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COMPUTER SERVICES INDUSTRY

1976 ANNUAL REPORT

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1976 Annual Report

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SEPTEMBER 1976

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COMPUTER SERVICES INDUSTRY

1976 ANNUAL REPORT

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LIST OF EXHIBITS

I. INTRODUCTION

I. INTRODUCTION

- This report is produced as part of the Market Analysis Service for the Computer Services Industry.

- The purpose of the report is to present trends and forecast developments in the computer services industry. These characteristics are described qualitatively and their impact on market size is reflected by computer services market size forecasts through 1981.

- The base year for forecasting is 1975.

- This report provides information on each computer service category covered in the service:

  Remote Computing Services

  Batch Processing Services

  Facilities Management

  Professional Services

  Software Products

- It presents information on each major industry category:

Discrete Manufacturing	Education
Process Manufacturing	Retail
Transportation	Wholesale
Utilities	Government
Banking and Finance	Services
Insurance	Other
Medical	

This information is of a summary nature; more detailed information is provided through the Industry Reports.

- This Annual Report provides updates on information published in the Industry Reports and Impact Reports. In this report, for example, information is provided on the position of IBM System/370 Models 138 and 148 on the price/performance charts first presented in the report on "Economics of Computer/Communications Networks and Their Future Impact."

- The data on which this report is based came from:
  - Approximately 100 telephone interviews of computer users carried out especially for this report.
  - Background information from about 550 personal and telephone interviews INPUT staff have carried out during the past year with computer and computer service users, and company executives.
  - Continuous contacts with computer service vendors during the past year, including over 300 formal interviews.

- The report is primarily an analysis of this data based on the experience and expertise of INPUT staff.
- This is the first annual report from the service.. Efforts have been concentrated on establishing the forecasting base by the commonly accepted services. Next year's report will concentrate on reordering and updating this data by user rather than vendor characteristics and the use to which services are put.
- Inquiries and comments from clients on the information presented are requested. Suggestions for changes in the structure or contents of this report are solicited.

II. DEFINITIONS

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- Computer Services. These are services provided by vendors which perform data processing functions using vendor computers, or assist users to perform such functions on their own computers.

- The following are the definitions of the modes of service used in this report:

  - 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. The three sub-modes of RCS are:

    1. Interactive (timesharing) is characterized by 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.
    2. Remote Batch is where the user hands over control of a job to the vendor's computer which schedules job execution according to priorities and resource requirements.
    3. Data Base is characterized by the retrieval of information from a vendor-maintained data base - this may be owned by the vendor or a third party.

- Batch Services. This includes data processing performed at vendors' sites of user programs and/or data which are physically transported (as opposed to electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and COM processing,are also included. Batch services include those expenditures by users which take their data to a vendor site which has a terminal connected to a remote computer used for the actual processing.
- Facilities Management (FM) (also referred to as 'Resource Management' or 'Systems Management'). The management of all or a part of a user's data processing functions under a long-term contract (not less than one year). To qualify as FM, the contractor must directly plan and control as well as operate the facility provided to the user on-site, through communications lines, or in mixed mode. Simply providing resources even though under a long term contract and/or for all of a users' processing needs does not necessarily qualify as FM.
- Professional Services. Management consulting related to EDP, systems consulting, systems design and programming, and other professional services are included in this category. Services can be provided on a basis of: "Time and Materials", whereby the user pays for the time used of an individual on a daily or other fixed rate, or "Fixed Price", where the user pays a fixed fee for a specific task or series of tasks.
- Software Products. This category is for users' purchases of systems and applications packages for use on in-house computer

systems. The figures quoted include 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. The two sub-categories are:

1. Systems Packages are operating systems, utilities, and language routines that enable the computer/communications system to perform basic functions. This software is provided by the mainframe manufacturers with their hardware; other vendors provide improved versions of this and special-purpose routines. This classification includes compilers, data base management software, communications packages, simulators, performance measurement software, diagnostic software, and sorts.

2. Applications Packages are software which perform processing to serve user functions: they consist of general purpose packages, such as for accounting and inventory controls, and special purpose packages, such as personal trust, airline scheduling, and demand deposit accounting.

- Processing Services encompass FM, RCS, and Batch Services: they are categorized by type of service, as distinguished from mode of service, bought by users as follows:
  - General Business services are processing services for applications which are common to users across industry categories. Software is provided by the vendor; this can be a complete package, such as a payroll package, or an application 'tool', such as a budgeting

model, where a user provides much of the customizing of the finished product it uses. General Business processing is often repetitive and transaction oriented.

- Scientific and Engineering services are the processing of scientific and engineering problems for users across industries. The problems usually involve the solution of mathematical equations. Processing is generally problem solving and is non-repetitive, except in the sense that the same packages or 'tools' are used to address different, but similar, problems.
- Specialty Applications 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 application 'tool' which the user employs to produce its unique solution. Specialty applications can be either business or scientific in orientation; 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 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 computer and/or communications network with basic software that enables any user to develop its own problem solution or processing system. These basic tools include terminal handling software, sorts, language compilers, data base management systems, information

retrieval software, scientific library routines, and other systems software.

- All expenditures and revenues addressed are 'available' in that they are open for competition. 'Captive' figures, which refer to expenditures by a user for services from a subsidiary company, such as Boeing Aircraft with Boeing Computer Services (BCS) are not included. They may be referred to when examining an individual 'spin-off' vendor, such as BCS.

- When any questions arise as to the place to properly count certain user expenditures, INPUT addresses the questions from the user viewpoint and categorizes the expenditures according to the answer to the question, 'What does the user perceive it is buying?'

- User organizations are categorized by size according to their average monthly expenditures for computer mainframes or their service equivalents. The general characteristics of these categories are shown in Exhibit II-1.

- A minicomputer for the purposes of this report is any non-general purpose computer which sells for less than $100,000.

- Small business computers are IBM System/32 and System/3 and their equivalents intended as general purpose, data processing, business computers.

- Industry sectors used in this report are defined in Exhibit II-2.

EXHIBIT II-1

Definition of User Organization Size Groups

Characteristics	Size Group			
	Small	Medium	Large	Very Large*
Number of Organizations With Computers				
1975	40,000	20,000	10,000	1,000
1981	100,000	40,000	15,000	1,200
Monthly Rental of Computer Equipment	<$5,000	$5,000-$20,000	$20,000 $100,000	>$100,000
Size In Annual Sales Or Equivalents	<$20 million	$20 million-$100 million	$100 million-$300 million	>$300 million
Proportion of Total EDP Industry in 1975	10%	35%	30%	25%

* Includes the Federal Government and its 6,000 installations.

EXHIBIT II-2

Industry Sector Definitions

- DISCRETE MANUFACTURING -- shipbuilding, railroad equipment, mobile homes, apparel, printing & publishing, motion picture manufacturing, aircraft & parts, appliances, electronics, motor vehicles & parts, office machinery, metal products, farm & industrial machinery, measuring, scientific & photographic equipment, furniture, jewelry and silverware, musical instruments, toys, sporting goods.

  SIC Codes - 23, 25, 27, 31, 34-37.

- PROCESS MANUFACTURING -- petroleum refining, mining, rubber, textiles, glass, cement, gypsum, concrete, chemicals, soaps, cosmetics, food, beverages, pharmaceuticals, tobacco, paper and wood products, metal manufacturing, leather & leather products.

  SIC Codes - 10-13, 20, 21, 22, 24, 26, 28, 29, 32, 33.

- TRANSPORTATION -- railroad, mass transit, shipping and barge traffic, airlines, pipelines, and transportation services, including delivery delivery.

  SIC Codes - 40-47.

- UTILITIES -- power and gas, communications, and water and sanitation.

  SIC Codes - 48-49.

- BANKING AND FINANCE -- banking, savings and loans, credit unions, security/commodity brokers, consumer and commerical credit institutions, mutual funds and other investment agencies.

  SIC Codes - 60, 61, 62, 67.

- INSURANCE -- life, health, property and casualty insurance, including agents and brokers.

  SIC Codes - 63, 64.

- MEDICAL -- hospitals, clinics, nursing homes, laboratories, dentists physicians, HMO's and PHP's.

EXHIBIT II-2 (Continued)

Industry Sector Definitions

- EDUCATION - schools, colleges, universities

  SIC Code - 80

- RETAIL - general merchandise, food, supermarkets, department stores, eating and drinking establishments, and auto dealers.

  SIC Codes - 52-59

- WHOLESALE

  SIC Code - 50-51

- STATE AND LOCAL GOVERNMENT - cities and municipalities, counties, states.

  SIC Codes - 91-97 as appropriate.

- FEDERAL GOVERNMENT

  SIC Codes - 91-97 as appropriate.

- SERVICES - accountants, legal services, consultants, architects and engineers, actuaries, and research and development organizations.

  SIC Code - 73

- OTHER INDUSTRIES - agriculture, fishery, construction, real estate, hotels/motels, personal services, repair services, entertainment, associations, unions, political parties, social service organizations, private households, and anything else not otherwise classified.

  SIC Codes - 01-09, 15-17, 65, 66, 70, 72, 75-79, 83-89, 99.

III. MANAGEMENT ACTION SUMMARY

III. MANAGEMENT ACTION SUMMARY

- The computer services market will more than double in the next five years, growing from $4.5 billion in 1975 to over $11 billion by 1981.

- The main limiting factor on the growth is the ability of vendors to acquire, train, and retain the skilled personnel needed to support the growth.

- Variables such as the state of the economy in the late 1970's and potential direct competition by AT&T and IBM at that time allow a wide degree of uncertainty on the over-all industry growth, as shown in Exhibit III-1.

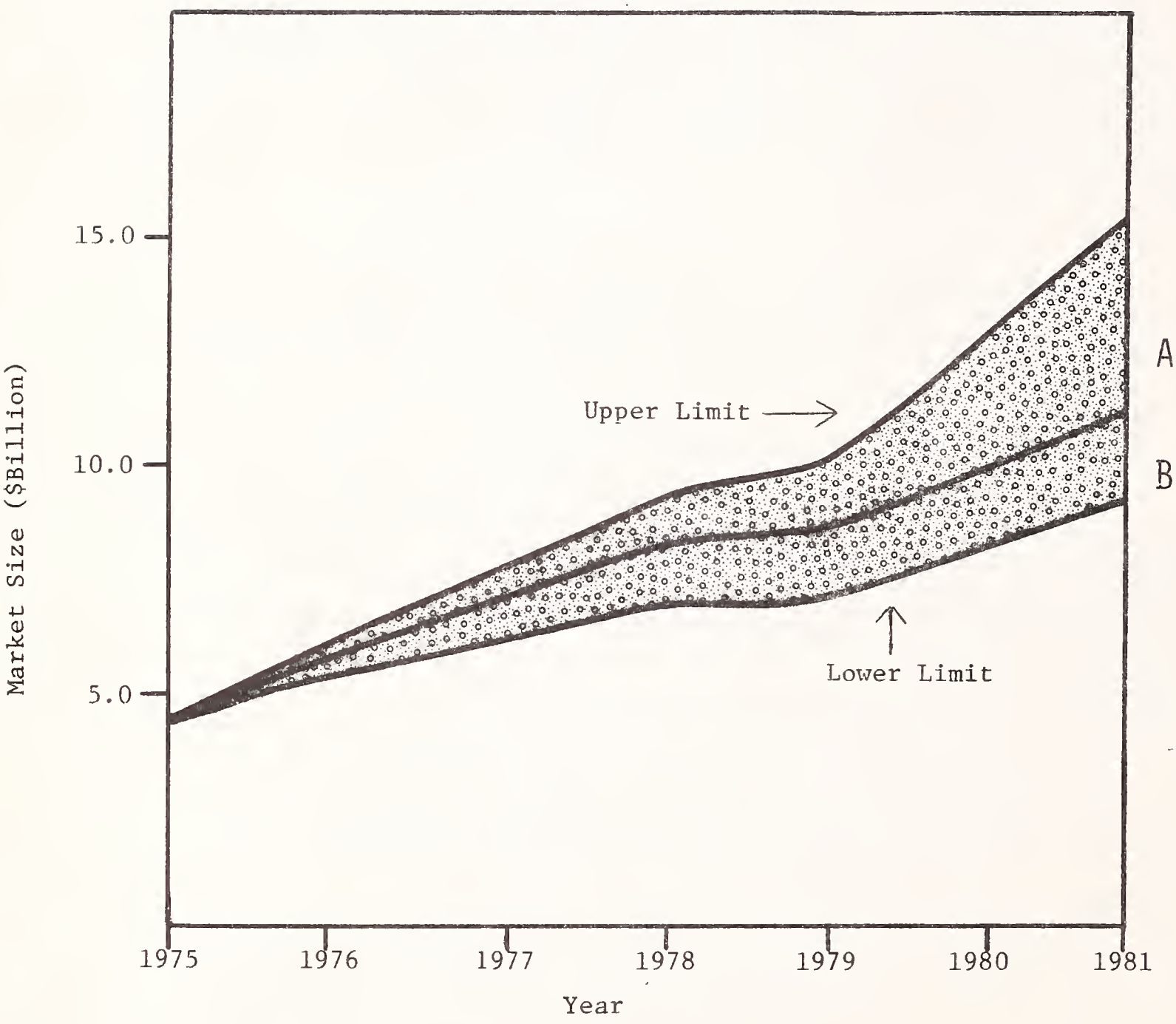
- The minimum level of the computer services market is expected to be over $9 billion while the maximum is over $15 billion, with significant mainframe vendor competition.

- Computer services depend on 'change', such as new applications, for the opportunity to provide services. In a static environment, users will convert services in-house.

- There will be a slowing of remote computing services (RCS) growth

EXHIBIT III-1

Potential Computer Services Market Growth, 1975-1981



A - • IBM Entry
- Complete Software Unbundling
- In-House Unionization

B - • Regulation
- Static Economy
- Lack of Vendor Response to Market Conditions

due to the increased size of the market and efforts needed to protect existing clients from going in-house.

- However, RCS with conversion from batch processing will be almost one-third of the total market by 1981.

- Another limiting factor for computer services growth is the availability of suitable software. Vendors must plan to develop their own in the future.

- The Federal Government, at the moment, is strongly emphasizing the use of outside services by their agencies, instead of using their own internal EDP groups.

- Vendors, particularly in RCS, need to develop and retain the posture in the industry of being technically advanced and secure. This requires R&D expenditures which have often been lacking in recent years.

- Profitability and, possibly, growth of vendors seems to be leveling off. Penetration of new markets is required to maintain this at healthy levels.

- The main competition to service companies comes from in-house processing. In very large companies this will cause certain sections of the market to shrink. Target company sizes are:
  - Specialty Applications; medium and large organizations.
  - General Business; small organizations.

- Collection of internal information on new and existing market opportunities is non-existent or poor in most computer services companies. Some valuable data is often wasted as well. To hold customers and be successful in new markets, vendors must dedicate people and systems to this process.

- Certain computer utility concepts provide potential business, in particular, replacing batch services computers with equivalent logical systems through remote computing. Also remote facilities management (RFM), based on this principle and industry expertise, will be relatively successful in medium and small companies.

- Batch Services and Professional Services have been regarded as unexciting, relatively unprofitable, markets. This is not the case--there are major opportunities in both markets and, combined with a product-based, remote computing service, these will be just as profitable areas of business as the 'glamour' areas.

- The success of FM, including remote facilities management (RFM), is directly dependent on the importance of EDP to the operations of an industry. Banking and insurance both have a relatively high percentage of expenses (6% in the case of banking) in EDP. As certain industries become more EDP intensive, their potential for FM increases.

- In the 1980's, a major area of expansion will be in services connecting the individual with business and government, through voice

input and other means.

- Similarly, within organizations, word processing and data processing will be combined, providing more people with direct EDP interface by several orders of magnitude. All computer services vendors must plan for this, especially remote computing services and facilities management vendors.

- There will be software product opportunities created by this integration into 'information processing'.

- Because of changes in hardware of all kinds, computer services companies must take a creative role in specifying and using it, instead of being reactive as at present. This applies to mainframes, terminals and peripherals.

IV. OVERALL INDUSTRY TRENDS AND DEVELOPMENTS

IV. OVERALL INDUSTRY TRENDS AND DEVELOPMENTS

A. MAJOR COMPUTER SERVICES TRENDS

- This section summarizes the detailed analyses of the five major sectors of the computer services industry.

- In spite of fairly large variations at detailed levels, the average growth rates in most of the sectors at an aggregate level are surprisingly close, considering that these statistics were compiled from the 'bottom-up' rather than 'top-down'.

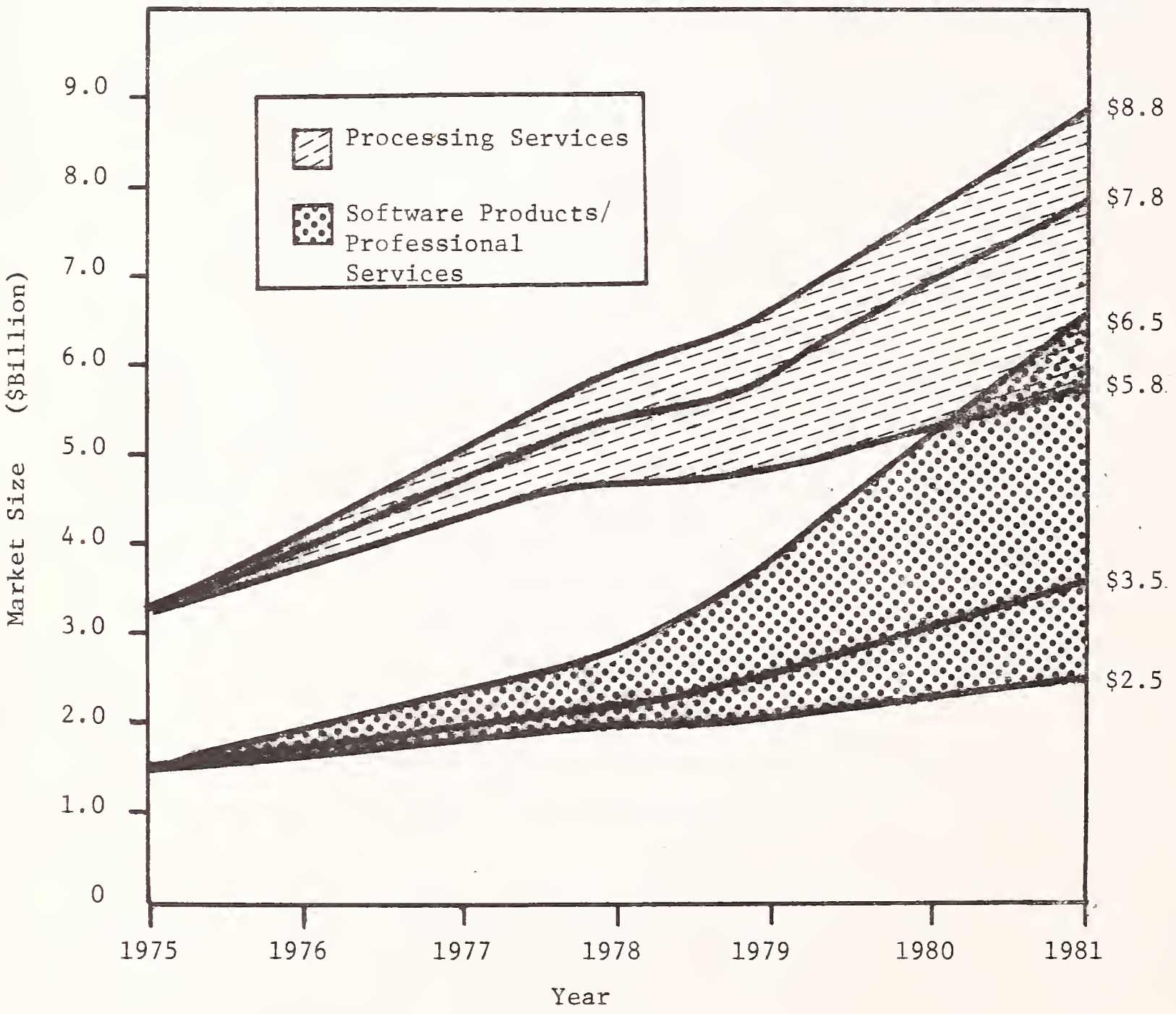
1. OVERALL MARKET POTENTIAL AND PROBABLE GROWTH

- Based on the assumptions in this report and the analysis of the variables affecting each computer service, a wide variation in possible market size is shown by Exhibit IV-1 for both processing and software related services. Processing services are batch services, remote computing services and facilities management.

- Most changes in the major variables affecting processing services will tend to decrease the market size. The major impact would come from a slow-

EXHIBIT IV-1

Potential Computer Services Market Growth 1975-1981



down in end-user demand for new applications support; this will accompany a serious economic downturn. Certain security restrictions could also negatively impact the market because of potential liability considerations. The major force which would increase the market would be the re-entry of IBM into the processing services market after its agreement with CDC expires in 1978. INPUT projects that this will happen but not in a significant way until the 1980's.

- On the other hand, most major changes in variables in the software market will serve to increase the market size. In particular, if IBM and other manufacturers completely unbundle their software, the product market would immediately increase dramatically. It would be possible for this market to overhaul the processing services market.

- A more detailed analysis of the user software development area is contained later in this section.

2. COMPUTER SERVICES MARKET GROWTH BY MODE AND TYPE OF SERVICE

- The predicted growth in Exhibit IV-2, shows that Remote Computing Services and Software Products will drive the market to grow at an average annual growth rate of 16%. The RCS growth rate is ambitious and is dependent on the ability of vendors to maintain a technical leadership over most in-house users and to push down from very large users which have been the mainstay of their growth to date.

- Facilities Management will more than double by 1981 due primarily to

EXHIBIT IV-2

Computer Services Market Growth

By Mode of Service, 1975 - 1981

MODE OF SERVICE	1975	1976	GROWTH 1975/76 %	1981	A A G R 1975/81 %
Remote Computing Services	$1,120	$1,400	25%	$3,800	23%
Facilities Management	630	720	13%	1,430	15%
Batch Services	1,400	1,610	12%	2,580	10%
Software Products	500	620	24%	1,540	21%
Professional Services	970	1,050	8%	1,960	12%
TOTAL	$4,660	$5,400	16%	$11,310	16%

($ Million)

government contract growth and opportunities in the banking and finance industries. An increasing amount of EDP FM will be bundled with other management contracts, for example, for trust department operation, Medicaid program management, or hospital management. The 'facility' will be more than a DP center.

- Specialty Applications will be the type of processing service most successful in the next five years as shown in Exhibit IV-3, although General Business services will also maintain the average growth rate. Vendors are now getting in position to attack chosen industry/applications/organization-size market segments. This is particularly shown by the acquisition strategies of ADP, Tymshare, SBC, and others.

- General Business growth will be primarily to small businesses. Utility sales are not finished - basic problem solving using sophisticated, but standard, tools will still be a major source of computer services revenues, particularly in remote computing services.

3. COMPUTER SERVICES MARKET GROWTH BY SIZE OF USER ORGANIZATION AND INDUSTRY

- Small users are the largest user sector of the computer services industry as shown in Exhibit IV-4; they will remain so primarily through EDP entry-level companies. These companies are serviced by batch services and remote computing services to accomplish their fundamental business processing.

EXHIBIT IV-3

Processing Services Market Forecast

By Type of Service, 1975 - 1981

TYPE OF PROCESSING SERVICE	1975	1981	A A G R 1975/81 %
General Business	$ 650	$1,620	16%
Scientific & Engineering	380	680	10
Specialty Applications	1,190	3,430	19
Utility	970	2,080	14
TOTAL	$3,190	$7,810	16%

($ Million)

EXHIBIT IV-4

Computer Services Market Forecast by Size of Organization, 1975-1981

ORGANIZATION SIZE	1975	1981	AAGR 1975/81 %
Federal Government	$ 620	$ 1,622	17%
Very Large	1,090	2,303	13
Large	765	2,095	18
Medium	815	2,020	16
Small	1,370	3,270	16
TOTAL	$4,660	$11,310	16%

($ Million)

- Very large users will reduce their aggregate market share due to the high turnover rate of business to in-house EDP departments.

- In order to maintain growth, computer services companies will have to concentrate more on medium and large companies.

- As shown in Exhibit IV-5, the growth rates of computer services by industry sector are surprisingly evenly distributed despite sizable variations for each constituent service type and industry sector. This is probably due to the fact that industries that are good candidates for one type of service are not as good for another. Also, those industries that have been heavy services users are getting saturated in certain areas, while other resistant industry areas may become more receptive.

EXHIBIT IV-5

Computer Services Market Forecast

By Industry Sector, 1975-1981

INDUSTRY SECTOR	USER EXPENDITURES					
	1975	1976	GROWTH 1975/76 %	1978	1981	A A G R 1976/81 %
Discrete Manufacturing	$ 660	$ 761	15%	$ 997	$ 1,570	16%
Process Manufacturing	405	460	14	595	910	14
Transportation	126	143	13	197	315	17
Utilities	208	242	16	335	463	14
Banking & Finance	775	954	23	1,323	1,970	17
Insurance	352	389	11	486	710	12
Medical	230	270	17	367	610	18
Education	100	117	17	153	220	14
Retail	222	255	15	364	570	17
Wholesale	331	377	14	502	710	14
Federal Government	625	700	12	978	1,622	17
State & Local Govt.	198	226	14	298	495	17
Services	213	257	21	394	655	21
Other	215	249	16	342	490	14
TOTAL	$4,660	$5,400	16%	$7,331	$11,310	16%

($Millions)

B. DEVELOPMENTS AFFECTING THE COMPUTER SERVICES INDUSTRY

• In this section some issues are presented which will affect the computer services industry. There are others which may have more significant impacts, such as the impact of IBM and AT&T approaches to computer services. Because of their complexity, due to regulatory entanglements, these are required to be researched and addressed separately.

• Earlier this year, INPUT produced the Impact Report on Economics of Computer/Communications Networks and Their Future Impact. This report presents further data on a section of that report which aroused particular client interest. An update is also provided to place the System/370 Models 138 and 148 in perspective.

1. USER SOFTWARE DEVELOPMENT TRENDS

a. Total User Expenditures for Software

- The total amount spent by users for software, EDP planning, education and other related items in 1975 was approximately $7.5 billion. As shown in Exhibit IV-6, about 20% of this was spent for software services and products and this proportion will increase to over 25% by 1981.

b. Variables Affecting User Software Expenditure Projections

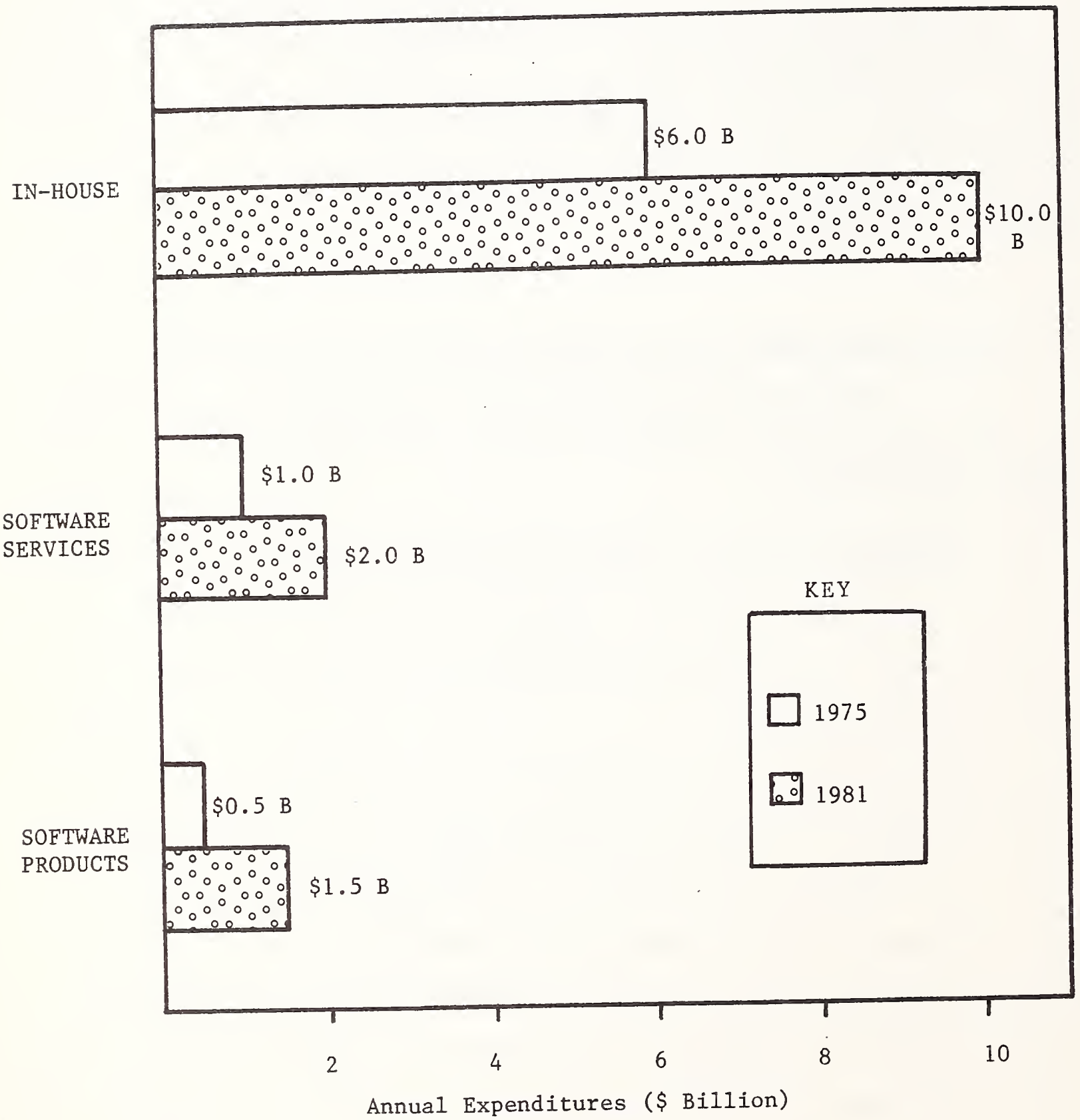
- There are, however, a number of variables affecting these projections including:

  - Economic climate; the projections assume an economic slow-down in 1978 with a resurgence continuing through 1981. An inflation rate, affecting labor costs, of from 5-7% is assumed.
  - User demand for new systems and services; the projections assume a continued, relatively strong demand for new systems from EDP by user management. In particular the trade-off between labor and automation will continue.
  - Mainframe vendor pricing of software; new software/hardware packaging methods will increasingly occur towards the end of this period. In these the software may not be separable in the pricing algorithm. These projections assume that software will continue to be priced separately or the software

EXHIBIT IV-6

User Software Expenditures Forecast

1975 - 1981



Software Expenditures 1975 $7.5 Billion

Software Expenditures 1981 $13.5 Billion

component identified in the majority of cases. (An example of a software/hardware package is a mini-computer-based building environment control system such as is offered by several manufacturers.)

- Mainframe vendors may well charge separately for all software supplied with a general system as opposed to specialized systems mentioned above, including operating systems. Mini-computer manufacturers have been doing this for years. The projections assume that these charges, which would be included in the software package market, will only be for new software announcements , perhaps made in conjuction with hardware.
- New software development techniques; the projections assume that generators and other techniques will be developed and implemented which will improve the speed and accuracy of software development. The balance of time spent in the various development tasks will change substantially, with coding and testing decreasing their share. It is assumed that the majority of these tools will be provided by mainframe manufacturers.
- Hardware/software trade-offs; it is assumed that an increasing use will be made by manufacturers of microcode to turn commonly used routines and subprograms into hardware. This will affect the construction of programs, their development time and accuracy.

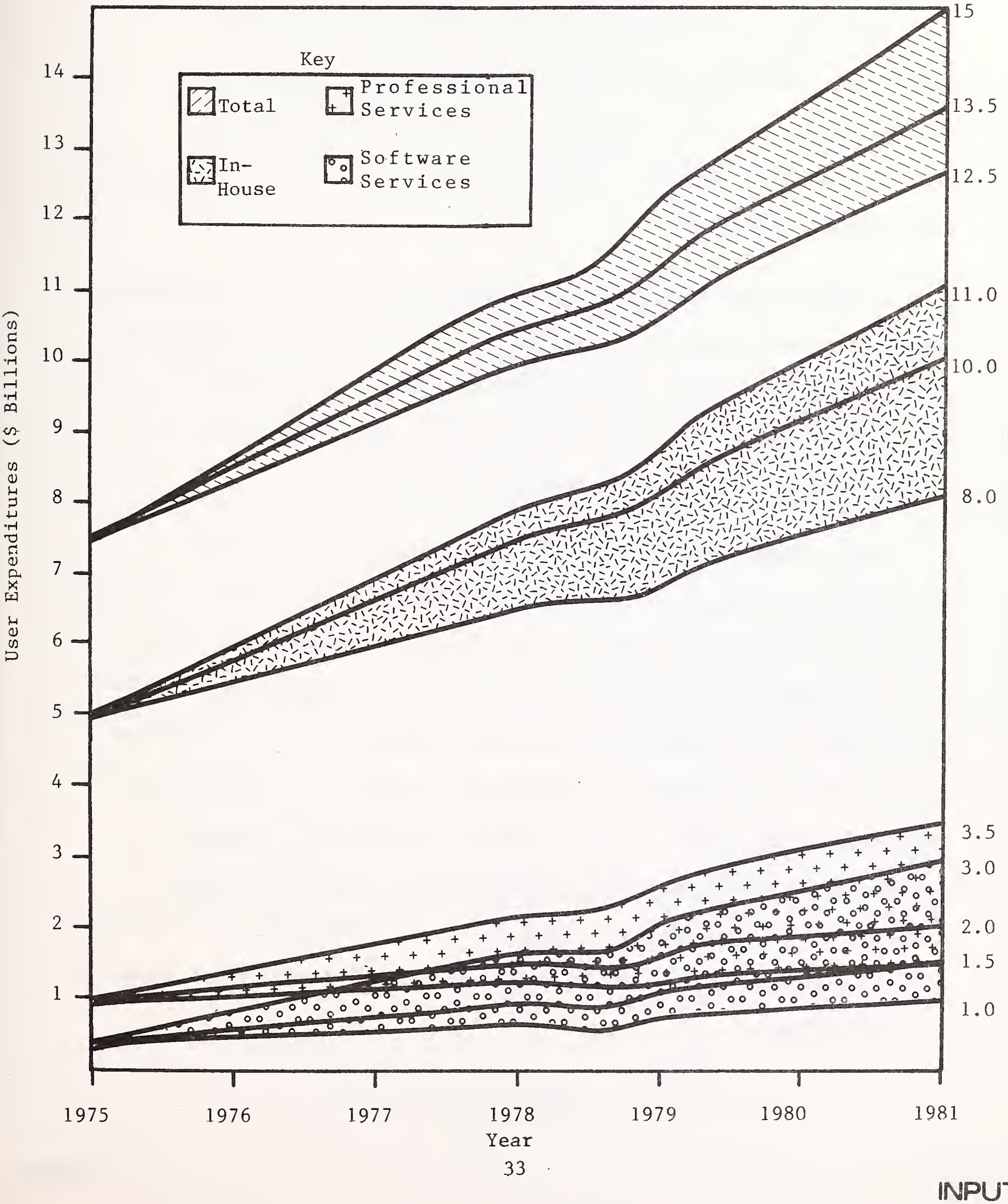
- Unionization; this will become increasingly a factor in productivity and mobility. It will be a driver towards package and outside service use.
- Personnel availability; unionization will exacerbate an already serious problem in the availability of trained and competent software people. Also, with increasing complexity and specialization, more software people will be attracted to service companies particularly small, specialist ones such as are being set up now in CPE, and mini-computer and microprocessor software development. The spread of small business computers will also drain-off software talent into installation management.
- New hardware/software systems; whether evolutionary or revolutionary these systems to be announced by mainframe vendors will require user effort to study and evaluate. Also, by making new features and facilities available they will cause redesign of some existing systems and development of new ones.
- Mini-computers; for all sizes of companies the availability of these relatively cheap and adaptable systems will create a demand for software systems of all types, but particulary standard software for small companies and specialized software for large ones.

• The net impact of these and other factors, as foreseen by INPUT. is that users in 1981 will spend from $12.5 to $15.0 billion on software and related items, as shown in Exhibit IV-7. The expected expenditure

EXHIBIT IV-7

User Software Related Expenditures Forecast

1971 - 1981



level of $13.5 billion represents a level growth of almost $3 billion after allowing for inflation. This is a conservative figure.

Also shown in the chart are the upper and lower limits for each of the components of the total software related expenditures. The largest proportionate variation is in the software product area which will be very much affected by mainframe vendor pricing and packaging policies.

- As shown in Exhibit IV-8,50% of in-house expenditures by end users goes into software maintenance,primarily of user developed applications; of this at least a third of the expenditures are to bring systems up to original specifications and the remainder is for enhancements to exisiting systems which do not require major rewrites.

- The most important statistic in this table is the growth of the maintenance portion of in-house expenditures to 75% by 1981. The amount of available effort for new systems development will then have decreased to only 15% of the total in-house software related expenditures. The reason for this growth in maintenance will simply be the expansion of the numbers, complexity and sizes of the applications being operated by users by 1981. Continued change in the business and government environment will be reflected by a continous need for modification and enhancements. At the same time, there will be neither the management will nor the personnel available to further expand the in-house software staffs.

EXHIBIT IV-8

Software Related User Expenditures by Function

1975 - 1981

	In-House	PROFESSIONAL SERVICES		Software Packages	Total
		Software Development	EDP Consulting		
Systems Software					
1975	0.1	0.1	—	0.3	0.5
1981	0.2	0.1	—	0.6	0.9
Applications Software					
1975	2.3	0.6	—	0.2	3.1
1981	1.5	1.2	—	0.7	3.4
Software Maintenance					
1975	3.0	0.1	—	—	3.1
1981	7.3	0.2	—	0.2	7.7
Other					
1975	0.6	—	0.2	—	0.8
1981	1.0	—	0.4	—	1.4
TOTAL					
1975	6.0	0.8	0.2	0.5	7.5
1981	10.0	1.5	0.4	1.5	13.5

($ Billions)

- In the Software Development portion of Professional Services, a small proportion is spent for maintenance, primarily for enhancements of existing systems, and another for systems software for users as mentioned earlier. Scheduling and performance systems are the most in demand in the latter area at the moment.

- The distribution of Software Product expenditures is covered in the section dealing with that part of the industry.

c. Most New Applications Will Come From External Sources in 1981

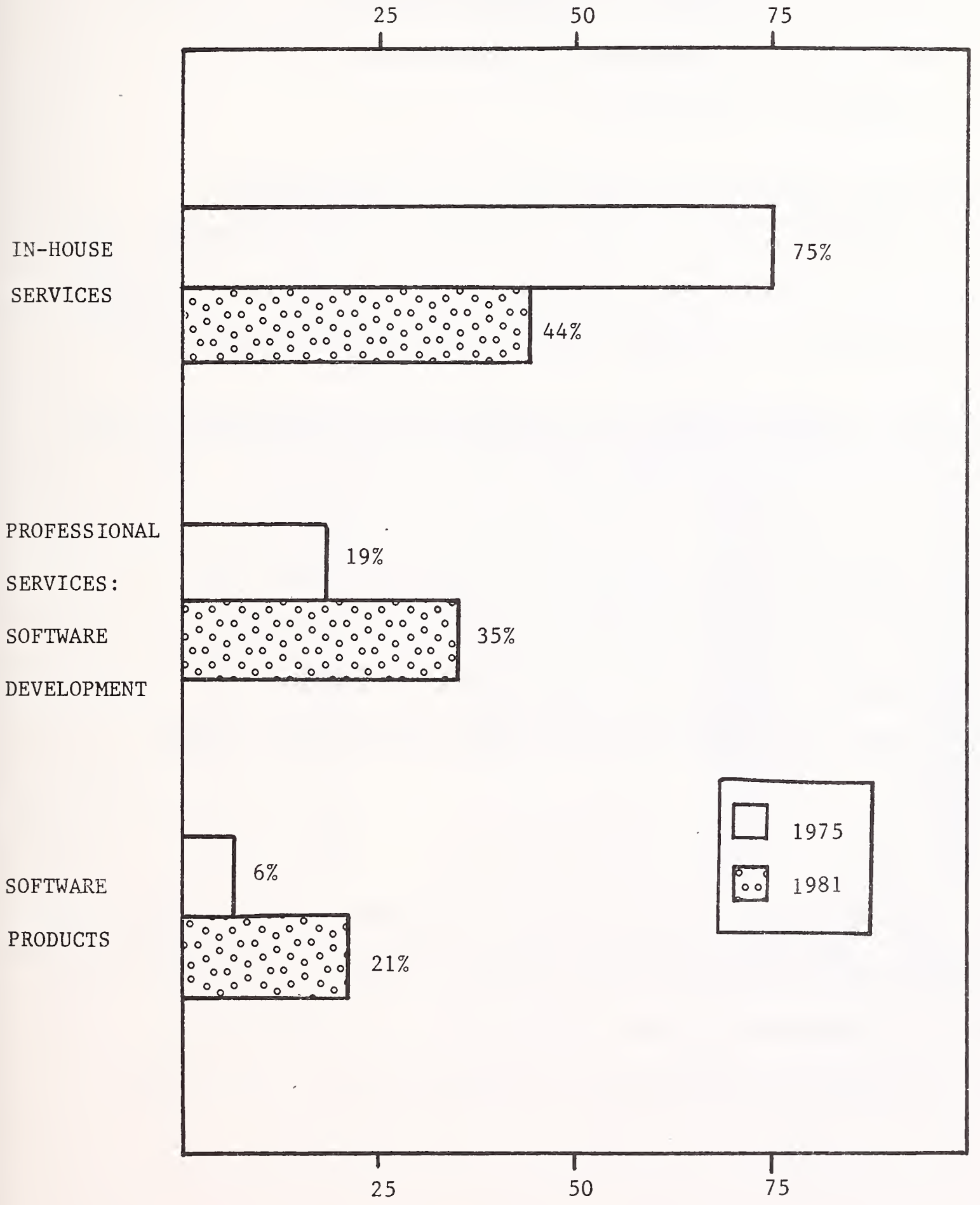
- The result of these developments will be that by 1981, user expenditures of $3.4 billion on application development will be only 10% higher per year than in 1975, equivalent to an average annual growth rate of 2%, or much less than the assumed inflation rate over this period. However, because of improved development methods and the increased use of packages this level of expenditure will probably be equivalent to an expenditure of $5 billion or more in terms of today's efficiencies. This assumes that packages, where they can be used, are twice as efficient as in-house software and that development methods are 30% more efficient overall at this time.

- As shown in Exhibit IV-9, expenditures for applications software supplied to users via Professional Services and Software Products will have grown from about 25% of the total to over 55% by 1981.

EXHIBIT IV-9

User Expenditure Forecasts by

Source of Applications Software, 1975 - 1981



% of Total of User Applications Software Expenditures

2. BASIS FOR COST COMPARISONS MADE IN THE 'COMPUTER/COMMUNICATIONS' IMPACT REPORT

• This section reviews the methodology that was used to develop the cost comparisons for Network vs. Standalone and Network vs. Computer Services Company which were contained in the report as Exhibits III - 3 and III - 4.(Exhibits IV-10 and 11)

• Fundamental to the overall methodology is the determination of equivalent standalone systems. These were derived in the following manner, and were developed to project what standalone system would have been installed at a particular point in time without centralization.

a) The capacities of the Level I center (370/165 and 370/168) had been established at 551 billable CPU hours per month with a capacity review level at 80% or 441 billable CPU hours. (This measure of capacity was fairly complex in its own development, but it was established for planning purposes in 1974 when 1975 budgets were being prepared, and worked out quite well in actual practice during 1975 which was a period when additional load was added through consolidation.)

b) The review level was established as being the point at which service would start to degenerate and consideration would be given to upgrading to a new capacity level. In other words, once the review level was exceeded the possibility of new equipment could be anticipated.

EXHIBIT IV-10

Computer/Communications Case Study

Network Vs. Standalone Cost Comparison $(000)

		CONSOLIDATED		STANDALONE	
LEVEL I COSTS					
HARDWARE		2,782			
COMMUNICATIONS		1,590			
PERSONNEL		1,126			
OTHER		1,126			
TOTAL			6.624		
TERMINAL OPERATING COSTS (INCLUDING HARDWARE)				EQUIVALENT REPLACED SYSTEM	STANDALONE COSTS
NODE	1	78.		370/125	276.
	2	78.		370/115	178.
	3	34.8		370/115	178.
	4	61.5		370/135	480.
	5	78.		S/3	115.
	6	118.8		370/145	804.
	7	52.8		370/125	350.
	8	349.		370/168	3408.
	9	88.8		370/145	804.
	10	164.7		370/168	3408.
	11	34.8		370/125	276.
	12	175.8		370/158	1800.
	13	73.5		370/125	350.
	14	34.8		370/135	480.
	15	114.		370/158	1740.
	16	26.7		370/125	216.
	17	49.5		370/145	804.
	18	34.8		370/115	179.
	19	26.7		370/125	240.
TOTAL			1,705.		
TOTAL CONSOLIDATED			8,329.	TOTAL STANDALONE	16,086.

EXHIBIT IV-11

Computer/Communications Case Study

COST COMPARISONS BY NODE $(000)

NODE NO.	STANDALONE	CONSOLIDATED (INCL. TERMINAL COST)	% OF STANDALONE	COMPUTER SERVICES COMPANY
1	276	150	54%	302
2	178	111	62%	96
3	178	69.8	39%	172
4	480	232.5	48%	672
5	115	96	83%	66
6	804	443.8	55%	776
7	350	109.8	31%	318
8	3408	1814.0	53%	2156
9	804	331.8	41%	818
10	3408	1706.7	50%	2580
11	276	184.8	67%	420
12	1800	1446.8	80%	1844
13	350	170.3*	49%	323
14	480	208.8	44%	506
15	1740	519.0	30%	1558
16	216	101.7	47%	197
17	804	478.5	60%	652
18	179	84.8	47%	142
19	240	87.7	37%	130
TOTALS	16,086	8347.8	52%	13,799

*ESTIMATED NOT INCLUDED IN TOTAL

c) Based on review level, individual systems were assigned "Rated CPU Capacities" in 165/168 CPU hours as follows:

System	Rated CPU Hours
370/168	286
370/165	220
370/158	84
370/155	70
370/145	40
370/135	22
370/125	11
360/30	9
370/115	4
System 3	4

d) Actual experience of replaced installed systems over a period of several years indicated that they operated at 1/3 of "rated capacity" once they were consolidated. For example, a 370/155 when replaced would use approximately 20-25 CPU hours per month on the Level I center even though its "rated capacity" was 70 CPU hours. This percentage figure was surprisingly consistent over the entire range of replaced systems, and this in itself demonstrates a significant advantage of consolidation.

e) In order to determine the "equivalent replaced system", nine months actual utilization for 1975 was averaged out and multiplied by the factor of 3 obtained in 2d above. This usage rating was the basis for assigning an equivalent system from the table in 2c above.

f) The results of these projections were then checked against historical records when these were available (as they were in most cases) to determine the validity (or at least credibility) of the method.

Even results which initially appeared questionable stood the test quite well. A 'light 158' tracked its lineage back to a 360/65, and a 'light 168' went back to a Univac 1108. (Both of these would appear logical replacement systems, at least from a salesman's point of view).

g) The node by node CPU ratings based on actual utilization were as shown in Exhibit IV-12 with the equivalent replaced system identified.

Systems were then assigned based on exceeding the 'Rated CPU Hours' as defined in 2c above.

- The standalone costs in Exhibit IV-10 were developed by taking the rental cost of an average configuration and adding 100% to cover the cost of operations and systems programming personnel, appropriate management,systems software, supplies and overhead. This is considered a conservative estimate of such operating costs and specifically excludes applications development and maintenance costs which were also excluded from the network costs.

- In the Computer/Communications Report, the performance of the centralized (Level I) center was not analyzed except to demonstrate that the theoretical capacity (based on equivalency to 135 CPU performance) was exceeded by the total of the equivalent replaced systems (page 13 of the report). Exhibit IV-13 shows the analysis of the Level I center performance based on the measures presented.

EXHIBIT IV-12

Computer/Communications Case Study

Derivation of Equivalent Replaced System By Node

Node	CPU Utilization Rating	Equivalent Replaced System
1	7.7	370/125
2	3.5	370/115
3	4.2	370/115
4	15. (+CICS)	370/135
5	2.8	S/3
6	27.1	370/145
7	10.7	370/125
8	165.4(+IMS)	370/168
9	25.2	370/145
10	160.6	370/168
11	7.3	370/125
12	140.3	370/158
13	11.1	370/125
14	22.4	370/135
15	50.5	370/158
16	6.2	370/125
17	30.8	370/145
18	4.6	370/115
19	5.9	370/125
Total	701.3	

EXHIBIT IV-13

Computer/Communications Case Study

Performance Analysis of Centralized Systems

	Monthly Billable CPU Hours	
Center Capacities of System 370/165 and 168	551	
Review Level	441	
Rated Capacity of Replaced Systems (from Figure above)	701	
Expected Actual Utilization (based on 1/3 rated capacity) as specified in 2d above.	234	
		Percent Of Review Level 1975
Actual Utilization in 1975		
High Month	286	65%
Low Month	193	44%
Average	231	52%
Actual Utilization in 1976 (four months)		
High Month	271	61%
Low Month	232	53%
Average	249	56%

- The processing on the central (Level I) computers was not 'compatible' in the sense that the center operated as a utility and no attempt was made to control or schedule the applications being run (except through system job scheduling and billing practices). Any processing done on Level II's was also the responsibility of the using organization (just as it would be in any utility). Because of the nature of the customer mix the applications' set was quite broad including both 'commercial' and ' scientific' works.

- Users of the 'utility' tend to optimize their use of the service as shown by the actual history of two nodes in Exhibit IV-14.

- In order to establish a 'decay curve', it is best to use standard charges since this measures true machine utilization as opposed to the discounted figures which include off-shift discounts.

- The results would indicate different 'decay rates', except that Node 15 was consolidated in May and Node 8 was consolidated in October. The results by year two are remarkably similar, at about 44% of the initial level.

- The organizations at Nodes 15 and 8 maintained or increased their business volumes during the period plotted, and Node 15 had a mixed 'scientific' and 'commercial' application mix, whereas Node 8 was exclusively 'commercial'.

EXHIBIT IV-14

Computer/Communications Case Study

Load Optimization by Utility Users

Year	Average Monthly Billings		% of Initial Level *
	Standard	Discounted	
Node 15			
1972**	$ 87,326	-----	-----
1973	48,641	$ 43,047	56%
1974	37,743	30,244	43%
1975	39,098	30,411	45%
Node 8			
1973***	$336,576	$304,584	-----
1974	245,370	188,612	73%
1975	146,865	109,222	44%

* Standard level in year as percentage of standard level in the year of consolidation into the Level I center.

** Consolidated into center in May 1972; figures givenare an eight month average after consolidation.

*** Consolidated into center in October 1973; figures givenare a three month average after consolidation.

• The discounted rates indicate an additional benefit to using organizations which wish to take advantage of the Level I center's billing policies. For example, true savings over time are as follows (once again as a percentage of original utilization immediately after consolidation):

	Node 15	Node 8
Year 1 after consolidation	49%	56%
Year 2 after consolidation	35%	32%
Year 3 after consolidation	35%	

Node 8 gets a somewhat better break on a discounted basis. This is natural since they have 'commercial' work of high volume which can more easily be scheduled 'off-shift' and on weekends . However, Node 15 took advantage of discount policies to maintain actual monthly billings (and budgets). Their machine utilization went up from 1974 to 1975 but their discounted billings remained the same.

- The explanation for the drastically reduced billings from the Level I center is partially a result of discounts but also represents optimization of applications systems to take advantage of billing practices (method of billing under the algorithm). For example, CPU utilization and tape EXCP's between the initial month of consolidation and at the end of 1975 are as follows:

	Node 15	Node 8
Initial Tape EXCP's (million's)	12.4	77.5
1975 Tape EXCP's (million's)	2.0	11.7
Initial CPU Use (hrs)	26.5	80.8
1975 CPU Use (hrs)	16.6	58.9

- The above is aimed at explaining the 'decay curve' and does not address the percentage of stand-alone costs presented in Exhibit III-4 of the report (Exhibit IV-11) although it does have substantial impact on overall cost savings. (Node 12 was used in the report as a basis for comparison on 'decay' since it was newly consolidated in 1975. Unfortunately, its business dropped substantially since consolidation and meaningful comparisons could not be made for their review).

- The percentage of standalone versus consolidated costs presented in Exhibit IV-15. reflect not only billings from the Level I center but operating costs of the terminal location. The remarkable thing is the consistancy across machine type. The average consolidated cost as a percentage of stand-alone by machine type is as follows:

EXHIBIT IV-15

Computer/Communications Case Study

Computer Service Company Charges

Related to Standalone and Consolidated Costs

Computer Service Company Charges		
Node	% of Standalone	% of Consolidation
1	109*	201
2	54*	86*
3	97	246
4	140*	289*
5	57*	69*
6	97	175
7	91	290*
8	63	119*
9	102	247
10	76	151
11	152*	227
12	102	127
13	92	190
14	105	242
15	90	300*
16	91	194
17	81	136
18	79	167
19	54*	148
Total	85	165

* One of the three highest or lowest percentages.

System 3	115	125	135	145	158	168
83%	49%	47.5%	46%	52%	55%	51.5%

- The high percentage for System 3 is understandable since operating costs for a terminal and System 3 should be quite close. However, the consistency across 370 machine types is surprising. It would be helpful to have a larger sample and make additional analysis. But lacking that it must remain an unproven hypothesis that any model machine can be consolidated with a savings of approximately 50%.

- To obtain the outside computer services company figures for comparison, as shown in Exhibit IV-11 , three computer services companies were compared with the actual billings from the Level I center for the month of September 1975 and all yielded roughly comparable results. Charges were computed by running a month's SMF data through the various billing algorithms. Then 40% was added to the charges obtained in this manner to account for terminal and communications. (This is a conservative percentage since communications and terminal costs add 46% to the Level I cost in the network being studied.)

- For detailed analysis the median service company was selected, and these numbers were used in Exhibit IV-11 and are further compared with standalone and consolidated costs in Exhibit IV-15 . The three highest and lowest percentages for both standalone and consolidated have been identified in Exhibit IV-15 . The following analysis explains some of these wide variations.

- Since billing algorithms are heavily dependent on CPU time and EXCP's a simple analysis has been made of these extreme nodes identified in Exhibit IV-15.

  - Nodes with 'low' computer services company billings

Node	EXCP's Per CPU Hour
2	1,693,956
5	2,029,813
8	1,540,642
19	2,193,349
Mean	1,864,440

  - Nodes with 'high' computer services company billings

Node	EXCP's Per CPU Hour
1	1,565,184
4	1,776,136
7	1,921,075
11	data not available
15	1,305,924
Mean	1,642,079

- The conclusion can be reached that nodes with 'high' computer services company billings executed fewer EXCP's per CPU hour, or put another way they were more heavily CPU oriented. Thus the services company's algorithm tended to charge relatively more for CPU cycles and less for EXCP's. This is probably true since the internal network algorithm also tended to 'punish' for EXCP's with the assumption that

this would be obvious to users.

It was obvious and users therefore increased block size (the 'decay curve' analysis for Nodes 15 and 8 indicated this). The Level I center also anticipated that reducing EXCP's would reduce CPU cycles because of the operating system's handling of these requests and this did occur. The overall result was less load on the system, better throughput and more capacity. This is a good strategy for a cost center but difficult to adopt for a service company since it reduces billings.

- Thus some of the variation is explained by users' responses to the network billing algorithms.

- However, the difference in billing algorithms cannot explain the differences in the comparisons in all of the extreme cases in the overall comparisons. This is also the result of having certain actual costs for terminal operations included in some of the figures. For very small installations these numbers can cause substantial percentage shifts. Also in the case of a major node (e.g. Node 8), the result can be directly attributable to high terminal operational costs on a standalone basis.

Comparative Charges

Cost Center vs. Computer Service Companies

	Algorithm Charges	Adjusted for Tape Mounts	Relative Charges *
Level I Center	$ 502,739	$ 502,739	1.0
Service Company X	$ 894,698	$1,074,698	2.138
Service Company Y	$1,199,412	$1,199,412	2.368
Service Company Z	$ 959,605	$1,139,605	2.267

* Adjusted figure divided by that for Level I center.

• The charges shown in the above table are the overall results of running September 1975 SMF data through the actual billing algorithms. Service Company Y and the cost center did not charge for tape mounts whereas Service Companies X and Z did. Since it must be assumed such costs were recovered under the algorithm if not specifically charged for, the actual tape mounting charges for X and Z were added in. The comparative costs for the service companies are then similar.

(The reason these algorithm charges appear relatively higher than the comparisons against consolidated figures previously mentioned is the assumptions which were made concerning possible priority discounts, and the conservative percentage of 40% which was added to the Service Companies' algorithm charges to compare with the in-house operation).

3. PRICE-PERFORMANCE ANALYSIS OF IBM SYSTEM/370 MODELS 138 AND 148.

- In the 'Computer/Communications' report the various System/370 models were plotted on a price-performance chart. This chart is updated in this section as shown in Exhibit IV-16.

- In Exhibit IV-16 price-performance is measured on the basis of internal speed and average configuration on a rental basis. The rental basis was selected since long term leasing and purchase prices vary too much, whereas rental prices are relatively stable.

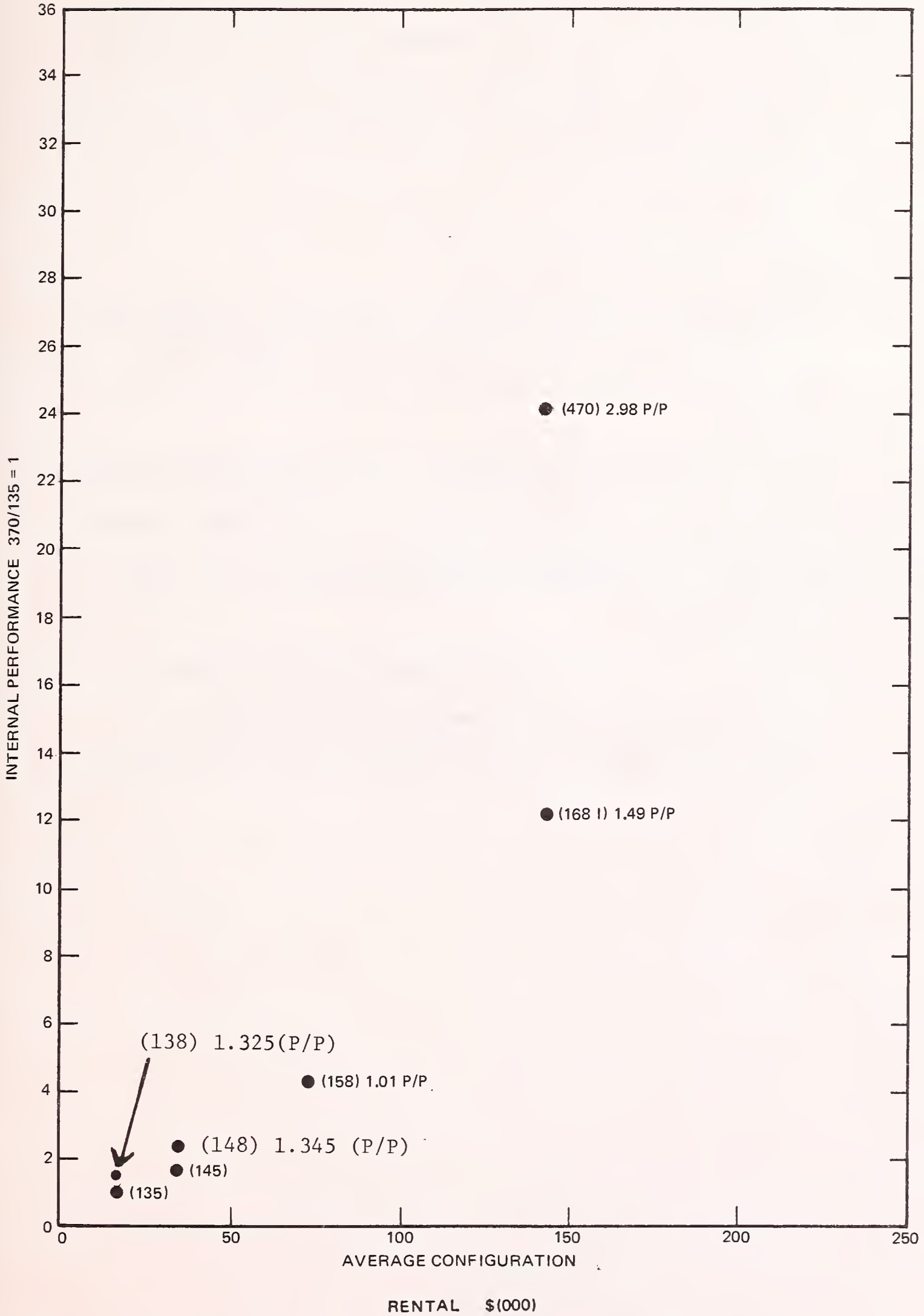
- The Models 138 and 148 were plotted on the attached chart on the basis of improved internal performance keeping the average configuration price the same.

- The analysis shows the average rental configuration of the 138 and 148 gives twice as much memory as the average configuration of the 135 and 145 for the same price. It is not chance that a 135 with a half meg cost $12,540 and a 138 with one meg costs $12,550, or that a 135 with 262,144 bytes cost $9,740 and the 138 with 524,288 bytes cost $9,600.

  - The average configuration of 138 and 148 using VS or VM will require at least twice as much memory.
  - The peripheral configurations were kept constant for this analysis and this may not be a good assumption using VS or VM.
  - The additional internal price-performance may be required when running VS and will certainly be required when running VM. Therefore, software changes may prevent the realization of potential improvements in price-performance.

EXHIBIT IV-10

IBM SYSTEM 370 INTERNAL PRICE-PERFORMANCE



- There would be substantially different results if purchase price was used, since the lease-purchase ratios have been changed. It is impossible to determine whether this is indeed a change of policy or merely a sale in preparation for a 'model change'.

- In summary this analysis indicates:
  - consolidation of small computer centers into a large center can realize savings in operations of up to 50% at consolidation.
  - due to optimization of systems to take advantage of billing algorithms and to be more efficient in processing, further savings of up to 15% may be realized within a year from consolidation.
  - a 60% discount from normal billing algorithm charges would be required from processing services companies to compare with in-house costs of operation on a consolidated basis.

V. MARKET ANALYSES BY MAJOR SERVICE SECTOR

V. MARKET ANALYSES BY MAJOR SERVICE SECTOR

- This report addresses two main types of computer services: processing services and software related services.

- This year processing services are divided into sections by mode of service; batch processing, remote computing and facilities management services. However, the boundaries among these services are becoming blurred. In future these analyses will be more in terms of type of service provided; general business, scientific and engineering, specialty and utility services.

- Software related services are likewise divided into professional services markets and software product markets.

A. REMOTE COMPUTING SERVICES

The remote computing services market in 1976 has three major components:

- Interactive/Timesharing - characterized by 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 computer, which schedules job execution according to priorities and resource requirements.

- Data Base Inquiry - characterized by the retrieval of information from a vendor maintained data base.

The components are not easily distinguishable in many cases: the borders between them are, in fact, becoming less distinct. For example, deferred timesharing runs have been available for several years on most major timesharing companies, together with the option to use high speed printers at the vendors' local offices for volume output. Vendor revenues for a deferred run could be classified under 'timesharing' (where the job initiated) or 'remote batch' (the manner in which it was performed), or split between the two categories. For the purposes of this analysis we allocate them between the two. We estimate between 5% and 10% of 'timesharing' vendor revenues are derived from 'deferred run' or other batch activities.

1. MARKET ANALYSIS OF REMOTE COMPUTING SERVICES (RCS)

- Users are concentrated primarily in the very large companies for timesharing and are split between small users for business processing and large users for scientific and engineering services.

- At least 10% of RCS revenues come from organizations without any other data processing. This will grow to 20% of the market by 1981.

- In very large organizations users are being consolidated. This results in fewer, but larger, contracts with some organizations and exposes RCS to in-house competition.

- The reason for use of RCS in most of the larger organizations has been the ability to get an application implemented quickly. INPUT estimates that at least 20% of the total RCS expenditures by users are for applications that could be run on in-house computers in batch mode; another 25% could be run in-house using remote computing combined with batch.

  As users establish internal remote computing functions much of this work will be transferred in-house.

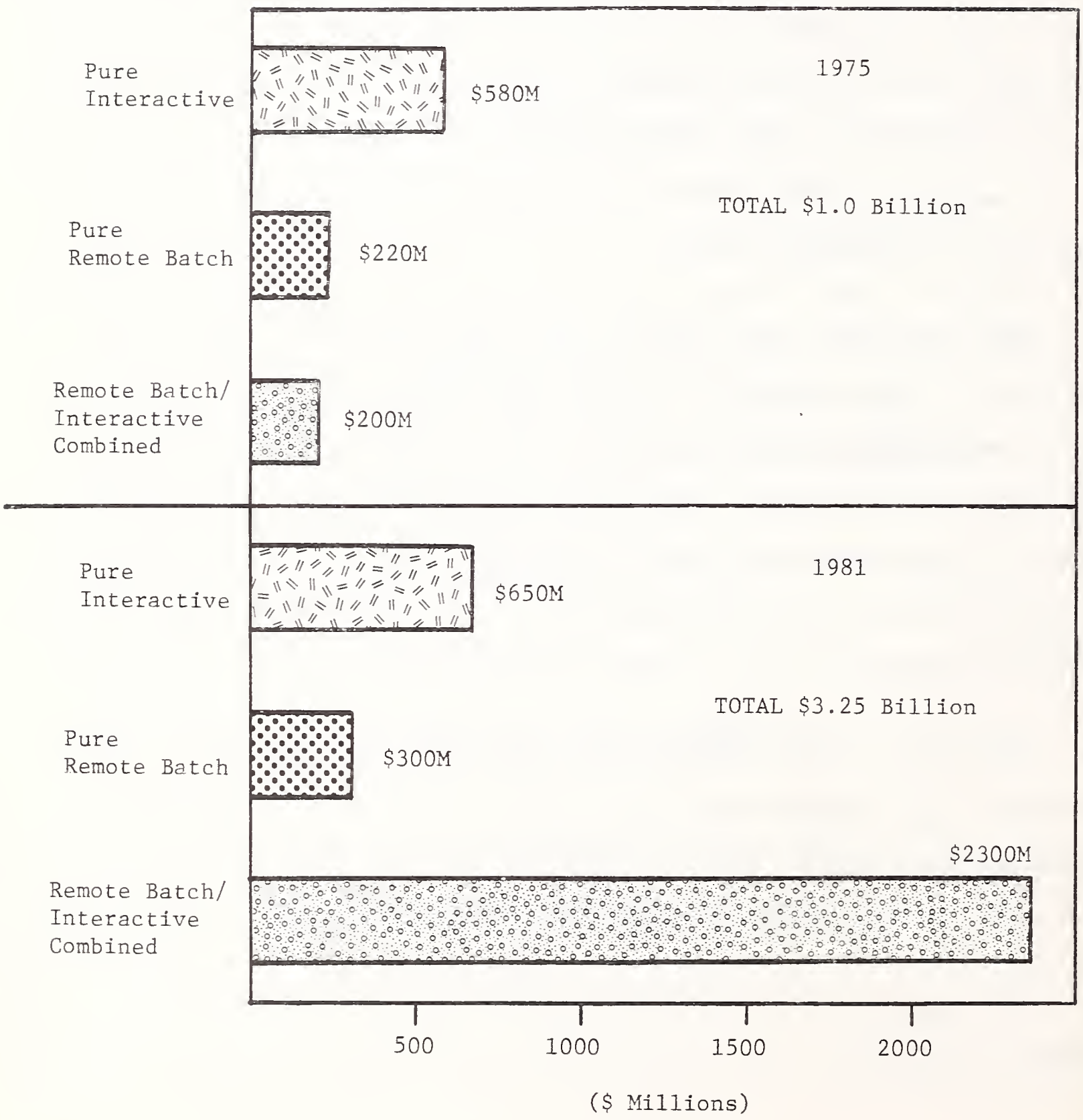
- There are several major changes in the user environment expected over the next six years. Probably the most significant is the move for many users towards remote computing services which provide both interactive and remote batch components. The remote batch activity will be the bulk production runs while the interactive capability will be for information retrieval and analysis, testing, quality control, auditing, and other activities requiring access to parts of the data files created.

- Associated with this change is the use of intelligent terminals: primarily the intelligence will be low level for data entry checking and communications control. However, some users will have full minicomputer (or small business computers) capability at the terminal end.

- The impact of these changes on the market characteristics are shown in Exhibit V-1.

EXHIBIT V-1

Remote Batch/Interactive Market Shares, 1975-1981



2. MARKET FORECAST FOR REMOTE COMPUTING SERVICES

a. Overall Market Potential and Probable Growth.

- The main factors affecting the growth of RCS are:
  - Ability of very large companies to establish their own central remote computing service functions through:
    i. acquisition of dedicated computer/s for internal RCS function;
    ii. expansion of existing hardware/software systems in-house to handle RCS functions.

    The dedicated computers can be large computers such as DEC10, System/370 158, Honeywell 6080, and CDC Cyber 170; or they can be 'minicomputers' such as HP 2000, PDP 11 and Data General Eclipse.
  - Trend to decentralization in the user environment which allows a user, such as a trust department,to replace outside RCS expenditures with an in-house minicomputer. This will usually be accomplished on a turnkey basis.
  - Availability of qualified sales and support people for RCS activities. Growth of the magnitude that is possible according to the market analysis, requires almost twice as many marketing staff to be added by RCS companies as are currently employed. This has been accomplished in the past, but the companies were far smaller then. Also, the requirements for specialization in sales forces will mean that qualified people will be harder to find and take longer to train.
  - 'Privacy' and 'Security' are almost synonymous when looking at

personal information files. For corporate information, too, the same concerns will be expressed ever more strongly. RCS vendors will be affected by these issues, but they may well cause as many opportunities as problems. However, inadequate preparation and execution will have a severely negative impact on the market.

- Keeping up with the 'state of the art' is a major problem for all but the largest RCS vendors, and it is not the easiest for them. One particular area in which they are lacking is the ability to support CRTs at a reasonable communications rate. With the exception of the data base access vendors such as Bunker Ramo and GTE, few vendors can support CRTs at anything other than 600 or 1200 bps (baud). Even at 1200 bps a screen takes several seconds to fill. INPUT's interviews with users have consistently shown this movement by users to CRTs on their in-house equipment.

- The role of the major computer manufacturers in RCS will tend to increase the market penetration but may negatively affect independent companies. The way in which IBM will support its future hardware will cause it to be a factor in the RCS business. In addition, IBM is already one of the world's largest RCS vendors due to its business outside the USA. In Britain, for example, its CALL service is one of the major components of the market.

- The role of AT&T and other communications companies is probably the largest dependent variable in the analysis. INPUT assumes that the telephone companies will not be allowed to offer RCS in any major form over this period. If they are allowed to do

so they could expand the total market by half as much again and severely cut into the revenue base of the independent companies. Key services they would provide could be network management, report consolidation, industry specialized services (such as EFT switches which are probably their most likely entree), and small business services. This last would, overall, have the largest impact on small business systems and computer service sales.

- The growth of RCS to small businesses is affected by the will to, and ability of, the smaller (less than $1 million per year) batch services companies to provide RCS services in conjunction with their batch business. The technology and cost trends for terminals are such that the cross-over points, from the users' aspects,for using some form of RCS as opposed to pure batch are moving towards RCS. However, there are support, operations, and management problems associated with this transfer, from the vendors' viewpoints. Unless they have a compelling reason they will not move to RCS as rapidly as they might.

  It is, perhaps, an indication of a failure in the concept of the 'computer utility' that batch service companies have not replaced their stand-alone, small computers with terminals to larger service vendors. Minicomputer manufacturers on the other hand have successfully persuaded hundreds of small service companies to 'represent' them in one way or another.

- Voice input will revolutionize remote computing services in the 1980's. The type of application that National Data performs now

for many of its oil and hotel industry clients will spread rapidly. Now, National Data has terminal operators at its central location to whom customers communicate via an '800' toll free call. These operators receive the data from the customer, input it to the system, and give back the information. This whole process will be replaced by a voice input/output system. Every telephone eventually becomes a terminal. The same principle will apply to any clerk or manager within an organization; eventually interfaces with the computer will be direct.

- Continued and increasing demand for applications from end users which in-house staffs and EDP departments will not be able to meet. This is the fundamental reason for the growth of RCS.
- The move towards centralization of companies that still have accounting and other basic functions decentralized. Whether or not these functions are computerized locally, central control requires consolidation of reports, for cash management, for example. Large and very large users then use RCS vendors to consolidate reporting from their various locations. The increasing cost, risk, and time delays associated with non-electronic communications such as the mail, are strong reasons for such companies to use the network capabilities of RCS vendors.
- Users' demands for on-line processing systems are particularly difficult for in-house EDP departments to fill when they have only a single, major central computer. Increasingly, such users will turn to RCS vendors for those particular applications

such as order entry and personnel status. Users are not looking for 'real time' services so much as for access to an organization of existing data when they need it. Business and government decisions require ever more rapid response in an increasingly complex environment. The time-value of information is increasing.

- Integration of word processing and data processing to provide true information processing. This integration will occur to a large part in the 1980's. It will require RCS vendors to interface with multitudes of local, small terminals and processors.

• The impact of these factors on the potential market growth is shown in Exhibit V-2. In general, many of the factors given above could affect the growth of the market on the 'down-side', particularly the movement in-house for larger users. RCS vendors have similar migration problems that batch services companies have with small business computers. The role of the computer manufacturers is a key factor in the 'up-side' potential of RCS. As 'new' or greatly expanded entrants they would significantly increase the US market.

b. Forecast Growth by Mode of Service of Remote Computing Services.

• As shown in Exhibit V-3, the area of fastest growth in RCS is that of Data Base Inquiry. Increasingly, however, there will be other RCS revenues associated with it, so that by 1981 almost 15% of the total Remote Batch and Interactive revenues will be 'pulled through' from Data Base activities compared with 5% in 1975.

EXHIBIT V-2

Potential Remote Computing Service
Market Growth, 1975-1981

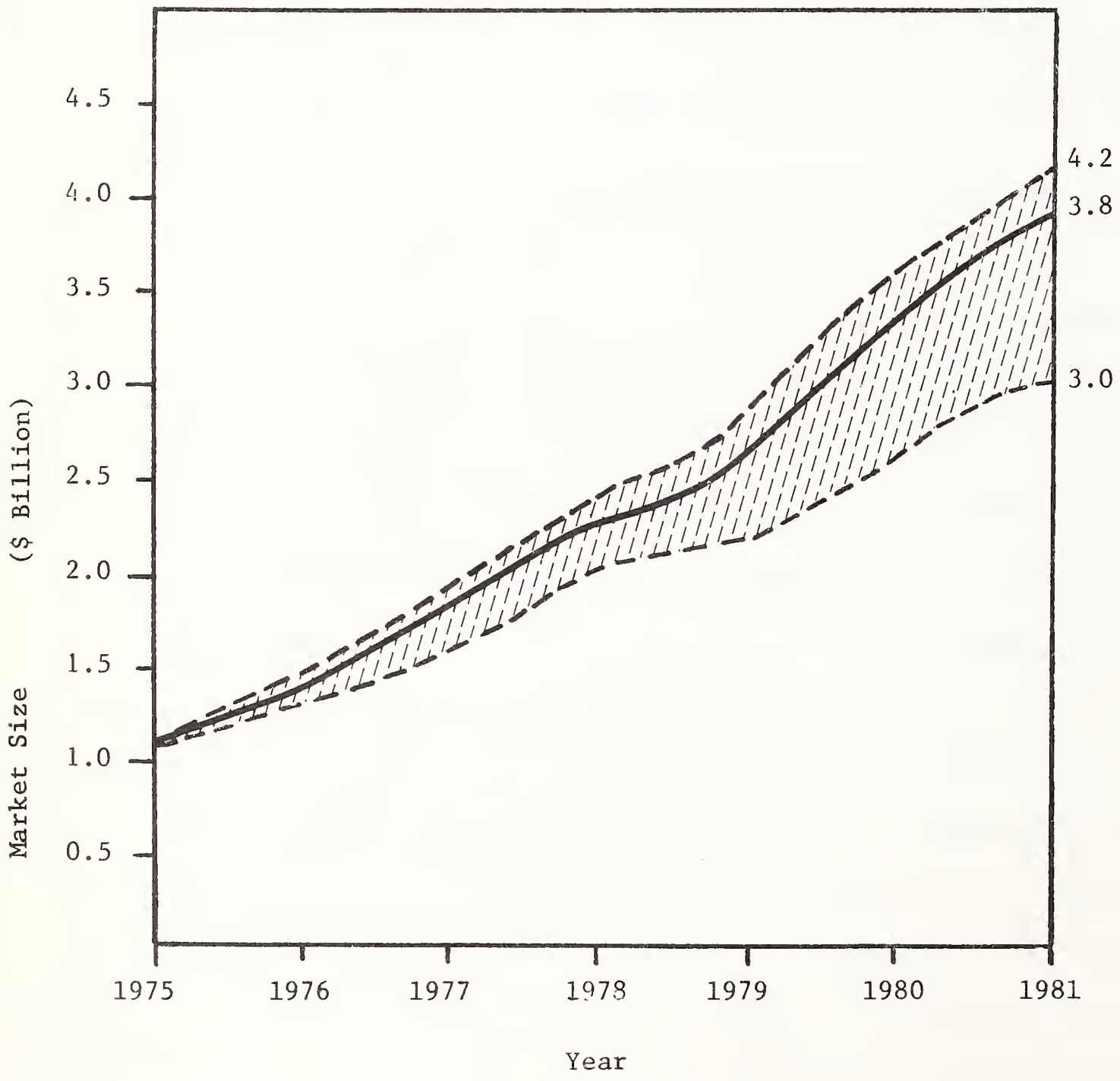
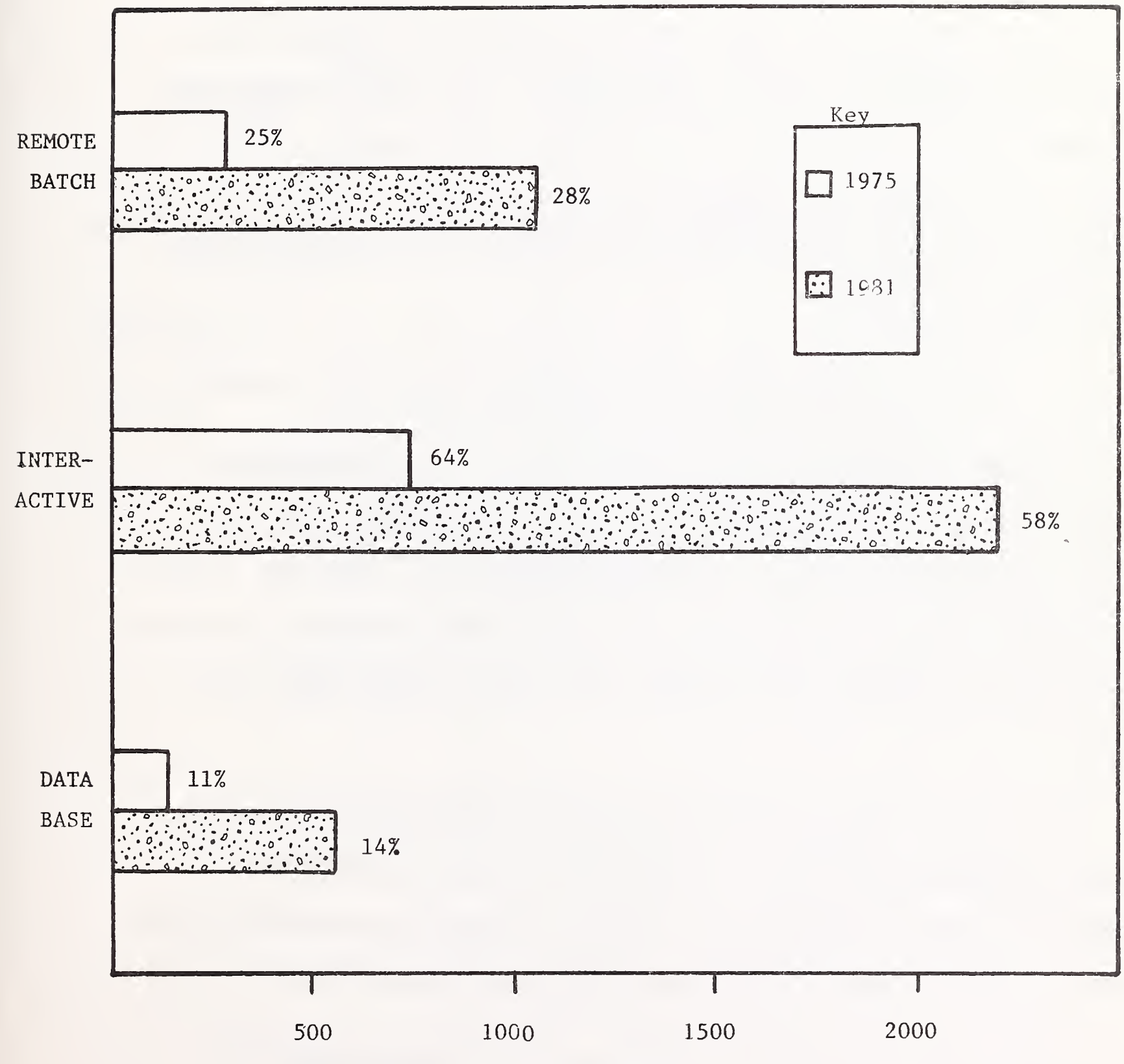


EXHIBIT V-3

RCS Market Shares by Mode of Service, 1975-1981



- It is INPUT's consideration that by 1981 differentiation between 'Remote Batch' and 'Interactive' services will be meaningless and virtually impossible. None of the characteristics of terminals, applications, line speeds, or host processor configuration or operation will indicate what expenditures are for in most cases.

- However, users expect remote batch processing to be cheaper than interactive processing in terms of the processing and communications (not terminal) costs, hence they will tend to use it where possible. Also, applications processing of bulk data through intelligent terminals will be more geared to remote batch. Hence this mode will be increasingly important in RCS processing

c. Forecast Growth of Remote Computing Services by Type of Service.

- 'Utility' processing where the vendor offers a remote computing service for the user to develop and/or run its own programs will still continue to grow through 1981, as shown in Exhibit V-4. This will largely be through the use of problem solving services based on general or proprietary data base packages such as Magnum, DML, Nomad, System 2000, IMS, and Total.

- For the other types of processing services, Specialty Applications, such as seismic processing in the petroleum industry or tax analysis for CPAs, will be fastest growing, as vendors concentrate on providing industry oriented services which are separable from mainstream processing in users.

- A large part of the growth of the General Business and Specialty

EXHIBIT V-4

RCS Market Forecast By Type of Service,
1975-1981

PROCESSING SERVICE TYPE	1975	1976	GROWTH 1975/76 %	1978	1981	AAGR 1975/81 %
General Business	$ 150	$ 190	27%	$ 300	$ 590	26%
Scientific & Eng.	160	190	20	250	380	16
Specialty Applications	290	370	28	620	1,350	29
Utility	520	650	25	1,030	1,480	19
TOTAL	$1,120	$1,400	25%	$2,200	$3,800	22

($ Million)

Applications area will come from vendor supplied packages as shown in Exhibit V-5. The user may tailor the system to its own needs but the basic processing will not alter from user to user.

- The other sources of software are 'Utility' where the user and/or vendor uses standard software to develop an application for the user, and 'Vendor Tools' where the vendor supplies a set of routines, such as the BIS package from SBC, and the user and/or vendor use these proprietary general or specialty tools to tailor a system for the user.

- As shown in Exhibit V-6, Data Base services are counted as 'Specialty Applications'. However, the two fastest growing RCS areas are Remote Batch/General Business, primarily for small users, and Interactive/Specialty Applications for all sizes of users, but primarily for medium and large organizations unable or unwilling to perform the applications in-house. An example of the latter type of service is the order entry system Anaconda is using from Computeristics.

d. Use of Remote Computing Services by Size of Organization.

- The Federal Government is counted as a very large user in the analysis of RCS use by mode of service and organization size in Exhibit V-7.

This contributes significantly to the growth of this segment of the market, since the Federal Government RCS expenditures increase from 17% of the segment in 1975 to 26% by 1981. As shown, Remote Batch and Interactive growth is parallel in the Very Large segment because this market is already well-established and users choose the processing mode most applicable to their needs.

EXHIBIT V-5

RCS Market Shares by Type of Software Used,
1975-1981

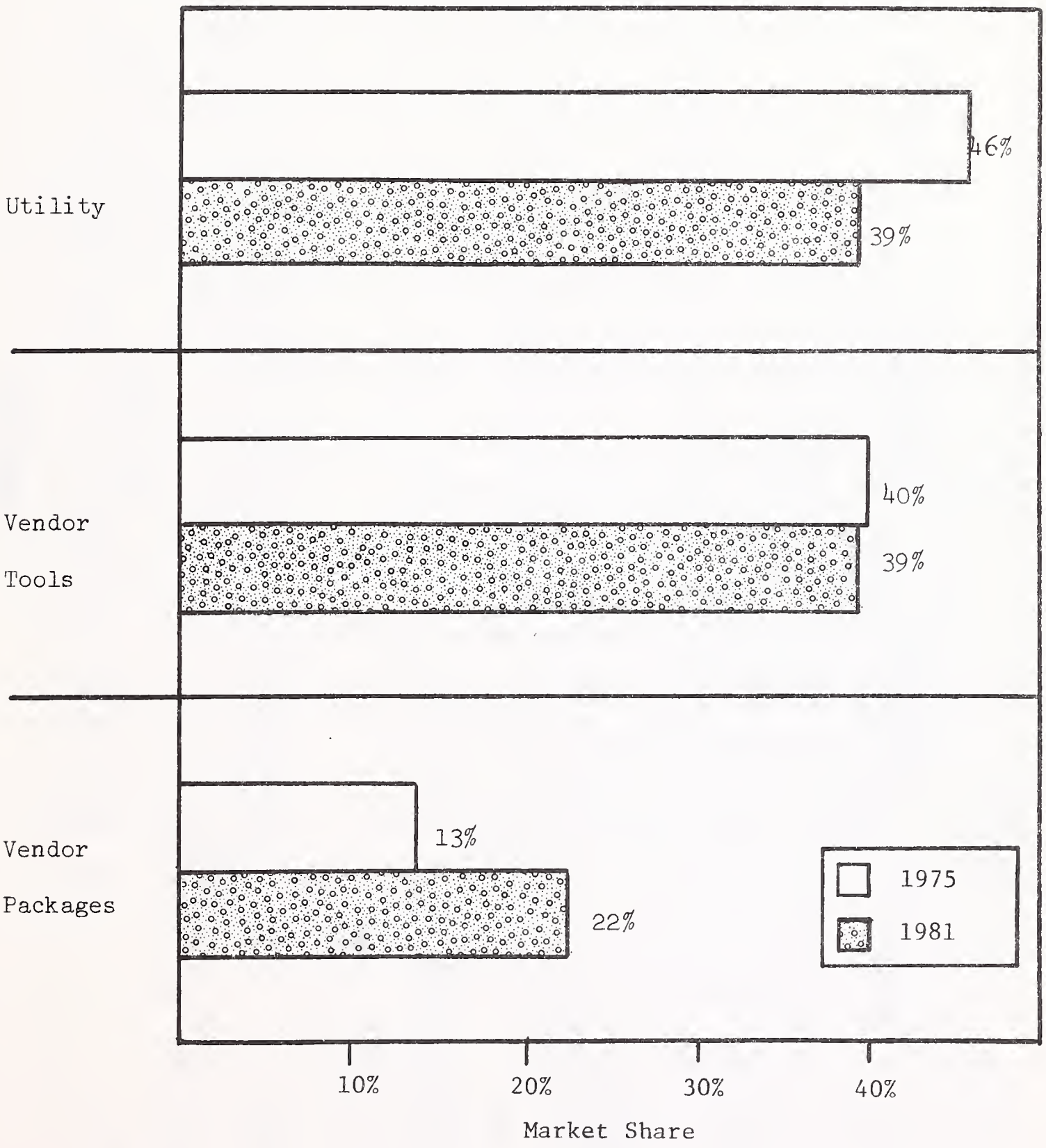


EXHIBIT V-6

RCS Market Forecast By Mode and Type of Service, 1975-1981

TYPE OF SERVICE	REMOTE BATCH			INTERACTIVE			DATA BASE			TOTAL		
	1975	1981	AAGR	1975	1981	AAGR	1975	1981	AAGR	1975	1981	AAGR
GENERAL BUSINESS	$ 30	$ 180	35%	$120	$ 410	23%	—	—	—	$ 150	$ 590	26%
SCIENTIFIC AND ENGINEERING	80	220	18	80	160	12	—	—	—	160	380	16
SPECIALTY APPLICATIONS	50	220	28	120	580	30	$120	$550	29%	290	1350	29
UTILITY	120	430	24	400	1050	17	—	—	—	520	1480	19
TOTAL	$280	$1050	25%	$720	$2200	21%	$120	$550	29%	$1120	$3800	22%

($ Million)

EXHIBIT V-7

RCS Market Forecast By Mode of Service And Organization Size,
1975-1981

	REMOTE BATCH			INTERACTIVE			DATA BASE			TOTAL		
	1975	1981	AAGR	1975	1981	AAGR	1975	1981	AAGR	1975	1981	AAGR
VERY LARGE*	$150	$ 450	20%	$460	$1250	18%	$ 80	$320	26%	$ 690	$2020	19%
LARGE	40	250	36	80	300	25	20	150	40	140	700	31
MEDIUM	40	150	25	70	200	19	10	40	26	120	390	22
SMALL	50	200	26	110	450	26	10	40	26	170	690	26
TOTAL	$280	$1050	25%	$720	$2200	21%	$120	$550	29%	$1120	$3800	23%

* Includes Federal Government.

($ Million)

INPUT

- Data Base use in large users will increase the fastest as the use of data for financial and performance modeling is 'pushed down' from the very large companies. Also large organizations will participate more in shared data bases, such as credit, than very large organizations.

- In general, RCS use will grow faster with large companies than with any others as they seek to obtain the benefits of on-line systems with installations that cannot afford to process them in-house.

- The other significant area of growth is for small organizations where data base use stems from credit data base access, stock quotation services in the financial industry, and special data base use by consultants, CPAs, lawyers, medical units, and other professional organizations.

- With the exception of data base areas there will be far fewer end-users of RCS in the 'very large' organization segment with very large contracts. There will be more users of specialized services, but the multi-million dollar generalized timesharing services contracts will be greatly reduced. Consequently, the average user expenditure size will decrease in this category, as shown in Exhibit V-8.

- In this context a 'user' is a functional entity within an organization that can authorize expenditures for services. It is not the contracting officer or purchasing agent, but the originating entity. 'User Expenditures' are not 'account size' or individual vendor expenditures, but the cumulative expenditures of the user for all vendors in a category for the year. Many users in the very large organizations have multiple vendors.

EXHIBIT V-8

Forecast Changes in Numbers Of RCS Users and Annual Expenditures
By Size Of Organization

Mode Of Service	Federal Govt.	Very Large	Large	Medium	Small
Remote Batch					
1975 Average User Expenditures	$200,000	$240,000	$ 70,000	$60,000	$120,000
Number Of Users	200	500	600	700	400
1981 Average User Expenditures	$100,000	$150,000	$100,000	$50,000	$100,000
Number Of Users	1,500	2,000	2,500	3,000	2,000
Interactive					
1975 Average User Expenditures	$100,000	$200,000	$ 40,000	$20,000	$ 15,000
Number Of Users	750	2,000	2,000	3,500	7,300
1981 Average User Expenditures	$100,000	$100,000	$ 30,000	$20,000	$ 15,000
Number Of Users	3,100	9,400	10,000	10,000	30,000
Data Base					
1975 Average User Expenditures	$ 15,000	$ 25,000	$12,000	$ 6,000	$ 6,000
Number Of Users	670	3,000	1,700	1,700	1,700
1981 Average User Expenditures	$ 30,000	$ 50,000	$25,000	$12,000	$ 6,000
Number Of Users	2,000	5,000	6,000	3,500	6,500

- Generally, average user expenditures will decrease for general RCS, with the exception of Data Base and Remote Batch expenditures by large organizations. In the latter case, Special Applications services will account for a large part of the growth.

- For medium and small users generally,expenditure rates will stay about the same but the number of users will increase rapidly.

- Very large organizations will have the most rapid increase in users because of their familiarity with the service and also because the RCS vendors are concentrating so heavily in finding users in those organizations.

e. Remote Computing Services Market Growth by Industry Sector.

- As shown in Exhibit V-9, the government sectors will be the fastest growing sectors for RCS over the next five years, primarily because of the unresponsive nature of their internal processing units combined with very high demand for services. Because of the Civil Service regulation and their equivalents, government EDP organizations are effectively unionized and their productivity is low.

- In the case of the Federal Government, agencies have been charged with using outside services where possible.

- In manufacturing and distribution, small organizations will contribute strongly to the growth. This is where the batch services companies offering RCS will have the greatest impact because of their base of business.

- The transportation industries, particularly airlines, are large users

EXHIBIT V-9

Remote Computing Services Market Forecast

By Industry Sector, 1975-1981

INDUSTRY SECTOR	USER EXPENDITURES					
	1975	1976	GROWTH 1975/76 %	1978	1981	A A G R 1976/81 %
Discrete Manufacturing	$ 170	$ 210	24%	$ 300	$ 530	21%
Process Manufacturing	130	160	19	220	370	19
Transportation	40	45	12	65	120	20
Utilities	90	115	28	170	240	18
Banking & Finance	200	260	30	400	700	23
Insurance	50	60	20	85	150	20
Medical	70	85	21	130	250	24
Education	30	35	17	50	70	15
Retail	50	65	30	110	200	26
Wholesale	40	50	25	80	150	25
Federal Government	120	150	25	260	520	28
State & Local Govt.	20	25	25	40	110	33
Services	70	90	22	130	270	25
Other	40	50	25	80	120	20
TOTAL	$1,120	$1,400	25%	$2,200	$3,800	23%

($Millions)

of remote computing systems. Most growth in RCS will come from motor-freight companies and from airlines receiving services from other airlines.

- Utilities have been proportionately very large purchasors of RCS. The telephone companies alone probably purchased $60 million of RCS in 1975 for such items as force scheduling. Their use of remote computing will continue to increase sharply but an increasingly larger share will be done in-house. Power and gas utilities will continue to use scientific and engineering RCS for power station construction and power distribution modelling.

- The banking and finance industry is, and will continue to be, the largest user sector of RCS.
  - Banks use interactive services for modelling and financial planning: this will spread through large banks and its use increase.
  - Investment areas of banking, savings and loan companies (S&Ls) and other financial institutions are major users of securities data bases and will continue to use them. Furthermore, instead of just obtaining price and volume quotations, these users will expand into modelling, planning and back office operations through RCS. Vendors such as Bunker Ramo and Quotron are actively pushing this.
  - Small banks, S&Ls, credit unions, consumer loan companies and other financial institutions are major opportunities for Specialty Applications processing.

- Insurance agents, brokers and field representatives will be tied to insurance companies' central and regional data bases through portable

terminals (eventually just the telephone itself). In addition, variable life and similar changes in insurance will create larger new applications demands. However, much of this will be done by in-house EDP. The securities investment area is one which will be increasingly important to insurance companies and a large part of RCS growth will come from that.

- The medical industry sector will provide growth for General Business and Specialty Applications. Hospitals and clinics with patient accounting and billing as well as inventory control of beds and materials will provide most of the growth. Government requirements for cost accounting, peer status review and other applications will also cause market opportunities. HMOs will not be the opportunity that was predicted a few years ago. Professional accounting and billing for dentists and doctors will also be an opportunity, particularly with increased Medicaid/Medicare regulation and increasing concentration into multi-professional practices.

- Education will primarily be serviced by shared facilities at the local level.

- Credit handling is the major application area for retailers as well as POS accounting for small chains and groups of retailers. Banks will be the major competitors in this market.

- In services, CPAs and other professionals are current large users of RCS and this will continue although IBM and other small system

suppliers will increasingly penetrate the market.

3. COMPETITIVE ENVIRONMENT.

As shown in Exhibit V-10, computer manufacturers, notably CDC and NCR, with Honeywell and IBM becoming later contenders, will increase their share of the market by 1981. However, independents will be the main force in the market place.

- Considerable consolidation of current RCS vendors will take place since the financial resources needed to keep pace with the technical and applications requirements of users will be beyond those available to many companies. The major source of such resources will be operations for most independent companies; the investor losses of the late 1960's dried-up the investment market as a source of funds, although there are signs of some returning interest.

- On the other hand almost all batch services companies over $500,000 per year in annual revenues will become RCS vendors.

- Spinoffs have the advantage of parent companies as sources of funds, but continued losses in operation will not encourage future investments in some cases.

4. TECHNICAL AND MARKETING REQUIREMENTS

The following are some summary points for RCS market penetration:

- Vendors must plan to provide integrated remote batch and interactive services.

EXHIBIT V-10

RCS Market Forecast By Type Of Vendor, 1975-1981

	1975	1981	AAGR
COMPUTER MANUFACTURERS	$ 150	$ 400	26%
INDEPENDENTS	550	2,100	25
SPINOFFS	370	1,200	22
OTHER	50	100	16
TOTAL	$1,120	$3,800	23%

($ Million)

- Networks must support CRTs, intelligent terminals and minicomputer 'hook-ups' at their preferred speeds and protocols. In-house systems will do this and RCS vendors must not fall behind the state-of-the-art again.

- Data base management and other applications development tools should be provided to users. They will require that these are 'industry standards' in many cases.

- Vendors should plan to step-up their R&D expenditures again in order to be able to compete in the new markets.

- International business is more risky and potentially less profitable than the opportunities in the U.S.

- Vendors should begin to shift targets from the 'Fortune 500/50' organizations to other levels depending on the types of services to be offered.

- General business services to small companies are a major RCS opportunity.

- Specialty Applications are, of course, the potentially most profitable area to pursue. This general statement has been made for years but the selection of the application/industry/company size area to pursue is difficult and there is little information available to call on. Vendors must step-up their internal information collection procedures in order to obtain this type of information.

- Sales forces must be organized along more specialist lines. Training of sales forces must be improved.

- Data Base products are a generator of revenues directly and through 'pull through'.

- Establish a full word-processing capability to provide users with the ability to work with data and words to produce reports and manage communications.

B. FACILITIES MANAGEMENT

- The term 'Facilities Management' arouses strong emotional response in many people in the computer industry. Certain vendors consider it has a negative connotation and prefer to call it 'Resource Management' or a 'Total Responsibility', whatever that may mean. Others attempt to draw artificial boundaries round it and put services into other categories.

- For this analysis, INPUT considers facilities management in the computer services industry to be the management of the computer processing resources for a user that enable that user to operate a major portion or all of its business. The location of the main processing hardware on-site or off-site is immaterial to the concept. To be classified as 'Facilities Management' the user must be purchasing computer resources, not just a single application such as payroll, order entry, or credit inquiry. There must also be a long-term (one year or more) contract.

- This analysis only deals with 'available' user expenditures: As in the whole report, spinoffs' revenues from parent companies are classified as internal EDP expenditures except where, as in the case of most of General Electric Information Services Division revenues from other General Electric divisions, such purchases are completely open to competition. Therefore the revenues of McAUTO, Boeing Computer Services, and SUNTECH from their parents are not included in this analysis.

- This analysis differentiates between on-site facilities management and off-site facilities management; the latter is called 'Remote Facilites Management' or RFM. In the area of RFM, the boundary with Remote Computing Services in-house computer substitution revenues is blurred. In deciding which category to count the expenditures, INPUT looks at the user's perspective; which service are they buying.

1. MARKET ANALYSIS OF FACILITIES MANAGEMENT

- The Federal Government funds almost half the current facilities management contracts through its own agency procurements, and through Medicare, Medicaid and Champus procurements.

This 'government funded health insurance' market is categorized as 'Insurance'; this is because many of the fiscal agents and fiscal intermediaries who actually contract with Federal and State governments are insurance companies such as Blue Cross, Blue Shield, Equitable and Prudential.

- There are certain industries, notably in manufacturing, which have been resistant to facilities management. In large part this has been due to lack of experience and expertise of vendors in particular industries. Manufacturers and their system requirements vary greatly.

- There is a certain category of commercial facilities management

where users have gone to outside vendors purely because of internal problems. These contracts are generally not renewed after the vendor has straightened out the problems. Such a contract is that which Computer Usage Corporation had with Fireman's Fund in San Francisco.

2. MARKET FORECAST FOR FACILITIES MANAGEMENT (FM)

a. Overall Market Potential and Probable Growth.

• The main factors affecting the growth of the Facilities Management Market are:

- Federal Government contract renewals for internal agency processing.
- Government-funded health insurance development; it is possible that the Federal Government will operate the centers for processing National Health Insurance replacements for Medicaid and Medicare. More likely, however, regional centers will be established and EDP operated by States or private contractors.
- Bank consolidation and developments including branch banking will push medium and large banks to obtain advanced systems to compete with the major banks.
- Proliferation of small business computers in small manufacturers and distributors is likely to cause many of the same problems that larger businesses had in the 1960's with computers.

This will cause many of them to become facilities management candidates for local service companies.

- Privacy and security are even more important issues with facilities management than with other processing methods. Again, however, facilities management suppliers can obtain advantages from this provided that regulation does not penalize off-site record keeping.
- Movement to in-house processing affects facilities management as other services; for example, states take over responsibility for EDP operations of Medicaid.

• The results of these factors are shown in Exhibit V-11. The projection assumes that the Federal Government will renew and increase its outside contracting. If it reduces it then the market will be negatively affected.

• The potential up-side growth of the market is virtually unlimited since many batch and RCS contracts with small and medium companies could be expanded to facilities management if the vendors had the expertise, software, and people to properly market and support them.

b. Forecast Growth of Facilities Management by Mode of Operation

• As shown in Exhibit V-12, on-site facilities management will continue to grow to about $700 million in 1981 from its current base of $500 million, but its share of the facilities management market will decrease considerably.

EXHIBIT V-11

Potential Facilities Management Market Growth,
1975-1981

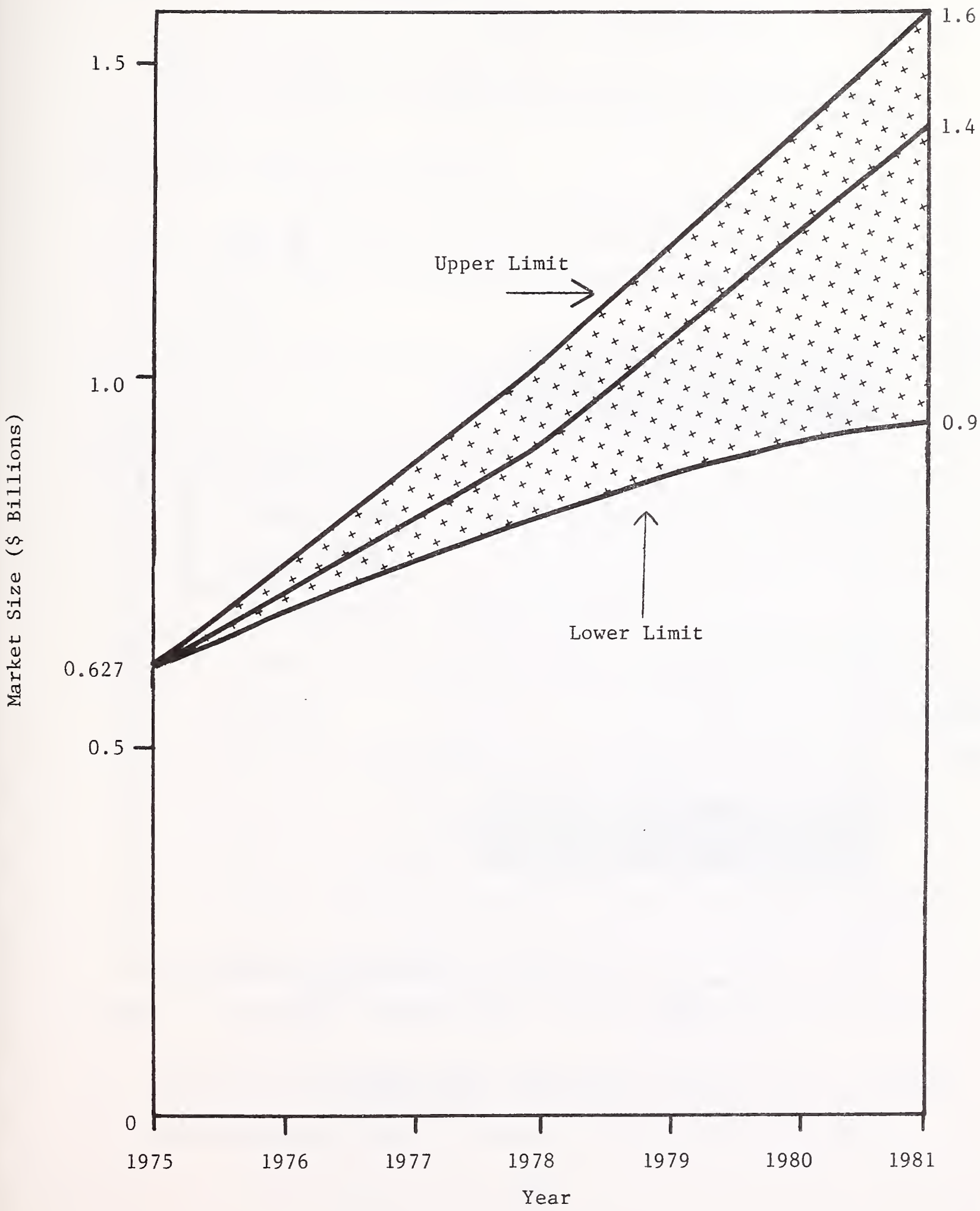
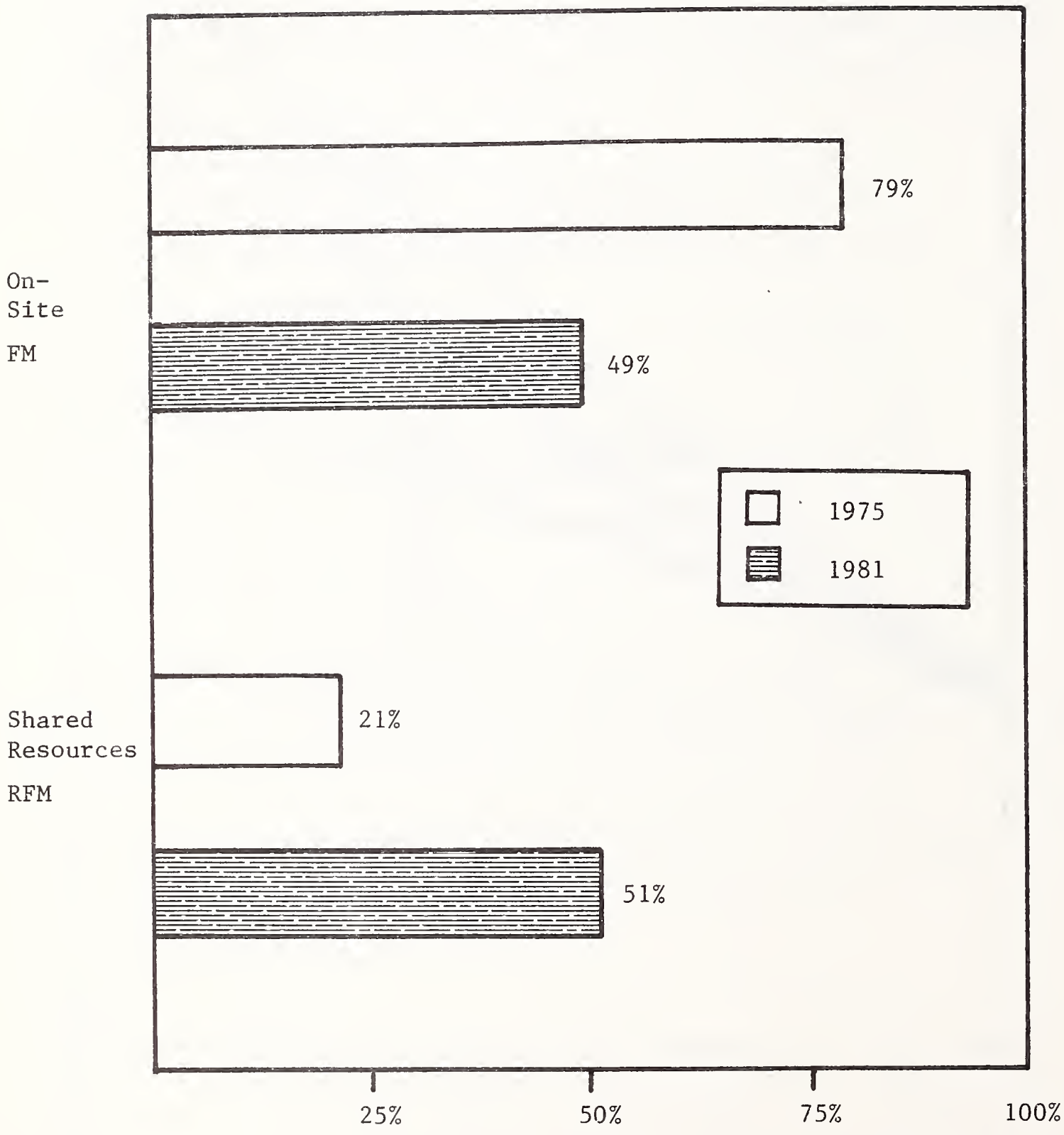


EXHIBIT V-12

On-Site And Remote Facilities Management

Market Shares, 1975-1981



- Government, banks, insurance companies will continue to insist on on-site processing. Organizations in other industries will also require it, at least initially.

- RFM will achieve most penetration in manufacturing and distribution industries. Hospitals and transportation organization will be next highest in acceptance.

c. Forecast Growth of Facilities Management by Type of Service.

- Although somewhat artificial, Facilities Management can be subdivided into the standard processing categories shown in Exhibit V-13, based on the following assignments:
  - Technical contracts for ERDA, NASA and DOD to Scientific and Engineering
  - Other government contracts to Utility
  - Standard, small business facilities management to General Business.
  - Facilities management contracts in Medicaid/Medicare, banking, and insurance to Specialty Applications together with any facilities management contracts with airlines and any facilities management contracts requiring special industry/application capability.
  - Facilities management of in-house timesharing to Utility

- Because of government market growth, the Utility area is actually the fastest growing; without government, growth would be negligible.

EXHIBIT V-13

Facilities Management Market Growth by

Type of Service, 1975-1981

TYPE OF SERVICE	1975	1981	AAGR 1975/1981 %
General Business	$50	$100	12%
Scientific and Engineering	100	150	7
Specialty Applications	380	880	15
Utility	100	300	20
TOTAL	$630	$1430	15%

($ Million)

Specialty Applications is the major growth area outside government.

d. Use of Facilities Management by Size of Organization.

- Apart from the Federal Government, medium and large organizations will account for most of facilities management in 1981 as shown in Exhibit V-14. This will be from organizations with EDP needs that they cannot meet satisfactorily in-house. These organizations and small ones will generally turn over their complete EDP to facilities management.

- For very large organizations, there will be facilities management contract growth for subsidiary operations such as personal trust in banks and insurance companies, and for government funded health insurance which accounts for the majority of these users' expenditures.

- Apart from small companies, there are only about 500 facilities management contracts in existance as shown in Exhibit V-15. Of these about 100 contracts are directly with Federal Government agencies or on pull through contracts such as those Aeronutronic Ford has with the Air Force.

- The average contract size will increase in all categories except in that for small organizations. Vendors will primarily 'push down' into this category, to get the $5,000 to $10,000 per month RFM contract.

e. Facilities Management Market Growth by Industry Sector.

EXHIBIT V-14

Facilities Management Market Forecast

By User Size Group, 1975-1981

USER SIZE	User Annual Expenditures		AAGR 1975/1981 %
	1975	1981	
Federal Government	$ 190	$ 400	13%
Very Large	120	240	12
Large	80	240	20
Medium	127	325	17
Small	110	220	12
TOTAL	$ 627	$ 1425	15%

($ Millions)

EXHIBIT V-15

Forecast Changes In Numbers Of Facilities Management Users And Annual Expenditures By Size Of Organization

	Size Of User				
	Federal Government	Very Large	Large	Medium	Small
1975 Average User Expenditures	$ 2,000,000	$ 2,500,000	500,000	400,000	200,000
Number of Users	100	50	150	300	500
1981 Average User Expenditures	$ 2,500,000	$ 3,000,000	800,000	600,000	120,000
Number of Users	160	80	300	600	2,000

- The largest growth by industry sector for facilities management, as shown in Exhibit V-16, will be in the banking and finance industries. There are at least 15 vendors with facilities management contracts with banks, and others with contracts with savings and loan companies, and other financial institutions. Some of these contracts, such as Weiland's in Chicago, are with groups of organizations.

- In spite of the size and growth of the banking market, there is no one vendor with the appropriate software and expertise to approach any bank, regardless of location and size, with a viable facilities management proposition. Each vendor has its particular areas of expertise.

- Federal Government agencies procuring facilities management services directly have been in the defense and high technology areas, such as the Air Force, ERDA, and NASA; more recently new agencies such as the Federal Energy Office and Environmental Protection Agency have used facilities management. Another group is the regulatory agencies, such as Federal Trade Commission and Federal Power Commission.

- Many of these newer contracts are receiving strong opposition in Congress from special interest groups. Since many of the recent ones have gone to vendors with IBM hardware, other manufacturers are charging that this is a way for agencies to get around the computer procurement requirements for open bids. Also, civil service representatives strongly oppose facilities management since it prevents the expansion of internal government 'empires'.

EXHIBIT V-16

Facilities Management Market Forecast

By Industry Sector, 1975-1981

INDUSTRY SECTOR	USER EXPENDITURES					
	1975	1976	GROWTH 1975/76 %	1978	1981	A A G R 1976/81 %
Discrete Manufactuirng	$ 30	$ 36	20%	$ 50	$ 90	20%
Process Manufacturing	15	18	20	20	40	18
Transportation	15	18	20	25	45	20
Utilities	5	5	--	5	10	12
Banking & Finance	160	200	25	240	400	17
Insurance	140	150	7	180	240	9
Medical	20	25	25	35	50	17
Education	10	15	50	20	30	20
Retail	2	2	--	5	10	30
Wholesale	20	25	25	35	60	20
Federal Government	190	200	5	260	400	13
State & Local Govt.	15	18	20	25	40	18
Services	--	--	--	--	--	--
Other	8	9	10	10	15	12
TOTAL	$630	$720	13%	$910	$1.430	15%

($Million)

Much of this opposition is being voiced in the name of 'security' and 'privacy'. This is basically just 'smoke' to confuse the basic issues of effective and economic performance. Leading vendors to the Federal Government are CSC, OSI, Logicon, PRC, SDC, and BCS.

- In the State and Local Government, CSC, OSI, McAUTO and BCS are the main contenders for contracts. In fact, the competition became so fierce for one contract in Washington State that it was lost to a joint venture with another local organization. The outcome of this is a set-back for the whole concept of facilities management in this sector. No manager, least of all an appointed or elected government official, wants to be exposed to the pressure associated with that procurement.

The practice of protesting every award to another company seems to be growing. This will be fatal to the industry if it continues.

- In manufacturing industries, the bulk of expenditures are by a wide variety of users with contracts with many vendors each having one or a few contracts. Distronics, the Western Union subsidiary, will get some facilities management contracts through its distribution capability. Other vendors include On-Line Systems with its timesharing facilities management contract for ALCOA, Greyhound, Martin Marietta Data Systems, and Eastern System Management.

- In transportation, the major facilities management suppliers are airlines such as Continental and Central providing RFM services to other airlines. There are also a very few FM contracts with motor freight companies.

- Although EDS is supposedly targeting utilities for RFM services, most facilities management contracts are for timesharing for FM such as that of Remote Computing Corporation for PT and T.

- Apart from the government funded health insurance market, there are several companies approaching the life and property and casualty markets. Among these are insurance companies such as INA. Other vendors to the insurance industries include TCC (Multiple Access) Health Applications Systems (Bergen Brunswick), EDS, OSI, McAUTO, CDC, FIS (Martin Marietta Data Systems and a Connecticut bank), Aspen Systems and Dikewood.

A recent development has been the movement of basically data processing organizations such as EDS and HAS to take full program management responsibility including actual payments for Medicaid programs. There are considerable risks entailed; for a time the potential liability of HAS exceeded the net worth of its parent corporation. Thus careful contracting is entailed.

The basic reason for this type of contract is that the private contractor has a incentive to control payments whereas a state agency or even an insurance company feels a 'moral' obligation to make payments for anyone 'in need' despite attempts at more rigorous control by the Federal Government.

- In the Medical sector, a certain amount of EDP facilities management is associated now with hospital management contracts. Vendors to hospitals include McAUTO, Shared Medical Systems, and Space Age

Computer Systems.

- In the Education sector, SDC had made an attempt to penetrate this market but without much success. More recently, Systems and Computer Technology has achieved more success.

- In the distribution industries, there are two types of facilities management driving forces, the accounting/inventory control needs of the wholesaler and the merchandising system requirements of the retailer. Neither industry sector has been susceptible to facilities management in the past, particularly retailers. XCS has contracts which border on facilities management as does Management Horizons Data Systems. RAAM, the Rapid American subsidiary attempted to penetrate the retail market without success. Distronics, the Western Union subsidiary, also has wholesaler facilities management contracts.

- In other industries, there is limited facilities management in the hotel industry.

3. COMPETITIVE ENVIRONMENT

- The major competition to facilities management is, of course, in-house processing. However, vendors of all other computer products and services oppose facilities management because it basically transfers account control to a third party and restricts opportunity for sales. This particularly refers to consultants, including CPAs.

- In the Federal Government, the aerospace companies are the strongest competitors besides the 'big three' of CSC, PRC and SDC. Of these CSC

is pulling ahead of the others. CSC, too, is attempting to expand from mainly data processing facilities management into systems management where 'system' here refers to a large military hardware procurement.

- The commerical banking industry is the most competitive of the Facilities Management markets. The very numbers and strengths of the vendors, in fact, make the market. Facilities management has credibility in banks despite the poor performance of a number of facilities management contractors in the past. This has improved dramatically as shown by the way one facilities management supplier obtained a new $1,000,000 per year contract.

The president of a client bank of this company sat next to the president of a larger bank at an 'IBM executive school'. The latter bemoaned the costs and poor performance of his internal EDP operation while the president of the bank with facilities management kept producing evidence of the efficiency of his operation. Finally, the first president told the satisfied facilities management user to get his contractor to call him when school was over. The result was a very lucrative contract, using IBM hardware, of course.

- In other industry sectors, the competition is weak and generally fragmented. This causes a lack of credibility for the service as opposed to other alternatives.

- As shown in Exhibit V-17, computer manufacturers' share of this market is miniscule with only CDC, through its brokerage and other

EXHIBIT V-17

Facilities Management Market Forecast

By Type Of Vendor, 1975-1981

TYPE OF VENDOR	1975	1981	AAGR 1975/1981 %
Computer Manufacturers	$ 10	$ 20	12%
Independents	$517	$1180	15%
Spinoffs	$100	$ 225	14%
Total	$627	$1425	15%

($ Million)

industry specialized services, and NCR having any significant revenues. Independents have the bulk of the market and will continue in a dominant position. For this analysis, National Sharedata, Distronics, and XCS are counted as independents.

4. TECHNICAL AND MARKETING REQUIREMENTS

- Industry knowledgeable people are more important than software. These people also perform sales and support functions.

- For a multi-service vendor the standard sales force can only operate as 'gofers' in this environment. Potential leads are then turned over to a special sales group.

- The cost of sales for facilities management is relatively high in terms of effort required and percent success. Many computer services vendors are unwilling or unable to accept the investment necessary to actively penetrate this market; they wait for the 'blue bird' to come along and to convert an existing client. In numbers, the majority of contracts outside banking, insurance, and government have come about in this way.

- A strong IBM-based capability is mandatory in almost all sectors except small and medium banks. The reason is that the market potential is cut down considerably for non-IBM based vendors because of conversion and operating requirements.

- Facilities management in banking and finance could well take off

very rapidly from a now fairly firm base. However, the window for entry is closing if not closed in many subsectors. A new entry will almost have to make it by acquisition, at the least of software and a marketing force. Enough pioneering has been done in banks.

- Remote facilities management will require on-site small computers, perhaps one in each major functional area in a larger organization, in order to give the user something tangible to see and more seriously to provide input and output control. 'Distributed processing' provides a major opportunity for sophisticated computer service companies with industry knowledge and software to penetrate a set of new industry markets.

- Remote facilities management in specialty store chains, hospitals, small banks, distributors and dispersed manufacturers are the targets of choice.

- On-site facilities management should be aimed at Government except for small county and municipality governments, very large banking and very large insurance companies.

C. BATCH SERVICES

- This computer services market sector is very fragmented. It is the oldest of the processing services and possibly the least understood since attention has often been focussed on the 'glamor' areas of facilities management and remote computing services. However, it probably accounts for as many user processing dollars as FM and RCS combined. Furthermore, it is growing and can be a very profitable business.

- Included in Batch Services are data input and output processing such as keying services and COM activities. The latter business is growing as fast as many of the fastest growing computer services segments right now.

1. MARKET ANALYSIS OF BATCH SERVICES

- These services are primarily bought by small companies or by small, geographically dispersed units of larger corporations. Western Union, for example, uses ADP for payroll services.

- Batch service business is the most susceptible of all the computer services to consolidation. There are few new entries, yet many larger vendors are looking to acquire successful companies for geographic and industry expansion. There are several sharks cruising the waters looking for minnows - among the most notable are Tymshare, ADP, and Itel, with CDC close behind.

- Virtually every city in the United States with a population of 10,000 people or more could support a small batch service business. Many smaller cities and towns already do.

- Most current use of batch services involves the use of a variety of custom applications software. In the case of larger companies, they often use service bureaus' time for overflow processing.

- Probably 30% of user installations sell some computer time or services to other users. These revenues, although small in each case, in aggregate are significant in the market.

- Banks are committed to aggressively expand automated customer services (ACS) to other banks, financial institutions, and other organizations.

2. MARKET FORECAST FOR BATCH SERVICES

a. Overall Market Potential and Probable Growth

- The main factors affecting the growth of the Batch Services market are:

  - Increased computerization of small businesses. At least 50% of all companies using EDP for the first time are projected to do so through batch services, often for payroll and accounting. The current emphasis by IBM, and the other major manufacturers, as well as the turnkey systems suppliers, on providing small business computers benefits batch service suppliers by emphasizing EDP solutions.

  - Promotion of their services through the media. Batch services companies must 'cash-in' on the exposure of small companies to computers by extensive promotion. ADP and others have made a start by advertising on the radio. However, most batch companies,

in general, have poor or non-existent promotional mechanisms.

- Conversion of batch services to RCS and FM.

- Degree of integration with RCS. By 1981 perhaps 50% of batch services revenues will have some remote computing component associated with them either for data entry or for processing from a 'public' terminal for connection to a central processer elsewhere.

- Conversion of batch services in-house on small business computers.

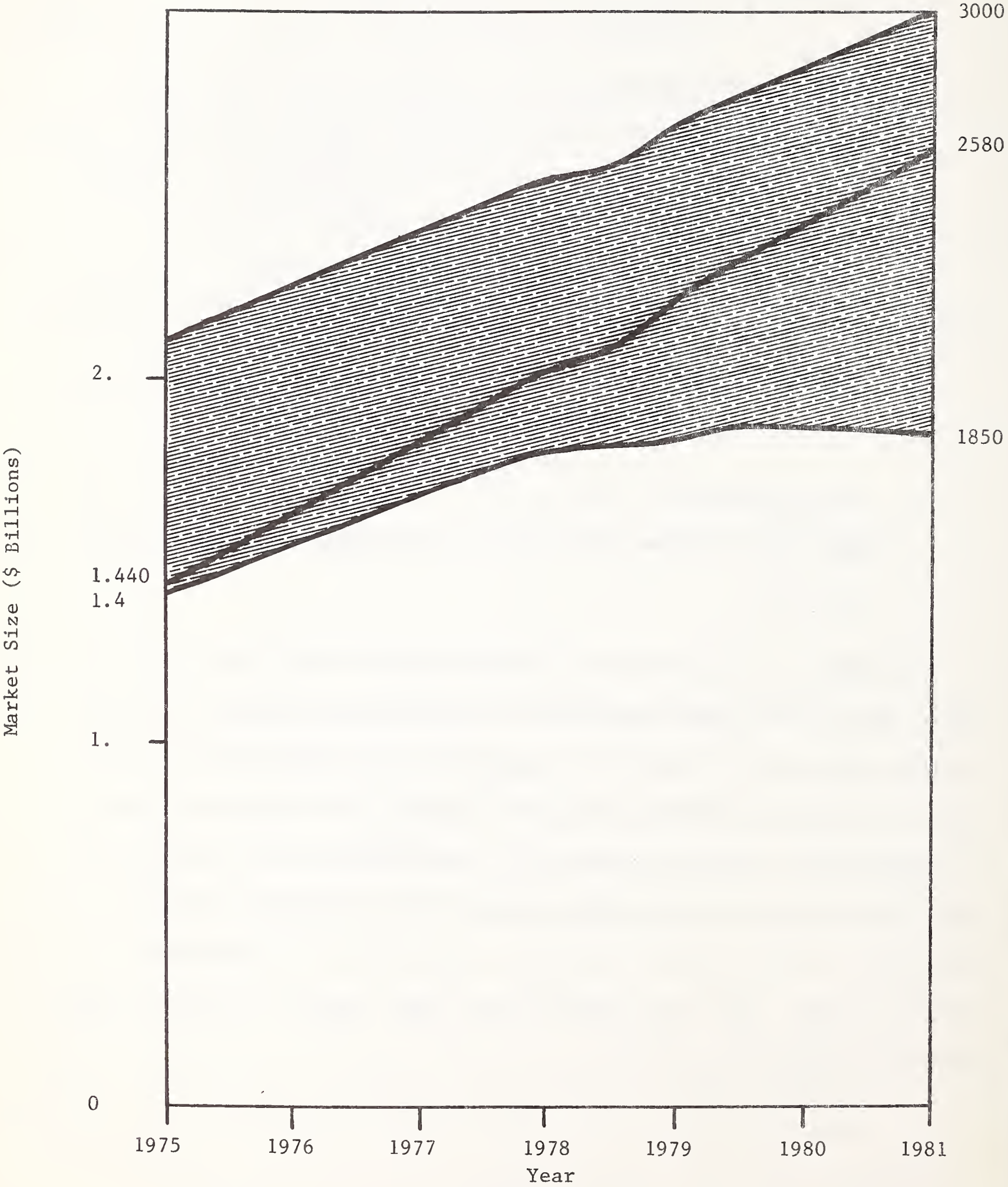
- Increase in data entry and output services; even EDS is getting in on the act and marketing data entry as a service.

- The willingness of batch services companies to stick with it and put their resources into batch services rather than jumping into new areas.

• The impact of these factors is shown in Exhibit V-18. This is one area where, in 1975, the actual market had not been closely estimated. This is because so many of the organizations purchasing batch services do not have their own computers and are difficult to identify, as are the large numbers of companies selling batch services on a cost recovery basis incidental to their main business. Finally INPUT estimates there are over a thousand independent service bureaus in the U.S., almost all of them small and privately owned. INPUT has identified over 1200 companies of which at least two-thirds offer batch services.

EXHIBIT V-18

Potential Batch Services Market Growth,
1975-1981



b. Forecast Growth of Batch Services by Type of Service.

- As shown in Exhibit V-19, Specialty Applications is the largest and fastest growing type of service. Based on industry analysis carried out to date, tax preparation services and correspondent banking are expected to grow at rates comparable to some of the faster growing computer services from a well established base.

- General Business services are the basic entry service for most companies and will continue to expand. Payroll services have not saturated the market; data collection changes using voice input and simple keyboard devices will push down the market to the companies with less than 50 employees. Also larger companies with increasingly complex payrolls will have them processed outside. Industries with unique demands such as construction will be especially large users.

- Specialty Applications and General Business will increase their market shares as shown in Exhibit V-20 at the expense of Utility and Scientific and Engineering services. This will benefit the companies in the industry by increasing their profitability, since both of the other two services are generally 'commodity sales'.

c. Use of Batch Services by Size of Organization

- The degree to which Utility sales to small organizations will decrease, is shown in Exhibit V-21. No longer will batch services companies write 'one-off' applications for small companies; they will provide package-based services while achieving growth in Specialty Applications and General Business.

EXHIBIT V-19

Batch Services Market Forecast By Type of Service

PROCESSING SERVICE TYPE	1975	1976	1975/76	1978	1981	AAGR% 1975/81
General Business	$450	$520	15%	$660	$930	13%
Payroll	250				450	10%
Order Processing/Billing	30				70	15%
Accounting	100				250	17%
Other	70				160	15%
Scientific & Engineering	120	130	8%	150	150	4%
Structural Analysis	30				20	(-7%)
Operations Research	20				20	--
Other	70				110	8%
Specialty Applications	520	610	18%	820	1200	15%
Correspondent Banking	150				400	18%
Brokerage Accounting	40					
S&L Processing	25					
Tax Preparation	40				100	17%
Client Accounting	25				40	8%
CPM Scheduling	10					
Manufacturing Control	50					
Utilities Billing	10					
Dues Processing	15					
School Class Scheduling	10					
Route Accounting	5					
Other	140					
Utility	350	350	0	330	300	(-3%)
TOTAL	$1440	$1610	12%	$1960	$2580	10%

($ Million)

EXHIBIT V-20

Batch Services Market Shares By Type Of Service, 1975-1981

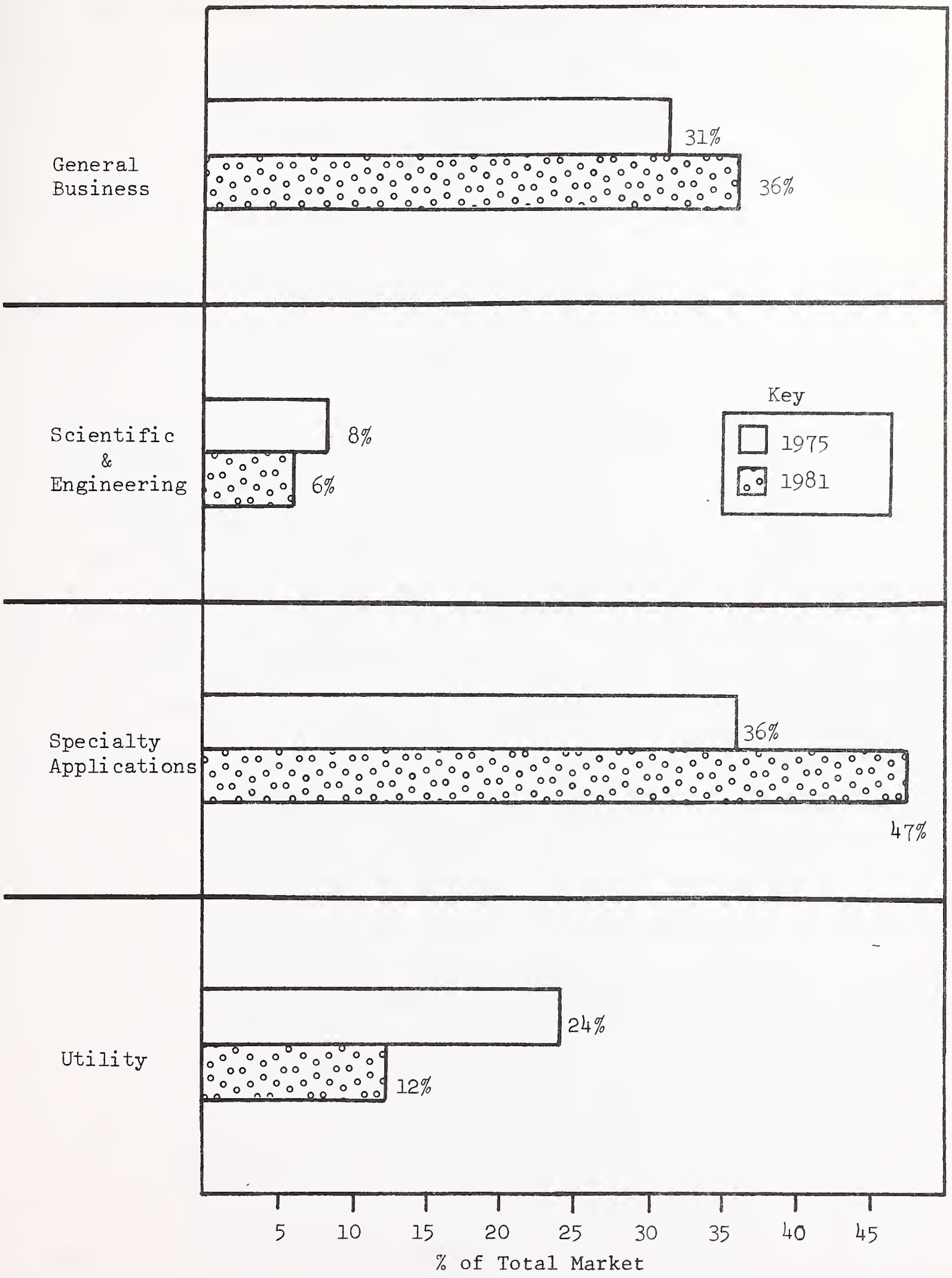


EXHIBIT V-21

Batch Services Market Forecast By

Type Of Service And Organization Size, 1975-1981

Size Of User	General Business			Scientific & Engineering			Special Applications			Utility			Total		
	1975	1981	AAGR	1975	1981	AAGR	1975	1981	AAGR	1975	1981	AAGR	1975	1981	AAGR
Federal Government	$ 5	$ 5	0%	$ 10	$ 20	12%	$ 5	$ 5	0%	$ 20	$ 30	7%	$ 40	$ 60	7%
Very Large	10	15	7	70	70	0	5	10	12	15	30	12	100	125	4
Large	30	50	9	15	20	5	10	25	17	40	50	4	95	145	7
Medium	50	100	12	5	10	12	80	200	17	100	100	0	235	410	10
Small	355	760	14	20	30	7	420	960	14	175	90	(-10)	970	1840	11
Total	$450	930	13%	$120	$150	4%	$520	1200	15%	$350	$300	(-3%)	$1440	2580	10%

($Million)

- Very large organizations primarily use Scientific and Engineering applications in Batch Services. However, much of this work, particularly in structures, will go in-house or be done through remote batch. Other use of batch services by these organizations is through small, local units buying time and also for overflow services.

- Among small users of batch services are companies such as architects and engineers, and consultants which do not have in-house computers, yet require access to large systems for their business. This accounts for the relatively large amount of Scientific and Engineering services purchased by organizations of this size.

- The major growth in numbers of users is in small organizations as shown in Exhibit V-22. Many of the users will be separate establishments of the same organization that have control over which service is used. Also, batch services companies are approaching the ultimate user, the individual home. Billing has already been tried without much success in Seattle. By 1981, voice input/output combined with telephone keypads will start to open up this market, primarily through banks.

d. Batch Services Market Growth by Industry Sector

- Primarily because of the impact of correspondent banking, the banking and finance industries spend the most for batch services as shown in Exhibit V-23. Savings and loan companies, credit unions, consumer finance companies, and brokerage organizations spend heavily for batch processing. The back office accounting in stock brokers accounts for about $25 Million a year in 1975 alone. Correspondent banking is estimated to be $110 Million in size in 1975.

EXHIBIT V-22

Forecast Changes In Numbers Of Batch Services
Users And Annual Expenditures By Size of Organization

	USER SIZE				
	Federal Government	Very Large	Large	Medium	Small
1975 Average User Expenditures	$ 40,000	$ 50,000	$ 25,000	$ 60,000	$ 12,000
Number of Users	1,000	2,000	3,800	4,000	80,000
1981 Average User Expenditures	$ 80,000	$ 70,000	$ 40,000	$ 60,000	$ 10,000
Number of Users	750	1,500	4,000	7,000	185,000

EXHIBIT V-23

Batch Services Markets Forecast

By Industry Sector, 1975-1981

INDUSTRY SECTOR	USER EXPENDITURES					
	1975	1976	GROWTH 1975/76 %	1978	1981	A A G R 1976/81 %
Discrete Manufacturing	$ 210	$ 235	12%	$ 320	$ 370	10%
Process Manufacturing	105	115	10	150	170	8
Transportation	30	33	10	50	60	12
Utilities	45	50	10	70	80	10
Banking & Finance	230	265	15	360	400	10
Insurance	70	75	7	90	100	3
Medical	95	105	11	140	180	11
Education	15	17	10	20	30	12
Retail	120	130	8	160	180	7
Wholesale	210	230	10	290	320	7
Federal Government	40	44	10	50	60	7
State & Local Govt.	40	46	15	60	80	12
Services	120	140	17	230	330	18
Other	110	125	14	170	220	12
TOTAL	$1,440	$1,610	12%	$2,160	$2,580	10%

($Million)

- Manufacturing and distribution companies, because of their sheer numbers, are major contributors to batch services revenues, primarily for General Business and Utility processing services. Inventory control and order entry are the most important applications after payroll, general ledger and standard accounting. Because of slightly higher value of on-line order entry, batch services to wholesalers will not increase as fast as to manufacturers.

- Education establishments, primarily school districts, purchase class scheduling and general services in a relatively small way, compared to the potential industry size. Most education systems will use cooperative services and local government systems for processing services.

- State and local government organizations will purchase data entry and output services, as well as tax services, utility billing, and payroll.

- Primary medical industry applications are patient accounting and billing for small hospitals and clinics, as well as payroll and inventory control. Increased demand for record keeping will force medical organizations to use services and in-house computers. Larger hospitals will go in-house to RCS services such as McAUTO's, or FM. Medical clinics will use local batch services primarily from banks.

- In the services industries, Specialty Applications for professional services such as CPAs and lawyers will be the major growth area. Tax preparation and client accounting, including financial statement preparation, account for $60 Million of batch services in 1975.

- The requirements for payroll and other services in the construction industry as well as in hotels and real estate contribute to the size and growth of this segment. The very variable nature of these businesses makes in-house processing less attractive than the use of packaged services.

3. COMPETITIVE ENVIRONMENT

- There is little real competition among small batch services companies themselves; they have in no way approached saturation of the market. Competition implies sales activity and there is relatively little of that in many companies.

- Banks are the major competitive threat to all batch services companies, even more so a small business computers for in-house processing. Banks are strongly committed at all size levels to providing financially oriented services to outside organizations; these services, such as payroll and accounting, are the lifeblood of the small batch service organization.

- In-house processing certainly is a threat to large accounts in service bureaus, but it can be met. Even if a client does go in-house, there are certain revenues that can be retained and we consider that at least 10% of companies that transfer in-house will come back to a service after poor in-house experience.

- As shown in Exhibit V-24, banks accounted for almost a quarter of the market in 1975 and will increase this share by 1980. Fortunately for batch services and other companies banks are very poor at marketing and sales.

- For computer manufacturers, the batch services portion of SBC accounts for over $40 Million in sales in 1975 and NCR was about the same size. CDC's scientific and engineering batch revenues effectively complete the market.

- Independents account for the largest share of the market with companies such as ADP, Itel, and Stat-Tab, accounting for over 20% of this share.

EXHIBIT V-24

Batch Services Market Forecast

By Type Of Vendor, 1975-1981

TYPE OF VENDOR	1975	1981	A A G R 1975/81%
Computer Manufacturers	$ 90	$ 150	9%
Independents	880	1530	10%
Banks	350	700	12%
Other Spinoffs	80	120	7%
Other	40	80	12%
Total	$ 1440	$ 2580	10%

($ Millions)

- Other organizations such as universities, government agencies and in-house operations effectively sell capacity or 'Utility' services. Use of this will grow as organizations with their own programs and data simply seek the cheapest place to run them.

4. TECHNICAL AND MARKETING REQUIREMENTS

- Spend available money on selling what they have already rather than trying to become a turnkey system house on even an RCS vendor.

- Acquire applications for new batch service such as included in the list of Specialty Applications.

- Investigate a relationship with an RCS vendor to provide basic processing or at least to provide the network to support opening a remote, batch location by means of a terminal.

- Pushing data entry itself back to the user does not necessarily help the vendor because if problems arise the user will spend more money and become a more exposed target for the in-house computer salesperson.

- Sell packaged services not certain services; this will enable reduction of expensive programming staffs.

- Promote,in competition with banks. Even a minimum PR budget can have significant returns.

- Provide 'full service' data processing including COM and data entry services.

- Develop Specialty Applications services packages and provide them on a royalty basis to other services companies.

D. SOFTWARE PRODUCTS

- The two basic kinds of software products addressed in this report are systems packages and applications packages. The former enables an in-house installation to theoretically improve its performance while the latter enables it to offer a service to end users.

- At times an application package may consist of a complete turnkey system encompassing major operating system developments. An airline reservation system might fall into this category.

- Packages may also be bought by users for external processing although this is not so common.

- In examining this market, INPUT counts user expenditures whether they are for the lease, purchase, or maintenance of the software. Unlike the situation with equipment, expenditures are not converted to equivalent annual rentals or lease prices.

- As mentioned above, maintenance fees for a software package are counted in the Software Products market.

1. MARKET ANALYSIS OF SOFTWARE PRODUCTS

- The current use of software products is limited by the availability of quality software. Of the thousands of products offered for sale, probably very few were designed and developed from scratch as software products. Most of them are outgrowths of systems designed for a particular client or developed by a user. Available packages have been screened by software

product companies that basically act as marketing agents in many cases.

- The number of successful packages, however, has increased to the point where vendors are specifying and developing their own products more extensively than ever before.

- Users want the packages they buy to be integratable. For example, applications packages should interface with common information retrieval languages, sorts should work on files created by common data base languages, and almost all packages should have provisions for 'own code' routines.

- The growth of the minicomputer market is providing opportunities for small organizations to develop turnkey systems.

- Minicomputer manufacturers are in the same position as the major mainframe companies in the middle 1960s in their needs for software. Thus a major market exists in providing these manufacturers with applications and systems software. For example, Basic Four has been working with CUC and DEC has just purchased the company which developed an APL compiler for the DEC 10.

2. MARKET FORECAST FOR SOFTWARE PRODUCTS

a. Overall Market Potential and Probable Growth

- Factors affecting the software products market have been mainly presented in the section on 'User Software Development'. These and some others are:

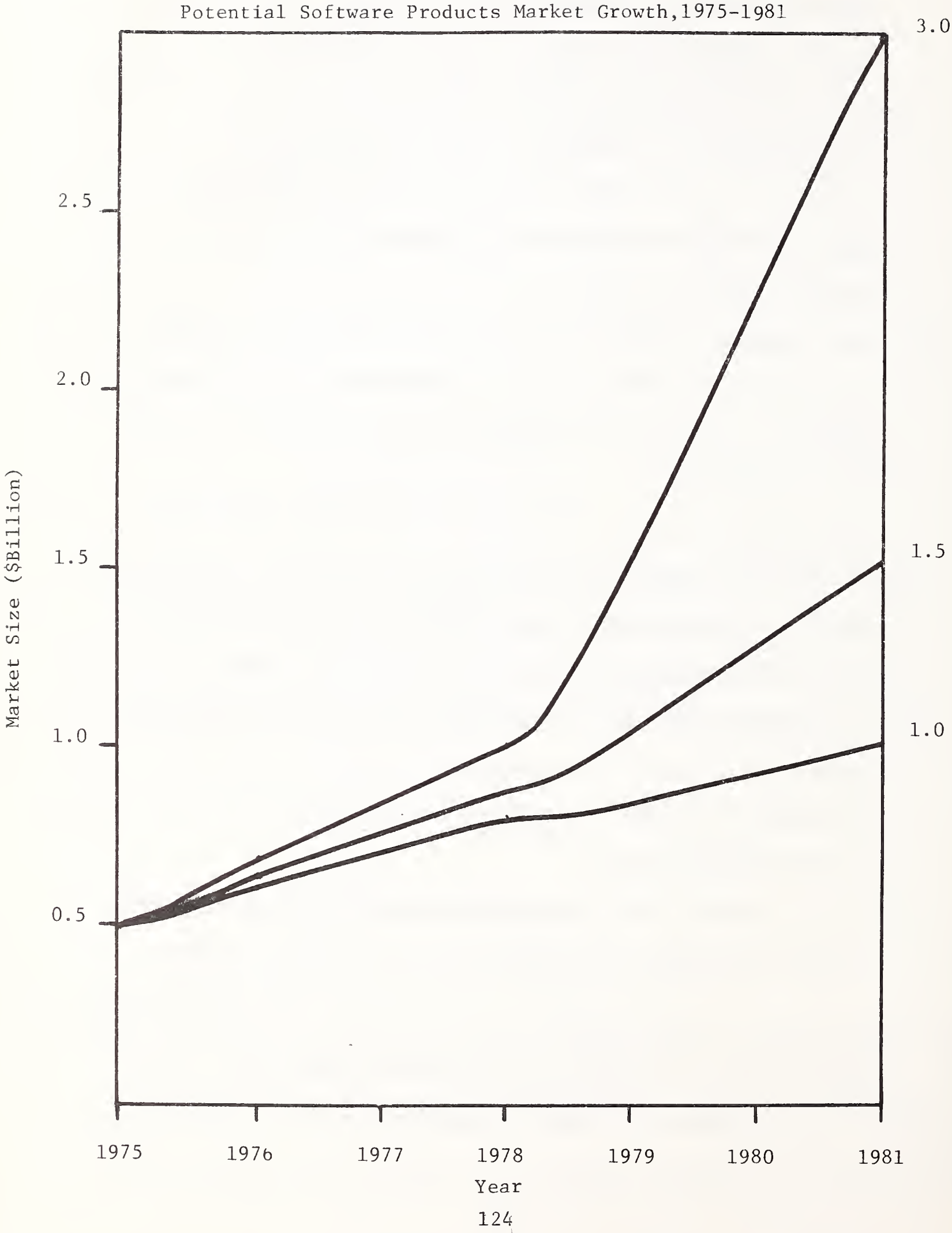
  - User demand for new systems and applications services.

- Economic climate and corresponding EDP budget levels.
- Computer manufacturers' pricing policies for software.
- New software development techniques.
- Hardware/software combinations, using microprocessors.
- Unionization of EDP departments and personnel availability.
- New hardware/software releases and features from the computer manufacturers.
- Minicomputer and small business computer installation growth.
- Availability of funds for, and the willingness of, independent vendors to develop new packages for the various markets from first principles.
- Patentability and taxation decisions in the legal environment could have a serious negative effect on the market. Registrations, search, and contest cases will make money only for lawyers if decisions favoring patentability of software are made. In the case of taxation, some conditions could benefit the software product market.
- Acceptance by users of cooperative custom development as an alternative to packages.
- Use by IBM and other vendors of security and privacy controls which will inhibit user acceptance of third party software.

• The net impact of these variables on the forecasts is shown in Exhibit V-25 . Without doubt the largest possible positive impact would be the completely separate pricing by IBM of its software products. This would really open up the software market. On the negative side, computer manufac-

EXHIBIT V-25

Potential Software Products Market Growth,1975-1981



turers can intentionally or unintentionally hinder the market development by use of microcode routines which are difficult to access or avoid, and by 'security' features.

b. Forecast Growth of Software Products Market by Type of Product.

- In 1975, systems packages such as Mark IV, Autoflow, Panvalet, TOTAL, and the UCC X series, plus IBM's TSO, IMS and similar packages accounted for over 50% of the market, as shown in Exhibit V-26.

- Applications packages such as those IAPs offered by IBM with its System/32 will contribute strongly to the growth of the applications market. Also, there are sales every year of very large applications systems such as Eastern Airlines' version of PARS where the price tag will be in the millions of dollars. EDS purportedly offers its Life Insurance software for a price in that range.

- By 1981, the Applications Packages market will account for 60% of the market. However, if IBM completely unbundles its software, Systems Packages will be the market which feels the brunt of the impact and, in that case, will certainly dominate the Applications Package segment in total dollars.

c. Use of Software Products by Size of Organization.

- As shown in Exhibit V-27, the majority of the growth for Systems Packages markets will come in medium and large users simply because of the numbers of users in these groups. There are few packages which are only needed or used by System/370 Model 158 or 168 users, and which carry a price much larger than similar packages for medium-sized systems: ADABAS might be an example

EXHIBIT V-26

Software Products Market

Forecast By Type Of Product, 1975-1981

	ANNUAL USER EXPENDITURES			
TYPE OF PRODUCT	1975	1976	1981	AAGR
Systems Packages	$ 260	$ 310	$ 640	16%
Applications Packages	240	310	900	25%
TOTAL	$ 500	$ 620	$1540	21%

($ Millions)

EXHIBIT V-27

Software Products Market Forecast

By Type Of Product And Organization, 1975-1981

	Very Large	Large	Medium	Small	Total
System Packages					
1975	$100	$ 90	$ 60	$ 10	$260
1981	180	200	200	80	640
Applications Packages					
1975	30	60	100	50	240
1981	60	140	400	300	900
Total					
1975	$130	$150	$160	$ 60	$ 500
1981	$220	$340	$600	$380	$1540

($ Million)

of such a system.

- Most Applications Packages growth will come from medium and small users purchasing standard software for General Business and Specialty Applications. In large and very large users non-mainstream applications including scientific and engineering packages account for the bulk of user expenditures. Also, subsidiaries and small divisions purchase applications software as small companies.

- A major part of the Systems Packages growth will come from Data Base Management Systems and their associated tools. This market in very large companies will be virtually saturated by 1978 as users commit to their main DBMS. After that there will be additions of special DBMS and features.

- As shown in Exhibit V-28, large users will become mainly saturated by 1981 with more flexible versions of the major DBMS, while penetration of the medium and small organizations will start.

- The use of packages will spread rapidly, as shown in Exhibit V-29, with almost three times as many users in 1981 as in 1975. Actually the numbers of users will be cumulatively far greater since there are many users, especially medium and small sized ones,which are in the market one year with some purchases and out the next. By 1981 virtually every installation will have some form of purchased software.

- Also, where the average price of individual packages will decrease, users will more frequently buy suites of packages. Users are already demanding interfaces with commonly available packages. They do not want

EXHIBIT V-28

Potential DMBS Market Growth

By User Size

SIZE OF USER	ANNUAL USER EXPENDITURES			
	1976	1978	1981	AAGR
VERY LARGE	20	48	70	23%
LARGE	10	60	200	65%
MEDIUM	2	3	20	47%
SMALL	—	2	30	—
TOTAL	32	113	320	47%

($ Million)

EXHIBIT V-29

Forecast Changes In Numbers Of Software

Products Users And Annual Expenditures By Size Of Organization

Software Package Type	Federal Government	Very Large	Large	Medium	Small
Systems Packages					
1975 Average					
User Expenditures	$10,000	70,000	18,000	6,000	1,000
Number of Users	3,000	1,000	5,000	10,000	10,000
1981 Average					
User Expenditures	15,000	100,000	20,000	10,000	2,000
Number of Users	4,000	1,200	10,000	20,000	40,000
Applications Packages					
1975 Average					
User Expenditures	10,000	35,000	60,000	25,000	2,500
Number of Users	500	750	1,000	4,000	20,000
1981 Average					
User Expenditures	15,000	40,000	70,000	40,000	5,000
Number of Users	1,000	1,100	2,000	10,000	60,000

to end up with a potpourri of incompatible, single-use packages.

d. Software Products Market Growth by Industry Sector.

- In order to identify those industries where applications packages will be best received, the Applications Package and Systems Package markets are analyzed separately in Exhibits V-30 and V-31.

- Generally, Systems Packages will grow fastest in the relatively under computerized industry sectors such as medical industries and retail. However, penetration of medium and small manufacturers and banks will cause the largest dollar growth with the government close behind. Banking and Finance has typically been the sector where users have been prone to use packages. Thus the growth rate will not be as high as in most of the other industries due to market saturation.

- In the Applications Package market, manufacturing and distribution account for the largest growths, this time in rates and expenditures. However, this is dependent on the availability of suitable applications software; the demand is present but the software may only now be becoming available. In the past, vendors have tended to concentrate on large and very large companies, the market is mainly with medium and small companies.

- Banks, particularly medium and large ones will be prime targets for applications packages: small banks will continue to get their EDP from correspondent banks to a large extent. Very large banks primarily buy non-mainstream applications such as personal trust, pension plan accounting and financial control.

EXHIBIT V-30

Systems Packages Market Forecast

By Industry Sector, 1975-1981

INDUSTRY SECTOR	USER EXPENDITURES					
	1975	1976	GROWTH 1975/76 %	1976	1981	A A G R 1976/81 %
Discrete Manufacturing	$ 50	$ 60	20%	$ 67	$130	17%
Process Manufacturing	35	42	20	65	95	18
Transportation	11	13	15	17	25	15
Utilities	13	15	18	19	30	15
Banking & Finance	40	50	25	67	90	14
Insurance	25	30	20	33	50	12
Medical	5	6	20	12	20	26
Education	10	11	10	14	20	12
Retail	8	10	20	14	25	21
Wholesale	8	9	18	12	20	17
Federal Government	30	35	17	48	70	15
State & Local Gvt.	16	18	15	26	40	16
Services	3	4	20	6	10	22
Other	6	7	24	10	15	16
TOTAL	$260	$310	19%	$410	$640	16%

($Million)

EXHIBIT V-31

Application Packages Market Forecast

By Industry Sector, 1975-1981

INDUSTRY SECTOR	USER EXPENDITURES					
	1975	1976	GROWTH 1975/76 %	1978	1981	A A G R 1976/81 %
Discrete Manufacturing	$ 40	$ 52	30%	$ 80	$200	31%
Process Manufacturing	15	20	33	30	70	29
Transportation	10	13	30	15	25	17
Utilities	5	7	35	10	18	24
Banking & Finance	70	89	29	126	180	17
Insurance	17	21	24	28	45	18
Medical	10	13	30	20	45	28
Education	5	7	35	14	30	35
Retail	12	16	35	30	70	34
Wholesale	23	30	30	45	100	28
Federal Government	5	6	25	10	17	23
State & Local Govt.	7	9	29	12	25	24
Services	10	12	15	18	30	20
Other	11	14	30	22	45	26
TOTAL	$240	$310	29%	$460	$900	25%

($Million)

- Government is a very poor market for applications packages: one reason for this is the sharing of software among governments.

- The consequences of the Systems Package and Applications Package developments are shown in Exhibit V-32 , where manufacturing will be the major growth area overall, again because of basic software requirements of small and medium sized companies.

- The Medical and Retail sectors are both coming under pressure and this will force the upgrading of EDP. Packages will play a relatively small part in this process, but will be cumulatively a lucrative market.

3. COMPETITIVE ENVIRONMENT

- The market for software packages is fairly evenly distributed between computer manufacturers and computer services companies as shown in Exhibit V-33 . By 1981, however, the computer services companies, primarily independents, will account for almost twice as much revenues as the manufacturers, provided that the latter do not charge for all software. If this occurs then manufacturers will account for most of the market, although that for independents will still be increased further.

- In the 'Other' category are primarily sales by users to others. The Federal Government is also a participant in the market.

- One part of the market that is not counted elsewhere in the Software Products market, is that due to sales of software to other computer services companies. These are most often on the basis of royalty sales

EXHIBIT V-3.2

Software Products Market Forecast

By Industry Sector, 1975-1981

INDUSTRY SECTORY	USER EXPENDITURES					
	1975	1976	GROWTH 1975/76 %	1978	1979	A A G R 1976/81 %
Discrete Manufacturing	$ 90	$112	24%	$147	$330	24%
Process Manufacturing	50	62	24	95	165	22
Transportation	21	26	24	32	50	16
Utilities	18	22	22	29	48	18
Banking & Finance	110	139	26	193	270	16
Insurance	42	51	21	61	95	15
Medical	15	19	27	32	65	28
Education	15	18	20	28	50	22
Retail	20	26	30	44	95	30
Wholesale	31	39	26	57	120	25
Federal Government	35	41	17	58	87	16
State & Local Govt.	23	27	17	38	65	19
Services	13	16	23	24	40	21
Other	17	21	24	32	60	23
TOTAL	$500	$620	24%	$870	$1,540	21%

($Million)

EXHIBIT V-33

Software Products Market Shares By
Type Of Vendor

VENDOR TYPE	ANNUAL REVENUES 1975	1981	AAGR %
Revenues From Users			
Computer Manufacturers	200	520	17%
Computer Service Companies	250	900	24%
Other	50	120	16%
Total	500	1540	21%
Revenues From Computer Service Companies	75	260	25%
TOTAL	575	1800	21%

($ Millions)

when the products are to be resold to customers. This is one of the fastest growing market segments over the next five years.

4. TECHNICAL AND MARKETING REQUIREMENTS

- Future package success depends not on marketing alone but on product management including marketing. Like an automobile, a package must be aimed at a particular industry segment, and designed, developed, and sold for that segment.

- Packages must be integrated with standard packages such as librarians, retrieval packages, and data base systems.

- Price sensivity is not a factor in many cases. Software packages are often underpriced.

- Packages to be sold with minicomputer systems are a major royalty opportunity.

- Usage pricing is not recommended. Users want to know what their commitments are; variable costs are not of interest to most users.

- Maintenance and maintainability are serious considerations for users. Vendors must design easy maintenance into their systems.

- Vendors should plan to diagnose and maintain software via RCS networks, to reduce people costs and improve maintainability. This will greatly expand market potential.

- Applications packages opportunities abound in the manufacturing and distribution industries for simple applications for medium and small users, particularly for those getting into an applications area for the first time. However, these packages will need to be individual industry tailored.

- Systems packages opportunities will occur mainly with large and medium sized companies. Operating system and compiler opportunities will occur at least with minicomputer companies and, if the manufacturers completely unbundle, for users of large systems as well.

- All packages handling sensitive data should have the ability to handle security features, such as encryption algorithms.

- Audit packages are a distinct opportunity as are computer performance evaluation (CPE) packages. Tools that will help plan and control EDP development and operation will continue to be successful.

E. PROFESSIONAL SERVICES

- The Professional Services market in computer services is composed of EDP Consulting and Software Development; the latter includes analysis of a specific system, system design, programming, testing and implementation. EDP Consulting interfaces with Software Development at the analysis level; general analysis is included in EDP Consulting together with installation planning, computer performance evaluation (CPE), feasibility studies and other EDP related consulting.

- For this report interviews were carried out with nineteen large computer users, as shown in Exhibit V-34, and ten vendors on key software issues. The role of software development is fundamental to the growth of in-house EDP and computer services; this "mini-survey" was designed to examine the use of professional services in accomplishing this development. The sample, although small, contains organization accounting for over $3 million per year in professional services contracts.

- In one sense, a professional services contract, just to develop applications software, is a restraint on computer services market growth, since it almost always results in in-house processing. The alternative would be to use an outside computer service source for the application processing and facilitating development. Similarly an applications package purchase for in-house processing pre-empts the external processing of the application in most cases.

EXHIBIT V-34

Professional Services User Interview Sample

LOCATION	SIZE	INDUSTRY
1. Tacoma, WA	$2.5 Billion	Forest Products
2. San Rafael, CA	$1.5 Billion	Insurance
3. Rahway, NJ	$1.0 Billion	Pharmaceuticals
4. E. Peoria, IL	$4.0 Billion	Heavy Equipment Manufacturing
5. Pittsburgh, PA	$8.6 Billion (Assets)	Banking
6. Rockville, MD	—	Education
7. San Francisco, CA	$1.25 Billion	Food Processing and Distribution
8. Washington, D.C.	—	Federal Government
9. Houston, TX	$18 Billion	Oil Company
10. Newport Beach, CA	$5.8 Billion (Assets)	S & L
11. Philadelphia, PA	Parent $3.2 Billion	Retail
12. Atlanta, GA	—	State Government
13. Washington, D.C.	—	Transportation (government funded)
14. St. Paul, MN	$5.2 Billion	Transportation
15. Washington, D.C.	$65 Million	Insurance
16. Bartlesville, OK	$5 Billion	Oil Company
17. Washington, D.C,	—	Federal Government
18. Glenview, IL	$6 Billion	Food Manufacturer
19. Atlanta, GA	$600 Million	Utility

Thus users' plans in the use of professional services impact other computer service vendors as well as the professional services vendors themselves.

1. MARKET ANALYSIS OF PROFESSIONAL SERVICES

a. Current Use of Professional Services

- As shown in Exhibit V-35, three times as many users were current users of software development services as were not: for EDP consulting this ratio dropped by two. These companies generally were frequent users of such services with two thirds of them using such services 6 or more times in recent years.

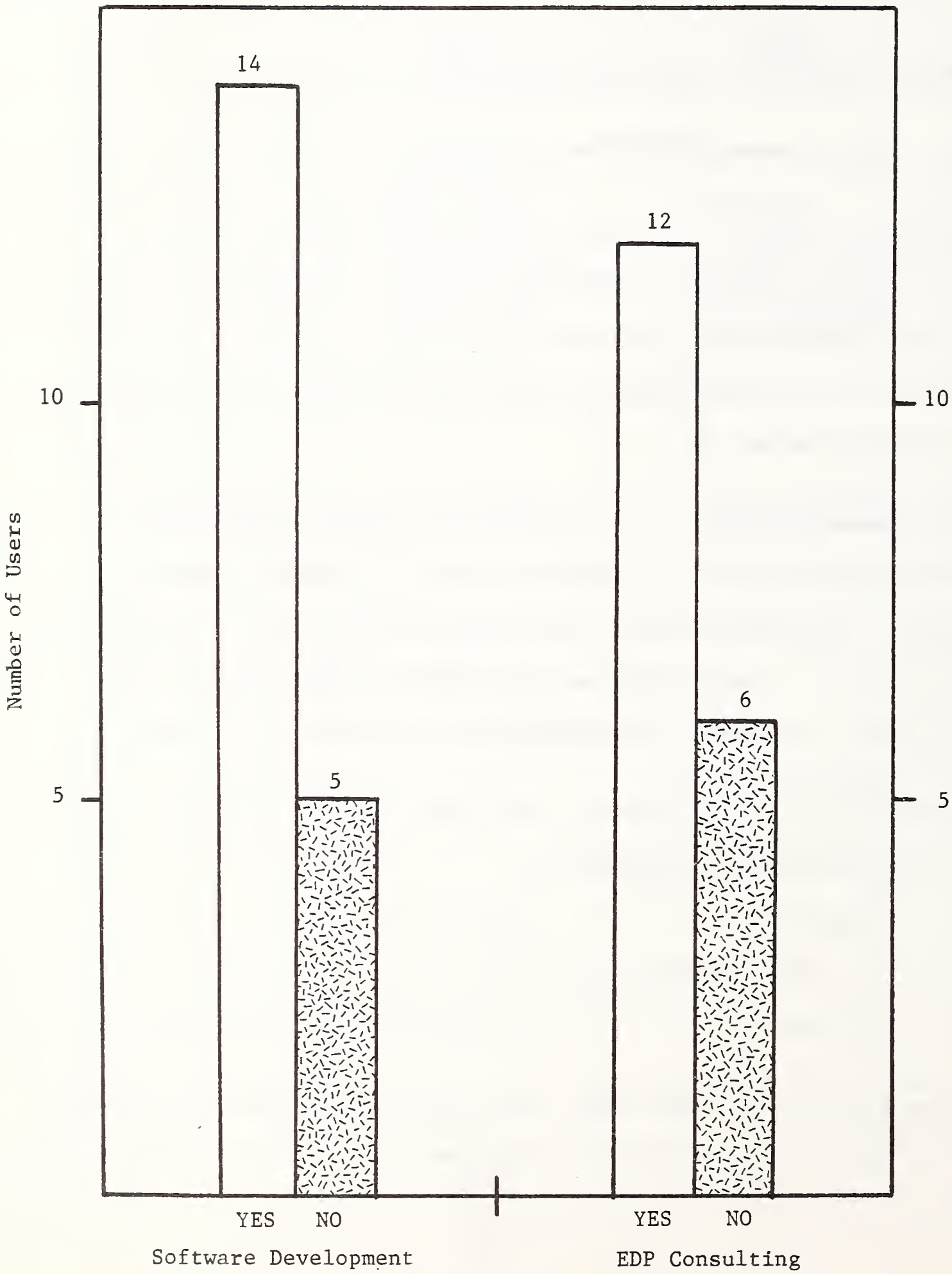
- The ranges of dollars spent for the use of software development services were wide with 6 of them giving maxima of $500,000 or more per project; the highest figure quoted was "several million dollars". Another group of 5 companies had an upper limit of about $50,000. For EDP Consulting the average range was $22,000 to $54,000 per project.

- Reasons for the use of Software development were as follows:
  - applications development (6)
  - MIS (2)
  - on-line/telecommunications (2)
  - other (3)

- Some 16 different vendors were identified by respondents as suppliers; IBM, PRC, Informatics, and Arthur Andersen were the only ones mentioned twice.

EXHIBIT V-35

Respondents' Current Use For Professional Services



- Reasons for the use of EDP Consulting were varied; only two subjects were mentioned more than once, "CPE" and "development methods." In this area, individuals were used by over a third of the respondents as their sources.

- Several users stated a preference for small or medium sized companies as vendors. However, these were only for the smaller contracts. Very obviously large contracts are going to larger, established vendors.

- Users contract differently for Software Development and EDP Consulting; over 90% of the users of software development services preferred fixed price contracts, whereas over 50% of the EDP Consulting users preferred a daily rate agreement, although accompanied by an estimate of total cost or an upper limit.

- Generally, users expected to define their needs very closely for Software Development thus allowing for fixed price bids. This indicates that users prefer to control the system specifications and design while contracting out the development and implementation. From the vendors' viewpoint, this provides the bulk of the work effort for outside services (up to 80% of the total cost) but introduces the severe problems associated with specifications transfer in general, and of working with incorrect analysis and design outputs in some cases.

b. Projected Use of Professional Services

- Almost half of the respondents were actively considering using professional services at the time of the interview. Significantly, two of the respondents whose companies were not current or past users were in this group. As shown in Exhibit V-36, at least four of the projects will be larger than $250,000; four will be consulting projects and four development projects.

- In three cases, the projects being contracted-out are basic applications for the organization concerned; in a fourth case, the project is an analysis of all the company's systems. The sample is too small to draw conclusions from this but it does raise the question as to where users are in their software life-cycle. One hypothetical structure is presented in Exhibit V-37.

- In the structure presented, applications software is divided into three main generations primarily covering second and third generation computer equipment cycles. Each generation presented has three phases:

  - Start-up phase, where innovative organizations take the development lead, sparked by manufacturers trying to sell new equipment
  - Mainstream phase, where the bulk of the applications development is performed
  - Tail-off phase, where secondary applications are developed and trailing organizations perform their development

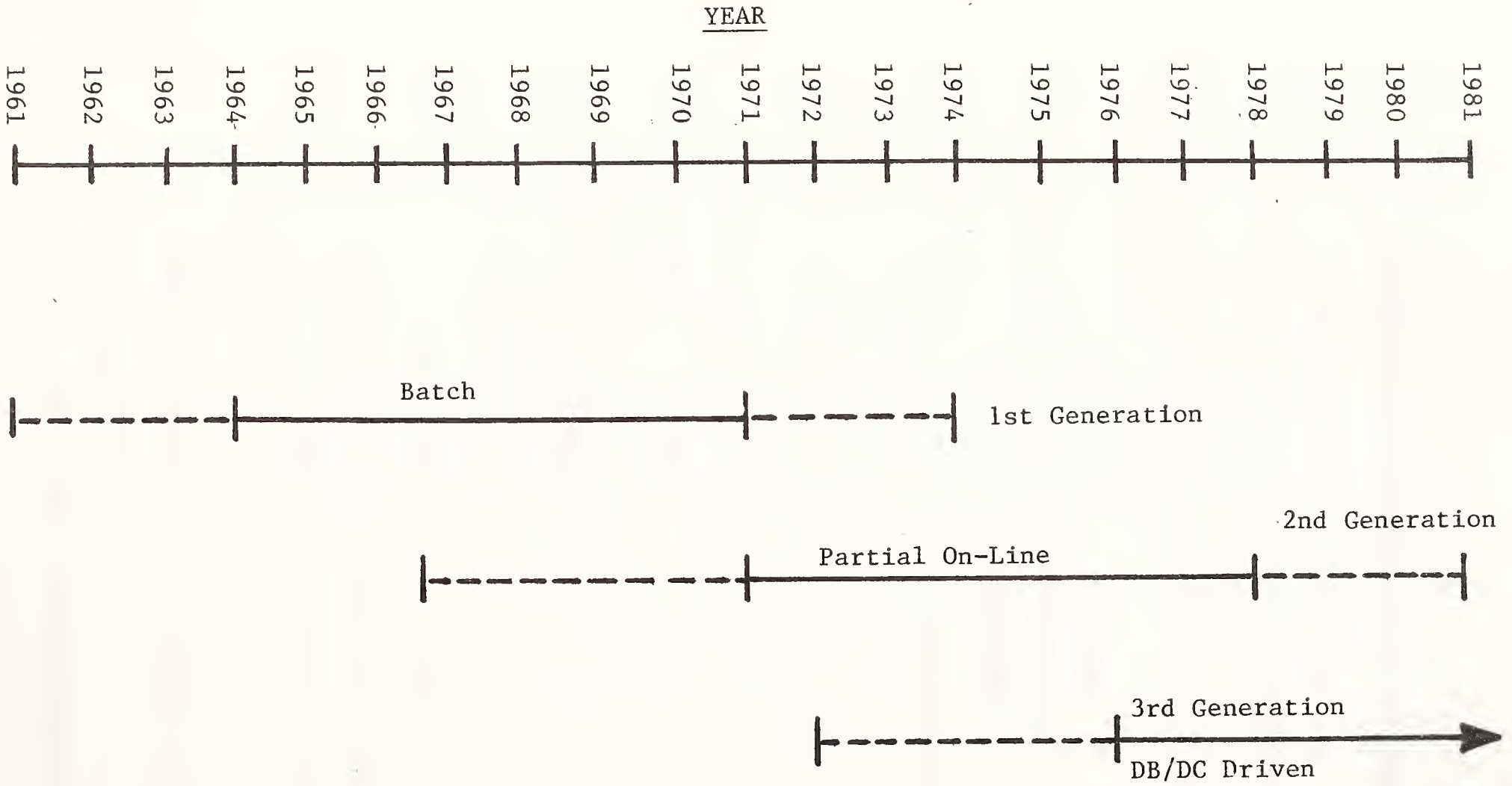
EXHIBIT V-36

Respondents Current Contract Plans For Professional Services

TYPE OF CONTRACT	SIZE	VENDOR
Aids for Program Development	$50-100 K	Synergetics
Accounts Payable	$400-500 K	None yet
Network Design Consulting	$25-30 K	None yet
Overall Systems Analysis	$60-500 K	None yet
CPE Monitoring	$30 K	TESDATA or COMTEN
Welfare System	$800 K +	IBM, BCS, Consultec or other
Scheduling System based on Data Management System	$300 K	PRC, KATER
RPG II Support for 370s	—	IBM
Consulting in Administration and Development Work in Europe	$60 K	Arthur Andersen

(Out of 19 Companies Surveyed)

EXHIBIT V-37



Applications Software Development Cycles

- The characteristics of the three generations included in the hypothesis are:

  1st Generation

  - Batch Processing
  - COBOL/ALC coded
  - Decentralized processing

  2nd Generation

  - Centralized processing
  - Remote data entry
  - Retrieval language use
  - Some interactive processing
  - Initial use of DBMS

  3rd Generation

  - DB/DC driven
  - Integration of distributed processing where appropriate
  - Network/terminal based

- If the hypothesis is correct, the industry is now embarking on another major development surge with systems far more complex than either of the two preceding generations. In this case there will be a major opportunity for professional services companies as well as for those processing services vendors with the required staff and technical capabilities.

- One of the key questions is whether the 2nd generation software was a "bridge" in between the 1st and 3rd generation, and thus with a relatively

short life, or a full generation with a life-span of 6-10 years.

- Answers to the questions in the survey showed a rapidly increasing need for "experts" in even the largest companies in those areas consistent with a new applications software generation. If the software to be developed was the same as in the past, then presumably these large EDP organizations would have their "experts" by now.

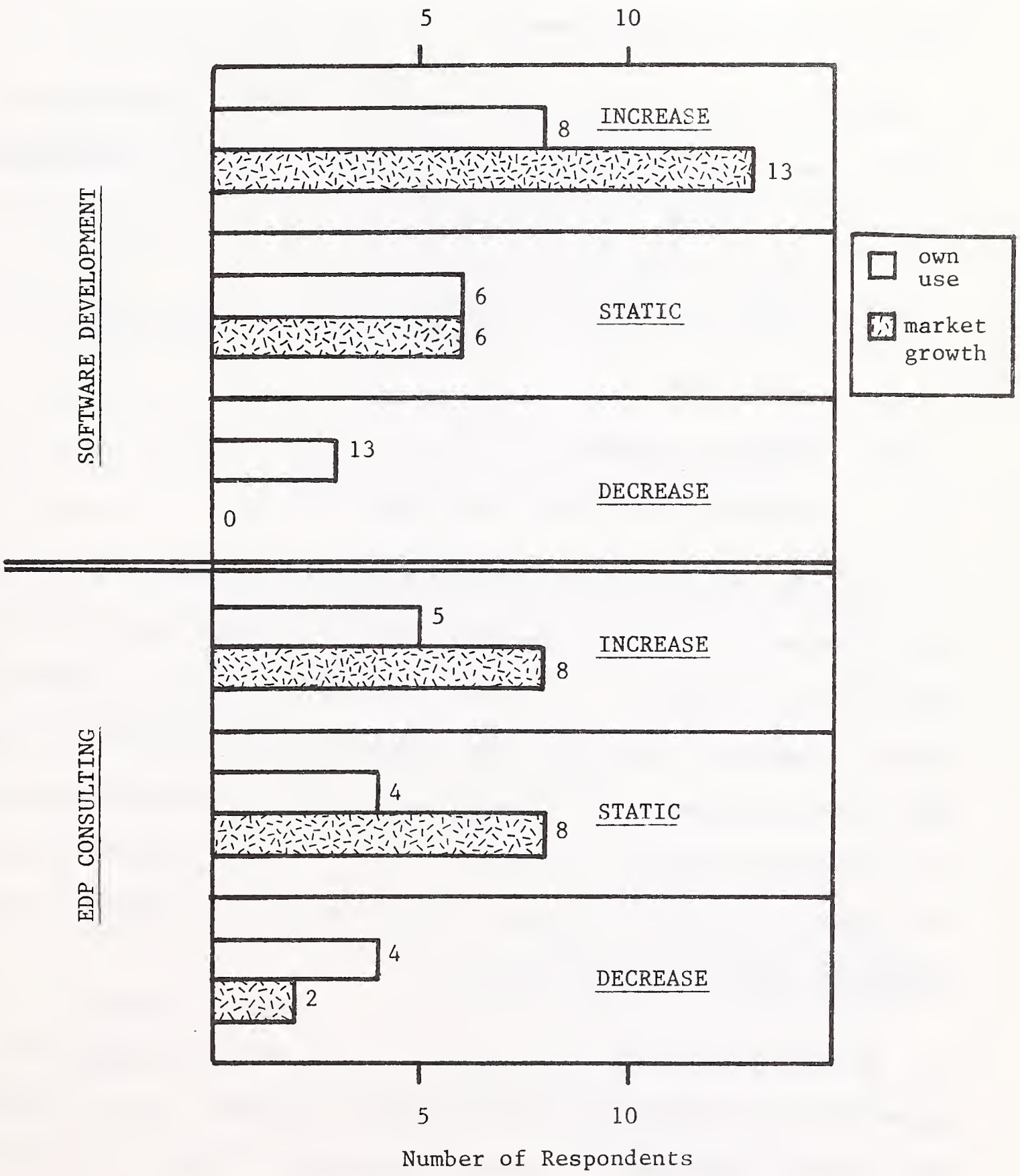
- The level of authorization required to contract-out for professional services was suprisingly high: five respondents would have to go to the president, chairman, or boards of directors of their organization for approval of significant contracts. Of the remainder almost half would have to get approval from an executive outside Data Processing, such as the Executive Vice President or Financial Vice President.

c. Perceived Market Changes

- As shown in Exhibit V-38, 68% of the users predicted an increase in the total market for software development services while 32% saw it remaining static. In terms of their own use, less than half saw an increase. Two of the three users who projected their use would decline were very large users who now saw that they were over their "technological vacuum." Even so, their projected decrease of 50%, would still leave contracts worth several hundreds of thousands of dollars per year.

EXHIBIT V-38

Respondents Perception of Changes in Own Use of and Market for Professional Services



- The average increase of the six companies quoting rates was 70%. Their reasons for the increase in use were varied but generally related to an increased demand for applications development; 'heavy demand', 'more MIS', and 'larger projects' were three comments. No respondent identified a reduction in applications demand.

- This theme was continued when respondents looked at the market for software development as a whole. The reasons why 13 of the respondents considered this market would grow were:

  - Quality of applications developed (2)
  - Ability of vendors to provide staff and skills to meet demand (5)
  - General trend (2)
  - Increasing complexity and demand (4)

- The point was well made that the increasing experience of the vendors is a key reason to use them; the more projects a vendor carries out in an area the more qualified it is to perform projects in that area and, as several respondents pointed out, the wider the knowledge gap between the vendor's and in-house staff. A key reason why one of the very large users of professional services would continue to use outside services in spite of building up its own staff was precisely this need to 'bridge the gap' between in-house and outside expertise.

- On the negative side one respondent didn't believe in the use of professional services because of maintenance problems: he felt packages were the only alternative to in-house development. Several respondents

felt that things would continue pretty much as they are.

- The types of software and/or applications respondents considered as major candidates for independent software development included:
  - communications software, on-line systems (7)
  - data base projects (3)
  - special applications (3)

The reasons for these software types being suggested were predominantly related to the specialization required to implement them. It was also pointed out by several respondents that smaller users must go outside because they could not have the necessary in-house expertise.

- For the future market of EDP Consulting services, respondents were generally less optimistic than for Software Development. Although, about 70% of respondents use such services, actual need for a particular discipline declines rapidly as the availability of people with that discipline becomes more universal. The ranking of disciplines which users require now are as follows:
  - Computer Performance Evaluation (9)
    (50% of the replies, a very high figure)
  - Data Base (5)
  - Communication (4)
  - Mini-systems, process control, computer assisted instruction, conversion analysis, structured programming, and data center operations, 1 respondent each.

- For EDP Consulting markets,45% of respondents saw it increasing, but not by that much, 45% considered it static and 10% felt it would decrease. The amount spent on EDP Consulting was regarded as insignificant compared with overall EDP expenses.

d. Impact of Developments on Professional Services

- Although the largest impact on the use of both EDP Consulting and Software Development was projected by respondents to be developments in minis. and micros., several other developments were projected to be almost as important as shown in Exhibit V-39. In particular the changing role of users received a surprisingly high proportion of positive responses with almost two thirds of those interviewed reporting that this would possibly or definitely increase their need for software development services.

- Changes in the economy have a far larger impact on the use of EDP Consulting than on Software Development; only 50% of respondents considered it to be a factor in their need for software development services, while 73% considered it a factor in the use of EDP consulting. The overall relatively low impact is probably due to the fact that 50% of those interviewed are in segments of the economy, such as life insurance, petroleum, and government, which have been relatively unaffected by the latest recession.

- In general, developments were felt to have a greater impact on the need for software development services than on that for EDP consulting.

EXHIBIT V- 39

Impacts of Developments on User Needs For
Professional Services

DEVELOPMENTS	% OF RESPONDENTS **		
	INCREASE	POSSIBLE INCREASE	NO IMPACT
EDP CONSULTING			
1. Data Base Systems *	32%	——	53%
2. Mini and Micro Computers	53%	26%	11%
3. Changing Roles of Users	26%	16%	37%
4. Developments in Communications	37%	——	42%
5. Larger CPU's	11%	5%	63%
6. Legal & Regulatory Changes	16%	11%	37%
SOFTWARE DEVELOPMENT			
1. Data Base Systems *	47%	11%	37%
2. Mini and Micro Computers	58%	16%	26%
3. Changing Roles of Users	42%	21%	37%
4. Developments in Communications	37%	11%	47%
5. Larger CPU's	11%	——	84%
6. Legal & Regulatory Changes	21%	16%	37%

(*) One respondent felt data base developments would decrease the need for professional services.

(**) Differences from 100% for each item reflect 'no comments'.

e. Justification for Use of Professional Services

- As shown in Exhibit V-40, the prime justification for use of professional services is economics; at least 25% of respondents used the term "cost effectiveness" or "cost/benefit justification" when describing their justification. Generally, this related to "expertise" in that users considered it cheaper to use outside specialists than building up their own internal staff. One multi-billion dollar company respondent stated "it was the only way to get the job done."

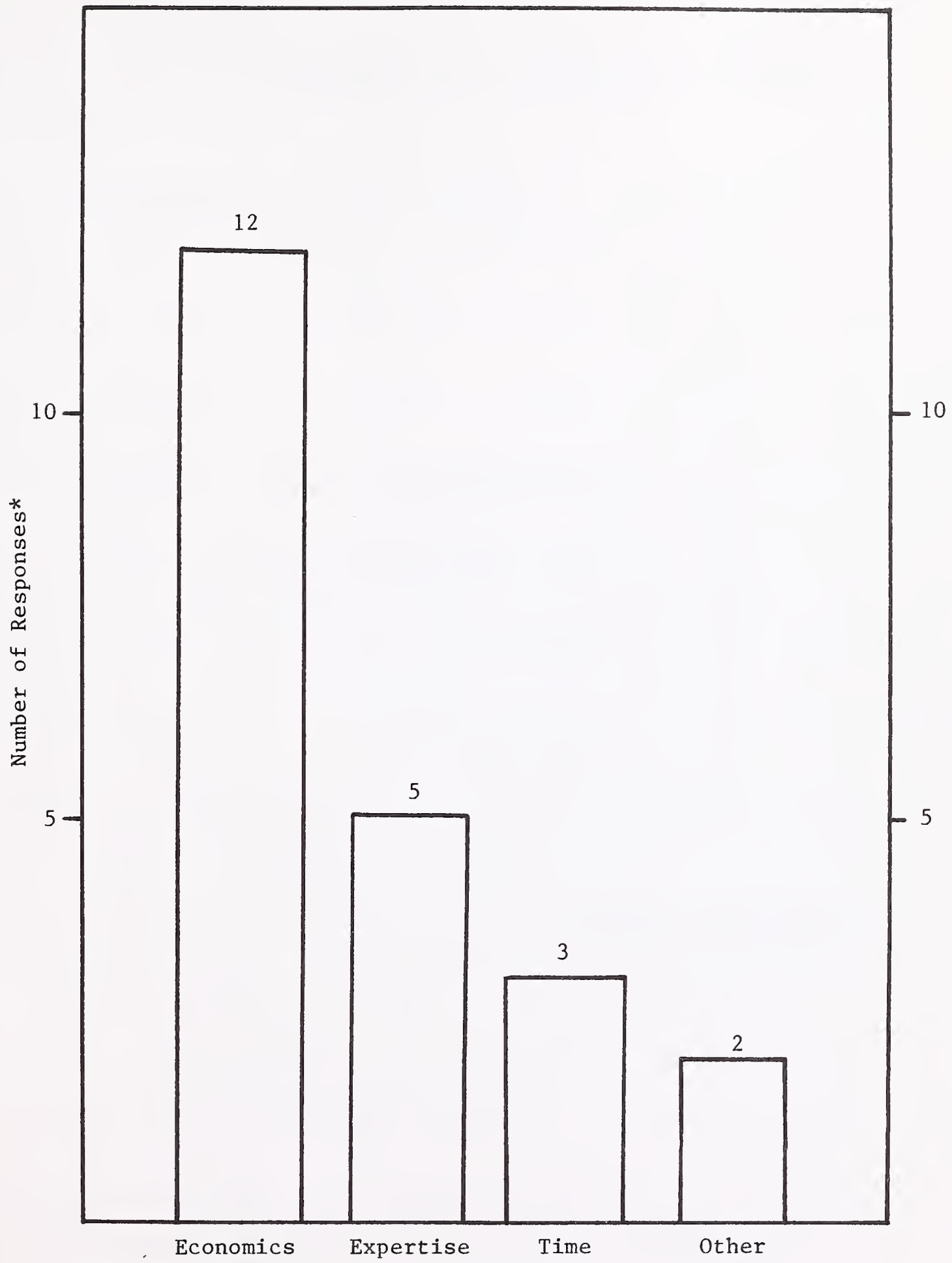
f. Vendor Selection Criteria

- When it came to selecting the vendor for a custom software development service users rated the selection criteria polled in the order of importance shown in Exhibit V-41. In addition three users volunteered that a vendor with a track record in the specific application area was very desirable - it is suspected that had this selection criteria been polled that it would have scored extremely high in the overall rankings. Users generally equated "expertise" with "experience." In all but one of the four instances where price was given top billing as a selection criterion a government agency was involved, underscoring the fact that government is a unique market place for this type of service.

- In examining user preferences, two thirds of the users preferred contractors to work on-site; one reason advanced was the ability

EXHIBIT V-40

Justification for Use of Professional Services



*Total is more than 19 due to multiple responses.

EXHIBIT V-41

Respondents' Ranking of Criteria for Selection of Professional Services Vendors

RANK	CRITERION	WEIGHT **
1	Reputation of Vendor	1.74
2	Price	2.37
3	Techniques Used	2.78
4	Aids Vendor Employs	3.14
5	Proximity	4.50
*	Expertise	2.0

* Volunteered criterion
** 1.0 = Perfect Score

of in-house staff to learn from working with the external people. Given the increasing importance of this need for expertise transfer expressed by respondents, it is expected that users preference for on-site work will increase.

The remaining users either had no preference or felt that it was fine to work off-site providing the deliverables were specified well enough.

g. Cooperative Software Development Market

- A suprisingly large proportion of the respondents were positive about the concept of cooperative software development as shown in Exhibit V-42. At least a third of them expressed themselves strongly in terms such as "very much needed," "good idea," "ought to be headed in this direction."

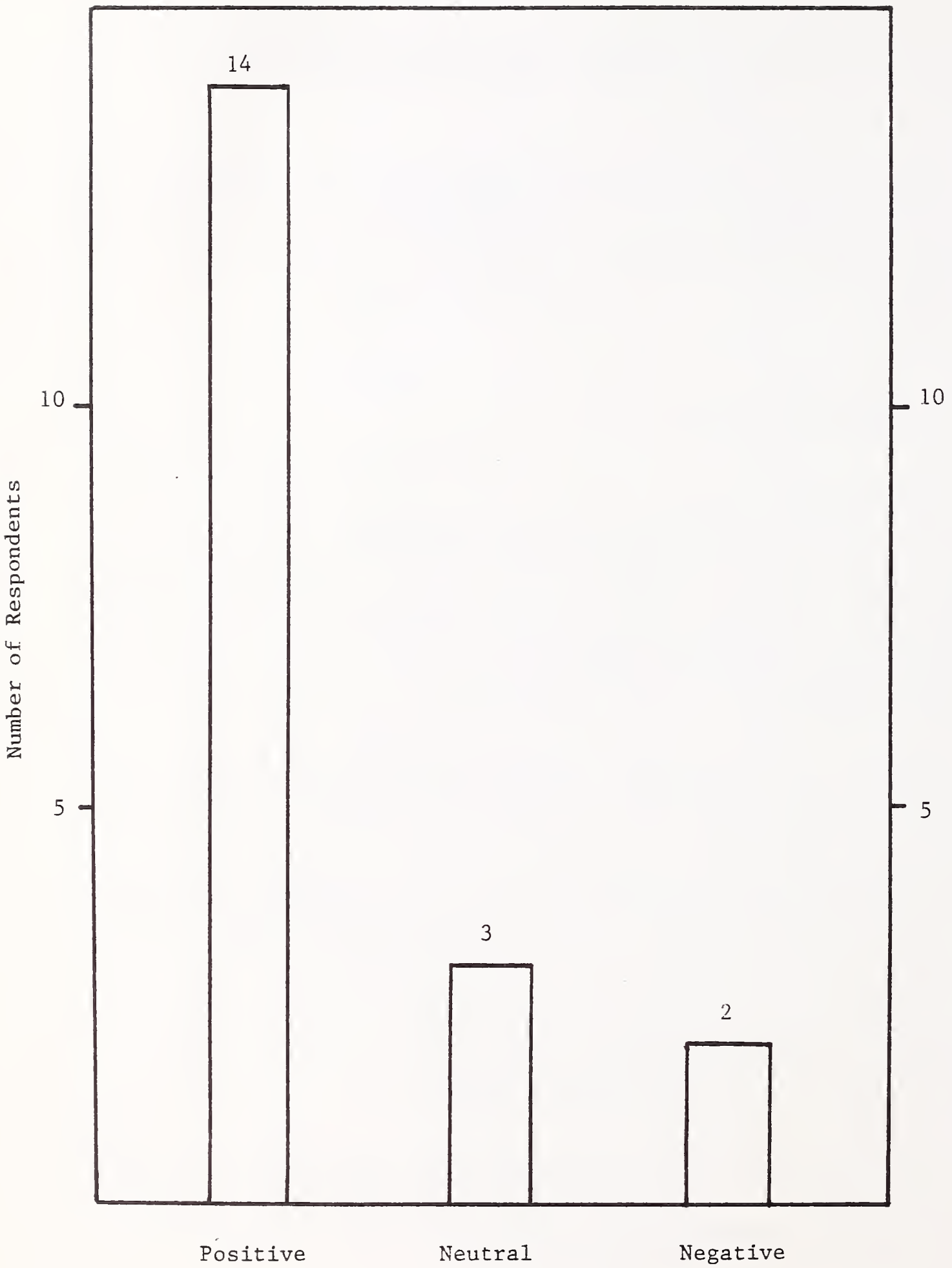
- However, there were also a number of qualifying statements such as "if the systems can be defined well enough," "O.K. if not in the business mainstream," and "needed but unlikely to happen." Government agencies insisted that this was already happening and in fact in one instance an opinion was ventured to the effect that "it (cooperative development) shortly would become a requirement for Federal funding of D.P. systems developments."

- Reasons for the positive attitude were primarily related again to the cost of software. It's the only way to get a "better bang

EXHIBIT V-42

Respondents Views of the Cooperative

Software Development Market



for the buck," according to one respondent. There was no consistency in the users views of packages in this regard; on one extreme a user who didn't think it would work, felt packages and modifications would be enough whereas another user considered packages just don't meet all needs.

- Actual experience according to users, has so far been limited; UMTA does it now and its use is projected to grow in mass transportation; Computer Logic tried it and failed; ISA Corporation has tried it in insurance without much success, apparently, HEW has mandated it with some success in Medicaid. In the last case, the development was, and is, hardly "cooperative"; HEW through SRS, develops a general design and then mandates its use if States are to get certain funding benefits.

- Problems associated with cooperative development relate to the practicality of these efforts. Two respondents felt it would not be practical due to uniqueness of users involved and the competitive aspects. Overall only two of the 19 respondents felt it had no future, two were not sure, and the remainder considered the industry would grow, albeit slowly in some cases.

- Upper management in these organizations would be a "tough sell" for large cooperative development efforts, but the consensus was that they would listen. This is especially so since manufacturers such as IBM have done so successfully in the past. Respondents

certainly thought the approach would be suitable for smaller organizations.

- As a final note on this subject, one interviewee drew attention to the fact that a recent legal decision had held that "programmers cannot be considered part of corporate management". Therefore, he felt that the unionization of programmers can be expected to increase. This may then be a strong boost to the custom software development services industry.

2. MARKET FORECAST FOR PROFESSIONAL SERVICES

a. Overall Market Potential and Probable Growth

- Factors affecting the professional services market have been presented in Section IV.B.2 on 'User Software Development Trends'. The main factors affecting the use of Professional Services, particularly in the Software Development market are:
  - Applications demand by end users, which has some dependence on the economic climate.
  - New software development techniques.
  - Unionization of programming staffs.

- Factors affecting EDP Consulting are the demand from users for services such as:
  - Performance measurement and planning.
  - Planning for new systems, including distributed processing

and minicomputer use,

- Computer installation auditing.

• The increasing complexity of hardware/software systems and variety of choice are fundamental reasons for users to turn outside for skills and knowledge unavailable economically in-house.

• As a consequence of these factors, skilled data processing people will see opportunities for themselves as consultants in their field of specialization. Therefore, the number of small specialized EDP Consulting and Software Development companies will increase.

• The potential growth of Professional Services is shown in Exhibit V-43. The large potential variation on the 'up-side' is caused by the fact that almost all the potential changes contemplated will increase the market if they happen more extensively and/or faster than predicted. The negative impacts from computer manufacturers' hardware/software packaging, applications packages and improved internal development efficiencies are largely included already.

b. Professional Services Market Growth by Type of Service

• Based on user responses, INPUT forecasts that Software Development will be a faster growing segment of the Professional Services market than EDP consulting, as shown in Exhibit V-44. This will be due to three factors:

- EDP Consulting is to a certain extent dependent on external

EXHIBIT V-43

Potential Professional Services Market Growth 1975-1981

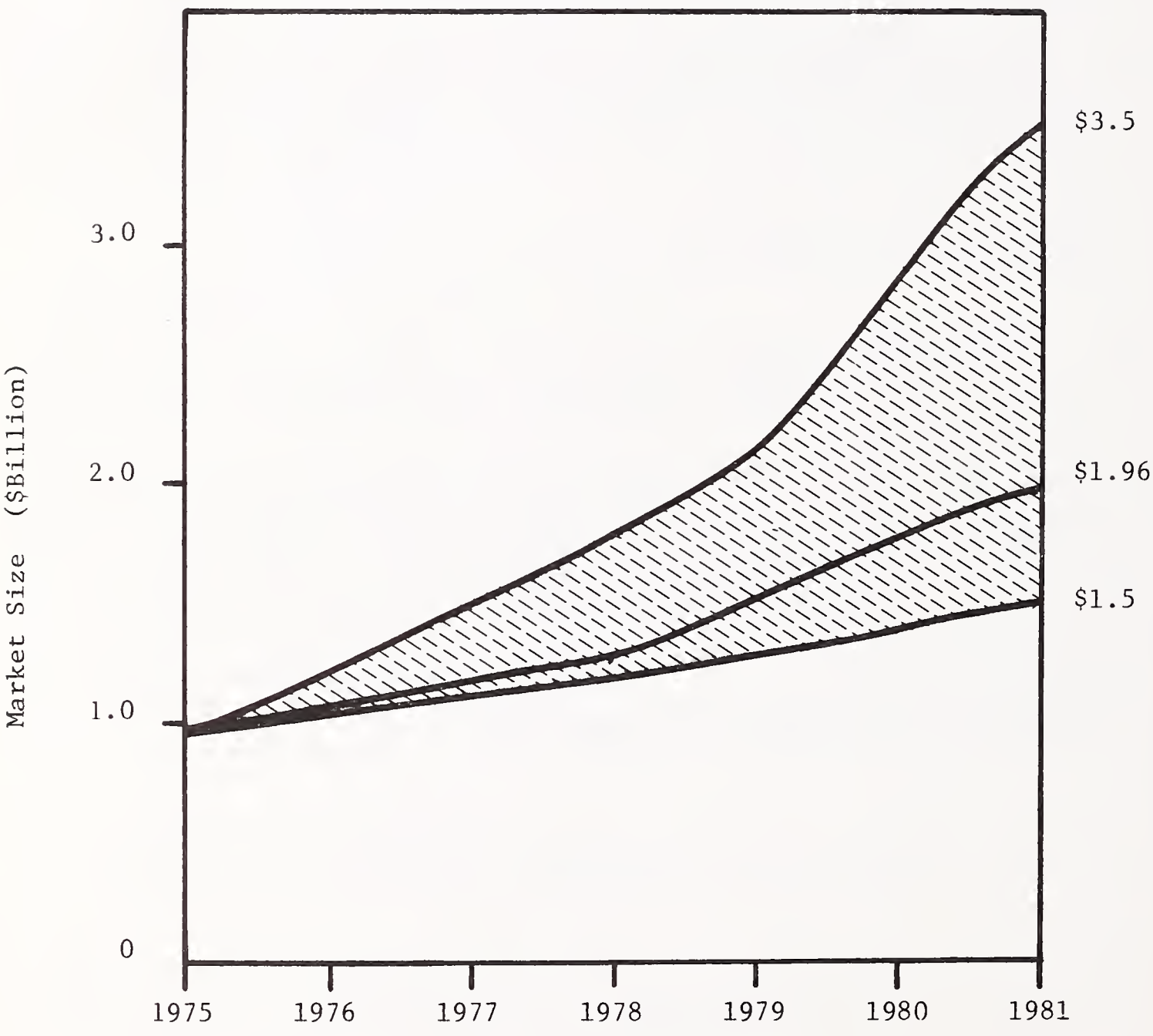


EXHIBIT V-44

Professional Services Market Growth by Type of Service,
1975-1981

TYPE OF SERVICE	1975	1976	1981	AAGR
Software Development	$ 730	$ 780	$ 1,540	14 %
EDP Consulting	240	270	420	10
TOTAL	$970	$1,050	$1,960	12%

($ Million)

organizations having skills which can and will be transferred inside, particularly in larger organizations; Software Development needs on the other hand are quantitative as well as qualitative, and transfer inside is feasible less often.

- Needs for EDP Consulting activities are irregular and relatively infrequent; needs for Software Development activities are constant and constantly increasing.
- Small and medium sized users have relatively less need for EDP Consulting than Software Development in terms of expenditures.

• As discussed elsewhere, the gap between end users' applications demand and the ability of in-house EDP departments to satisfy those needs, will be a major reason for the growth of processing services where custom developed and packaged applications are provided together with their processing by an outside vendor. Exhibit V-45 shows that user expenditures for Professional Services and Software Development associated with external processing will increase at an average annual growth rate of 30% compared with 10% for that for internal processing.

c. Professional Services Market Growth by Size of Organization.

• As shown in Exhibit V-46, 'large' and 'small' companies will contribute slightly more to the growth of Professional Services than "very large" and "medium" sized companies. Since the Federal Government is included as a single entity under the "very large" category, the commercial side of this category will grow at an average annual rate of only 4%. Companies below the "very large" category will be the main contributors through their

EXHIBIT V-45

Use of Software Development Services for

External and Internal Processing

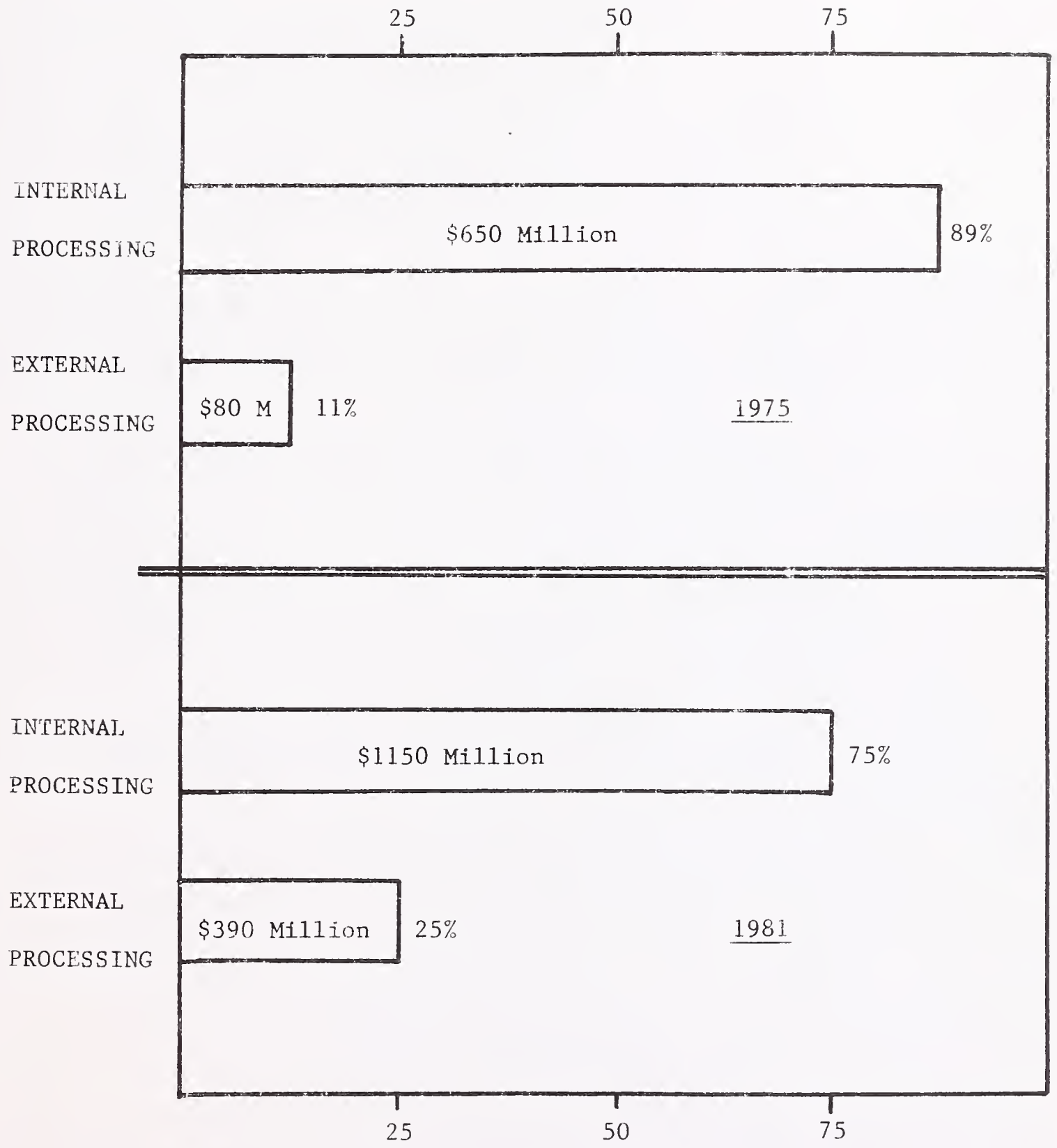


EXHIBIT V- 46

Professional Services Market Forecast by Organization Size,

1975- 1981

	*VERY LARGE	LARGE	MEDIUM	SMALL	TOTAL
Software Development					
1975	$ 330	$ 230	$ 120	$ 50	$ 730
1981	680	480	260	120	1540
EDP Consulting					
1975	110	70	50	10	240
1981	180	140	80	20	420
TOTAL					
1975	$ 440	$ 300	$ 170	$ 60	$ 970
1981	$ 860	$ 620	$ 340	$140	$1960

($ Million)

* Includes Federal Government

need for software development services. Also, large companies will require relatively higher use of consulting services, since they will be less able to transfer state-of-the-art skills inside than very large companies.

- The growth in numbers of users of professional services will come mainly from large and medium sized companies, as shown in Exhibit V-47. Average user expenditures for Software Development will actually decrease from 1975 to 1981, although the amount of work obtained in this area by the average user will increase due to improved development methods. The exception to this decrease is at the lower size end, where there is an effective minimum size of project which will increase due to labor costs.

- In this context, a user is an identifiable unit that can initiate contract work. Thus in the Federal Government, which is one organization with less than 100 agencies, several thousand users are identifiable. This also applies in very large companies; for these the numbers of users given may be considerably understated due to the number of them which contract with RCS vendors for software to be run externally.

- The average user expenditure for EDP Consulting will increase in every case since consulting is generally dependent on labor time rather than techniques use.

d. Professional Services Market Growth by Industry Sector.

Industry break-out of the Professional Services market shown in

EXHIBIT V-47

Forecast Changes in Numbers of Professional Services Users

And Annual Expenditures by Size of Organization

	FEDERAL GOVT	VERY LARGE	LARGE	MEDIUM	SMALL
SOFTWARE DEVELOPMENT					
1975: Average User Expenditures	$100,000	$375,000	$150,000	$50,000	$10,000
Number of Users	1,800	400	1,500	2,400	5,000
1981: Average User Expenditures	$140,000	$300,000	$125,000	$50,000	$20,000
Number of Users	3,000	800	4,000	5,000	6,000
EDP CONSULTING					
1975: Average User Expenditures	$60,000	$50,000	$35,000	$10,000	$5,000
Number of Users	1,000	1,000	2,000	5,000	2,000
1981: Average User Expenditures	$100,000	$80,000	$50,000	$15,000	$10,000
Number of Users	1,000	1,000	3,000	5,500	2,000

Exhibit V-48, demonstrates the importance of government sectors with over a third of the expenditures in 1975 coming from the Federal, and State and Local Government sectors. This proportion will increase slightly by 1981.

- Apart from these, the Banking and Finance sector will increase the fastest; consultants are one of the few groups making money from EFTS now and this need will spill-over into development in the next several years. Competition among banks, savings and loan companies, and insurance companies for access to new funds will also spur the growth of EDP consulting and software development activities.

EXHIBIT V-48

Professional Services Market Forecast

By Industry Sector, 1975-1981

INDUSTRY SECTOR	USER EXPENDITURES					
	1975	1976	GROWTH 1975/76 %	1978	1981	A A G R 1976/81 %
Discrete Manufacturing	$ 160	$ 168	4%	$ 180	$ 250	11%
Process Manufacturing	105	105	0	110	165	8
Transportation	20	21	5	25	40	12
Utilities	50	50	0	60	85	9
Banking & Finance	75	90	20	130	200	18
Insurance	50	53	5	70	125	17
Medical	30	36	20	30	65	14
Education	30	32	5	35	40	5
Retail	30	32	5	45	85	19
Wholesale	30	33	10	40	60	12
Federal Government	240	265	10	350	555	15
State & Local Govt.	100	110	10	135	200	12
Services	10	11	5	10	15	7
Other	40	44	10	50	75	11
TOTAL	$970	$1,050	8%	$1,270	$1,960	12%

($Million)

3. COMPETITIVE ENVIRONMENT

- As part of the coverage of the Professional Services markets, INPUT inverviewed 10 vendors accounting for approximately $200 million of annual revenues in this segment of the industry. The average annual revenue per employee was about $32,000 from the statistics given, or about $35,000, neglecting a very large government vendor.

- The average growth per year in the number of clients was expected to be 16%; the average revenue growth was expected to be 23%. Of the 10 vendors, six of them identified government as the main industry interested in their services; two respondents identified manufacturing as a key industry for them.

a. Market Position

- This survey covered vendors of these types of services with total computer services annual revenues of from 0.75 to 127 million dollars. The companies ranged in scope from a single industry market place to "anything that comes along." Some of the vendors were in this business as their only product but most also provided processing services.

- Generally, most vendors saw their respective track records in this business as being their strength in a marketing and user appeal sense. However, two of the vendors polled saw their appeal resting now and in the future with the fact that their products are produced using high-level source language generators thus making "enormous" cost savings possible.

- Some vendors felt that their marketing strength was in establishing immediate relationships between the prospect and 'the men who will manage the job'. This made the prospect comfortable with the capabilities he was hiring rather than a fancy proposal appended with resumes. (The need for this approach was borne out by the general skepticism of user's interviewed on this subject about the in-house maintainability of custom software produced outside and 'the all too frequent horror stories one hears.')
- Several vendors saw their strength in terms of market appeal lying in the fact that they offered the 'full' range of computer services. Others felt that national coverage was the feature that was most important. The talent maintained in-house was mentioned in passing by some vendors as a strength especially as it related to some of the more specialized disciplines (e.g. mathematical, scientific, etc.).
- One vendor was trying its hardest to get out of this end of the business as it 'conflicted with the successful operation of their other services business in terms of having to provide heavy on-going support to custom software purchasers that were also heavy time buyers'. Another vendor said that this end of their business is discouraged for much the same reasons.
- In the area of competition the responses to questioning concerning major competitors invariably (apart from the two vendors who do not compete) gave the following information:

- The chief competition for a vendor comes from the similarly sized and configured vendors (e.g. CSC vs SDC).
- The other major competition comes from smaller, local and less well-established organizations.

- Vendors estimated the market to be growing at 15% to 20% per year.

b. Client Base

- All vendors polled who engage in this type of service had their three largest clients providing between 40% and 60% of their total business. The average contribution was 55%. Generally speaking, the larger the vendor - the larger its reliance on government work or, at least, the larger the share of its income was from government activities.

- Revenue-per-client figures varied widely from $27,000 per client to $1,000,000 per client from a government specialized vendor. After discounting the three largest clients for each; four of the vendors had average annual revenues per client of $200,000 to $300,000. In all cases save one there was a mixture of government and commercial business; in the one case of a small commercial vendor the average annual revenues per client were $34,000.

- The results seem to be consistent with user reported expenditures; small companies obtaining contracts in the $5,000 to $50,000 range while the multi-hundred thousand dollar and up contracts go to the large vendors. Also, government contracts are generally much

larger (perhaps by a factor of 10) than commercial contracts.

- The task of persuading commercial users that there is a viable software services industry and that they should not be maintaining high cost in-house alternatives is the challenge that the vendors must face. To accomplish this, vendors must guarantee a good product at a fair price and also guarantee to clients that competitive developments are not 'given away' to competing user orgainzations.

c. Impact of Minicomputers

- The effect of minicomputers on the marketplace for software services was seen to be a sharp increase in business in this sector by all but one interviewee. This organization saw the maxi continuing to be the work-horse for the basically large commercial users that use their services. All other vendors saw minis, as both stand-alone CPU's and in networks, becoming a major segment of their total business in this area. One vendor saw maxis disappearing altogether for general business applications (over a period of a few years).

- It is noteworthy that medium sized software service companies in Europe have already aligned with one or more of the major mini computer vendors thus becoming favorites as vendors to users of those mini's. This does not seem to be the case in the U.S.

d. Future Growth

- Vendors generally felt that less than 20% of the companies that could use these types of services were doing so but that their penetration would more than double by 1981.

- The vendor's view of the reasons for the predicted increase in the needs for software services was seen to fall into several categories. The reasons given, in the order in which they were given, are:

  - smaller companies getting into Data Processing
  - increases in all sectors
  - Fortune 500 companies
  - DOD increases
  - new applications (process control and manufacturing systems)
  - growth in commercial sector
  - growth in local government

- As a final word from the vendors, the spectre of 'firmware' was raised in the context of it representing a real threat to the software services industry unless the cost of software could be brought down significantly in the near future.

e. Market Shares by Vendor Type

- As shown in Exhibit V-49 , the competitive environment for computer services is fragmented. Independent companies, including consulting companies have the largest individual share of 35% in 1975 and will increase this to over 42% by 1981.

- Computer manufacturers will continue to participate in this market, primarily to ensure the introduction of hardware. However, in the Federal Government sector several companies, notably IBM and CDC, persue the software market as an entity in itself. CDC

EXHIBIT V-49

Professional Services Market Forecast By Type of Vendor, 1975-1981

TYPE OF VENDOR	1975	1981	AAGR
Computer Manufacturers	$ 300	$550	10%
Independents	350	850	16%
Spinoffs	100	150	7%
Accountants	150	300	12%
Other	100	150	7%
TOTAL	$1000	$2000	12%

($ Million)

also pursues certain commercial markets and has overall revenues of $30 million per year in the U.S. from its Professional Services Division.

- Independent processing services companies will emphasize this market to obtain processing services revenues; this objective will be emphasized to a greater extent in the spinoffs' case. Their relatively slow growth reflects a conversion in many cases from indpendent contracts to contracts tied to processing services. Grumman and Boeing are two vendors where this is particularly true. Spinoff revenues with their parent companies are counted as in-house expenditures and are not included in this table.

- Accountants growth will come mainly from EDP Consulting; particularly with large and medium sized firms. However; some 'Big 8' firms such as Arthur Andersen will aggressively pursue software development contracts in the Federal Government and very large companies.

- The 'other' competitive sector includes universities; research organizations; such as Batelle and SRI; and non-profit organizations set up simply to 'feed at the Federal trough'. These organizations; include Mitre; obtain access to federal funds for EDP Consulting and Software Development in non-competitive situations and through the federal grants program.

4. TECHNICAL AND MARKETING REQUIREMENTS

The following are some summary points for penetration of the Professional Services market:

- Target on government contracts as a base. Contracts with the government are of an order of magnitude larger than in private industry. Sell price/performance.

- In the commercial area target on specific industries and/or functions (e.g. personnel), selling expertise and experience. Obtain this by acquisition of small specialized companies - 'people' companies are relatively cheap.

- Sell primarily to large companies with a fall-back into medium-sized companies. Leave small companies to individuals and 'locals'.

- Relate commercial contracts to processing.

- Attempt to perform bulk of development work off-site but emphasize enough designers and managers on-site to transfer knowledge.

- Offer maintenance contracts.

- Attack maintenance problems for users.

- Demonstrate up-to-date knowledge in techniques such as on-line program development and 'structured programming'; in data base/data communications systems and in minicomputer use.

- Leave 'one-off' minicomputer projects to individuals, small companies, and 'losers.' In the minicomputer area, target on providing services to manufacturers (watching their cash flow!) and to larger companies installing distributed networks.

- Include the use of development aids as advantages in carrying out the project for the user. Some companies have made the mistake of selling the "aid" instead of the solution to the user's need.

- Integrate the professional services people with those software people supporting processing services as National CSS and CDC do.

VI. INDUSTRY SECTOR SUMMARIES

VI. INDUSTRY SECTOR SUMMARIES

- This section presents summary data by user industry sector. Further detail is presented through Industry Reports.

A. DISCRETE MANUFACTURING

- Remote Computing Services growth will come from three sources in discrete manufacturing industries.
  - Small and medium sized business converting partially from batch to get better control; this particularly applies to inventory and production control, as well as order entry and billing.
  - 'Push down' of RCS utility use for problem solving in large organizations from very large organizations.
  - Use of single on-line applications, such as order entry, by medium and large companies without the resources to operate them.
- A limiting factor on applications growth in RCS to discrete manufacturers is the inability of vendors to offer CRTs to support status inquiry and expediting for both finished goods and work-in-progress. This is one of the most important areas of use of CRTs. In spite of this, order entry and inventory control are major opportunities for RCS vendors.
- Almost all RCS vendors get a significant part of their revenues from discrete manufacturers, particularly the large ones. Transportation equipment companies have been heavy users of RCS for technical

problem solving, such as with GE, Tymshare, and Cyphernetics for interactive services, and CDC, UCS and McAUTO for structures and other engineering analysis. XCS, Keydata (30% of revenues from manufacturing), Martin Marietta Data Systems, Boeing Computer Services, and McAUTO are vendors marketing applications services to manufacturers; with the first two concentrating on small to medium sized companies, MMDS in medium to large, and McAUTO with only the large companies. Tymshare, too, has acquired manufacturing packages, including an IBM software package from ASK, to approach the Applications Specialty market to manufacturers. OSI has a basic remote batch system for manufacturers which has about 10 clients.

- Specialty Applications such as numerical control of machine tools and computer aided design (UCC, NCSS and McAUTO) provide opportunities in discrete manufacturing.

- Facilities Management has not been a successful service in manufacturing. Actual FM contracts are distributed among a variety of vendors: Distronics and XCS for small manufacturers, and Martin Marietta Data Systems for very large and large ones, are vendors providing on-site and remote FM. A variety of small batch services companies have FM contracts, such as CDSI (acquired by ITEL) with several apparel companies. MMDS has de-emphasized FM.

- As EDP becomes more important to manufacturing companies, FM will achieve more acceptance. Also, many manufacturing locations are dispersed in somewhat out-of-the-way places and this has meant on-site FM difficult: with RFM this will not be so important a factor. Software availability has also been a limiting factor.

- For the Batch Services market, the bulk of the business in manufacturing comes from General Business services such as accounting and payroll for small companies. Growth in this area is inhibited by conversion to in-house systems and to RCS. Almost every batch services vendor obtains 10% to 20% of its revenues from manufacturers. There are probably 10,000 manufacturing locations using batch services. Another significant slice of batch business comes from large-scale scientific and engineering work for very large manufacturers.

- Applications packages for medium and small companies are the major driving force for the Software Products market in manufacturing. In the past, these applications have been targeted on the large and very large companies.

- Vendors of software products to the discrete manufacturing industry include IBM which will reach the market in the small business area.

Other product vendors are:

MMDS (Hoskyns)	-	MAS
COMSERV	-	MAPS
INFORMATICS	-	PRODUCTION IV
CONTROL INFORMATION, INC.	-	MATERIALS MANAGEMENT AND CONTROL SYSTEM

- System packages will grow almost as quickly, in parallel with the EDP growth in those industries.

- In Professional Services for discrete manufacturers, a large part of it is 'pull through' from batch services companies doing 'Utility' processing. Standard systems planning and support functions provide a large opportunity for EDP consulting. CPAs have a high penetration of this market, as do specialized vendors as a group.

- As a consequence of the individual services sector growth, the total computer services market to the discrete manufacturing industries will grow to over $1.5 billion by 1981, as shown in Exhibit VI-1.

EXHIBIT VI-1

Computer Services Markets in the
Discrete Manufacturing Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$170	$530	21%
Facilities Management	30	90	20
Batch Services	210	370	10
Processing Services Total	410	990	16
Software Products	90	330	24
Professional Services	160	250	11
Total	$660	$1570	16%

($ Million)

B. PROCESS MANUFACTURING

- Although there is a tendency to think of this industry sector as being composed of a few large companies such as oil companies and large food manufacturers, there are, in fact, of the order of 100,000 organizations in this sector, especially small food and chemical processors.

- In RCS, very large process manufacturers in the petroleum, chemical and drug industries are major users of scientific and engineering services. The food processing industry is a user of interactive processing for modelling and product planning as well as operations research applications. CDC, UCC, UCS, and GE get a major portion of their revenues from the industry sector.

- Facilities management contracts in the process industries have been less popular than in almost any other sector. There are a variety of disparate users of FM including a small amount of FM of remote computing facilities.

- Batch service revenues include some scientific and engineering processing for applications such as seismic processing. The bulk of the business comes from small and medium sized businesses for general business applications such as accounting and payroll. For food processors, order processing, and sales analysis are also important.

- Process manufacturers have not been a good market for application packages. This will change somewhat with the growth of small computer

use not only for small organizations but also for the dispersed operations of larger companies, such as drink manufacturers. This industry sector accounts for a relatively larger share of systems packages, since organizations are generally able to spend relatively freely and are among the most sophisticated in terms of EDP use.

- Although they have a tendency to want to do everything possible in-house, process manufacturers have been free to make major outside purchases of software development contracts. A general difference from discrete manufacturers, is that in process manufacturing there are fewer but much larger contracts, for example, a million dollar financial systems development activity by a major paper supplier with Arthur Andersen. Large centers such as those in the oil companies are heavy purchasers of CPE and similar operations oriented consulting, but not of software development.

- However, the strong tendency for companies in this sector to keep work in-house, plus their general availability of funds make this sector grow less rapidly than discrete manufacturing as shown in Exhibit VI-2.

EXHIBIT VI - 2

Computer Services Markets in the
Process Manufacturing Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$130	$370	19%
Facilities Management	15	40	18
Batch Services	105	170	8
Processing Services Total	250	580	15
Software Products	50	165	22
Professional Services	105	165	8
Total	$405	$910	14%

($ Million)

C. TRANSPORTATION

- Airlines are major users of RCS, not only from independent suppliers, but also from other airlines; Continental, United, Eastern and Delta are all vendors of computer services, including RCS to other airlines. In many cases these services are 'pull throughs' from other services such as maintenance. There are a few independents such as R. Dixon Speas (PRC) and Lockheed in this part of the industry.

- Particular applications demanded and used by airlines are
  - Reservations and Ticketing
  - Flight Planning
  - Maintenance Control
  - Meal Scheduling
  - Interline Accounting

- In motor freight, on-line computing is used by larger truckers for data entry reporting and control. Most of the work, however, involves telephone calls from remote locations to operators at CRTs or other terminals. Growth in this industry will be sparked by cheaper, simpler terminals and by increased pressure for reporting from government.

- In the Facilities Management market, airlines also are the prime users particularly through RFM from other airlines. The major reason is the high cost and expertise needed to install and operate the sophisticated EDP systems that airlines use. In addition, U.S.

airlines provide computer services for the U.S. operations of foreign airlines. With the poor economic condition of many airlines, the ones able to make the necessary system investments will decrease, thus increasing the services market.

- There is a little FM in the motor freight industry. This will grow as the system demands becomes more complex.

- The major part of processing services to the trucking industry is provided through batch services for standard applications, such as fleet maintenance, driver and vehicle scheduling, vehicle acquisition analysis, and ICC rate application support.

- One of the key problem areas for the trucking industry is that of rating: IBM, Honeywell, Bank of America, and others have spent millions of dollars attempting to develop automatic rating systems without much success. This is due to the volume of tariffs in effect: for example, a general commodity carrier interlining with other carriers (i.e. transferring cargos to other lines when required to deliver outside its territory) would have about 300,000 rate basis points which would have to be figured 'from' and 'to'; this would give billions of possible rate bases. In addition, the national commodity classification guide has over 110,000 items that must be used, each item probably in different weight brackets. Obviously, there are very many fewer rates currently used.

Interchanging freight between carriers adds a further complication so that is is possible for a group of Tariff men to each come up with a different 'legal' rate for a given transfer.

These rate considerations produce major problems in billing and also in keeping up with rate changes.

- A major opportunity for services companies to the trucking industry is to provide data collection and analysis systems to produce information on cost-performance characteristics by routes served. These systems will use sampling techniques as well as effective cost accounting systems. The potential benefits to truckers because of rate applications support make this application potentially acceptable.

- Application package sales to transportation companies are primarily in the airline industry where a few, large ticket systems are sold annually. For example, the Eastern Airlines version of PARS carries a price-tag of over a $1 million. Small applications product sales, often for general business activities, are made in the trucking and railroad industries.

- Transportation companies are not large users of external software development. The airlines have specialized and sophisticated staffs while the other industries are conservative in their approach to EDP. Consulting is more acceptable in many areas and changes in the environment will cause this to be a growth area.

- Overall, computer services in the transportation industry is working from a relatively low base except in airlines. Increasing requirements for reporting and control in shipping and motor freight

will cause the market to expand slightly faster than average as shown in Exhibit VI-3. An effective automatic billing and rating service could increase the 1981 market by 50%.

EXHIBIT VI - 3

Computer Services Markets in the
Transportation Industries, 1975 - 1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$ 40	$120	20%
Facilities Management	15	45	20
Batch Services	30	60	12
Processing Services Total	85	225	18
Software Products	21	50	16
Professional Services	20	40	12
Total	$126	$315	17%

($ Million)

D. UTILITIES

- The utilities industries are relatively large users of remote computing services as shown in Exhibit VI-4. Of the $90 million in expenditures in 1975, GEIS alone probably received over $12 million from telephone companies. Rapidata and NCSS are heavily dependent on this segment of the industry. Tymshare, Com-Share, McAUTO, CSC, and UCS have significant revenues from communications companies but are less dependent on them.

- In the power and gas utility area, CDC is the major supplier of RCS followed by UCS, GE, UCC, and McAUTO. These utilities have been heavy purchasers of nuclear codes and structural systems. However, the slowdown in nuclear plant construction will impact these services. On the other hand environmental concerns and energy source price changes will increase the expenditures by these companies for items such as modelling and economic planning.

- Although a considerable amount of RCS will be transferred in-house over the next five years, the increased need for the types of services RCS companies supply to all segments of utilities will cause it to grow. Telephone companies themselves expect that putting-in 'Timesharing' functions will not replace all external purchases and that they will continue to rise in some cases, but more slowly.

- Facilities management in the Utilities industry sector has not been popular. EDS is reportedly approaching it with RFM. The majority

EXHIBIT VI-4

Computer Services Markets in the
Utilities Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$90	$240	18%
Facilities Management	5	10	12
Batch Services	45	80	10
Processing Services Total	140	330	15
Software Products	18	48	18
Professional Services	50	85	9
Total	$ 208	$ 463	14%

($ Million)

of FM revenues now comes from FM of internal timesharing such as RCC has with PT&T. This type of contract is probably an interim stage before transfer in-house.

- Batch services purchases by utilities include billing services purchased by small utilities and by the scientific and engineering purchases of large utilities. Data preparation services are also purchased by some utilities.

- The Utilities sector is not a large factor in software products purchases. In the communications industry, Bell develops packages then 'gives' them to the operating companies. The system package market is over twice as large as the applications market. However, small utilities will purchase standard business applications packages, while large ones will purchase scientific and engineering packages.

- Professional services purchases by utilities fall into several categories; on one hand they will contract for major applications systems development as New York Telephone is now doing in its billing area, on the other hand these contracts are often because they basically fail with in-house efforts. The utility companies are rated like government entities in their relative inefficiency of EDP. However, they will contract for specialized consulting of all kinds very easily. Government and PUC considerations require responsiveness which leads to using outside services, especially from computer manufacturers and accountants.

However, the number of utilities is limited and although applications requirements will change over the next five years, the professional services market will stay relatively static, except for labor cost increases.

E. BANKING AND FINANCE

- As shown in Exhibit VI-5, the computer services markets in Banking and Finance, although well established already, will almost triple by 1980.

- Over 25% of the processing services expenditures in the industry sector are in correspondent banking as shown in Exhibit VI-6. This is primarily batch processing at the moment but has a rapidly increasing remote computing content. By 1981, correspondent banking will be a $400 million market despite in-roads by service companies through banking FM.

- Since 70% of computer services to this sector are concentrated in commercial banking the following analysis is made of this market sector. Exhibit VI-7 defines the size categories used in the analysis.

- Exhibit VI-8 shows the major market sectors for commercial banking and the target areas for computer services penetration.

- The remainder of the analysis is concerned with the market for standard banking applications and services in-house and through correspondent banking. (An FM contract for correspondent banking is with the central bank of the relationship; the small banks are correspondents of the larger one and are served by the FM contract).

- Related to this standard banking market is one in S&L's; perhaps 200 of the large S&Ls are candidates for banking software with their moves into 'checking' accounts and similar activities.

EXHIBIT VI-5

Computer Services Markets in the
Banking and Finance Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$200	$700	23%
Facilities Management	160	400	17
Batch Services	230	400	10
Processing Services Total	590	1500	17
Software Products	110	270	16
Professional Services	75	200	18
Total	$775	$1970	17%

($ Million)

EXHIBIT VI-6

Processing Services Expenditures Distribution

In The Banking And Finance Industries

PROCESSING SERVICES:	1975 ANNUAL EXPENDITURES
Correspondent Banking	$150
Banking FM:	
- Standard Banking	100
- Trust Accounting	40
Credit Union Processing	20
Savings and Loan Processing	70
Securities Data Bases	80
Brokerage-Back Office Accounting	40
"Timesharing" in Banks	60
Other	30
TOTAL	$590

EXHIBIT VI-7

Commercial Bank Distribution By Size Category

SIZE CATEGORY	DEPOSIT SIZE	NUMBER OF BANKS
Very Large	> $1 Billion	70
Large	$500 Million to $1 Billion	100
Medium	$100 Million to $500 Million	620
Small *	< $100 Million	13,570
TOTAL		14,360

* Of the 'small' banks, almost 10,000 of them have under $10 million in deposits; 2,500 ofrom $10 million to $25 million; and 1,000 from 1,000 from $25 million to $100 million.

INPUT

EXHIBIT VI-8

Target Areas In Commercial Banking For

Applications Related Computer Services

BANK MARKET	BANK SIZE			
	VERY LARGE	LARGE	MEDIUM	SMALL
In-House Processing				
Mainstream Applications	PS	FM	(RCS) FM SP	SP RCS BATCH FM*
Secondary Applications e.g.Trust Accounting	FM RCS SP	RCS SP	(RCS) Batch	—
Out-Bank Processing				
Correspondent Banking	SP	SP FM	(FM)*	—
Customer Services	FM Batch SP	FM Batch SP	Batch SP	—

() = Limited Opportunity
* = For Cooperatives
Batch = Batch Services
RCS = Remote Computing Services
FM = Facilities Management
SP = Software Products
PS = Professional Services

- The major competitors in the markets are shown in Exhibit VI-9. Not shown are the various banks that compete in the market.

- As shown in Exhibit VI-10,the independent vendors of standard applications software to banks accounted for half the total market in 1975. This share will grow to two-thirds by 1981, with computer manufacturers also increasing their share at the expense of banks.

- The major opportunity for independents providing standard applications software to banks is directed to banks in the $100 million to $1 billion deposit size range as shown in Exhibit VI-11. Above this level, banks tend to do everything themselves except for standard products for correspondent banking. Below the $100 million mark banks are better candidates for data services from independents, and obtain applications software from other banks and manufacturers.

- In small banks the prime source of standard applications products revenues will be for small system sales. IBM is reputed to be targeting a System/32 on small banks.

- Another market for standard bank applications packages is that for correspondent bank processing to the large and very large banks. ($500 million and up). ACS and Florida Software target on this market with multi-bank, multi-branch systems.

- In view of the relatively small number of banks, it would seem that the market could easily be saturated. This would be true given a static situation. However, the actual nature of banking will change

EXHIBIT VI- 9

Major Competitors In The

Bank Computer Services Market

TYPE OF SERVICE	BANK SIZE			
	VERY LARGE	LARGE	MEDIUM	SMALL
In-House Processing Processing Services (FM, RCS, Batch)	EDS UCC Systematics CSC CUC MMDS (FIS) BCS	EDS Systematics UCC Metridata ACS Bradford CSC	EDS Metridata National Sharedata Systematics Weiland/SBC ADP/FCS ACTS	National Sharedata BCS/Leader Weiland/SBC ITEL ADP/FCS Greyhound CDC Moll Colorado Computer Corp.
Correspondent Banking Processing Services	National Sharedata Bradford	National Sharedata Weiland Systematics Bradford	National Sharedata ACS Weiland Systematics	
Processing In-Bank Software	UCC EDS Bradford	UCC Florida Software EDS Bradford (MSA) (Kranzley)	MSA Florida Software Kranzley ACS GCS (Weiland)	MSA (Florida Software) (IBM)*
Correspondent Banking Software	Weiland Florida Software ACS GCS	ACS Weiland GCS		

* = Potential

EXHIBIT VI-10

Standard Bank Application Packages

Vendor Revenues, 1975

VENDOR	1975 REVENUES
Independents	
UCC	$ 6
MSA	2
Kranzley	1
Weiland (Chicago)	1
ACS (Dallas)	1
EDS	1
Florida Software	3
GCS (Huntsville)	1
Other Independents	4
TOTAL Independents	20
Banks	10
Computer Manufacturers	10
TOTAL	$ 40

($Million)

EXHIBIT VI-11

Standard Bank Applications Packages

Market Growth By Bank Size

BANK SIZE GROUP	1975	1981	A A G R 1975/81 %
Very Large	$ 6	$ 9	7%
Large	5	12	16
Medium	16	35	14
Small	13	29	15
TOTAL	$ 40	$ 85	14%

($million)

substantially over the next 10 years; among the needs of banks will be:

- single statement banking
- descriptive billing on credit cards
- on-line CIF
- ACM/POS support
- proof-in-transit/certificate of deposit
- integrated savings/checking accounting (initially checking with automatic overdraft).

On the contrary, in fact, the total market will really 'take off' in the next few years in the consumer area. Some stable products on the commercial side will stabilize.

- Some competitive comments follow:
  - UCC is the leading vendor of in-bank software and services to large banks, with 1975 revenues of about $14 million. It has the reputation of knowing the industry exceptionally well, but of being 'shaky' because of the Wyly entanglement with Datran. Their FM contracts are not that profitable and UCC's market share here has dropped. UCC targets on $500 million deposit size banks and up where its software is unequalled.
  - ACS is a Dallas processing and software company recently acquired by Mercantile Bank. Mercantile has purchased $250,000 worth of UCC software in the last two years but wanted a multi-bank processing capability (which UCC does not

have) for correspondent banking; they ended up buying ACS which targets banks in the $100 million to $500 million range. Itel uses ACS software in New England through an acquisition it made; Greyhound uses it elsewhere in the U.S.

- Kranzley provides more tailored packages to large banks but they are more expensive than UCC.

- Florida Software has 170 people and does about $4.5 million annually. Their software products are primarily for banks in the $200 million to $500 million range. Their software is used by ACTS and Metridata.

- EDS targets very large and large banks for FM processing. It now has 5 clients, although it has lost one in South Carolina recently.

- National Sharedata, the acknowledged leader of standard processing services for banks, now has 200 banks being processed through 55 centers.

- Colorado Computer Corp. is a $2 1/2 million company with 50 bank customers for remote computing FM services.

- Financial Computer Systems is being acquired by ADP. It is a Burroughs-based, $3 million a year company with 56 banking and 14 savings and loan clients.

- MSA has a fairly comprehensive set of software for medium sized banks.
- Metridata Computing, Inc., will have revenues of close to $10 million this year, over half of which will be for banking FM.
- Moll Associates, Inc. has been acquired by System Development Corp. It is a Burroughs-based company with $2 million in revenues. It is phasing out FM to replace it with RCS.
- Weiland Computer Group, Inc. has made an arrangement with SBC for the latter to use Weiland's software to market services to small banks. It is an IBM based vendor with $2 1/2 million in revenues and 54 bank customers.
- Payment Systems, Inc. is a Burroughs operation owned by AMEXCO; they have some bank clients through a local data center.
- Systematics, Inc. is one of the strongest independents in the banking business. Revenues in 1975 were probably about $9 million. The company is growing at a rate of 40-50% per year. It has 65 customers with assets from $145 million to $2 billion.

• In recent months considerable personnel turnover has occurred. OSI has formed a banking group based on ex-National Sharedata staff. EDS in Dallas also hired a National Sharedata manager to replace its banking program manager who left to form his own company.

F. INSURANCE

- In life insurance, in particular, but also for casualty, on-line sales support and policy control are major requirements which will push RCS growth. In addition, insurance companies operate investment departments just as banks, which are heavy users of securities quotation services. Finally, they are significant users of RCS through actuarial analysis, although this is increasingly being done on minicomputers.

  Local office consolidation and control is a major network opportunity.

- Among the RCS vendors servicing this market with insurance applications are Multiple-Access (through TCC), Cybertec, McAuto, SBC, ISSS, Inc., (a $1 1/2 million company which piggybacks on Compu-Serv's RCS), Network Data Processing, Macro, and Informatics. Dataflow in Atlanta provides RCS to casualty companies based on DMV records.

- Variable life, variable annuities, and other securities - related areas of life insurance will be major causes of RCS in Insurance to grow. Securities and insurance will 'come together'.

- Facilities management in insurance is driven by the Medicaid/ Medicare/Champus FM contracts of EDS, HAS, and others. In addition, insurance companies such as Equitable and Prudential participate in this market; they do so as a protective measure in case of National Health Insurance.

There are also some significant casualty and life insurance FM contracts. Although EDS has recently lost one client in Texas, it still takes out over $10 million from these insurance FM contracts; this is small compared to its $70 million that it gets from government funded health insurance.

- The growth of the FM market is difficult to predict because of the potential impact of NHI legislation. Also, states have a tendency to take Medicaid contracts in-house. On the other hand, companies such as HAS and EDS are now bidding for complete Medicaid program operation including payment and non-EDP work. Thus there may be more EDP 'pull through' revenues.

- Batch services expenditures in insurance are for small companies and for local offices of large companies that buy local processing time. In addition, at least 30% of these expenditures are for COM work and data entry.

- The software products market to insurance companies will expand faster for applications products than systems products. However, it is already a well established market with multi-million dollar suppliers such as Asyst, Insurance Systems of America, Multiple Funding Corp. of America, TCC, Value Computing, IBM, McAUTO, and Informatics providing applications software. For this reason, the overall growth rate shown in Exhibit VI-12, is not as rapid as for other less well established industries.

EXHIBIT VI-12

Computer Services Markets in the
Insurance Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$ 50	$150	20%
Facilities Management	140	240	9
Batch Services	70	100	3
Processing Services Total	260	490	11
Software Products	42	95	15
Professional Services	50	125	17
Total	$352	$710	12%

($ Million)

The price tag on some insurance products is considerable; EDS is reputed to offer its system at over a million dollars.

- Professional services in the Insurance sector are relatively large due to the predisposition of insurance companies to operate their own system, yet the size of the development efforts require outside assistance. EDS, again provides development services in this area. Also, computer manufacturers, notably IBM, are often preferred vendors.

Radical changes in the insurance industry will create the demand for new systems to be developed which will need outside manpower.

- As well as computer manufacturers and independents, there are several spinoffs of insurance companies that offer services to other insurance companies. Notable among these are INSCO (Continental Insurance, Co.), CNA, and INA which does part of its casualty work through The Data Center in Los Angeles. These companies will participate in the growth of the Insurance sector use of computer services shown in Exhibit VI-12 in a relatively small way with the exception of government funded health insurance. They do not want to lose competitive advantages to other insurance companies caused by their services.

G. MEDICAL

- The Medical Industries sector, including hospital, clinic, and physician services, is the fastest growing computer services sector. Driven by government and public demand for 'better' services at controlled costs, record keeping and automation will create numerous services opportunities. This is despite the resistance of the top management of hospitals (not the hospital administrators, but the policy group) to these changes.

- The nature of the health care industry will change over the next five years; doctors are increasingly becoming parts of medical practices, which are in part, small companies. Health maintenance organizations have not progressed as some hoped, but the concepts will grow in acceptance.

- These changes will push the growth of RCS to over $200 million by 1981, primarily to small and medium sized hospitals and clinics for patient record-keeping and billing. Inventory control and planning will also force this growth but the major new applications opportunities will be in control and surveillance from a medical viewpoint, including medical audit, support, surveillance and utilization review, and cost accounting.

- McAUTO is the major vendor to hospitals and should continue to outstrip other service companies. Putting minicomputers in hospitals to operate in conjunction with the RCS will enhance its market.

TELEMED, which operates two DEC10s and two XDS Sigma 5s for processing of electrocardiograms is also consolidating its position by installing on-site Interdata minicomputers to use in conjunction with its service.

- McAUTO's services to some 300 hospitals can be classified in many cases as RFM. Shared Medical Systems and Technicion participate in the FM market which will also be relatively fast growing. There will be 'pull through' RFM from expanding hospital managers such as HCA, Humana, and HAI, Inc.

- However, major changes in hospitals in EDP will involve the installation of multiple small systems providing opportunities for software packages to grow rapidly as shown in Exhibit VI-13.Computer manufacturers such IBM, Honeywell and NCR will heavily participate in this growth. Specialized turnkey systems companies, such as Spectra Medical Systems, Inc. will also take a significant market share.

- Batch services expenditures will be for patient billing by professional groups; a certain proportion of which will be done through RCS and on-site small computers. Patient records data bases will also be a factor in the growth of all kinds of EDP for professional groups. Banks such as Bank of America are major suppliers to this market.

- Competition in this industry sector will be intense, but this is what is needed to get the medical trade to take advantage of technology developments.

EXHIBIT VI-13

Computer Services Markets in the
Medical Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$ 70	$250	24%
Facilities Management	20	50	17
Batch Services	95	180	11
Processing Services Total	185	480	17
Software Products	15	65	28
Professional Services	30	65	14
Total	$230	$610	18%

($ Million)

- A factor in future hospital systems development will be the use of computers to handle clinical activities, such as vital sign monitoring, together with administrations.

- This sector should be an area of concentration for services companies.

H. EDUCATION

- Despite the numbers of school districts and colleges in the U.S., and their need for EDP for student accounting scheduling, payroll, accounting, and inventory control, the market for computer services to the industry is relatively small, as shown in Exhibit VI-14.

- Use of RCS is primarily for modeling and program-related activities in universities. There are also companies such as Uni-Coll which are spinoffs from universities which offer RCS to other educational institutions.

- Facilities management, which SDC tried to penetrate relatively unsuccessfully, will be more successful in the future as school districts and colleges try to save money to keep teachers on-board. An approach such as that adopted to banks of taking an FM contract in one district in order to resell some services to other districts may well work. Schools and colleges are oriented to this sharing concept. Systems and Computer Technology Corp. is proving relatively successful here. Trilog was also developing this area; it has now been sold to Pentamation.

- Batch services are for payroll and once a year for class scheduling.

- Software products will have the fastest growth of services to this sector; application packages growing from a virtually non-existent base to being a $30 million a year business by 1981

primarily for standard products to school districts. However, this market will be impacted by cooperative purchases and developments, as will the Professional Services markets.

- Professional services purchases are primarily for EDP consulting: this is often with CPA firms and management consultants such as Booz Allen Hamilton. Larger school districts such as Montgomery County, Maryland, also buy small program development services often from individuals.

EXHIBIT VI-14

Computer Services Markets in the
Education Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$30	$70	15%
Facilities Management	10	30	20
Batch Services	15	30	12
Processing Services Total	55	130	15
Software Products	15	50	22
Professional Services	30	40	5
Total	$90	$220	14%

($ Million)

I. RETAIL

- The overall growth rate of computer services to the retail industries is slightly above average due to the growth in RCS and Software. Products as shown in Exhibit VI-15. The growth in Batch Services is slower as business is converted from batch to RCS mode, as through NCR's data centers, for example.

- Credit handling is now the major remote computing service purchased by retailers but this will become integrated with merchandising systems with the advent of full POS over the next 5 years. TRW Data Systems is the major vendor in this area, though National Data has an interest in it. With J. C. Penney, TRW is establishing an interstore credit system.

- The remote batch handling of the equivalent of cash register tapes will be a major growth market for RCS and NCR has moved strongly to a position for this market. They can now poll stand-alone NCR 250 and NCR 280 systems from their 38 data center network. NCR estimates that a $3.6 million sales per year store would generate about $2000 per year of revenues, excluding terminal costs.

- POS terminal pricing is dropping so that virtually all stores will have them. There is an opportunity for a service that will work with any of the common POS, from IBM and NCR in particular, but also with TRW, Bunker-Ramo, Singer and other systems, particularly where the manufacturer has dropped out of the business.

- POS/EFTS is not here yet and may be slower developing than a lot of people have hoped. Significant revenues to service companies

EXHIBIT VI-15

Computer Services Markets in the
Retail Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$ 50	$200	26%
Facilities Management	2	10	30
Batch Services	120	180	7
Processing Services Total	172	390	15
Software Products	20	95	30
Professional Services	30	85	19
Total	$222	$570	17%

($ Million)

(which would probably be counted in 'Banking' since it will be banks and S&Ls that purchase computer services) are not included in these data.

- FM has been notably unsuccessful with retailers. A Lambda company subsidiary, Vertex, has several contracts in the Washington D.C. area and there are other small ones distributed around.

- General Business Services to small retailers is a common source of revenues for batch services companies. As mentioned above, there will be a conversion of these services to remote batch data entry as terminals replace cash registers. However, reports will still largely be provided in batch mode, although an inquiry feature may be provided.

- The retail industries will be one of the major target areas for applications software. This will be provided by the computer manufacturers in many cases. Standard business packages, and inventory control and sales analysis will be target areas. In larger companies, 'plastic' (credit/debit) card processing will provide package opportunities. In this context, the potential of retailers to act as 'banks' for handling cash is relevant; more checks are now cashed by individuals at supermarkets than in banks.

- Professional services will have a relatively large growth in retail industries: because they have been undercomputerized and backward in the past, they will have to turn outside for assistance

in developing new systems. POS and EFTS are areas where only consultants seem to have made money so far!

J. WHOLESALE

- This industry sector will achieve a better than average growth in processing services to new customers, probably at least 20%, but because of erosion of revenues to in-house small systems will have an actual growth rate of only 12%, as shown in Exhibit VI-16.

- The RCS growth with vendors such as CMS Industries, Keydata, XCS, MHDS, and Distronics could be higher than the 25% quoted provided that vendors are able to provide some degree of flexibility, particularly putting intelligence on-site at the user. This will reduce communications costs,particularly on the shipment side,while enabling users to get inquiry services. One of the problems associated with XCS, for example, is its inability to handle non-standard applications such as interactive problem solving. Thus larger wholesalers, for whom XCS does not have a complete service, cannot perform any of the missing functions on XCS themselves. They must have another source.

- FM, particularly RFM has some acceptance with wholesalers. Distronics, the Western Union subsidiary, has some FM contracts as does MHDS and CMS Industries. For larger wholesalers this mode of service will grow. UCS also is emerging as a vendor in this area.

- Batch services are the major source of computer services revenues accounting for 63% of total expenditures in 1975 although this will decrease to 45% by 1981. The reason for the maintenance of even this level are the large numbers of users which will do basic accounting

EXHIBIT VI-16

Computer Services Markets in the
Wholesale Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$ 40	$150	25%
Facilities Management	20	60	20
Batch Services	210	320	7
Processing Services Total	270	530	12
Software Products	31	120	25
Professional Services	30	60	12
Total	$331	$710	14%

($ Million)

in batch mode and also will have batch output associated with RCS data entry and inquiry.

- The other strong growth area in these industries is that of applications software products for small and medium sized wholesalers particularly for general business applications. The growth rate of 28% reflects the penetration of small business computers in this segment where much of the software will be provided for a fee by the computer manufacturers such as IBM. IBM has already announced several packages for System/32 in the wholesale industries.

- Professional services purchases are primarily for consulting and also for custom modification of systems by type of industry. Also, RCS and Batch Services companies will derive revenues from custom programming associated with processing.

K. FEDERAL GOVERNMENT

- The Federal Government and its multitude of agencies will be the second largest user of computer services by 1981, as shown in Exhibit VI-17. and may easily be the largest. The $1.6 billion market will then be about 30% of the Federal Government's EDP budget compared with about 15% now (excluding maintenance). Various sources are asking that this be at least 60/40 for in-house/services.

- The government has a policy of relying on the private sector for products and services. OMB Circular A-76 is a document which specifically states this policy. The Office of Federal Procurement Policy and GAO are attempting to see that this policy is implemented in data processing. Agencies have and will resist this, aided and abetted to a certain extent by GSA and OMB.

- The method adopted for passing out slices of federal EDP spending, by application, by agency function, by agency, or by EDP function will largely determine the character of the market.

- Another concern of GAO is the lack of interest of most computer services vendors in dealing with the government. A recent survey is intended to point out how to remedy this, but basically there is too much 'red tape' and a lack of profitability (in terms of profit on sales) entailed which most vendors and their investors are unwilling to accept. Also vendors are expected to give substantial discounts to the government based on 'economies of scale' which don't exist.

- The fastest growing segment of the market is that of RCS. Calendar 1975 revenues are estimated at $120 million, which is in between fiscal '75 reported expenditures of $109 million for computer time (including batch processing) and fiscal '76 budgets of $126 million. INPUT considers that not all such 'time' purchased by the government is accounted for in their figures because it may be covered by other categories such as 'research' or 'surveys'. Also, U.S. Postal Service is included which accounts for approximately $5.0 million of RCS expenditures.

- The CSC INFONET contract was running at the rate of $4 million per month in December 1975. Agencies currently using the service will have up to 30 months to 'recompete' their contracts under the new 'Teleprocessing services' contracts. These contracts which fall into two categories will theoretically open up the government RCS to competition. Although CSC is well entrenched other vendors already have two-thirds of the market.

- One reason for increased procurement of hardware in the last two years may well have been a desire by EDP staffs to preempt the move to services. Several poorly planned acquisitions have been stopped however.

- Although FM accounts for over half the processing services expenditures by the Federal Government in 1975, its growth rate is lower than the RCS or the overall sector. The reasons are that INPUT projects federal agencies will relinquish their EDP functions

EXHIBIT VI-17

Computer Services Markets in the
Federal Government, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$120	$520	28%
Facilities Management	190	400	13
Batch Services	40	60	7
Processing Services Total	350	980	19
Software Products	35	87	16
Professional Services	240	555	15
Total	$625	$1622	17%

($ Million)

in pieces rather than transfer total responsibility. FM will grow in new agencies such as FEA and EPA. Some of the smaller agencies may also be 'sacrificed' so that the government may show it is keeping to the letter of the law.

- Major government FM contractors are CSC, PRC, SDC, Logicon, Wolf R&D, BCS and OSI. If the government throws open more centers to FM then the manufacturers will bid contracts as well. At the moment, IBM does better proportionately through FM awards then it does through equipment procurements so it will not enter the fray.

- A major weapon in the battle of the agencies to keep their people will be 'Privacy'. Already statements are being made by GSA officials and others that commercial services cannot match internal privacy. This emphasizes the attention vendors must pay to this issue.

- The Federal Government purchases about $30 million per year of data entry and ouput (COM) services. This is the major constituent of the batch market. Local purchases are made outside Washington. Also, large scale scientific and engineering processing is done with CDC and other vendors at their Washington locations.

- The Application Package market in the Federal Government is virtually nonexistent. It will not grow appreciably.

- The System Package market will grow at a reasonable rate, but agencies still tend to do everything themselves if they can. Thus a

recent survey found almost every major agency with its own data dictionary development or equivalent. 'Software sharing' may well become mandatory in the government, thus system packages will be purchased once but on a multi-user payment basis.

- Professional services contracts are the single, largest category of computer service purchased by the Federal Government and will continue to be so. OMB reports FY 1975 expenditures of $180 million for systems analysis and programming contracts and an estimate of $220 million for FY 1976. Therefore, in addition to the estimated $200 million for Software Development, INPUT estimates there was another $40 million for EDP consulting in various forms and also for grant expenditures for software development and consulting. Mitre has a contract worth over $20 million a year with the Air Force for computer related activities. Part of this is research which is not included in Professional Services.

- A major problem associated with professional services contracts with the Federal Government is the low bidding rates supposedly required to obtain major contracts. Vendors get around this by setting up divisions with special overhead rates allowing rates to be kept to a bare minimum. However, the quality of a programmer being billed at the Huntsville, Alabama center at $5.66 per hour must be questionable.

- GSA now acts as a vendor of systems and programming personnel to other agencies. As identified by GAO this year, the rates charged by GSA are higher than available from commercial vendors by a

substantial margin. Although only amounting to $5 million per year at present, GAO has stepped in to ensure that this does not increase. However, it shows that GSA, itself, is attempting to become a major services vendor to the government and its commitment to using outside services is questionable.

L. STATE AND LOCAL GOVERNMENT

- RCS is the fastest growing computer services area in this sector as shown in Exhibit VI-18. This will come from a small base due to a lack of sophistication in use of EDP. Pressure for responsiveness and reporting will push governments to on-line systems which many will not be able to support internally. Cities and counties will buy services from vendors such as OSI. EDS and Anacomp also provide services to some State agencies.

- One area of expenditure which channels federal money into EDP is that of federal grants to States and cities for development and operational work. Of the $300 to $400 million EDP-related grants funded to States in 1975, very little found its way to services companies. This will increase in future as OMB cracks down on these expenditures.

- Facilities Management is still a relatively small market to State and local governments. CSC, OSI, McAUTO and BCS will pursue this market strongly. However, because of lead time for sales and conversion it will not grow as strongly as demand might indicate. Also, over-intense competition will damage the market. NCR, Anacomp, and Metridata also have a position in this market.

- Batch services from local companies will continue to grow. A large part is for overload work at certain times of the year; tax processing time, for example. Data entry and COM services will continue to grow.

EXHIBIT VI-18

Computer Services Markets in
State and Local Government, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$ 20	$110	33%
Facilities Management	15	40	18
Batch Services	40	80	12
Processing Services Total	75	230	21
Software Products	23	65	19
Professional Services	100	200	12
Total	$198	$495	17%

($ Million)

- Software Products growth in this sector will mainly come from systems packages and, to a limited extent, standard business application packages. Computer manufacturers supplying municipalities will participate in this market.

- Professional Services, primarily consulting to all levels of government and software development for States will continue to be a large proportion of the market. Accounting companies, such as Touche Ross, are heavy participants in this market. A 'local' image is almost mandatory for success except for particular areas such as law enforcement systems. Thus most of the market (90%) of it lies with local companies and accountants which have that local image. Computer manufacturers also participate in it, sometimes with studies recommending their own equipment.

M. SERVICES

- Accountants, lawyers, engineers, architects, consultants, research and development organizations form the base of this market sector.

- As reported in the Industry Report on the Services Industries, accounting, legal, and consulting firms account for about half the 1975 RCS expenditures of this sector shown in Exhibit VI-19.This report modifies the data contained in the Industry Report. While maintaining the processing revenues constant in 1981 at about $300 million, the division between batch and RCS has been changed as follows:

	RCS	Batch
Industry Report	85 29%	208 71%
Annual Report	120 - 41%	173 - 59%

The reason is that the internal word processing typewriter will also function as a communications terminal and will be used for data entry and output for some of the tax and financial statement work. The recent movement of IBM into this market with small, in-house systems for CPAs and lawyers accelerates this trend.

- Architects and engineers will make increasing use of all forms of RCS due to increased demand for modelling and planning before construction. Companies like Bechtel are among the largest purchasers of RCS and will continue to increase their purchases from a variety of vendors, including Honeywell.

EXHIBIT VI-19

Computer Services Markets in the
Services Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$ 70	$270	25%
Facilities Management	--	--	--
Batch Services	120	330	18
Processing Services Total	190	600	21
Software Products	13	40	20
Professional Services	10	15	7
Total	$213	$655	21%

($ Million)

- Batch services will still be the largest segment of the market in 1981 although an increasing proportion of it will have some RCS component as indicated above.

- Software product sales will primarily be for applications packages associated with client work and also for small in-house systems.

- The Professional Services market is primarily for custom software development.

N. OTHER INDUSTRIES

- Industries in this sector include agriculture, construction, real estate, amusement, and social organization (such as private clubs) as well as associations, unions, advertising agencies, religious organizations, foundations, broadcasting companies, and hotel/motel organizations. Finally, services directly to the individual household are included, although presently virtually non-existent.

- The RCS estimates of $40 million do not include expenditures by companies such as Bechtel for A&E related services.

- Of the total processing services expenditures of $173 million in 1975, shown in Exhibit VI-20, it is estimated that over $30 million was related to the petroleum industry through construction firms.

- In construction companies, CPM scheduling, payroll, capital investment analysis, cash flow and other business management functions are of increasing importance. These companies also use econometric data bases on an international scale for use in financial planning. McAUTO, CDC, UCS, GEIS, and UCC participate in this market. There are also numerous specialized vendors.

- Significant RCS expenditures are also made by the broadcasting and advertising industries. TV and radio station spot sales and billing are being serviced by CDC through ARBSEC and by Data

EXHIBIT VI-20

Computer Services Markets in
Other Industries, 1975-1981

Mode of Service	1975	1981	AAGR 1975/1981 %
Remote Computing Services	$ 40	$120	20%
Facilities Management	8	15	12
Batch Services	125	220	12
Processing Services Total	173	355	13
Software Products	17	60	23
Professional Services	40	75	11
Total	$215	$490	14%

($ Million)

Communications Corp. in Memphis, Tennessee. Advertising agencies purchase RCS for modelling of media performance and market research companies for statistical analysis.

- In the Facilities Management market, National Data provides services for several hotels as well as providing reservation services. There are also a variety of small FM contracts, some with associations in Washington, D.C.

- Batch services account for most of the computer services market in this sector. Associations and unions spend over $35 million per year for dues billing, mailing list processing, director processing, and statistics collection. Construction companies process payroll, general accounting and CPM scheduling. Property management for real estate companies is also a significant source of revenues. The market will continue to grow despite movement in-house: large potential in this industry sector is still largely untapped.

- Applications package market will increase at over 25% per year, making Software Products the fastest growing market in this sector. This will primarily be for standard products for those companies that go in-house with systems such as the IBM System/32 for associations. There are also sales of large packages such as UAL's Western Hotel reservation system.

- Professional Services market is primarily associated with processing services through custom program development. There is also a lack of standard applications packages in several of these industries

encouraging the use of custom programming.

- This industry sector is particularly recommended for computer services companies because EDP use is emerging in many cases, while the variable nature of the business makes establishment of in-house EDP functions a potentially costly business.

VII. COMPETITIVE ENVIRONMENT

VII. COMPETITIVE ENVIRONMENT

A. COMPUTER SERVICES COMPANIES SURVEY ANALYSIS

- As part of the Company Analysis and Monitoring Program, INPUT surveyed approximately 500 computer services companies this year. Of the returns, 146 were usable for the following analyses of revenues per employee, and revenue distribution by user industry segment by vendor company size.
- The purpose of these analyses is to establish some performance standards by size and type of company and to establish a base for market analysis and forecasts. In order to be included in this analysis a company had to provide data on annual sales, number of employees and revenue distribution by type of service; most of them also provided revenue distribution by end user industry. Because of these requirements all but 5 of the companies analyzed were independents.

1. RESPONDENT CHARACTERISTICS

- These companies were distributed by annual revenue size group as shown in Exhibit VII-1. In aggregate they employed 23,500 people in 1975 and had annual revenues of $690 million. The average revenue per company and per employee by size group is shown in Exhibit VII-2, however size in itself is not as important a characteristic of the vendors as is the type of service offered.

EXHIBIT VII-1

Computer Services Vendor Interviews-Respondent Characteristics

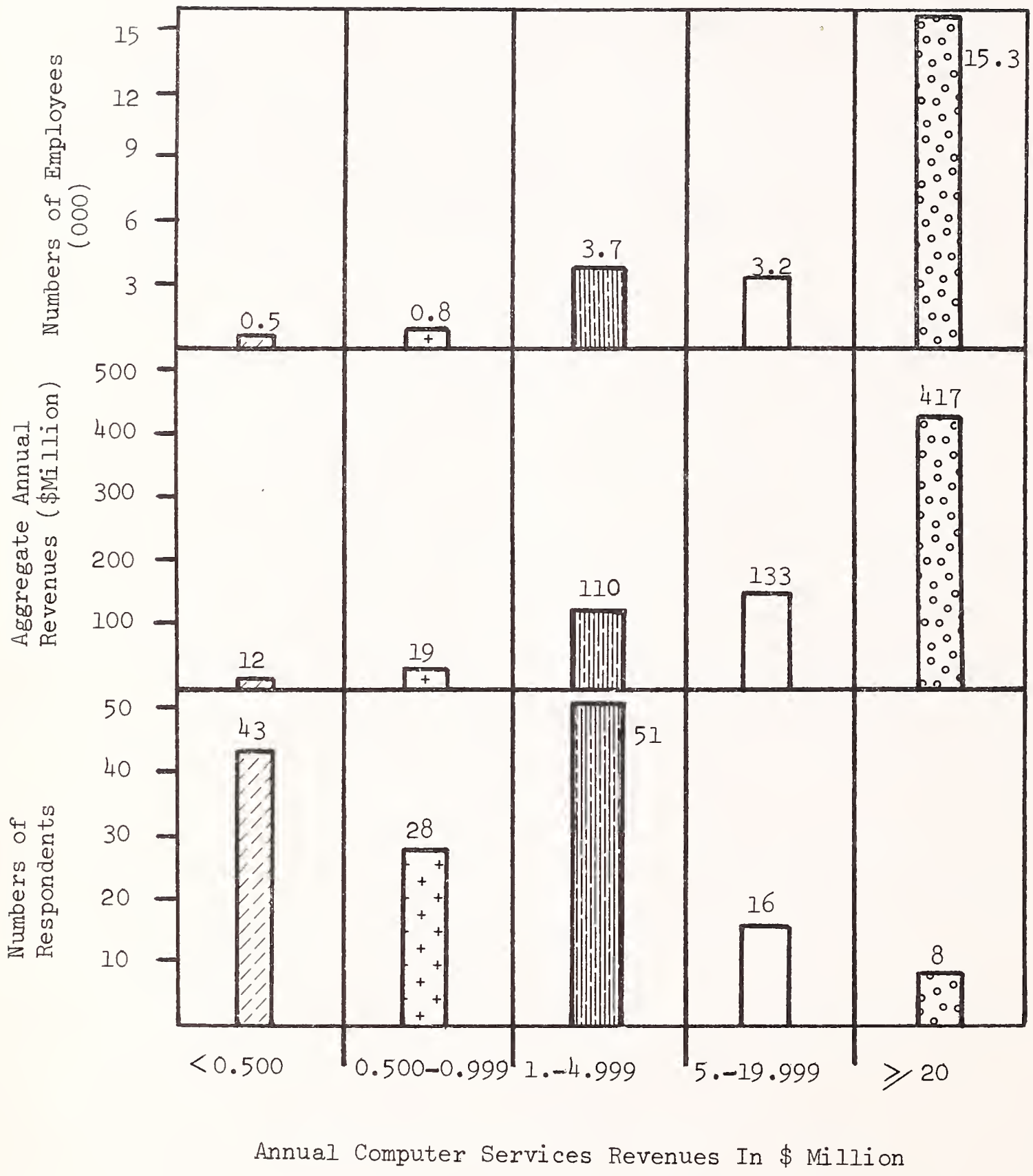


EXHIBIT VII-2

Annual Computer Services Revenues Per Employee And Per Company

By Company Size Category

Size Category	Average Revenue Per Company	Average Revenue Per Employee
< $500,000	$ 275,000	$24,392
$500,000 to $999,999	$ 691,000	$24,188
$1,000,000 to $4,999,999	$ 2,145,000	$29,262
$5,000,000 to $19,999,999	$ 8,305,000	$41,179
> $20,000,000	$52,095,000	$27,325
Total	$ 4,727,000	$29,368

(For 146 companies)

- The companies were categorized by their major service offering: if over 60% of annual revenues were obtained from a particular type of service a company was included in the category for that type of service. Otherwise it was counted as a multi-service vendor (MSV). As shown in Exhibit VII-3, 45% of the respondents were 'Batch' services vendors according to this categorization; in addition, about 50% of the MSV's had 50% or more of their revenues from batch services.

- The concentration of vendor revenues in specific types of services is shown by the fact that 30% of the respondents regarded themselves as purely (100%) in one or other of the service categories. This characteristic crosses all size groups; even for those companies over $20 million in annual revenues only two out of the eight were MSV's.

2. RESPONDENT ANALYSIS BY TYPE OF SERVICE

- As shown in Exhibit VII-4, almost 75% of the respondents offered batch services but this segment only accounted for 38% of the aggregate revenues. Facilities Management is only offered by one company in five, yet, because it is offered by larger companies, has more aggregate revenues than Software Products or Professional Services.

- Facilities Management and Professional Services offerings are definitely secondary services to most computer services companies. The numbers of companies in each type of service category is small (2 for FM and 5 for PS) and the average contribution of revenues from these types of services is also relatively small. Therefore, in examining FM and PS

EXHIBIT VII-3

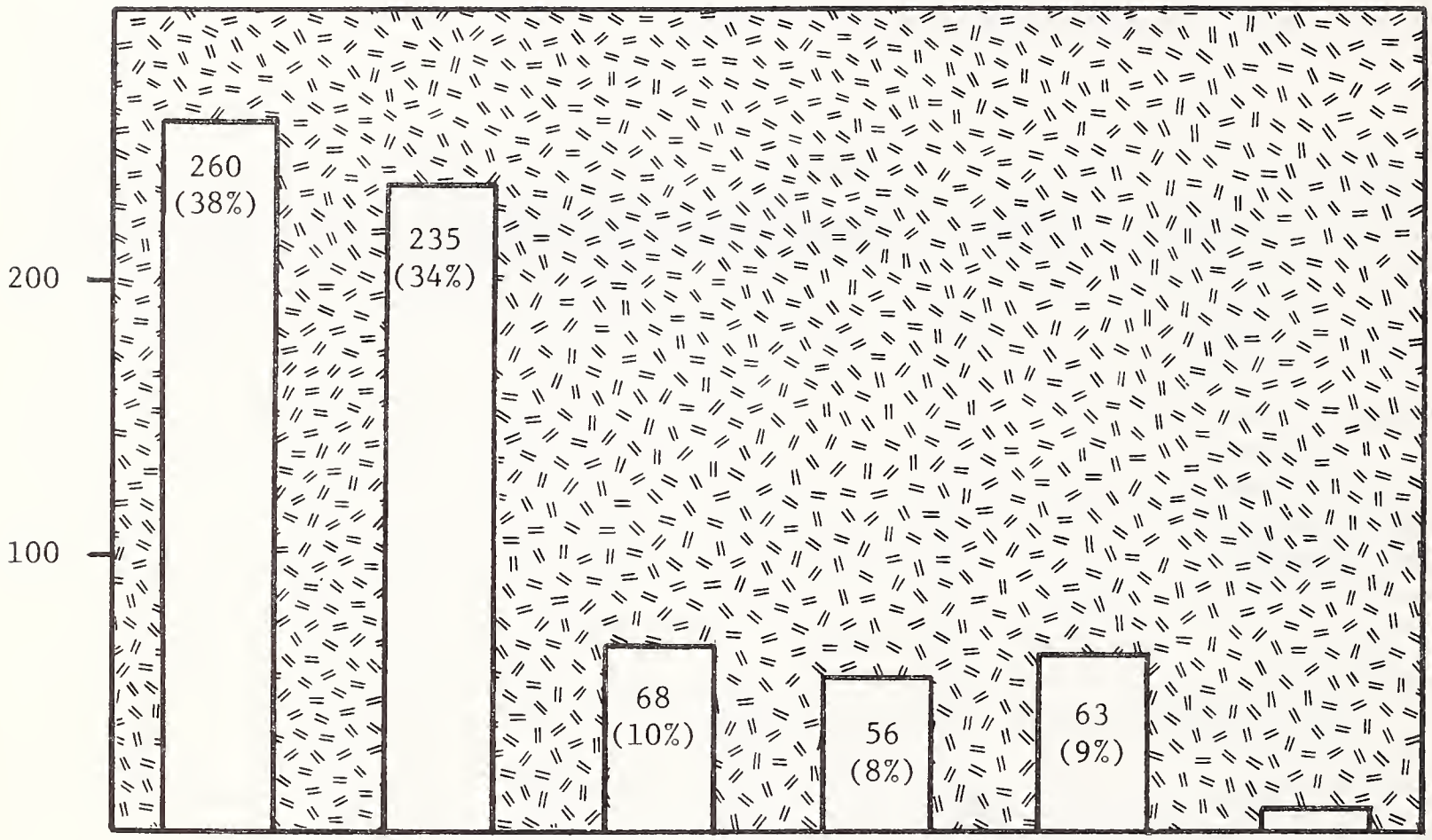
Respondent Distribution By Size And Type Of Service

Type Of Computer Service Category	Annual Computer Services Revenue Size Group ($ Million)					
	< 0.5	0.5-0.999	1-4.999	5-19.999	≥20	Total
Batch Services	25	18	19	1	2	65
Remote Computing Services	2	1	10	9	3	25
Facilities Management	-	1	-	-	1	2
Software Products	6	2	5	2	-	15
Professional Services	1	2	2	-	-	5
Multi-Service Vendor	9	4	15	4	2	34
Total	43	28	51	16	8	146

(Numbers of Companies)

EXHIBIT VII-4

Distribution of Respondent Revenues by Type of Service



	BATCH	RCS	FM	SOFT. PRODS.	PROF. SERVS.	OTHER
A *	107	65	28	44	67	19
B *	73%	45%	19%	30%	46%	--
C *	66%	49%	27%	40%	19%	--

* Type of Service

A. Number of Respondents Offering Service
B. Percentage of Respondents
C. Average Revenues from this Type of Service

markets, user industry and other analyses must not only look at the specialized vendors but also at other vendor categories, particularily MSV's.

- Further, in analyzing company size of respondents by type of service, Exhibit VII-5 shows that little FM or RCS revenues come from companies below $1 million. The bulk of FM revenues come from specialized companies with over $20 million in annual revenues. RCS revenues on the other hand are concentrated in companies with from $5 million to $20 million in annual computer services revenues.

- The distortion of the few, very large companies included in the analysis tend to hide the differences among the smaller size categories. However, the analysis shows relatively large concentrations of revenues in small, specialized Software Product and Batch companies, with Professional Services revenues being due to small specialized companies and 'pull through' from small Batch vendors. These typically obtain 10% to 20% of their revenues from custom software development.

- These findings are confirmed when the annual revenues of respondents are examined by type of service within size category. Within each size category, Professional Services obtains about 10% of the revenues as shown in Exhibit VII-6; FM grows as a proportion of the total with increasing vendor size; and Software Products trails off for very large companies. Within the two smallest size groups, Batch Services predominate, with RCS achieving a majority of revenues in the $5 million to $20 million size group. (For Exhibit VII-6, figures given are averages of respondents'

EXHIBIT VII-5

Computer Services Revenue Distribution Of Respondents By Size Category Within Type Of Service

Type of Computer Service Category	Annual Computer Services Revenues Size Group ($ Millions)											
	< 0.5		0.5-0.999		1-4.999		5-19.999		≥ 20		Total	
	$ Million	%	$ Million	%	$ Million	%	$ Million	%	$ Million	%	$ Million	%
Batch Services	7	3	13	5	47	18	12	5	181	70	260	100
Remote Computing Services	1	0	1	0	28	12	127	51	78	33	235	100
Facilities Management	0	0	1	1	7	10	12	18	48	71	68	100
Software Products	2	4	2	4	12	21	19	34	21	38	56	100
Professional Services	1	2	3	5	10	16	9	14	40	63	63	100
Other											9	100
Total	11	2	20	3	104	15	179	26	368	53	691	100

EXHIBIT VII-6

Computer Services Revenue Distribution Of Respondents
By Type Of Service Within Size Category

Type Of Computer Service Category	($Million) Annual Computer Services Revenue Size Group				
	< 0.5	0.5-0.999	1-4.999	5-19.999	≥20
Batch Services	62%	66%	43%	9%	43%
Remote Computing Services	9	7	26	59	30
Facilities Management	1	4	6	9	12
Software Products	15	9	11	14	5
Professional Services	10	13	9	7	10
Other	3	2	4	3	--
Total	100%	100%	100%	100%	100%

percentage distributions except for the '≥$20 million' category where, because of the large size spread, the responses have been weighted by the annual revenue size of the respondents.)

3. ANNUAL REVENUES PER EMPLOYEE BY VENDOR SIZE/TYPE

- While there is no indication that revenue per employee relates to profitability across types of service, it appears that it does affect profitability of companies within a particular type of service category. It also indicates those services most sensitive to employee turnover, fringe benefit controls, pay raises, and other labor related costs.

- As shown in Exhibit VII-7, the best performing companies in terms of revenues per employee in every category with appropriate data were those companies in the $5 million to $20 million annual computer services revenue size. RCS and Software Product companies each have average annual revenue per employee of over $40,000. One reason for the decrease in revenues per employee in the $20 million category, is that several of the very large vendors deal with the Federal Government. Another is that a batch services vendor accounting for over half the revenues in this category has an unusually high proportion of data entry personnel, thus bringing down the average.

- The similarity of annual revenues per employee between the Batch and FM vendors is noticeable. In large part this is due to the similarity in operations characteristics with large, relatively low-paid, data entry staffs.

EXHIBIT VII-7

Computer Services Revenues per Employee by Company
Size Category and Type of Service

Vendor By Type Of Service	Annual Computer Services Revenue Size Group ($ Million)					
	< 0.5	0.5-0.999	1-4.999	5-19.999	≥ 20	Total
Batch Services	$23,700	$23,000	$25,200	($28,600)	($24,400)	$24,500
Remote Computing Services	(30,000)	(50,000)	41,700	44,700	44,300	44,100
Facilities Management	---	(17,300)	---	---	(24,400)	(24,200)
Software Products	39,700	(44,300)	36,000	(50,000)	---	42,000
Professional Services	(8,700)	(30,0y0)	(31,000)	---	---	30,400
Multi-Service Vendor	22,100	(23,400)	27,000	(32,100)	(23,100)	23,600
Total	$24,400	$24,200	$29,200	$41,200	$27,300	$29,400

( ) Are Figures For Cells With Less
Than 5 Companies Responding

- Because of the large proportion of batch work they do, MSV's have similar but slightly higher revenue per employee performance as Batch vendors.

4. VENDOR ANALYSIS BY INDUSTRY SERVED

- As shown in Exhibits VII-8 and VII-9, Manufacturing & Distribution provide about half of the revenue base for computer services companies. This is true when analyzed by type of service or vendor company size. However, the proportion of revenues due to the distribution industries drops significantly with company size. Also Software Products revenues are much less concentrated in these sectors.

- Services to the Banking and Finance sector increase with size of vendor except that the concentration in very large vendors drops off slightly. This last is accompanied by a corresponding increase in revenues from the Federal Government.

- 'Other' industry sector revenues are derived from services organizations and, particularily in the case of Software Products, from other computer services companies.

5. DATA UTILIZATION

- The data obtained from this survey is used in the report to develop certain market size data. Since the survey obtained data primarily from independents, other categories of suppliers, notably spinoffs and computer manufacturers, have to be included for that purpose.

EXHIBIT VII-8

Computer Services Companies' Revenues From User Industry Sectors

By Type Of Service Category

Industry Sector	Vendor Type						
	Batch Services	Remote Computing Services	Facilities Management	Software Products	Professional Services	Multi-Service Vendor	Total
Manufacturing	23%	31%	(3%)	12%	(13%)	22%	22%
Transportation	2	3	--	2	(4)	2	2
Utilities	2	11	--	2	(12)	3	4
Distribution	27	24	(40)	14	(8)	17	23
Banking & Finance	9	11	(50)	33	(11)	22	15
Insurance	5	2	--	3	(16)	6	5
Medical	8	1	--	8	--	7	6
Education	1	5	--	2	(1)	4	2
Government	5	6	(7)	3	(2)	9	6
Other	19	6	--	22	(33)	8	14
Total	100%	100%	100%	100%	100%	100%	100%
No. of Companies Providing Data	58	20	(2)	9	(5)	34	128
Aggregate Annual Revenues ($ Million)	83	154	23	16	9	167	452

( ) 5 or Fewer Companies Responding

EXHIBIT VII-9

Computer Services Companies' Revenues From User Industry Sectors By Company Size Category

Industry Sector	Annual Computer Services Revenue Size Category ($ Million)					
	< 0.5	0.5-0.999	1-4.999	5-19.999	≥20	Total
Manufacturing	27%	19%	18%	22%	31%	22%
Transportation	1	1	3	2	5	2
Utilities	2	3	4	11	7	4
Distribution	28	26	19	14	11	23
Banking & Finance	8	9	23	27	20	15
Insurance	4	9	5	5	2	5
Medical	7	8	6	2	1	6
Education	1	2	4	2	1	2
Government	3	3	8	9	15	6
Other	18	20	11	6	7	14
Total	100%	100%	100%	100%	100%	100%
No. Of Companies Reporting Data	41	23	46	12	6	128

B. PROFITABILITY ANALYSIS OF COMPUTER SERVICES COMPANIES

- As shown in Exhibit VII-10, the profitability of major computer services companies did not improve in fiscal year 1975 from 1974. For those companies with fiscal years finishing early in the calendar year, fiscal year 1976 appears to offer little or no improvement either.

- For companies over $100 million in annual revenues, the Electronic Data Systems performance was typical as shown in Exhibit VII-11, return on earnings dropped in 1975 while return on equity slightly improved.

- Electronic Data Systems and On-Line Data Systems were the most profitable of the companies analyzed, although the fiscal 1976 performance of both is relatively poor.

- The performance of the $20 million to $100 million group of four companies was the best of the three groups, with only National CSS having a slightly poorer performance in fiscal 1975 than 1974. On a calendar year basis its fiscal 1976 results more closely align with 1975, as shown in Exhibit VII-12, and also show significant improvement.

- Companies with less than $20 million in annual sales had mixed results in 1975 compared with 1974, with 'negatives' slightly outweighing 'positives', as shown in Exhibit VII-13.

EXHIBIT VII-10

Summary of Profitability Performance of Computer Services Vendors by Size Category

Fiscal Years 1974 and 1975

VENDOR SIZE CATEGORY	YEAR	REVENUES	INCOME BEFORE TAXES & EXTRAORDINARY ITEMS	STOCKHOLDER'S EQUITY	RETURN ON EARNINGS %	RETURN ON EQUITY %	EQUITY AS A % OF REVENUES
> $100 MILLION	1974	$ 588.8	$ 62.6	$ 194.0	10.6%	32.3%	32.9%
	1975	699.9	71.2	196.6	10.2%	36.2%	28.0%
$20-$100 MILLION	1974	159.8	16.3	80.8	10.2%	20.2%	50.6%
	1975	187.7	24.7	93.5	13.2%	26.4%	49.8%
< $20 MILLION	1974	67.6	7.0	22.6	10.4%	31.0%	33.4%
	1975	84.2	9.1	29.5	10.8%	30.8%	35.0%
TOTAL	1974	816.2	85.9	297.4	10.5%	28.9%	36.4%
	1975	$ 971.8	$ 105.0	$ 319.6	10.8%	32.9%	32.9%

($ millions)

INPUT

EXHIBIT VII-11

Profitability Performance of Computer Services Vendors

With Sales Over $100 Million

Fiscal Years 1974 and 1975

COMPANY	FISCAL YEAR ENDING	TOTAL REVENUE	INCOME BEFORE TAXES & EXTRAORDINARY ITEMS	STOCKHOLDER'S EQUITY	RETURN ON EARNINGS % *	RETURN ON EQUITY % **	EQUITY AS A % OF REVENUES
1974 Fiscal Year							
Computer Sciences Corporation	March 28,1974	$147.0	$ 2.4	$ 11.6	1.6%	20.7%	7.9%
Automatic Data Processing Inc.	June 30, 1974	122.8	22.8	68.4	18.6	33.3	55.7
Electronic Data Systems	June 30, 1974	118.7	29.2	82.9	24.6	35.2	69.8
Planning Research Corporation	June 30, 1974	110.1	5.4	19.6	4.9	27.6	17.8
Systems Development Corporation	June 30, 1974	90.2	2.8	11.5	3.1	24.3	12.7
TOTAL		$588.8	$62.6	$194.0	10.6%	32.3%	32.9%
1975 Fiscal Year							
Computer Sciences Corporation	March 28,1975	$177.4	$ 7.2	$ 15.2	4.1%	47.4%	8.6%
	(April 2 ,1976	219.9	14.5	22.3	6.6	65.0	10.1)
Automatic Data Processing Inc.	June 30, 1975	154.7	27.2	80.2	17.6	33.9	51.8
Electronic Data Systems	June 30, 1975	123.9	27.1	66.9	21.9	40.5	54.0
	(June 30, 1976	133.0	13.6	76.1	10.2	17.9	57.2)
Planning Research Corporation	June 30, 1975	135.3	6.2	21.8	4.6	28.4	16.1
Systems Development Corporation	June 30, 1975	108.6	3.5	12.5	3.2	28.0	11.5
TOTAL		$699.9	$71.2	$196.6	10.2%	36.2%	28.0%

($ Millions)

* Return on Earnings (Gross Margin) = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Revenue}}$

** Return on Equity = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Total Stockholder's Equity}}$

EXHIBIT VII-12

Profitability Performance of Computer Services Vendors

With Sales From $20 Million to $100 Million

Fiscal Years 1974 and 1975

COMPANY	FISCAL YEAR ENDING	TOTAL REVENUE	INCOME BEFORE TAXES & EXTRAORDINARY ITEMS	STOCKHOLDER'S EQUITY	RETURN ON EARNINGS % *	RETURN ON EQUITY % **	EQUITY AS A % OF REVENUES
1974 Fiscal Year							
Bradford National	December 31,1974	$ 59.0	$ 4.6	$40.0	7.8%	11.5%	67.8%
Tymshare Inc.	December 31,1974	46.5	6.1	15.3	13.1	39.9	32.9
National CSS,Inc.	February 28,1974	23.7	2.8	6.1	11.8	45.9	25.7
National Data Corporation	May 31,1975	30.6	2.8	19.4	9.2	14.4	63.4
TOTAL		$159.8	$16.3	$80.8	10.2%	20.2%	50.6%
1975 Fiscal Year							
Bradford National	December 31,1975	$ 67.4	$ 8.5	$43.5	12.6%	19.5%	64.5%
Tymshare Inc.	December 31,1975	56.4	9.2	20.9	16.3	44.0	37.1
National CSS,Inc.	February 28,1975 (February 28,1976	32.6 35.6	3.5 4.4	8.0 10.2	10.7 12.4	43.8 43.1	24.5 28.7)
National Data Corporation	May 31,1975	31.3	3.5	21.1	11.2	16.6	67.4
TOTAL		$187.7	$24.7	$93.5	13.2%	26.4%	49.8%

($millions)

* Return on Earnings (Gross Margin) = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Revenue}}$

** Return on Equity = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Total Stockholder's Equity}}$

EXHIBIT VII-13

Profitability Performance of Computer Services Vendors

Sales $20 Million Or Less

Fiscal Years 1974 and 1975

COMPANY	FISCAL YEAR ENDING	TOTAL REVENUE	INCOME BEFORE TAXES & EXTRAORDINARY ITEMS	STOCKHOLDER'S EQUITY	RETURN ON EARNINGS %*	RETURN ON EQUITY % **	EQUITY AS A % OF REVENUES
1974 Fiscal Year							
Mathematica	June 30,1974	$ 11.8	$ 1.1	$ 3.4	9.3	32.4	28.8
Rapidata,Inc.	Dec. 31,1974	11.5	.9	3.1	7.8	29.0	27.0
Keydata Corp.	July 31,1974	11.7	(.6) loss	2.7	(5.1)	(22.2)	23.1
Com Share Inc.	June 30,1974	9.5	1.4	2.9	14.7	48.3	30.5
On-Line Systems	April 30,1974	9.9	2.9	5.1	29.3	56.9	51.5
Anacomp Inc.	June 30,1974	6.0	.5	1.5	8.3	33.3	25.0
Compu-Serv Network Inc.	Dec. 31,1974	7.2	.8	3.9	11.1	20.5	54.2
TOTAL		$ 67.6	$ 7.0	$ 22.6	10.4	31.0	33.4
1975 Fiscal Year							
Mathematica	June 30,1975	$ 14.8	$ 1.0	$ 3.8	6.8	26.3	25.7
Rapidata,Inc.	Dec. 31,1975	14.8	2.4	4.4	16.2	54.5	29.7
Keydata Corp.	July 31,1975	13.5	.3	3.1	2.2	9.7	23.0
Com Share Inc.	June 30,1975	12.3	1.5	4.4	12.2	34.1	35.8
On-Line Systems	April 30,1975 (April 30,1976	11.4 12.0	2.4 1.4	6.3 7.2	21.1 11.7	38.1 19.4	55.3 60.0)
Anacomp Inc.	June 30,1975	8.9	1.1	3.1	12.4	35.5	34.8
Compu-Serv Network Inc.	Dec. 31,1975	8.5	.4	4.4	4.7	9.1	51.8
TOTAL		$ 84.2	$ 9.1	$ 29.5	10.8	30.8	35.0

($ millions)

* Return on Earnings (Gross Margin) = Income Before Taxes & Extraordinary Items / Revenue

** Return on Equity = Income Before Taxes & Extraordinary Items / Total Stockholder's Equity

- In terms of type of service provided, there is sufficient data on the companies included for analysis of multi service vendors and remote computing services vendors only.

- For four large, multi service vendors, only Bradford improved its performance in 1975 as shown in Exhibit VII-14. In fiscal 1976 Electronic Data Services has further deteriorated in its profit performance.

- Of the remote computing services companies, the turn-around of Keydata and the performance of Tymshare and Rapidata enabled the group performance to improve slightly in fiscal 1975 although half of the companies analyzed had poorer performances, as shown in Exhibit VII-15.

- In general, if a return on equity of 33% is regarded as 'good', over half the companies analyzed had a better performance than this in 1975. Computer Sciences, Tymshare, Rapidata and National CSS are all above 40% in fiscal 1975.

- Through a very severe recession, computer services companies were able to maintain an average growth rate of about 20% while maintaining profitability. This shows a stability in the marketplace and in the leading vendors which was lacking in many other industries.

EXHIBIT VII-14

Profitability Performance of Multi Service Vendors

Fiscal Years 1974 and 1975

COMPANY	FISCAL YEAR ENDING	TOTAL REVENUE	INCOME BEFORE TAXES & EXTRAORDINARY ITEMS	STOCKHOLDER'S EQUITY	RETURN ON EARNINGS %*	RETURN ON EQUITY %**	EQUITY AS A % OF REVENUES
1974 Fiscal Year							
Computer Sciences Corporation	March 28,1974	$147.0	$ 2.4	$ 11.6	1.6%	20.7%	7.9%
Automatic Data Processing	June 30,1974	122.8	22.8	68.4	18.6	33.3	55.7
Electronic Data Systems	June 30,1974	118.7	29.2	82.9	24.6	35.2	69.8
Bradford National	Dec. 31,1974	59.0	4.6	40.0	7.8	11.5	67.8
		$447.5	$ 59.0	$202.9	13.2%	29.1%	45.3%
1975 Fiscal Year							
Computer Sciences Corporation	March 28,1975	$177.4	7.2	$ 15.2	4.1%	47.4%	8.6%
Automatic Data Processing	June 30,1975	154.7	27.2	80.2	17.6	33.9	51.8
Electronic Data Systems	June 30,1975	123.9	27.1	66.9	21.9	40.5	54.0
Bradford National	Dec. 31,1975	67.4	8.5	43.5	12.6	19.5	64.5
TOTAL		$523.4	$ 70.0	$ 205.8	13.4%	34.0%	39.3%

($ millions)

* Return on Earnings (Gross Margin) = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Revenue}}$

** Return on Equity = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Total Stockholder's Equity}}$

EXHIBIT VII-15

Profitability Performance of Remote Computing Services Companies

1974 Fiscal Year

COMPANY	FISCAL YEAR ENDING	TOTAL REVENUE	INCOME BEFORE TAXES & EXTRAORDINARY ITEMS	STOCKHOLDER'S EQUITY	RETURN ON EARNINGS %*	RETURN ON EQUITY %**	EQUITY AS A % OF REVENUES
1974 Fiscal Year							
Tymshare Inc.	Dec. 31,1974	$ 46.5	$ 6.1	$ 15.3	13.1%	39.9%	32.9%
National CSS Inc.	Feb. 31,1974	23.7	2.8	6.1	11.8	45.9	25.7
National Data Corp.	May 31,1974	30.6	2.8	19.4	9.2	14.4	63.4
Rapidata Inc.	Dec. 31,1974	11.5	.9	3.1	7.8	29.0	27.0
Keydata Corp.	July 31,1974	11.7	(.6)	2.7	(5.1)	(22.2)	23.1
On-Line Systems	April 30,1974	9.9	2.9	5.1	29.3	56.9	51.5
Com Share Inc.	June 30,1974	9.5	1.4	2.9	14.7	48.3	30.5
Computer Services Network Inc.	Dec. 31,1974	7.2	.8	3.9	11.1	20.5	54.2
TOTAL		$150.6	$ 17.1	$ 58.5	11.4%	29.2%	38.8%

($millions)

* Return on Earnings (Gross Margin) = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Revenues}}$

** Return on Equity = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Total Stockholder's Equity}}$

(continued on page 267)

EXHIBIT VII-15
(continued)

Profitability Performance of Remote Computing Services Companies

1975 Fiscal Year

COMPANY	FISCAL YEAR ENDING	TOTAL REVENUE	INCOME BEFORE TAXES & EXTRAORDINARY ITEMS	STOCKHOLDER'S EQUITY	RETURN ON EARNINGS %*	RETURN ON EQUITY %**	EQUITY AS A % OF REVENUES
1975 Fiscal Year							
Tymshare Inc.	Dec. 31,1975	$ 56.4	$ 9.2	$20.9	16.3%	44.0%	37.1%
National CSS Inc.	Feb. 28,1975	32.6	3.5	8.0	10.7	43.8	24.5
National Data Corp.	May 31,1975	31.3	3.5	21.1	11.2	16.6	67.4
Rapidata Inc.	Dec. 31,1975	14.8	2.4	4.4	16.2	54.5	29.7
Keydata Corp.	July 31,1975	13.5	.3	3.1	2.2	9.7	23.0
On-Line Systems	April 30,1975	11.4	2.4	6.3	21.1	38.1	55.3
Com Share,Inc.	June 30,1975	12.3	1.5	4.4	12.2	34.1	35.8
Computer Service Network, Inc.	Dec. 31,1975	8.5	.4	4.4	4.7	9.1	51.8
TOTAL		$180.8	$23.2	$72.6	12.8%	32.0%	40.2%

($ millions)

* Return on Earnings (Gross Margin) = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Revenue}}$

** Return on Equity = $\frac{\text{Income Before Taxes \& Extraordinary Items}}{\text{Total Stockholder's Equity}}$

C. GROWTH RATE ANALYSIS OF ADP AND TYMSHARE

- The two leading acquisition-oriented computer services companies are probably ADP and Tymshare, with Itel close behind. Indeed, on a percentage of revenue base, Itel Data Services has probably been the most acquisition-oriented in the last two years. With its acquisition of Control Data Systems, Inc. and proposed acquisition of Computer Dimensions, Itel has quite properly gone for companies that are geographically well situated for its expansion, are basically compatible in customers base and type of service, and are relatively large. ($9 million for CDSI and approximately $12 million for Computer Dimensions).

- However, this analysis concentrates on Tymshare and ADP since the results of their acquisitions are more easily estimated.

- Exhibit VII-16 shows that ADP's acquisitions in 1975 and 1976 have contributed 30% of its growth from 1975 to 1976 ($154,700,000 to $188,000,000). Meanwhile, the established business provided 70% of the growth at an annual growth rate of 17%. With Tymshare, Exhibit VII-17 shows that acquisitions are even more important to their success in terms of absolute dollars. Here again, however, the established business is growing at over 20% per year.

- ADP, Itel and Tymshare are able to make acquisitions because of their stock price, their known acquisition orientation and performance, and the staff they have committed full time to the tedious tasks of filtering, analyzing and negotiating the acquisition opportunities that occur.

EXHIBIT VII-16

ADP Acquisition Analysis

Date	Firm	Annual Revenues for fiscal year		
		1975	1976 E	1977 E
Jun 75	Cyphernetics	$16,200,000	$21,000,000	$27,000,000
Oct 75	Financial Computer Services	N/A	2,000,000	3,600,000
Mar 76	PCS Data Processing	N/A	300,000	1,000,000
Apr 76	Delos	N/A	2,000,000	7,500,000
Apr 76	Systems S.A.	N/A	700,000	800,000
Apr 76	Information Sciences, Inc.	N/A	140,000	500,000
Total from Acquisitions		$16,200,000	$26,140,000	$40,400,000
Total after Acquisitions		$154,700,000	$188,000,000	$230,500,000
Total before Acquisitions		$138,500,000	$161,860,000	$190,100,000
Projected annual gain:				
Acquisitions included			21.5%	22.6%
Acquisitions excluded			16.7%	17.4%

E = INPUT ESTIMATE

EXHIBIT VII-17

Tymshare Acquisition Analysis

Firm	1974 Revenues	Estimated 1975 Revenues	Estimated 1976 Revenues
Acquired 1974			
United Data Centers	$13,500,000	$16,500,000	$19,200,000
Acquired 1975			
Medical Data Systems	N/A	-	1,750,000
Leasco Response	N/A	-	100,000
Quelcx	N/A	-	2,600,000
Acquired 1976			
Western 29	-	-	1,500,000
Unitax	-	-	5,400,000
Total Contribution From Acquisitions	$13,500,000	$16,500,000	$30,550,000
Total Tymshare Revenues	$46,450,000	$56,400,000	$80,000,000
Total Tymshare Revenues Before Acquisitions	$32,950,000	$39,900,000	$49,450,000
Projected Annual Growth:			
Including Acquisitions		21.4%	42%(20%)*
Before Acquisitions		21.1%	24%

*1976 acquisitions only.

- In the case of ADP, and to a lesser extent Tymshare, their size is such that acquisitions in the future must be sizable (over $10 million) to have a significant impact. Also, the 'cream' is getting skimmed from the available acquisition candidates. In future their acquisitions will be oriented to penetration or consolidation of specific industry areas. Other acquisitions will be in computer-based service areas such as information services, reservations, tax services, and analytical services. Also, some spinoffs will sell their services and get out of the business; this will provide these companies with major acquisition possibilities.