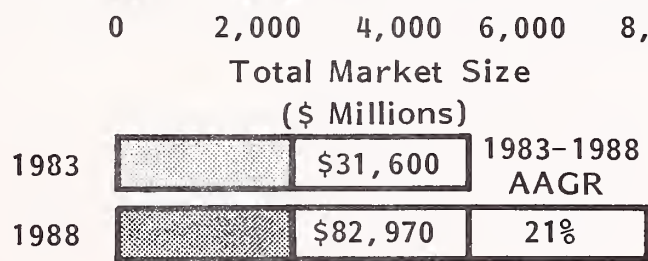
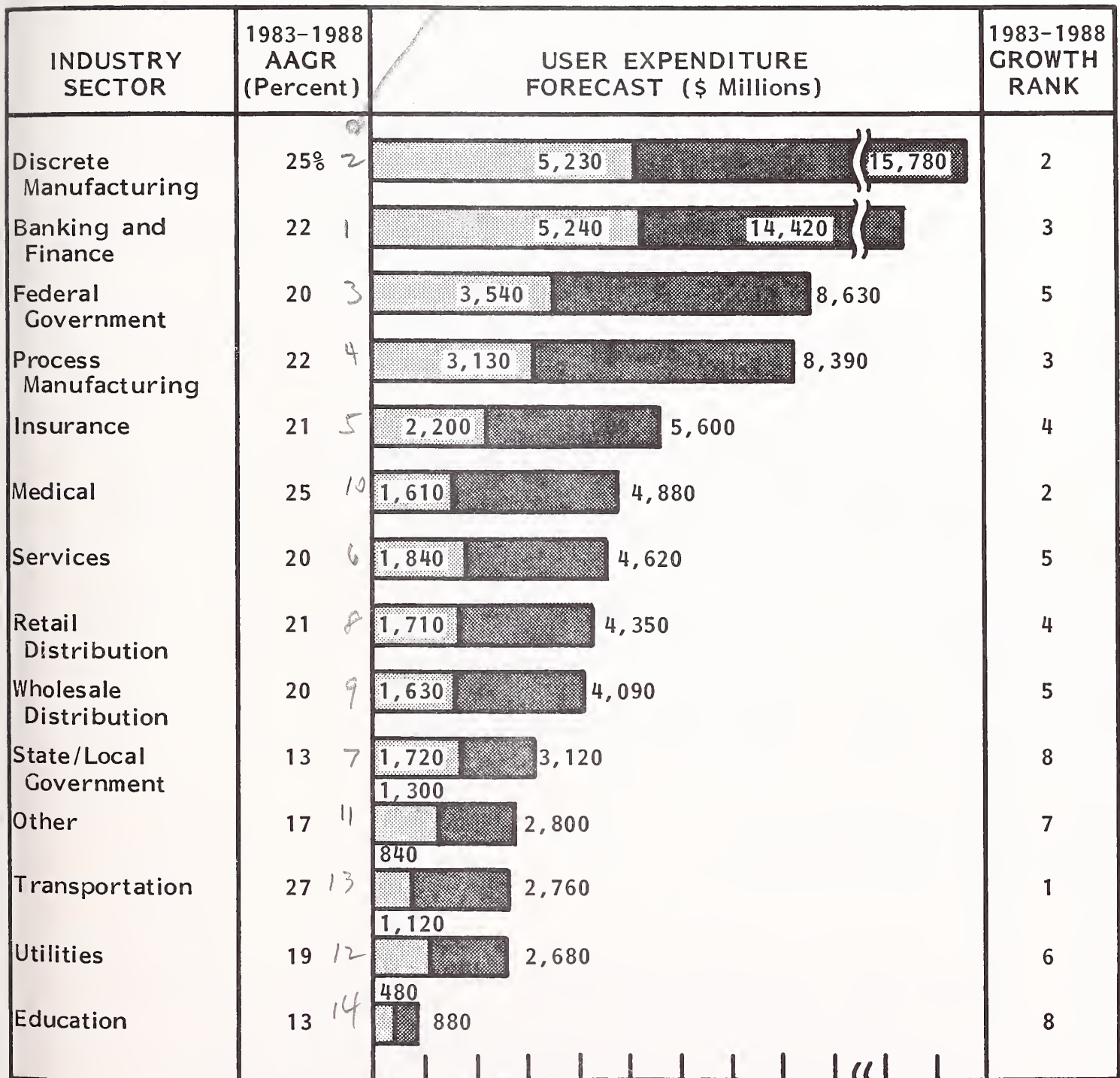
## B. PROCESSING SERVICES

- Processing services include remote computing, batch processing, and facilities management.



EXHIBIT III-1  
TOTAL U.S. INFORMATION SERVICES MARKETS  
RANKED BY 1988 SIZE

*1983 Size Rank*



- These delivery modes combined account for \$12.6 billion of sales in 1983. The combined five-year forecast growth of 13% should mean \$23.3 billion in sales by 1988. Details are shown in Exhibit III-2.
- As in the total information services marketplace, discrete manufacturing, and banking and finance are the largest subsectors. Banking and finance alone consumes almost one quarter of the entire economy's processing services.
- Not surprisingly, over half of the largest 15 processing vendors have significant commitments to this marketplace.
- ADP is increasing its activity in this marketplace. In 1982 ADP surpassed CDC as the leading information services vendor.
- The fastest growing processing market is in the vertical industry where 16% annual average growth in demand should boost the market size from \$830 million in 1983 to \$1,770 million in 1988.
- Several of the top processing vendors have a strong presence in the medical market.
- Exhibit III-3 lists the largest processing services vendors.

### C. SOFTWARE PRODUCTS

- Software products are made up of application and system products. In Volume II of this series, cross-industry applications are further subdivided into main-frame and minicomputer products and personal-computer-based packages. System software is analyzed by application development tools, system controls, and data center management products.

EXHIBIT III-2  
PROCESSING SERVICES MARKETS  
RANKED BY 1988 SIZE

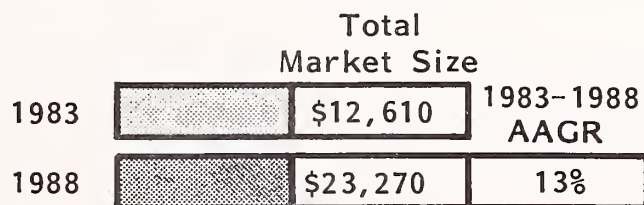
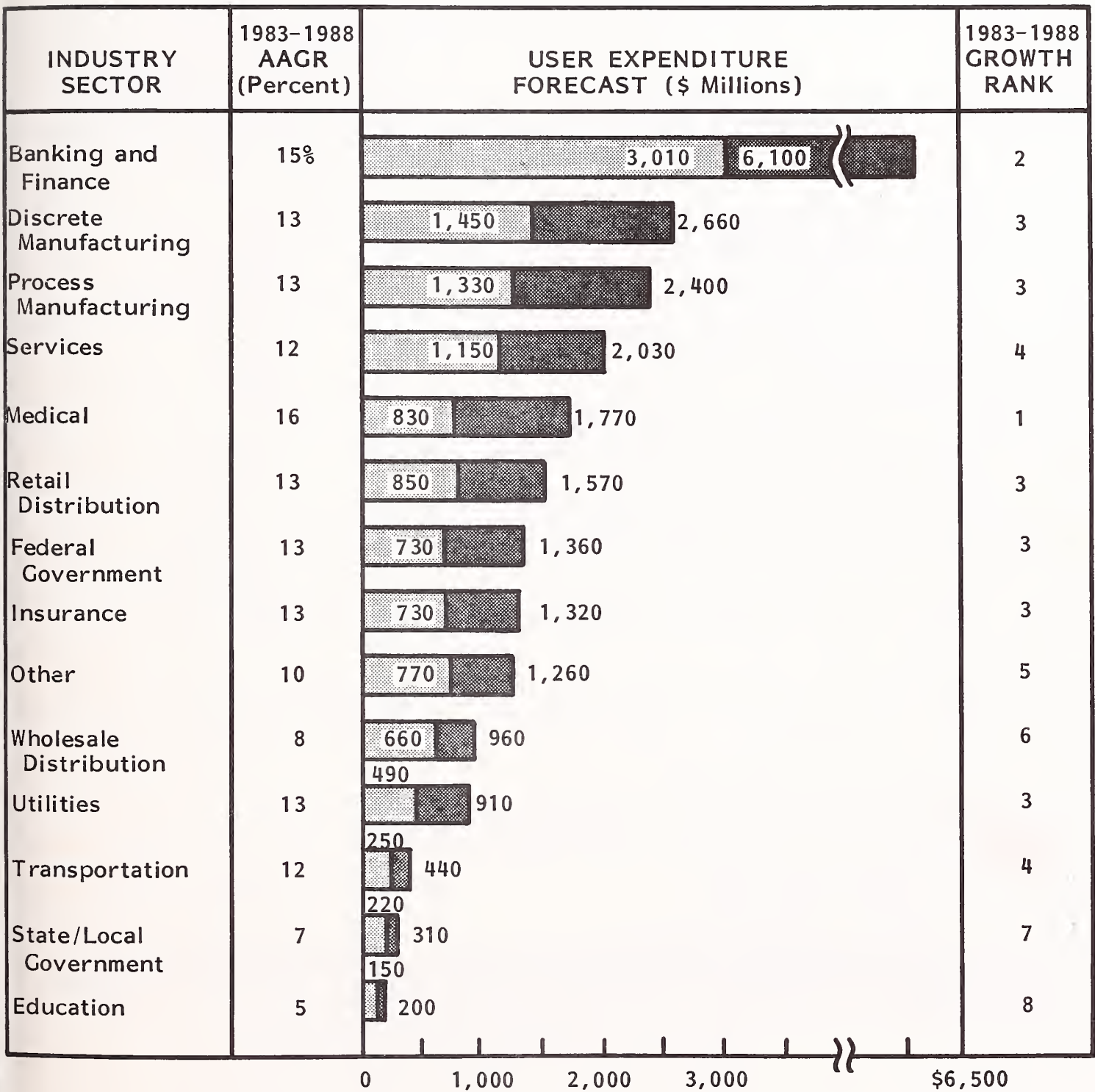


EXHIBIT III-3

LARGEST PROCESSING SERVICES VENDORS BY NONCAPTIVE U.S. REVENUE

RANK		COMPANY	CALENDAR YEAR REVENUES (\$ millions)		1981/1982 PERCENT GROWTH
1982	1981		1982	1981	
1	2	Automatic Data Processing, Inc. (ADP)	\$599	\$520	15%
2	1	Control Data Corporation (CDC)	590	541	9
3	3	General Electric Company	282	250	13
4	4	Electronic Data Systems Corporation (EDS)	256	236	8
5	5	Tymshare, Inc.	178	192	(7)
6	6	McDonnell Douglas Automation Company (McAuto)	177	155	14
7	9	Computer Sciences Corporation (CSC)	151	122	24
8	7	Litton Industries, Inc.	148	132	12
9	11	Shared Medical Systems Corporation	141	112	26
10	10	Equifax, Inc.	131	121	8
11	8	Dun & Bradstreet	126	128	(2)
12	12	National Data Corporation	116	107	8
13	16	Boeing Computer Services, Inc. (BCS)	115	93	24
14	14	Chase Manhattan Bank	114	97	17
15	16	Bradford National Corporation	110	97	13

NOTE: Growth rates are rounded and are based on revenues rounded to the nearest thousand; revenues shown are rounded to the nearest million.

- As a whole, the market for software products is \$7.7 billion in 1983. It will experience the fastest growth of any of the four primary delivery modes over the next five years - 32% - and will quadruple in size, exceeding \$30 billion in revenues by 1988. Details are in Exhibit III-4.
  
- Within the economy as a whole, there is wide variation by industry sector in the forecast size and growth in demand for software products.
  - From the largest sectors, discrete manufacturing, and banking and finance, present size declines to the smallest, education, where \$130 million of software products were bought this year.
  
  - Rate of growth in demand varies, from the 18% annual increase by state and local governments, to the 40% yearly growth for transportation.
  
- Many of the largest software vendors are, understandably, hardware vendors, as shown in Exhibit III-5. The fastest growing software products vendors are those selling personal computer software.
  
- Personal computer software is forecast to grow at a rate of 51% per year over the next five years, as shown in Exhibit III-6.
  - Cross-industry products, which now make up 87% of all PC software, will grow at 46% per year to \$3.11 billion by 1988, when they will make up 73% of all sales.
  
  - Industry-specific software, starting from a base only one-sixth that of cross-industry products, is forecast to experience an explosive 73% annual growth, reaching \$1.13 billion by 1988.

EXHIBIT III-4  
SOFTWARE PRODUCTS MARKETS  
RANKED BY 1988 SIZE

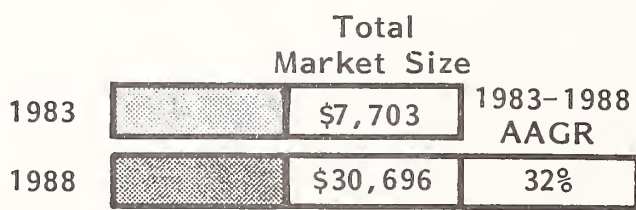
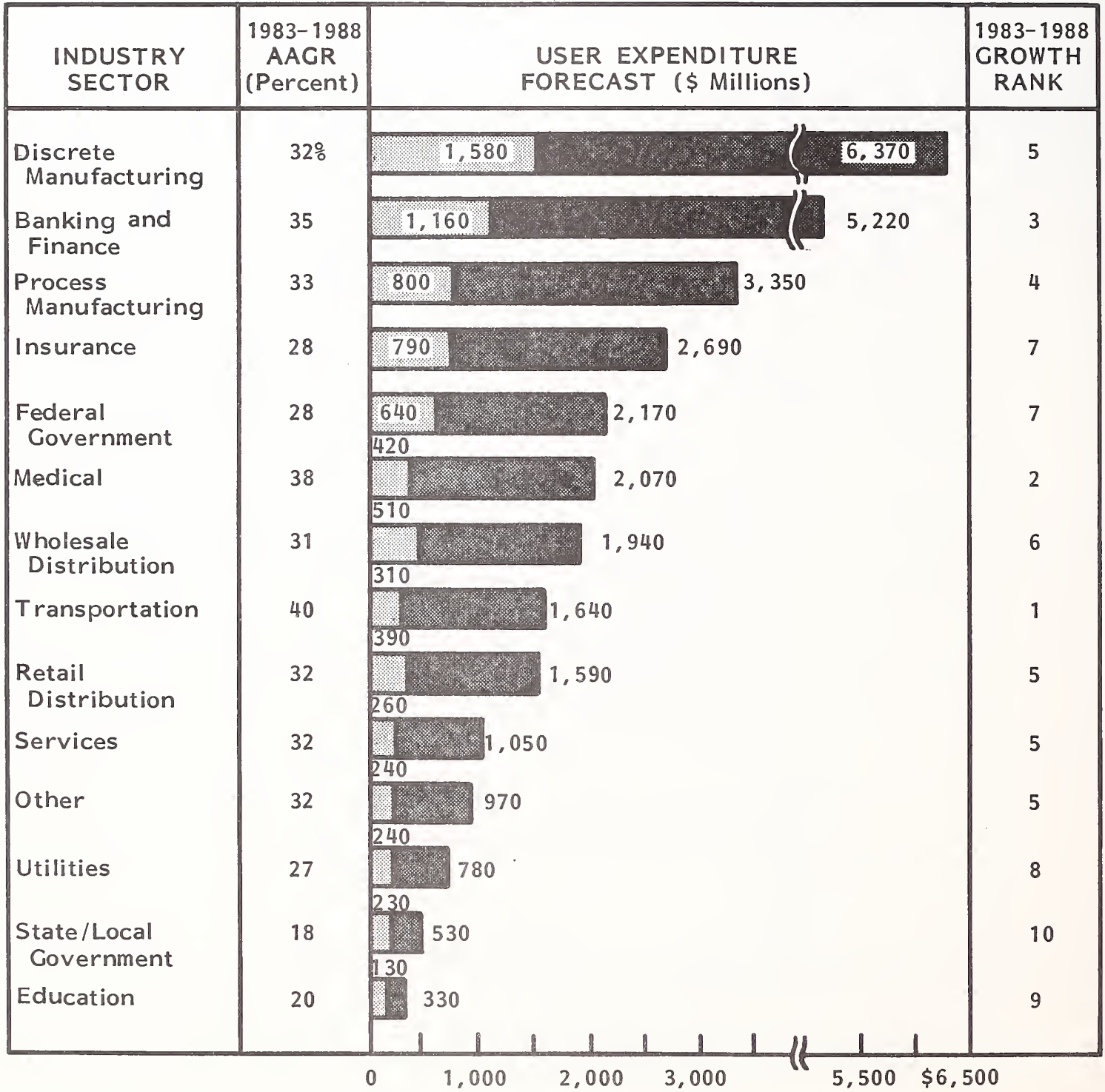


EXHIBIT III-5

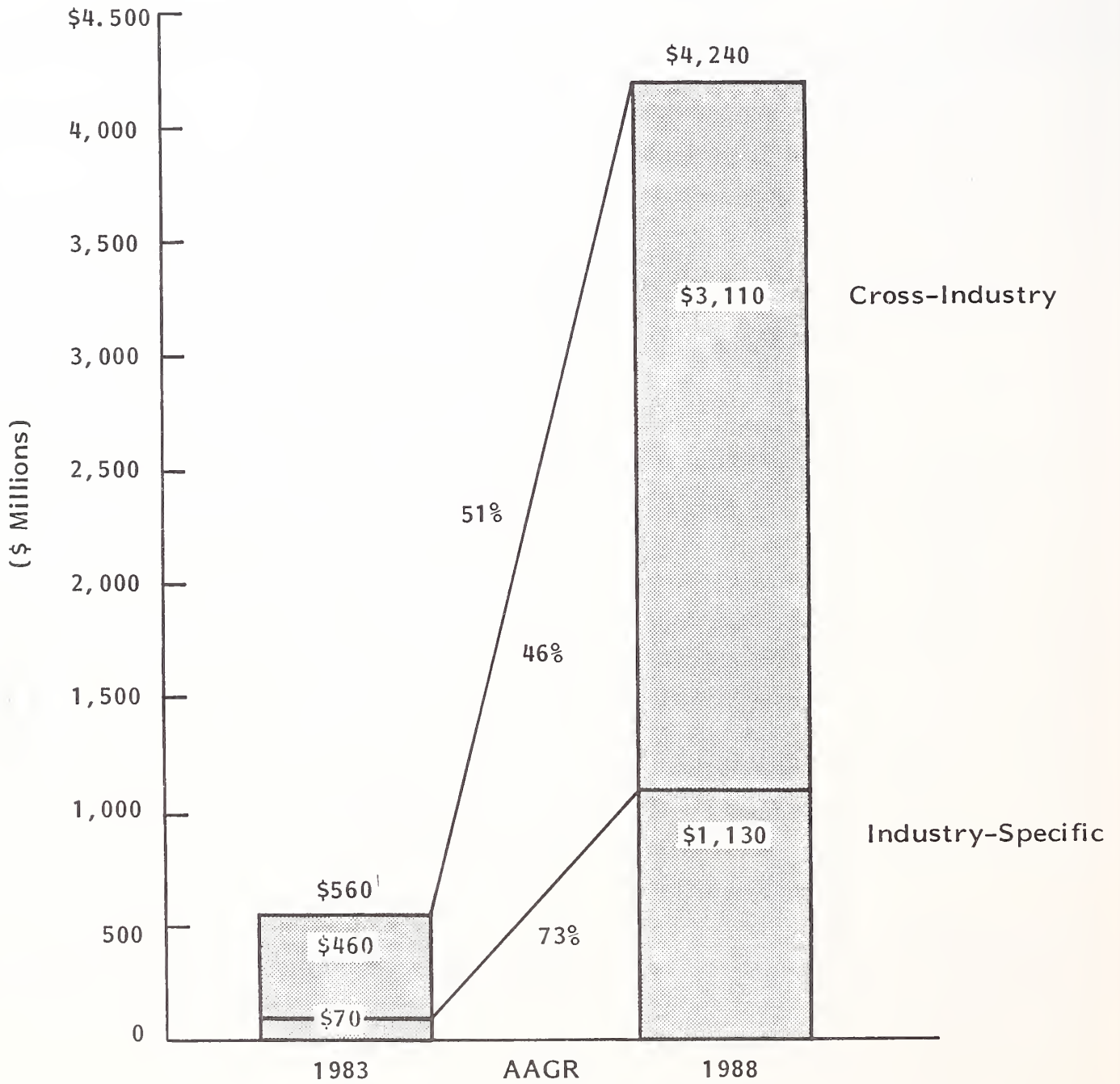
LARGEST SOFTWARE PRODUCTS VENDORS BY NONCAPTIVE U.S. REVENUE

RANK		COMPANY	CALENDAR YEAR REVENUES (\$ millions)		1981/1982 PERCENT GROWTH
1982	1981		1982	1981	
1	1	International Business Machines Corporation (IBM)	\$1,020	\$815	25%
2	2	Digital Equipment Corporation (DEC)	134	100	34
3	3	Sperry Corporation	75	67	12
4	4	Management Science America, Inc.	73	57	29
5	10	Tandy Corporation	67	36	86
6	5	Burroughs Corporation	62	57	10
7	7	Control Data Corporation (CDC)	55	50	10
8	8	Honeywell, Inc.	55	50	10
9	12	Apple Computer	51	34	50
10	9	Informatics General Corp.	50	38	31
11	13	Cullinet Software	49	32	53
12	10	University Computing (WYLY)	49	37	33
13	11	Hewlett-Packard Corporation	43	34	25
14	15	Applied Data Research	40	30	35
15	19	Anacomp, Inc.	33	24	38

NOTE: Growth rates are rounded and are based on revenues rounded to the nearest thousand; revenues shown are rounded to the nearest million.

EXHIBIT III-6

PERSONAL COMPUTER APPLICATIONS SOFTWARE MARKETS  
1983-1988



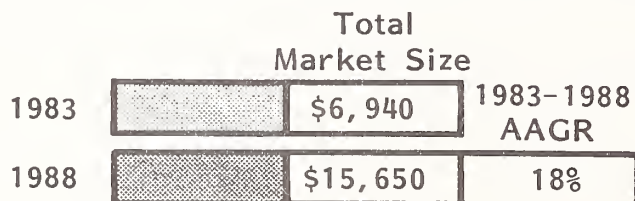
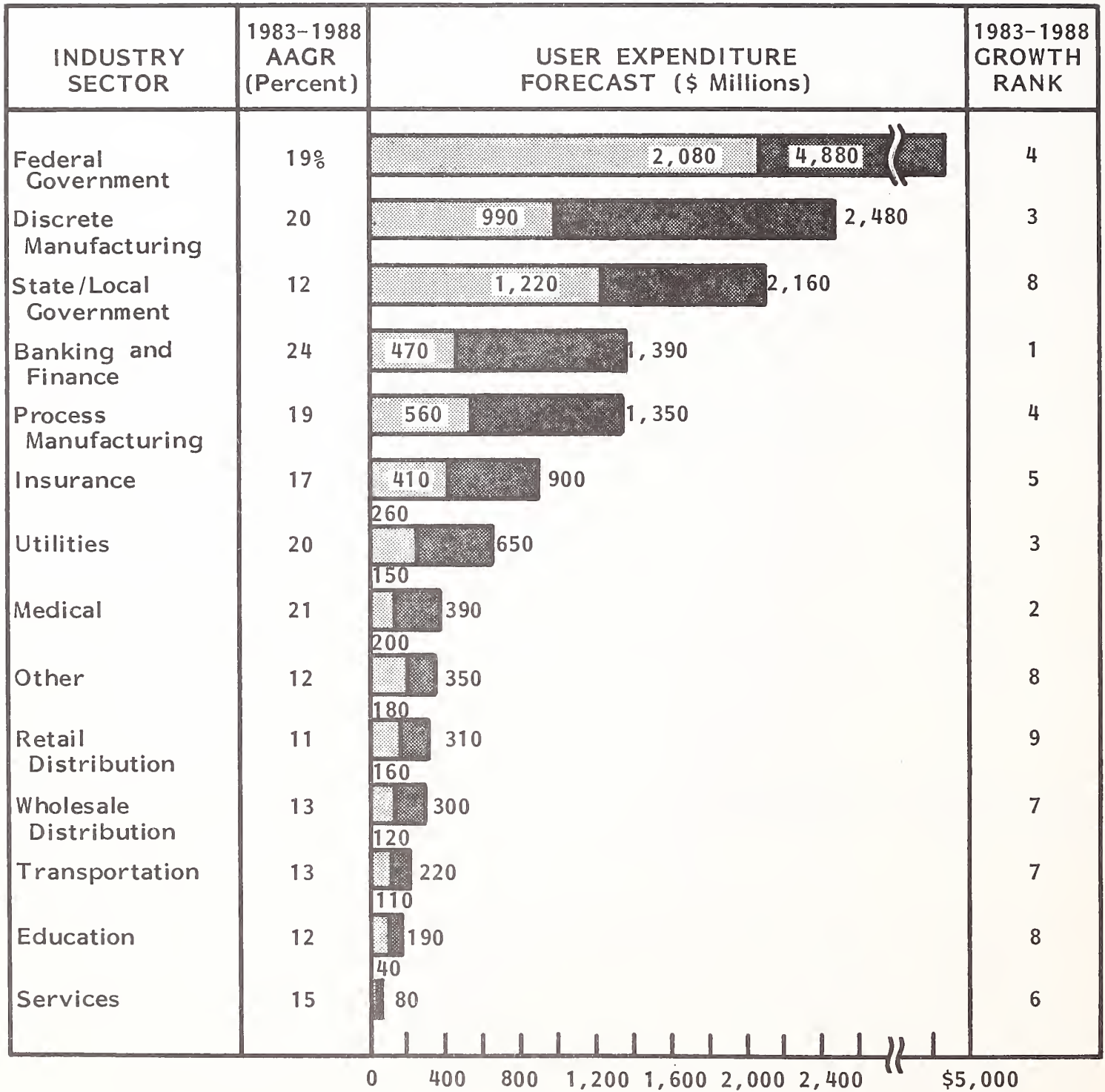


- Much of the dollar volume of this industry-specific sector will flow to main-frame and mini software vendors incorporating subsets of larger packages into PC offerings.
- To date, most industry-specific offerings have been targeted at PC-based office practices in the legal, accounting, and medical fields. More recent offerings have begun to incorporate computer-aided design in manufacturing, cash management and trust applications in banking, and inventory management in wholesale and retail distribution.
- Increased horsepower in PC-based systems will present greater opportunities to package subsets or function-reduced industry applications for sale to numerically greater markets.
- Industry-specific applications should experience greater immunity to price erosion than cross-industry packages.
- It is likely that within three (possibly two) years, the largest independent software vendors will be those serving the personal computer marketplace.
- Personal computer software vendors dominate the list of fastest growing software vendors.

#### D. PROFESSIONAL SERVICES

- The federal government is easily the largest industry market for professional services, accounting for \$2.08 billion in sales, 30% of the entire \$6.94 billion market, as shown in Exhibit III-7.
- At a higher than average growth rate of 19% yearly through 1988, the federal government market will demand \$4.88 billion in professional services. The market as a whole will have expanded at an 18% annual rate to \$15.65 billion.

EXHIBIT III-7  
PROFESSIONAL SERVICES MARKETS  
RANKED BY 1988 SIZE



- Banking and finance is the fastest growing industry market at 24% growth.
- Retail distribution, in addition to being a small market, will experience the slowest growth in demand for professional services, 11% per year through 1988.
- The ranks of the largest professional services vendors are populated by a disparate coterie of companies, from hardware manufacturers and accounting firms, to subsidiaries of aerospace giants and, of course, information services firms. The specifics are shown in Exhibit III-8.

#### E. INTEGRATED SYSTEMS

- This market is slated for buoyant growth over the next five years, from \$4.34 billion in 1983 to \$13.36 in 1988. This represents a 25% average annual growth rate. For details see Exhibit III-9.
- Services will represent the fastest growing industry market for integrated systems over this period.
- Even the slowest growing sectors (education, and state and local government) will advance by 15% per year, almost five times the expected increase in the GNP.
- CAD/CAM vendors are heavily represented among the largest integrated systems firms. Specifics are noted in Exhibit III-10.
- Most of the largest vendors sell industry-specific products.
- Metier Management Systems is a notable exception. Metier has achieved stellar growth recently by marketing a project evaluation, planning, and management system to a variety of industries.

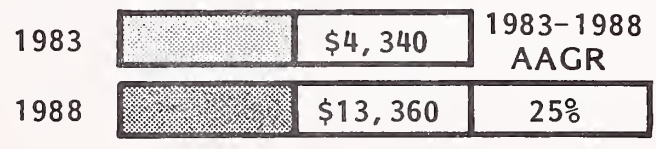
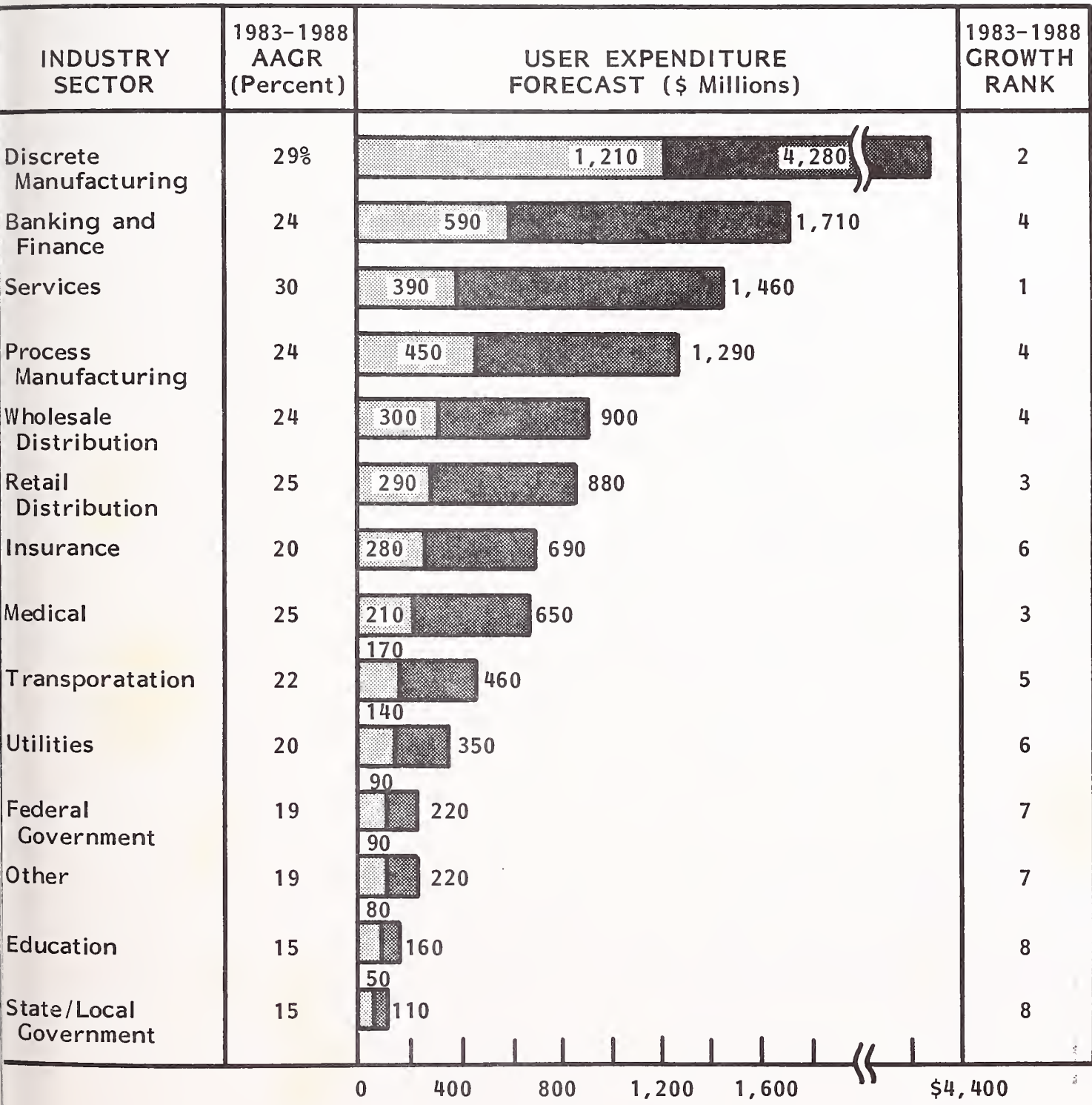
EXHIBIT III- 8

LARGEST PROFESSIONAL SERVICES VENDORS BY NONCAPTIVE U.S. REVENUE

RANK		COMPANY	CALENDAR YEAR REVENUES (\$ millions)		1981/1982 PERCENT GROWTH
1982	1981		1982	1981	
1	1	Computer Sciences Corporation (CSC)	\$420	\$389	8%
2	2	Electronic Data Systems Corporation (EDS)	250	206	21
3	3	Burroughs Corporation	232	198	17
4	5	International Business Machines Corporation (IBM)	195	170	15
5	4	Arthur Andersen and Company	187	165	13
6	6	Mitre Corporation	175	151	16
7	7	Price Waterhouse	147	138	7
8	8	Planning Research Corporation (PRC)	116	98	18
9	9	Peat, Marwick and Mitchell	92	84	9
10	16	CACI, Inc.	81	49	66
11	10	Control Data Corporation (CDC)	80	80	0
12	12	General Electric Company (GE)	72	56	29
13	35	McDonnell Douglas Automation Company (McAUTO)	70	21	233
14	11	Grumman Data Systems	65	59	10
15	13	Syscon	63	54	17

NOTE: Growth rates are rounded and are based on revenues rounded to the nearest thousand; revenues shown are rounded to the nearest million.

EXHIBIT III-9  
INTEGRATED SYSTEMS MARKETS  
RANKED BY 1988 SIZE



## EXHIBIT III-10

## LARGEST INTEGRATED SYSTEMS VENDORS BY NONCAPTIVE U.S. REVENUE

RANK		COMPANY	CALENDAR YEAR REVENUES (\$ millions)		1981/1982 PERCENT GROWTH
1982	1981		1982	1981	
1	1	Computervision	\$203	\$164	24%
2	2	General Electric Company	108	86	25
3	6	Intergraph Corporation	93	60	55
4	3	Triad Systems	90	79	15
5	5	Gerber Scientific, Inc.	73	60	21
6	4	Schlumberger, LTD.	70	72	(4)
7	7	Computer Consoles	63	51	25
8	10	HBO and Company	52	37	41
9	13	McDonnell Douglas Automation Company (McAUTO)	50	27	81
10	8	Reynolds and Reynolds Company (The)	47	40	18
11	12	Control Data Corporation	42	30	40
12	9	Auto-trol Technology	39	40	(2)
13	11	C3	38	33	16
14	29	Metier Management Systems, Inc.	27	12	131
15	14	Automatic Data Processing, Inc. (ADP)	26	21	24

NOTE: Growth rates are rounded and are based on revenues rounded to the nearest thousand; revenues shown are rounded to the nearest million.

## IV INDUSTRY MARKETS





## IV INDUSTRY MARKETS

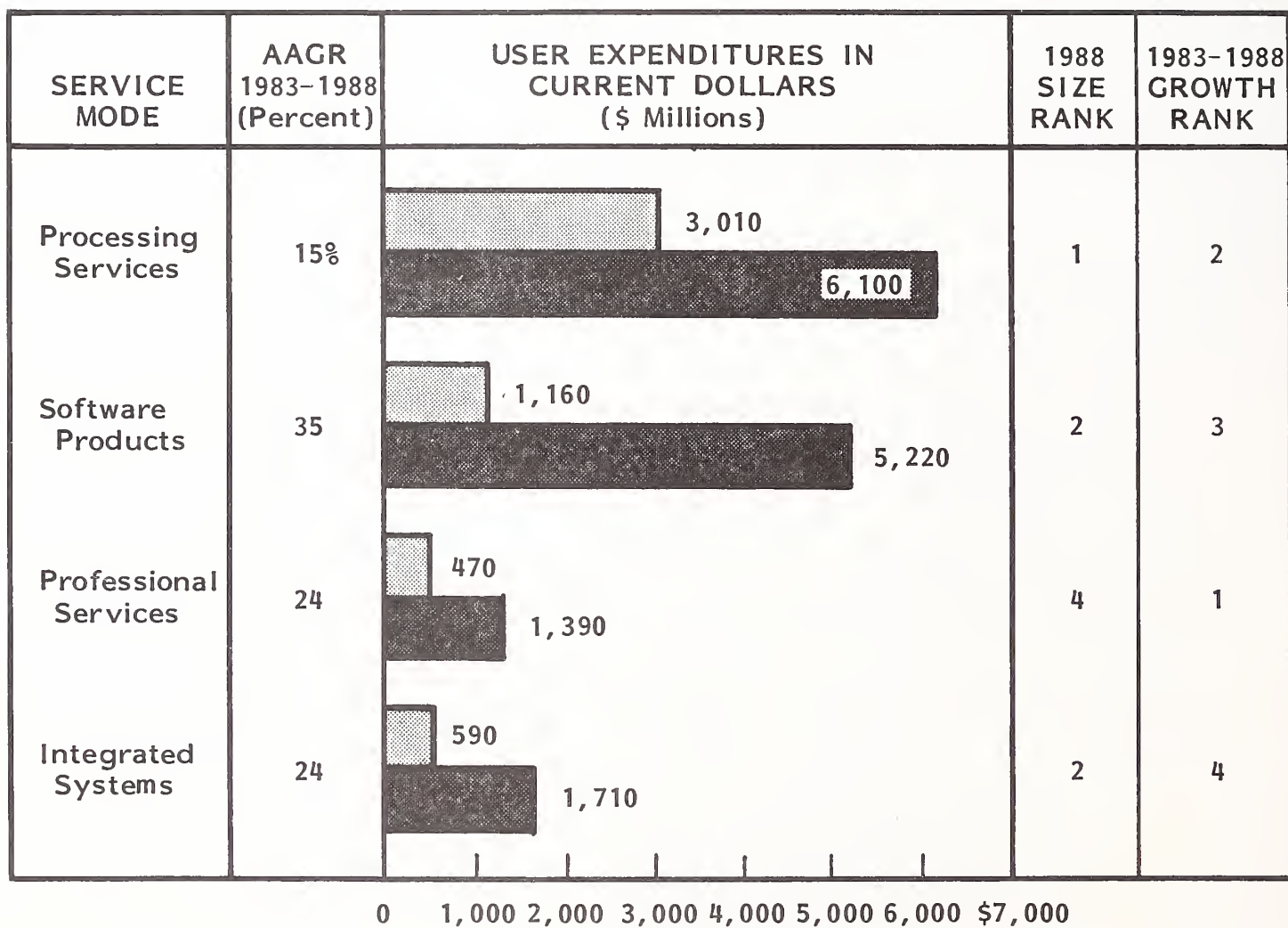
### A. BANKING AND FINANCE

#### I. MARKET SIZE AND GROWTH

- The banking and finance sector is one of the most information intensive in the economy. Changes rocking this sector (see section 2 following) will contribute to continuing high growth in demand for information services.
- Overall this sector represents a \$5.2 billion market in 1983, growing to \$14.4 by 1988, a compound average growth rate of 22%, as shown in Exhibit IV-1.
- In dollar terms, banking and finance is the largest purchaser of information services.
  - It is the leading purchaser of processing services, spending an estimated \$3 billion in 1983. Almost 80% of that total - some \$2.3 billion - is industry specific, as shown in Exhibit IV-2.
  - Next to the discrete manufacturing sector, it is the second largest market for software products, spending almost \$1.2 billion this year.
- Growth in the size of the market exceeds that of most other sectors.

EXHIBIT IV-1

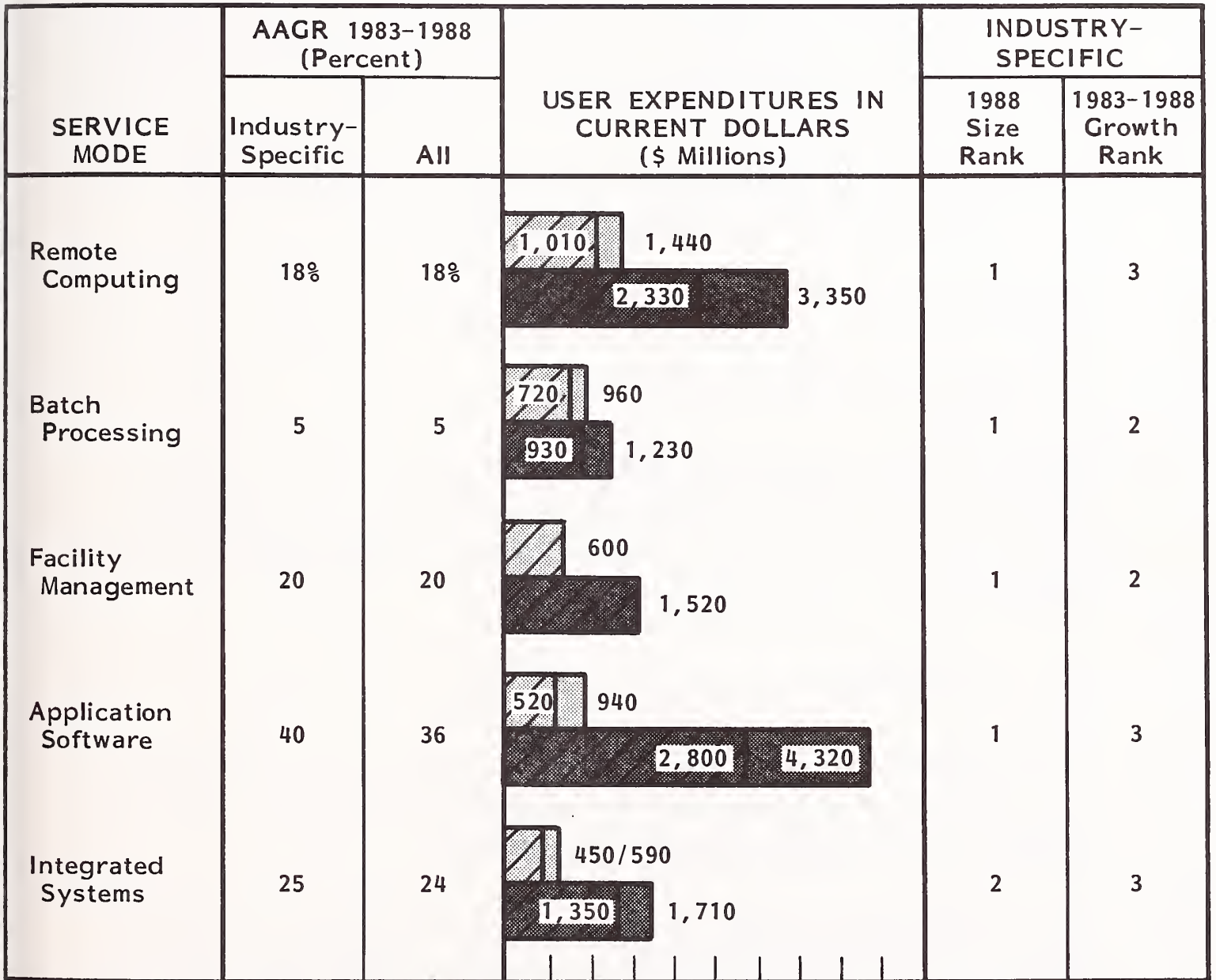
TOTAL INFORMATION SERVICES FORECAST  
BANKING AND FINANCE SECTOR, 1983-1988



Total Information Services		1983-1988 AAGR
1983	\$ 5,240	
1988	\$14,420	22%

(\$ Millions)

EXHIBIT IV-2  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 BANKING AND FINANCE SECTOR, 1983-1988



0 1,000 2,000 3,000 4,000 \$5,000

(\$ Millions)

All

Industry- Total  
Specific Exhibit\*

1983		\$3,300	\$ 4,530
1988		\$8,930	\$12,130

Industry-Specific Portion

\* May not total exactly due to rounding.

- Demand for processing services should grow by 15% a year through 1988, reaching \$6.1 billion. Only the medical industry will experience a higher level of growth in demand. Demand for application software is forecast to grow at a vigorous 36% per year over the next five years, reaching \$4.3 billion by 1988. The industry-specific component of this demand is growing even faster, at 40% per year. By 1988 it will reach \$2.8 billion, equal to 65% of total sectoral purchases.
- Banking and finance, at 24% average annual growth rate, is the fastest growing sector for roles of professional services.
- The composition of the industry is shown in Exhibit IV-3.

## 2. KEY ISSUES, TRENDS, AND EVENTS

- Several factors account for the continuing high level of demand for information services by this sector. Among the most important are continuing deregulation, mergers and acquisitions, and more rapid assimilation of electronic technologies.
  - a. Deregulation
- Deregulation has accelerated and its impact on banking has grown this year. The effects of earlier deregulation have caught up with the industry while the impact of new deregulation is being felt immediately.
- The Federal Reserve Board's January approval of the Bank of America's purchase of the Charles Schwab discount brokerage house sparked a rash of mergers, acquisitions, and start-ups of discount brokerages by banks.
- The success of cash management accounts (CMA) offering clients money market funds, credit cards, check cashing privileges, lines of credit, and brokerage services, all in one account, has lent urgency to these efforts. CMAs are being marketed by a number of banks and brokerage houses.

## EXHIBIT IV-3

BANKING AND FINANCE INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
60	Banks (Total)	Number of Establishments (1980) Number of Employees (1982)	46,184 1.7 Million
601	Federal Reserve Banks	Assets (1982) Number of Banks (1980) Number of Employees (1980)	\$ 168.5 Billion 50 21,000
602	Commercial Banks	Assets (1982) Number of Banks (1982) Number of Employees (1982)	\$1,801.0 Billion 14,913 1.5 Million
603	Mutual Savings Banks	Assets (1980) Number of Banks (1980) Number of Employees (1980)	\$ 166.6 Billion 2,223 59,000
604/605	Trust Companies and Other Functions	Assets Number of Establishments (1980) Number of Employees (1980)	- 1,745 32,000
61	Credit Agencies (Total)	Assets Number of Agencies (1980) Number of Employees (1982)	- 60,339 581,000
611	Rediscount and Financing Institutions	Assets Number of Establishments (1980) Number of Employees (1982)	- 60 1,000
612	Savings and Loan Associations	Assets (1982) Number of Associations (1981) Number of Employees (1982)	\$ 708.0 Billion 3,851 275,000

Continued

EXHIBIT IV-3 (Cont.)

BANKING AND FINANCE INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
613	Agricultural Credit Institutions	Assets Number of Establishments (1980) Number of Employees (1980)	- 1,360 16,000
614	Credit Unions	Assets (1978) Number of Establishments (1980) Number of Employees (1982)	\$ 62.6 Billion 36,133 195,000
615	Business Credit Institutions	Assets Number of Establishments (1980) Number of Employees (1980)	- 2,416 50,000
616	Mortgage Bankers & Brokers	Value of Mortgage Originations (1978) Number of Firms (1980) Number of Employees (1980)	\$104 Billion 4,652 63,000
62	Security & Commodity Brokers	Total Capitalization (1978) Number of Companies (1980) Number of Employees (1982)	\$ 5.7 Billion 11,279 274,000
67	Holding and Other Investment Companies	Number of Establishments (1980) Number of Employees (1982)	13,135 138,000

- At the end of 1982, the Federal Reserve Board rescinded restrictions on interest rates paid on bank savings and checking accounts. Money market, "Super-NOW," and other accounts were soon promoted offering much higher interest rates to depositors and lowering spreads (the difference between the interest paid to depositors and the interest received on loans).
- These lower spreads have reduced margins and led to cost-cutting campaigns in many banks, as well as to many mergers and acquisitions. Overhead and support personnel have been slashed especially deeply, often being replaced by data processing services.
- Further loosening of interest rate ceilings went into effect in October 1983, leaving only passbook savings accounts of S&L's interest-paying checking accounts, and certain time deposits left to be deregulated.
- The approvals by the Federal Reserve Board of the acquisitions of Federal Savings and Loan of California by CitiCorp in September 1982 and of Seafirst of Seattle by Bank of America in July 1983 lend momentum to the drive toward unrestricted inter- and intrastate banking.
- Restrictions had already been finessed by bank-owned finance companies and other subsidiaries in some states and brokerage houses offering CMAs nationwide and by ATM networks.
- Since the Federal Reserve Board granted CitiCorp permission to market its financial data processing services to corporations last year, other banks have asked for similar permission, raising the possibility of a new competitive force in the information services marketplace.
- New legislation proposed by the administration and the Treasury Department would allow banks to expand real estate and insurance products and to participate more in securities activities.

b. Mergers and Acquisitions

- The dollar value of mergers and acquisitions among financial institutions has soared recently as large- and medium-sized players seek to consolidate operations, enter new markets, or shed undesired lines of business. From less than \$500 million total volume in 1980, the value of bank acquisitions alone should top \$5 billion in 1983.
- Mergers among regional second-tier banks have increased as a response to competitive pressures from larger organizations.
- The entrance to financial circles by traditionally nonbanking firms has accelerated.
  - Both Sears and National Steel own savings and loans. Sears has indicated a desire to enter the home mortgage banking business.
  - Dreyfus Corporation has set up a "nonbank" bank, buying a commercial bank, selling off its commercial loans, and thereby freeing itself of regulation by the Federal Reserve Board. Many other such entries can be expected.
  - American Express, already a major player in the industry, added further to its corporate breadth with the purchase this year of Investors Diversified Services (IDS).
- Savings and loans in California are now permitted to make commercial loans and enter other lines of business, a trend likely to extend to other states.



c. Assimilation of Technology

- The assimilation of new electronic technologies has accelerated in the last year.
- INPUT projects Automatic Teller Machine (ATM) installations to increase by 15,000 in 1983 to a year-end total of 50,000. By 1986 the dollar volume of transactions from ATMs should exceed \$6 billion.
- Banks are increasing their installation of ATMs because of competitive pressure from other banks and in order to cut costs by displacing tellers. There are over 300 local and regional shared ATM networks.
- In the past year, there has been rapid development of nationwide ATM networks, such as Cirrus, Plus, The Exchange, and Nationet. VISA International and MasterCard are planning and developing their own networks.
- Nonexclusive ATM networks - where cards are usable in any machine, regardless of the bank sponsorship of the card holder - should arrive within the next five years.
- The nation's automated clearinghouses have begun transferring corporate payments electronically.
- While initial adoption by corporations will be slowed by their loss of float (funds in transit), savings in processing will encourage growth. Applications designed around this new service will be in great demand. Some vendors are planning network services that will integrate sales and delivery information with payment transactions that would be transmitted to the ACH.
- The introduction of new POS services during 1983 that allow consumers to buy gas at unattended pumps, tickets, and other goods and services has been of interest to banks and merchants.

- In California, Wells Fargo Bank and Bank of America are both experimenting with debit cards, offering incentives and price discounts to lure users.
- A number of large banks including Chemical, Chase, and Citibank have been experimenting with home banking. Vendors including ADP, Anacomp, and Bell operating companies are developing videotex home banking systems.

### 3. APPLICATIONS ANALYSIS

#### a. Retail Applications

- Processing of savings and checking accounts, consumer loans, insurance, and traveler's checks will grow at a slower rate in the next few years. Only 5% more checks will be processed in 1984 than in 1983.
- Large banks moving processing in-house and in some cases reselling these services complicate the scenario of low growth in these traditional retail applications.
- However, many new retail products are appearing, and they can be divided into two classes: those that provide higher returns to customers and those that simplify making payments or obtaining funds. Both offer excellent opportunities to information services firms.
- Bankers are being forced by the competitive deregulated environment to provide increasingly attractive products to their clients such as Super-NOW, IRA, Keogh accounts, and money market accounts. Opportunities exist for vendors of applications for these products.
- Electronic Funds Transfer (EFT) of debits and credits through the ACH network has expanded greatly, although a few banks dominate processing.

- Automatic Teller Machines (ATMs) are growing not only in numbers of installations but also in interconnections.
- Continued opportunities exist for installing ATMs, and 1984 will see growth in demand for services in switching local, regional, and national traffic. POS use will expand rapidly to provide goods and services together with the reduction of clerks.
- There is still uncertainty about the willingness of the public to pay for home banking services. The ADP systems being tested in Washington state, Connecticut, and New Jersey are trying out features.
  - Several banks, including Crocker National, have expressed interest in licensing Pronto from Chemical Bank.
  - INPUT notes that home banking system vendors will include large banks and several large independent information services vendors such as Bell operating companies and electronic publishers.
- INPUT expects rapid growth of POS in 1984 and a great deal of opportunity for information services vendors positioned to push it.
- Pay-by-phone use is expanding with both banks and vendors offering services, but its use is competitive with home banking on PCs in some situations.

b. Cash Management Systems (Commercial Banking)

- Cash management systems' traditional applications have included collection and funds concentration, funds investment and dealer functions, account reconciliation, funds transfer (domestic and international), disbursement services, and information access.

- Vendors will be offering more software products, integrated systems, and processing services that link these products and other bank services.
- New cash management systems applications will consist largely of automation of cash management decisions for the corporate financial officer. Cash management decisions will be initiated by user computers tied directly to banks.
- Microcomputers will be used by corporate officials to download cash management system data bases and programs. Users can then cross-reference cash management information from banks to their own financial systems, review forecasts, targets, and debt management, and plan investment.
- The market for these new applications will be especially strong next year.

c. Trust and Securities Applications

- Trust processing will grow in 1984, but more slowly than retail or cash management.
- New applications include:
  - Automated aids for relating customer and bank records, entailing personal computers in many cases.
  - Improved interfaces for trust and custody customers that have high trade volumes.
  - New personal trust and investment or asset management systems for individuals, including money market sweeps.
  - For individuals, accounting features that approach the complexity of those offered as corporate services, including portfolio management,

tax and cash flow reporting, performance measurement, and liquidity analysis.

- The new applications provide a most fertile ground for product development. The new securities (discount brokerage) divisions of banks should be prime target customers.

#### 4. COMPETITIVE ANALYSIS

- Certain large banks will become increasingly aggressive marketers of information services to other banks. They are bolder now because:
  - The need for new sources of revenue will encourage large banks to sell versions of data processing, administrative, or communication systems that are used internally.
  - The startup costs of new banking services, such as home banking, are going up as the services grow more sophisticated, and the banks undertaking the development want to spread their risks and costs.
  - Big banks see fee income as an attractive alternative to spread income (i.e., the difference between interest paid to banks by borrowers and that paid to savers by banks), which has suffered from bank deregulation.
- RCS vendors will continue to feel pressure on their markets as banks bring processing in-house to cut costs and take advantage of the declining cost of hardware.
- In all modes of information services, vendors are linking banking applications.
  - Anacomp, Hogan, and Systematics have been extending this capability in systems addressing retail banking and other banking functions.

- Anacomp is developing a system that will link international applications with the aid of American Express.
- University Computing offers software that links applications products as well. Their system provides customer profitability analysis and pricing for corporate customers.
- Integrated systems offered by Anacomp (CIS) and GEISCO (the MAX system) for retail banking provide linked application modules.
- Traditional industry lines are being crossed as well. Interfinancial software has been created by the partnership of the Continuum Company (insurance), Monchik-Weber (securities), and Hogan Systems (banking) to explore application requirements that might emerge from the blurring of distinctions between these three lines of business.
- Vendors of processing systems have been offering linked banking applications, particularly for retail banking and cash management.
  - GEISCO, ADP, and other vendors of automated cash management will carry this linkage one step further by using PCs as cash management terminals in corporate offices, enabling customers to compare and exchange data from the bank to their internal systems.
  - Home banking systems will also provide a means of linking bank customer activity with processing systems. ADP and Anacomp are both active in home banking systems for this reason.
- Many top vendors of processing services and software products for banks (such as GEISCO, ADP, Tymshare, MSA, IBM, Stockholder Systems, and others) include the use of PCs in their strategies.

- PCs are offered to retail banking institutions or departments as integrated systems, terminals for input/output, and vehicles for running banking models.
  - PCs are offered to handle domestic and international cash management functions on corporate premises.
  - PCs, together with software, will also be sold through banks to meet corporate financial and other needs.
- Top vendors of information services in banking also tend to diversify their services to more than one banking department and to expand their use of service modes. This diversification allows top vendors to take advantage of cyclical increases of activity in one area of banking or another.
    - EDS, a leader in facility management in banking, has developed a fourth-generation language capability for L.I. Trust and a large network capability for credit unions.
    - Systematics, another leading banking FM vendor, has entered the trust arena with an integrated system offering based on the HP 3000 mini-computer.
    - SEI, already a force in trust processing, has added on-line money transfer, investment analysis, and currency conversion, together with a new PC offering.
    - The activities of Anacomp and GEISCO in retail, corporate, and international banking has been noted.
  - The securities market for information services continues to grow rapidly, led by the provision of on-line data bases (see Volume 2 of this report). Bunker Ramo, Quotron, Telerate, Reuters, and ADP, with its acquisition of GTE Telenet's Brokerage Services, are some of the leading vendors to this market.

- Almost all vendors have offered up some form of user site hardware based on personal computers.
  - Bunker Ramo uses the Fortune Systems hardware.
  - The Quotron 1000 incorporates the Motorola 68000 chip and the Unix operating system from Bell Labs.
  - ADP is providing a Convergent Technologies workstation based on the new Intel 186 and 286 microprocessors for a branch office automation system for Prudential Bache Securities.

## 5. RECOMMENDATIONS

- Opportunities exist to develop integrated systems for retail banking that use personal computers of many sizes and types.
  - Current products for smaller banks do not offer linked retail applications in a completely satisfactory fashion as yet.
  - Nonstop micros and supermicros will expand the opportunity.
- The squeeze on banks' margins makes for a fertile market for application products that include modules to evaluate the asset/liability mix of profit plans of retail banks. These applications will be especially useful if the merger movement (see above) continues its present momentum.
- The linkage of retail banking and personal trust applications will continue to offer opportunities for system development.
- A considerable opportunity exists to provide micros and software to corporations for electronic reporting from banks for customer statements, advisements, etc.



- Banks entering new lines of business, e.g., discount brokerage, will require help in administering services and in integrating accounts.
  - The rush by vendors and banks to offer micros as cash management terminals is just beginning.
  - Many vendors of processing services, software, and turnkeys will find opportunities to help banks transmit data transactions, advices, corrections, statements, and other information to corporate customers and receive instructions from the same customers.
  
- Vendors of software products, integrated systems, and processing will find opportunities to upgrade existing products with DBMS and fourth-generation language capabilities.
  - Several large banks are implementing new money transfer systems with the above capabilities.
  - Large-scale retail banking systems, cash management systems, treasury management and trading, and trust systems can all profit from upgrading this type of capability.
  - Older data base products may prove to be a competitive disadvantage.
  
- Vendors of facility management and RCS may find it possible to develop capabilities to serve a group of customers in a collective way. Vendors may act as an integrated operations facility for institutions that are in the same area or that have similar needs.
  
- Processing vendors designing new systems for banks and securities firms that extend computing to end users should explore the possibility of capturing some of the data for data base development.

- Especially in the area of corporate cash management systems, such proprietary data bases can be leveraged to large gains later.
- Home information systems may hold similar promise.
- Vendors seeking primary or supporting roles in the home information/banking markets should plan their involvement carefully.
  - Knight Ridder's decision earlier this year not to charge for its home banking service may indicate a current softness in the market for home information services.
  - Vendors should proceed only after having understood the long commitment that may be necessary and the consumer marketing approach that must be used to successfully sell services.
- Vendors should be sensitive to opportunities to offer new technology in existing applications.
  - Several vendors are experimenting with "signature validation" products.
  - Voice response is being considered for ATM and POS terminals.
  - Voice response is being used successfully in customer inquiry systems.

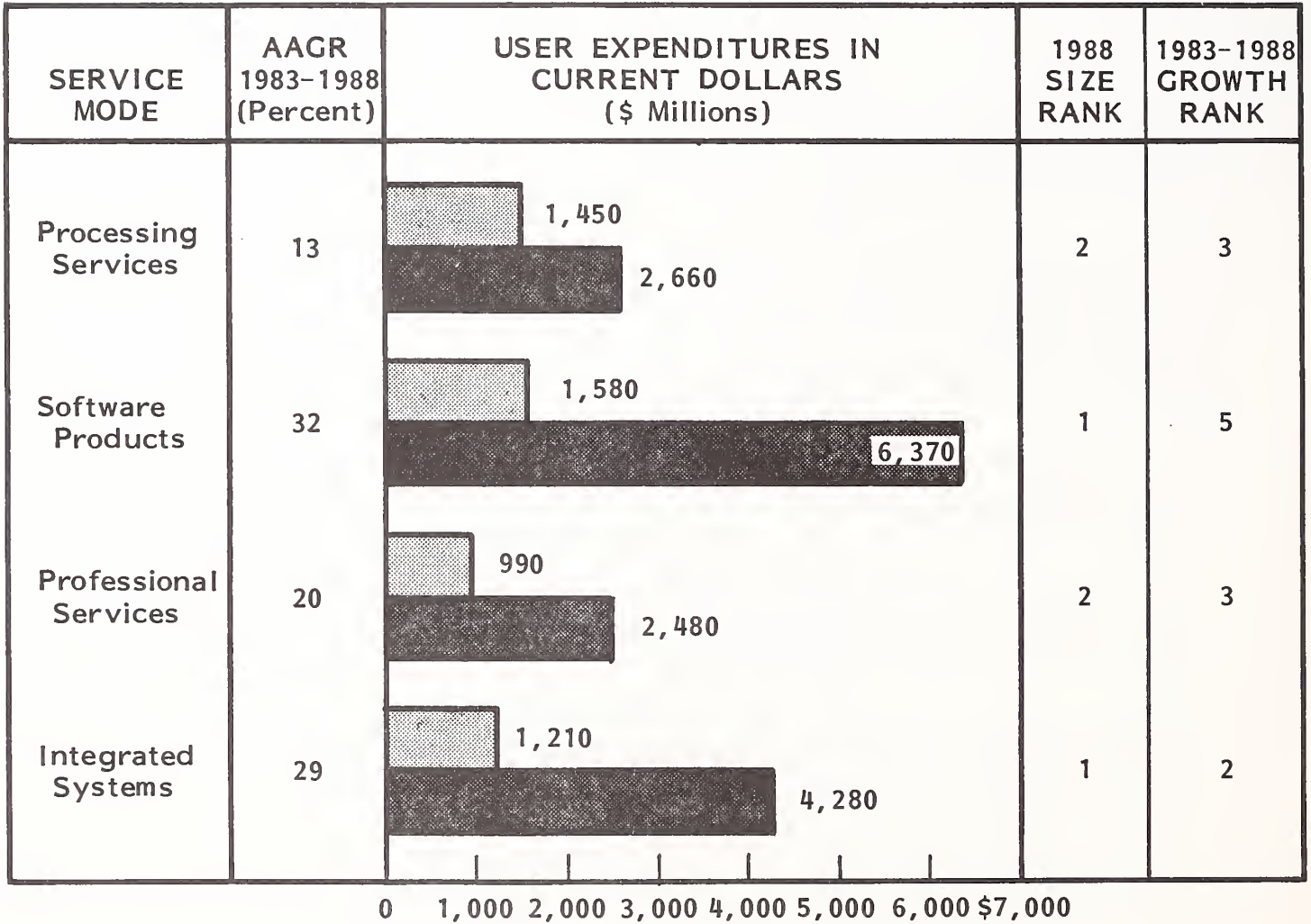
## B. DISCRETE MANUFACTURING

### I. MARKET SIZE AND GROWTH

- The discrete manufacturing marketplace is among the largest for information services, exceeding \$5.2 billion in 1983, as shown in Exhibit IV-4.
- Its forecast five-year average annual growth rate of 25% per year is also among the highest for all industries and will produce a total market approaching \$16 billion by 1988.
- Software sales to this marketplace should grow at a vigorous 32% per year over the forecast period, rising from \$1.58 billion in 1983 to \$6.37 billion by 1988.
  - Application software products sales will grow even faster, at 35% per year, as shown in Exhibit IV-5.
  - Industry-specific application software products sales will grow faster yet, at 40% per year to \$1.53 billion by 1988.
- Integrated systems sales will be the largest industry-specific market by 1988, reaching \$3.29 billion by 1988 on an annual growth rate of 30%.
- Processing services, as shown in Exhibit IV-4, overall will exhibit the same growth rate in this market - 13% - as they will on average for the economy as a whole.
  - The industry-specific component, however, will grow faster, at 16% versus 14% for all industry sectors.

EXHIBIT IV-4

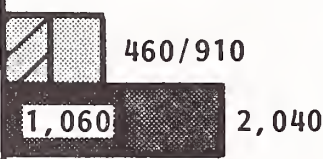



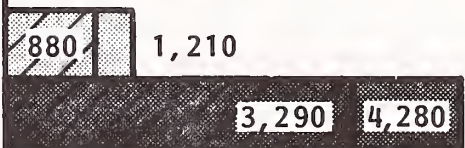
TOTAL INFORMATION SERVICES FORECAST  
DISCRETE MANUFACTURING SECTOR, 1983-1988



Total Information Services		1983-1988 AAGR
1983	\$ 5,230	25%
1988	\$15,790	

(\$ Millions)



**EXHIBIT IV-5**  
**INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST**  
**DISCRETE MANUFACTURING SECTOR, 1983-1988**

SERVICE MODE	AAGR 1983-1988 (Percent)		USER EXPENDITURES IN CURRENT DOLLARS (\$ Millions)	INDUSTRY-SPECIFIC	
	Industry-Specific	All		1988 Size Rank	1983-1988 Growth Rank
Remote Computing	18%	18%		2	3
Batch Processing	4	0		6	3
Facility Management	17	17		5	3
Application Software	40	35		2	3
Integrated Systems	30	29		1	1

0 1,000 2,000 3,000 4,000 \$5,000

(\$ Millions)

All  
Industry-Specific    Total  
Exhibit \*

1983		\$1,750	\$3,340
1988		\$6,070	\$9,930

 Industry-Specific Portion

\* May not total exactly due to rounding.

- Remote processing growth, at 18%, will also exceed the average rate of 16% growth for all industries.

- This industry sector is very diverse, as shown in Exhibit IV-6.

## 2. ISSUES AND APPLICATIONS

- Manufacturing has suffered considerable excess capacity in recent years, primarily as a result of two successive recessions in 1979-1980 and 1981-1982.
- In addition, a considerable part of its capital stock is old, if not obsolete.
- Competition from more efficient foreign producers is, by now, well understood for many manufacturing subsectors, even for markets within the U.S.
- These three facts place manufacturing in a curious position with regard to future growth. Profit margins are most easily improved by incremental use of idle capacity, a tempting course after several years of red ink and contraction.
- On the other hand, increased reliance on old or obsolete production facilities represents a dangerous strategy for boosting the bottom line, leading as it must to increasingly inefficient production and competitive stagnation or retreat.
- In some subsectors, for example electronics and related manufacturing, the overhead burden of obsolete plants is negligible or nonexistent, due to the sector's general newness. Also, high and sustained levels of demand from the military have enabled many producers to maintain relatively up-to-date plants and equipment.
- Some companies in heavy manufacturing, most notably the Chrysler Corporation, have updated their production facilities with robots and increased use of

EXHIBIT IV-6

DISCRETE MANUFACTURING INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
23	Apparel	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 51.6 Billion 22,067 1.2 Million
25	Furniture	Value of Shipments (1981) Number of Establishments (1980) Number of Employees (1982)	\$ 23.9 Billion 8,885 433,000
27	Printing	Value of Shipments (1982) Number of Establishments (1979) Number of Employees (1982)	\$ 36.9 Billion 44,415 1.3 Million
31	Leather	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 8.0 Billion 2,626 204,000
34	Fabricated Metal Products	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$113.9 Billion 31,243 1.4 Million
35	Machinery	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$180.6 Billion 46,244 2.3 Million
36	Electronics	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$140.5 Billion 13,756 2.0 Million
37	Transportation Equipment	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$195.4 Billion 8,369 1.7 Million

Continued

EXHIBIT IV-6 (Cont.)

DISCRETE MANUFACTURING INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
38	Instruments & Related Products	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 48.9 Billion 7,015 715,000
39	Miscellaneous Manufacturers	Value of Shipments (1981) Number of Establishments (1980) Number of Employees (1982)	\$ 26.9 Billion 13,459 385,000



plant automation. At the same time they trimmed labor use and the per hour costs. Chrysler's massive government loans must be acknowledged, however, as unique. For each such dramatic turnaround there are several more producers that have gone under or are on the brink of extinction.

a. MRP

- Utilization of latent capacity of a plant is a major concern of manufacturing companies. This applies both to machine utilization and to in-process inventories.
- The typical machine in a multiproduct metal fabricating company is cutting metal only about 5-10% of the time.
  - Set up, including loading workpieces, changing tools, changing operators, and other tasks, adds perhaps another 5-15%.
  - For 80-90% of available time the machine is not being used productively.
- Some machines develop bottlenecks even though they are run at peak capacity. Queues develop, which raise in-process inventory.
- Though these problems are not as common for machines used with fixed tooling configurations in large-scale production processes, problems increase in importance as production runs shorten and tooling changes increase. This pattern of production - small, frequently changed batch runs - is typical of most fabricated metal manufacturing.
- MRP systems promise to be both a blessing and a curse.
  - By streamlining and rationalizing flexible automation work centers, MRP systems have the potential to greatly improve plant automation.

- Most current MRP systems, however, are not integrated with other factory information centers. Many are batch-oriented and therefore totally unsuited to the dynamic nature of real-world production.
  - Forecast and control on a machine-by-machine basis is impossible when systems are not connected and operating interactively: orders change, schedules aren't met, breakdowns occur, supplies don't arrive, production priorities change, etc.
  - Worse, forecasted utilization parameters, as an input to most MRP systems, work to ensure that when a queue is forecast, it becomes self-fulfilling.
- Recognition of these limitations has resulted in MRP systems beginning to evolve toward systems with several important features:
  - They will be based on DBMS software.
  - They will be interactive.
  - They will deterministically model all of the relations between the products, parts, supplies, stock, machines, tooling, and other factors.
  - They will be distributed in the factory, using intelligent terminals with graphics capabilities for generating workorders and monitoring operations and material flow.
  - They will be fully integrated backwards into new materials inventory, receiving, purchasing, and accounts payable, and forward into finished goods inventory, shipping, accounts receivable, sales tracking, and forecasting.

b. CAD/CAM

- CAD/CAM has moved decisively beyond the basic computer-aided drafting systems that typified the technology only a few years ago.
  - Ironically, with the advent of more powerful microprocessors, PC-based CAD systems, primarily used for drafting, are proliferating.
  - Two of the more visible vendors, CAD Linc and Auto Desk base their systems on the MC 68000 and the 8086 processors, respectively.
- On a larger scale, however, the trend and objective of CAD/CAM suppliers is to build broader CAM and CIM (computer-integrated manufacturing) capabilities into turnkey CAD/CAM systems. This will be a natural step, as the product design data base is established in engineering (using the CAD/CAM system), and then used by all other manufacturing tasks.
- Computervision's agreement with IBM is indicative of this trend. CV president James Berrett states: with IBM, "We will be able to provide not only the capability to create new engineering and manufacturing information, but to manage and control that information as well."
- CV is not alone in planning to add more plant and production information system capabilities to their CAD/CAM products.
- The most important justification of CAD/CAM is reducing time. With a CAD/CAM system closely integrated with other factory automation systems, the time to develop and begin to manufacture new products can be reduced, potentially by large factors.
- This means that more of the product life is used in the market. This will force competing companies to go the same way.

- During production, using CAD/CAM to change production processes and the use of flexible automation, will shorten the time between order and delivery.
- This increases production from the plant, and reduces inventory. The combined effects can have a snowball effect.
- Exhibit IV-7 lists the largest CAD/CAM integrated systems vendors by non-captive U.S. revenue in 1982.

c. Robotics

- Robot applications conform generally to one of two classes:
  - Those used in mass production environments, such as in the automotive industry.
  - Those used in flexible manufacturing applications.
- Robot use in mass production accounts for most robot applications today.
- Two needs associated with this are:
  - To change over to new model production without extensive downtime for the factory (or a part of the factory).
  - To design products that better utilize robots in production (a tie to CAD/CAM).
- Extensive computer software systems will be used to model the robots, their geometry and control systems, and the manufactured part and assemblies. Software systems will also be used to realistically simulate robots' use in production. These advances will reduce factory downtime.

EXHIBIT IV-7

LARGEST CAD/CAM INTEGRATED SYSTEMS  
VENDORS BY NONCAPTIVE U.S. REVENUE

RANK		COMPANY	CALENDAR YEAR REVENUES (\$ millions)		1981/1982 PERCENT GROWTH
1982	1981		1982	1981	
1	1	Computervision	\$203	\$164	24%
2	2	General Electric Company	98	74	33
3	5	Intergraph Corporation	93	60	55
4	4	Gerber Scientific, Inc.	73	60	21
5	3	Schlumberger, Ltd.	70	72	(4)
6	7	McDonnell Douglas Automation Company (McAUTO)	40	22	81
7	6	Auto-trol Technology	39	40	(2)
8	9	Scientific Calculations, Inc.	14	11	33
9	10	Racal-Redac, Inc.	10	10	8
10	11	Control Data Corporation (CDC)	8	5	60

NOTE: Growth rates are rounded and are based on revenues rounded to the nearest thousand; revenues shown are rounded to the nearest million.

- Solid modeling will be used for this simulation. Presently, there are 15 commercial solid modeling systems, both offered as independent packages, and both bundled with CAD/CAM systems.
- Robot applications simulation is of growing importance since off-line programming and verification can be leveraged against improved factory utilization and throughput.
- Robot vision is a subset of a larger market for machine vision systems. Software and hardware systems for each have much in common.
- Robot vision systems are important to future robot applications. The impact of using vision systems is that major costs for fixed tooling are greatly reduced.
- Robot vision requires extensive computing, both of a general-purpose type, and by special processors. These special processors include array processors and other systems more specific to vision. Solid modeling systems will also be used in robot vision.

### 3. USER REQUIREMENTS/COMPETITIVE CONSIDERATIONS

- For all of the above applications, the nature of the market for sale of computer services to discrete manufacturers is changing:
- The large centralized computer is no longer indispensable. Systems will be small, interactive, distributed, and specialized. This is partly the result of increasing microprocessor power, for example provided by the MC68000.
- Making specialized CIM systems work together will become most important. The current CAD/CAM suppliers are working to make their systems suitable as core systems for integration. An interactive DBMS for the discrete manufacturer is the key to this integration.

- Software will be a much larger part of the value added to all products for this market. Computer companies won't be selling iron, but will be selling software. They will need active third-party programs to acquire more software products.
- In automated companies a central data base for product design, manufacturing planning, operations control, and general management will evolve. Formal DBMS have not yet been well applied to this. The data base is, in many ways, the place to begin building an automated factory.
- The growth rate for remote computing services companies depends on their transition to offering and supporting software, instead of computing. It will be less expensive, particularly in the interactive environment, to have more computing done in the user's terminal, using resources that are part of a local-area network.
- Professional services sales to the discrete manufacturing market should grow rapidly. There is a need for these services today. This need will increase as skills limit how well manufacturing companies can acquire and use computer systems for automation.
- Vendors should be wary of the inherent low leverage of selling consulting services to individual customers. Software has the potential for increasing this leverage.
- Professional services companies should increasingly develop and market software resulting from their consulting contracts. SDRC is a good example of a large consulting company (in computer-aided engineering) that has developed and is marketing related software products.

## C. EDUCATION

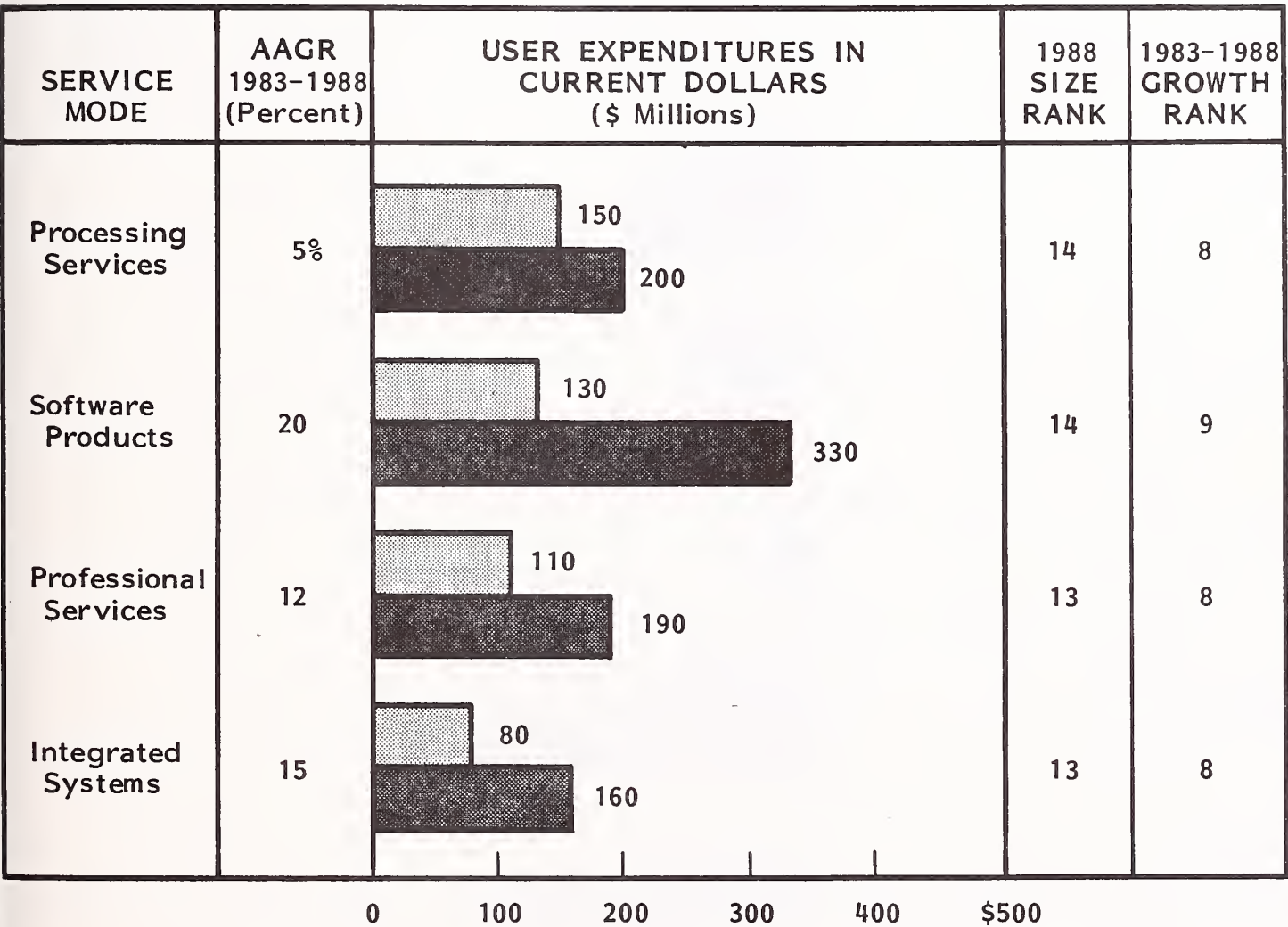
### I. MARKET SIZE AND GROWTH

- Education remains the smallest industry market for information services, totalling only \$470 million in 1983. The forecast growth rate over the 1983-1988 timeframe is 13%.
- The principal buyers in this market are primary and secondary educational institutions, colleges and universities, libraries, and vocational schools. Other markets for cross-industry education and training application services are discussed in Chapter 3 of the companion volume to this report, Information Services Industry, Volume II, Cross-Industry Markets.
- Applications software sales will lead other delivery modes in terms of growth, increasing from \$80 million in 1983 to \$220 million in 1988, a 23% compound rate of increase.
- Professional services will grow at a 12% compound annual rate, from \$110 in 1983 to \$190 million in 1988.
- The only big loser in terms of expected growth rates is batch processing, declining from its current \$63 million base to a \$57 million market in 1988. Rounding in Exhibit IV-9 obscures this decline.
- The size and growth rates for each of the other delivery modes to the education marketplace are illustrated in Exhibits IV-8 and IV-9.
- Demographic information is provided in Exhibit IV-10.



EXHIBIT IV-8

TOTAL INFORMATION SERVICES FORECAST  
EDUCATION SECTOR, 1983-1988

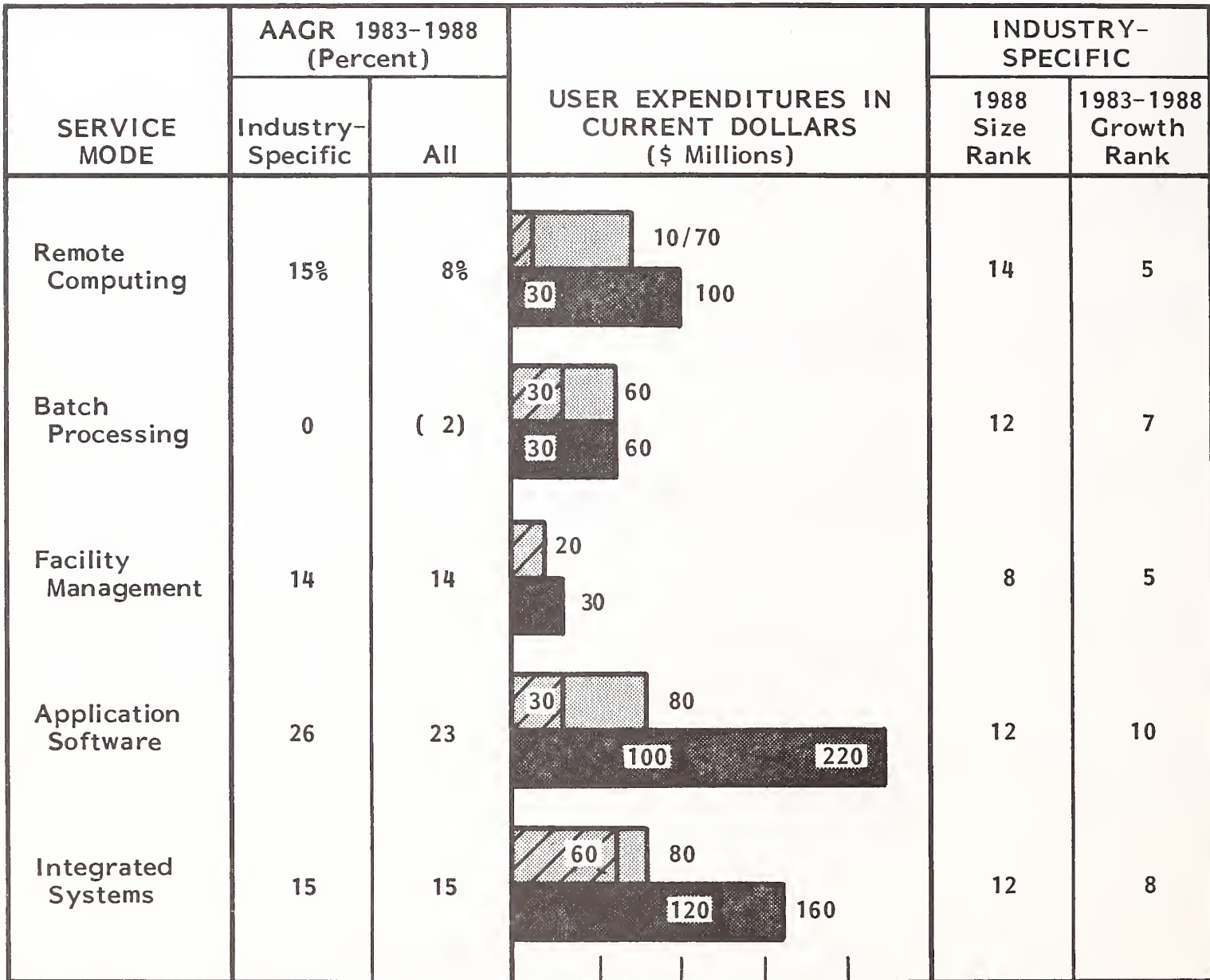


Total Information Services 1983-1988 AAGR

1983	\$470
1988	\$880

13%

EXHIBIT IV-9  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 EDUCATION SECTOR, 1983-1988



(\$ Millions)      0      50      100      150      200      \$250

All  
 Industry-Specific      Total Exhibit\*

1983		\$150	\$310
1988		\$310	\$570

Industry-Specific Portion

\* May not total exactly due to rounding.

EXHIBIT IV-10

EDUCATION INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
All	Education	Number of Establishments (1980) Number of Employees (1982)	\$ 23,323 1.0 Million
821	Elementary and Secondary	Expenditures (1982) Number of Schools (1980) Number of Employees (1982)	\$126.7 Billion 11,332 285,000
822	Higher Education	Expenditures (1982) Number of Colleges (1980) Number of Employees (1982)	\$ 73.1 Billion 2,433 610,000
823	Libraries and Similar	Expenditures (1979) Number of Establishments (1980) Number of Employees (1980)	\$188.3 Million 1,315 13,000
824	Correspondence and Vocational	Expenditures (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 1.0 Billion 2,753 47,000
829	Schools and Educational Services (N.E.C.)*	Expenditures (1977) Number of Establishments (1980) Number of Employees (1980)	\$895.2 Million 4,998 62,000

\* Not elsewhere classified

## 2. KEY ISSUES, TRENDS, AND EVENTS

- Microcomputers are entering secondary schools at an accelerating rate.
  - Schools were using 274,000 desktop machines at the end of 1983, and will have nearly one million units by 1986.
  - Classroom microcomputer education programs will constitute a \$30 million market in 1983.
- This infusion of microcomputers has more often than not proceeded haphazardly, with little planning. It has moved forward at the insistence of parents and the encouragement of hardware vendors, who stand to gain considerable follow-on sales from students made comfortable on their equipment in the classroom.
- Software vendors do not have similar incentives because educational courseware is specialized and there is no effective linkage between classroom use and follow-on software sales. The result has been a dearth of acceptable educational courseware, but a number of firms are working to meet the new demand; educators have reported a visible improvement in software quality in the last year.
- In the meantime, school districts are skimping on purchases of educational courseware because of budgetary squeezes. With the emphasis on purchasing equipment instead of systems - an outcome of the economics of the business - this skimping appears inevitable.
- As more attention is paid to schools by vendors and as school administrators learn how to introduce PCs more effectively, INPUT predicts increasing sophistication in the procurement of educational computer systems by schools. Software will become a more important consideration and will receive more funding, but the fundamental economic structure militates against the success of integrated systems, unless coordinated with manufacturers.

- Universities are also expanding their educational use of computers, again largely microcomputers. Some of the microcomputers have been donated to a few of the universities, and others have been offered at discount; again, hardware vendors recognize that exposure to their products in classrooms will lead to follow-on sales to students.
- In the school administration arena, microcomputers and "friendly" minis are bringing applications in-house from RCS vendors.
- These same vendors are also facing new competition from universities, who are selling some of their excess timesharing capacity to other schools. The universities have been aided in these new efforts by the tax laws, which give them advantages as nonprofit organizations.

### 3. APPLICATIONS

- Secondary school administrators and teachers appear unanimous in their condemnation of existing courseware. They regard it as of little instructional value. They also express feelings of helplessness in the face of a fragmented and confusing marketplace.
- The void of acceptable educational courseware in secondary schools appears to represent a significant new business opportunity for software firms. The market will grow very quickly in the next few years as pent-up demand for quality software is realized and as budget foci shift from hardware acquisition to instructional support.
- The leading educational courseware application is math instruction, followed by language arts and reading. At the university level, language arts, math, economics, physics, biology, and engineering courseware have appeared.

- Just as in the secondary schools, the sophistication of university-level software has not kept up with hardware installations, but better motivated and more capable students and faculty are still finding no problems keeping existing systems humming. The need for improved higher education courseware is widely recognized, however, and presents a significant marketing opportunity.

#### 4. VENDORS

- Major entertainment and publishing companies are entering the educational courseware market. Among them are Walt Disney, Children's Computer Workshop, Scholastic, McGraw-Hill, Milliken, and Scott-Foresman.
- The publishing companies have a special competitive advantage in the form of their existing textbook distribution networks. None of these companies have strong software development backgrounds, however.
- Leaders among the companies specializing in educational software are Learning Company, Krell Software, and Spinnaker.
- Some video game software firms are preparing educational games that should be very successful when introduced in the next year or so.
- The leading vendor of school and college administration RCS services and software is Westinghouse Information Services.

#### 5. RECOMMENDATIONS

- The economics of the educational courseware marketplace mitigates against the success of integrated systems providers; it is simply too tempting for hardware vendors to undercut others in order to leverage hardware sales. At the same time, RCS vendors cannot expect much success in a marketplace that is already dominated by minicomputers.

- Software vendors should only consider entering the educational courseware market if they can develop the distribution system required (or perhaps use textbook suppliers as distributors) and if they have a good understanding of the vagaries of producing quality educational courseware. The potential market size is enormous, but distribution costs, competition, market fragmentation and tight school budgets will hold margins low.
- Excellent opportunities exist for professional services to secondary schools and universities struggling to implement educational courseware systems. These implementations are now often being handled by inexperienced teachers - often science and math teachers, who can ill afford to spend time setting up computer systems.

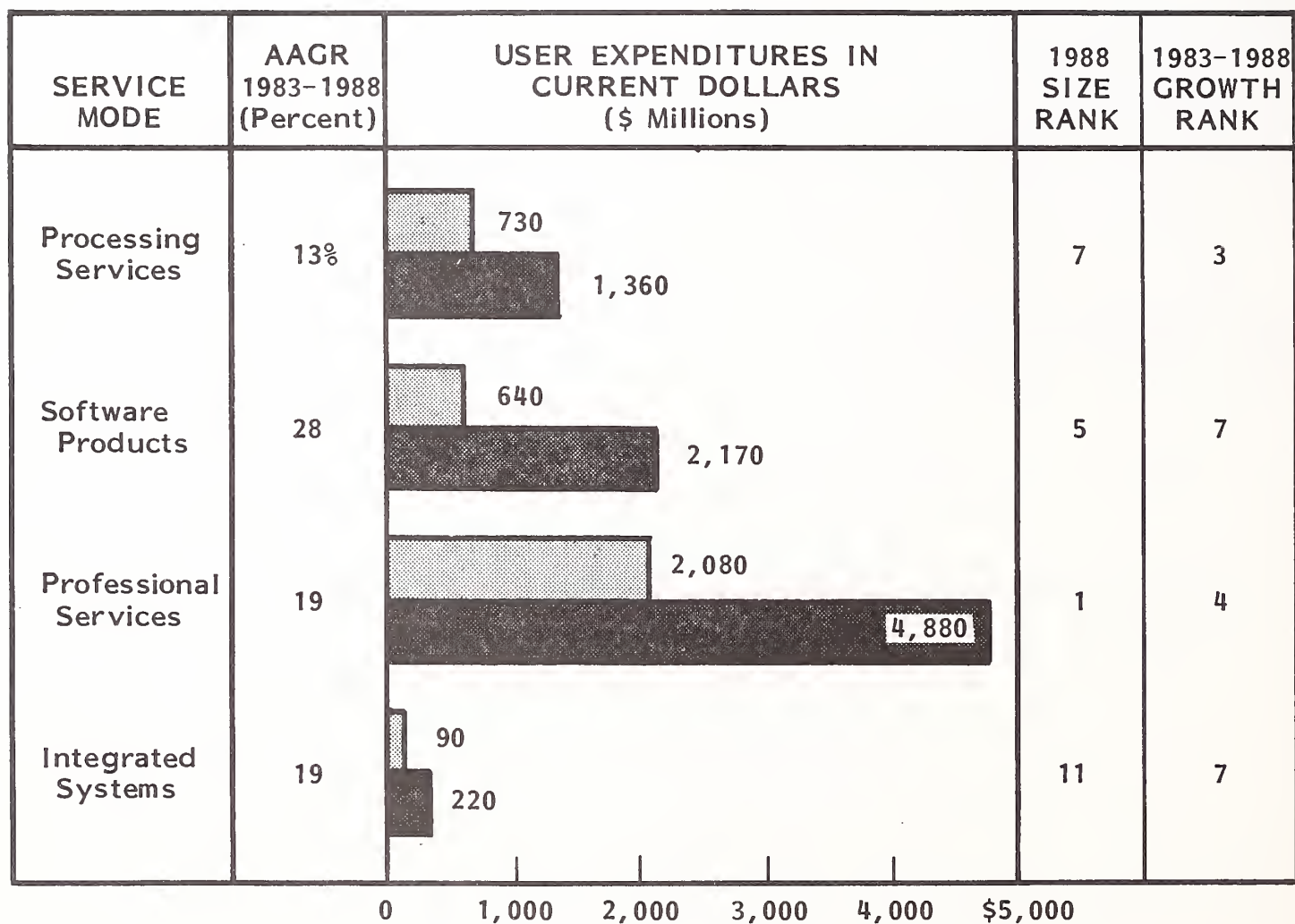
#### D. FEDERAL GOVERNMENT

##### I. MARKET SIZE AND GROWTH

- The federal government will buy some \$3.54 billion of information services in 1983. It should be a source of buoyant growth - 20% per year - until 1988, when it is forecast to be an \$8.63 billion market, as shown in Exhibit IV-11.
- Processing services as a whole will reach \$1.36 billion in 1988, up 13% per year from \$730 million in 1983.
- Remote computing will continue to be the largest form of processing sold to the federal government in 1988. However, facility management will experience the fastest growth among processing modes over the five-year forecast period, increasing from \$120 million in 1983 to \$290 million in 1988, a compound growth rate of 20%, as shown in Exhibit IV-12.

EXHIBIT IV-11

TOTAL INFORMATION SERVICES FORECAST  
FEDERAL GOVERNMENT SECTOR, 1983-1988

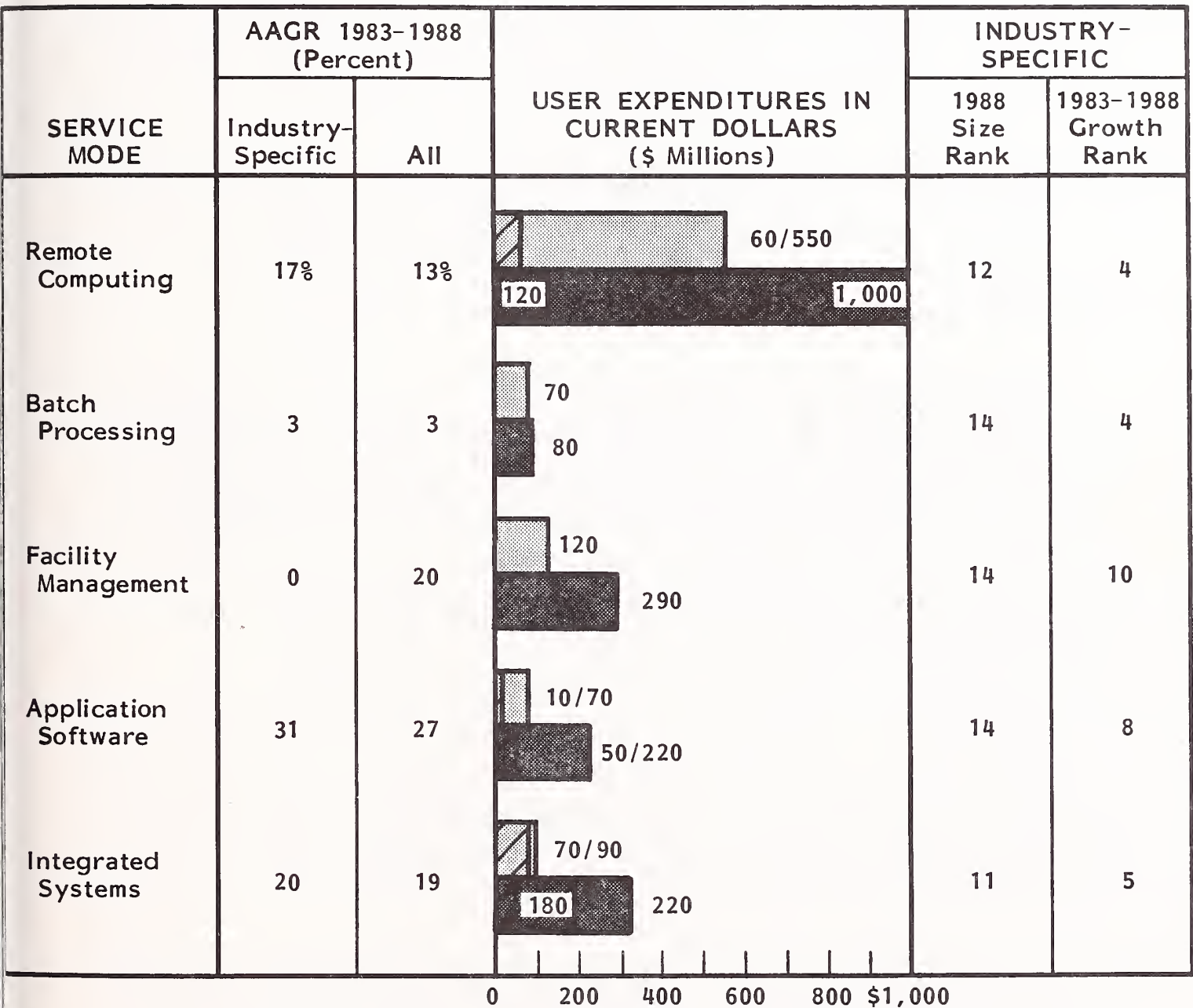


Total Information Services		1983-1988 AAGR
1983	\$3,540	
1988	\$8,630	20%

(\$ Millions)



EXHIBIT IV-12  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 FEDERAL GOVERNMENT SECTOR, 1983-1988



(\$ Millions)  
 All Industry-Specific Total Exhibit\*

1983		\$ 140	\$ 900
1988		\$ 350	\$1,810

Industry-Specific Portion

\* May not total exactly due to rounding.

- Application software sales will almost double this year over last with a large requisition for PC software products and should continue at a healthy 27% AAGR through 1988, when total sales will equal \$220 million.
- The federal government is the largest buyer of professional services in the economy, purchasing some \$2.1 billion dollars worth of services in 1983, 59% of its total spending on information services.
- Federal government demand for professional services is expected to remain high through 1988, growing at 19% per year to \$4.88 billion dollars.

## 2. KEY ISSUES, EVENTS, AND TRENDS

- The federal government market will change character quite substantially during the remainder of this decade, with some essential and unavoidable dislocation of both in-house and commercial elements. At stake is the need for the government to steadily improve both the quality and quantity of ADP-supported services, within the confines of budget deficit reduction measures, while overcoming the handicap of a rapidly aging ADP inventory and escalating software costs.
- Key issues influencing the dynamics of change in the federal ADP environment are rising concern with system obsolescence, software productivity, and quality control problems; inadequate management computer literacy; unnecessarily complex services and systems procurement regulations; and evasive data base management standards.
- A government analysis of the fiscal year 1982 inventory of ADP equipment revealed that more than 4% (over 800) CPUs had been acquired prior to 1966, and that 90% of the inventory acquired prior to 1980 was based on IBM 360/370 architecture dating back to the early 1960s. The analysis also noted, however, that 40% of the growth in the federal ADPE inventory, not including some 20,000 microcomputer-based systems, occurred between 1978 and 1981.

- Although software costs represented 60% of the ADP system investment in 1980, they are predicted to use up to 80-85% by 1990, and 90% in the last decade, unless substantial improvements take place.
  - Documentation, quality control, and reproducibility are companion problem areas.
  - The General Accounting Office has repeatedly reported the shortcomings of software developed for government use, because of inadequate requirements, poor pricing, incomplete documentation, or minimal or absent management oversight of the software production process.
  
- The President's ADP reorganization project highlighted the pervasive lack of federal management computer literacy as a primary factor in the government's failure to effectively utilize its already-massive ADP resource base.
  - Information services operations were relegated to lower levels of management, with little or no visibility of the information resource requirements being levied upon the agency by presidential orders or congressional mandates.
  - Continuing illiteracy is seen by a recent NBS study as a serious obstacle to early employment of the capabilities of microprocessors or computerized management tools.
  
- The rapidly escalating acquisition of personal computers by government personnel (engineers, scientists, program managers) has also highlighted one facet of the government's enormous data base problem - accessibility.
  - Inaccurate conclusions and/or substantial time is spent acquiring significant data manually or recoding from large ADP printouts that should be available electronically.

- The implementation of newer technology ADPE with more efficient software imposes an additional technical problem - how to recover information from the tapes of earlier systems, especially when file codes are inadequately documented.
- Several events of the past three years have set in motion federal government efforts to address and resolve the issues described above. Some of these actions have their roots as far back as 1965, but competing and sometimes conflicting interests - technical, managerial, and political - required extensive studies, hearing, and compromises before coming to fruition.
  - Key among these events are the Paperwork Reduction Act of 1980, the Federal Acquisition Regulations (to become effective April 1984), the Department of Defense Software Initiative (1982), Ada Language - MIL-57D-1815A (1983), GSA's Technology Update Program (begun in 1982), GSA's Managed Innovation Programs (1983), and the GSA "Computer Store" (1983).
  - The Paperwork Reduction Act of 1980 was ostensibly legislated to reduce the duplication and proliferation of different government agency requests for information from individuals, businesses, and corporations. Under the provisions of the act, the information resource managers designated for each executive department and agency were given oversight of that agency's employment of, and requests for, new ADP systems and services. Correspondingly, the OBM and GSA ADP review process was substantially streamlined.
  - The Federal Acquisition Regulations (FARs) are a 12-year development of recommendations by the Defense Blue Ribbon Panel of 1970 to combine the various agency procurement regulations into one streamlined set of rules.

- . In the late 1970s Defense began conversion of the ASPR's (Armed Services Procurement Regulations) into today's DAR (Defense Acquisition Regulations).
- . The corresponding civil agencies FPRs (Federal Procurement Regulations) required consolidation of various agency supplemental/special procurement regulations until they could be codified into the Federal Acquisition Regulations (FARs).
- The combining of FAR and DAR into a Uniform Acquisition System has been delayed until recently by DOD reluctance to use a single, government-wide system. Barring any further opposition, FAR becomes effective April 1, 1984.
- The DOD Software Initiative of 1982 recommends creation of a DOD Software Engineering Institute, aimed at improving software productivity, transferability, reproducibility, and management visibility of software production.
  - In addition, concern of military commanders with software maintenance of deployed ADP systems for weapons, platforms, C<sup>3</sup>I (command, control, communications, and intelligence) led to the development and adoption of Ada as a uniform fielded systems language under MIL-STD-1815A.
  - A recent Defense Directive also limited the non-Ada language applications to CMS-2 (Navy), JOVIAL (Command/Control), FORTRAN (scientific), COBOL (business), and ATLAS (automatic test equipment).
- The General Services Administration has three significant thrusts in the past year. Beginning in 1982, GSA began the overhaul and revision of the segments of the Federal Procurement Regulations (FPR) and Federal Property Management Regulations (FPMR) applicable to ADP services and systems, under their Technology Update Program.

- The changes are aimed at streamlining the acquisition process without the loss of either management oversight or the assurance of technical competency. GSA is using the resources of the Institute of Computer Sciences and Technology of the National Bureau of Standards to devise tests for technical adequacy of data processing and will sponsor early replacement of outdated or inefficient systems and software.
  
- In response to the proliferation of personal computers in the federal establishment as a result of what are perceived to be inadequate and/or unplanned acquisitions, GSA is initiating its "Mandated Innovation Program."
  - The program proposes several ongoing education and selection activities that would improve PC employment without a moratorium. The most recent initiative is the GSA-sponsored "Computer Store," called "Computer Technology Plus," which is a pilot effort in the Washington area. If successful, GSA would expand the stores to all of the GSA regions.
  
  - Under the present operating rules, agency representatives can evaluate several vendors' personal computers, receive instruction, and acquire them (with appropriate funding authority) without a lengthy purchase process.
  
- Several trends in federal government acquisition and the application of information services are apparent and supported by the present establishment. End-user computing, employing a range of personal computers and small business minicomputers, will experience strong growth. The avowed preference is for commercially developed operating systems and applications packages requiring a minimum of local modification. Heavy use of 8-bit machines and software will continue for several years.

- Many federal users view the 16-bit machine and its software as transient and expect, instead, to see early adoption of 32-bit systems with enhanced flexibility, speed and easier interface with existing or new data base mainframes. Major agencies planning large system replacements in the next four to five years expect to use some derivation of OMB Circular A-109 (or its defense counterpart DD 5000.1/5000.2), with emphasis on "systems houses" as integrators/implementers/maintainers.
- Except for research facilities and laboratories and a few very high volume service centers, the CPU trend is toward smaller mainframes operating in distributed networks, interacting with large numbers of personal computers. Batch type operations will be mainly employed for high volume data input (tax returns, federal forms) and output (checks, etc.) Interactive systems will be more widely used.
- Government agencies are moving toward commercial packages with minor modifications for a wide range of financial, personnel, and administrative applications (to control the increasing cost of custom programming).

### 3. APPLICATIONS ANALYSIS

- A recent GAO (Government Accounting Office) report on Computer Software Alternatives (AFMD-83-29) pointed out that federal agencies make minimal effort to aid use of commercially available software. With three different questionnaires, GAO noted that: 1) only about 2% of software sales are made to the federal government; 2) more than 95% of federal software was custom developed, and 3) at 15 installations visited by GAO staffers, over 98% of the installed software had been custom developed.
- The major obstacle to wider use of commercially developed software has been the convoluted and heavily documented process required by the federal procurement regulations. Most agencies decided that the effort was not justified for one or two applications packages.

- Several GSA and DOD initiatives of 1982-83 are expected to reverse the federal trend of the past decade. Effective September, 1, 1982, the GSA, under authority granted by the Brooks (ADP) Act and the Paperwork Reduction Act of 1980 (Mini-Brooks Act), has revised upward the thresholds above which agencies need Delegations of Procurement Authority (DPAs), the acquisition of which is a lengthy process at best. Federal agencies can now acquire under their own authority up to \$100,000 of software products single-source, or up to \$1,000,000 by competitive procedures, in a single order.
- GSA has also broadened the scope of Federal Supply Schedule TLC, to permit software vendors to catalog available packages, with prices and discounts, for government-wide purchase.
- Dr. Edith Martin at DOD had initiated and is responsible for STARS (Software Technology for Adaptable and Reliable Systems), which has as its objectives the streamlining of the acquisition process, production of information technology reviews, and supervision of the software development versus acquisition decision process.
- End user computing in the federal government is expected to expand substantially the market for microcomputer software products available in the commercial marketplace. The contract for the GSA-sponsored personal computer store, called "Computer Technology Plus," located in GSA headquarters in Washington, was won by a consortium headed by Math Box.
  - The consortium included P.C. Telemart, a software package index and catalog service of a leading bookstore chain. P.C. Telemart permits potential P.C. buyers to compare potential hardware and software solutions to their needs by means of a computer-aided display system.
  - In addition, Polaris Inc., located in Rolington, VA, has been awarded a Schedule TLC agreement with GSA that will allow government PC



users to make direct purchases from among more than 500 software packages.

- In summary, ADP planning groups and executives of the federal government are well aware that projections of future software cost growth are based on continuation of their present methods of software development.
  - Custom development, one-of-a-kind/nontransferable applications, and the inadequate employment of software tools may become prohibitively expensive under the constraints of moderate federal budget growth.
  - Shortfalls in projected programmer staffing requirements and continued proliferation of operating systems and languages are expected to impede further efforts of the government to benefit from the industry's technological growth.
  - Software sharing, use of software tools, improved transportability of common software and the modification of commercially developed software packages, rather than custom generation, are seen as key strategies for de-escalating software acquisition costs.
- a. Leading Applications
- The leading software application prospect is graphics, both packaged and customized, with potential for continued growth over the next three to five years. Every graphics tool acquired from the private sector is shortly thereafter loaded with customized applications to meet a widening range of engineering, scientific, financial, scheduling, and general management needs for graphical portrayal of statistical, fiscal, and survey data.
  - The increase in personal computer acquisitions to meet middle, and even senior management requirements for graphical presentations is cited as a major factor in the demand for newer graphics tools and more efficient coding.

- While still not considered as cost efficient for long-term storage as microfiche, graphical technologies for data file storage and frequent retrieval, electronic transmission, and financial planning are currently perceived as more desirable in strategies for expanding office automation in the government.
- Stock control and inventory software developed to meet high-volume, cost-efficient commercial operations is being given increased consideration in the midst of major overhauls of logistics support systems for both military and civilian applications.
  - Many of the current government systems are running on second and early third-generation computer systems that are unsuited to newer, distributed philosophies.
  - Although some customizing will be required to adapt the commercial packages, the modifications will be less expensive and will be available much earlier than would be new custom software or the conversion of millions of lines of code to the newer mainframes.
- Government agencies are considering the latest versions of job-scheduling software employed in heavy industry and large maintenance shops, to provide detailed yet timely data for comparable government installations.
  - The prospective impact of OMB Circular A-76, the contracting-out policy of the executive branch, and its requirement for cost comparisons between in-house and contractor performance of commercial/ industrial services, has given impetus to federal manager consideration of computerized job tracking, time and attendance reporting, and production efficiency analyses.

- Earlier in-house pilot programs have convinced key government automation experts that modification of working commercial software would be more expedient.
- The increasing application of personal and small business computers to government management functions, and the impetus toward substantial reduction of internal paperwork, is expected to increase the demand for financial planning, cash flow analysis, and financial MIS software.
  - Responding to earlier suggestions that nonprofit, service-oriented government functions are more interested in utility rather than profit, some vendors are beginning to offer modified commercial packages to end-user computer managers.
  - Agency officials see a rapid rise in the acquisition of these packages, if sufficiently advertised.
- Network control software for data/graphics communications applications appears (to the government) to be split between operating, utility, and applications categories. Although the Defense Department and GSA have some pilot projects underway for providing computer-driven switching for large government installations and metropolitan areas, agencies operating at more remote sites are interested in programmable intelligent voice/data PBXs.

b. Emerging Applications

- From the government's perspective, four applications areas that already exist in some stage of evolution in both the public and private sector will be given new emphasis during the next few years: software tools, software security packages, electronic mail, and expert systems.
- Both software tools and the disciplines associated with their use were highlighted in the 1983 DOD Software Initiatives and the DOD STARS (Software

Technology for Adaptable and Reliable Systems). Although the industry has employed many of the existing software tools in the development of commercial applications, the government has not enforced their use by either in-house or contractor project teams. DOD and other computer-literate agencies are advocating the incorporation of the tools in "user friendly" software packages understandable to program managers.

- Until recently, the security of computer systems and installations was not considered to be a serious issue. There has been a drastic turnabout among both senior management and information resource managers, as a reaction to the publicized tapping of facilities by teenage "hackers."
  - Policy officials are not only concerned about protection of data in the widely employed personal computers and their frequently unofficial networks, but also about sensitive financial transactions that are not intended for public or private disclosure.
  - Several security measures, including security software, will see substantially greater investment, especially when the PCs are permitted to tap large government data bases.
- While electronic mail features are generally considered a utility subset of operating systems, the end-user computing community is interested in adopting X.25 to existing installations without requiring programmer assistance. Either embedded in interface devices or available as a separate applications, electronic mail software is expected to attract wider support in the federal sector in the next few years.
- Expert systems and artificial intelligence are expected to receive increasing financial support over the remainder of this decade.
  - While the primary emphasis and most concentrated source of buyer interest will be Embedded Computer Resources Segment of Defense

ADP budgets, there is increasing interest in decision-supporting expert systems among a number of high technology civilian agencies.

- . Examples include development of the next generation of national air traffic control system; tax agencies; customs, immigration, and resource development/protection agencies; and of course NASA.
- . Software package developments in the private sector will be sought in expert systems, while artificial intelligence goes through at least one generation of development.
- In recent conferences, it was apparent to government observers that the majority of technical expertise resides in the private sector, which will be expected to develop some of the new-generation applications.

#### 4. COMPETITIVE CONSIDERATIONS

##### a. General

- Business conditions and the arena for ADP goals and services in the federal marketplace have become increasingly competitive in the past few years, with substantial shakeout of marginal or undercapitalized companies.
- The services areas, such as RCS, processing services, facilities management, and programming and analysis, became highly price sensitive. The winners worked with progressively narrower margins, smaller management teams, more tightly controlled overhead, and meaningful, in-depth presolicitation intelligence-gathering efforts.
- Bid selection reviews (determinations of which government contract opportunities will be chosen) have become more vigorous. They involve executive management earlier and entail extensive risk analyses, team partner selection

criteria and consideration of financial commitment alternatives. Companies that have failed to heed the early warning signals have found themselves wasting proposal budgets on an increasing number of failures.

- Congressional emphasis on perceived waste and/or contract cost overruns drove a number of leading information sciences organizations out of the federal marketplace. For the past few years, their places have been increasingly taken over by either aerospace firms with large in-house ADP departments, service contractors in the state and local market looking for revenue growth, or software firms reaching for systems house or systems engineer/integrator status.
- There are several indicators regarding direction, scope, and extent to which the Federal Government marketplace will develop in the next five years that need to be tracked to improve market position, to assist in market penetration, or to be considered if entry into this marketplace is one part of a long-term strategic business plan.

b. Government Policies, Plans, and Procedures

- Most important changes occur when, and only when, there is consensus on needs, requirements, expected results, and costs. OMB Circular A76, the national policy for reliance on (contracting to) the private sector for goods (ADPE) and services (software, maintenance, FM, RCS), has undergone evolutionary changes and setbacks since 1955. The latest version is the seventh, and federal employee unions are likely to oppose any significant change in balance between in-house and contractor services staffs.
- The Federal Acquisition Regulations (FAR), which went into effect, presumably, in April 1, 1982, promise some significant contracting improvements, including reductions in procurement procedures proposed over 12 years ago. The new ADP systems/hardware/software services thresholds and simplified procurement procedures are a temporary regulation, with some period of trial

before final approval. Conversion to permanent regulations depends on whether the pilot agencies perform within the prescribed limits.

c. Industry Leaders

- Certain of the information industry's hardware and software firms lead the pack in any given timeframe. Most of the large systems and software procurements will be won by the leaders because they have invested sustained marketing and sales efforts to know what their government clients want, need, and can afford - and they know well in advance of the RFP release.
- Latecomers do not fare well in this environment, unless they have something unique to offer, or spend some time as a supplier to one of the leading companies. Examination of annual statistical summaries by DOD, NASA, and GSA reveal that a relative handful of companies garner the major proportion of funds, but the mix tends to change, based on the continuing ability of a leader to provide a quality product or service at reasonable rates (i.e., margins).

d. Technical Obsolescence

- A much-touted indicator of the federal government's intentions to increase procurement is the obsolescence of mainframes, systems architectures, and primary (large-volume) languages.
  - As the federal inventory of older CPUs is replaced, the new CPUs set the pace. Part of the third-generation installed base tended to be minicomputers, which were less expensive, less labor intensive, and more readily modified.
  - The new generation of large number crunchers will be fewer in number. Minicomputers will progressively become parts of distributed networks employing newer micro-based PCs and terminals, with shorter estimated life cycles (five to eight years) instead of the earlier 10-15

years, and therefore the tendency to be more readily replaced by more advanced technology.

e. Standardization

- Many of the future system characteristics described by the larger ADP goods and services consumers (principally Defense) will require new standards; GSA and NBS will be forced to set up standards that will enable buyers to compare apples to apples in making procurement decisions. Standards will be essential to multiple-unit buys (umbrella funding), for some measure of technological control, and for transferability.
- But a number of agencies prefer innovations and solutions aimed at satisfying the user's perceived requirements (given equal weight as criteria by the current GSA Information Resource Management and Advisors). Except for mission-essential requirements that need replication and some degree of interchangeability and modernization, even Defense is strongly motivated to move rapidly into the next phase of computer technology.

f. Trends in Federal Expenditures

- Until the smoke clears from the impending presidential election, no one can predict with any certainty the rate at which the federal government will invest in new information sciences technology. The lion's share of the Federal Budget is spent on services to the public and on military consumables. Automated information processing has improved and can continue to improve management of tax-supported government initiatives. The controlling factors will be the rate at which middle and senior government management becomes computer literate, the extent to which high-technology efforts are supported by future efforts, government-sponsored (and funded) responses to the threats of high-technology imports, and international events, both political and economic.



## E. INSURANCE

### 1. MARKET SIZE AND GROWTH

- Information services sales to the insurance industry total \$2.2 billion in 1983 and will grow to \$5.6 billion by 1988, as shown in Exhibit IV-13.
- Processing services overall will lag behind growth in demand from other delivery modes, posting only a 13% annual increase over the forecast period. Software products will be the largest delivery mode by 1988.
- Software products represent the fastest growing delivery mode of information services to the insurance industry, increasing at 28% per year over the next five years.
- Sales of industry-specific integrated systems will show strong growth, expanding 25% per year through 1988 to reach \$310 million dollars, as shown in Exhibit IV-14. Industry demographics are shown in Exhibit IV-15.

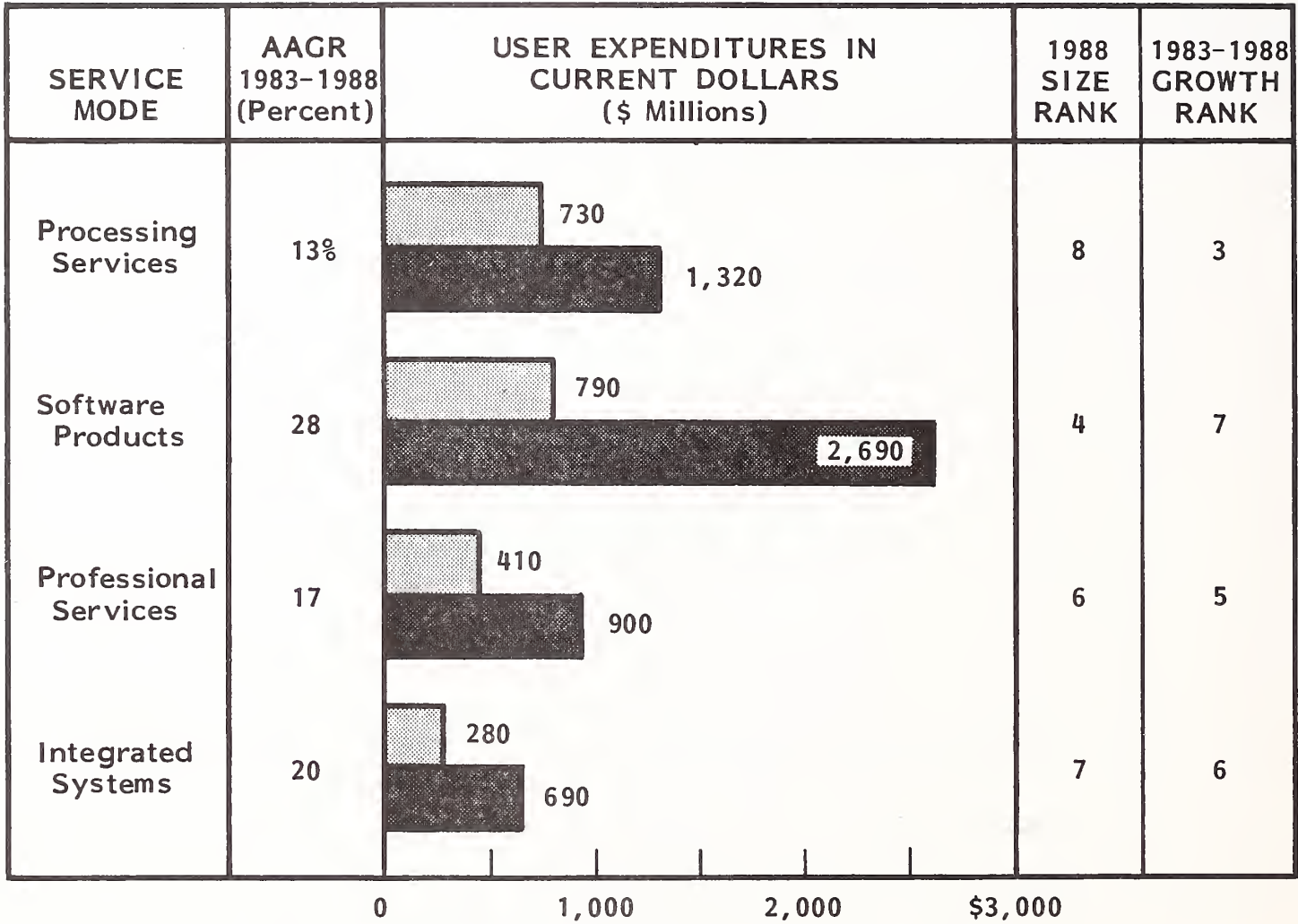
### 2. ISSUES AND IMPLICATIONS FOR INFORMATION SERVICES SUPPLIERS

#### a. Property/Casualty Issues

- For many, perhaps most, property/management companies business conditions are not favorable.
  - Competition has been considerable for several years and intense price competition has led to severe underwriting losses for many companies.
  - Also, until recently, the high interest rates earned on premiums not yet paid out had kept companies profitable; fallen interest rates have, therefore, hit companies hard.

EXHIBIT IV-13

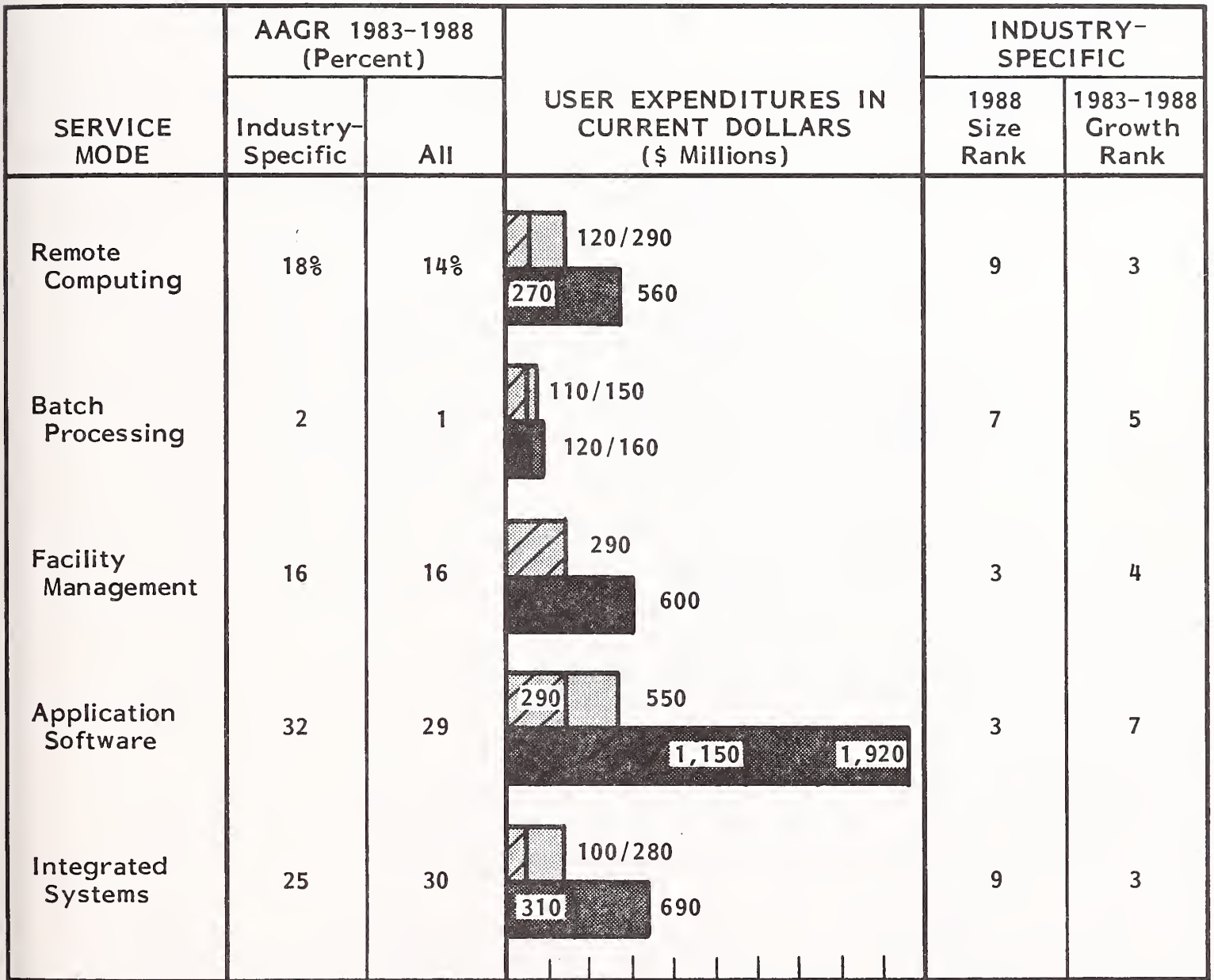
TOTAL INFORMATION SERVICES FORECAST  
INSURANCE SECTOR, 1983-1988



Total Information Services		1983-1988 AAGR
1983	\$2,210	21%
1988	\$5,600	

(\$ Millions)

**EXHIBIT IV-14**  
**INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST**  
**INSURANCE SECTOR, 1983-1988**



(\$ Millions)

All
Industry-Specific    Total Exhibit*

0    400    800    1,200    1,400    \$2,000

Industry-Specific Portion

1983		\$1,190	\$1,590
1988		\$2,420	\$3,930

\* May not total exactly due to rounding.

EXHIBIT IV-15  
INSURANCE INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
63 and 64	Insurance	Number of Establishments (1982) Number of Employees (1980)	112,000 1.7 Million
631	Life Insurance	Premium Receipts (1982) Number of Corporate Groups (1982) Number of Employees (1982)	\$119.0 Billion 1,892 549,000
632	Medical and Health Insurance	Premium Receipts (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 44.0 Billion 1,576 143,000
633	Fire, Marine and Casualty Insurance	Premium Receipts (1980) Number of Establishments (1982) Number of Employees (1982)	\$ 99.0 Billion 9,236 480,000
635	Surety Insurance	Premium Receipts (1978) Number of Establishments (1980) Number of Employees (1982)	\$835.8 Million 450 8,000
636	Title Insurance	Number of Establishments (1980) Number of Employees (1980)	2,714 51,000
637	Pension, Health and Welfare Funds	Number of Establishments (1980) Number of Employees (1980)	3,157 33,000
639	Insurance Carriers (N.E.C.)*	Number of Establishments (1980) Number of Employees (1980)	176 3,000
64	Insurance Agents, Brokers and Services	Operating Revenues (1979) Number of Establishments (1980) Number of Employees (1982)	\$ 20.7 Billion 78,833 478,000

\* Not elsewhere classified

- In the past this competition leading to losses was part of the "underwriting cycle"; as losses mounted, companies would become more selective in the risks underwritten and rates would firm up.
- However, these are not normal times for property/casualty insurers.
  - . Increasing numbers of corporations are self-insuring or setting up captive insurers.
  - . There is worldwide and increasing overcapacity, i.e., the financial ability to write insurance but insufficient customers.
- These forces have combined to create slow growth in the amount of business written. In 1982 there was less than a 5% increase in premiums written. There is little reason to believe that there will be appreciable growth in the near future.
  - Mergers and acquisitions within the industry continue.
  - There is, however, relatively little expansion by P&C companies outside of the P&C area, let alone outside of insurance.
    - . The INA-Connecticut General (CIGNA) merger was a partial exception to this; the two companies will continue to operate as separate entities for the foreseeable future.
    - . It is noteworthy that when industrial companies (e.g., ITT, American Can) acquire P&C companies, they do not change their P&C acquisition's essential character.
    - . The major life insurance companies have generally stayed clear of the P&C business. When Prudential recently looked to dis-

pose of their successful P&C subsidiary it was because, in the words of Prudential's chairman, the P&C business was "no fun."

- The "direct writer" companies (e.g., Allstate, State Farm), who have their own agents as opposed to using independent agents, have continued their seemingly inexorable one-percentage-point-a-year capture of market shares in the personal lines business.
  - Even more worrisome to the "American Agency" companies is the aggressive entry of direct writers into an already competitive commercial lines market.
  - It is not clear if the special underwriting experience needed to write commercial business will be a serious obstacle to the direct writers' expansion.
- All of these issues and problems will be addressed, to varying degrees, by increased or improved automation, as shown in Exhibit IV-16.
  - There is a limit, of course, to the contribution that any data processing system can make to the reduction of costs or the improvement of administrative efficiency since total administrative costs are generally only about 10% of premiums.
  - However, improved data can improve marketing and underwriting (e.g., by helping to set rates and select risks).
- Offering these new solutions will require a higher level of knowledge of insurance needs and of how data processing is involved in insurance activities. Many times vendors can achieve this knowledge more readily than can overly large, inwardly focused information systems departments.

EXHIBIT IV-16

PROPERTY/CASUALTY ISSUES AND IMPLICATIONS FOR  
INFORMATION SERVICES SUPPLIERS

PROPERTY / CASUALTY AREA	ISSUES	INFORMATION SERVICE IMPLICATIONS
General	<ul style="list-style-type: none"> <li>● Overcapacity, increased competition</li> <li>● Underwriting losses</li> <li>● Mergers (within P/C arena)</li> </ul>	<ul style="list-style-type: none"> <li>● Better marketing intelligence</li> <li>● Faster agent communications</li> <li>● More efficient administration</li> <li>● Improved data and analysis for rate making and underwriting</li> <li>● Fewer buying points, more likely to look to in-house solutions</li> </ul>
Personal Lines	<ul style="list-style-type: none"> <li>● Increased proportion of business to direct writers</li> <li>● Prohibition of gender-based ratemaking</li> </ul>	<ul style="list-style-type: none"> <li>● Agency companies must link to agents in a more cost-effective way</li> <li>● More sophisticated underwriting and actuarial methods will need better data and analytical tools</li> </ul>
Commercial Lines	<ul style="list-style-type: none"> <li>● Increased competition from self-insurance captives, direct writers</li> </ul>	<ul style="list-style-type: none"> <li>● More commercial lines automation needed to be competitive</li> </ul>

b. Life/Health Issues

- The general issues of increased competition and change are similar to those facing P&C companies. However, these pressures come from different sources and consequently have somewhat different effects on information services vendors.
  - Life companies have been unable to stand the losses on their group insurance business.
  - Competition is increasingly coming from outside the bounds of the traditional life insurance industry.
    - Self-insurance and self-administration have become popular in group health and, to a degree, in benefits administration.
    - The potential "financial supermarket" of the future promises much more competition to the traditional life company, for both consumer and corporate business.
- The life companies are affected by this "invasion" in several ways:
  - Life companies have begun to compete in offering interest-based investment vehicles through so-called Universal Life policies (which, essentially, combine a mutual fund and term insurance).
    - Last year Universal Life products accounted for over 10% of life premiums.
    - An important harbinger of future possibilities was the fact that E.F. Hutton was the second largest seller of this new type of policy.



- Banking institutions (Citicorp, First Interstate) have begun to directly enter the insurance field via a friendly South Dakota legal environment.
  - . In defense, insurers have begun a counter-affiliation (e.g., Prudential, Travellers) with banking and finance firms.
  - . The legality of such formal affiliations is currently in question. However, such formal ties are not as important as product linkages and good marketing (e.g., the American Express tie with Bank One of Columbus, Ohio, and Equitable's recently announced agreement to use Citibank's Focus product).
- The life/health sector also faces several government actions that could have significant short-term and, perhaps, long-term effects.
  - The outlawing of gender-based rate making or benefits now appears a certainty. However, a new law is almost certain not to be applied retroactively, but only to new business.
  - There is sentiment in Congress to reduce many of the tax breaks that the industry now enjoys. Having to then raise prices during a time of new external competition will place great pressures on the companies to manage their operations and marketing more efficiently.
  - Recent changes to reimburse most Medicare claims on a flat-rate, prediagnosis basis presents the group health insurance industry (both commercial companies and Blue Cross) with a two-edged sword.
    - . On the one hand, anything that promises to reduce payouts can only be welcomed, since the industry has been bedeviled by a rate structure that has consistently lagged behind health care (especially hospital) inflation.

- . On the other hand, hospitals have usually reacted to increased cost containment by Medicare, Medicaid and, sometimes, Blue Cross by raising their prices to commercial insurers. This will almost certainly be tried again.
- Finally, there are increasingly strong calls to tax fringe benefits, of which health insurance is usually the largest. If this were to occur, it would reduce the biggest incentive for group insurance.
- As in the P&C area, many aspects of these problems and opportunities are addressable by automation, as shown in Exhibit IV-17.
  - Increasingly flexible systems will be needed just to handle insurance-related activities.
  - Offering new financial products that are only tangentially related to insurance certainly offers the most opportunities to vendors. This opportunity is discussed at greater length in Section 3.b.
- c. Agency Issues
  - The insurance industry is heading in at least two directions with respect to its dealings with agents.
    - On the P&C side, the direct writers' success can be traced in large part to the effectiveness of their distribution systems.
      - . Direct writers can much better control the product and its presentation.
      - . Direct writers' agency expenses are much lower, since their agent costs are largely in the form of salary, rather than commission.

EXHIBIT IV-17

LIFE/HEALTH ISSUES AND IMPLICATIONS FOR  
INFORMATION SERVICES SUPPLIERS

LIFE/HEALTH AREA	ISSUES	INFORMATION SERVICE IMPLICATIONS
Life	<ul style="list-style-type: none"> <li>● Changing product mix: decline in whole life, increase in universal life and term; prohibition of gender-based underwriting</li> <li>● Probability of increased taxation; increased price competition generally</li> <li>● Mergers (within life/health arena)</li> </ul>	<ul style="list-style-type: none"> <li>● New/more flexible support systems</li> <li>● Increased administrative efficiency</li> <li>● Conversions of tied agents to independent brokers</li> <li>● Fewer buying points, more likely to look to in-house solutions</li> </ul>
Commercial Group/ Employee Benefits Administration	<ul style="list-style-type: none"> <li>● Underwriting losses</li> <li>● Increased self-insurance, self-administration</li> </ul>	<ul style="list-style-type: none"> <li>● Better marketing intelligence and programs</li> <li>● Improved underwriting data and analysis</li> <li>● More cost-effective systems</li> <li>● Offering administration only</li> </ul>
Pension Fund Administration	<ul style="list-style-type: none"> <li>● Increased competition from noninsurance sources</li> </ul>	<ul style="list-style-type: none"> <li>● Improved marketing</li> <li>● Improved performance</li> </ul>
Group Health (Commerical, Blue Cross/ Shield)	<ul style="list-style-type: none"> <li>● Increased self-insurance</li> <li>● Potential taxation of health benefits</li> <li>● Cost containment</li> </ul>	<ul style="list-style-type: none"> <li>● More cost-effective systems</li> <li>● Offering of administration only</li> <li>● Offering nongroup products</li> <li>● New policies</li> <li>● New claims processing</li> </ul>

- Agency companies and agents generally have a much higher number of (unproductive) quotations per policy issued than direct writers.
- Life companies, most of whom handle their agents in a way that is analogous to the way that direct-writer P&Cs handle their agents, are making opposite complaints.
  - Life companies' large, dedicated distribution networks, combined with large amounts of agent turnover, are a drag on profitability.
  - Some life companies have gone as far as to convert their tied-agent networks into independent brokers who, at least initially, handle their ex-company's business predominantly.
  - This would be an odd strategy for an industry soon to be competing as financial supermarkets. In reality, the vast majority of insurance companies seem to have little enthusiasm for converting themselves into purveyors of general financial services (their enthusiasm is small compared to, say, banks and brokerages).
- The agent network is already under attack from:
  - Benefits consultants (for group business).
  - Other financial institutions (e.g., Universal Life competitors).
- It would not be surprising to see the agent networks contract appreciably in the next decade.

- In the case of P&C, there will be a course of mergers and agency dissolutions that result in fewer, larger agencies.
- In the life business, there will be somewhat fewer agent slots that are filled with much more experienced agents. It will be impossible to compete with relatively well trained bank/brokerage salespeople unless life agents serve for (and are capable of serving for) much longer periods of time in their positions.
- Independent P&C agents are especially handicapped by their expensive, low-quality communications with the insurance companies they do business with. The IVANS project (see section 3.e, below) is critical for overcoming this handicap.
- Agents need improved communications in the larger sense, as shown in Exhibit IV-18.
  - Outside vendors are ideally positioned to tie agents with multiple companies. The vendor must, of course, have in-depth insurance knowledge.
  - In the P&C area this is the focus of the IVANS project. As IVANS takes hold there should be many ancillary services that are outside the scope of IVANS and that IBM is unable to deliver.

### 3. COMPETITIVE DEVELOPMENTS

#### a. ISA

- The largest single event was the dissolution of ISA as a major competitor in the insurance-only marketplace. Acquired in 1981 by United Telecommunications (as it turned out, for ISA's ISACOMM satellite communications technology), by mid-1982 most of ISA's insurance products had been shed.

EXHIBIT IV-18

AGENCY ISSUES AND IMPLICATIONS FOR  
INFORMATION SERVICES SUPPLIERS

AGENCY AREA	ISSUES	INFORMATION SERVICES IMPLICATIONS
Life	<ul style="list-style-type: none"> <li>● Declining efficiency of traditional tied agent; conversion to independent brokers</li> <li>● Increased competition from benefits consultants and other financial service suppliers</li> </ul>	<ul style="list-style-type: none"> <li>● Need to tie brokers to multiple companies</li> <li>● Cost-effective education on new products</li> <li>● More sophisticated agent support systems</li> </ul>
Property/Casualty (Independent Agents)	<ul style="list-style-type: none"> <li>● Continued erosion of marketing position by direct writers; mergers and declining profits</li> </ul>	<ul style="list-style-type: none"> <li>● More cost-effective links to companies (e.g., IVANS)</li> </ul>
Direct Writers	<ul style="list-style-type: none"> <li>● New product offerings</li> </ul>	<ul style="list-style-type: none"> <li>● System expansion</li> </ul>

- Its personal lines software was sold to The Farmers Alliance Insurance Company and was reborn as AIMS.
- Its commercial lines software under development was sold to another insurance company, Maryland Casualty, and renamed AdTec.
- Its group health and dental claims processing systems were dropped.
- ISA has redirected its accounting systems toward the cross-industry market; success is still not assured.
- ISA did release an Apple-based life quotation system ("Lifeline") in mid-1982 and has had some success with it.

b. Property/Casualty

- The withdrawal of ISA from most insurance markets has left PMS as the major current force in property/casualty software.
- PMS intends to build on its predominant position gained in the personal lines area by supplying similar software for commercial lines.
  - Commercial lines requirements are significantly more complex than for personal lines.
  - PMS development has been underway for several years. Parts of the product are scheduled for release in 1984.
- There are not currently many competitors for PMS' commercial lines offerings.
  - AdTec is in live-test mode in several companies.

- Data Concepts, Lexington, Massachusetts, has a product, "The Data Conveyor," aimed at handling most insurance functions for SMP and monoline policies. It is said to be installed in three large companies.
- IDAPS (an Australia/New Zealand company) has a Perkin-Elmer-based turnkey ("POLISY") installed in about a dozen companies in Canada, Europe, and Asia. U.S. rights are being discussed.
- Equifax provides systems to assist insurance underwriters by reevaluating their outstanding policies on a batch basis.
  - Equifax also furnishes motor vehicle reports to companies for use in classifying risks and setting premiums.
  - Their five regional distributed-processing centers for this function are scheduled for significant expansion in 1984.
- In professional services, Data Architects and Analysts International are leading providers of system analysis and programming to P&C, and life and health companies.

c. Life/Health

- 1982 was the year of the micro for life insurance. Besides LIFELINE there are:
  - The Top Producer (Informatics General).
  - Sysgen (Re-direct).
  - Financial Goals Analysis and others (Syntax Corporation).



- These quotation and illustration systems can be very effective selling tools to allow life agents to play "what if" with potential clients.
  - They are very competitive with older, terminal-based systems hooked into company computers.
  - These terminal systems are usually awkward and not meaningfully interactive.
  
- Computone, one of the earliest noninsurance company providers of these quotation/illustration systems, also maintains a data base with over 3,000 policies from some 240 insurance companies for inquiry by independent agents.
  - Computone stresses their systems' use with Universal Life sales in cases where the more complex financial planning aspects require computerized presentation.
  - In October, 1983, Computone announced its plans to merge with a retail computer store chain and a system software house.
  
- Informatics is a leading provider of software to the life insurance sector with its Life Comm product, also offered on a timesharing basis.
  
- Other competitors include Cybertek, Continuum, and Pallm Company.
  - The Continuum recently announced an agreement to form Inter Financial Software, a joint venture with Monchik-Weber (securities) and Hogan Systems (banking).
  - The emergence of the financial supermarket and the blurring of distinctions between the delivery of these formerly separate products suggests good potential for this type of combination.

d. Agents

- 1983 saw the property/casualty companies move into agency automation in a big way. Exhibit IV-19 shows the companies and their offerings.
- The motivation and effects of these moves are not always clear.
  - An obvious reason for making these offerings is to try to tie agents closer to a particular company.
    - Most agents, however, will resist this.
    - More importantly, the IVANS project (see section 3.e) is designed to make most large companies and all participating agents easily accessible to one another.
  - This is one way that P&C companies can diversify where they feel comfortable. This does not mean, however, diversifying out of the P&C industry.
  - Companies believe that they understand agents better than do ordinary vendors; this is true to some extent. It is certainly true that agents have no bias toward buying services from an insurance company (so long as it is not designed to tie the group close to one company).

e. IVANS

- Certainly the news of 1982 was the award to IBM of the contract to develop IVANS (Insurance Value-Added Network System). In principle, IVANS is straightforward: an intelligent switching network to serve as an interface between companies and agents.

EXHIBIT IV-19

PROPERTY/CASUALTY COMPANY OFFERINGS TO AGENTS

COMPANY(IES)	PRODUCT
Hartford (80%) St. Paul (10%) Crum and Foster (10%)	Redshaw System (co-owned)
CNA Crum and Foster Great American Zurich American Commercial Union New Hampshire	Agency Management System (AMS) (co-owned)
American International Group	Agent access package
Federal Kemper/American Systems	Agent package
Ideal Mutual/Cantor and Co.	Risk manager PC package
Safeco	SAFEDEX
Aetna	Gemini
Celina Mutual	Agent Package
Travelers	Atlas
Fireman's Fund	Agency Automation System (subsidiary)

- The experience of 1983, however, is that this has turned into a very large undertaking. A few of the roadblocks have been:
  - Hundreds of different companies and dozens of agent turnkey systems.
  - Different data definition and formats (although earlier industry-wide forms and policies mitigate this problem).
  - Differing hardware.
  - Differing communication protocols.
- IBM's name, track record and, especially, its functioning information network carried the day over several competitors, including AT&T, Control Data, ISACOMM and EDS.
  - Until this point, IBM's Information Network had not broken any new ground.
  - The network's main use by existing customers was to provide information center end-user support and program development tools. While useful, especially in a scattered, multiple-location environment, it had been a relatively expensive alternative that did not add a great deal more value than in-house solutions.
  - However, the Information Network's entry into the multifirm universe, as shown in Exhibit IV-20, changed the situation markedly.
- Supplying multifirm communications is a new ballgame.
  - Costs may be high, but there is no real comparison to what has gone on before. This is an enviable position for any vendor, but especially for IBM.

EXHIBIT IV-20

IBM INFORMATION NETWORK -  
DIFFERENCE IN SINGLE AND MULTIFIRM FOCUSES

CHARACTERISTIC	MULTIFIRM COMMUNICATIONS	SINGLE FIRM COMMUNICATIONS
Type of Functions Supported	Direct, Mainline Business Function	Staff Functions (Analysis, System Development)
Novelty of Application	High	Low
Effect of Application	Discontinuing, Could be Large	Incremental, Usually Small
Risk to Vendor and Customer	Medium to High	Low
Expense (Compared to Alternatives)	Not Comparable	High
Value-added	Very High	Medium

- Assuming that the system works (and there are few technical road-blocks that hard work and attention to detail will not solve), the value added will be high: it is no exaggeration to say that it could right the current competitive imbalance in the insurance industry.
- A handful of companies and agents have been using the system on a test basis since the summer of 1983. There has not yet been much interest expressed by paying customer, partly because neither the costs nor benefits are yet clear and some important parts of the service (e.g., ability to handle standardized batch transactions) are not in place yet.
- However, IBM's performance to date has been little short of spectacular.
  - It has entered a new market area against vigorous competition.
  - It has stolen a march on its competition, both from a technical and from an image standpoint.
  - It has dealt ATT Information Systems a strategic blow in what should have been AIS's home ground.
  - It is gaining experience that can be applied to other industry segments.

#### 4. OPPORTUNITIES

##### a. Insurance-Related

##### (i) Areas of High Opportunity

- The most intriguing area of opportunity is to develop products and services that will tie into the IVANS service. Agencies will certainly be a product focus, although the sales focus should be on insurance companies because in insurance there are fewer, richer buying points.

- There will be a medium-term market to develop company interfaces to IVANS.
- A long-term and potentially very rewarding market area would be to add value to IVANS-collected data to use for underwriting purposes. IBM will, of course, seek to exploit this itself. However, it will not be in the industry's interest to have a single vendor responsible for both data switching/processing and data aggregation and analysis. This should be a powerful marketing argument.
- Personal lines software would not be an easy market to enter, either with a new product or by acquisition because of PMS's dominant position. Successful competitors would have to develop specific niches based on size, line of business, and unique underwriting characteristics. So far no vendor has been very successful at doing so.
- Commercial lines are a different story: the runners have barely left the starting blocks. Commercial lines software is an order-of-magnitude more complex than personal lines software, with commensurate development costs (in dollars and time).
  - Important to note here is the increasing importance of insurance for corporate financial transactions.
  - As the use and size of such policies increase, insurers need more sophisticated information and tools to assess the risks and to determine appropriate premiums.
- The changing health insurance environment offers opportunities for new software approaches and computer-based professional services that are aimed at self-insurers and third-party benefit administrators.

## (ii) Areas of Medium Opportunity

- The changing life insurance environment offers opportunities for flexible home office software support packages, possibly based on a DBMS and fourth-generation language.
- Integrated systems offer opportunities in the life/benefits sales area for providing quotations based on what-if illustrations. These quotations will be PC-based.
  - There is a danger that this market could soon be glutted because of the ease with which small entrepreneurs can enter.
  - Individuals with insurance backgrounds who develop such systems could be prime candidates for becoming licensors to established information service companies.
- The benefits area is a very dynamic one and offers many specialized opportunities for computer-based products. However, knowledge and standing in this business is critical. Joint ventures between benefits consulting/marketing organization and information service firms could serve both parties' interest well.

## (iii) Areas of Low Opportunity

- Except for IVANS-related services, conventional processing services do not appear to offer many long-term opportunities. The ability of insurance specialists (whether in-house or vendor's) to implant their ideas in PCs makes for an ever-haunting opponent. While there may be opportunities for niche-focused services, there will also be the ever-present danger of these being siphoned off.



- Integrated systems for independent P&C agencies are of relatively low interest now because of:
  - The large number of vendors.
  - The uncertain impact of IVANS.
  - The vigorous entry of insurance companies themselves into this sector.

(iv) Summary

- It should be noted that even in the areas noted as "low" opportunities there will always be niches or specialized opportunities.
- The insurance sector is one where a vendor needs expertise and, more importantly, needs to be perceived as having this expertise. This is one reason why so many vendors are also in the insurance business.

b. Financial Services Related

- Earlier, the concept of the "financial services supermarket" was alluded to. Even when in its mature form, this will not have a major impact on the information system components that make it up.
  - That is, financial service supermarkets that offer insurance will have to support systems that are very similar to the present ones.
  - Exhibit IV-21 shows how these services will be similar in other product areas as well.
- However, if the supermarket approach takes hold, by 1990 there may be several dozen financial conglomerates handling most financial services. This centralization would greatly reduce the number of sources for services.

EXHIBIT IV-21

THE FINANCIAL SUPERMARKET AND  
ASSOCIATED INFORMATION SERVICES SUPPORT

FINANCIAL SUPERMARKET OFFERINGS	INFORMATION SERVICES SUPPORT (Examples)
<ul style="list-style-type: none"> <li>● Financial Products                             <ul style="list-style-type: none"> <li>– Interest-paying investments</li> <li>– Equity investments</li> <li>– Other investment products</li> </ul> </li> <li>● Asset management                             <ul style="list-style-type: none"> <li>– Consumer</li> <li>– Corporate</li> </ul> </li> <li>● Insurance                             <ul style="list-style-type: none"> <li>– Personal                                     <ul style="list-style-type: none"> <li>· Property/Casualty</li> <li>· Life</li> </ul> </li> <li>– Corporate                                     <ul style="list-style-type: none"> <li>· Property/Casualty</li> <li>· Group life and health</li> </ul> </li> </ul> </li> </ul>	<p>Money market/demand deposit systems</p> <p>Brokerage processing and accounting systems</p> <p>Specialized systems</p> <p>Personal trust systems</p> <p>Corporate trust systems</p> <p>Personal lines processing Quotations; policy management</p> <p>Commercial lines processing Group processing</p>

- Financial supermarkets will have a great need to be able to tie together information about a particular customer. This will be critical to marketing success.
  - The need is analogous to that for the "Customer Information System" in banking. It is a nontrivial exercise.
  - Insurance companies that try similar exercises find it even more difficult.
  - The long-range opportunity is to devise a shell that can fit over and unify the individual products in the supermarket.

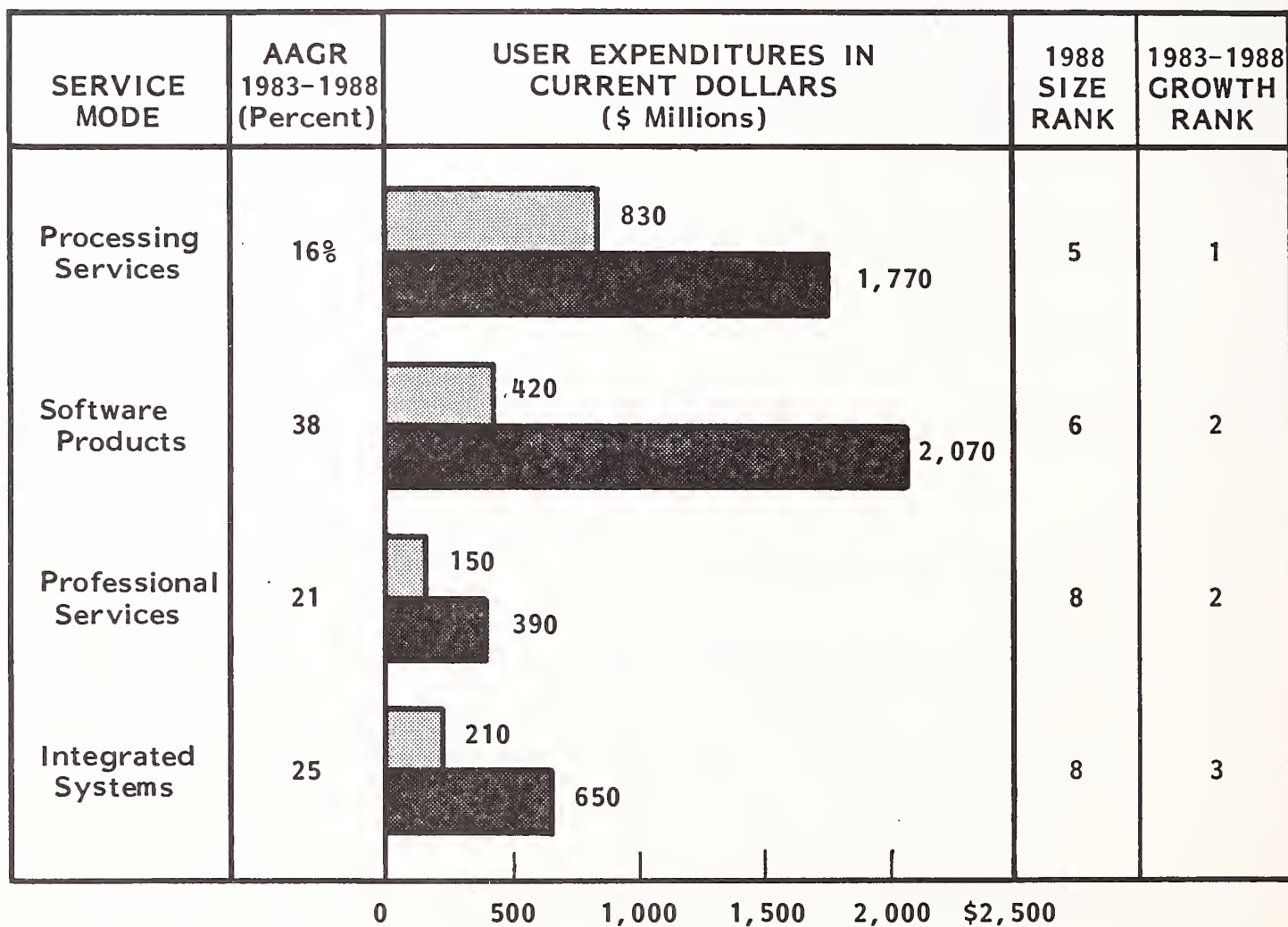
## F. MEDICAL

### I. MARKET SIZE AND GROWTH

- The medical industry represents one of the best market opportunities for information service providers. The medical market as a whole will grow 25% per year for the next five years, tripling in size from \$1.61 billion in 1983 to \$4.88 billion in 1988, as shown in Exhibit IV-22.
- The medical sector is the fastest growing marketplace for industry-specific processing facility management services and will be the second largest market in 1988, reaching \$670 million, as shown in Exhibit IV-23.
- The medical market for application software products is also the fastest growing among the economy's 14 primary industry sectors. Application software product sales are forecast to grow by 40% per year through 1988, 46% per year for industry-specific products.

EXHIBIT IV-22

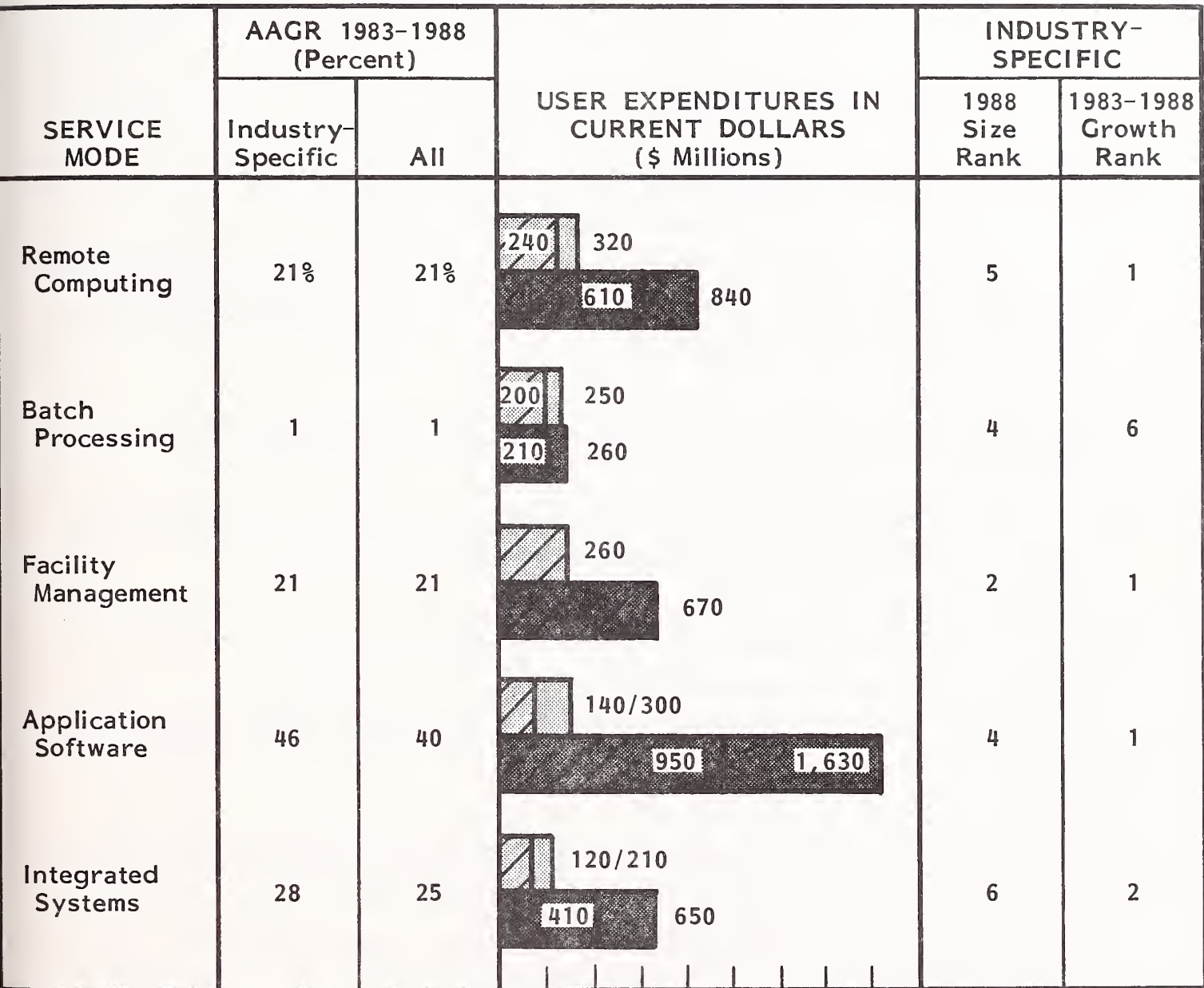
TOTAL INFORMATION SERVICES FORECAST  
MEDICAL SECTOR, 1983-1988



Total Information Services		1983-1988 AAGR
1983	\$1,610	25%
1988	\$4,880	

(\$ Millions)

EXHIBIT IV-23  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 MEDICAL SECTOR, 1983-1988



(\$ Millions)  
 All Industry-Specific Total Exhibit\*

1983		\$ 960	\$1,340
1988		\$2,850	\$4,050

0      400      800      1,200      \$1,600

Industry-Specific Portion

\* May not total exactly due to rounding.

- Only in batch computing services will growth fall below the average for all industries, showing a slight 1% per year increase over the next five years.
- Exhibit IV-24 illustrates the composition of this industry.

## 2. ISSUES, TRENDS, AND EVENTS

### a. Health Care and Change

- Until recently, the medical sector has been one of the least changing and least competitive sectors. In part this has been a result of medicine's long tradition of charitable service and research.
- There has also been a strong predisposition toward cartelization, e.g.:
  - Organized medicine for a long time was able to limit the production of physicians (by limiting medical school places).
  - Hospitals organized de facto cartelization of markets.
  - There was often uniformity of fees charged for similar services in a region.
- However, the medical sector is now in the midst of a transition from being one of the least competitive and dynamic sectors to one that promises many changes. However, change is coming piecemeal, without planning or often even awareness:
  - Unlike with transportation and communications, change in the medical sector is not coming about because of an external political commitment to introduce more competition and/or fewer regulations. Health care remains one of the most regulated sectors, where every provider of services must receive positive permission:

EXHIBIT IV-24  
MEDICAL INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
80	Medical	Health Expenditures (1982) Number of Establishments (1980) Number of Employees (1982)	\$320.9 Billion 310,843 5.8 Million
801	Physicians	Health Expenditures (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 46.6 Billion 147,247 825,000
802	Dentists	Health Expenditures (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 15.6 Billion 85,691 388,000
803	Osteopaths	Receipts (1977) Number of Establishments (1980) Number of Employees (1980)	\$776.3 Million 5,527 24,000
804	Health Practitioners (N.E.C.)*	Health Expenditures (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 2.2 Billion 29,887 93,000
805	Nursing Homes	Health Expenditures (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 27.1 Billion 12,801 1.1 Million
806	Hospitals	Health Expenditures (1979) Number of Establishments (1980) Number of Employees (1982)	\$ 99.6 Billion 5,261 3.0 Million
807	Medical and Dental Laboratories	Health Expenditures (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 2.1 Billion 10,849 98,000
808	Outpatient Care Facilities	Health Expenditures (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 1.8 Billion 8,611 165,000

\* Not elsewhere classified

Continued

EXHIBIT IV-24 (Cont.)  
 MEDICAL INDUSTRY SECTOR -  
 DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
809	Health and Allied Services (N.E.C.) *	Health Expenditures (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 3.6 Billion 3,501 107,000

\* Not elsewhere classified



- To enter the marketplace (i.e., licensing of hospitals and physicians).
  - To expand (e.g., to add more hospital beds).
  - To change the mix of service offered (e.g., hospitals must receive approval to offer particular services and specialties).
- Nor has increased competitiveness come about because of a desire to compete. This situation is in contrast to that of banking, where key banks have resolved to escape the regulation that prevents them from offering a full range of financial services.

b. Forces Causing Change

- Government attempts to improve supply and accessibility of health care have largely succeeded. However, the enlarged supply has also had other, unintended effects.
  - In post-war years the production of American physicians rose much more rapidly than did the population as a whole. The increase was a result of public policy that raised spending on health education.
  - The increase in medical education has had a very important, but wholly unintended and usually unrecognized effect: many more hospitals have become teaching hospitals with post-graduate programs for resident physicians. The number of residencies increased even faster than the production of American-trained physicians. Consequently more and more residents have been graduates of foreign medical schools.
  - Readily available government funding has made it easy for suburban hospitals to grow to meet changing population patterns. At the same

time, prestigious city center hospitals were often also expanding. The result has been that the number of hospital beds per units of population has increased dramatically in the past 30 years.

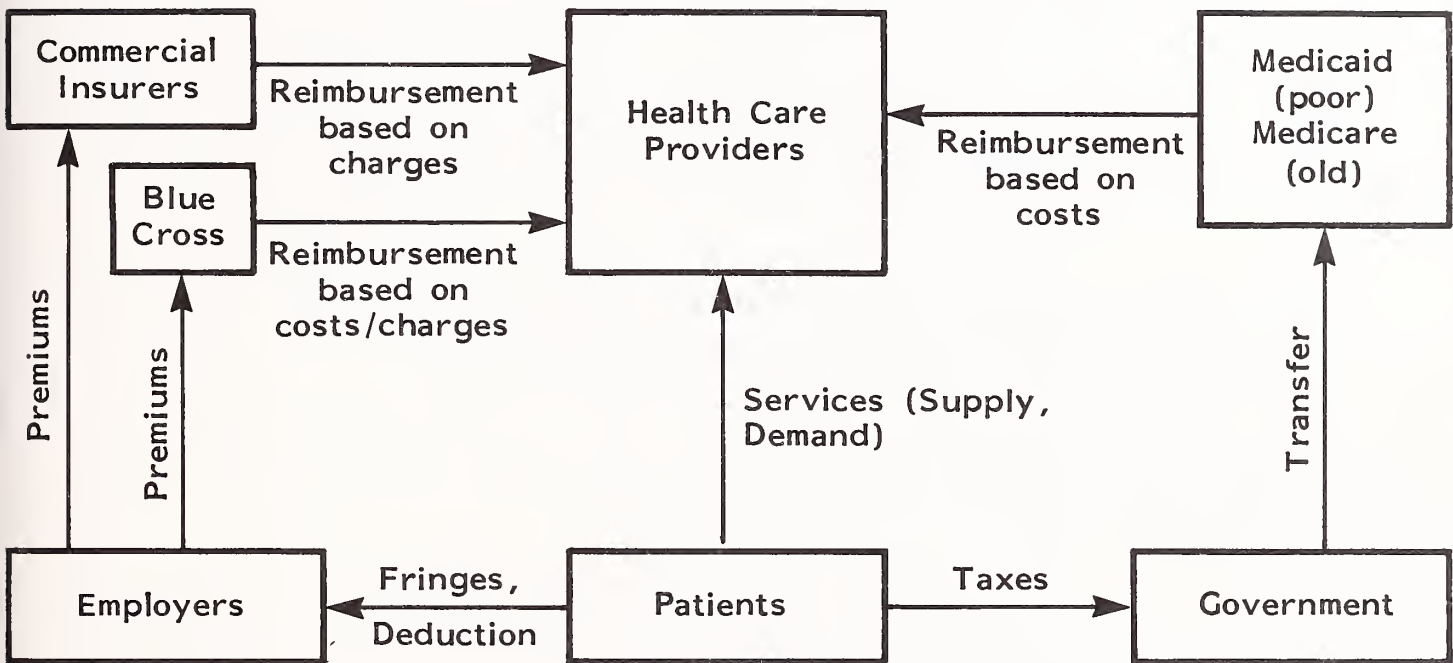
- A heightened awareness of anti-trust laws as well as consumerism has made the comfortable habits of cartelization much more difficult. The elimination of the prohibitions against professional advertising is one aspect of the threat to cartelization.
- New modes of practice, e.g., stronger (and profit-based) prepaid medical plans (Health Maintenance Organizations - HMOs) have been established.
- Corporations have increased their intervention in health care to hold down health insurance fringe benefits. However, most of these efforts are mired in the political process (e.g., to make fringes feasible) or in the semi-political arena of labor negotiations (e.g., to reduce health insurance coverage, increase deductibles, etc.).
- The rise of private and government-sponsored health insurance (during the period 1950-1970), which has led to about 90% of the population having some medical insurance, at first tended to reinforce the anticompetitive forces within the medical sector: with demand so high, there were so many ways to make money that competition appeared to be pointless.

c. The Key Role of Reimbursement Mechanisms

- The rise in health insurance, as shown in Exhibit IV-25, introduced a new set of destabilizing changes by decoupling services from funding. Since health care is a need that is virtually insatiable, health insurance led to constantly rising levels of consumption. As a percentage of the GNP the health sector has risen from less than 4% in 1950 to 11% in 1982.

EXHIBIT IV-25

THE SEPARATION OF SERVICES AND PAYMENTS  
IN THE HEALTH CARE SYSTEM



- Much of this increased percentage of the GNP was caused by an inflation in medical personnel's incomes, especially in the hospital sector, since hospitals could just pass along their costs. This inflation of income occurred because most hospital insurance reimbursement was on a cost-plus basis and/or based on what the hospital cared to charge. Until the early 70s, there were no real ceilings on these cost increases. Since then there have been only partially effective ceilings.
  
- These ceilings have been very difficult to administer and are based on a very complex system of cost accounting at the individual hospital and regional level. These ceilings have given birth to a whole new industry that advises hospitals on how to legally avoid the consequences of rate ceilings. This avoidance can take a number of different forms, e.g.:
  - Gaining exemptions from regulations on an individual-case basis or, sometimes, on an industry basis.
  - Reclassifying expenses to gain more favorable overall treatment.
  - Reapportioning expenses so that more expenses are allocated to reimbursers that treat a particular hospital more favorably.
  - Demonstrating that the service profile of a hospital requires that it be placed in a more favorable group of hospitals for reimbursement purposes.
  
- These kinds of advisement services have a distinct value-added character, requiring:
  - Hospital accounting expertise.
  - Extensive knowledge of regulations.

- Knowledge of diverse computer-based systems.
  - Computer models of hospitals.
- Consulting for rate ceiling avoidance has been a very rewarding field for specialized consultants, especially for public accounting firms. Surprisingly, mainstream information service firms, even those heavily involved in supplying computer services to the industry, have not been active in this area.
- There are two basic reasons for leaving this field to the accounting firm.
  - Most information service firms in the medical field are operations and processing oriented.
  - As a result, most hospitals would not, certainly at first glance, view a traditional information services firm as an alternative to a specialist firm.
- At least for the leading information services suppliers, leaving the field to the accounting firm has not been a critical issue to date; there have been sufficient opportunities in replacing manual operations. As described in the following section, the situation is changing.
- Not surprisingly there has been increasing concern over the seemingly uncontrollable increase in medical costs, particularly hospital costs (since hospital costs make up about 40% of total health care costs and have the highest rate of increase).
- Efforts to place a ceiling on cost increases have inherent limitations:

- Inventive consultants can find procedural or data holes in most regulations if for no other reason than the best of the regulators often become consultants.
  - Lowering cost-based reimbursement means increasing charge-based reimbursement.
  - As in all price control systems, the controls introduce anomalies and inefficiencies in the system.
- Other experimental means of reimbursement include arriving at a total hospital budget for a region and then allocating fair shares to individual hospitals. There is, however, no evidence that this strategy can work administratively:
  - It will give rise to its own appeals mechanisms.
  - It ultimately makes hospitals wards of the state.
- The most prominent and possibly most promising of hospital reimbursement alternatives is so-called case mix reimbursement, where all hospital patients are classified into one of over 450 diagnosis-related groups (DRGs). A flat rate is then set for each group. Medicare is planning to begin reimbursing in this manner; other insurers may follow.
  - There is a great deal of intellectual attractiveness to the DRG approach, since hospitals, in principle, will have to focus on productivity and not on manipulating regulations.
  - However, there will still be considerable room for interpretation, classification and, especially, data manipulation.

d. The New Health Care System: Competition

- For the foreseeable future, the health care industry will see a much greater emphasis on planning and marketing, and a lessened importance on operations.
  - Marketing-oriented health care organizations will prosper. Weaker units will cease to exist as independent entities.
  - Fewer, but stronger and smarter operating units will make marketing-oriented health care organizations more attractive, but more demanding, customers for information services.

3. COMPETITIVE CONSIDERATIONS

- Until now, the information service industry has focused most of its energy on helping the health care industry automate previously manual processes, as shown in Exhibit IV-26. These processes have largely been operational functions. Leading vendors such as SMS, McAuto, HBO, Cycare, and Equifax have done well providing these basic services.
- At least some vendors realize that providing these manual-equivalence services should only be a foundation for additional services.
  - SMS, for example, besides expanding its services further into traditional areas (e.g., a nursing-support system and a comprehensive laboratory system) is also adding additional value-added services such as:
    - A computer-based nursing education system.
    - Financial and diagnostic data aggregations to help hospitals plan for the changing reimbursement environment.

EXHIBIT IV-26

HEALTH CARE INFORMATION SERVICES -  
TRADITIONAL SERVICES (Examples)

Hospital Sector

- Intrahospital communications (e.g., between nursing areas, laboratory, pharmacy etc.)
- Admission, discharge and transfer
- Patient bill preparation (detailed charges, etc.)
- Insurance claim preparation
- Accounts receivable preparation
- Payroll; personnel; inventory; purchasing
- Cost accounting
- Medical record indexing
- Ancillary department automation (labs, pharmacy, etc.)

Physician Sector (including group practice and hospital clinics)

- Patient and insurer bill preparation
- Appointment scheduling
- Medical records/patient information
- Administrative systems (accounting, inventory, word processing, etc.)



- Ad hoc reporting for group practices for statistical and financial analysis.
- It is indicative of SMS' view of the marketplace that its new president has had extensive experience in hospital management.
- However, it can certainly be questioned whether vendors as a group are sufficiently attuned to the changes going on in the health care industry and the opportunities - as well as the problems - that this presents.
  - The need for traditional computer-based services is certainly not going away. These services will continue to expand, especially internal hospital communications. Many existing financial and accounts receivable systems are also nearing the end of their useful lives and are due for replacement.
  - While these services are not commodities by any stretch of the imagination, the needs that they fill are not the critical, competition-related needs that health care managers will be increasingly focusing on.
  - The danger for established vendors is that they will be upstaged by competitors or new entrants who will be offering enhanced services on top of the traditional services. Exhibits IV-27 and IV-28 give examples of enhanced services that will be needed by the hospital and group practice markets.
- Current vendors may believe that it will be sufficient to give health care clients the data and analytical tools to make the necessary analyses and plans. Giving health care clients this responsibility would be a mistake on several levels:
  - Many, if not most, health care providers are not capable of performing such analyses unassisted. Total solution companies must be able to provide such consulting services.

## EXHIBIT IV-27

### HEALTH CARE INFORMATION SERVICES - ENHANCED GROUP PRACTICE SERVICES (Examples)

- Group practice siting (HMD management companies, established group practices)
  - Population and planning data (external data bases)
  - Patient and physician market share (internal data base)
  - Regional market share trends (by specialty)
  
- Group practice management
  - Business planning tools
  - Specialty mix
  - Ancillary staff maximization models
  - Revenue and expense division
  - Patient and service segment profitability analysis
  
- Marketing
  - Patient and prospective patient data base
  - Personalized mailings and personal contact calendaring
  - Pricing models
  - Analysis of promotional effectiveness

## EXHIBIT IV-28

### HEALTH CARE INFORMATION SERVICES - ENHANCED HOSPITAL SERVICES (Examples)

- Group practice siting
  - Regional population and planning data, including trends and projections (from commercial data bases, government planning data, and proprietary data)
  - Hospital patient demographics, subdivided by target segments
  - Prospective patient market research data base
  - Hospital and competitive hospital physician profiles; regional physician referral
  - Patterns and physician trends
  
- Marketing
  - Market research data base, prospective patients needs regarding physicians, hospitals, and new services
  - Computer-directed mailings and promotions
  - Patient demographics: Actual versus targeted
  - Analysis of physician recruitment, physician referrals: Actual versus targeted
  
- Revenue maximization
  - Hospital cost accounting model
  - Identification of critical cost allocation areas
  - Hospital case mix model
    - . Identification of potential DRG classification options
    - . Effects of exercising DRG options
  - Trade-offs between DRG, cost- and charge-based payment systems
  - Effects of changing hospitals case mix
    - . Services/physicians generating profitable/unprofitable workload
    - . Regional cost variations and effects of interhospital transfer
  - Identification of high-cost departments/services/physicians

- Companies that do not offer a complete range of services, especially those aimed at critical issues, may be superceded in the health care business.
- This kind of problem-solving keeps information services companies abreast of critical client needs.
- Attaining a suitable level of knowledge will not be easy for a technically oriented information service firm. There are several routes available for building up this kind of expertise and image:
  - Directly hiring managers and professional personnel with the right kind of background. This will have to be done ultimately by any company; however, initially it can be expensive, uncertain, and time-consuming.
  - Entering into a business relationship with an established organization. This relationship can run the gamut, from jointly bidding on specific projects, to formal joint ventures, to outright acquisition. There are a number of different choices open to information service firms.
    - Specialized health care consulting firms or accounting firms with significant amounts of health care work represent one fairly obvious pool of expertise.
    - A less obvious source of knowledge is hospitals themselves. As part of competition for revenues, hospitals are forming separate subsidiaries to go into related areas of business. These subsidiaries would be a vehicle for joint ventures and would signify a desire to enter the commercial marketplace.

## G. PROCESS MANUFACTURING

### I. MARKET SIZE AND GROWTH

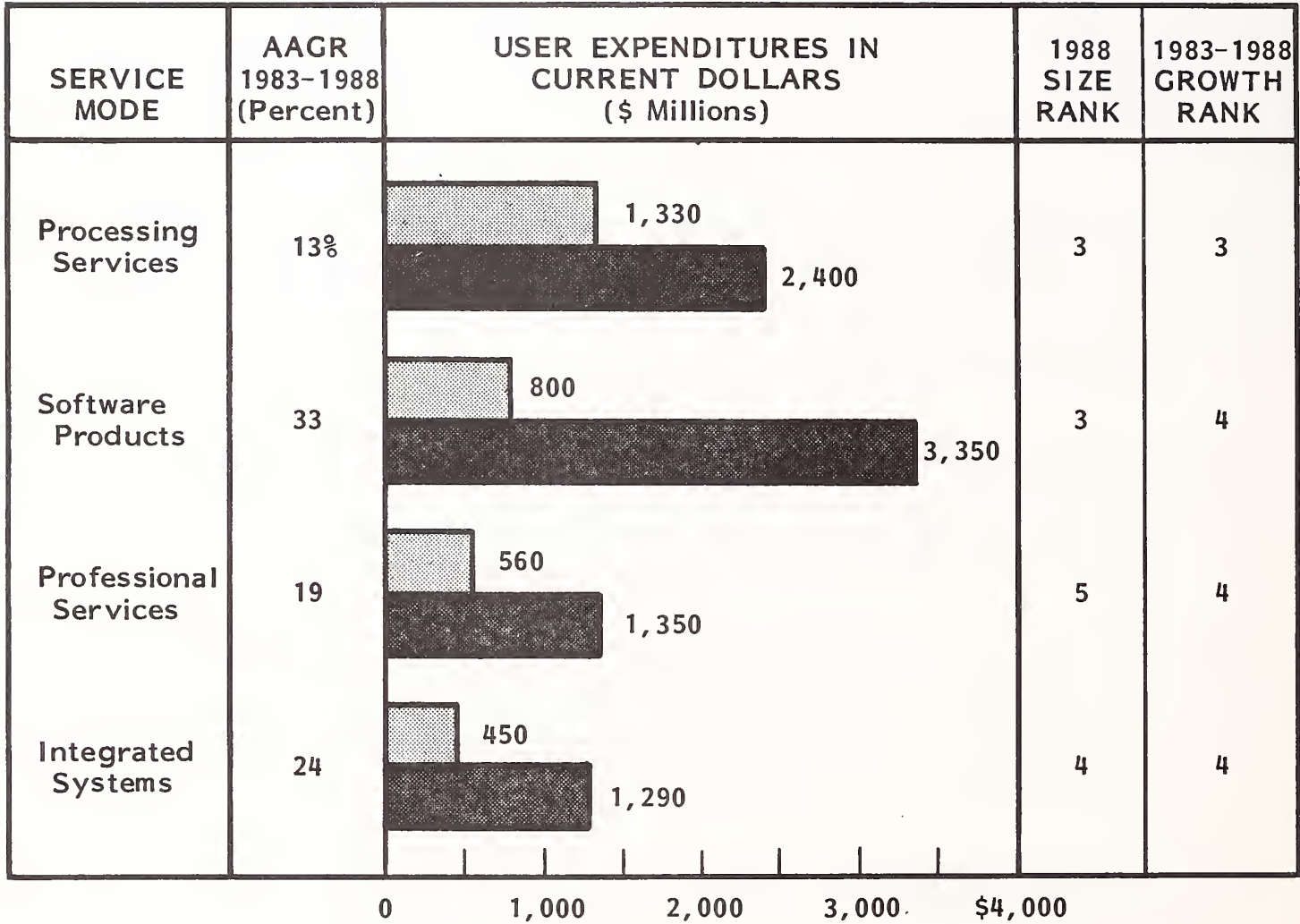
- Demand for RCS in the process manufacturing industry will grow from 1983's \$580 million to 1988's \$1,230 million, a 16% AAGR. The industry-specific component of this spending will more than double, reflecting a healthier 21% AAGR - the highest of any industry sector, as shown in Exhibits IV-29 and IV-30.
- Demand for applications software in the process manufacturing sector will remain quite strong, growing from \$260 million in 1983 to \$1,200 million in 1988 - a 35% AAGR. The industry-specific portion will grow at a 41% rate for the next five years.
- While increasing at a respectable 17% AAGR, the small base of \$40 million in 1983 makes the process manufacturing market not as attractive as are some of the larger markets for FM.
- Growing at a 24% AAGR, from 1983's \$450 million to 1988's \$1,290 million, integrated systems will remain the smallest component of the process manufacturing information systems marketplace. The industry-specific portion of this component will remain around 75%.

### 2. KEY ISSUES, TRENDS, AND EVENTS

- The process manufacturing industry sector is composed of several diverse subsectors, each with unique characteristics and requirements, as shown in Exhibit IV-31.
- In the chemical subsector, capacity utilization fell to the 65% to 70% range and prices fell during 1982. Capacity utilization is especially important in

EXHIBIT IV-29

TOTAL INFORMATION SERVICES FORECAST  
PROCESS MANUFACTURING SECTOR, 1983-1988



Total Information Services		1983-1988 AAGR
1983	\$3,140	22%
1988	\$8,390	

(\$ Millions)

EXHIBIT IV-30  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 PROCESS MANUFACTURING SECTOR, 1983-1988

SERVICE MODE	AAGR 1983-1988 (Percent)		USER EXPENDITURES IN CURRENT DOLLARS (\$ Millions)	INDUSTRY-SPECIFIC	
	Industry-Specific	All		1988 Size Rank	1983-1988 Growth Rank
Remote Computing	21%	16%		10	1
Batch Processing	10	9		2	1
Facility Management	17	17		4	3
Application Software	41	35		7	2
Integrated Systems	25	24		4	3

(\$ Millions)  
 All Industry-Specific Total Exhibit\*

1983		\$1,080	\$2,040
1988		\$2,660	\$4,890

Industry-Specific Portion

\* May not total exactly due to rounding.

EXHIBIT IV-31  
PROCESS MANUFACTURING INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
10 and 14	Metal and Nonmetal Mining	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 20.8 Billion 7,123 192,000
11 and 12	Anthracite and Coal Mining	Value of Shipments (1977) Number of Establishments (1980) Number of Employees (1982)	\$ 16.6 Billion 4,033 240,000
13	Oil and Gas Extraction	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$130.0 Billion 18,152 160,000
20	Food Products	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$277.3 Billion 20,983 1.6 Million
21	Tobacco	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 14.5 Billion 194 67,000
22	Textile Products	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 47.2 Billion 6,302 750,000
24	Lumber and Wood Products	Value of Shipments (1981) Number of Establishments (1980) Number of Employees (1982)	\$ 46.8 Billion 29,718 603,000

Continued



EXHIBIT IV-31 (Cont.)

PROCESS MANUFACTURING INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
26	Paper Products	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 79.0 Billion 6,193 662,000
28	Chemicals	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$172.8 Billion 11,261 1.1 Million
29	Petroleum	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$206.4 Billion 2,142 201,000
30	Rubber & Plastics	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 50.1 Billion 11,806 700,000
32	Stone, Glass, Clay	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 44.0 Billion 15,645 577,000
33	Primary Metals	Value of Shipments (1982) Number of Establishments (1980) Number of Employees (1982)	\$107.0 Billion 6,989 922,000

this capital-intensive industry, and managers have slashed capital-expansion programs to meet the problems of over-supply. Managers have also worked to lower break-even points through cutting costs and streamlining operations; they have also pared their debt levels.

- In the petroleum subsector, the worldwide recession and energy conservation caused demand and prices to fall last year. Heavy reliance on expensive OPEC and hard-to-get domestic oil also put pressure on margins.
- Oil firms have reacted by modernizing refineries to operate more efficiently and by closing marginal refineries to decrease excess capacity.
- Surplus capacity in almost every phase of the industry has resulted in the most intensive competition in recent memory, further depressing profit margins. 1983 demand is expected to increase only 1%, and the long-term demand outlook is not at all certain.
- Paper products make up another important subsector in process manufacturing. Several paper companies completed major expansion projects last year - just in time for the worst part of the depression. Demand and prices for uncoated stocks slid throughout the year, but demand for lightweight coated paper remained steady - supported by the printing industry.
- Companies improved cash flow by curtailing operations and reducing employment. With most capital projects now completed, the paper products companies should do well in the years ahead; they have emerged from the recession leaner and more efficient.
- Automobile tires dominate the rubber industry. Dwindling original-equipment demand for tires in 1982 was partially offset by emphasis on replacement markets. But the tire manufacturers are not satisfied with growth prospects in their own industry and are actively diversifying - mainly into energy. Still, new tire demand is expected to grow 10% to 20% this year, helping earnings growth.

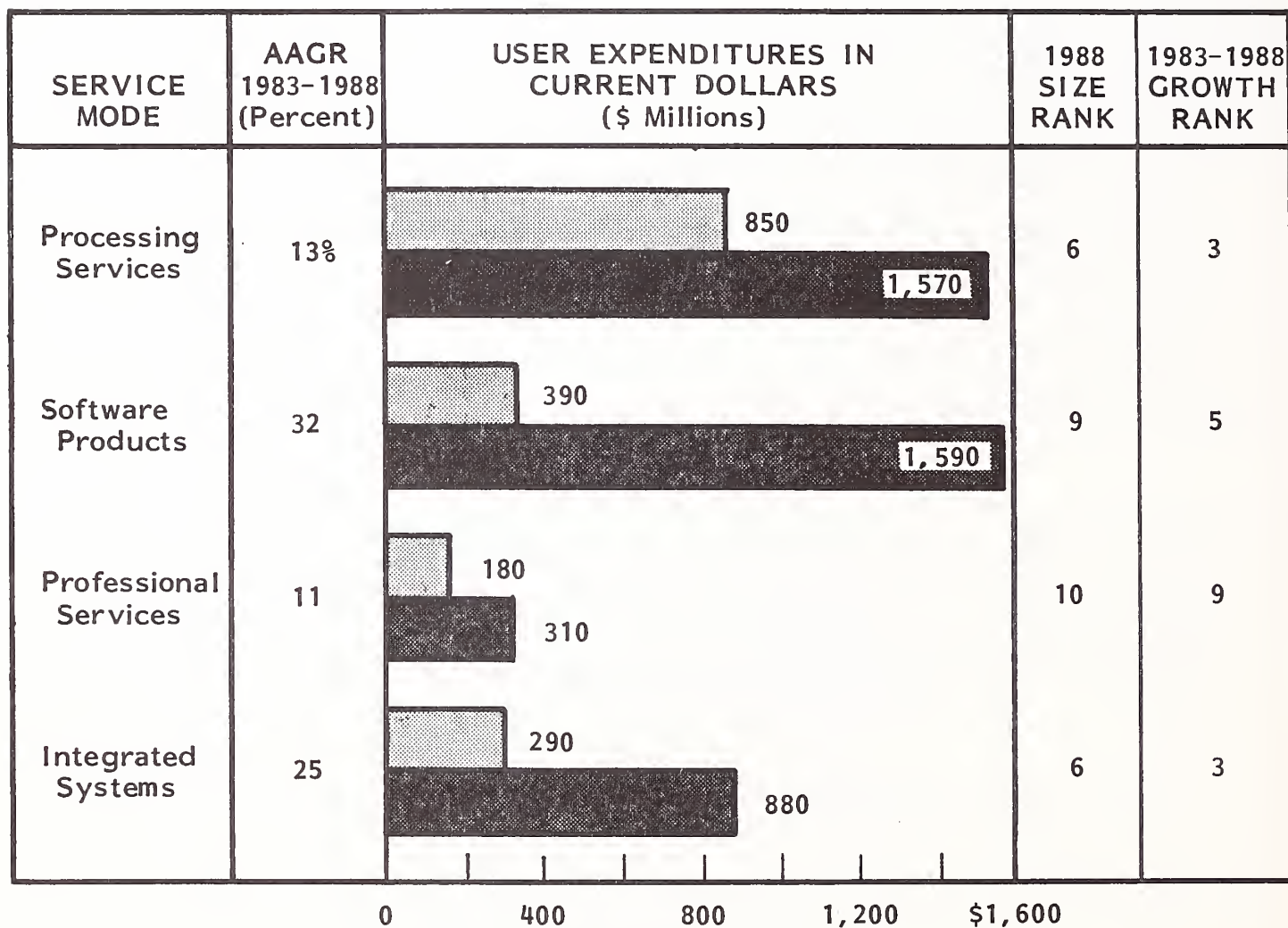
- In the primary metals field, steel production, shipments, employment, and operations in general fell to their lowest levels since 1938, and only a modest improvement is expected in the near future. Capacity utilization fell as low as 30%. World spot steel export prices remain 35% below domestic list prices, and imports remain largely unrestrained, increasing price pressures.
- Other metals did not fare much better; aluminum production last year averaged about 55% of capacity, copper 38%, and lead and zinc from 40% to 50%. Many firms sustained large losses and few did respectably. There is some concern about an all-out international trade war, which would further depress prices. In any case, metals will not share a large part of the recovery and should remain weak for the foreseeable future.

#### H. RETAIL DISTRIBUTION

- The retail distribution sector is one of the fastest growing marketplaces for information services. Growing at an average annual compounded rate of 21%, this market should reach \$4.35 billion by 1988. For this sector 1983 represents a \$1.7 billion market, as shown in Exhibit IV-32.
  - Growth in processing services and integrated systems rank third for all industries.
    - Processing services will grow from \$850 million in 1983 to \$1,570 million in 1988, an average annual growth rate of 13%.
    - Integrated systems will grow from \$290 million to \$880 million (an AAGR of 25%).

EXHIBIT IV-32

TOTAL INFORMATION SERVICES FORECAST  
RETAIL DISTRIBUTION SECTOR, 1983-1988

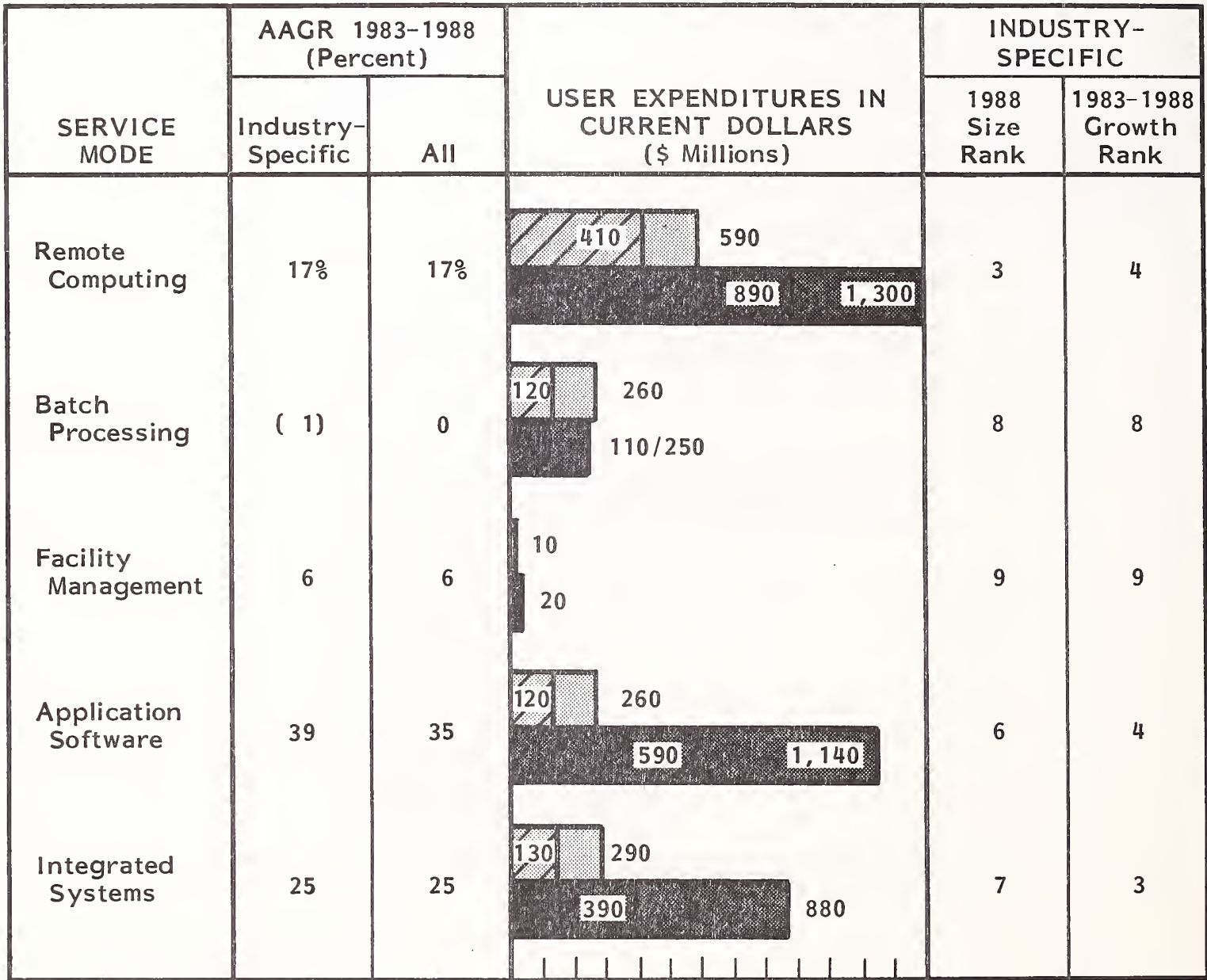


Total Information Services		1983-1988 AAGR
1983	\$1,710	21%
1988	\$4,350	

(\$ Millions)

- Software products and integrated systems are expected to be the fastest growing information services for the retail distribution sector, growing at 32% and 25% respectively. The software products market is expected to reach almost \$1.6 billion by 1988 from \$390 million in 1983.
- In industry-specific information services, the retail distribution sector represents \$790 million and is expected to grow to \$2 billion by the end of 1988 at a compounded annual growth rate of 21%, as shown in Exhibits IV-32 and IV-33.
- Industry-specific remote computing services markets in this sector ranks third in size among all industries, superceded only by the banking and discrete manufacturing sectors.
- Particularly noteworthy (as shown in Exhibit IV-33), is the negative annual growth rate for industry-specific batch processing. However, this "yellow alert" for the industry-specific batch processing market in the retail distribution sector affects only a 1983 base of \$120 million.
- On the other hand, industry-specific applications software is expected to grow from \$120 million in 1983 to \$590 million by 1988, a compound rate of 39%.
- The industry-specific integrated systems market in the retail distribution sector ranks third in growth at an average compound annual rate of 25%. This market will grow from \$130 million in 1983 to \$390 million by 1988.
- Demographics of the retail distribution industry are summarized in Exhibit IV-34.

EXHIBIT IV-33  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 RETAIL DISTRIBUTION SECTOR, 1983-1988



0 200 400 600 800 1,000 \$1,200

(\$ Millions)

All

Industry-Specific    Total Exhibit\*

1983		\$ 790	\$1,410
1988		\$2,000	\$3,590

Industry-Specific Portion

\* May not total exactly due to rounding.

EXHIBIT IV-34  
RETAIL INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
All	Retail Trade	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$1,080.0 Billion 1.2 Million 15.5 Million
52	Building Materials, Hardware	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 49.7 Billion 62,376 616,000
53	General Merchandise	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$133.9 Billion 36,858 2.1 Million
54	Food Stores	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$251.7 Billion 157,649 2.6 Million
55	Automotive Dealers & Gasoline Service Stations	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$290.5 Billion 202,322 1.6 Million
56	Apparel & Accessories	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 49.9 Billion 124,586 988,000
57	Furniture, Home Furnishings & Equipment	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$ 44.3 Billion 84,433 580,000
58	Eating & Drinking	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$102.5 Billion 282,460 4.9 Million
59	Miscellaneous Retail	Sales (1982) Number of Establishments (1980) Number of Employees (1982)	\$157.5 Billion 260,388 2.0 Million

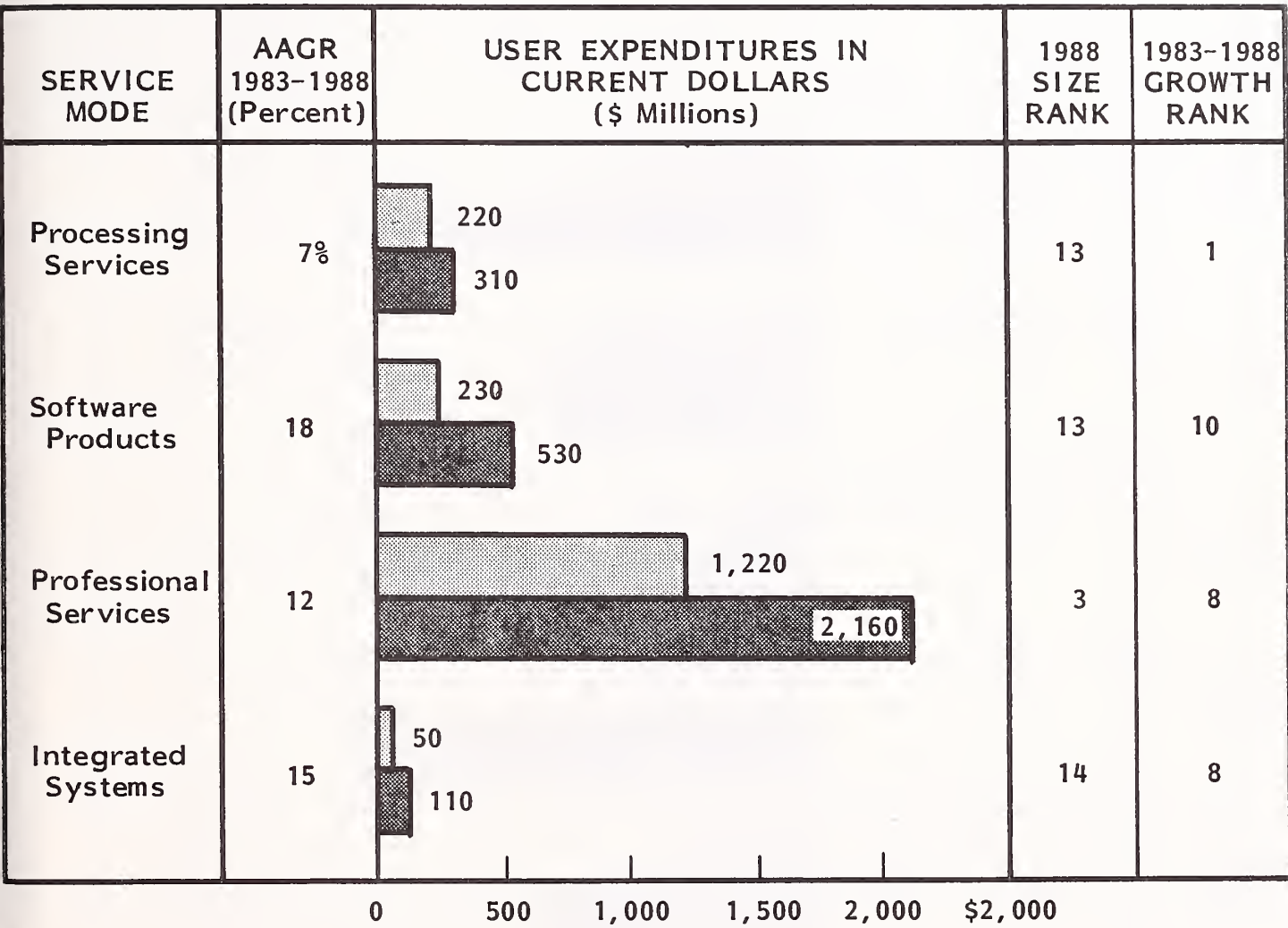
## I. STATE/LOCAL GOVERNMENT

- The information services industry in the state and local government sector will grow at an average compounded annual rate of 13% over the next five years, as shown in Exhibits IV-35 and IV-36.
- During this period, the information services market will grow from \$1.7 billion in 1983 to \$3.1 billion in 1988.
- The state and local government market for processing services ranks first in growth and will grow from \$220 million in 1983 to \$310 million by 1988.
- As the third-largest market for professional services, the state and local government sector demanded \$1.2 billion worth of these services in 1983 and will grow to \$2.2 billion by the end of 1988 (an average compounded rate of 12%).
- The industry-specific information services market for the state and local government sector will grow from \$100 million in 1983 to \$220 million by 1988 at a compounded growth rate of 16%, as shown in Exhibit IV-36.
- Although growth in industry-specific batch processing for this sector ranks fourth among other industry sectors, the small \$30 million 1983 base of this market won't expand significantly through 1988.
- Industry-specific remote computing services, on the other hand, will grow from \$20 million in 1983 to \$30 million by 1988.
- As with other industry sectors, industry-specific application software and integrated systems will grow the most, reaching \$80 million and \$60 million respectively by 1988.



EXHIBIT IV-35

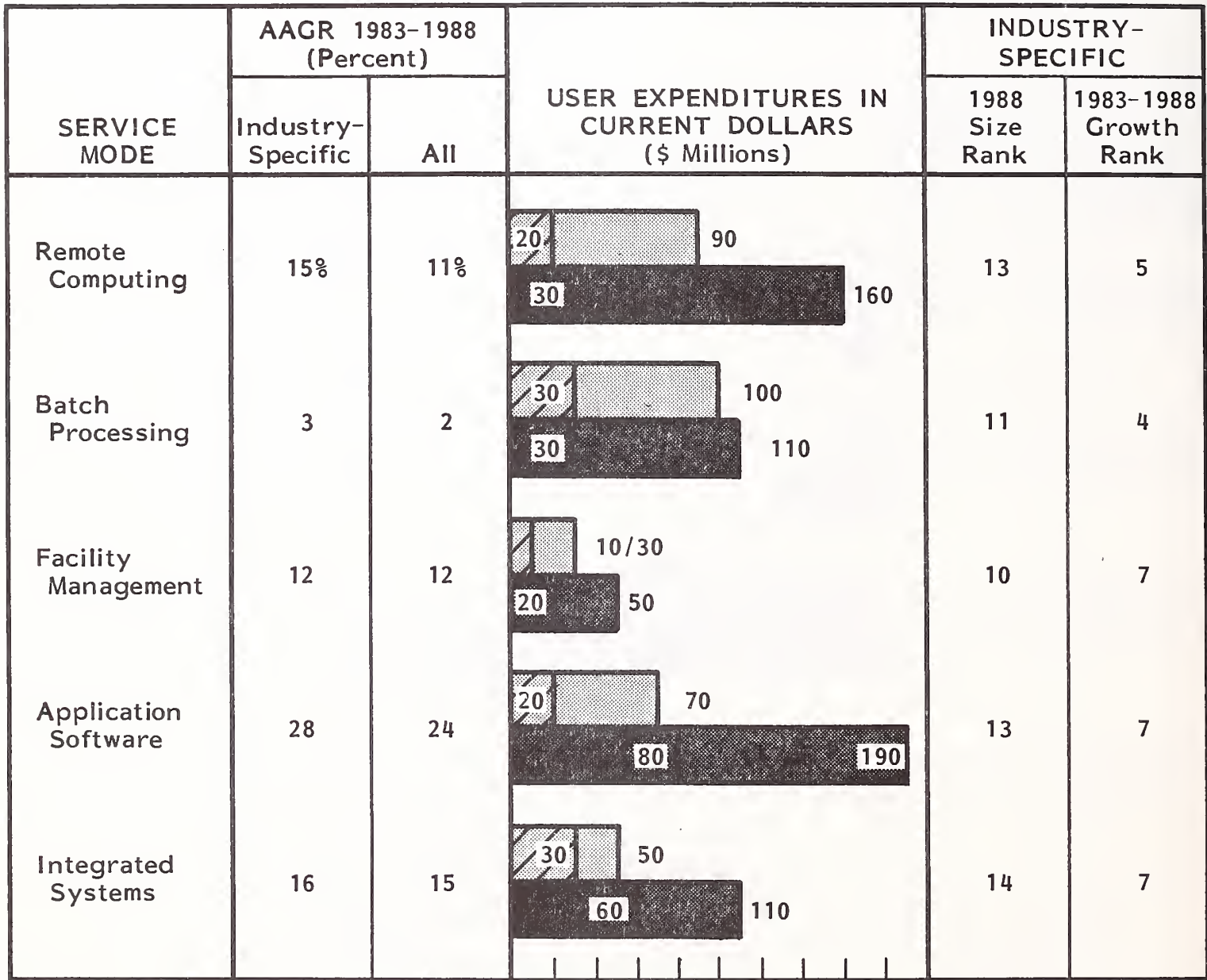
TOTAL INFORMATION SERVICES FORECAST  
STATE AND LOCAL GOVERNMENT SECTOR, 1983-1988



Total Information Services		1983-1988 AAGR
1983	\$1,720	
1988	\$3,110	13%

(\$ Millions)

EXHIBIT IV-36  
**INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST**  
**STATE AND LOCAL GOVERNMENT SECTOR, 1983-1988**



(\$ Millions)      0      40      80      120      160      \$200

(\$ Millions)  
**All**

Industry-Specific      Total Exhibit\*

1983		\$ 100	\$ 340
1988		\$ 220	\$ 620

Industry-Specific Portion

\* May not total exactly due to rounding.

- State and local government demographics are displayed in Exhibits IV-37, IV-38, and IV-39.

## J. TRANSPORTATION

### I. MARKET SIZE AND GROWTH

- The overall market for information services in the transportation industry stands at \$850 million in 1983. It is expected to grow to \$2.76 billion by 1988, an average annual growth rate of 27%, as shown in Exhibit IV-40.
- Especially noteworthy in this market is the very vigorous growth in the demand for application software.
  - From a \$160 million market in 1983, transportation should grow to a \$1.0 billion market by 1988, a compound growth of 45%, as shown in Exhibit IV-41.
  - This growth makes transportation the fastest growing industry market for application software.
- Spending for processing services for transportation will grow more slowly than the average for the economy as a whole. An 12% growth rate will bring demand to \$440 million by 1988. Seventy percent of this spending, \$290 million, will be industry specific in 1988.

### 2. KEY ISSUES, TRENDS, AND EVENTS

- No other industry, with the exception of banking, is so heavily impacted by deregulation as is the transportation industry.

EXHIBIT IV-37

1980 STATE AND LOCAL EXPENDITURES

Total:	3,676
Education:	1,336
Highways:	336
Public welfare:	466
Health, hospitals:	326
All other:	1,236



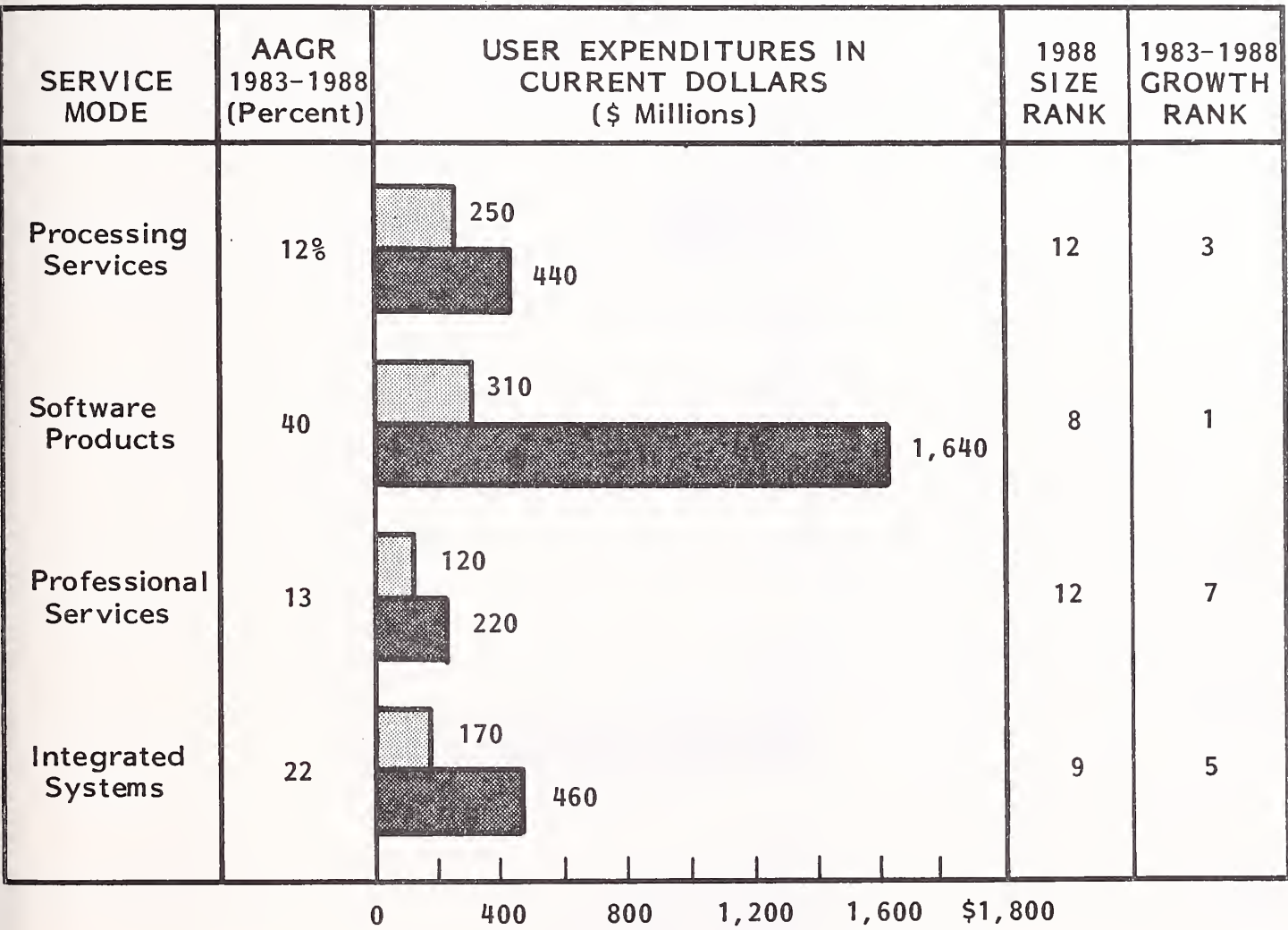
EXHIBIT IV-39

STATE AND LOCAL GOVERNMENT

1. Total employment: 12,215
  
  2. State total: 3,428
    - State hospitals: 499
    - State education: 1,187
    - General administration: 1,110
  
  3. Local total: 8,787
    - Transportation, public utilities: 533
    - Local government hospitals: 637
    - Local education: 4,231
    - General administration: 3,042
- States: 50
- Local governments: 82,637
- Counties: 3,041
- Municipalities: 19,083
- Townships and towns: 16,748
- School districts: 15,032
- Special districts: 28,733
- Total U.S. governmental units: 82,688

EXHIBIT IV-40

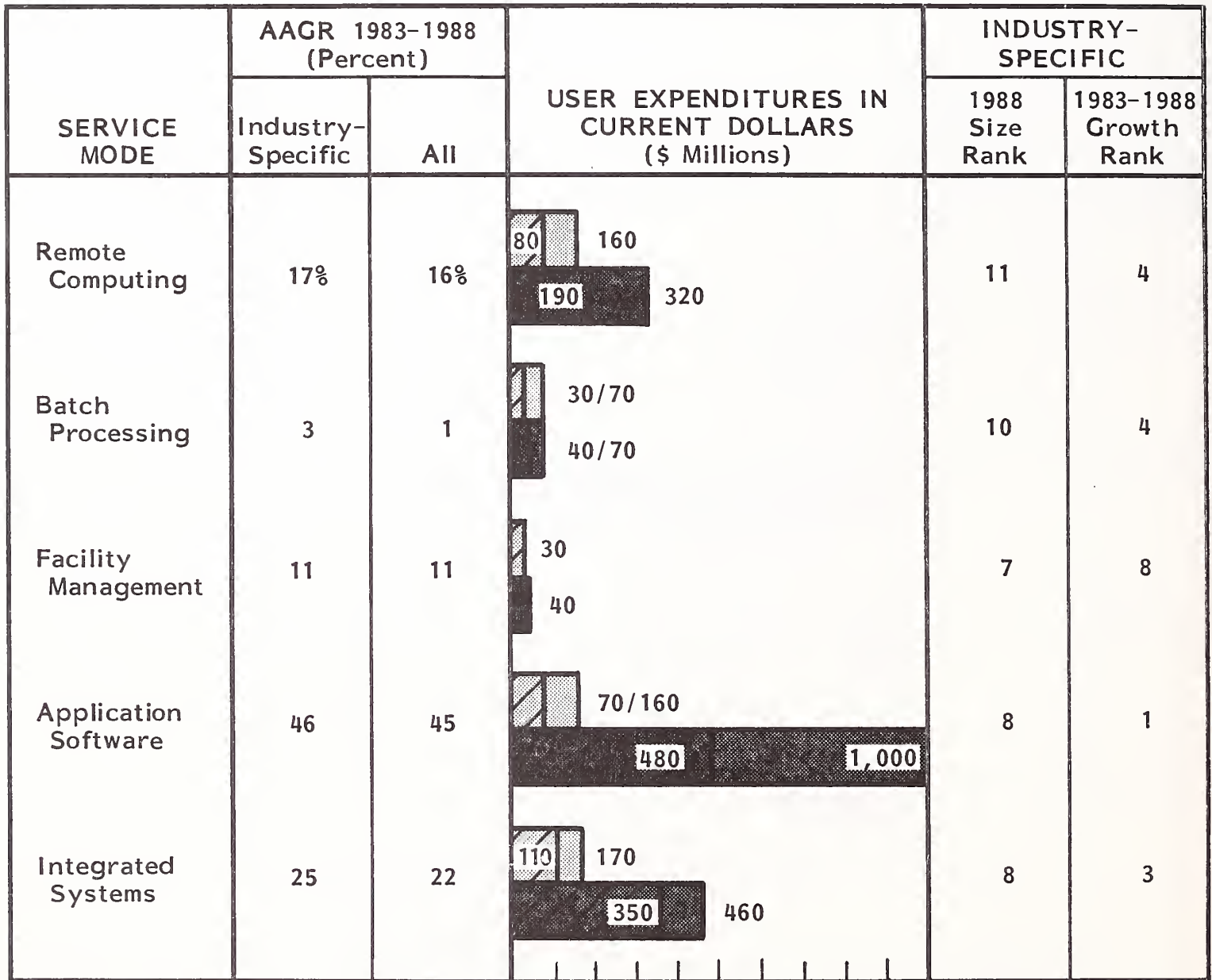
TOTAL INFORMATION SERVICES FORECAST  
TRANSPORTATION SECTOR, 1983-1988



Total Information Services		1983-1988 AAGR
1983	\$ 850	27%
1988	\$2,760	

(\$ Millions)

EXHIBIT IV-41  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 TRANSPORTATION SECTOR, 1983-1988



(\$ Millions) 0 200 400 600 800 \$1,000

All  
 Industry-Specific Total  
 Exhibit\*

1983		\$ 320	\$ 590
1988		\$1,100	\$1,890

Industry-Specific Portion

\* May not total exactly due to rounding.



- Motor freight, the largest subsector of the industry, as shown in Exhibit IV-42, was largely deregulated by the Motor Carrier Act of 1980.
  - With applications for entry as "easy to get as a marriage license," the number of motor freight carriers has increased from 17,000 in 1979 to 25,000 in 1982.
  - Average price for shipments has declined 25% since 1978.
  - The financial health of the trucking industry has suffered both from internal competition and from new competition from railroads.
  
- Railroads were deregulated under the Harley O. Staggers Act of 1980, producing a result that is generally healthier than the effect of deregulation on trucking.
  - Twenty years ago there were almost 1,000 freight railroads in the U.S. Today there are fewer than 500, with only 36 "Class I" carriers, which are those with \$50 million or more annual revenues.
  - Deregulation has given much greater flexibility to railroads in setting rates, choosing routes, and even entering related lines of business.
    - The past two years have seen the growth of intermodal freight forwarders - companies owning more than one type of transportation facility.
    - CSX corporation owns a trucking company, a pipeline, an air freight concern and is acquiring a barge operation.
    - Southern Pacific's Intermodal Business has increased over 50% in the past five years.

EXHIBIT IV-42

TRANSPORTATION INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
41	Local and Suburban Transit	Operating Revenues (1978) Number of Establishments (1980) Number of Employees (1980)	\$ 2.4 Billion 12,887 269,000
42	Motor Freight	Operating Revenues (1978) Number of Establishments (1978) Number of Employees (1978)	\$ 36.5 Billion 80,270 1.3 Million
44	Water Transportation	Operating Revenues (1978) Number of Establishments (1980) Number of Employees (1982)	\$944.0 Million 6,793 190,000
45	Air Transportation	Operating Revenues (1982) Number of Air Carriers (1980) Number of Employees (1982)	\$ 36.0 Billion 6,152 390,000
46	Pipelines	Operating Revenues (1978) Number of Establishments (1980) Number of Employees (1982)	\$ 4.9 Billion 517 21,000
47	Transportation Services	Operating Revenues (1978) Number of Establishments (1980) Number of Employees (1982)	\$ 68.8 Million 22,381 217,000

- Other railroads and trucking companies are entering into similar horizontal integration to provide total end-to-end freight forwarding.
- Mergers have left only four major west coast railroads and three major east coast carriers. The recently announced merger between Southern Pacific and Santa Fe, creating the first transcontinental railroad, highlights the trend of consolidation in order to expand to new service areas and reduce overhead and maintenance costs.
- Much of the growth in business for railroads has come at the expense of business for trucks. Piggyback bookings were the only kind of shipment that was up in 1982.
- Airline deregulation in 1978 has inflicted major changes on the industry.
  - Two major airlines have gone into bankruptcy proceedings in the past year. Several medium-sized airlines have been merged with others to avoid collapse.
  - Routes, fares, and frequencies are under continual review and modification.
  - Newer, low-cost carriers have moved quickly to skim the cream from lucrative short-hop routes and will begin attacking longer haul corridors soon.
  - Lower operating costs for these new carriers virtually insure that more shakeouts will occur.
  - In addition, the larger established companies are attempting to institute more cost-effective salary structures in order to cope with the newer carriers.

- The bus industry, like trucking, railroad, and airlines, has felt the sting of deregulation.
  - The Busing Regulatory Reform Act of 1981 opened the doors to new, low-cost carriers and competition that is similar to that in the airlines.
  - Authority over routes within states, formerly controlled by State Public Utility Commissions, now rests with the ICC.
  - Established bus companies, like the older air carriers, are attempting to lower wage costs in order to remain competitive with new, lower cost entrants.

### 3. APPLICATIONS ANALYSIS

- Fleet maintenance applications are common to all modes of transportation providers, but are especially widespread in the trucking and bus area where thousands of firms exist. Typical functions required of this application include:
  - Repair interval monitoring and notification.
  - Vehicle repair frequency evaluation.
  - Vehicle operation cost analysis by a variety of measures, including per mile, per hour, per gallon, etc., and for a variety of equipment, including fluids, filters, tires, drive trains, etc.
  - Amortization scheduling.
  - Tracking of repair orders for outside purchases.

- File maintenance for individual vehicle histories.
- Vehicle and cargo tracking are among the oldest computerized applications in this industry.
- Logistics modeling has recently grown in importance with the advent of intermodal carriers. Functions includes:
  - Analysis of variables such as time, mode cost, service requirements, equipment availability, labor cost, etc.
  - Rail applications include dynamic inventory modeling of rolling stock to match cargo requirements with available freight cars and destination variables, such as:
    - Nature of the cargo (frozen, bulk, toxic, etc.)
    - Track and rail year utilization factors.
    - Track conditions.
    - Equipment availability, etc.
- Many applications for railroads have been developed by the railroads themselves. One carrier has developed a data base of conditions and attributes of track structure for use in lead scheduling and maintenance planning.
- Probably the most important emerging application is the development of an on-line, electronic tariff filing system, now under evaluation by the ICC.
  - The system would be accessible to both tariff users and issuers.
  - Standardized filing and reporting formats will most likely emerge.

- Most importantly, intermodal comparisons and conversions will be facilitated.
- Simultaneously, rate-basing systems are being simplified by reducing extraneous and less-important factors and by emphasizing such factors as density, distance, etc.
- The major established automated airline reservation systems - United's Apollo and American's Sabre - have come under attack from travel agents and other airlines who say the systems are biased. A CAB ruling supported the allegations, suggesting that a new system(s) may be in the offering.

#### 4. COMPETITIVE ANALYSIS

- Airlines have proven very aggressive at providing information services to other airlines.
- In addition to the reservation systems mentioned above, other airlines have entered the fray, promising unbiased reservation processing systems. Delta and TWA are two such vendors. Tymshare has also entered this market with a system purchased from ITT.
  - Official Airlines Guide has announced an on-line version of its popular flight information handbook.
  - By its very nature - high development costs, large incentives for discounting, established vendors who can price at near-zero cost - this is a tough market to crack.
- Japan Airlines is marketing a cargo reservation system for air freight companies to allocate space and weight.

- For the railroad subsector several major vendors offer services.
  - Sun Information Services (SIS) offers a software product for tracking railcar location and status.
  - Rand Information Systems offers a similar package for use in IDM mainframes.
  - The MAPPER system by Sperry Univac is in use by Santa Fe Railway to monitor railcar location, contents, changes, etc.
- SIS also sells software for trucking applications. Its motor carrier maintenance system includes maintenance scheduling, vehicle performance, inventory control, etc.
- The trucking market subsector is the most heavily populated in the transportation industry. Its 25,000 users vary from one-person owner/operators to nationwide long-haul freight carriers operating thousand-plus rig fleets.
- Computer Task Group offers several packages to this market for vehicle maintenance, freight bill accounting, and tariff tracking. CTG has recently offered a PC-based product, Hercules, based on the IBM PC and the Apple II line. Hercules performs vehicle maintenance tracking and scheduling, performance monitoring, and other functions.
- Arthur Andersen & Company offers Truckpac to provide a variety of common functions to common and contract carriers.
- Comdata Network is a leading provider of remote computing services to the transportation industry. Its cash advance system for truckers is the most widely used in the industry.

- Recently added services include a cash discount program for fuel purchases and a cargo/space matching system for facilitating freight consolidation.
- Comdata Network recently announced plans to acquire Instacom, its leading competitor.

## 5. RECOMMENDATIONS

- The most impressive requirement of transportation providers is the need to contain costs.
- Both railroads and airlines, by virtue of their size, develop most industry applications internally.
- Major opportunities exist, however, in assisting large transportation vendors to extend their data processing capabilities to encompass intermodal distribution channels.
  - Though the number of such possible sales will be small, their value will be large.
  - Expertise gained in any one delivery mode, e.g., rail, trucking, etc., might then be leveraged into sales to the much larger number of smaller companies operating within only one service mode.
- The trucking and bus subsectors provide many more opportunities in terms of number of companies, although the size of the average purchaser may be small.
- Significant opportunities exist in providing integrated systems to trucking and bus companies.



- Combining modules into the same package to offer a variety of functions should be a goal. Typical modules would include:
  - Vehicle maintenance.
  - Cargo tracking.
  - Tariff tracking.
  - Billing.
  - Accounting.
  - Labor reporting.
  - Fuel reporting.
  
- Applications for larger carriers should include route and network modeling to optimize capacity utilization, to minimize fuel and labor expenses, and to assist in intermodal billing standardization, etc.
  
- The growth of intermodal transportation holds several opportunities for information services providers.
  - Dynamic planning and analysis at network mode conversion points (e.g., from truck to rail, or rail to ship, etc.) will become increasingly important.
  - Billing conversion and standardization will be essential to ease shippers' tariff tracking burdens and to increase the appearance of complete "cradle-to-grave" service. Many medium- to large-sized carriers that already operate minicomputers and software for these systems should incorporate facilities for communicating with remotely located microcomputers.

- As freight consolidation - combining many small cargoes to fill a single, larger shipping container - becomes of increasing importance, logistical packages to plan for and analyze cargo movement patterns will be required.
- Electronic tariff keeping will greatly expand opportunities for electronic interchange of bills between customers and carriers.
  - RCS facilities to standardize and process bills can be combined with electronic data bases of tariffs.
  - Network opportunities for enhanced value-added network providers should expand.

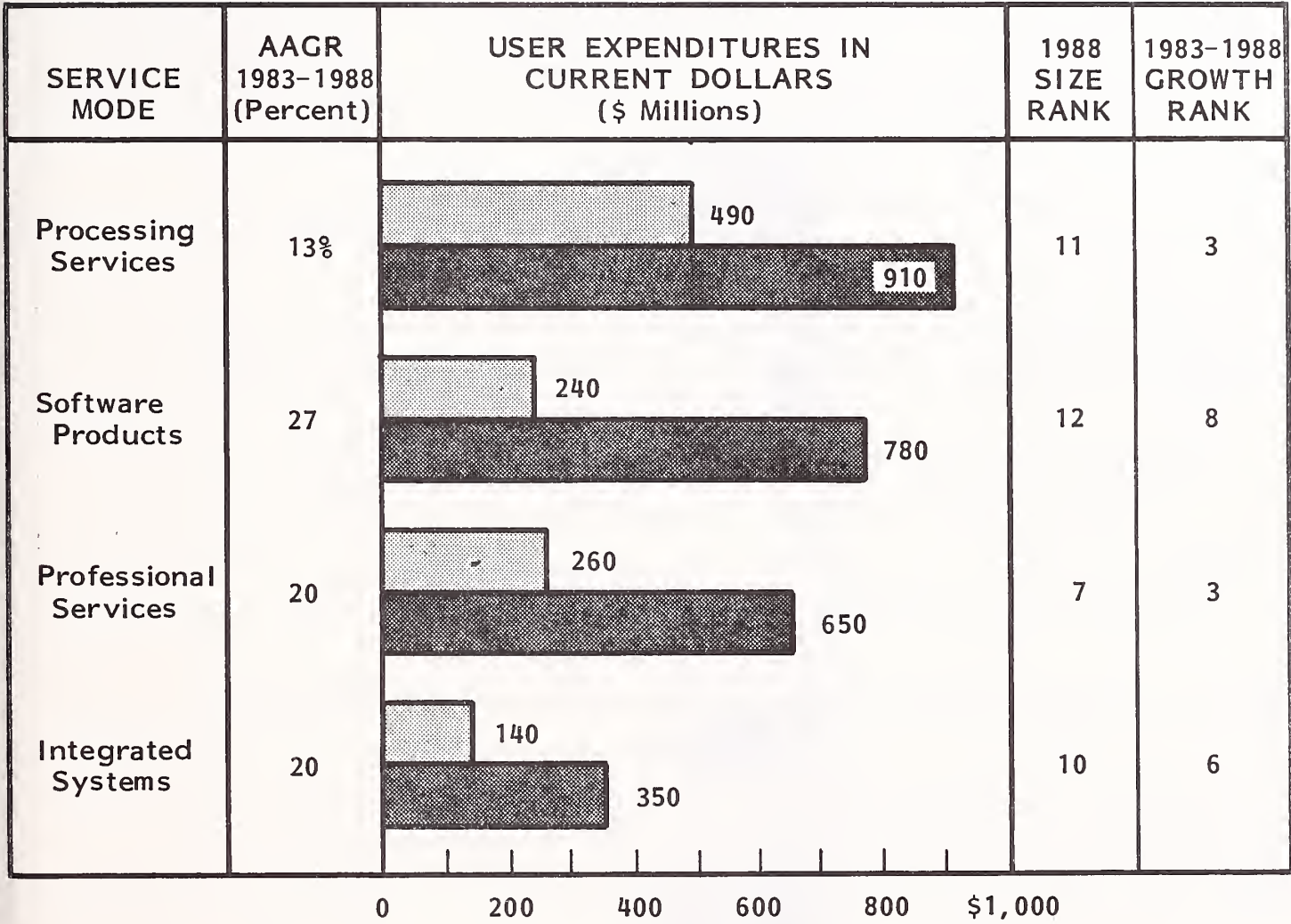
## K. UTILITIES INDUSTRY SECTOR

### I. MARKET SIZE AND GROWTH

- The utility marketplace for information services stands at \$1.13 billion in 1983. It is expected to grow by 19% per year on average for the next five years, reaching \$2.68 billion by 1988, as shown in Exhibits IV-43 and IV-44.
- Processing services are the largest form of information services sold to this market, totaling \$490 million in 1983.
  - Processing services growth at 13% for the next five years should lead to a \$910 million market in 1988.
  - Remote computing services should be the fastest growing element of this market, growing at 15%. Industry-specific RCS will grow even

EXHIBIT IV-43

TOTAL INFORMATION SERVICES FORECAST  
UTILITIES SECTOR, 1983-1988

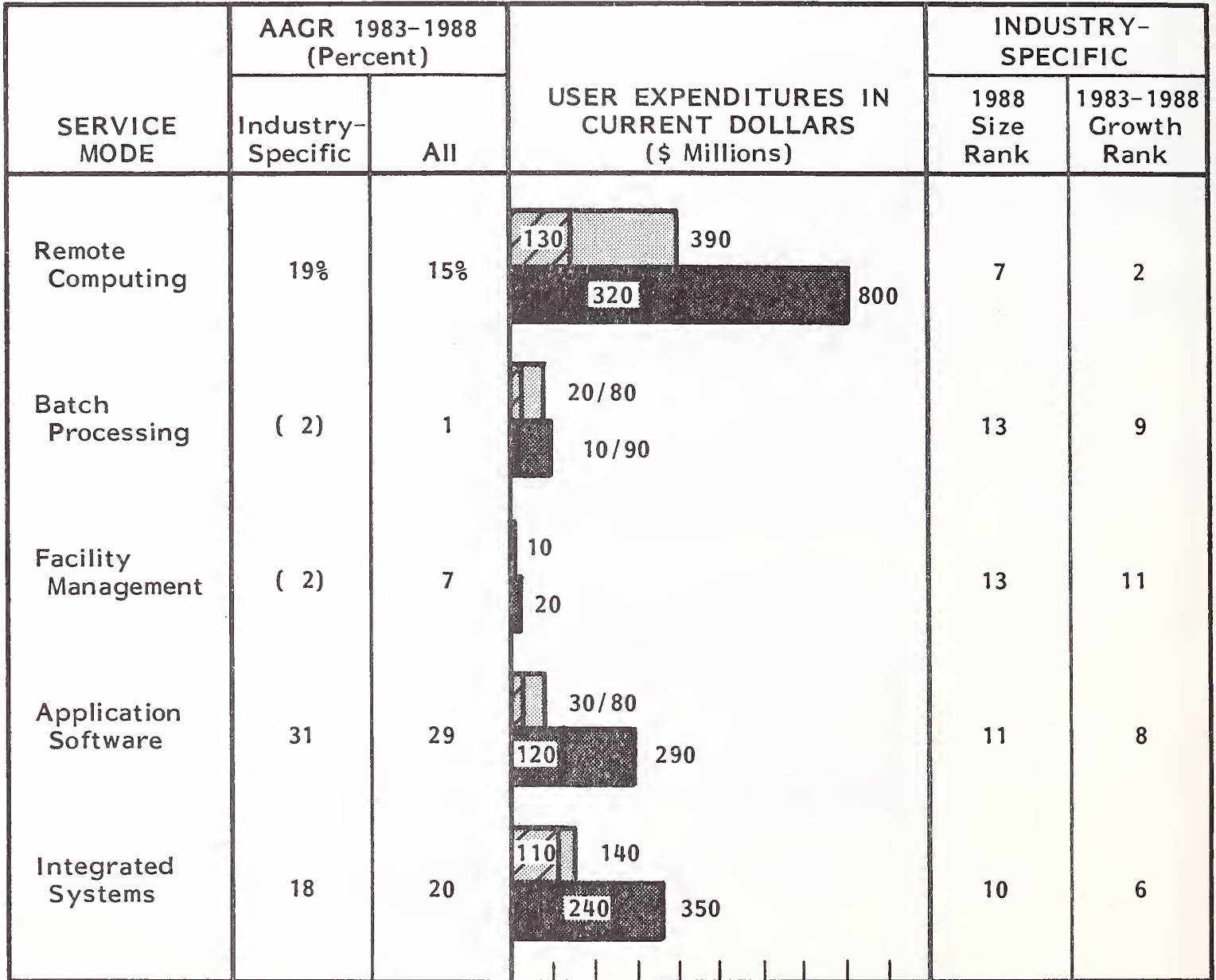


Total Information Services 1983-1988 AAGR

1983	\$1,130
1988	\$2,680

(\$ Millions)

EXHIBIT IV-44  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 UTILITIES SECTOR, 1983-1988



(\$ Millions) 0 200 400 600 800 \$1,000

(\$ Millions)  
 All Industry-Specific Total Exhibit\*

1983		\$ 290	\$ 700
1988		\$ 690	\$1,550

Industry-Specific Portion

\* May not total exactly due to rounding.

faster (19%), offsetting a slower growth in demand from batch and utility processing.

- Software products will lead the growth in this market at 27% for the next five years, followed by professional services and integrated systems at 20% each.
- The different industries making up the utilities sector are illustrated in Exhibit IV-45.

## 2. ELECTRIC UTILITIES

### a. Issues and Trends

- The electric power generation industry is characterized by excess capacity - growth in demand for electricity has leveled off and to some extent declined.
  - Utilities report excess capacity of 40%. Reserve generating capacity of 20% over peak load demand is considered more than adequate.
  - Peak load demand fell 4% in 1982, the first decline in almost 40 years.
- The emergence of this overcapacity is attributable to several sources.
  - During the 1960s the utilities overestimated the demand for electricity, believing it would continue to increase for the foreseeable future.
  - Utilities believed demand was inelastic - that it would continue to rise regardless of price.
  - Rate structures, typically providing a fixed rate of return on operating capacity, had a built-in bias for continued capital investment and plant expansion.

EXHIBIT IV-45

UTILITIES INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
481-482	Telephone & Telegraph Services	Operating Revenues (1982) Number of Companies (1982) Number of Employees (1982)	\$ 82.2 Billion 1,458 1.1 Million
483	Radio & TV Broadcasting & Cable TV	Operating Revenues (1982) Number of Stations (1980) Number of Employees (1982)	\$ 15.0 Billion 10,200 199,000
491	Electric Services	Revenues (1982) Number of Plants (1980) Number of Employees (1982)	\$122.0 Billion 4,498 428,000
492	Gas Products & Services	Revenues (1982) Number of Establishments (1982) Number of Employees (1982)	\$ 63.4 Billion 2,916 183,000
493	Combined Gas and Electric	Operating Revenues Number of Establishments (1980) Number of Employees (1982)	- 959 200,000
494	Water Supply	Operating Revenues Number of Establishments (1980) Number of Employees (1980)	- 2,836 21,000

\* Not elsewhere classified

Continued

EXHIBIT IV-45 (Cont.)

UTILITIES INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
495	Sanitary Services	Operating Revenues Number of Establishments (1980) Number of Employees (1982)	- 3,758 52,000
496	Steam Supply	Operating Revenues Number of Establishments (1980) Number of Employees (1982)	- 58 4,000
497	Irrigation Systems	Operating Revenues Number of Establishments (1980) Number of Employees (1982)	- 302 2,000

- The two oil shocks of the 1970s prompted quick responses from consumers, industry, and commerce that lead to conservation, increased automation, and new technologies promoting greater efficiency.
- The quick sequence of three recessions in six years put a damper on industrial output, further heightening the need for cost-saving efficiencies.
- Today, utilities are in a stage of retrenchment.
  - In 1981 and 1982, 47 major generating plants were canceled after partial completion.
  - Capital spending by the industry is expected to decline in 1984 and through the rest of the decade.
  - Most utilities plan no major new plants until the 1990s.
  - Several utilities without excess reserve capacity are actively promoting and subsidizing conservation programs, believing that with high interest rates and long lead times, investment in new plants may never be recoverable.

b. Applications Analysis

- Nuclear plant applications vendors received a surge of orders following the Three Mile Island incident in 1979, largely because of the wave of new regulations and uncertainty that followed. This bonanza has since subsided, leaving few new applications in the nuclear power market.
- Perhaps the most visible new application will be in plant decommission modeling and engineering.



- To date only one commercial nuclear power plant has been decommissioned in the U.S.
- Industry experience has shown that plant life cycles are shorter than the 40 years originally projected; the late 1980s will see an increase in the number of decommissioned plants.
- With utilities reluctant to add capacity in cases of peak load shortfall, purchases from neighboring utilities (even countries) have increased. This wheeling operation increases demand for grid management and analysis applications.
- Load management - balancing power output from several internal and external sources - is a mature application and not likely to experience a resurgence in the near future.
- Plant conversion engineering and analysis is increasing as fossil fuels of choice replace other disfavored fossil fuels or uranium as the source of power generation.
- Internal utility computing is notoriously commercial in nature, dealing with billing, payroll, financial reporting, and similar applications.
- Emerging applications include new billing and payment systems, such as pay-by-phone and radio frequency emitting meters.
- Many utilities mention the need for applications to deal with regulatory authorities.
- Conservation management at the customer level will assume increasing importance to utilities faced with the build/buy/conserves decision.

c. Competitive Analysis

- Control Data is a dominant supplier of information services to this market.
  - CDC offers engineering processing services, software products, and professional services.
  - CDC has plans to offer an integrated system to utilities, aimed at the engineering staff.
- Other leading vendors of processing services and software products to the engineering function include University Computing Company, Boeing Computer Services, McAuto, and Babcock and Wilcox.
- In professional services, CDC is followed by Boeing, Babcock and Wilcox, and General Electric.
- Industry research organizations, such as the Electric Power Research Institute (EPRI), provide cooperatively developed software and services to industry participants at reduced rates.
- Recently, software packages for power plan applications have appeared in the U.S. marketplace from foreign countries, notably Sweden and France.
- IBM strongly dominates the commercial side of hardware and services, with most utilities locked into Big Blue.

d. Recommendations

- The power generation marketplace will be a very tough one for new vendors to crack.

- Essential is a deep commitment to this market because of the very technical nature of most of its applications.
  - Processing services need to be complemented by professional services staffs serving on-site in many instances, co-developing applications with the customer utility.
  - On site service is all the more essential to compete against large engineering and construction firms already serving this marketplace as a specialty in both construction and processing (e.g., Babcock & Wilcox).
- Vendors serving applications that are declining or dormant (such as nuclear plant construction) should look for opportunities to regroup resources to address related applications (e.g., decommissioning or plant conversions).
- New engineering-related applications should be examined closely. Several utilities have begun developing computerized data bases of their power grids, down to the level of individual buildings.
  - This application holds potential for vendors of computer-aided mapping services.
  - The data bases need to be accessible to dynamic load modeling applications.
  - Ultimately, data bases should be accessible from a field repair or installation crew.
- Utilities will become prime marketers of conservation and conservation-related equipment and services.

- INPUT foresees a healthy market for commercial, industrial, and household conservation analysis applications.
- This is a good market for application software and PC sales.
- Potential exists on the commercial side of electrical and gas utilities.
  - Many utilities report having hardware in place from the 1960s. As these installations are updated, new software will be needed for such applications as customer billing, financial analysis, and regulatory reporting.
  - Because many larger utilities believe their needs to be unique, this should also be a good market for professional services.
- The 3,000-plus local electric, gas, and sewage utilities in the U.S. are a good market for packaged products for engineering, operations, and commercial applications.

### 3. TELECOMMUNICATIONS

- All other telecommunications issues are diminished by comparison to the breakup of AT&T. This is likely to remain so for some time as the breakup actually occurs, as Congress decides whether it wants a regulated communications industry or not, and as a new industry structure emerges.
- It was originally believed that the divestiture by AT&T of its 22 Bell Operating Companies (BOCs) would reduce government interference into communications networks. Though this may come to pass in the long run, it will definitely not be so for several years.
- The FCC appears to have believed that it was possible to deregulate enhanced communications services, while keeping basic telephone services essentially

regulated. The settlement of the antitrust suit mandated deregulation of long-distance communications as well.

- In a free market, the historic cross-subsidization of local service by long distance would no longer exist, adding a \$10+ billion dollar burden to local phone rates. Local phone rates would increase 100-300%, depending on local density and other factors.
- This is not politically feasible, given the disproportionate representation of rural districts in the U.S. Senate, and the adverse impact on millions of disadvantaged people.
- Consequently, access changes will be shifted to business, especially for the intrastate toll network. States have taken the lead in this direction and Congress has followed.
- The result will be a communications structure that is at least as skewed as before the AT&T divestiture. Now, however, instead of long lines subsidizing local calls, business will be subsidizing consumer calls. Once established in principle, this will be difficult to change.
- Several consequences can be expected to flow from the new telecommunications environment.
  - Cost-based rate selling for AT&T's long-distance service will narrow the margin between WATS and direct-dial service.
  - Leased lines will come down in price, making resale less attractive. The rationale for the 200-odd resellers that have sprung up under this role differential umbrella will be jeopardized.
  - AT&T's competitors, such as GTE, MCI, and Northern Telecom, will be weakened.

- Companies will have strong incentives to abandon the public network wherever possible in favor of private networks.
- Though such networks will almost certainly be taxed so as to not leave public network users with ever-mounting system costs, the trend will accelerate nonetheless.
  - Declining service quality, spawned of low productivity and low investment due to a politically uncertain competitive environment, will increase the incentive to go private.
  - This tendency will be especially pronounced in areas of highest density. New York Telephone reportedly earns one-half of its revenue from one percent of its customers, all based in Manhattan.
- The seven new regional operating companies will be under intense pressure to price as close to cost as possible to minimize bypass incentive.
- Many new types of services will appear, as much a response to deregulation as to emerging or pent-up technology. They include:
  - Cellular radio, already in commercial operation in Chicago. Direct hookups to long distance should follow.
  - Local digital transmission.
  - Two-way cable TV.
  - Voice compression.

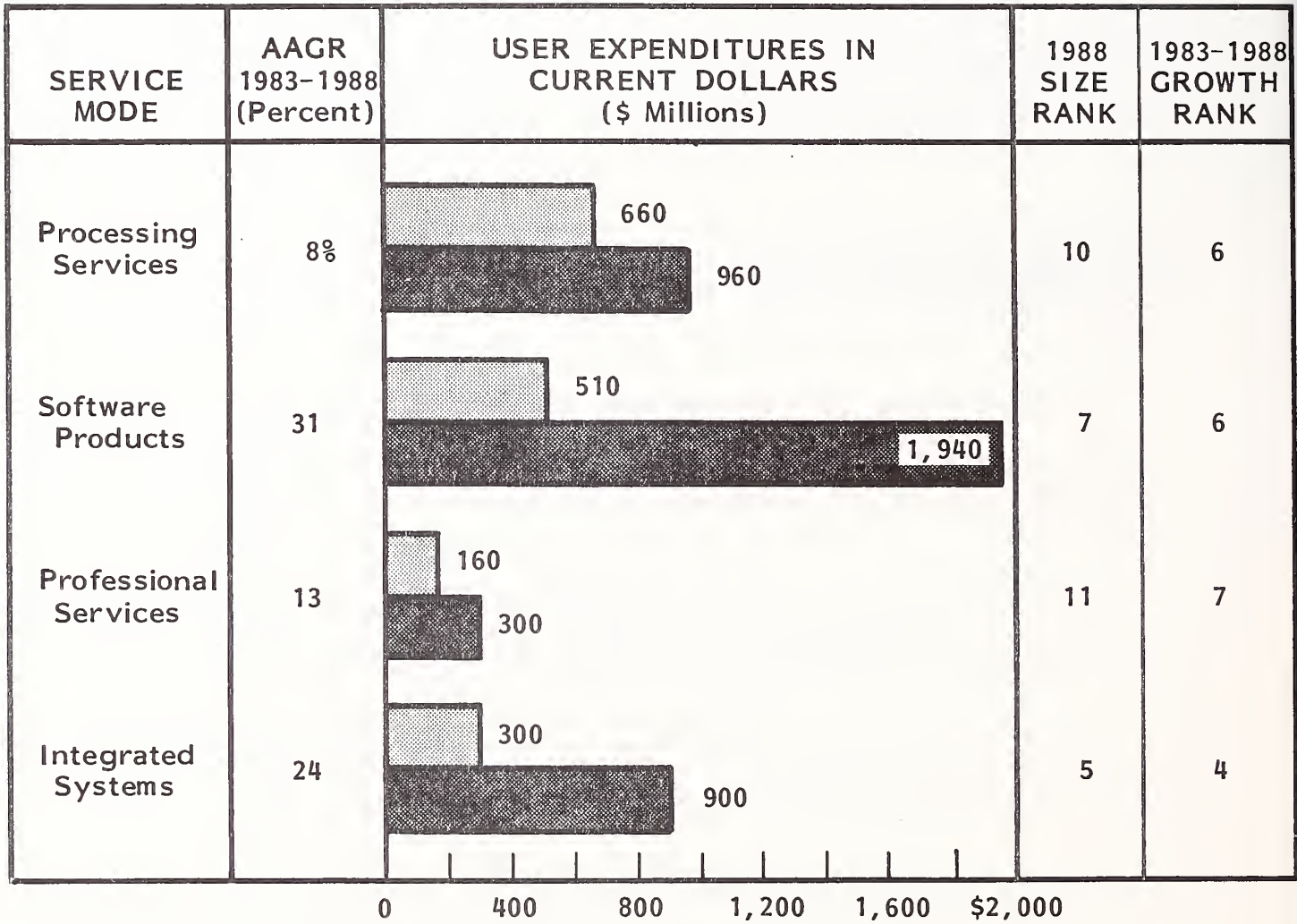
- Fiber optic trunks.
- Inexpensive satellite receiving technology.
- Office automation vendors may attempt forward integration into communications.
  - Recent moves by IBM, Wang, Tandem, and Mitel are indicative of this trend. Wang's recent abortive takeover attempt of Tymshare can be interpreted in this light.

#### L. WHOLESALE DISTRIBUTION

- Total information services for the wholesale distribution sector will grow from \$1.6 billion in 1983 to \$4.1 billion by 1988 at an average compounded growth rate of 20%, as shown in Exhibit IV-46.
- All industry-specific information services for this sector will grow from \$610 million in 1983 to \$1.8 billion by 1988, as shown in Exhibit IV-47.
- Industry-specific batch processing for this sector will decline at an average compound rate of 3% per year over the next five years.
- Industry-specific application software for this sector will expand from \$210 million in 1983 and at an average compounded rate of 35% to \$930 million by 1988. The wholesale distribution sector ranks fifth in 1988 size and sixth in growth rate for industry-specific application software.
- The industry-specific integrated systems market in this sector ranks fourth in growth at a compounded annual growth rate of 24%.

EXHIBIT IV-46

TOTAL INFORMATION SERVICES FORECAST  
WHOLESALE DISTRIBUTION SECTOR, 1983-1988

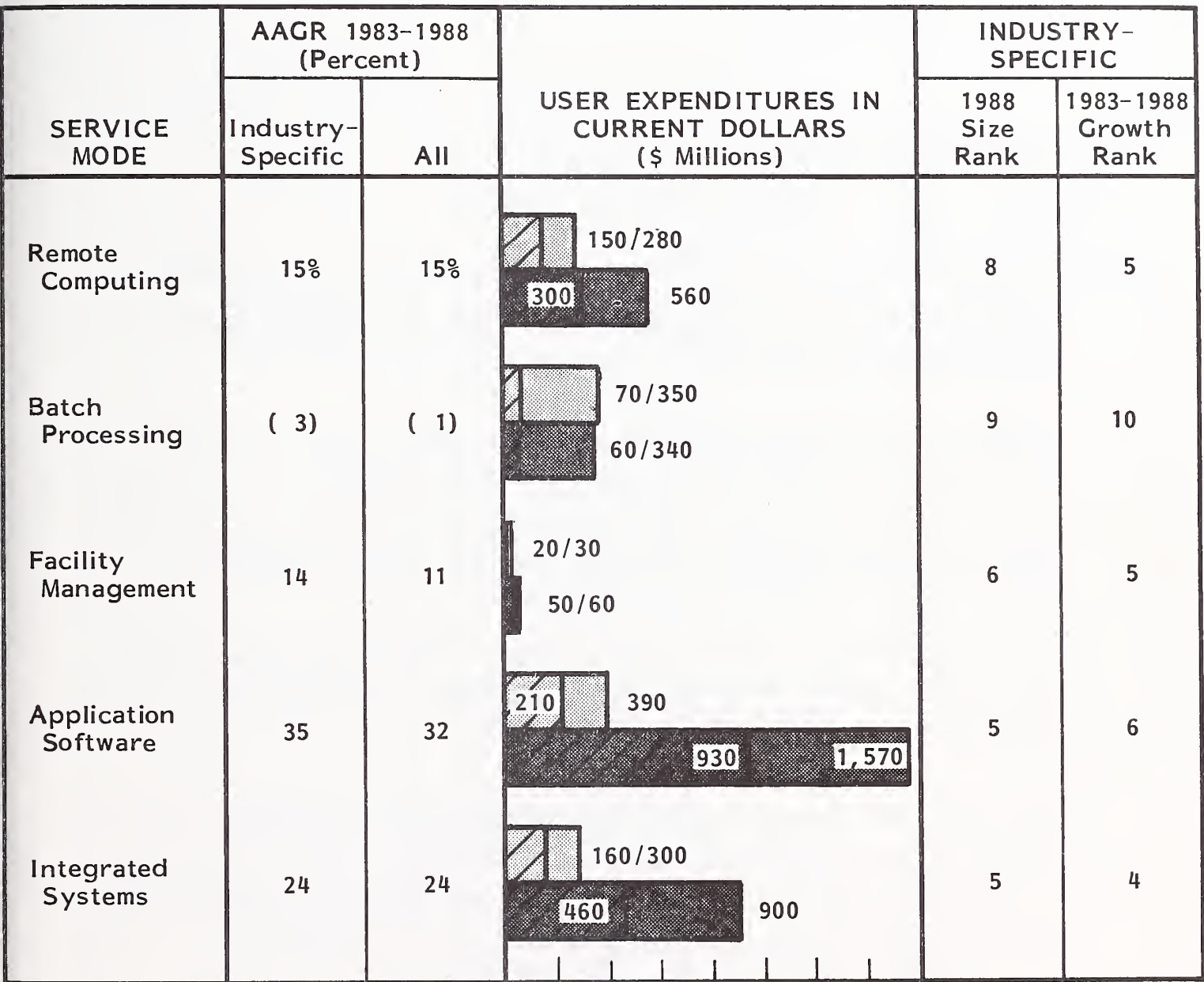


Total Information Services		1983-1988 AAGR
1983	\$1,630	20%
1988	\$4,100	

(\$ Millions)



EXHIBIT IV-47  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 WHOLESALE DISTRIBUTION SECTOR, 1983-1988



(\$ Millions)  
 All Industry-Specific Total Exhibit\*

1983		\$ 610	\$1,350
1988		\$1,800	\$3,430

Industry-Specific Portion

\* May not total exactly due to rounding.

- At this rate, the market for industry-specific integrated systems will reach \$460 million by 1988, up from \$160 million in 1983, making it the fifth largest market in this category among all other industries.
- The many categories of this wholesale industry and some of its demographics are shown in Exhibit IV-48.

#### M. SERVICES AND "OTHER"

- Both the services and the "other" sector of the economy are composed of a variety of disparate types of business. They range from lawyers and accountants to construction, real estate, and museums.
- As a group, the industries are characterized by a large number of very small firms - frequently one- and two-people operations - and a very few very large firms, as in engineering services and accounting. Details are shown in Exhibits IV-49 and IV-50. Industry demographics are shown in Exhibit IV-51.
- In the services sector, the market as a whole stands at \$1.84 billion in 1983. It is expected to grow at 20% per year through 1988, reaching \$4.62 billion, as shown in Exhibit IV-49.
- This market is undistinguished for its growth prospects, save those in integrated systems, where it is forecast to be the leader. Thirty percent compound average annual growth should propel this market from a \$390 million level in 1983 to a \$1.46 billion level in 1988.
- Farms (in the "other" category) are the forgotten stepchildren of standard industrial classification schemes. Data for the "other" category is shown in Exhibits IV-52 and IV-53. Still, as a whole, the "other" category constitutes a sizable market for information services, \$1.3 billion in 1983, as shown in Exhibit IV-52.

## EXHIBIT IV-48

WHOLESALE INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
50-51	Wholesale Trade	Total Sales (1982) Number of Establishments (1982) Number of Employees (1982)	\$1,163.0 Billion 307,264 5.3 Million
501	Motor Vehicles & Automotive Equipment	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 81.6 Billion 37,517 407,000
502	Furniture	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 15.6 Billion 10,788 112,000
503	Lumber and Construction	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 33.2 Billion 16,407 179,000
504	Sporting Goods and Toys	Total Sales Number of Establishments (1980) Number of Employees (1982)	- \$ 6,126 72,000
505	Metals and Minerals	Total Sales (1977) Number of Establishments (1980) Number of Employees (1982)	\$ 29.0 Billion 9,339 139,000
506	Electrical Goods	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 46.4 Billion 25,635 430,000
507	Hardware, Plumbing and Heating	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 27.6 Billion 19,023 236,000
508	Machinery and Equipment	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$129.0 Billion 87,630 1.3 Million

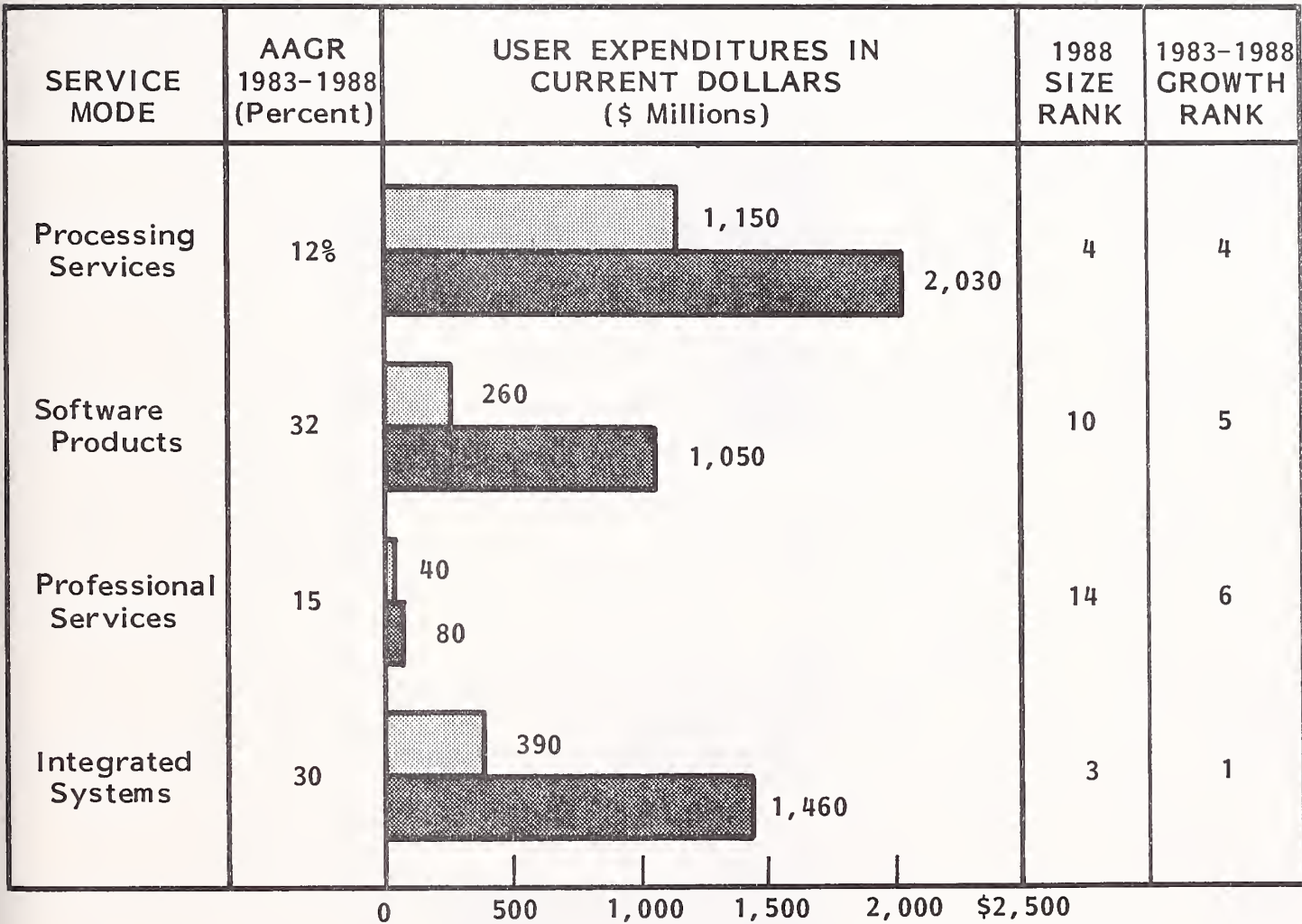
Continued

EXHIBIT IV-48 (Cont.)  
WHOLESALE INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
509	Miscellaneous Durables	Total Sales Number of Establishments (1980) Number of Employees (1982)	\$ 17,409 176,000
511	Paper and Paper Products	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 21.6 Billion 11,846 158,000
512	Drugs and Sundries	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 13.0 Billion 3,388 155,000
513	Apparel Piece Goods and Notions	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$ 25.8 Billion 12,495 170,000
514	Groceries & Related Products	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$149.9 Billion 35,636 687,000
515	Farm Products	Total Sales (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 84.2 Billion 13,675 138,000
516	Chemicals and Allied Products	Total Sales Number of Establishments (1980) Number of Employees (1982)	- \$ 8,607 134,000
517	Petroleum and Petroleum Products	Total Sales (1980) Number of Establishments (1980) Number of Employees (1982)	\$158.2 Billion 18,552 227,000

EXHIBIT IV-49

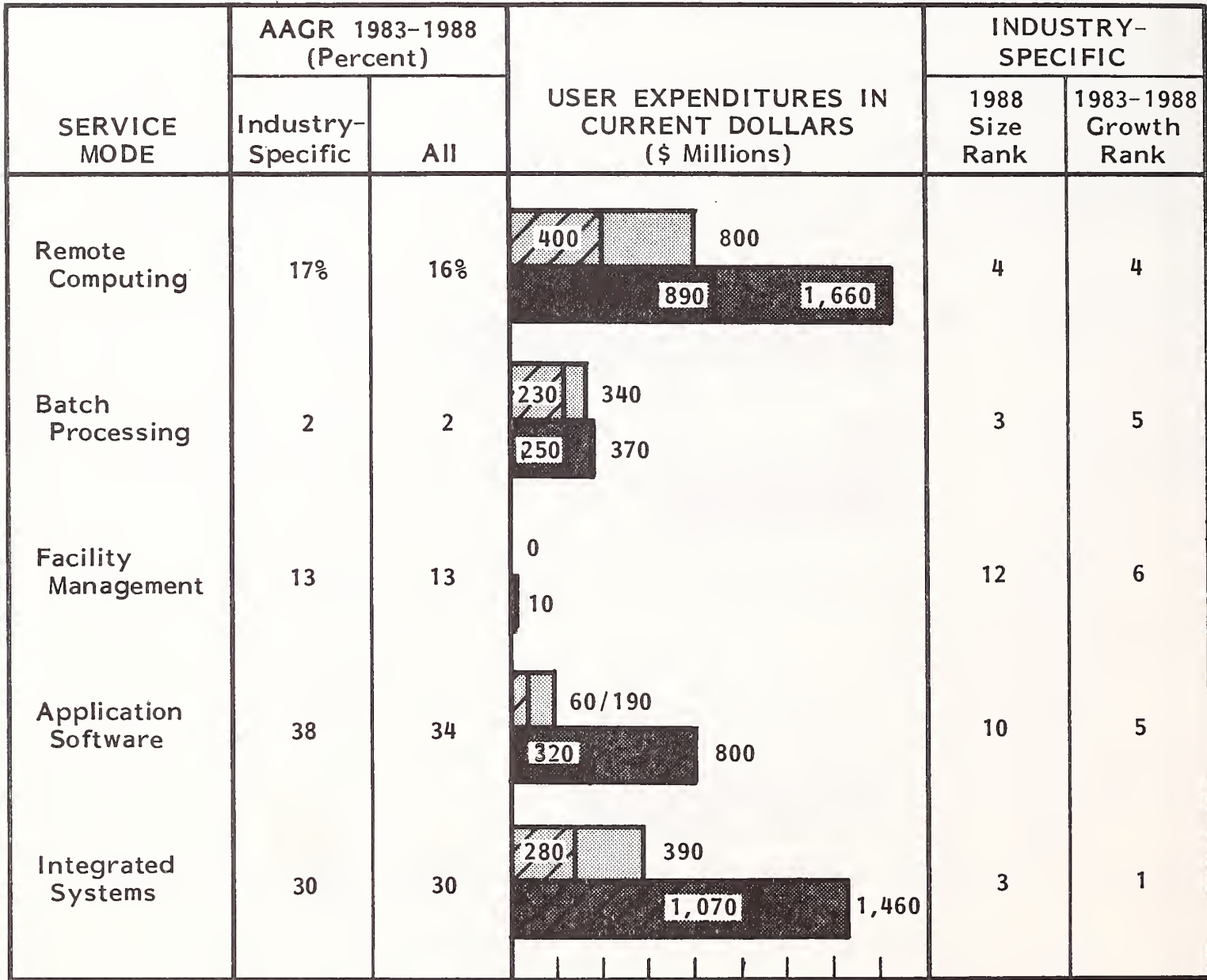
TOTAL INFORMATION SERVICES FORECAST  
SERVICES SECTOR, 1983-1988



Total Information Services		1983-1988 AAGR
1983	\$1,840	
1988	\$4,620	20%

(\$ Millions)

**EXHIBIT IV-50**  
**INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST**  
**SERVICES SECTOR, 1983-1988**



(\$ Millions) 0 400 800 1,000 \$1,400

(\$ Millions)  
 All Industry-Specific Total Exhibit\*

1983		\$ 970	\$1,720
1988		\$2,540	\$4,300

Industry-Specific Portion

\* May not total exactly due to rounding.

EXHIBIT IV-51

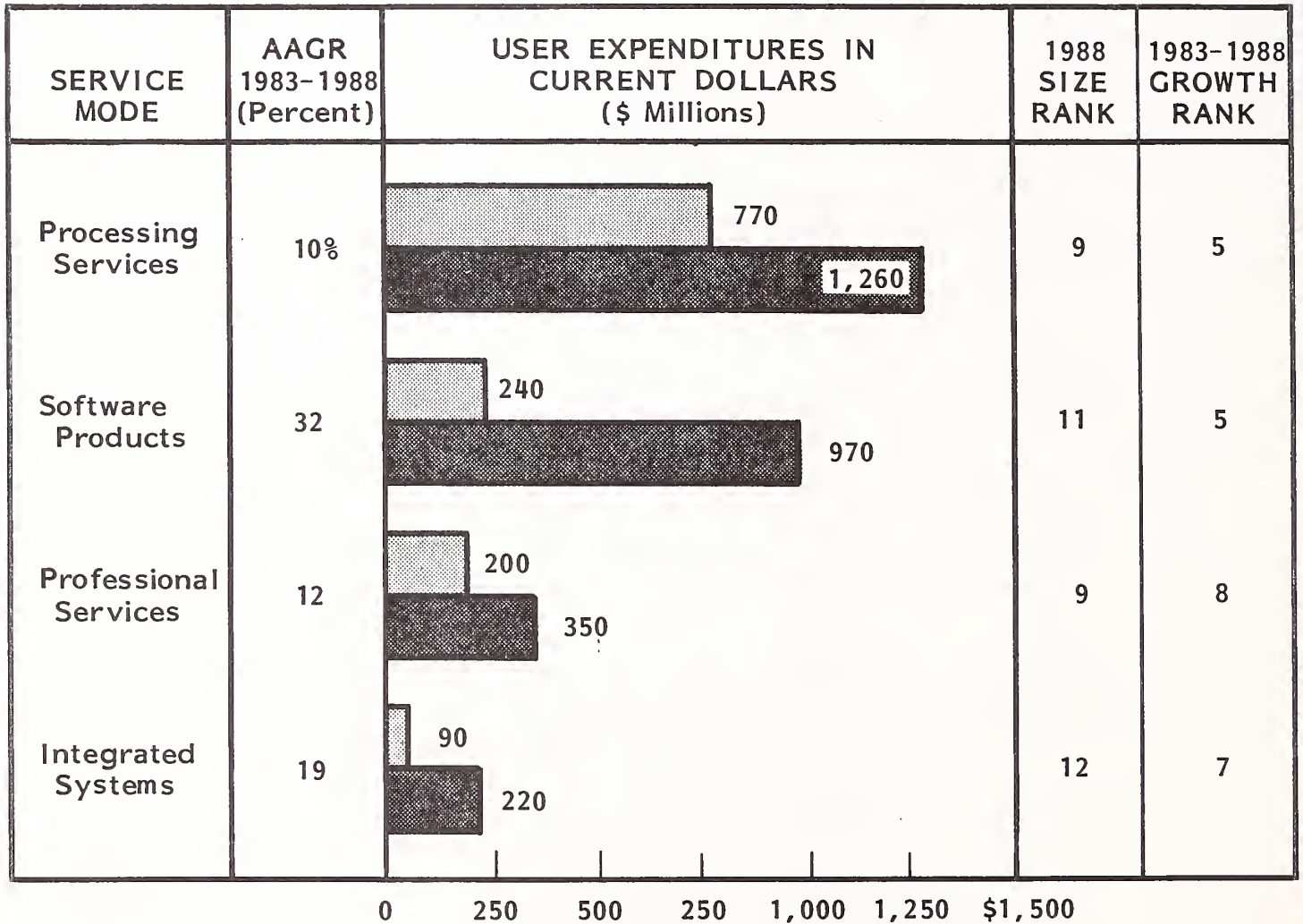
SERVICES INDUSTRY SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
73, 81, 89	Services	Number of Establishments (1980) Number of Employees (1982)	- \$344,321 4.8 Million
73	Business Services	Receipts (1980) Number of Establishments (1980) Number of Employees (1982)	\$111.0 Billion 161,446 3.3 Million
81	Legal Services	Receipts (1977) Number of Establishments (1980) Number of Employees (1982)	\$ 18.7 Billion 97,335 582,000
891	Engineering and Architectural Services	Receipts (1982) Number of Establishments (1982) Number of Employees (1982)	\$ 31.0 Billion 75,583 583,000
892	Non-Commercial Research Organizations	Receipts (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 81.7 Million 2,023 74,000
893	Accounting, Auditing & Bookkeeping	Receipts (1977) Number of Establishments (1980) Number of Employees (1982)	\$ 8.0 Billion 40,774 347,000
899	Services (N.E.C.)*	Receipts (1977) Number of Establishments (1980) Number of Employees (1980)	\$439.2 Million 5,265 26,000

\* Not elsewhere classified

EXHIBIT IV-52

TOTAL INFORMATION SERVICES FORECAST  
"OTHER" SECTOR, 1983-1988

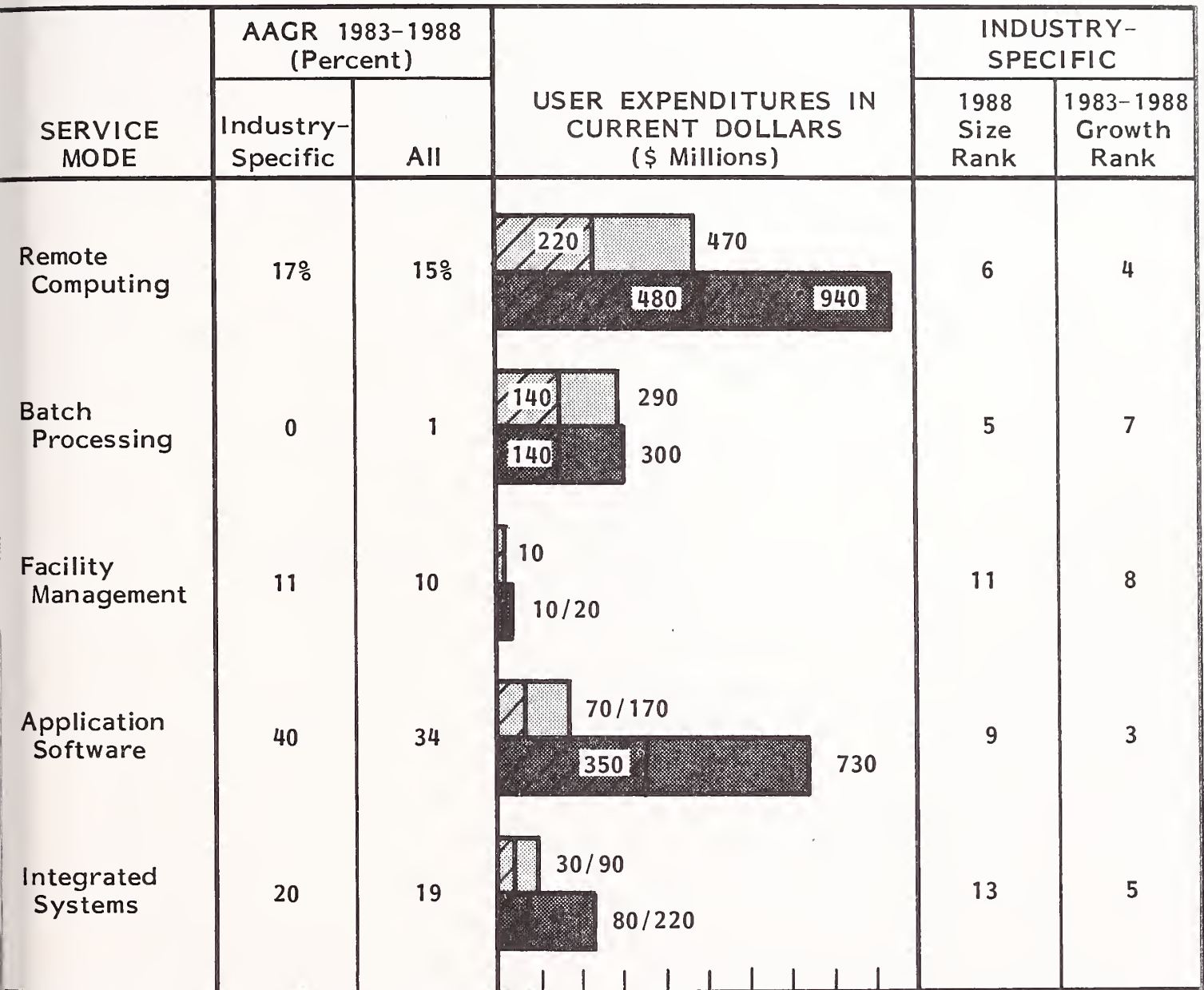


Total Information Services		1983	1988	1983-1988 AAGR
		\$1,300	\$2,800	17%

(\$ Millions)



EXHIBIT IV-53  
 INDUSTRY-SPECIFIC INFORMATION SERVICES FORECAST  
 "OTHER" SECTOR, 1983-1988



0    200    400    600    800    \$1,000

(\$ Millions)  
 All Industry-Specific Total Exhibit\*

1983		\$ 470	\$1,030
1988		\$1,060	\$2,210

Industry-Specific Portion

\* May not total exactly due to rounding.

- The 17% annual growth through 1988 is expected to produce a market demanding \$2.8 billion in services. Of that total, 49% - \$1.36 billion - will be for industry-specific services, as shown in Exhibit IV-53.
- Demographics can be found in Exhibit IV-54.

EXHIBIT IV-54

"OTHER" INDUSTRIES SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
01-09	Agriculture, Forestry, Fishing	Sales (1978) Number of Establishments (1979) Number of Employees (1979)	\$136.7 Billion 45,880 282,689
15-17	Construction	Sales (1977) Number of Establishments (1980) Number of Employees (1982)	\$223.2 Billion 417,953 4.1 Million
65	Real Estate	Sales (1979) Number of Establishments (1980) Number of Employees (1980)	\$119.8 Billion 169,952 1.0 Million
66	Real Estate, Insurance	Sales (1979) Number of Establishments (1980) Number of Employees (1980)	\$341.0 Million 6,426 18,000
70	Hotels, Etc.	Receipts (1982) Number of Establishments (1980) Number of Employees (1980)	\$ 29.0 Billion 41,418 1.2 Million
72	Personal Services	Receipts (1981) Number of Establishments (1980) Number of Employees (1980)	\$ 25.0 Billion 152,322 99,514
75	Auto Repair	Receipts (1981) Number of Establishments (1980) Number of Employees (1980)	\$ 34.0 Billion 99,514 583,000
76	Miscellaneous Repair	Receipts (1981) Number of Establishments (1980) Number of Employees (1980)	\$ 19.0 Billion 48,021 283,000

Continued

EXHIBIT IV-54 (Cont.)

"OTHER" INDUSTRIES SECTOR -  
DEMOGRAPHIC DATA

STANDARD INDUSTRIAL CLASSIFICATION	INDUSTRY NAME	TYPE OF STATISTIC	DATA
78-79	Motion Pictures and Recreation	Receipts (1981) Number of Establishments (1980) Number of Employees (1980)	\$ 32.0 Billion 60,440 1.2 Million
83	Social Services	Receipts (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 10.3 Billion 60,561 1.2 Million
84	Museums, Etc.	Expenses (1977) Number of Establishments (1980) Number of Employees (1980)	\$613.1 Million 1,496 28,231
86	Membership Organizations	Expenses (1977) Number of Establishments (1980) Number of Employees (1980)	\$ 12.1 Billion 130,668 1.5 Million
99	Non-Classifiable	Number of Establishments (1980) Number of Employees (1980)	\$255,411 559,000

## APPENDIX A: DEFINITIONS



## APPENDIX A: DEFINITIONS

- INFORMATION SERVICES - The provision of:
  - Data processing functions using vendor computers (processing services).
  - The provision of data base access where computers perform an essential role in the processing or conveyance of data.
  - Services that assist users to perform functions on their own computers (software products and/or professional services).
  - A combination of hardware and software, integrated into a total system (integrated systems).

### A. REVENUE

- All revenue and user expenditures reported are available (i.e., noncaptive) revenue, as defined below.
- NONCAPTIVE INFORMATION SERVICES REVENUE - Revenue received for information services provided within the U.S. from users who are not part of the same parent corporation as the vendor.

- CAPTIVE INFORMATION SERVICES REVENUE - Revenue received from users who are part of the same parent corporation as the vendors.
- OTHER REVENUE - Revenue derived from lines of business other than those defined above.

## B. SERVICE MODES

- PROCESSING SERVICES - Remote computing services, batch services, and processing facilities management.
  - REMOTE COMPUTING SERVICES (RCS) - Provision of data processing to a user by means of terminals at the user's site(s) connected by a data communications network to the vendor's central computer. There are five submodes of RCS:
    - INTERACTIVE (timesharing) - Characterized by the interaction of the user with the system, primarily for problem-solving timesharing but also for data entry and transaction processing: the user is on-line to the program/files.
    - REMOTE BATCH - Where the user hands over control of a job to the vendor's computer, which schedules job execution according to priorities and resource requirements.
    - 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) - These offerings provided by RCS vendors place programmable hardware on the user's site (rather than in the EDP center). USHS offers:



- Access to a communications network.
  - Access through the network to the RCS vendor's larger computers.
  - Significant software as part of the service.
- BATCH SERVICES - This includes data 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 key-punching 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.
- Processing services are further differentiated as follows:
    - Function-specific services are the processing of applications that are targeted to specific user departments (e.g., finance, personnel, sales) but cut across industry lines. Most general ledger, accounts receivable, payroll, and personnel applications fall into this category. Function-specific data base services where 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.

- Industry-specific services provide processing for particular functions or problems unique to an industry or industry group. The software is provided by the vendor either as a complete package or as an applications "tool" that the user employs to produce a unique solution. Specialty applications can be either business or scientific in orientation. Industry-specific data base services, where 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 where the vendor provides access to a computer and/or communications network with basic software that enables users to develop their own problem solutions or processing systems. These basic tools 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 systems packages for use on in-house computer systems. Included are lease and purchase expenditures, as well as fees for work performed by the vendor to implement and maintain the package at the users' sites. Fees for work performed by organizations other than the package vendor are counted in professional services. There are several subcategories of software products.

- APPLICATIONS PRODUCTS - Software that performs processing to service user functions. They consist of:
  - 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 and airline scheduling.
  
- SYSTEMS PRODUCTS - Software that enables the computer/communications system to perform basic functions. They consist of:
  - SYSTEMS CONTROL PRODUCTS - Function during applications program execution to manage the computer system resource. Examples include operating systems, communication monitors, emulators, and spoolers.
  - DATA CENTER MANAGEMENT PRODUCTS - 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 - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

- PROFESSIONAL SERVICES - Made up of services in the following categories:
  - EDUCATION SERVICES - EDP products and/or services - related to corporations, not individuals.
  - CONSULTING SERVICES - EDP management consulting and feasibility studies, for example.
  - SOFTWARE DEVELOPMENT - Including system design, contract programming, and "body shopping."
  - PROFESSIONAL SERVICES FACILITIES MANAGEMENT (PSFM) - The counterpart to processing facilities management, except that in this case the computers are owned by the client, not the vendor; the vendor provides people to operate and manage the client facility.
  
- INTEGRATED SYSTEMS (Also known as Turnkey Systems) - 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 integrated systems. This does not include specialized hardware systems such as word processors, cash registers, and process control systems.
  
- Integrated systems revenue in this report is divided into two categories.
  - INDUSTRY-SPECIFIC systems, i.e., systems that serve a specific function for a given industry sector such as seismic processing systems, automobile dealer parts inventory, CAD/CAM systems, discrete manufacturing control systems, etc.
  - CROSS-INDUSTRY systems, i.e., systems that provide a specific function that is applicable to a wide range of industry sectors such as financial planning systems, payroll systems, personnel management systems, etc.

- Revenue includes hardware, software, and support functions.

### C. OTHER CONSIDERATIONS

- When questions arise about the proper place to count certain user expenditures, INPUT addresses them from the user viewpoint. Expenditures are then categorized according to the answer to what the 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, Transportation, etc.
- The specific industries (and their SIC codes) included under these generic industry sectors are detailed in Exhibit A.

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
	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
Utilities	47	Transportation Services
	48	Communications
Banking and Finance	49	Electric, Gas, and Sanitary
	60	Banks
	61	Credit Agencies
	62	Security and Commodity Brokers
Insurance	63	Holding and Investment Offices
	64	Insurance (Life, Health, Etc.)
Medical	67	Insurance Agents
	80	Health Services

Continued

EXHIBIT A-1 (Cont.)

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
Education	82	Educational Services
Retail	52	Building Materials, Hardware
	53	General Merchandise
	54	Food
	55	Automotive and Gas Stations
	56	Apparel
	57	Furniture
	58	Eating and Drinking
Wholesale	59	Miscellaneous Retail
	50	Durable Goods
	51	Nondurable Goods
State and Local Government	91-97	As Appropriate
Federal Government	91-97	As Appropriate
Services	73	Business Services (excluding information services companies themselves)

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
	83	Social Services
	84	Museums, Art Galleries, Botanical and Zoological Gardens
	86	Membership Organizations
89	Miscellaneous Services	



**APPENDIX B: DATA BASE**



## APPENDIX B: DATA BASE

- This section contains the data base used in this report. In addition to the 1982 base year data, data are given for all of the intervening years from 1983 to 1988.
- None of the individual numbers have been rounded, as they have been in the main body of the report (but the reader should not assume a higher degree of accuracy for these data than for those in the main body of the report). Totals, however, have been rounded so that:
  - Certain items will not total due to the rounding.
  - The exhibits will not necessarily cross-foot and total exactly because the tabulations were rounded along different axes.
- Exhibits B-1 through B-29 present the market data by industry sector.
- Exhibits B-30 through B-44 present the market data by delivery mode.

EXHIBIT B - 1

TOTAL INFORMATION SERVICES - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	4277	22	5225	6474	8080	10110	12641	15775	25
PROCESS MANUFACTURING	2660	18	3132	3746	4532	5547	6800	8390	22
TRANSPORTATION	693	22	843	1052	1325	1685	2151	2756	27
UTILITIES	964	17	1123	1338	1604	1918	2272	2679	19
BANKING	4335	21	5240	6425	7864	9613	11765	14422	22
INSURANCE	1831	20	2200	2675	3253	3921	4702	5597	21
MEDICAL	1296	24	1609	2020	2550	3202	3960	4875	25
EDUCATION	431	11	477	534	603	686	779	883	13
RETAIL DISTRIBUTION	1448	18	1709	2043	2463	2978	3591	4344	21
WHOLESALE DISTRIBUTION	1359	20	1627	1962	2355	2832	3394	4086	20
FEDERAL GOVERNMENT	2984	19	3543	4221	5028	6000	7240	8633	20
STATE/LOCAL GOVERNMENT	1542	12	1723	1927	2165	2436	2756	3117	13
SERVICES	1558	18	1843	2209	2653	3199	3844	4623	20
OTHER	1138	14	1302	1505	1741	2032	2382	2800	17
<b>TOTAL</b>	<b>26516</b>	<b>19</b>	<b>31595</b>	<b>38130</b>	<b>46216</b>	<b>56162</b>	<b>68275</b>	<b>82970</b>	<b>21</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 2  
TOTAL INDUSTRY SPECIFIC INFORMATION SERVICES MARKETS  
BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	1452	21	1758	2206	2808	3622	4686	6067	28
PROCESS MANUFACTURING	956	13	1078	1259	1499	1809	2184	2660	20
TRANSPORTATION	272	20	326	408	516	660	846	1090	27
UTILITIES	248	15	285	339	407	491	583	691	19
BANKING	2771	19	3305	4027	4898	5975	7303	8940	22
INSURANCE	769	18	904	1101	1353	1653	2015	2442	22
MEDICAL	789	21	957	1189	1489	1861	2301	2841	24
EDUCATION	136	10	150	172	197	230	266	308	15
RETAIL DISTRIBUTION	666	17	780	928	1116	1353	1641	2005	21
WHOLESALE DISTRIBUTION	494	22	603	749	931	1159	1438	1790	24
FEDERAL GOVERNMENT	111	28	142	174	211	251	298	348	20
STATE/LOCAL GOVERNMENT	93	11	103	118	136	159	185	217	16
SERVICES	832	17	977	1175	1422	1728	2091	2530	21
OTHER	407	14	462	538	628	741	883	1061	18
<b>TOTAL</b>	<b>9996</b>	<b>18</b>	<b>11830</b>	<b>14383</b>	<b>17611</b>	<b>21692</b>	<b>26720</b>	<b>32990</b>	<b>23</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 3

## TOTAL PROCESSING - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	1300	11	1449	1616	1806	2037	2314	2658	13
PROCESS MANUFACTURING	1187	12	1326	1483	1670	1886	2124	2399	13
TRANSPORTATION	224	11	249	279	310	349	392	438	12
UTILITIES	442	10	488	550	625	716	808	907	13
BANKING	2595	16	3010	3488	4022	4630	5324	6097	15
INSURANCE	649	13	731	826	930	1047	1178	1317	12
MEDICAL	711	17	830	970	1135	1321	1530	1769	16
EDUCATION	144	4	150	156	163	173	184	195	5
RETAIL DISTRIBUTION	755	13	853	964	1090	1233	1388	1567	13
WHOLESALE DISTRIBUTION	600	10	659	718	771	830	888	955	8
FEDERAL GOVERNMENT	643	14	732	827	941	1059	1201	1364	13
STATE/LOCAL GOVERNMENT	207	6	220	235	252	271	291	313	7
SERVICES	1010	13	1146	1300	1460	1641	1831	2032	12
OTHER	697	10	768	853	936	1033	1141	1262	10
TOTAL	11164	13	12611	14265	16111	18227	20593	23273	13

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.



EXHIBIT B - 4

CROSS INDUSTRY PROCESSING - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	601	11	665	731	808	894	998	1131	11
PROCESS MANUFACTURING	308	18	364	421	490	575	673	791	17
TRANSPORTATION	58	13	65	74	83	94	106	120	13
UTILITIES	173	13	196	221	250	286	322	360	13
BANKING	480	18	568	658	761	867	996	1157	15
INSURANCE	155	14	177	196	216	238	261	284	10
MEDICAL	92	18	108	126	148	175	205	241	17
EDUCATION	49	4	51	53	55	58	62	66	5
RETAIL DISTRIBUTION	208	13	235	268	303	343	385	434	13
WHOLESALE DISTRIBUTION	261	9	285	315	340	368	393	423	8
FEDERAL GOVERNMENT	214	16	249	293	347	404	472	550	17
STATE/LOCAL GOVERNMENT	53	8	57	64	71	78	87	96	11
SERVICES	367	16	424	482	542	609	679	757	12
OTHER	262	12	292	326	360	399	443	493	11
<b>TOTAL</b>	<b>3281</b>	<b>14</b>	<b>3736</b>	<b>4227</b>	<b>4775</b>	<b>5388</b>	<b>6085</b>	<b>6904</b>	<b>13</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 5

## INDUSTRY SPECIFIC PROCESSING - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	522	14	595	684	782	911	1062	1250	16
PROCESS MANUFACTURING	601	10	662	739	833	936	1046	1172	12
TRANSPORTATION	129	11	143	163	184	209	238	269	13
UTILITIES	135	11	150	175	207	247	289	336	18
BANKING	2015	16	2337	2713	3132	3624	4179	4782	15
INSURANCE	459	12	516	588	671	764	869	984	14
MEDICAL	595	17	696	816	956	1113	1289	1489	16
EDUCATION	57	4	59	64	68	74	81	88	8
RETAIL DISTRIBUTION	474	14	538	611	695	793	901	1024	14
WHOLESALE DISTRIBUTION	216	12	241	269	297	331	366	407	11
FEDERAL GOVERNMENT	50	12	56	65	76	89	104	121	17
STATE/LOCAL GOVERNMENT	48	5	51	55	60	66	72	79	9
SERVICES	558	13	629	716	809	914	1025	1141	13
OTHER	332	10	366	409	453	505	564	631	12
TOTAL	6191	14	7040	8067	9223	10574	12084	13773	14

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 6

UTILITY PROCESSING - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	177	7	189	202	216	233	253	277	8
PROCESS MANUFACTURING	278	8	300	322	346	375	404	436	8
TRANSPORTATION	37	9	40	42	44	46	47	48	4
UTILITIES	134	6	142	154	168	184	198	211	8
BANKING	100	6	106	118	129	139	150	159	8
INSURANCE	35	9	38	41	43	46	48	49	5
MEDICAL	24	7	26	28	31	34	36	39	9
EDUCATION	38	4	40	40	40	41	41	41	1
RETAIL DISTRIBUTION	73	9	80	85	91	97	102	109	6
WHOLESALE DISTRIBUTION	123	7	132	135	133	131	128	125	-1
FEDERAL GOVERNMENT	379	13	427	468	517	566	625	693	10
STATE/LOCAL GOVERNMENT	106	5	112	117	121	127	132	137	4
SERVICES	85	9	92	101	109	118	126	134	8
OTHER	103	7	110	118	123	129	134	138	5
<b>TOTAL</b>	<b>1692</b>	<b>8</b>	<b>1834</b>	<b>1971</b>	<b>2113</b>	<b>2265</b>	<b>2424</b>	<b>2595</b>	<b>7</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 7

## TOTAL REMOTE COMPUTING SERVICES - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	775	17	907	1055	1229	1441	1705	2036	18
PROCESS MANUFACTURING	503	15	578	665	768	898	1051	1233	16
TRANSPORTATION	134	16	155	182	209	243	281	324	16
UTILITIES	351	12	393	452	524	614	706	804	15
BANKING	1184	22	1444	1733	2053	2423	2859	3354	18
INSURANCE	252	15	290	333	380	433	494	558	14
MEDICAL	265	21	321	388	473	577	699	838	21
EDUCATION	65	7	70	74	79	87	95	104	8
RETAIL DISTRIBUTION	506	16	587	687	806	952	1113	1297	17
WHOLESALE DISTRIBUTION	239	15	275	316	363	422	485	558	15
FEDERAL GOVERNMENT	491	12	550	616	699	783	884	999	13
STATE/LOCAL GOVERNMENT	85	11	94	105	116	129	143	158	11
SERVICES	686	17	803	939	1084	1258	1447	1655	16
OTHER	402	16	466	541	617	709	816	938	15
TOTAL	5938	17	6933	8086	9401	10968	12778	14855	16

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 8

CROSS INDUSTRY REMOTE COMPUTING SERVICES - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	297	19	354	414	489	571	679	814	18
PROCESS MANUFACTURING	202	23	249	294	349	419	502	604	19
TRANSPORTATION	37	19	44	52	60	71	83	97	17
UTILITIES	129	16	149	172	199	233	268	306	15
BANKING	273	27	347	423	514	611	732	887	21
INSURANCE	128	16	148	167	186	208	232	257	12
MEDICAL	57	24	71	87	108	134	165	201	23
EDUCATION	30	7	32	34	37	41	45	50	9
RETAIL DISTRIBUTION	120	18	141	166	197	234	276	324	18
WHOLESALE DISTRIBUTION	93	15	107	124	143	167	193	223	16
FEDERAL GOVERNMENT	169	14	192	232	281	335	402	480	20
STATE/LOCAL GOVERNMENT	34	12	38	44	50	58	66	76	15
SERVICES	277	19	329	381	436	501	570	649	15
OTHER	140	20	168	197	227	264	307	356	16
TOTAL	1985	19	2368	2785	3276	3845	4520	5324	18

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 9

## INDUSTRY SPECIFIC REMOTE COMPUTING SERVICES - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	395	17	462	540	627	744	883	1058	18
PROCESS MANUFACTURING	86	15	98	118	143	174	212	259	21
TRANSPORTATION	72	16	84	100	116	137	161	188	17
UTILITIES	119	12	134	159	191	231	274	322	19
BANKING	829	22	1011	1213	1432	1696	2001	2333	18
INSURANCE	103	15	119	141	166	196	230	268	18
MEDICAL	196	21	237	286	348	424	511	612	21
EDUCATION	12	7	13	15	17	20	23	26	15
RETAIL DISTRIBUTION	349	16	405	474	556	657	768	895	17
WHOLESALE DISTRIBUTION	129	15	148	171	196	228	262	301	15
FEDERAL GOVERNMENT	49	12	55	64	75	88	103	120	17
STATE/LOCAL GOVERNMENT	15	11	17	20	23	26	30	35	15
SERVICES	343	17	401	477	560	659	770	890	17
OTHER	189	16	219	259	300	350	409	478	17
<b>TOTAL</b>	<b>2888</b>	<b>18</b>	<b>3405</b>	<b>4037</b>	<b>4751</b>	<b>5628</b>	<b>6638</b>	<b>7785</b>	<b>18</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 10

UTILITY REMOTE COMPUTING SERVICES - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	83	9	91	101	113	127	143	163	12
PROCESS MANUFACTURING	215	8	231	253	276	305	336	370	10
TRANSPORTATION	25	12	28	31	33	35	37	39	7
UTILITIES	103	7	110	121	134	150	164	177	10
BANKING	82	6	87	97	107	116	126	134	9
INSURANCE	21	10	23	25	27	29	32	33	8
MEDICAL	12	7	13	15	17	20	22	25	14
EDUCATION	23	7	24	25	25	26	27	28	3
RETAIL DISTRIBUTION	37	11	41	47	53	61	69	78	14
WHOLESALE DISTRIBUTION	17	15	19	21	24	27	30	33	12
FEDERAL GOVERNMENT	273	11	302	320	342	360	380	400	6
STATE/LOCAL GOVERNMENT	36	10	40	41	43	45	46	47	4
SERVICES	66	9	72	81	89	98	107	116	10
OTHER	73	9	79	85	90	95	99	103	5
<b>TOTAL</b>	<b>1065</b>	<b>9</b>	<b>1161</b>	<b>1264</b>	<b>1374</b>	<b>1494</b>	<b>1620</b>	<b>1747</b>	<b>9</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 11

## TOTAL BATCH PROCESSING - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	475	2	485	494	499	504	499	494	0
PROCESS MANUFACTURING	649	9	707	771	848	925	998	1078	9
TRANSPORTATION	65	2	66	68	68	69	69	69	1
UTILITIES	80	4	83	86	87	88	87	87	1
BANKING	899	7	962	1029	1091	1146	1191	1227	5
INSURANCE	142	6	151	158	163	164	163	160	1
MEDICAL	230	7	246	258	264	266	264	261	1
EDUCATION	64	0	64	64	63	62	60	58	-2
RETAIL DISTRIBUTION	238	7	255	265	270	267	259	254	0
WHOLESALE DISTRIBUTION	330	6	350	364	364	360	349	339	-1
FEDERAL GOVERNMENT	64	3	66	69	71	73	75	75	3
STATE/LOCAL GOVERNMENT	96	2	98	101	103	105	106	107	2
SERVICES	321	6	340	357	372	379	379	371	2
OTHER	284	2	290	298	304	307	307	304	1
TOTAL	3937	6	4162	4382	4568	4717	4808	4884	3

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.



EXHIBIT B - 12

CROSS INDUSTRY BATCH PROCESSING - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	299	2	305	310	312	315	310	306	0
PROCESS MANUFACTURING	104	9	113	125	139	153	168	183	10
TRANSPORTATION	21	2	21	22	22	22	22	22	1
UTILITIES	42	4	44	47	49	50	51	52	3
BANKING	207	7	221	235	247	257	264	270	4
INSURANCE	27	6	29	29	30	29	28	27	-1
MEDICAL	35	7	37	39	40	40	40	39	1
EDUCATION	19	0	19	19	18	18	17	16	-4
RETAIL DISTRIBUTION	88	7	94	101	106	109	108	109	3
WHOLESALE DISTRIBUTION	162	6	171	184	190	194	194	193	2
FEDERAL GOVERNMENT	12	3	12	13	15	16	17	18	9
STATE/LOCAL GOVERNMENT	19	2	20	20	20	20	20	20	1
SERVICES	90	6	95	101	106	108	109	108	2
OTHER	122	2	125	129	133	136	137	137	2
<b>TOTAL</b>	<b>1246</b>	<b>5</b>	<b>1307</b>	<b>1374</b>	<b>1426</b>	<b>1467</b>	<b>1486</b>	<b>1501</b>	<b>3</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 13

## INDUSTRY SPECIFIC BATCH PROCESSING - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88
	1982 (\$M)	GROWTH (%)							AAGR (%)
DISCRETE MANUFACTURING	100	2	102	108	113	118	121	124	4
PROCESS MANUFACTURING	487	9	531	583	646	710	773	841	10
TRANSPORTATION	33	2	33	34	36	37	37	38	3
UTILITIES	14	4	14	14	14	14	13	13	-2
BANKING	674	7	721	774	823	866	903	933	5
INSURANCE	101	6	107	113	117	119	118	116	2
MEDICAL	184	7	197	207	211	213	211	209	1
EDUCATION	29	0	29	30	30	30	30	29	0
RETAIL DISTRIBUTION	114	7	122	126	126	124	118	114	-1
WHOLESALE DISTRIBUTION	66	6	70	71	70	68	64	61	-3
FEDERAL GOVERNMENT	1	3	1	1	1	1	1	1	3
STATE/LOCAL GOVERNMENT	25	2	25	27	28	29	29	30	3
SERVICES	212	6	225	236	245	250	250	245	2
OTHER	136	2	139	142	144	144	143	140	0
<b>TOTAL</b>	<b>2175</b>	<b>6</b>	<b>2316</b>	<b>2465</b>	<b>2603</b>	<b>2721</b>	<b>2811</b>	<b>2894</b>	<b>5</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 14

UTILITY BATCH PROCESSING - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	76	2	78	76	74	72	68	64	-4
PROCESS MANUFACTURING	58	9	64	63	63	61	58	54	-3
TRANSPORTATION	12	2	12	11	11	10	10	9	-6
UTILITIES	24	4	25	25	24	24	23	22	-3
BANKING	18	7	19	21	22	23	24	25	5
INSURANCE	14	6	15	16	16	16	16	16	1
MEDICAL	12	7	12	13	13	13	13	13	1
EDUCATION	15	0	15	15	15	15	14	13	-3
RETAIL DISTRIBUTION	36	7	38	38	37	35	33	31	-4
WHOLESALE DISTRIBUTION	102	6	108	108	104	99	92	85	-5
FEDERAL GOVERNMENT	52	3	53	55	56	57	57	56	1
STATE/LOCAL GOVERNMENT	52	2	53	54	55	56	56	57	1
SERVICES	19	6	20	21	21	20	20	19	-2
OTHER	26	2	26	27	27	28	28	27	1
<b>TOTAL</b>	<b>516</b>	<b>5</b>	<b>539</b>	<b>543</b>	<b>539</b>	<b>529</b>	<b>510</b>	<b>490</b>	<b>-2</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 15

TOTAL FACILITIES MANAGEMENT - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	50	15	58	67	78	92	110	128	17
PROCESS MANUFACTURING	35	15	40	46	54	63	74	87	17
TRANSPORTATION	24	8	26	29	32	36	40	44	11
UTILITIES	10	5	11	11	12	13	14	15	7
BANKING	512	18	604	725	877	1061	1274	1516	20
INSURANCE	255	14	291	334	388	450	522	600	16
MEDICAL	215	22	262	323	397	476	567	669	21
EDUCATION	16	10	18	20	22	25	29	34	14
RETAIL DISTRIBUTION	11	5	12	12	13	14	15	15	5
WHOLESALE DISTRIBUTION	32	10	35	39	45	49	55	60	11
FEDERAL GOVERNMENT	87	32	115	141	170	202	240	288	20
STATE/LOCAL GOVERNMENT	25	6	27	29	32	36	41	46	12
SERVICES	3	6	3	3	4	4	5	6	13
OTHER	11	12	12	14	15	17	18	20	10
<b>TOTAL</b>	<b>1286</b>	<b>18</b>	<b>1513</b>	<b>1793</b>	<b>2138</b>	<b>2539</b>	<b>3003</b>	<b>3529</b>	<b>18</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 16

CROSS INDUSTRY FACILITIES MANAGEMENT - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	5	15	6	6	7	8	9	10	12
PROCESS MANUFACTURING	2	15	2	2	3	3	4	4	17
TRANSPORTATION	0	0	0	0	0	0	0	0	0
UTILITIES	2	5	2	2	2	2	2	2	0
BANKING	0	0	0	0	0	0	0	0	0
INSURANCE	0	0	0	0	0	0	0	0	0
MEDICAL	0	0	0	0	0	0	0	0	0
EDUCATION	0	0	0	0	0	0	0	0	0
RETAIL DISTRIBUTION	0	0	0	0	0	0	0	0	0
WHOLESALE DISTRIBUTION	6	10	7	7	7	8	7	7	0
FEDERAL GOVERNMENT	33	32	44	48	51	52	53	52	4
STATE/LOCAL GOVERNMENT	0	0	0	0	0	0	0	0	0
SERVICES	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>48</b>	<b>26</b>	<b>60</b>	<b>66</b>	<b>70</b>	<b>73</b>	<b>75</b>	<b>75</b>	<b>5</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 17

## INDUSTRY SPECIFIC FACILITIES MANAGEMENT - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	27	15	31	36	42	49	58	68	17
PROCESS MANUFACTURING	28	15	33	37	43	51	60	71	17
TRANSPORTATION	24	8	26	29	32	36	40	44	11
UTILITIES	2	5	2	2	2	2	2	2	-2
BANKING	512	18	604	725	877	1061	1274	1516	20
INSURANCE	255	14	291	334	388	450	522	600	16
MEDICAL	215	22	262	323	397	476	567	669	21
EDUCATION	16	10	18	20	22	25	29	34	14
RETAIL DISTRIBUTION	11	5	12	12	13	14	15	15	6
WHOLESALE DISTRIBUTION	21	10	24	27	32	36	41	46	14
FEDERAL GOVERNMENT	0	0	0	0	0	0	0	0	0
STATE/LOCAL GOVERNMENT	8	6	8	9	10	11	12	14	12
SERVICES	3	6	3	3	4	4	5	6	13
OTHER	7	12	8	9	10	11	12	13	11
TOTAL	1129	17	1320	1565	1871	2227	2637	3097	19

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 18

UTILITY FACILITIES MANAGEMENT - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	18	15	21	24	29	35	42	50	19
PROCESS MANUFACTURING	5	15	6	6	8	9	10	12	17
TRANSPORTATION	0	0	0	0	0	0	0	0	0
UTILITIES	7	5	7	8	9	10	11	12	11
BANKING	0	0	0	0	0	0	0	0	0
INSURANCE	0	0	0	0	0	0	0	0	0
MEDICAL	0	0	0	0	0	0	0	0	0
EDUCATION	0	0	0	0	0	0	0	0	0
RETAIL DISTRIBUTION	0	0	0	0	0	0	0	0	0
WHOLESALE DISTRIBUTION	4	10	5	5	5	6	6	7	8
FEDERAL GOVERNMENT	54	32	71	93	119	149	187	236	27
STATE/LOCAL GOVERNMENT	18	6	19	20	22	25	28	32	12
SERVICES	0	0	0	0	0	0	0	0	0
OTHER	4	12	5	5	6	6	7	7	9
<b>TOTAL</b>	<b>109</b>	<b>21</b>	<b>132</b>	<b>162</b>	<b>197</b>	<b>240</b>	<b>292</b>	<b>356</b>	<b>22</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 19

TOTAL SOFTWARE - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
	1982 (\$M)	GROWTH (%)							
BISCRETE MANUFACTURING	1174	35	1583	2144	2857	3776	4933	6368	32
PROCESS MANUFACTURING	618	29	799	1049	1389	1861	2495	3345	33
TRANSPORTATION	214	42	305	435	613	855	1186	1640	40
UTILITIES	181	31	236	312	406	513	634	775	27
BANKING	855	36	1165	1612	2192	2939	3917	5221	35
INSURANCE	620	27	788	1024	1335	1709	2162	2692	28
MEDICAL	283	48	420	609	867	1199	1587	2074	38
EDUCATION	109	23	134	164	199	239	283	331	20
RETAIL DISTRIBUTION	290	35	391	522	696	923	1216	1590	32
WHOLESALE DISTRIBUTION	376	35	508	678	895	1170	1506	1937	31
FEDERAL GOVERNMENT	480	33	639	846	1102	1419	1784	2173	28
STATE/LOCAL GOVERNMENT	191	22	233	281	331	391	457	534	18
SERVICES	197	33	262	351	464	612	801	1047	32
OTHER	178	35	241	321	427	564	741	970	32
<b>TOTAL</b>	<b>5766</b>	<b>34</b>	<b>7703</b>	<b>10346</b>	<b>13771</b>	<b>18170</b>	<b>23702</b>	<b>30696</b>	<b>32</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.



## EXHIBIT B - 20

## TOTAL APPLICATIONS SOFTWARE - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	509	32	672	914	1234	1665	2232	2990	35
PROCESS MANUFACTURING	200	32	264	354	478	650	883	1201	35
TRANSPORTATION	105	50	158	235	343	493	701	995	45
UTILITIES	60	32	79	103	134	173	223	285	29
BANKING	683	37	936	1301	1782	2406	3223	4319	36
INSURANCE	436	25	545	703	921	1188	1521	1916	29
MEDICAL	195	53	298	448	653	921	1235	1630	40
EDUCATION	61	27	77	97	121	150	183	220	23
RETAIL DISTRIBUTION	194	33	258	343	463	625	844	1140	35
WHOLESALE DISTRIBUTION	290	36	394	528	703	928	1206	1568	32
FEDERAL GOVERNMENT	35	86	65	88	117	148	183	219	27
STATE/LOCAL GOVERNMENT	50	28	64	81	101	126	155	189	24
SERVICES	139	35	188	253	339	455	605	805	34
OTHER	123	38	170	229	309	415	551	733	34
<b>TOTAL</b>	<b>3080</b>	<b>35</b>	<b>4168</b>	<b>5676</b>	<b>7698</b>	<b>10343</b>	<b>13744</b>	<b>18210</b>	<b>34</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 21

CROSS INDUSTRY APPLICATIONS SOFTWARE - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	295	32	390	514	671	876	1134	1465	30
PROCESS MANUFACTURING	134	32	177	231	305	404	535	709	32
TRANSPORTATION	58	50	87	128	184	262	369	517	43
UTILITIES	37	32	49	63	82	105	135	171	28
BANKING	301	37	412	549	720	929	1186	1512	30
INSURANCE	205	25	256	321	407	509	630	766	25
MEDICAL	101	53	155	224	314	424	543	684	35
EDUCATION	37	27	46	57	71	86	104	123	21
RETAIL DISTRIBUTION	107	33	142	184	242	318	417	547	31
WHOLESALE DISTRIBUTION	139	36	189	246	318	406	511	643	28
FEDERAL GOVERNMENT	28	86	52	70	92	116	142	169	27
STATE/LOCAL GOVERNMENT	33	28	42	52	64	78	95	113	22
SERVICES	92	35	124	164	216	284	370	483	31
OTHER	76	38	105	137	179	232	298	381	29
<b>TOTAL</b>	<b>1642</b>	<b>36</b>	<b>2226</b>	<b>2940</b>	<b>3864</b>	<b>5029</b>	<b>6468</b>	<b>8284</b>	<b>30</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 22

## INDUSTRY SPECIFIC APPLICATIONS SOFTWARE - TOTAL MARKET MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	214	32	282	400	563	789	1098	1525	40
PROCESS MANUFACTURING	66	32	87	122	173	246	348	493	41
TRANSPORTATION	47	50	71	107	158	231	332	478	46
UTILITIES	23	32	30	40	52	68	88	114	31
BANKING	382	37	524	752	1062	1477	2037	2808	40
INSURANCE	231	25	289	382	514	680	891	1150	32
MEDICAL	94	53	143	224	340	497	691	945	46
EDUCATION	24	27	31	40	50	64	79	97	26
RETAIL DISTRIBUTION	87	33	116	159	221	308	427	593	39
WHOLESALE DISTRIBUTION	151	36	205	282	385	521	695	925	35
FEDERAL GOVERNMENT	7	86	13	18	25	32	41	50	31
STATE/LOCAL GOVERNMENT	18	28	22	29	37	48	60	76	28
SERVICES	47	35	64	89	124	171	235	322	38
OTHER	47	38	65	92	130	182	254	352	40
TOTAL	1438	35	1942	2736	3834	5314	7277	9926	39

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 23

## TOTAL SYSTEM SOFTWARE - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	665	37	911	1230	1623	2111	2701	3377	30
PROCESS MANUFACTURING	418	28	535	696	911	1212	1612	2144	32
TRANSPORTATION	109	35	147	200	270	362	485	645	34
UTILITIES	121	30	157	209	272	340	411	490	25
BANKING	172	33	229	311	411	534	694	902	32
INSURANCE	184	32	243	321	414	521	641	776	26
MEDICAL	88	38	121	162	213	277	352	444	30
EDUCATION	48	18	57	67	78	89	100	112	15
RETAIL DISTRIBUTION	96	38	132	179	233	298	372	450	28
WHOLESALE DISTRIBUTION	86	32	114	150	192	242	300	369	27
FEDERAL GOVERNMENT	445	29	574	758	985	1271	1601	1953	28
STATE/LOCAL GOVERNMENT	140	20	168	198	228	262	299	341	15
SERVICES	58	29	75	97	125	157	196	243	27
OTHER	55	29	71	92	117	149	189	236	27
TOTAL	2685	32	3534	4668	6071	7824	9953	12481	29

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 24

TOTAL PROFESSIONAL SERVICES - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	822	20	986	1194	1456	1747	2079	2474	20
PROCESS MANUFACTURING	465	21	563	681	817	972	1147	1354	19
TRANSPORTATION	108	9	118	132	150	171	195	221	13
UTILITIES	221	17	259	308	369	443	536	649	20
BANKING	386	22	471	584	730	912	1131	1392	24
INSURANCE	343	18	405	478	564	659	771	903	17
MEDICAL	124	20	149	180	220	266	322	386	21
EDUCATION	102	8	110	121	135	151	170	194	12
RETAIL DISTRIBUTION	164	9	179	198	222	249	276	307	11
WHOLESALE DISTRIBUTION	138	15	159	183	208	235	266	298	13
FEDERAL GOVERNMENT	1793	16	2080	2433	2847	3360	4065	4878	19
STATE/LOCAL GOVERNMENT	1096	11	1217	1350	1512	1694	1914	2163	12
SERVICES	36	14	41	47	53	61	71	82	15
OTHER	183	11	203	225	253	283	317	352	12
<b>TOTAL</b>	<b>5981</b>	<b>16</b>	<b>6938</b>	<b>8114</b>	<b>9536</b>	<b>11204</b>	<b>13261</b>	<b>15651</b>	<b>18</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 25

SOFTWARE DEVELOPMENT PROFESSIONAL SERVICES - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	608	20	730	895	1107	1345	1622	1955	22
PROCESS MANUFACTURING	353	21	428	526	641	774	927	1110	21
TRANSPORTATION	81	9	88	100	116	134	154	177	15
UTILITIES	172	17	202	244	297	362	444	545	22
BANKING	255	22	311	389	491	619	774	960	25
INSURANCE	220	18	259	308	365	430	506	596	18
MEDICAL	97	20	116	140	170	204	246	293	20
EDUCATION	82	8	88	93	100	107	116	126	7
RETAIL DISTRIBUTION	115	9	125	138	154	171	189	209	11
WHOLESALE DISTRIBUTION	115	15	132	147	164	180	197	214	10
FEDERAL GOVERNMENT	1201	16	1394	1650	1953	2332	2854	3464	20
STATE/LOCAL GOVERNMENT	866	11	961	1048	1152	1267	1405	1557	10
SERVICES	30	14	34	39	44	50	58	66	14
OTHER	141	11	156	172	191	213	236	260	11
<b>TOTAL</b>	<b>4335</b>	<b>16</b>	<b>5024</b>	<b>5889</b>	<b>6943</b>	<b>8187</b>	<b>9727</b>	<b>11532</b>	<b>18</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 26

OTHER PROFESSIONAL SERVICES - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	214	20	256	298	349	402	457	520	15
PROCESS MANUFACTURING	112	21	135	155	176	198	220	244	13
TRANSPORTATION	27	9	29	32	35	38	41	44	8
UTILITIES	49	17	57	64	72	82	92	104	13
BANKING	131	22	160	195	239	294	358	431	22
INSURANCE	123	18	146	170	198	229	265	307	16
MEDICAL	27	20	33	40	50	62	76	93	23
EDUCATION	20	8	22	28	35	44	54	68	25
RETAIL DISTRIBUTION	49	9	54	60	68	78	87	98	13
WHOLESALE DISTRIBUTION	23	15	27	35	45	55	69	83	25
FEDERAL GOVERNMENT	592	16	686	784	894	1028	1211	1415	16
STATE/LOCAL GOVERNMENT	230	11	255	302	360	427	509	606	19
SERVICES	6	14	7	8	9	11	13	16	19
OTHER	42	11	47	53	61	70	80	91	14
<b>TOTAL</b>	<b>1646</b>	<b>16</b>	<b>1914</b>	<b>2225</b>	<b>2593</b>	<b>3017</b>	<b>3534</b>	<b>4119</b>	<b>17</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 27

## TOTAL INTEGRATED SYSTEMS - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
DISCRETE MANUFACTURING	981	23	1207	1520	1961	2550	3315	4276	29
PROCESS MANUFACTURING	390	14	445	534	656	827	1034	1292	24
TRANSPORTATION	147	17	172	206	252	310	378	457	22
UTILITIES	120	17	140	168	204	247	294	349	20
BANKING	498	19	593	741	919	1130	1390	1709	24
INSURANCE	219	26	276	348	424	505	591	685	20
MEDICAL	178	18	210	260	328	417	521	646	25
EDUCATION	76	9	83	93	107	124	142	164	15
RETAIL DISTRIBUTION	239	20	287	359	455	574	711	882	25
WHOLESALE DISTRIBUTION	245	23	301	383	482	598	735	897	24
FEDERAL GOVERNMENT	68	35	92	115	138	162	190	219	19
STATE/LOCAL GOVERNMENT	48	11	53	60	69	80	93	108	15
SERVICES	315	25	394	512	676	885	1142	1462	30
OTHER	80	12	90	106	126	152	183	216	19
TOTAL	3604	20	4342	5404	6797	8560	10718	13361	25

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.



EXHIBIT B - 28

INDUSTRY SPECIFIC INTEGRATED SYSTEMS - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								83-88 AAGR (%)
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	
DISCRETE MANUFACTURING	716	23	881	1122	1463	1922	2526	3292	30
PROCESS MANUFACTURING	289	14	329	398	493	627	790	995	25
TRANSPORTATION	96	17	112	138	174	220	276	343	25
UTILITIES	90	17	105	124	148	176	206	241	18
BANKING	374	19	444	562	704	874	1087	1350	25
INSURANCE	79	26	99	131	168	209	255	308	25
MEDICAL	100	18	118	149	193	251	321	407	28
EDUCATION	55	9	60	68	79	92	106	123	15
RETAIL DISTRIBUTION	105	20	126	158	200	252	313	388	25
WHOLESALE DISTRIBUTION	127	23	157	198	249	307	377	458	24
FEDERAL GOVERNMENT	54	35	73	91	110	130	153	177	20
STATE/LOCAL GOVERNMENT	27	11	30	34	39	45	53	62	16
SERVICES	227	25	284	370	489	643	831	1067	30
OTHER	28	12	31	37	45	54	65	78	20
<b>TOTAL</b>	<b>2366</b>	<b>20</b>	<b>2849</b>	<b>3581</b>	<b>4553</b>	<b>5804</b>	<b>7359</b>	<b>9288</b>	<b>27</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT B - 29

CROSS INDUSTRY INTEGRATED SYSTEMS - TOTAL MARKET FORECAST

BY INDUSTRY SECTOR, 1983 - 1988

INDUSTRY SECTOR	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AA6R (%)
DISCRETE MANUFACTURING	265	23	326	398	498	627	789	983	25
PROCESS MANUFACTURING	101	14	116	136	163	200	244	297	21
TRANSPORTATION	51	17	60	68	78	90	102	114	14
UTILITIES	30	17	35	44	56	71	87	108	25
BANKING	125	19	148	179	215	255	303	359	19
INSURANCE	140	26	177	216	256	296	335	377	16
MEDICAL	78	18	92	111	135	166	200	239	21
EDUCATION	21	9	22	25	28	32	36	41	13
RETAIL DISTRIBUTION	134	20	161	201	255	321	398	494	25
WHOLESALE DISTRIBUTION	118	23	145	184	233	291	359	440	25
FEDERAL GOVERNMENT	14	35	19	24	28	32	37	42	17
STATE/LOCAL GOVERNMENT	21	11	23	26	30	35	40	46	15
SERVICES	88	25	110	142	186	243	311	395	29
OTHER	52	12	58	69	81	98	117	138	19
<b>TOTAL</b>	<b>1238</b>	<b>21</b>	<b>1493</b>	<b>1823</b>	<b>2243</b>	<b>2756</b>	<b>3359</b>	<b>4073</b>	<b>22</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

DISCRETE MANUFACTURING SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983	1984	1985	1986	1987	1988	83-88
	1982	GROWTH							AAGR
	(\$M)	(%)	(\$M)	(\$M)	(\$M)	(\$M)	(\$M)	(%)	
REMOTE COMPUTING SERVICES									
CROSS INDUSTRY	297	19	354	414	489	571	679	815	18
INDUSTRY SPECIFIC	395	17	462	540	627	743	883	1058	18
UTILITY	83	9	91	101	113	127	143	163	12
SUBTOTAL	775	17	907	1055	1229	1441	1705	2036	18
BATCH PROCESSING SERVICES									
CROSS INDUSTRY	299	2	305	310	312	314	310	306	0
INDUSTRY SPECIFIC	100	2	102	108	113	118	121	124	4
UTILITY	76	2	78	76	74	72	68	64	-4
SUBTOTAL	475	2	485	494	499	504	499	494	0
FACILITY MANAGEMENT									
CROSS INDUSTRY	5	15	6	6	7	8	9	10	12
INDUSTRY SPECIFIC	27	15	31	36	42	49	58	68	17
UTILITY	18	15	21	24	29	35	42	50	19
SUBTOTAL	50	15	58	67	78	92	110	128	17
TOTAL PROCESSING SERVICES									
CROSS INDUSTRY	601	11	665	731	808	894	999	1131	11
INDUSTRY SPECIFIC	522	14	595	684	782	911	1062	1250	16
UTILITY	177	7	189	202	216	233	253	277	8
GRAND TOTAL PROCESSING	1300	11	1449	1616	1806	2038	2314	2658	13
SOFTWARE PRODUCTS									
APPLICATIONS									
CROSS INDUSTRY	295	32	389	513	671	875	1133	1464	30
INDUSTRY SPECIFIC	214	32	282	401	563	790	1099	1527	40
SUBTOTAL	509	32	672	914	1234	1666	2232	2991	35
SYSTEMS	665	37	911	1230	1623	2111	2701	3377	30
TOTAL SOFTWARE	1174	35	1583	2144	2857	3776	4933	6368	32
PROFESSIONAL SERVICES									
SOFTWARE DEVELOPMENT	608	20	730	895	1106	1345	1621	1954	22
OTHER	214	20	257	299	350	402	458	520	15
TOTAL PROFESSIONAL SERVICES	822	20	986	1194	1456	1747	2079	2475	20
INTEGRATED SYSTEMS									
INDUSTRY SPECIFIC	716	23	881	1122	1463	1922	2525	3292	30
CROSS INDUSTRY	265	23	326	399	498	628	789	984	25
TOTAL INTEGRATED SYSTEMS	981	23	1207	1520	1961	2550	3314	4275	29
GRAND TOTAL	4277	22	5225	6474	8080	10111	12641	15776	25

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 31

PROCESS MANUFACTURING SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
REMOTE COMPUTING SERVICES									
CROSS INDUSTRY	202	23	248	293	348	418	501	603	19
INDUSTRY SPECIFIC	86	15	99	119	144	175	214	260	21
UTILITY	215	8	231	253	276	305	336	370	10
SUBTOTAL	503	15	578	665	768	898	1051	1233	16
BATCH PROCESSING SERVICES									
CROSS INDUSTRY	104	9	113	125	139	154	168	184	10
INDUSTRY SPECIFIC	487	9	531	583	647	710	773	842	10
UTILITY	58	9	63	63	62	61	58	54	-3
SUBTOTAL	649	9	707	771	848	925	999	1079	9
FACILITY MANAGEMENT									
CROSS INDUSTRY	2	15	2	3	3	4	4	5	17
INDUSTRY SPECIFIC	28	15	32	37	43	50	59	70	17
UTILITY	5	15	6	7	8	9	11	12	17
SUBTOTAL	35	15	40	46	54	63	74	87	17
TOTAL PROCESSING SERVICES									
CROSS INDUSTRY	308	18	364	421	490	575	673	791	17
INDUSTRY SPECIFIC	601	10	662	739	833	936	1046	1172	12
UTILITY	278	8	300	322	346	375	404	436	8
GRAND TOTAL PROCESSING	1187	12	1326	1483	1670	1886	2124	2399	13
SOFTWARE PRODUCTS									
APPLICATIONS									
CROSS INDUSTRY	134	32	177	231	305	404	535	709	32
INDUSTRY SPECIFIC	66	32	87	122	173	246	348	493	41
SUBTOTAL	200	32	264	354	478	650	883	1201	35
SYSTEMS	418	28	535	696	911	1212	1612	2144	32
TOTAL SOFTWARE	618	29	799	1049	1389	1861	2495	3345	33
PROFESSIONAL SERVICES									
SOFTWARE DEVELOPMENT	353	21	427	525	640	773	926	1109	21
OTHER	112	21	136	156	177	199	221	245	13
TOTAL PROFESSIONAL SERVICES	465	21	563	681	817	972	1147	1353	19
INTEGRATED SYSTEMS									
INDUSTRY SPECIFIC	289	14	329	399	494	628	791	996	25
CROSS INDUSTRY	101	14	115	135	162	199	243	296	21
TOTAL INTEGRATED SYSTEMS	390	14	445	534	656	827	1034	1292	24
GRAND TOTAL	2660	18	3132	3746	4532	5546	6800	8389	22

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

TRANSPORTATION SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88
	1982 (\$M)	GROWTH (%)							AA6R (%)
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	37	19	44	52	61	72	84	98	17
INDUSTRY SPECIFIC	72	16	84	99	116	136	160	187	17
UTILITY	25	12	28	31	33	35	37	39	7
<b>SUBTOTAL</b>	<b>134</b>	<b>16</b>	<b>155</b>	<b>182</b>	<b>209</b>	<b>243</b>	<b>281</b>	<b>324</b>	<b>16</b>
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	21	2	21	22	22	22	22	22	1
INDUSTRY SPECIFIC	33	2	34	35	36	37	38	39	3
UTILITY	12	2	12	12	11	11	10	9	-6
<b>SUBTOTAL</b>	<b>66</b>	<b>2</b>	<b>67</b>	<b>69</b>	<b>69</b>	<b>70</b>	<b>70</b>	<b>70</b>	<b>1</b>
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	24	8	26	29	32	36	40	44	11
UTILITY	0	0	0	0	0	0	0	0	0
<b>SUBTOTAL</b>	<b>24</b>	<b>8</b>	<b>26</b>	<b>29</b>	<b>32</b>	<b>36</b>	<b>40</b>	<b>44</b>	<b>11</b>
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	58	13	65	74	83	94	106	120	13
INDUSTRY SPECIFIC	129	11	143	163	184	209	238	269	13
UTILITY	37	9	40	42	44	46	47	48	4
<b>GRAND TOTAL PROCESSING</b>	<b>224</b>	<b>11</b>	<b>249</b>	<b>279</b>	<b>310</b>	<b>349</b>	<b>392</b>	<b>438</b>	<b>12</b>
<b>SOFTWARE PRODUCTS</b>									
<b>APPLICATIONS</b>									
CROSS INDUSTRY	58	50	87	128	185	264	370	520	43
INDUSTRY SPECIFIC	47	50	71	106	157	230	330	475	46
<b>SUBTOTAL</b>	<b>105</b>	<b>50</b>	<b>158</b>	<b>235</b>	<b>343</b>	<b>493</b>	<b>700</b>	<b>995</b>	<b>45</b>
<b>SYSTEMS</b>	109	35	147	200	270	362	485	645	34
<b>TOTAL SOFTWARE</b>	<b>214</b>	<b>42</b>	<b>305</b>	<b>435</b>	<b>613</b>	<b>855</b>	<b>1186</b>	<b>1640</b>	<b>40</b>
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	81	9	88	100	116	134	154	177	15
OTHER	27	9	29	32	35	38	41	44	8
<b>TOTAL PROFESSIONAL SERVICES</b>	<b>108</b>	<b>9</b>	<b>118</b>	<b>132</b>	<b>150</b>	<b>171</b>	<b>195</b>	<b>221</b>	<b>13</b>
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	96	17	112	139	175	221	277	345	25
CROSS INDUSTRY	51	17	60	68	77	89	101	113	14
<b>TOTAL INTEGRATED SYSTEMS</b>	<b>147</b>	<b>17</b>	<b>172</b>	<b>206</b>	<b>252</b>	<b>310</b>	<b>378</b>	<b>458</b>	<b>22</b>
<b>GRAND TOTAL</b>	<b>693</b>	<b>22</b>	<b>843</b>	<b>1052</b>	<b>1325</b>	<b>1685</b>	<b>2151</b>	<b>2756</b>	<b>27</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

UTILITIES SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983	1984	1985	1986	1987	1988	83-88
	1982	GROWTH							AAGR
	(\$M)	(%)	(\$M)	(\$M)	(\$M)	(\$M)	(\$M)	(%)	
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	129	16	150	172	200	234	269	306	15
INDUSTRY SPECIFIC	119	12	133	159	190	230	273	321	19
UTILITY	103	7	110	121	134	150	164	177	10
SUBTOTAL	351	12	393	452	524	614	706	804	15
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	42	4	44	46	48	50	51	51	3
INDUSTRY SPECIFIC	14	4	15	15	15	14	14	13	-2
UTILITY	24	4	25	25	24	24	23	22	-3
SUBTOTAL	80	4	83	86	87	88	87	86	1
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	2	5	2	2	2	2	2	2	0
INDUSTRY SPECIFIC	2	5	2	2	2	2	2	2	-2
UTILITY	7	5	7	8	9	10	11	12	11
SUBTOTAL	11	5	12	12	14	15	15	16	7
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	173	13	196	221	250	286	322	360	13
INDUSTRY SPECIFIC	135	11	150	175	207	247	289	336	18
UTILITY	134	6	142	154	168	184	198	211	8
GRAND TOTAL PROCESSING	442	10	488	550	625	716	808	907	13
<b>SOFTWARE PRODUCTS</b>									
APPLICATIONS									
CROSS INDUSTRY	37	32	49	63	81	104	134	170	28
INDUSTRY SPECIFIC	23	32	30	40	52	68	89	115	31
SUBTOTAL	60	32	79	103	134	173	223	285	29
SYSTEMS	121	30	157	209	272	340	411	490	25
TOTAL SOFTWARE	181	31	237	312	406	513	634	775	27
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	172	17	201	243	296	361	443	544	22
OTHER	49	17	57	65	73	82	93	105	13
TOTAL PROFESSIONAL SERVICES	221	17	259	308	369	443	536	648	20
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	90	17	105	124	148	176	206	241	18
CROSS INDUSTRY	30	17	35	44	56	71	87	108	25
TOTAL INTEGRATED SYSTEMS	120	17	140	168	204	247	294	349	20
<b>GRAND TOTAL</b>	<b>964</b>	<b>17</b>	<b>1123</b>	<b>1339</b>	<b>1604</b>	<b>1919</b>	<b>2272</b>	<b>2679</b>	<b>19</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

**BANKING AND FINANCE SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988**

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88
	1982 (\$M)	GROWTH (%)							AAGR (%)
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	273	27	346	423	514	610	731	886	21
INDUSTRY SPECIFIC	829	22	1011	1214	1432	1696	2002	2334	18
UTILITY	82	6	87	97	107	116	126	134	9
SUBTOTAL	1184	22	1444	1733	2053	2423	2859	3354	18
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	207	7	221	235	247	257	265	270	4
INDUSTRY SPECIFIC	674	7	721	774	822	866	903	932	5
UTILITY	18	7	19	21	22	23	24	25	5
SUBTOTAL	899	7	962	1029	1091	1146	1191	1227	5
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	512	18	604	725	877	1061	1274	1516	20
UTILITY	0	0	0	0	0	0	0	0	0
SUBTOTAL	512	18	604	725	877	1061	1274	1516	20
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	480	18	568	658	761	867	996	1157	15
INDUSTRY SPECIFIC	2015	16	2337	2712	3132	3624	4178	4782	15
UTILITY	100	6	106	118	129	139	150	159	8
GRAND TOTAL PROCESSING	2595	16	3011	3488	4021	4630	5324	6097	15
<b>SOFTWARE PRODUCTS</b>									
APPLICATIONS									
CROSS INDUSTRY	301	37	412	550	721	930	1188	1514	30
INDUSTRY SPECIFIC	382	37	523	751	1061	1475	2035	2804	40
SUBTOTAL	683	37	936	1301	1782	2405	3223	4319	36
SYSTEMS	172	33	229	311	411	534	694	902	32
TOTAL SOFTWARE	855	36	1164	1612	2192	2939	3917	5221	35
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	255	22	311	389	491	619	775	961	25
OTHER	131	22	160	195	239	293	357	431	22
TOTAL PROFESSIONAL SERVICES	386	22	471	584	730	912	1132	1392	24
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	374	19	445	562	705	876	1088	1352	25
CROSS INDUSTRY	125	19	149	180	216	256	304	360	19
TOTAL INTEGRATED SYSTEMS	499	19	594	742	920	1132	1392	1713	24
<b>GRAND TOTAL</b>	4335	21	5240	6425	7864	9613	11765	14422	22

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

INSURANCE SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88
	1982 (\$M)	GROWTH (%)							AAGR (%)
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	128	16	148	167	187	208	233	257	12
INDUSTRY SPECIFIC	103	15	118	141	166	195	229	267	18
UTILITY	21	10	23	25	27	29	32	33	8
SUBTOTAL	252	15	290	333	380	433	494	558	14
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	27	6	29	29	30	29	28	27	-1
INDUSTRY SPECIFIC	101	6	107	113	117	119	118	117	2
UTILITY	14	6	15	16	16	16	16	16	1
SUBTOTAL	142	6	151	158	163	164	163	160	1
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	255	14	291	334	388	450	522	600	16
UTILITY	0	0	0	0	0	0	0	0	0
SUBTOTAL	255	14	291	334	388	450	522	600	16
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	155	14	177	196	216	238	261	284	10
INDUSTRY SPECIFIC	459	12	516	588	671	764	870	984	14
UTILITY	35	9	38	41	43	46	48	49	5
GRAND TOTAL PROCESSING	649	13	731	826	930	1047	1178	1317	13
<b>SOFTWARE PRODUCTS</b>									
APPLICATIONS									
CROSS INDUSTRY	205	25	256	321	407	509	630	767	25
INDUSTRY SPECIFIC	231	25	289	382	514	679	891	1149	32
SUBTOTAL	436	25	545	703	921	1188	1521	1916	29
SYSTEMS	184	32	243	321	414	521	641	776	26
TOTAL SOFTWARE	620	27	788	1024	1335	1709	2162	2692	28
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	220	18	260	308	366	431	507	597	18
OTHER	123	18	145	169	198	229	264	306	16
TOTAL PROFESSIONAL SERVICES	343	18	405	478	564	659	772	903	17
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	79	26	100	132	168	209	256	309	25
CROSS INDUSTRY	140	26	176	216	256	295	335	376	16
TOTAL INTEGRATED SYSTEMS	219	26	276	348	424	505	591	685	20
<b>GRAND TOTAL</b>	1831	20	2200	2675	3253	3921	4702	5597	21

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.



**MEDICAL SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988**

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88
	1982 (\$M)	GROWTH (%)							AAGR (%)
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	57	24	71	87	108	134	165	202	23
INDUSTRY SPECIFIC	196	21	237	286	348	424	511	612	21
UTILITY	12	7	13	15	17	20	22	25	14
<b>SUBTOTAL</b>	<b>265</b>	<b>21</b>	<b>321</b>	<b>388</b>	<b>473</b>	<b>577</b>	<b>699</b>	<b>839</b>	<b>21</b>
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	35	7	37	39	40	41	40	40	1
INDUSTRY SPECIFIC	184	7	197	207	211	213	211	209	1
UTILITY	12	7	13	13	14	14	14	14	1
<b>SUBTOTAL</b>	<b>231</b>	<b>7</b>	<b>247</b>	<b>260</b>	<b>265</b>	<b>267</b>	<b>265</b>	<b>262</b>	<b>1</b>
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	215	22	262	323	397	476	567	669	21
UTILITY	0	0	0	0	0	0	0	0	0
<b>SUBTOTAL</b>	<b>215</b>	<b>22</b>	<b>262</b>	<b>323</b>	<b>397</b>	<b>476</b>	<b>567</b>	<b>669</b>	<b>21</b>
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	92	18	108	126	148	175	205	241	17
INDUSTRY SPECIFIC	595	17	696	816	956	1113	1289	1489	16
UTILITY	24	7	26	28	31	34	36	39	9
<b>GRAND TOTAL PROCESSING</b>	<b>711</b>	<b>17</b>	<b>830</b>	<b>970</b>	<b>1135</b>	<b>1321</b>	<b>1530</b>	<b>1769</b>	<b>16</b>
<b>SOFTWARE PRODUCTS</b>									
<b>APPLICATIONS</b>									
CROSS INDUSTRY	101	53	155	223	312	422	541	682	35
INDUSTRY SPECIFIC	94	53	144	225	341	500	694	949	46
<b>SUBTOTAL</b>	<b>195</b>	<b>53</b>	<b>298</b>	<b>448</b>	<b>654</b>	<b>922</b>	<b>1235</b>	<b>1631</b>	<b>40</b>
<b>SYSTEMS</b>	<b>88</b>	<b>38</b>	<b>121</b>	<b>162</b>	<b>213</b>	<b>277</b>	<b>352</b>	<b>444</b>	<b>30</b>
<b>TOTAL SOFTWARE</b>	<b>283</b>	<b>48</b>	<b>420</b>	<b>609</b>	<b>867</b>	<b>1199</b>	<b>1587</b>	<b>2074</b>	<b>38</b>
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	97	20	116	140	170	205	246	294	20
OTHER	27	20	32	40	50	61	75	92	23
<b>TOTAL PROFESSIONAL SERVICES</b>	<b>124</b>	<b>20</b>	<b>149</b>	<b>180</b>	<b>220</b>	<b>266</b>	<b>322</b>	<b>386</b>	<b>21</b>
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	100	18	118	150	194	252	322	408	28
CROSS INDUSTRY	78	18	92	110	135	165	199	238	21
<b>TOTAL INTEGRATED SYSTEMS</b>	<b>178</b>	<b>18</b>	<b>210</b>	<b>260</b>	<b>328</b>	<b>417</b>	<b>521</b>	<b>646</b>	<b>25</b>
<b>GRAND TOTAL</b>	<b>1296</b>	<b>24</b>	<b>1609</b>	<b>2020</b>	<b>2550</b>	<b>3203</b>	<b>3960</b>	<b>4876</b>	<b>25</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EDUCATION SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	1982 (\$M)	82-83 GROWTH (%)	1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
REMOTE COMPUTING SERVICES									
CROSS INDUSTRY	30	7	32	34	37	41	46	50	9
INDUSTRY SPECIFIC	12	7	13	14	16	19	22	25	15
UTILITY	23	7	25	25	25	26	28	28	3
SUBTOTAL	65	7	70	74	79	87	95	104	8
BATCH PROCESSING SERVICES									
CROSS INDUSTRY	19	0	19	19	18	17	16	15	-4
INDUSTRY SPECIFIC	29	0	29	30	30	30	29	28	0
UTILITY	15	0	15	15	15	14	14	13	-3
SUBTOTAL	63	0	63	63	62	61	59	57	-2
FACILITY MANAGEMENT									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	16	10	18	20	22	25	29	34	14
UTILITY	0	0	0	0	0	0	0	0	0
SUBTOTAL	16	10	18	20	22	25	29	34	14
TOTAL PROCESSING SERVICES									
CROSS INDUSTRY	49	4	51	53	55	58	62	66	5
INDUSTRY SPECIFIC	57	4	59	64	68	74	81	88	8
UTILITY	38	4	40	40	40	41	41	41	1
GRAND TOTAL PROCESSING	144	4	150	156	163	173	184	195	5
SOFTWARE PRODUCTS									
APPLICATIONS									
CROSS INDUSTRY	37	27	47	58	71	87	105	124	21
INDUSTRY SPECIFIC	24	27	30	39	50	63	78	95	26
SUBTOTAL	61	27	77	97	121	150	183	219	23
SYSTEMS	48	18	57	67	78	89	100	112	15
TOTAL SOFTWARE	109	23	134	164	199	239	283	331	20
PROFESSIONAL SERVICES									
SOFTWARE DEVELOPMENT	82	8	89	94	100	107	116	127	7
OTHER	20	8	22	27	34	43	53	67	25
TOTAL PROFESSIONAL SERVICES	102	8	110	121	134	150	170	193	12
INTEGRATED SYSTEMS									
INDUSTRY SPECIFIC	55	9	60	68	78	91	105	122	15
CROSS INDUSTRY	21	9	23	25	29	33	37	42	13
TOTAL INTEGRATED SYSTEMS	76	9	83	93	107	124	142	164	15
GRAND TOTAL	431	11	477	534	603	686	779	883	13

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

**RETAIL DISTRIBUTION SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988**

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983	1984	1985	1986	1987	1988	83-88
	1982	GROWTH							AAGR
	(\$M)	(%)	(\$M)	(\$M)	(\$M)	(\$M)	(\$M)	(%)	
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	120	18	141	166	197	234	276	325	18
INDUSTRY SPECIFIC	349	16	405	474	556	656	768	894	17
UTILITY	37	11	41	47	53	61	69	78	14
SUBTOTAL	506	16	587	687	806	952	1113	1297	17
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	88	7	94	101	106	109	108	109	3
INDUSTRY SPECIFIC	114	7	122	125	126	123	118	114	-1
UTILITY	36	7	39	38	38	36	33	31	-4
SUBTOTAL	238	7	255	265	270	267	259	254	0
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	11	5	12	12	13	14	15	15	6
UTILITY	0	0	0	0	0	0	0	0	0
SUBTOTAL	11	5	12	12	13	14	15	15	6
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	208	13	235	267	303	343	385	434	13
INDUSTRY SPECIFIC	474	14	538	611	695	794	901	1024	14
UTILITY	73	9	80	85	91	97	102	109	6
GRAND TOTAL PROCESSING	755	13	853	964	1090	1233	1387	1567	13
<b>SOFTWARE PRODUCTS</b>									
APPLICATIONS									
CROSS INDUSTRY	107	33	142	184	242	319	418	549	31
INDUSTRY SPECIFIC	87	33	116	159	221	307	426	591	39
SUBTOTAL	194	33	258	343	463	625	844	1139	35
SYSTEMS	96	38	132	179	233	298	372	450	28
TOTAL SOFTWARE	290	35	391	522	696	923	1216	1589	32
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	115	9	125	138	154	172	189	209	11
OTHER	49	9	53	60	68	77	87	98	13
TOTAL PROFESSIONAL SERVICES	164	9	179	198	222	249	276	307	11
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	105	20	126	158	200	252	313	388	25
CROSS INDUSTRY	134	20	161	201	255	322	399	495	25
TOTAL INTEGRATED SYSTEMS	239	20	287	359	455	574	711	882	25
<b>GRAND TOTAL</b>	<b>1448</b>	<b>18</b>	<b>1709</b>	<b>2043</b>	<b>2463</b>	<b>2978</b>	<b>3591</b>	<b>4345</b>	<b>21</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

**WHOLESALE DISTRIBUTION SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988**

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983	1984	1985	1986	1987	1988	83-88
	1982	GROWTH							AAGR
	(\$M)	(%)	(\$M)	(\$M)	(\$M)	(\$M)	(\$M)	(%)	
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	93	15	107	124	143	167	193	223	16
INDUSTRY SPECIFIC	129	15	148	171	196	228	262	301	15
UTILITY	17	15	20	22	24	27	31	34	12
SUBTOTAL	239	15	275	316	363	422	485	558	15
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	162	6	172	184	190	194	194	193	2
INDUSTRY SPECIFIC	66	6	70	71	70	68	64	61	-3
UTILITY	102	6	108	108	104	98	91	84	-5
SUBTOTAL	330	6	350	364	364	360	349	339	-1
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	6	10	7	7	7	7	7	7	0
INDUSTRY SPECIFIC	21	10	23	27	31	35	40	45	14
UTILITY	4	10	4	5	5	6	6	6	8
SUBTOTAL	31	10	34	38	43	48	53	58	11
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	261	9	285	315	340	368	393	423	8
INDUSTRY SPECIFIC	216	12	241	269	297	331	366	407	11
UTILITY	123	7	132	135	133	131	128	125	-1
GRAND TOTAL PROCESSING	600	10	659	718	771	830	888	955	8
<b>SOFTWARE PRODUCTS</b>									
APPLICATIONS									
CROSS INDUSTRY	139	36	189	246	317	406	511	642	28
INDUSTRY SPECIFIC	151	36	205	283	386	522	696	926	35
SUBTOTAL	290	36	394	529	703	928	1206	1568	32
SYSTEMS	86	32	114	150	192	242	300	369	27
TOTAL SOFTWARE	376	35	508	678	895	1170	1506	1937	31
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	115	15	132	148	164	180	198	215	10
OTHER	23	15	26	34	44	54	67	82	25
TOTAL PROFESSIONAL SERVICES	138	15	159	182	208	235	265	297	13
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	127	23	156	198	248	306	375	456	24
CROSS INDUSTRY	118	23	145	185	234	292	360	441	25
TOTAL INTEGRATED SYSTEMS	245	23	301	383	482	598	736	897	24
<b>GRAND TOTAL</b>	<b>1359</b>	<b>20</b>	<b>1627</b>	<b>1962</b>	<b>2355</b>	<b>2832</b>	<b>3394</b>	<b>4086</b>	<b>20</b>

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT B - 40

FEDERAL GOVERNMENT SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
	1982 (\$M)	GROWTH (%)							
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	169	14	193	232	281	335	402	480	20
INDUSTRY SPECIFIC	49	12	55	64	75	87	102	120	17
UTILITY	273	11	302	320	342	360	380	400	6
SUBTOTAL	491	12	550	616	699	783	884	999	13
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	12	3	12	14	15	17	18	19	9
INDUSTRY SPECIFIC	1	3	1	1	1	1	1	1	3
UTILITY	52	3	54	55	56	57	57	56	1
SUBTOTAL	65	3	67	70	72	75	76	76	3
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	33	32	44	48	51	52	53	52	4
INDUSTRY SPECIFIC	0	0	0	0	0	0	0	0	0
UTILITY	54	32	71	93	119	149	187	236	27
SUBTOTAL	87	32	115	141	170	202	240	288	20
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	214	16	249	293	347	404	472	550	17
INDUSTRY SPECIFIC	50	12	56	65	76	89	104	121	17
UTILITY	379	13	427	468	517	566	625	693	10
GRAND TOTAL PROCESSING	643	14	732	827	941	1059	1201	1364	13
<b>SOFTWARE PRODUCTS</b>									
APPLICATIONS									
CROSS INDUSTRY	28	86	52	70	92	116	142	169	27
INDUSTRY SPECIFIC	7	86	13	18	25	32	41	50	31
SUBTOTAL	35	86	65	88	117	148	183	219	27
SYSTEMS	445	29	574	758	985	1271	1601	1953	28
TOTAL SOFTWARE	480	33	639	846	1102	1419	1784	2172	28
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	1201	16	1393	1650	1953	2331	2853	3463	20
OTHER	592	16	687	784	894	1028	1212	1415	16
TOTAL PROFESSIONAL SERVICES	1793	16	2080	2433	2847	3360	4065	4878	19
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	54	35	73	92	110	131	154	178	20
CROSS INDUSTRY	14	35	19	23	27	32	36	41	17
TOTAL INTEGRATED SYSTEMS	68	35	92	115	138	163	190	219	19
<b>GRAND TOTAL</b>	2984	19	3543	4221	5028	6000	7240	8633	20

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

STATE/LOCAL GOVERNMENT SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88
	1982 (\$M)	GROWTH (%)							AAGR (%)
REMOTE COMPUTING SERVICES									
CROSS INDUSTRY	34	12	38	44	51	58	67	76	15
INDUSTRY SPECIFIC	15	11	17	19	22	26	30	34	15
UTILITY	36	10	40	41	43	45	46	47	4
SUBTOTAL	85	11	94	105	116	129	143	158	11
BATCH PROCESSING SERVICES									
CROSS INDUSTRY	19	2	19	20	20	20	20	20	1
INDUSTRY SPECIFIC	25	2	26	27	28	29	29	30	3
UTILITY	52	2	53	54	55	56	57	57	1
SUBTOTAL	96	2	98	101	103	105	106	107	2
FACILITY MANAGEMENT									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	8	6	8	9	10	11	13	15	12
UTILITY	18	6	19	21	23	26	29	33	12
SUBTOTAL	26	6	28	30	33	37	42	48	12
TOTAL PROCESSING SERVICES									
CROSS INDUSTRY	53	8	57	64	71	78	87	96	11
INDUSTRY SPECIFIC	48	5	51	55	60	66	72	79	9
UTILITY	106	5	112	117	121	127	132	137	4
GRAND TOTAL PROCESSING	207	6	220	235	252	271	291	313	7
SOFTWARE PRODUCTS									
APPLICATIONS									
CROSS INDUSTRY	33	28	42	52	64	79	96	115	22
INDUSTRY SPECIFIC	18	28	23	30	38	49	62	78	28
SUBTOTAL	51	28	65	82	103	129	158	193	24
SYSTEMS	140	20	168	198	228	262	299	341	15
TOTAL SOFTWARE	191	22	233	281	331	391	457	534	18
PROFESSIONAL SERVICES									
SOFTWARE DEVELOPMENT	866	11	961	1048	1153	1267	1405	1558	10
OTHER	230	11	255	302	360	427	509	605	19
TOTAL PROFESSIONAL SERVICES	1096	11	1217	1350	1512	1694	1914	2163	12
INTEGRATED SYSTEMS									
INDUSTRY SPECIFIC	27	11	30	34	39	46	53	62	16
CROSS INDUSTRY	21	11	23	26	30	35	40	46	15
TOTAL INTEGRATED SYSTEMS	48	11	53	60	69	80	93	108	15
GRAND TOTAL	1542	12	1723	1926	2165	2436	2756	3117	13

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

SERVICES SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983	1984	1985	1986	1987	1988	83-88
	1982	GROWTH							AAGR
	(\$M)	(%)	(\$M)	(\$M)	(\$M)	(\$M)	(\$M)	(\$M)	(%)
REMOTE COMPUTING SERVICES									
CROSS INDUSTRY	277	19	329	381	436	501	570	649	15
INDUSTRY SPECIFIC	343	17	401	477	560	659	770	890	17
UTILITY	66	9	72	81	89	98	107	116	10
SUBTOTAL	686	17	803	939	1084	1258	1447	1655	16
BATCH PROCESSING SERVICES									
CROSS INDUSTRY	90	6	95	101	106	109	109	108	2
INDUSTRY SPECIFIC	212	6	225	236	245	250	250	245	2
UTILITY	19	6	20	20	21	20	19	18	-2
SUBTOTAL	321	6	340	357	372	379	379	371	2
FACILITY MANAGEMENT									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	3	6	3	3	4	4	5	6	13
UTILITY	0	0	0	0	0	0	0	0	0
SUBTOTAL	3	6	3	3	4	4	5	6	13
TOTAL PROCESSING SERVICES									
CROSS INDUSTRY	367	16	424	482	542	609	679	757	12
INDUSTRY SPECIFIC	558	13	629	716	809	914	1025	1141	13
UTILITY	85	9	92	101	109	118	126	134	8
GRAND TOTAL PROCESSING	1010	13	1146	1300	1460	1641	1831	2032	12
SOFTWARE PRODUCTS									
APPLICATIONS									
CROSS INDUSTRY	92	35	124	165	217	285	371	484	31
INDUSTRY SPECIFIC	47	35	63	89	123	170	233	320	38
SUBTOTAL	139	35	188	253	339	455	605	804	34
SYSTEMS	58	29	75	97	125	157	196	243	27
TOTAL SOFTWARE	197	33	262	351	464	612	801	1047	32
PROFESSIONAL SERVICES									
SOFTWARE DEVELOPMENT	30	14	34	39	44	50	57	66	14
OTHER	6	14	7	8	10	11	14	16	19
TOTAL PROFESSIONAL SERVICES	36	14	41	47	53	61	71	82	15
INTEGRATED SYSTEMS									
INDUSTRY SPECIFIC	227	25	284	370	490	643	832	1068	30
CROSS INDUSTRY	88	25	110	142	186	242	310	394	29
TOTAL INTEGRATED SYSTEMS	315	25	394	512	676	885	1142	1462	30
GRAND TOTAL	1558	18	1843	2209	2653	3200	3844	4623	20

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

OTHER SECTOR - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88
	1982 (\$M)	GROWTH (%)							AAGR (%)
REMOTE COMPUTING SERVICES									
CROSS INDUSTRY	140	20	168	197	227	264	307	356	16
INDUSTRY SPECIFIC	189	16	219	259	300	350	410	478	17
UTILITY	73	9	79	85	90	95	99	103	5
SUBTOTAL	402	16	466	541	617	709	816	938	15
BATCH PROCESSING SERVICES									
CROSS INDUSTRY	122	2	124	129	133	136	137	137	2
INDUSTRY SPECIFIC	136	2	139	142	143	144	142	140	0
UTILITY	26	2	27	27	28	28	28	28	1
SUBTOTAL	284	2	290	298	304	307	307	304	1
FACILITY MANAGEMENT									
CROSS INDUSTRY	0	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	7	12	8	9	10	11	12	13	11
UTILITY	4	12	4	5	5	6	6	7	9
SUBTOTAL	11	12	12	14	15	17	19	20	10
TOTAL PROCESSING SERVICES									
CROSS INDUSTRY	262	12	292	326	360	399	443	493	11
INDUSTRY SPECIFIC	332	10	366	409	453	505	564	631	12
UTILITY	103	7	110	118	123	129	134	138	5
GRAND TOTAL PROCESSING	697	10	768	853	936	1033	1141	1262	10
SOFTWARE PRODUCTS									
APPLICATIONS									
CROSS INDUSTRY	76	38	105	137	179	231	297	380	29
INDUSTRY SPECIFIC	47	38	65	92	131	183	255	354	40
SUBTOTAL	123	38	170	229	309	415	552	734	34
SYSTEMS	55	29	71	92	117	149	189	236	27
TOTAL SOFTWARE	178	35	241	321	427	564	741	970	32
PROFESSIONAL SERVICES									
SOFTWARE DEVELOPMENT	141	11	157	172	192	213	236	260	11
OTHER	42	11	47	53	61	70	80	91	14
TOTAL PROFESSIONAL SERVICES	183	11	203	225	253	283	317	352	12
INTEGRATED SYSTEMS									
INDUSTRY SPECIFIC	28	12	31	37	45	54	65	78	20
CROSS INDUSTRY	52	12	58	69	81	98	117	138	19
TOTAL INTEGRATED SYSTEMS	80	12	90	106	126	152	183	216	19
GRAND TOTAL	1138	14	1302	1505	1741	2032	2382	2800	17

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.



INFORMATION SERVICES INDUSTRY - TOTAL MARKET FORECAST  
BY DELIVERY MODE, 1983 - 1988

DELIVERY MODE	USER EXPENDITURE FORECAST								
	82-83		1983 (\$M)	1984 (\$M)	1985 (\$M)	1986 (\$M)	1987 (\$M)	1988 (\$M)	83-88 AAGR (%)
	1982 (\$M)	GROWTH (%)							
<b>REMOTE COMPUTING SERVICES</b>									
CROSS INDUSTRY	1985	19	2368	2785	3276	3845	4520	5324	18
INDUSTRY SPECIFIC	2888	18	3405	4038	4751	5629	6638	7785	18
UTILITY	1065	9	1161	1263	1374	1494	1619	1746	9
SUBTOTAL	5938	17	6933	8087	9401	10960	12778	14856	16
<b>BATCH PROCESSING SERVICES</b>									
CROSS INDUSTRY	1246	5	1306	1374	1426	1466	1486	1501	3
INDUSTRY SPECIFIC	2175	6	2316	2465	2602	2721	2811	2893	5
UTILITY	516	5	540	544	539	529	511	490	-2
SUBTOTAL	3937	6	4162	4382	4567	4716	4808	4884	3
<b>FACILITY MANAGEMENT</b>									
CROSS INDUSTRY	48	26	60	66	70	73	75	75	5
INDUSTRY SPECIFIC	1129	17	1320	1566	1871	2227	2637	3098	19
UTILITY	109	21	132	162	197	239	291	355	22
SUBTOTAL	1286	18	1513	1793	2138	2539	3003	3528	18
<b>TOTAL PROCESSING SERVICES</b>									
CROSS INDUSTRY	3279	14	3734	4225	4772	5385	6081	6900	13
INDUSTRY SPECIFIC	6192	14	7041	8068	9225	10577	12087	13777	14
UTILITY	1690	8	1832	1969	2110	2262	2421	2591	7
GRAND TOTAL PROCESSING	11161	13	12608	14262	16107	18223	20589	23268	13
<b>SOFTWARE PRODUCTS</b>									
APPLICATIONS									
CROSS INDUSTRY	1642	36	2226	2940	3864	5029	6468	8285	30
INDUSTRY SPECIFIC	1438	35	1942	2736	3834	5314	7277	9926	39
SUBTOTAL	3080	35	4168	5676	7698	10343	13744	18211	34
SYSTEMS	2685	32	3534	4668	6070	7823	9952	12479	29
TOTAL SOFTWARE	5765	34	7702	10344	13768	18166	23697	30690	32
<b>PROFESSIONAL SERVICES</b>									
SOFTWARE DEVELOPMENT	4335	16	5023	5888	6942	8186	9726	11531	18
CONSULTING	710	17	831	989	1186	1435	1722	2050	20
EDUCATION	380	20	456	552	673	821	994	1192	21
FACILITY MANAGEMENT	556	13	628	685	734	762	818	878	7
TOTAL PROFESSIONAL SERVICES	5981	16	6938	8114	9536	11204	13261	15651	18
<b>INTEGRATED SYSTEMS</b>									
INDUSTRY SPECIFIC	2366	20	2849	3581	4554	5804	7359	9289	27
CROSS INDUSTRY	1238	21	1492	1823	2243	2756	3358	4072	22
TOTAL INTEGRATED SYSTEMS	3604	20	4342	5404	6797	8560	10718	13361	25
<b>GRAND TOTAL</b>	26511	19	31590	38124	46208	56153	68264	82970	21

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

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## APPENDIX C: RECONCILIATION



## APPENDIX C: RECONCILIATION

- Each year INPUT reviews its prior forecasts in light of new information gleaned from all the sources that contribute to the process. These include:
  - Thousands of interviews with end users and IS departments.
  - Hundreds of structured interviews with information services vendors, including an annual census of those firms earning more than \$10 million annually.
  - Indicative industry trends as reported in annual reports, 10K reports, announcements, press releases, etc.
  - INPUT's CAMP Directory data base of 3,900 industry firms.
- Exhibits C-1 through C-15 are presented to compare past and present forecasts. The data include:
  - Comparison of 1982 market size as forecast last year, versus that reported this year.
  - Comparison of 1988 estimated market size, as derived from last year's forecast of the 1987 market, with the estimated 1988 market size forecast this year.

EXHIBIT C-1

DISCRETE MANUFACTURING SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1982 MARKET			1988 MARKET			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	165	297	-44	419	815	-49	16	18
INDUSTRY SPECIFIC	475	395	20	1209	1058	14	17	18
UTILITY	106	83	28	281	163	73	17	12
SUBTOTAL	746	775	-4	1909	2036	-6	17	18
BATCH PROCESSING								
CROSS INDUSTRY	313	299	5	502	306	64	9	0
INDUSTRY SPECIFIC	102	100	2	180	124	45	10	4
UTILITY	79	76	4	108	64	69	6	-4
SUBTOTAL	494	475	4	790	494	60	8	0
FACILITY MANAGEMENT								
CROSS INDUSTRY	6	5	20	10	10	1	8	11
INDUSTRY SPECIFIC	32	27	19	81	68	19	17	17
UTILITY	21	18	17	60	50	19	19	19
SUBTOTAL	59	50	18	150	128	17	17	17
TOTAL PROCESSING								
CROSS INDUSTRY	484	601	-19	931	1131	-18	11	11
INDUSTRY SPECIFIC	609	522	17	1470	1250	18	16	16
UTILITY	206	177	16	449	277	62	13	8
GRAND TOTAL PROCESSING	1299	1300	0	2850	2658	7	14	13
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	494	509	-3	4243	2991	42	43	35
SYSTEM SOFTWARE	642	665	-3	4496	3377	33	38	30
SUBTOTAL SOFTWARE	1136	1174	-3	8739	6368	37	40	32
PROFESSIONAL SERVICES	764	822	-7	2682	2475	8	22	20
INTEGRATED SYSTEMS								
CROSS INDUSTRY	255	265	-4	1155	984	17	28	25
INDUSTRY SPECIFIC	706	716	-1	4003	3292	22	33	30
SUBTOTAL	961	981	-2	5158	4276	21	32	29
GRAND TOTAL	4160	4277	-3	19429	15777	23	28	25

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT C-2

PROCESS MANUFACTURING SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1 9 8 2 M A R K E T			1 9 8 8 M A R K E T			82-87 AAGR	83-88 AAGR
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	171	202	-15	511	603	-15	20	19
INDUSTRY SPECIFIC	67	86	-22	242	260	-7	24	21
UTILITY	247	215	15	682	370	84	18	10
SUBTOTAL	485	503	-4	1435	1233	16	19	16
BATCH PROCESSING								
CROSS INDUSTRY	114	104	10	288	184	57	17	10
INDUSTRY SPECIFIC	544	487	12	1493	842	77	19	10
UTILITY	65	58	12	107	54	97	9	-3
SUBTOTAL	723	649	11	1888	1080	75	18	9
FACILITY MANAGEMENT								
CROSS INDUSTRY	2	2	0	4	5	-20	15	20
INDUSTRY SPECIFIC	34	28	21	89	70	28	17	17
UTILITY	6	5	20	15	12	28	17	15
SUBTOTAL	42	35	20	109	87	25	17	17
TOTAL PROCESSING								
CROSS INDUSTRY	287	308	-7	804	792	1	19	17
INDUSTRY SPECIFIC	645	601	7	1824	1172	56	19	12
UTILITY	318	278	14	804	436	84	16	8
GRAND TOTAL PROCESSING	1250	1187	5	3432	2400	43	18	13
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	187	200	-7	1477	1201	23	41	35
SYSTEM SOFTWARE	407	418	-3	2852	2144	33	39	32
SUBTOTAL SOFTWARE	594	618	-4	4329	3345	29	40	33
PROFESSIONAL SERVICES	431	465	-7	1507	1353	11	22	19
INTEGRATED SYSTEMS								
CROSS INDUSTRY	101	101	0	409	296	38	26	21
INDUSTRY SPECIFIC	282	289	-2	1363	996	37	30	25
SUBTOTAL	383	390	-2	1772	1292	37	29	24
GRAND TOTAL	2658	2660	0	11040	8390	32	26	22

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT C-3

TRANSPORTATION SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1982 MARKET			1988 MARKET			82-87 AAGR	83-88 AAGR
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	29	37	-22	59	98	-40	12	17
INDUSTRY SPECIFIC	73	72	1	225	187	20	20	17
UTILITY	27	25	8	45	39	16	9	7
SUBTOTAL	129	134	-4	330	324	2	16	16
BATCH PROCESSING								
CROSS INDUSTRY	22	21	5	33	22	51	7	1
INDUSTRY SPECIFIC	34	33	3	58	39	50	10	3
UTILITY	12	12	0	13	9	44	2	-6
SUBTOTAL	68	66	3	104	70	49	8	1
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	29	24	21	57	44	30	11	11
UTILITY	0	0	0	0	0	0	0	0
SUBTOTAL	29	24	21	57	44	30	11	11
TOTAL PROCESSING								
CROSS INDUSTRY	51	58	-12	92	120	-23	10	13
INDUSTRY SPECIFIC	136	129	5	341	270	26	16	13
UTILITY	39	37	5	58	48	22	7	4
GRAND TOTAL PROCESSING	226	224	1	491	438	12	13	12
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	98	105	-7	1088	995	9	49	44
SYSTEM SOFTWARE	103	109	-6	599	645	-7	34	34
SUBTOTAL SOFTWARE	201	214	-6	1687	1640	3	42	40
PROFESSIONAL SERVICES	103	108	-5	224	221	1	13	13
INTEGRATED SYSTEMS								
CROSS INDUSTRY	52	51	2	178	113	58	22	13
INDUSTRY SPECIFIC	95	96	-1	308	345	-11	21	25
SUBTOTAL	147	147	0	486	458	6	22	22
GRAND TOTAL	677	693	-2	2889	2757	5	26	27

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.



EXHIBIT C-4

UTILITIES SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1982 MARKET			1988 MARKET			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	91	129	-29	200	306	-35	14	15
INDUSTRY SPECIFIC	119	119	0	295	321	-8	16	19
UTILITY	122	103	18	246	177	39	12	10
SUBTOTAL	332	351	-5	741	804	-8	14	15
BATCH PROCESSING								
CROSS INDUSTRY	45	42	7	71	51	40	8	3
INDUSTRY SPECIFIC	15	14	7	21	13	62	6	-3
UTILITY	24	24	0	37	22	70	7	-3
SUBTOTAL	84	80	5	130	86	51	7	0
FACILITY MANAGEMENT								
CROSS INDUSTRY	2	2	0	2	2	0	0	0
INDUSTRY SPECIFIC	2	2	0	2	2	0	0	0
UTILITY	8	7	14	16	12	36	12	11
SUBTOTAL	12	11	9	20	16	27	8	8
TOTAL PROCESSING								
CROSS INDUSTRY	138	173	-20	274	359	-24	12	13
INDUSTRY SPECIFIC	136	135	1	318	336	-5	15	18
UTILITY	154	134	15	300	211	42	11	8
GRAND TOTAL PROCESSING	428	442	-3	891	906	-2	13	13
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	54	60	-10	283	285	-1	32	29
SYSTEM SOFTWARE	114	121	-6	527	490	7	29	26
SUBTOTAL SOFTWARE	168	181	-7	809	775	4	30	27
PROFESSIONAL SERVICES	213	221	-4	703	648	8	22	20
INTEGRATED SYSTEMS								
CROSS INDUSTRY	31	30	3	127	108	17	26	25
INDUSTRY SPECIFIC	89	90	-1	281	241	17	21	18
SUBTOTAL	120	120	0	408	349	17	23	20
GRAND TOTAL	929	964	-4	2811	2678	5	20	19

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT C-5

BANKING AND FINANCE SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1982 MARKET			1988 MARKET			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	97	273	-64	237	886	-73	16	21
INDUSTRY SPECIFIC	985	829	19	3124	2334	34	21	18
UTILITY	59	82	-28	138	134	3	15	9
SUBTOTAL	1141	1184	-4	3499	3354	4	20	18
BATCH PROCESSING								
CROSS INDUSTRY	208	207	0	306	270	13	7	4
INDUSTRY SPECIFIC	724	674	7	1055	932	13	7	5
UTILITY	17	18	-6	28	25	13	9	6
SUBTOTAL	949	899	6	1390	1227	13	7	5
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	615	512	20	1642	1516	8	18	20
UTILITY	0	0	0	0	0	0	0	0
SUBTOTAL	615	512	20	1642	1516	8	18	20
TOTAL PROCESSING								
CROSS INDUSTRY	305	480	-36	544	1156	-53	10	15
INDUSTRY SPECIFIC	2324	2015	15	5822	4782	22	16	15
UTILITY	76	100	-24	166	159	4	14	8
GRAND TOTAL PROCESSING	2705	2595	4	6531	6097	7	16	15
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	644	683	-6	5387	4319	25	43	36
SYSTEM SOFTWARE	157	172	-9	1108	902	23	38	32
SUBTOTAL SOFTWARE	801	855	-6	6495	5221	24	42	35
PROFESSIONAL SERVICES	357	386	-8	1296	1392	-7	24	24
INTEGRATED SYSTEMS								
CROSS INDUSTRY	115	125	-8	449	360	25	25	19
INDUSTRY SPECIFIC	363	374	-3	1834	1352	36	31	25
SUBTOTAL	478	499	-4	2283	1712	33	30	24
GRAND TOTAL	4341	4335	0	16606	14422	15	24	22

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT C-6

INSURANCE SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1982 MARKET			1988 MARKET			82-87 AAGR	83-88 AAGR
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	99	128	-23	253	257	-2	17	12
INDUSTRY SPECIFIC	115	103	12	264	267	-1	15	18
UTILITY	24	21	14	45	33	38	11	7
SUBTOTAL	238	252	-6	562	557	1	15	14
BATCH PROCESSING								
CROSS INDUSTRY	28	27	4	38	27	41	6	-1
INDUSTRY SPECIFIC	105	101	4	154	117	32	7	2
UTILITY	15	14	7	24	16	51	8	1
SUBTOTAL	148	142	4	217	160	35	7	1
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	303	255	19	735	600	23	16	16
UTILITY	0	0	0	0	0	0	0	0
SUBTOTAL	303	255	19	735	600	23	16	16
TOTAL PROCESSING								
CROSS INDUSTRY	127	155	-18	291	284	2	15	10
INDUSTRY SPECIFIC	523	459	14	1154	984	17	14	14
UTILITY	39	35	11	70	49	42	10	5
GRAND TOTAL PROCESSING	689	649	6	1514	1317	15	14	12
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	428	436	-2	2572	1916	34	35	29
SYSTEM SOFTWARE	183	184	-1	1067	776	37	34	26
SUBTOTAL SOFTWARE	611	620	-1	3639	2692	35	35	28
PROFESSIONAL SERVICES	318	343	-7	933	903	3	20	17
INTEGRATED SYSTEMS								
CROSS INDUSTRY	131	140	-6	417	376	11	22	16
INDUSTRY SPECIFIC	70	79	-11	314	309	2	28	25
SUBTOTAL	201	219	-8	731	685	7	24	20
GRAND TOTAL	1819	1831	-1	6816	5597	22	24	21

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT C-7

MEDICAL SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1 9 8 2 M A R K E T			1 9 8 8 M A R K E T			82-87 AAGR	83-88 AAGR
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	23	57	-60	66	202	-67	19	23
INDUSTRY SPECIFIC	216	196	10	667	612	9	20	21
UTILITY	10	12	-17	24	25	-6	15	14
SUBTOTAL	249	265	-6	756	839	-10	20	21
BATCH PROCESSING								
CROSS INDUSTRY	36	35	3	69	40	74	12	2
INDUSTRY SPECIFIC	201	184	9	322	209	54	9	1
UTILITY	12	12	0	17	14	22	6	1
SUBTOTAL	249	231	8	409	263	55	9	1
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	256	215	19	835	669	25	22	21
UTILITY	0	0	0	0	0	0	0	0
SUBTOTAL	256	215	19	835	669	25	22	21
TOTAL PROCESSING								
CROSS INDUSTRY	59	92	-36	135	242	-44	15	18
INDUSTRY SPECIFIC	673	595	13	1824	1490	22	18	16
UTILITY	22	24	-8	41	39	4	10	8
GRAND TOTAL PROCESSING	754	711	6	1999	1771	13	17	16
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	192	195	-2	1739	1631	7	45	40
SYSTEM SOFTWARE	88	88	0	511	444	15	35	30
SUBTOTAL SOFTWARE	280	283	-1	2249	2075	8	42	38
PROFESSIONAL SERVICES	112	124	-10	343	386	-11	20	21
INTEGRATED SYSTEMS								
CROSS INDUSTRY	77	78	-1	309	238	30	26	21
INDUSTRY SPECIFIC	98	100	-2	531	408	30	32	28
SUBTOTAL	175	178	-2	840	646	30	30	25
GRAND TOTAL	1321	1296	2	5432	4878	11	26	25

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT C-8

EDUCATION SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1982 MARKET			1988 MARKET			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	23	30	-23	38	50	-23	9	9
INDUSTRY SPECIFIC	11	12	-8	18	25	-27	8	14
UTILITY	25	23	9	34	28	22	5	2
SUBTOTAL	59	65	-9	91	103	-12	7	8
BATCH PROCESSING								
CROSS INDUSTRY	20	19	5	25	15	67	4	-5
INDUSTRY SPECIFIC	31	29	7	41	28	47	5	-1
UTILITY	16	15	7	19	13	47	2	-3
SUBTOTAL	67	63	6	85	56	52	4	-2
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	19	16	19	45	34	33	15	14
UTILITY	0	0	0	0	0	0	0	0
SUBTOTAL	19	16	19	45	34	33	15	14
TOTAL PROCESSING								
CROSS INDUSTRY	43	49	-12	63	65	-3	7	5
INDUSTRY SPECIFIC	61	57	7	105	87	20	9	8
UTILITY	41	38	8	53	41	30	4	0
GRAND TOTAL PROCESSING	145	144	1	221	193	15	7	5
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	45	61	-26	161	219	-26	24	23
SYSTEM SOFTWARE	46	48	-4	151	112	35	21	14
SUBTOTAL SOFTWARE	91	109	-17	312	331	-6	23	20
PROFESSIONAL SERVICES	94	102	-8	195	193	1	13	12
INTEGRATED SYSTEMS								
CROSS INDUSTRY	20	21	-5	56	42	33	18	13
INDUSTRY SPECIFIC	54	55	-2	159	122	31	19	15
SUBTOTAL	74	76	-3	215	164	31	19	15
GRAND TOTAL	404	431	-6	943	881	7	15	13

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT C-9

RETAIL DISTRIBUTION SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1 9 8 2 M A R K E T			1 9 8 8 M A R K E T			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 AAGR (%)	FORECAST IN '83 AAGR (%)
REMOTE COMPUTING								
CROSS INDUSTRY	51	120	-58	153	325	-53	20	18
INDUSTRY SPECIFIC	395	349	13	974	894	9	16	17
UTILITY	41	37	11	85	78	8	12	14
SUBTOTAL	487	506	-4	1211	1297	-7	16	17
BATCH PROCESSING								
CROSS INDUSTRY	96	88	9	165	109	51	10	3
INDUSTRY SPECIFIC	118	114	4	138	114	21	3	-1
UTILITY	34	36	-6	45	31	45	5	-4
SUBTOTAL	248	238	4	348	254	37	6	0
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	13	11	18	19	15	27	7	5
UTILITY	0	0	0	0	0	0	0	0
SUBTOTAL	13	11	18	19	15	27	7	5
TOTAL PROCESSING								
CROSS INDUSTRY	147	208	-29	318	434	-27	14	13
INDUSTRY SPECIFIC	526	474	11	1131	1023	11	13	14
UTILITY	75	73	3	130	109	19	9	6
GRAND TOTAL PROCESSING	748	755	-1	1578	1566	1	13	13
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	182	194	-6	1337	1139	17	39	35
SYSTEM SOFTWARE	92	96	-4	501	450	11	33	28
SUBTOTAL SOFTWARE	274	290	-6	1838	1589	16	37	32
PROFESSIONAL SERVICES	152	164	-7	313	307	2	13	11
INTEGRATED SYSTEMS								
CROSS INDUSTRY	121	134	-10	644	495	30	32	25
INDUSTRY SPECIFIC	101	105	-4	442	388	14	28	25
SUBTOTAL	222	239	-7	1086	883	23	30	25
GRAND TOTAL	1396	1448	-4	4815	4345	11	22	21

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT C-10

WHOLESALE DISTRIBUTION SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1982 MARKET			1988 MARKET			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	AAGR FORECAST IN '82 REPORT (%)	AAGR FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	70	93	-25	134	223	-40	11	16
INDUSTRY SPECIFIC	131	129	2	300	301	0	15	15
UTILITY	27	17	59	43	34	28	8	11
SUBTOTAL	228	239	-5	477	558	-15	13	15
BATCH PROCESSING								
CROSS INDUSTRY	173	162	7	323	193	68	11	2
INDUSTRY SPECIFIC	68	66	3	80	61	31	3	-3
UTILITY	107	102	5	103	84	23	0	-5
SUBTOTAL	348	330	5	506	338	50	7	-1
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	6	0	0	7	0	0	0
INDUSTRY SPECIFIC	33	21	57	63	45	39	11	14
UTILITY	5	4	25	7	6	17	7	8
SUBTOTAL	38	31	23	70	58	20	11	11
TOTAL PROCESSING								
CROSS INDUSTRY	243	261	-7	457	423	8	11	8
INDUSTRY SPECIFIC	232	216	7	443	407	9	11	11
UTILITY	139	123	13	153	124	24	2	-1
GRAND TOTAL PROCESSING	614	600	2	1053	954	10	9	8
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	287	290	-1	2117	1568	35	39	32
SYSTEM SOFTWARE	87	86	1	520	369	41	35	26
SUBTOTAL SOFTWARE	374	376	-1	2637	1937	36	38	31
PROFESSIONAL SERVICES	128	138	-7	276	297	-7	13	13
INTEGRATED SYSTEMS								
CROSS INDUSTRY	111	118	-6	534	441	21	30	25
INDUSTRY SPECIFIC	120	127	-6	513	456	13	27	24
SUBTOTAL	231	245	-6	1048	897	17	28	24
GRAND TOTAL	1347	1359	-1	5013	4085	23	24	20

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT C-11

FEDERAL GOVERNMENT SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1982 MARKET			1988 MARKET			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	129	169	-24	257	480	-46	12	20
INDUSTRY SPECIFIC	41	49	-16	96	120	-20	15	17
UTILITY	292	273	7	559	400	40	11	6
SUBTOTAL	462	491	-6	913	1000	-9	12	13
BATCH PROCESSING								
CROSS INDUSTRY	13	12	8	18	19	-5	6	10
INDUSTRY SPECIFIC	0	1	0	0	1	0	0	0
UTILITY	54	52	4	72	56	29	5	1
SUBTOTAL	67	65	3	90	76	19	5	3
FACILITY MANAGEMENT								
CROSS INDUSTRY	40	33	21	60	52	16	7	3
INDUSTRY SPECIFIC	0	0	0	0	0	0	0	0
UTILITY	64	54	19	308	236	31	31	27
SUBTOTAL	104	87	20	368	288	28	24	20
TOTAL PROCESSING								
CROSS INDUSTRY	182	214	-15	336	551	-39	11	17
INDUSTRY SPECIFIC	41	50	-18	96	121	-21	15	17
UTILITY	410	379	8	940	692	36	14	10
GRAND TOTAL PROCESSING	633	643	-2	1372	1364	1	13	13
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	18	35	-49	66	219	-70	25	27
SYSTEM SOFTWARE	417	445	-6	2448	1953	25	34	28
SUBTOTAL SOFTWARE	435	480	-9	2514	2172	16	33	28
PROFESSIONAL SERVICES	1669	1793	-7	4146	4878	-15	16	19
INTEGRATED SYSTEMS								
CROSS INDUSTRY	14	14	0	41	41	1	19	17
INDUSTRY SPECIFIC	52	54	-4	165	178	-7	21	20
SUBTOTAL	66	68	-3	206	219	-6	21	19
GRAND TOTAL	2803	2984	-6	8238	8633	-5	19	19

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.



EXHIBIT C-12

STATE/LOCAL GOVERNMENT SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1 9 8 2 M A R K E T			1 9 8 8 M A R K E T			82-87 AAGR	83-88 AAGR
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	28	34	-18	68	76	-11	15	15
INDUSTRY SPECIFIC	15	15	0	29	34	-14	12	15
UTILITY	38	36	6	57	47	22	7	3
SUBTOTAL	81	85	-5	154	157	-2	11	11
BATCH PROCESSING								
CROSS INDUSTRY	21	19	11	33	20	66	8	1
INDUSTRY SPECIFIC	25	25	0	42	30	41	9	3
UTILITY	54	52	4	88	57	55	9	1
SUBTOTAL	100	96	4	164	107	53	9	2
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	9	8	13	16	15	7	11	13
UTILITY	21	18	17	38	33	16	11	12
SUBTOTAL	30	26	15	54	48	13	11	12
TOTAL PROCESSING								
CROSS INDUSTRY	49	53	-8	101	96	5	12	11
INDUSTRY SPECIFIC	49	48	2	88	79	11	10	9
UTILITY	113	106	7	184	137	34	9	4
GRAND TOTAL PROCESSING	211	207	2	373	312	19	10	7
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	43	51	-16	161	193	-17	25	24
SYSTEM SOFTWARE	131	140	-6	406	341	19	21	15
SUBTOTAL SOFTWARE	174	191	-9	567	534	6	22	18
PROFESSIONAL SERVICES	1000	1096	-9	2102	2163	-3	13	12
INTEGRATED SYSTEMS								
CROSS INDUSTRY	21	21	0	65	46	42	20	15
INDUSTRY SPECIFIC	27	27	0	76	62	22	19	16
SUBTOTAL	48	48	0	141	108	31	20	15
GRAND TOTAL	1433	1542	-7	3182	3117	2	14	13

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT C-13

SERVICES SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1 9 8 2 M A R K E T			1 9 8 8 M A R K E T			82-87 AAGR	83-88 AAGR
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	161	277	-42	364	649	-44	14	15
INDUSTRY SPECIFIC	429	343	25	1171	890	32	18	17
UTILITY	74	66	12	148	116	28	12	10
SUBTOTAL	664	686	-3	1682	1655	2	16	16
BATCH PROCESSING								
CROSS INDUSTRY	94	90	4	154	108	42	9	3
INDUSTRY SPECIFIC	227	212	7	311	245	27	6	2
UTILITY	21	19	11	26	18	45	4	-2
SUBTOTAL	342	321	7	491	371	32	7	2
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	4	3	33	8	6	36	12	15
UTILITY	0	0	0	0	0	0	0	0
SUBTOTAL	4	3	33	8	6	36	12	15
TOTAL PROCESSING								
CROSS INDUSTRY	255	367	-31	517	757	-32	12	12
INDUSTRY SPECIFIC	660	558	18	1490	1141	31	14	13
UTILITY	95	85	12	174	134	30	10	8
GRAND TOTAL PROCESSING	1010	1010	0	2182	2032	7	13	12
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	128	139	-8	858	804	7	38	34
SYSTEM SOFTWARE	55	58	-5	297	243	22	32	27
SUBTOTAL SOFTWARE	183	197	-7	1155	1047	10	36	32
PROFESSIONAL SERVICES	33	36	-8	81	82	-2	16	15
INTEGRATED SYSTEMS								
CROSS INDUSTRY	84	88	-5	470	394	19	33	29
INDUSTRY SPECIFIC	215	227	-5	1169	1068	9	33	30
SUBTOTAL	299	315	-5	1639	1462	12	33	30
GRAND TOTAL	1525	1558	-2	5056	4623	9	22	20

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

EXHIBIT C-14

OTHER SECTOR - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1 9 8 2 M A R K E T			1 9 8 8 M A R K E T			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	56	140	-60	126	356	-65	14	16
INDUSTRY SPECIFIC	247	189	31	686	478	44	18	17
UTILITY	79	73	8	141	103	37	10	5
SUBTOTAL	382	402	-5	954	937	2	16	15
BATCH PROCESSING								
CROSS INDUSTRY	132	122	8	245	137	79	11	2
INDUSTRY SPECIFIC	144	136	6	198	140	42	6	0
UTILITY	26	26	0	36	28	29	6	1
SUBTOTAL	302	284	6	480	305	57	8	1
FACILITY MANAGEMENT								
CROSS INDUSTRY	0	0	0	0	0	0	0	0
INDUSTRY SPECIFIC	8	7	14	16	13	26	12	10
UTILITY	5	4	25	9	7	31	10	12
SUBTOTAL	13	11	18	25	20	27	11	11
TOTAL PROCESSING								
CROSS INDUSTRY	188	262	-28	371	493	-25	12	11
INDUSTRY SPECIFIC	399	332	20	901	631	43	14	12
UTILITY	110	103	7	187	138	35	9	5
GRAND TOTAL PROCESSING	697	697	0	1459	1262	16	13	10
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	112	123	-9	851	734	16	41	34
SYSTEM SOFTWARE	51	55	-7	282	236	20	34	27
SUBTOTAL SOFTWARE	163	178	-8	1133	970	17	39	32
PROFESSIONAL SERVICES	169	183	-8	357	352	1	13	12
INTEGRATED SYSTEMS								
CROSS INDUSTRY	52	52	0	208	138	51	25	19
INDUSTRY SPECIFIC	28	28	0	81	78	4	19	20
SUBTOTAL	80	80	0	289	216	34	23	19
GRAND TOTAL	1109	1138	-3	3238	2800	16	19	17

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

## EXHIBIT C-15

INFORMATION SERVICES INDUSTRY - DATABASE RECONCILIATION  
OF MARKET FORECAST, BY DELIVERY MODE

DELIVERY MODE	1 9 8 2 M A R K E T			1 9 8 8 M A R K E T			82-87	83-88
	1982 FORECAST (\$M)	1983 REPORT (\$M)	VARIANCE AS % OF '83 RPRT	1982 FORECAST (\$M)	1983 FORECAST (\$M)	VARIANCE AS % OF '83 FCST	FORECAST IN '82 REPORT (%)	FORECAST IN '83 REPORT (%)
REMOTE COMPUTING								
CROSS INDUSTRY	1193	1985	-40	2882	5324	-46	16	18
INDUSTRY SPECIFIC	3319	2888	15	9288	7785	19	18	18
UTILITY	1171	1065	10	2523	1746	44	13	9
SUBTOTAL	5683	5938	-4	14693	14855	-1	17	16
BATCH PROCESSING								
CROSS INDUSTRY	1315	1246	6	2270	1501	51	10	3
INDUSTRY SPECIFIC	2337	2175	7	4086	2893	41	10	5
UTILITY	536	516	4	724	490	48	5	-2
SUBTOTAL	4188	3937	6	7079	4884	45	9	3
FACILITY MANAGEMENT								
CROSS INDUSTRY	50	48	4	76	75	2	7	5
INDUSTRY SPECIFIC	1358	1129	20	3610	3098	17	18	19
UTILITY	129	109	18	450	355	27	24	22
SUBTOTAL	1537	1286	20	4136	3528	17	18	18
TOTAL PROCESSING								
CROSS INDUSTRY	2558	3279	-22	5228	6900	-24	13	13
INDUSTRY SPECIFIC	7014	6192	13	16983	13776	23	16	14
UTILITY	1836	1690	9	3697	2591	43	12	7
GRAND TOTAL PROCESSING	11408	11161	2	25908	23267	11	14	13
SOFTWARE PRODUCTS								
APPLICATION SOFTWARE	2913	3080	-5	22316	18211	23	40	34
SYSTEM SOFTWARE	2574	2685	-4	15744	12479	26	35	29
SUBTOTAL SOFTWARE	5487	5765	-5	38060	30690	24	38	32
PROFESSIONAL SERVICES								
SOFTWARE DEVELOPMENT	4158	4335	-4	11246	11531	-2	18	18
CONSULTING	598	710	-16	1869	2050	-9	21	20
EDUCATION	307	380	-19	1184	1192	-1	24	21
FACILITY MANAGEMENT	480	556	-14	841	878	-4	10	7
SUBTOTAL PROF. SERVICES	5543	5981	-7	15140	15651	-3	18	18
INTEGRATED SYSTEMS								
CROSS INDUSTRY	1183	1238	-4	5047	4072	24	27	22
INDUSTRY SPECIFIC	2298	2366	-3	11232	9289	21	30	27
SUBTOTAL	3481	3604	-3	16279	13361	22	29	25
GRAND TOTAL	25919	26511	-2	95369	82969	15	24	21

NOTE: SINGLE DIGIT PRECISION FOR PURPOSE OF COMPUTATION ONLY. FOR OTHER USES ROUND TO TEN MILLIONS.  
GROWTH RATES ROUNDED TO 1%.

- Comparison of the growth rates that were forecast to occur over the overlapping 1982-1987 and 1983-1988 time periods.
- In addition to being presented for the industry as a whole, data are presented on an industry-by-industry basis.

## A. INFORMATION SERVICES INDUSTRY

- The industry as a whole is forecast to grow at 21% per year over the next five years, as shown in Exhibit C-15. This compares with last year's 24% per year forecast over the 1982-1987 timeframe.
- Approximately one percentage point difference can be attributed to the forward shift of timeframes by one year. As the industry continues to grow, its sheer size makes continued growth at previous levels more difficult, hence part of the downward revision.
- The other two-percentage-point difference in forecast is traceable to a downward revision in growth estimates for specific delivery modes, primarily batch processing and software products.
- The 1983 estimate of the total 1982 market was increased by 2%. This is principally due to increases in the reported size of the software and professional services markets.
- These changes in both the 1982 and 1988 market sizes are detailed in the respective sections below.

## B. PROCESSING SERVICES

- The largest change in the 1982 base numbers for processing services occur in the facility management area, where the base has been lowered by 20% (from \$1,537 million to \$1,286 million).
  - Thirty percent of this figure - \$76 million - has occurred as a result of the reclassification of revenue from processing to professional services facility management.
  - The remainder - approximately \$175 million - is now attributed to remote computing services, where it is counted as user site hardware services in cross-industry applications.
- Estimates for facility management growth through 1988 are substantially unchanged from last year, with 18% annual growth forecast.
- The remote computing sector of the 1982 processing services marketplace has been increased by 4% from last year's estimate. Though relatively stable, much reclassification has occurred within that market.
- A major restatement (40% increase) of the cross-industry portion of RCS has occurred and is traced to three sources:
  - Some RCS revenue, formerly classified as industry specific, has been reclassified as cross-industry in nature. Certain cash and portfolio management applications are examples. A certain portion of data base revenue from credit card and securities applications are other examples. The above factors account for the lowering of industry-specific RCS revenue by 10%.

- Estimates of batch revenue were lowered and shifted to RCS because much data base revenue that was formerly treated as batch is now coming on-line.
- The reclassification of facilities management - noted above - resulted in a substantial shift in market size and proportion.
- Growth rates for RCS over the 1983-1988 timeframe remain largely unchanged, save for a material reduction in the estimate for utility processing growth. The utility processing growth rate has been lowered from a 13% yearly increase to 9%, reflecting an increasing softness in this market.
- Discrepancies between the 1982 and 1983 dollar value forecasts for the 1988 market (1982 forecast values have been extended outward one year) are a result of the combination of different base dollar values with differing growth rates.
- Batch processing revenue is reported largely unchanged for 1982 but has been targeted for significantly lowered growth expectations through 1988 because of:
  - The rapid proliferation of data networks facilitating electronic (RCS) conveyance of data and applications. This effect is expected to fall especially heavily on the discrete and process manufacturing sectors where on-line needs are high, as well as on the medical, transportation, and wholesale industries.
  - The substitution in small businesses (where batch is especially strong) of PCs for routine batch transaction processing applications such as payroll and accounting.
- It should be noted that the 3% forecast increase in batch revenue represents a real decline - albeit small - in the inflation-adjusted value of services sold.

The total dollar difference in 1988 market size estimates is the result of a lowered base and lowered growth expectations.

### C. SOFTWARE PRODUCTS

- The software products marketplace estimate for 1982 has been changed slightly. The five-year forecast has been lowered by six percentage points that, when compounded yearly for five years, result in a significant (24%) difference in estimates for 1988 market size. The principal reasons for this change are:
  - Price erosion has begun to appear in the lower-end package market and should migrate upward as smaller systems increase in power and supplant larger systems. In the micro market price erosion is especially visible because of several factors.
    - Diskette duplication costs are incredibly low (\$2-\$5 with diskette).
    - Because of low product costs, large volumes are needed to achieve significant revenue, increasing the incentive for price cutting and discounting. "Share-ware" - free software - is beginning to appear.
    - Most applications are not very complex, making for quick copying and improvement by imitators who use lower prices to fight established name products - witness the "Visiclone" phenomenon.
    - Competition is fierce and slated to get much more intense.



- Saturation will begin to occur in some industries, compounded by industry consolidation and possible shrinkage, e.g., in banking and insurance.
- The spreading use of fourth-generation languages, enabling end users to write their own applications, will slow the growing demand for large applications packages.

#### D. PROFESSIONAL SERVICES

- The professional services market estimate for 1982 has been raised by 7%, principally owing to changes in the education and consulting subsectors. These increases are attributable to new revenue (not previously recognized) from third-party education services and some consulting revenue from accounting firms.
- Professional services facility management was changed as a result of the reclassification of revenue that is discussed under processing above.
- There have not been appreciable changes in the growth forecasts for this sector.

#### E. INTEGRATED SYSTEMS

- The integrated systems market size figure for 1982 was raised slightly in 1983 over the 1982 forecast of 1982, acknowledging spending not formerly counted.

- The five-year forecasts through 1988 have been lowered three to five percentage points, reflecting both the expected decline in hardware costs, which still make up 60%-75% of the value of typical systems, and the increasing importance of retail distribution channels, which assist low-priced systems buyers assemble their own systems.

**APPENDIX D: RELATED INPUT REPORTS**



## APPENDIX D: RELATED INPUT REPORTS

	<u>Year</u>
<b>ANNUAL REPORTS</b>	
● U.S. Information Services Markets, 1983-1988	
Volume I - Industry-Specific Markets	1983
Volume II - Cross-Industry Markets	1983
● U.S. Information Services Markets, 1982-1987	
Volume I - Processing Services and Integrated Systems	1982
Volume II - Software Products and Professional Services	1982
● ISIP 1981 Annual Report	1981
● ISIP 1980 Annual Report	1980
● ISIP 1979 Annual Report	1979
● ISIP 1978 Annual Report	1978
● ISIP 1977 Annual Report	1977
● ISIP 1976 Annual Report	1976
<b>INDUSTRY SURVEYS</b>	
● Seventeenth Annual ADAPSO Survey of the Computer Services Industry - 1983	7/83
● Sixteenth Annual ADAPSO Survey of the Computer Services Industry - 1982	7/82
● Fifteenth Annual ADAPSO Survey of the Computer Services Industry - 1981	7/81

- Fourteenth Annual ADAPSO Survey of the Computer Services Industry - 1980 7/80
- Thirteenth Annual ADAPSO Survey of the Computer Services Industry - 1979 7/79
- Twelfth Annual ADAPSO Survey of the Computer Services Industry - 1978 7/78

#### 1983 ISIP REPORTS

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

#### OTHER 1983 REPORTS

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

#### 1982 REPORTS

- Personal Computer Software Market Opportunities
- New Processing Opportunities in Banking
- Market Opportunities in Discrete Manufacturing
- Market Opportunities in Network Services
- Directory of Leading U.S. Computer Services Vendors

#### 1981 REPORTS

- Opportunities for Business Graphics Services and Software
- The Merging of Hardware, Software, and Services
- Computer Services Opportunities in Energy Markets

- Impact of Communications Development on Information Services Vendors
- Market Trends in Professional Services
- Personal Computer Use in Large Companies

### MANAGEMENT BRIEFS

- Information Services in 1990
- Banking and Finance Industry Trends: Impact on Computer Services
- Directory of Leading U.S. Computer Services Firms
- Information Services Industry Opportunities in Hardware Services

### 1980 REPORTS

- Computer Services Markets for Insurance Agents and Brokers
- Market Opportunities for Data Base Services
- Marketing Applications Software Products
- Trends in Computer Services Pricing
- Trends in Delivery of Remote Computing Services
- Improving Sales Productivity in the Computer Services Industry

### 1979 REPORTS

- Sales and Sales Support Training
- Computer Services Market in Banking and Finance
- Opportunities in Education Services
- Opportunities in Marketing Systems Software Products
- Computer Services Markets in Government Funded Health Insurance
- Office of the Future: Opportunities for Service Companies
- Turnkey Systems Opportunities, 1979-1984

### 1978 REPORTS

- Acquisition Strategies for Computer Services Companies
- Financial Management and Planning Services and Software Markets
- Opportunities in User Site Hardware Services

- Distributed Data Processing Systems: Applications, Performance, and Architecture
- Trends in Services and Software Pricing
- Computer Services Markets in Hospitals
- Data Base Management Systems Software Markets
- Remote Computing Services Markets in Europe
- Computer Services in Federal Government Energy Programs

#### 1977 REPORTS

- Computer Services Markets in Correspondent Banking
- Small Business Computers: Their Impact on Processing Services
- Plug-Compatible Mainframes: The New Hardware Economics
- Impact of Marketing Compensation Plans in the Computer Services Industry
- Computer Services Markets in the Savings and Loan Industry
- Computer Services Markets in the Wholesale Industry - Petroleum, Petrochemical, Food, and Electrical/Electronic
- Computer Services Markets in the Discrete Manufacturing Industry
- Opportunities for Investment in the Computer Services Industry
- Remote Computing Services Markets Based on Data Base Management Systems

#### 1976 REPORTS

- EDP Plans and Budgets in 1977
- Computer Services Markets in the Services Industries. Part I - Accountants, Lawyers, Consultants
- Computer Services Markets in the Services Industries. Part II - Architects, Engineers, Research and Development Organizations
- Remote Computing Services Markets for Economic and Financial Data Bases
- Computer Services Markets in the Food Processing Industry



### 1982 MULTICLIENT STUDIES

- Opportunities in Financial Planning Systems Markets: 1982-1987 12/82
- Computer Output Services Markets, 1981-1986 3/82

### 1981 MULTICLIENT STUDIES

- Improving the Productivity of Engineering and Manufacturing Using CAD/CAM 12/81
- Western European Opportunities for On-Line Data Base Services 6/81

### 1980 MULTICLIENT STUDIES

- Strategies for Competing in the IBM Compatible Marketplace 2/80
- Selling Personal Computers to Large Companies 10/80
- Productivity Improvement, 1980-1983 12/80
- Opportunities in Digital Communications Services Market Information: A Study of User Networks and Needs 11/80

### OTHER INPUT SUBSCRIPTION PROGRAMS

- Company Analysis and Monitoring Program (CAMP) for the Information Services Industry
- Field Service Programs (FSP)
- Management Planning Program in Information Systems (ISP)
- Residual Value Forecasting Program
- Federal Information Systems and Services Program (FISSP)





