COMPUTER SERVICES INDUSTRY

ANNUAL REPORT – 1978

INPUT

ABOUT INPUT

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

The company carries out continuous and in-depth research. Working closely with clients on important issues, INPUT's staff analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients' needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Professional staff have, on average, nearly 20 years experience in the information processing industry. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT [illegible] international consulting firm. Clients include over 100 of the [illegible] anced companies.

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INPUT
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1 INTRODUCTION

I INTRODUCTION

- This report is produced by INPUT as part of the Market Analysis Service (MAS).

- The purpose of the report is to present forecasts and analyses of markets and developments in the computer services industry.

  - These characteristics are described qualitatively, and their impact is reflected by computer services market size forecasts through 1983.

  - Because of the increasing integration of hardware and services, the coverage of hardware issues has been greatly expanded.

- The base year for forecasting is 1977.

- This report provides information on each type of computer service category covered:

  - Processing Services

    . General Business
    . Scientific and Engineering
    . Industry Specialty
    . Utility

- Software Products

  - Systems Software
  - Applications Software

- Professional Services

- It also addresses the mode of delivery of processing services:

  - Remote Computing Services

  - Batch Processing Services

  - Facilities Management

- For the first time the types and modes of services are forecast both separately and combined for each industry sector, in response to client requests for such forecasts.

- Analysis and forecasts are presented on each of the following major industry sectors:

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

This information is of a summary nature; more detailed information is provided through the INPUT Industry Reports which are referenced in the text where appropriate.

- This Annual Report provides updates on information published in previous annual reports and other INPUT reports.

  - It is designed to be used in conjunction with the 1977 Annual Report.

  - To avoid repetition of information which was contained in the 1977 Annual Report, particularly with regard to industry characteristics and vendor activities, the relevant pages in the 1977 report are referenced where appropriate.

- The data on which this report is based comes from:

  - Information from over 2,000 personal and telephone interviews INPUT staff have carried out during the past year with computer and computer services users, and company executives.

  - Continuous interchange with vendors during the past year, including over 500 formal interviews and 1,000 direct contacts.

- For the first time, results from a detailed questionnaire completed by over 430 EDP managers on INPUT's User Panel are included.

- The report is primarily an analysis of this data based on the experience and expertise of INPUT staff.

- This is the third Annual Report provided within the MAS program. In the first year (1976), the forecasting base was established for the commonly accepted services. The 1977 report concentrated on reordering and updating this data by user rather than vendor characteristics, and by the use to which services are put. This year's report expands the degree of detail in the forecasts and incorporates added coverage of software and equipment markets.

- A companion volume containing INPUT's Annual In-House Presentation is included as part of the MAS program.

- Inquiries and comments from clients on the information presented are requested. Suggestions for changes in the structure or contents of this report are welcomed.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. COMPUTER SERVICES MARKET GROWTH

- The computer services market in the United States in 1977 was $6.8 billion and is forecast to grow 19% in 1978 to $8.1 billion in current dollars.
  - This includes IBM software and services revenues of $0.5 billion.
  - This excludes captive U.S. revenues of $0.4 billion and non-U.S. revenues of U.S. companies of $0.3 billion.
- For the five-year forecast period, the compounded growth is 16%, with the market doubling to $16.7 billion by 1983.
- Of particular significance are the wide differences in growth rates within segments of the total market.
  - For processing services, general business and industry specialty delivered in an RCS mode will grow at 25%, while scientific and engineering delivered in a batch mode will decline at 7%; other combinations of types and modes of services will have intermediate growth values to yield the key overall market figures shown in Exhibit II-1.

EXHIBIT II-1

COMPUTER SERVICES MARKET FORECASTS,
U.S. AVAILABLE REVENUES, 1978-1983

MODE OF SERVICE	$ MILLION			AVERAGE ANNUAL GROWTH RATE 1978-1983
	1977	1978	1983	
REMOTE COMPUTING	$2,198	$2,707	$6,885	21%
FACILITIES MANAGEMENT	914	1,082	2,410	17
BATCH	1,738	1,976	2,364	5
TOTAL PROCESSING	$4,850	$5,765	$11,659	15%
SOFTWARE PRODUCTS				
SYSTEMS	$ 418	$ 508	$ 1,280	20
APPLICATIONS	380	473	1,235	21
TOTAL SOFTWARE PRODUCTS	$ 798	$ 981	$ 2,515	21%
PROFESSIONAL SERVICES	1,187	1,362	2,532	13
TOTAL	$6,835	$8,108	$16,706	16%

INF

- Industry sector markets, while having individual growth rates clustered between 13% and 17%, vary widely in relative size.

- Banking and finance is by far the largest market, as shown in Exhibit II-2. Of this market in 1977, $310 million was obtained by banks offering correspondent banking services to other banks.

- Discrete manufacturing and federal government are major markets and are similar in size and growth, but vary greatly in services offered and competitive environment.

- Transportation and education are the lagging sectors, with the remaining nine sectors forming a middle group.

- Software products are forecast to grow at 21%, driven by several forces:

  - The increasing willingness of EDP managers to use packaged software as a partial solution to a growing applications backlog.

  - The profusion of smaller computers.

  - The continued investment by software companies in research and development at a rate double that of the rest of the industry in terms of percent of revenues.

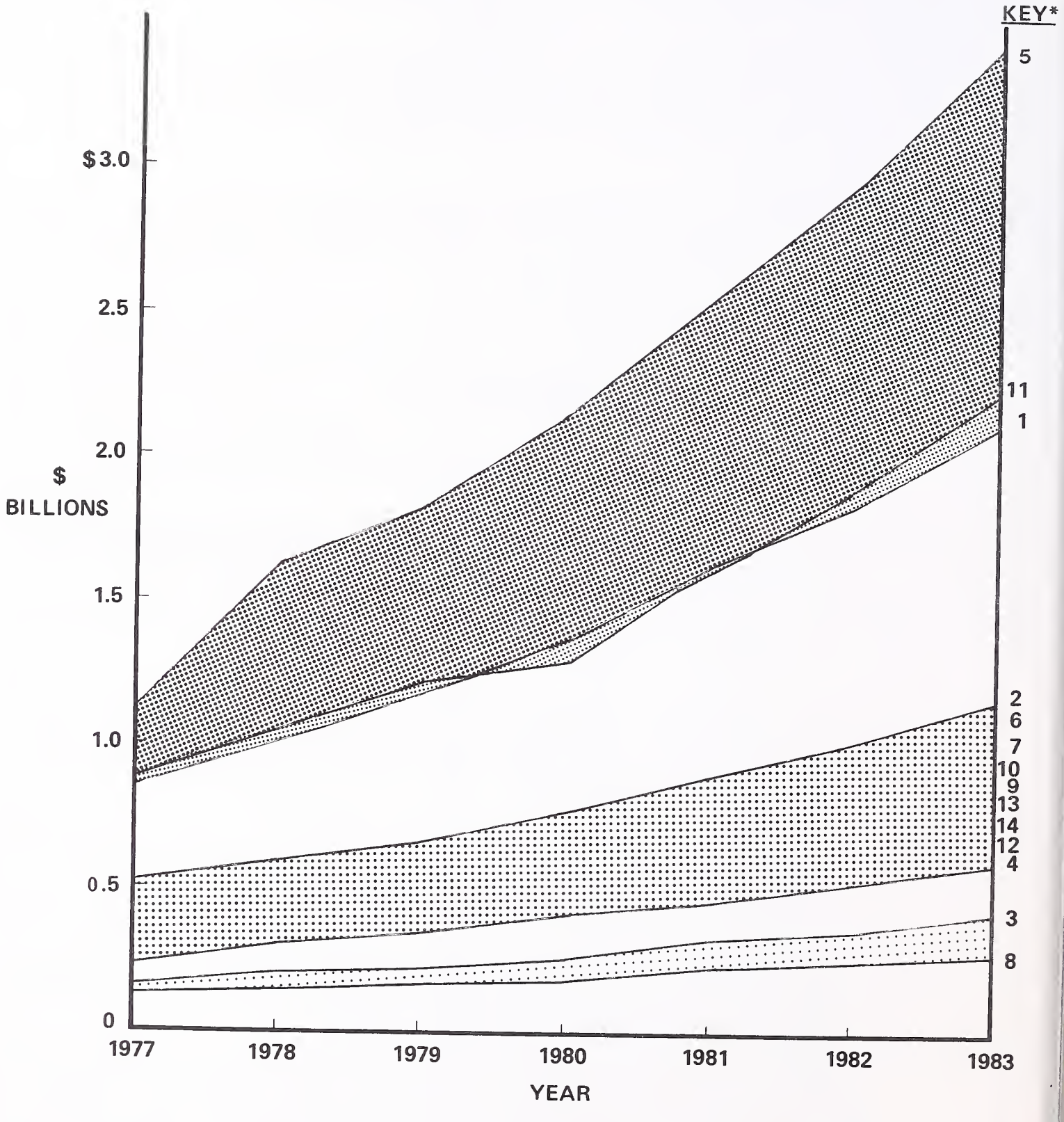
  - The emergence of DBMS and implementation language software as programming languages replacing COBOL, BASIC and ASSEMBLER.

- A more aggressive sale of software by IBM and other hardware vendors would cause actual market growth to exceed the forecast.

- Professional services are forecast to continue to grow at their historic rate of 13%. There is some indication that this growth will acctually accelerate as users turn to outside consulting, programming and systems analysis to assist in

EXHIBIT II-2

COMPUTER SERVICES MARKETS BY INDUSTRY SECTOR
1977-1983



*KEY - THE FOLLOWING INDUSTRY SECTOR MARKETS ARE IDENTIFIED BY THE NUMBERS AT THE RIGHT EDGE OF THE CHART. THE SECTOR REVENUES ARE OVERLAID SO THAT THE VALUES OF EACH LINE REPRESENT TOTAL REVENUES FOR THAT SECTOR. ACTUAL DOLLAR VALUES ARE PRESENTED IN CHAPTER III.

1. DISCRETE MANUFACTURING
2. PROCESS MANUFACTURING
3. TRANSPORTATION
4. UTILITIES
5. BANKING & FINANCE
6. INSURANCE
7. MEDICAL
8. EDUCATION
9. RETAIL
10. WHOLESALE
11. FEDERAL GOVERNMENT
12. STATE & LOCAL GOVERNMENT
13. SERVICES
14. OTHER

implementation of more complex communications based systems. Education and training is in much demand as the nature and complexity of the environment changes.

- One of the most significant factors in the growth of professional services in particular, and computer services in general, is the continuing lack of skilled EDP personnel. Two traditional sources of staff, the federal government and computer manufacturers, are not providing the numbers of trained people that flowed into the computer services industry five years ago.

B. ISSUES AFFECTING COMPUTER SERVICES MARKETS

- Distributed data processing (DDP), the distribution of programmability and applications processing over a telecommunications network, is an emerging force in applications development.

  - An estimated 15% of all current computer equipment purchases are for distributed systems and this percentage will grow to 30% by 1983.

  - Communications software is often now the limiting factor.

  - Users are satisfied with current distributed systems being implemented, but cannot quantify the savings obtained - often service improvement is the motivator.

- As management continues to be more demanding of EDP, in-house systems and computer services offerings must respond.

  - Distributed services, such as ADP's on-site offering incorporating DEC 2020 hardware, are appearing.

- Industry specialized services which solve immediate user needs, such as more efficient hospital information systems, are a growth opportunity.

- Less expensive hardware continues to be both a threat and an opportunity to services companies.

  - Eighty percent of processing companies feel they have some vulnerability to small computers.

  - Smaller processing companies feel more vulnerable than large ones, possibly because they have less understanding of the "threat."

  - Larger processing services companies see less expensive hardware as an opportunity and are offering hardware direct to users. National CSS's 3200 minicomputer system is a prime example of the latter.

- Communications expenditures and small computers/programmable terminals are growing as a percent of EDP budgets. This is accelerating the confrontation between IBM and AT&T.

  - Both IBM and AT&T offer networking tools with Systems Network Architecture (SNA) from IBM, and the new Advanced Communications Service (ACS) from AT&T.

  - AT&T has begun installing its Dimension 200 PBX's which include features such as room status reports and energy consuming device restrictions; already there are reports of the AT&T equipment being interfaced with management systems based on IBM Series/1 and room management systems supplied by Micor.

- Other companies are also moving into communications, with Tymshare's Tymnet being a leading example of a value added network (VAN).

  - Tymshare recently announced Tymnet II with a reported "up to tenfold" increase in data handling capability.

- Xerox and Exxon Enterprises are both rumored to be preparing communications offerings aimed at electronic mail.

- Smaller companies are exploiting new technology. Durango Systems, Inc., recently introduced a minicomputer system complete with CRT and dual diskette drives which weighs only 65 pounds.

- Services companies are in a position to exploit this proliferation of growth in hardware and communications options, and in number of potential users.

  - Some services companies are already offering turnkey systems.

  - Success to date of such systems is mixed with problems arising from maintenance and software support.

C. KEY CHARACTERISTICS OF IN-HOUSE EDP

- Results of INPUT's 1978 User Panel survey of over 430 EDP managers of major installations showed the EDP manager to be responding to some of the same forces acting on the computer services industry.

  - A major objective of EDP managers is to improve responsiveness to the user by expanding the implementation of on-line applications.

  - Data base applications are growing as a prime thrust in some industry sectors.

  - DDP is beginning to move up in priority from a currently low position.

- Involvement in office automation is becoming more recognized as part of EDP, although currently over one-half of EDP managers surveyed do not anticipate playing a role in office automation functions through 1983.

- The EDP manager continues to be a threat to services as he presses to move processing services in-house. He is a significant market, however, for software, maintenance and education services, all of which are growing at greater than 20% annually.

- The EDP manager is being pressed increasingly with a corporate management responsibility as DDP is implemented.

  - The EDP manager is playing a wider role through providing centralized control of DDP systems.

  - Processing services companies can broaden their access to total client information needs by cultivating the in-house EDP management.

D. THE COMPETITIVE ENVIRONMENT

- The good growth and profit performance of the computer services industry has been reflected by a growth in market value of stock in publicly held computer services companies.

  - The market value of 18 companies increased from a September 1977 value of $1.25 billion to a September 1978 value of $2.0 billion.

  - This is a 60% growth in value in an otherwise stable stock market.

- New services companies are being formed, but there is a marked shift to formation of software and professional services companies rather than the

dominance of processing services companies which characterized the late 1960s.

- Acquisitions are being made at an increasing pace by almost all leading companies as a means of adding capability, client base, and geographical coverage. ADP, CSC, Itel, Tymshare, Comshare, Anacomp and National CSS are examples of companies having active acquisition programs.

- Several companies are projected to be over $500 million per year in computer services by 1983. The process of industry consolidation will accelerate over the next five years.

E. RECOMMENDATIONS

- The continued growth of the industry is dependent on attracting and retaining competent personnel.

  - Improved recruiting techniques are required, particularly to reduce the 30% and higher turnover rates many vendors are experiencing with field sales personnel.

  - Vendors must invest more in in-house training.

- Vendors should target all information processing, including data, text and graphics.

  - Existing offerings can be enhanced by adding new capabilities, particularly graphics.

  - Planning must include recognition of changes in communications.

- Broader information processing requirements are one element of a viable acquisition strategy.

- Services companies will benefit by developing closer relationships with hardware companies (computer, communications, office equipment, and high technology companies).

  - They can specify and integrate special hardware in services offerings.

  - Equipment companies are markets for software and applications expertise.

  - Maintenance is growing in importance both as a market opportunity and as a part of the service/equipment/software environment.

  - Network capability is mandatory for equipment companies in the future.

- Processing services companies in particular must promote an image as a competitive alternative to in-house processing to combat the migration of services to in-house systems.

  - Emphasize sale of a total service, not a product which compares directly to a hardware equivalent.

  - Unbundle and price service elements separately, showing reductions in some cases.

- Vendors must continually re-evaluate a wide range of opportunities for current or future exploitation, even if these opportunities have been rejected in the past, including:

  - Overseas markets.

- Maintenance services.

- Education services.

- Consumer/small business markets.

- All vendors should treat their customer base as a very important asset:

  - Install lost business and lost opportunity prevention programs.

  - Research and plan services that can be profitably delivered to current clients, including services which are not traditional computer services.

  - Keep informed of changes in user requirements so that services offered are responsive to these requirements.

III MARKET ANALYSIS 1978-1983

III MARKET ANALYSIS 1978-1983

A. OVERALL COMPUTER SERVICES MARKET CHANGES

- Computer services markets were evaluated, compared to prior INPUT reports, and forecast for the five-year period 1978-1983.
  - Market forecasts presented in Exhibit III-1 were built primarily on the forecasts contained in the 1977 Annual Report.
  - Adjustments to the 1977 forecasts were made in cases where 1978 research indicated changes would increase the accuracy of the forecasts.
- The 1977 forecasts were derived from the "bottom-up" in that individual forecasts were made by subsector, and then grouped into the same 14 user industry sectors used again in the 1978 report.
- Data from interviews, INPUT's Company Analysis and Monitoring Program (CAMP) and other MAS surveys were introduced and adjustments made.
- A major effort in the 1978 forecast was made to provide more detailed categories in response to client demand for:

EXHIBIT III-1

COMPUTER SERVICES MARKET FORECAST TOTAL, 1978-1983, BY MODE AND TYPE OF SERVICE

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	$ 227	$ 283	24%	$ 337	$ 426	$ 535	$ 660	$ 805	23%
	SCI. & ENG.	258	301	16	350	405	475	551	640	16
	IND. SPEC.	1,120	1,403	25	1,635	2,024	2,464	3,040	3,700	21
	UTILITY	593	720	21	860	1,019	1,215	1,461	1,740	19
	TOTAL	2,198	2,707	23	3,182	3,874	4,689	5,712	6,885	20
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.	93	101	8	113	122	136	149	161	10
	IND. SPEC.	646	771	19	904	1,088	1,345	1,538	1,801	19
	UTILITY	175	210	20	246	282	332	386	448	16
	TOTAL	914	1,082	18	1,263	1,492	1,813	2,073	2,410	17
BATCH	GEN. BUS.	473	541	14	595	653	697	694	675	5
	SCI. & ENG.	85	93	9	93	94	90	78	67	(7)
	IND. SPEC.	836	968	15	1,034	1,139	1,230	1,263	1,286	6
	UTILITY	344	374	9	376	373	374	354	336	(2)
	TOTAL	1,738	1,976	14	2,098	2,259	2,391	2,389	2,364	4
TOTAL PROCESSING	GEN. BUS.	700	824	18	932	1,079	1,232	1,354	1,480	12
	SCI. & ENG.	436	495	14	556	621	701	778	868	12
	IND. SPEC.	2,602	3,142	21	3,573	4,251	5,039	5,841	6,787	17
	UTILITY	1,112	1,304	17	1,482	1,674	1,921	2,201	2,524	14
	TOTAL	4,850	5,765	19	6,543	7,625	8,893	10,174	11,659	15
SOFTWARE PRODUCTS	SYSTEM	418	508	22	599	709	846	1,037	1,280	20
	APPLICATION	380	473	24	578	710	876	1,029	1,235	21
	TOTAL	798	981	23	1,177	1,419	1,722	2,066	2,515	21
PROFESSIONAL SERVICES		1,187	1,362	15	1,505	1,712	1,950	2,225	2,532	13
TOTAL	TOTAL	$6,835	$8,108	19%	$9,225	$10,756	$12,565	$14,465	$16,706	16%

- Processing services forecast both by type of service (general business, scientific and engineering, industry specialty, and utility) and mode of service (remote computing, batch and facilities management).

- Software products both by applications packages and systems packages.

- Expanded coverage of in-house EDP activities as they relate to computer services.

- Vendor activity in each industry was studied to validate the base market and forecast numbers. The 1978 ADAPSO survey, which was performed by INPUT and included responses from 308 vendors, was used as a further validation of key numbers. For example, facilities management detail was expanded partly based on ADAPSO survey results.

- The growth rate for the total industry is forecast to continue at 16%, the same rate forecast in the 1977 report. Therefore, the 1977 and 1978 report figures are very close as shown in Exhibit III-2.

- The significant differences in industry sector figures between the 1977 and 1978 reports are a result of new information and are the following:

  - In banking and finance, industry specialty services revenues are increased by $200 million by 1982 based on a faster rate of growth for correspondent banking services found in the MAS study, "Computer Services Opportunities in Correspondent Banking."

  - In education, $10 million of 1977 revenues was transferred from the remote computing to the batch category in recognition that applications such as testing, scores, and scheduling are usually handled by batch mode.

EXHIBIT III-2

RECONCILIATION OF COMPUTER SERVICES FORECASTS BY INDUSTRY SECTOR BETWEEN 1977 AND 1978 ANNUAL REPORTS

INDUSTRY SECTOR	1977 FORECAST OF 1977 MARKET	1978 REPORT OF 1977 MARKET	1977 FORECAST OF 1982 EXTENDED FOR 1983 MARKET	1978 FORECAST OF 1983 MARKET	AAGR FORECAST IN 1977 REPORT	AAGR FORECAST IN 1978 REPORT
DISCRETE MANUFACTURING	$ 890	$ 890	$ 2,158	$ 2,145	16%	15%
PROCESS MANUFACTURING	510	510	1,188	1,188	15	15
TRANSPORTATION	169	169	418	419	16	16
UTILITIES	275	275	604	600	14	13
BANKING & FINANCE	1,130	1,330	3,323	3,481	17	16
INSURANCE	480	480	1,116	1,102	15	15
MEDICAL	430	430	1,027	1,021	16	16
EDUCATION	132	132	285	285	14	14
RETAIL	440	440	1,112	1,100	17	16
WHOLESALE	425	425	946	930	14	14
FEDERAL GOVERNMENT	885	860	2,200	2,230	17	17
STATE & LOCAL GOVERNMENT	265	265	661	660	16	17
SERVICES	306	306	844	800	18	16
OTHER	323	323	741	745	14	15
TOTAL	$ 6,660	$ 6,835	$ 16,623	$16,706	16%	16 %

- In the federal government sector, software product expenditures have been increased significantly based on research results. On the other hand, scientific and engineering FM revenues were reduced.

- The more rapid growth in Data Base Management Systems Software (DBMS) is reflected in the size and growth of systems software.

- The individual industry sector growth rates remain the same or within a percentage point of the 1977 forecast with the exception of the services sector which was reduced from 18% to the total industry average growth of 16%.

- The year-by-year forecast by industry sector is presented in Exhibit III-3.

  - 1978, an unusually good year, is expected to show a 19% growth over 1977.

  - The 1978-1983 growth rates are the average annual compounded rates.

  - The rates between individual years may differ, since the figures were built up from the more detailed forecasts which follow, and which take into account growths (and declines) in certain types and modes of service in each industry sector.

  - All figures are in current dollars.

- Within each industry there are usually widely varied growth rates among the modes and types of computer services use. These differences are covered in later chapters.

EXHIBIT III-3

COMPUTER SERVICES MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 890	$1,047	18%	$1,211	$ 1,399	$ 1,630	$ 1,860	$ 2,145	15%
PROCESS MANUFACTURING	510	597	17	655	782	900	1,030	1,188	15
TRANSPORTATION	169	200	18	225	266	311	360	419	16
UTILITIES	275	325	18	359	409	462	530	600	13
BANKING & FINANCE	1,130	1,638	23	1,805	2,161	2,570	2,965	3,481	16
INSURANCE	480	558	16	655	736	830	970	1,102	15
MEDICAL	430	489	14	580	659	760	885	1,021	16
EDUCATION	132	151	14	175	196	226	250	285	14
RETAIL	440	527	20	600	700	815	950	1,100	16
WHOLESALE	425	493	16	545	630	730	830	930	14
FEDERAL GOVERNMENT	860	1,015	18	1,190	1,380	1,625	1,900	2,230	17
STATE & LOCAL GOVERNMENT	265	305	15	360	415	495	570	660	17
SERVICES	306	388	27	435	533	611	715	800	16
OTHER	323	375	16	420	490	560	650	745	15
TOTAL	$6,635	$8,108	19%	$9,225	$10,756	$12,525	$14,465	$16,706	17%

B. GENERAL BUSINESS PROCESSING SERVICES

- Marketing and distribution account for almost 60% of the market for general business processing services which is experiencing an 18% growth in 1978 vs. 1977, but is expected to slow to a 12% average growth rate 1978-1983, as shown in Exhibit III-4.

- The market is being impacted by small standalone computers which offer general business software.

- An opportunity for RCS continues to be human resources systems.

  - Government regulations and complex benefits packages increase the complexity of employee records.

  - A typical product is InSci's Human Resource System which includes personnel records, payroll, employment history, EEO compliance data, benefits/ERISA data, OSHA data, attendance information and job evaluation data.

  - Informatics recently announced a competing product, Management IV/Human Resource System.

- The integration of text processing with data processing is producing services opportunities:

  - An example of a recent announcement in this area is Call Data's making Wylbur, a conversational text editor, available on its network.

  - Other opportunities are emerging in electronic mail, directory maintenance, and text dominant data bases such as patent and legal.

EXHIBIT III-4

GENERAL BUSINESS PROCESSING SERVICES MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$181	$215	19%	$250	$ 285	$ 315	$ 330	$ 340	10%
PROCESS MANUFACTURING	73	87	19	94	115	130	137	146	11
TRANSPORTATION	20	25	25	27	35	40	43	47	13
UTILITIES	14	20	43	21	24	28	30	35	12
BANKING & FINANCE	31	38	23	45	56	70	80	96	20
INSURANCE	18	22	22	25	29	35	42	50	18
MEDICAL	23	26	13	29	32	36	40	43	11
EDUCATION	14	17	21	20	24	29	32	36	16
RETAIL	75	85	13	90	99	110	115	124	8
WHOLESALE	140	158	13	175	197	221	249	260	10
FEDERAL GOVERNMENT	18	21	17	26	31	40	45	55	21
STATE & LOCAL GOVERNMENT	16	20	25	25	32	37	45	55	23
SERVICES	20	24	20	30	38	50	60	70	24
OTHER	57	66	16	75	82	91	106	123	13
TOTAL	$700	$824	18%	$932	$1,079	$1,232	$1,354	$1,480	12%

- Graphics are increasing in importance with products such as CDC's Plotpac appearing on the market.

- Financial applications which assist in cash management for medium and large companies are an opportunity.

  - Most recent vendor activity in this field has been in upgrading existing products such as Rapidata's new release of FISCAL, a financial modeling service.

  - Tax calculation and tax planning services from vendors such as Tymshare are expected to continue to grow at over 20% per year.

- As reflected in the forecast, federal, state, and local government markets will outpace the industry as pressures build to increase efficiency in government, and computer services will fill part of this requirement.

C. SCIENTIFIC AND ENGINEERING PROCESSING SERVICES

- This market will continue to grow at a slower pace than the total market, as shown in Exhibit III-5.

- Vendors in this market are established with most activity aimed at enhancing existing programs.

- Market opportunities exist in several areas, including:

  - Integration of graphics capability.

  - Medical research will feed rapid growth in the medical sector from a small current base.

EXHIBIT III-5

SCIENTIFIC AND ENGINEERING PROCESSING SERVICES MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 65	$ 76	17%	$ 85	$ 93	$ 110	$ 130	$ 155	15%
PROCESS MANUFACTURING	40	45	13	50	60	67	73	85	14
TRANSPORTATION	5	5	0	5	5	5	5	5	0
UTILITIES	55	65	18	70	78	85	90	93	7
BANKING & FINANCE*									
INSURANCE*									
MEDICAL	1	2	100	3	4	5	5	7	28
EDUCATION	8	9	13	10	12	13	13	15	11
RETAIL*									
WHOLESALE*									
FEDERAL GOVERNMENT	135	150	11	169	185	210	225	240	10
STATE & LOCAL GOVERNMENT	4	5	25	8	10	13	18	22	34
SERVICES	83	94	13	105	116	127	143	160	11
OTHER	40	44	10	51	58	66	76	86	14
TOTAL	$ 436	$ 495	14%	$ 556	$ 621	$ 701	$ 778	$ 868	12%

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $5 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

- Some new product announcements were made in the past year, such as CDC's Unistruc service, a computer-based structural analysis technique with computer graphics which is claimed to produce time savings as high as 75%.

- Acquisitions are also taking place, such as United Telecom's acquisition of Calma, a supplier of computer based systems for three dimensional mechanical design and other design and mapping services.

- Even with the improvement of processing in-house, external services will continue to be used for development testing and running of infrequently used applications.

D. INDUSTRY SPECIALTY PROCESSING SERVICES

- Industry specialty processing services are the largest and fastest growing segment of processing services, as shown in Exhibit III-6.

  - Banking and finance continues to be the largest individual sector and maintains its position with 37% of the total in 1983.

  - Correspondent banking applications are a major portion of this sector's revenues accounting to $641 million in 1977, distributed as follows: $331 million to services companies, and $310 million to commercial banks doing processing for other banks.

  - For additional detail in this market see INPUT's 1978 report, "Computer Services Opportunities in Correspondent Banking."

- Utilities and state and local government are growing most rapidly from small bases, as specialized applications are developed for these two sectors which have previously lagged in development.

EXHIBIT III-6

INDUSTRY SPECIALTY PROCESSING SERVICES MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 185	$ 221	19%	$ 265	$ 315	$ 375	$ 440	$ 510	18%
PROCESS MANUFACTURING	115	136	18	160	195	229	272	318	19
TRANSPORTATION	65	81	25	95	116	138	167	198	20
UTILITIES	40	50	25	65	82	100	130	160	26
BANKING & FINANCE	925	1,145	17	1,250	1,520	1,835	2,125	2,525	17
INSURANCE	290	330	14	385	425	495	553	614	13
MEDICAL	330	370	12	440	497	592	660	750	15
EDUCATION	34	40	18	48	55	67	78	89	17
RETAIL	250	300	20	350	401	460	540	631	16
WHOLESALE	110	135	23	145	172	202	229	265	14
FEDERAL GOVERNMENT	14	17	21	20	24	30	35	40	18
STATE & LOCAL GOVERNMENT	16	22	38	30	40	55	70	37	32
SERVICES	132	181	37	200	263	296	350	380	16
OTHER	96	114	19	120	146	165	192	220	14
TOTAL	$2,602	$3,142	21%	$3,573	$4,251	$5,039	$5,841	$6,787	17%

- Utilities in particular are being pressured toward specialization by standards imposed by government regulation.

- Zytron, a major COM services company recently acquired by NCSS, has successfully marketed a turnkey system specifically to utilities.

- Within the medical sector, hospitals represent a major specialty market.

  - Shared Medical Systems has built a major position utilizing Four Phase equipment in a distributed data processing environment.

  - McDonnel Douglas Automation is also a leading services vendor.

  - Further details on this market are contained in INPUT's 1978 report, "Computer Services Opportunities in Hospitals."

- Other major industry specialties include:

  - Industry specialized econometric and financial data bases which approximate $250 million in annual revenues today and will exceed $500 million by 1983.

  - Credit, a retail data base service, which is now approaching a $200 million per year rate.

  - Text, news, legal data bases.

- Total data bases will be a multi-billion dollar market in the 1980s and processing services, particularly RCS, will be a major participant in maintaining and delivering these data bases to users.

- Opportunities exist for RCS vendors to install existing data bases on their systems.

- On-Line Systems announcement of the availability of a demographic data base on their system is a recent example.

E. UTILITY PROCESSING SERVICES MARKET

- In utility services, the vendor provides access to a computer and/or communications network with basic software that enables any user to develop its own problem solution or processing system.

- The main driving force in the development of this market are the groups of data base management systems on which services are based. For further detail on these services see INPUT's 1977 report, "Data Base Management Systems Services."

  - Typical offerings are Nomad by NCSS and Magnum by Tymshare.

  - In the past year Computer Sciences Corporation added Manage to its existing Aladin offering. Manage is presented as easy to use; ease of use is the major unfilled user demand as determined by INPUT's research in 1978 (see INPUT's 1978 report, "Data Base Management Systems Software Markets" for further detail).

- Utility processing services continue to grow most rapidly in the federal government sector as shown in Exhibit III-7.

EXHIBIT III-7

UTILITY PROCESSING SERVICES MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 119	$ 140	18%	$ 151	$ 166	$ 190	$ 210	$ 240	11%
PROCESS MANUFACTURING	102	119	17	131	142	154	183	209	12
TRANSPORTATION	25	29	16	33	37	42	45	50	12
UTILITIES	81	94	16	99	108	119	130	137	8
BANKING & FINANCE	114	132	16	155	175	195	220	250	14
INSURANCE	42	49	17	55	62	70	80	88	12
MEDICAL	11	12	9	13	15	17	20	25	16
EDUCATION	20	24	18	29	28	27	27	29	4
RETAIL	45	50	11	55	60	65	75	85	11
WHOLESALE	90	101	12	105	118	129	136	140	7
FEDERAL GOVERNMENT	298	362	21	435	510	610	725	870	19
STATE & LOCAL GOVERNMENT	70	78	11	92	103	125	137	151	14
SERVICES	40	49	23	55	63	75	92	110	18
OTHER	55	65	18	74	87	103	121	140	17
TOTAL	$1,112	$1,304	17%	$1,482	$1,674	$1,921	$2,201	$2,524	14%

- The nature of the federal government business requires specialized marketing.

- There is a tendency toward standardization as evidenced by the preference often given to services based on System 2000 (MRI's DBMS) in this industry sector.

- In the medical sector increased government and insurance reporting requirements are leading to increased use of DBMS and other systems software based services, hence an increasing growth rate over the forecast period.

- The relative overall decline in the rate of use of utility services is largely due to a decline in the sale of raw time which is included in this mode of service.

  - Combinations of DBMS and communications software-based services are also a growing opportunity.

  - Micrographics, graphics and other new input/output devices are growth opportunities where sharing of an expensive peripheral has an economic advantage.

- Planning Research Corporation recently formed PRC Image Data Systems Company (IDSC) targeted at the micrographics market.

  - The new company, formed from existing elements of two other PRC companies, will offer micrographic systems development and services.

  - Current business is primarily in the federal government sector, but the company is aiming at expanding into commercial markets.

F. TOTAL PROCESSING SERVICES MARKETS BY TYPE OF SERVICE

- To allow tracking of processing services by type of service (versus mode of service as was done in the preceding sections), the same processing services revenues have been spread over the four types of service in the following exhibits:

  - Exhibit III-8, RCS Total
  - Exhibit III-9, RCS - General Business
  - Exhibit III-10, RCS - Scientific and Engineering
  - Exhibit III-11, RCS - Industry Specialty
  - Exhibit III-12, RCS - Utility
  - Exhibit III-13, FM - Total

  (Facilities management in general business is not significant and is not shown separately. What little does exist is included in Exhibit III-9.)

  - Exhibit III-14, FM - Scientific and Engineering
  - Exhibit III-15, FM - Industry Specialty
  - Exhibit III-16, FM - Utility
  - Exhibit III-17, Batch - Total
  - Exhibit III-18, Batch - General Business
  - Exhibit III-19, Batch - Scientific and Engineering

EXHIBIT III-8

REMOTE COMPUTING SERVICES TOTAL MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 249	$ 300	19%	$ 360	$ 430	$ 530	$ 640	$ 770	21%
PROCESS MANUFACTURING	187	226	20	265	318	370	455	547	19
TRANSPORTATION	60	74	22	89	115	140	170	205	23
UTILITIES	146	172	15	198	235	280	330	379	17
BANKING & FINANCE	526	672	20	756	938	1,140	1,385	1,686	20
INSURANCE	70	86	17	101	122	150	175	206	19
MEDICAL	109	132	21	169	204	255	315	392	24
EDUCATION	31	38	11	45	51	58	65	75	15
RETAIL	220	270	21	323	383	450	550	664	20
WHOLESALE	117	144	15	160	197	239	289	341	19
FEDERAL GOVERNMENT	203	252	27	311	377	470	570	695	22
STATE & LOCAL GOVERNMENT	36	46	33	64	83	112	145	182	32
SERVICES	157	190	20	216	268	315	401	478	20
OTHER	87	105	19	125	153	180	222	265	20
TOTAL	$2,198	$2,707	23%	$3,182	$3,874	$4,689	$5,712	$5,885	21%

EXHIBIT III-9

REMOTE COMPUTING SERVICES - GENERAL BUSINESS FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 36	$ 45	25%	$ 55	$ 70	$ 90	$115	$140	26%
PROCESS MANUFACTURING	28	35	25	39	50	60	72	86	20
TRANSPORTATION	7	9	29	10	16	20	25	30	27
UTILITIES	7	10	43	11	15	20	24	29	24
BANKING & FINANCE	19	24	27	30	38	50	60	76	26
INSURANCE	11	14	27	16	20	25	32	40	24
MEDICAL	7	9	29	11	13	16	20	25	23
EDUCATION	7	9	29	10	12	15	18	21	19
RETAIL	15	20	33	25	31	40	50	64	26
WHOLESALE	42	51	21	59	72	86	109	126	20
FEDERAL GOVERNMENT	18	21	17	26	31	40	45	55	21
STATE & LOCAL GOVERNMENT	8	10	25	13	18	22	30	40	32
SERVICES	15	18	20	22	28	38	44	54	25
OTHER	7	8	14	10	12	13	16	19	19
TOTAL	$227	$283	25%	$337	$426	$535	$660	$805	23%

EXHIBIT III-10

REMOTE COMPUTING SERVICES - SCIENTIFIC AND ENGINEERING FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 40	$ 50	25%	$ 58	$ 65	$ 80	$ 100	$ 125	20%
PROCESS MANUFACTURING	26	30	15	35	43	50	60	72	19
TRANSPORTATION	3	3	0	3	4	5	5	5	10
UTILITIES	40	45	13	52	60	70	75	80	12
BANKING & FINANCE*									
INSURANCE*									
MEDICAL	1	2	100	3	4	5	5	7	29
EDUCATION	6	7	7	8	9	10	10	11	9
RETAIL*									
WHOLESALE*									
FEDERAL GOVERNMENT	43	50	16	58	67	80	90	100	15
STATE & LOCAL GOVERNMENT	4	5	25	8	10	13	18	22	34
SERVICES	72	82	14	92	103	115	131	150	13
OTHER	23	27	17	33	40	47	57	68	20
TOTAL	$ 258	$ 301	16%	$ 350	$ 405	$ 475	$ 551	$ 640	16%

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $5 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

EXHIBIT III-11

REMOTE COMPUTING SERVICES - INDUSTRY SPECIALTY FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 113	$ 135	19%	$ 165	$ 200	$ 245	$ 295	$ 350	21%
PROCESS MANUFACTURING	68	82	21	100	122	145	180	220	22
TRANSPORTATION	32	40	25	50	65	80	100	125	26
UTILITIES	33	42	27	55	70	90	120	150	29
BANKING & FINANCE	417	540	29	595	750	920	1,125	1,380	21
INSURANCE	35	42	20	50	60	75	83	96	23
MEDICAL	96	115	20	147	177	222	275	340	24
EDUCATION	5	6	20	8	10	12	15	19	27
RETAIL	184	225	22	268	316	370	450	540	19
WHOLESALE	59	74	25	81	100	124	145	175	19
FEDERAL GOVERNMENT	14	17	21	20	24	30	35	40	19
STATE & LOCAL GOVERNMENT	5	7	40	10	14	20	25	32	36
SERVICES	42	56	33	60	83	93	140	170	27
OTHER	17	22	29	26	33	38	52	63	23
TOTAL	$1,120	$1,403	25%	$1,635	$2,024	$2,464	$3,040	$3,700	21%

EXHIBIT III-12

REMOTE COMPUTING SERVICES - UTILITY FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 60	$ 70	82%	$ 82	$ 95	$ 115	$ 130	$ 155	17%
PROCESS MANUFACTURING	65	79	22	91	103	115	143	169	16
TRANSPORTATION	18	22	22	26	30	35	40	45	15
UTILITIES	66	75	14	80	90	100	111	120	10
BANKING & FINANCE	90	108	20	131	150	170	200	230	16
INSURANCE	24	30	25	35	42	50	60	70	18
MEDICAL	5	6	20	8	10	12	15	20	27
EDUCATION	13	16	23	19	20	21	22	24	8
RETAIL	21	25	19	30	36	40	50	60	19
WHOLESALE	16	19	19	20	25	29	35	40	16
FEDERAL GOVERNMENT	128	164	28	207	255	320	400	500	25
STATE & LOCAL GOVERNMENT	19	24	26	33	41	57	72	88	30
SERVICES	28	34	21	42	54	69	86	104	25
OTHER	40	48	20	56	68	82	97	115	19
TOTAL	$593	$720	21%	$860	$1,019	$1,215	$1,461	$1,740	19%

EXHIBIT III-13

FACILITIES MANAGEMENT - TOTAL MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 42	$ 51	21%	$ 61	$ 74	$ 90	$ 110	$ 130	20%
PROCESS MANUFACTURING	29	34	17	38	47	56	65	75	17
TRANSPORTATION	20	25	25	27	31	35	40	45	13
UTILITIES	6	7	16	9	10	12	14	14	15
BANKING & FINANCE	210	270	29	315	420	550	620	760	23
INSURANCE	197	225	14	269	297	350	400	450	15
MEDICAL	120	135	13	160	180	220	250	280	16
EDUCATION	14	17	22	21	24	30	35	41	19
RETAIL	4	5	25	6	8	10	13	15	25
WHOLESALE	29	33	14	35	43	48	55	62	13
FEDERAL GOVERNMENT	213	245	15	282	313	360	408	465	14
STATE & LOCAL GOVERNMENT	21	24	14	29	32	37	45	52	17
SERVICES*									
OTHER	9	11	22	11	13	15	18	21	14
TOTAL	$914	$1,082	18%	$1,263	$1,492	$1,813	$2,073	$2,410	17%

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $5 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

EXHIBIT III-14

FACILITIES MANAGEMENT - SCIENTIFIC AND ENGINEERING FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 4	$ 5	25%	$ 6	$ 8	$ 10	$ 15	$ 20	32%
PROCESS MANUFACTURING	2	2	0	2	3	3	3	3	9
TRANSPORTATION*									
UTILITIES	2	2	0	3	3	3	3	3	9
BANKING & FINANCE*									
INSURANCE*									
MEDICAL*									
EDUCATION*									
RETAIL*									
WHOLESALE*									
FEDERAL GOVERNMENT	85	92	8	102	108	120	128	135	8
STATE & LOCAL* GOVERNMENT									
SERVICES*									
OTHER*									
TOTAL	$ 93	$ 101	8%	$113	$122	$136	$149	$161	10%

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $3 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

EXHIBIT III-15

FACILITIES MANAGEMENT - INDUSTRY SPECIALTY FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 22	$ 26	18%	$ 31	$ 37	$ 45	$ 55	$ 65	20%
PROCESS MANUFACTURING	23	27	17	30	37	44	52	60	17
TRANSPORTATION	20	25	25	27	31	35	40	45	12
UTILITIES*									
BANKING & FINANCE	210	270	29	315	420	550	620	760	23
INSURANCE	197	225	14	269	297	350	400	450	15
MEDICAL	120	135	13	160	180	220	250	280	16
EDUCATION	14	17	21	21	24	30	35	41	19
RETAIL	4	5	25	6	8	10	13	15	25
WHOLESALE	26	29	12	31	38	42	48	54	13
FEDERAL GOVERNMENT*									
STATE & LOCAL GOVERNMENT	4	5	25	7	8	10	15	20	32
SERVICES*									
OTHER	6	7	17	7	8	9	10	11	9
TOTAL	$ 646	$ 771	19%	$ 904	$1,088	$1,345	$1,538	$1,801	19%

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $5 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

EXHIBIT III-16

FACILITIES MANAGEMENT - UTILITY FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
DISCRETE MANUFACTURING	$ 16	$ 20	25%	$ 24	$ 29	$ 35	$ 40	$ 45	18%
PROCESS MANUFACTURING	4	5	6	6	7	9	10	12	19
TRANSPORTATION*									
UTILITIES	4	5	25	6	7	9	11	11	17
BANKING & FINANCE*									
INSURANCE*									
MEDICAL*									
EDUCATION*									
RETAIL*									
WHOLESALE	3	4	33	4	5	6	7	8	15
FEDERAL GOVERNMENT	128	153	20	180	205	240	280	330	17
STATE & LOCAL GOVERNMENT	17	19	12	22	24	27	30	32	11
SERVICES*									
OTHER	3	4	33	4	5	6	8	10	20
TOTAL	$175	$210	20%	$246	$282	$332	$386	$448	16%

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $5 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

EXHIBIT III-17

BATCH SERVICES TOTAL MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
DISCRETE MANUFACTURING	$ 259	$ 301	16%	$ 330	$ 355	$ 370	$ 360	$ 345	3%
PROCESS MANUFACTURING	114	127	11	132	147	154	145	136	1
TRANSPORTATION	35	41	17	44	47	50	50	50	4
UTILITIES	38	50	32	48	47	40	36	32	9
BANKING & FINANCE	334	373	12	379	393	410	420	425	3
INSURANCE	83	90	8	95	97	100	100	96	1
MEDICAL	136	143	5	156	164	175	160	153	1
EDUCATION	31	35	13	41	44	48	50	53	9
RETAIL	146	160	10	166	169	175	167	161	0
WHOLESALE	194	217	12	230	247	265	270	262	4
FEDERAL GOVERNMENT	49	53	8	57	60	60	52	45	(3)
STATE & LOCAL GOVERNMENT	49	55	12	62	70	81	80	81	8
SERVICES	118	158	34	174	212	233	244	242	9
OTHER	152	173	14	184	207	230	255	283	10
TOTAL	$1,738	$1,976	14%	$2,098	$2,259	$2,391	$2,389	$2,364	4%

EXHIBIT III-18

BATCH SERVICES - GENERAL BUSINESS FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
DISCRETE MANUFACTURING	$145	$170	17%	$195	$215	$225	$215	$200	3%
PROCESS MANUFACTURING	45	52	16	55	65	70	65	60	3
TRANSPORTATION	13	16	23	17	19	20	18	17	1
UTILITIES	7	10	43	10	9	8	6	6	(11)
BANKING & FINANCE	12	14	17	15	18	20	20	20	7
INSURANCE	7	8	14	9	9	10	10	10	2
MEDICAL	16	17	6	18	19	20	20	18	1
EDUCATION	7	8	14	10	12	14	14	15	13
RETAIL	60	65	8	65	68	70	65	60	2
WHOLESALE	98	107	9	116	125	135	140	134	5
FEDERAL GOVERNMENT*									
STATE & LOCAL GOVERNMENT	8	10	25	12	14	15	15	15	9
SERVICES	5	6	20	8	10	12	16	16	22
OTHER	50	58	16	65	70	78	90	104	12
TOTAL	$473	$541	14%	$595	$653	$697	$694	$675	4%

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $5 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

EXHIBIT III-19

BATCH SERVICES - SCIENTIFIC AND ENGINEERING FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
DISCRETE MANUFACTURING	$21	$21	0%	$21	$20	$20	$15	$10	(16%)
PROCESS MANUFACTURING	12	13	8	13	14	14	10	10	(5)
TRANSPORTATION	2	2	0	2	1	0	0	0	
UTILITIES	13	18	38	15	15	12	12	10	(12)
BANKING & FINANCE*									
INSURANCE*									
MEDICAL*									
EDUCATION	2	2	0	2	3	3	3	4	15
RETAIL*									
WHOLESALE*									
FEDERAL GOVERNMENT	7	8	14	9	10	10	7	5	(10)
STATE & LOCAL GOVERNMENT*									
SERVICES	11	12	9	13	13	12	12	10	(4)
OTHER	17	17	0	18	18	19	19	18	1
TOTAL	$85	$93	9%	$93	$94	$90	$78	$67	(7%)

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $5 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

- Exhibit III-20, Batch - Industry Specialty

- Exhibit III-21, Batch - Utility

- The growth rates of the above exhibits are summarized in Exhibit III-22.

  - The individual exhibits show market changes by industry sector which result from a combination of forces acting on the type of service as discussed earlier in this section. Forces acting on the individual industry sector will be discussed in Sections V through XVIII.

  - The summary of growth rates in Exhibit III-22, however, allows some conclusions which cut across the total analysis:

    . General business services experience the greatest relative decline among types of service although they have the highest five-year growth in the RCS category.

    . Batch services experience the greatest decline among modes of service; they continue to grow slightly in general business and industry specialty.

G. SOFTWARE PRODUCTS MARKETS

- Software products are growing faster overall than processing services, as shown in Exhibit III-23.

- Unlike processing services which often are perceived by the EDP manager as competition, software products are most often sold to the EDP manager.

EXHIBIT III-20

BATCH SERVICES - INDUSTRY SPECIALTY FORECAST

BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 50	$ 60	20%	$ 69	$ 78	$ 85	$ 90	$ 95	10%
PROCESS MANUFACTURING	24	27	13	30	36	40	40	38	7
TRANSPORTATION	13	16	23	18	20	23	27	28	12
UTILITIES	7	8	14	10	12	10	10	10	5
BANKING & FINANCE	298	335	12	340	350	365	380	385	3
INSURANCE	58	63	8	66	68	70	70	68	2
MEDICAL	114	120	5	133	140	150	135	130	2
EDUCATION	15	17	13	19	21	25	28	29	11
RETAIL	62	70	13	76	77	80	77	76	2
WHOLESALE	25	32	28	33	34	36	36	36	2
FEDERAL GOVERNMENT*									
STATE & LOCAL GOVERNMENT	7	10	43	13	18	25	30	35	29
SERVICES	90	125	39	140	180	203	210	210	11
OTHER	73	85	16	87	105	118	130	146	11
TOTAL	$836	$968	16%	$1,034	$1,139	$1,230	$1,263	$1,286	6%

*BECAUSE THIS SECTOR IS ESTIMATED TO HAVE LESS THAN $5 MILLION IN 1983 REVENUES IN THIS TYPE OF SERVICE, IT HAS NOT BEEN INDIVIDUALLY FORECAST.

EXHIBIT III-21

BATCH SERVICES - UTILITY FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
DISCRETE MANUFACTURING	$ 43	$ 50	16%	$ 45	$ 42	$ 40	$ 40	$ 40	(25%)
PROCESS MANUFACTURING	33	35	6	34	32	30	30	28	(2)
TRANSPORTATION	7	7	0	7	7	7	5	5	(7)
UTILITIES	11	14	27	13	11	10	8	6	(19)
BANKING & FINANCE	24	24	0	24	25	25	20	20	(2)
INSURANCE	18	19	5	20	20	20	20	18	(1)
MEDICAL	6	6	0	5	5	5	5	5	(4)
EDUCATION	7	8	14	10	8	6	5	5	(10)
RETAIL	24	25	4	25	24	25	25	25	0
WHOLESALE	71	78	9	81	88	94	94	92	3
FEDERAL GOVERNMENT	42	45	7	48	50	50	45	40	(2)
STATE & LOCAL GOVERNMENT	34	35	3	37	38	41	35	31	(2)
SERVICES	12	15	25	13	9	6	6	6	(20)
OTHER	12	13	8	14	14	15	16	15	3
TOTAL	$344	$374	9%	$376	$373	$374	$354	$336	(2%)

EXHIBIT III-22

COMPARISON OF GROWTH RATES OF PROCESSING SERVICES BY MODE AND TYPE OF SERVICE

TYPE OF SERVICE GROWTH (%)		REMOTE COMPUTING	FACILITIES MANAGEMENT	BATCH	TOTAL
GENERAL BUSINESS	77/78	25%	-	14	18%
	78/83	23	-	4	12
SCIENTIFIC AND ENGINEERING	77/78	16	8	9	14
	78/83	16	10	(7)	12
INDUSTRY SPECIALTY	77/78	25	19	16	21
	78/83	21	19	6	17
UTILITY	77/78	21	20	9	17
	78/83	19	16	(2)	14
TOTAL	77/78	23	18	14	19
	78/83	21%	17	4	16%

KEY: 77/78 = PERCENT GROWTH IN REVENUES 1977 TO 1978
78/83 = PERCENT AVERAGE ANNUAL GROWTH COMPOUNDED 1978 TO 1983

EXHIBIT III-23

SOFTWARE PRODUCTS TOTAL MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
DISCRETE MANUFACTURING	$150	$185	23%	$ 230	$ 285	$ 360	$ 430	$ 540	24%
PROCESS MANUFACTURING	70	95	36	110	135	165	190	230	19
TRANSPORTATION	30	32	6	35	40	50	60	75	20
UTILITIES	26	30	15	34	41	48	60	75	20
BANKING & FINANCE	160	193	20	215	240	270	310	350	13
INSURANCE	62	75	21	95	110	125	150	180	19
MEDICAL	25	33	32	45	55	65	85	110	27
EDUCATION	22	25	14	30	38	50	60	75	25
RETAIL	30	42	40	50	70	95	120	150	25
WHOLESALE	48	57	19	75	93	120	150	190	27
FEDERAL GOVERNMENT	95	115	21	140	170	205	250	300	21
STATE & LOCAL GOVERNMENT	32	38	19	45	54	65	78	95	20
SERVICES	22	29	32	33	38	44	51	60	16
OTHER	26	32	23	40	50	60	72	85	22
TOTAL	$798	$981	23%	$1,177	$1,419	$1,722	$2,066	$2,515	21%

- As will be discussed in more detail in Section IV, EDP managers interviewed in INPUT's user panel anticipate a growth in expenditures for software products almost identical to INPUT's forecast.

- This supports the strong growth potential for software products.

- As shown in INPUT's 1978 MAS study, "Trends in Services and Software Pricing," EDP managers actually anticipate larger price increases than the vendors plan to implement and will buy the software products at even higher prices because:

  - Their in-house costs for software development are going up.

  - They are under pressure to implement programs quickly.

  - They are having success with packages.

- Software products markets are receiving increased interest from hardware manufacturers.

  - IBM's Series/1 software offering actually had a higher total rental potential than the mainframe at the time of initial announcement. (IBM has since increased the software package availability further.)

  - DEC, Hewlett-Packard and others in the minicomputer fields are promoting their software capability heavily.

  - DBMS in particular is getting interest from mainframe manufacturers who will dominate the small and medium DBMS market according to findings in INPUT's 1978 MAS report, "Data Base Systems Software Markets."

- Software products companies responding to the 1978 ADAPSO survey who as a group out-performed the industry, actually reported a 36% revenue increase 1976 to 1977 and forecast a 23% growth 1977 to 1978.

I. SYSTEMS SOFTWARE MARKETS

- The discrete manufacturing and federal government markets total almost 40% of the market, reflecting the relatively high degree of standardization in these sectors and the high number of large installations. Details are presented in Exhibit III-24.

- The market will pass the $1.0 billion dollar mark in 1982 and could be even larger if IBM continues unbundling (IBM sales, as well as those from other mainframe manufacturers) are in INPUT's forecast.

  - At this time only IBM among hardware vendors has revenues comparable to independent vendors.

  - INPUT estimates IBM's 1977 IMS revenues were approximately $35 million.

  - IBM's recent 8100 announcement included significant systems software offerings.

- There is increasing activity between hardware and systems software firms.

  - Intel is in the process of acquiring MRI.

  - Cincom with its TOTAL system, which has passed the $50 million mark in total revenues, has its product offered by mainframe manufacturers:

    . An example is NCR's recent announcement of NCR Total IQL (Interactive Query Language).

EXHIBIT III-24

SYSTEMS PACKAGES MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 80	$ 95	19%	$ 115	$ 140	$ 175	$ 215	$ 275	24%
PROCESS MANUFACTURING	48	65	35	75	90	105	120	140	17
TRANSPORTATION	15	17	13	18	20	25	30	35	16
UTILITIES	17	20	18	22	26	30	38	48	19
BANKING & FINANCE	58	67	15	72	80	90	110	135	15
INSURANCE	37	45	16	55	63	71	90	110	20
MEDICAL	8	11	38	15	17	20	28	40	29
EDUCATION	14	16	14	20	24	30	37	46	24
RETAIL	13	16	23	20	25	32	45	60	30
WHOLESALE	10	12	20	15	18	23	30	40	27
FEDERAL GOVERNMENT	82	100	22	120	146	175	210	250	20
STATE & LOCAL GOVERNMENT	22	26	18	31	35	40	49	60	18
SERVICES	6	8	33	10	12	15	17	20	20
OTHER	8	10	25	11	13	15	18	21	16
TOTAL	$ 418	$ 508	22%	$ 599	$ 709	$ 846	$1,037	$1,280	20%

- Both NCR and Cincom will sell the system.

- The vendors claim that a user can learn to use the product in one hour, obviously aiming at the user's demand for ease of use.

- Vendors such as Software AG are reporting success in competing with IMS which is perceived by users as being relatively complex according to INPUT research.

2. APPLICATIONS SOFTWARE MARKETS

- Applications software shows strong growth in all industry sectors except banking and finance where a heavy penetration has already been achieved:

  - Overall growth is very strong as shown in Exhibit III-25.

  - The $1.0 billion threshold will be passed in 1982.

- The structure of the applications package market differs from the systems package market in several ways:

  - The packages are priced lower and there are more of them.

  - There is little or no maintenance offered with most packages.

  - There are many small vendors.

- Applications packages continue to be combined with hardware, with the following being recent significant announcements:

  - Reynolds and Reynolds is offering a desk top payroll system using a microprocessor and preprogrammed firmware costing less than $1,000.

EXHIBIT III-25

APPLICATIONS SOFTWARE PACKAGES MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
DISCRETE MANUFACTURING	$ 70	$ 90	29%	$115	$145	$185	$ 215	$ 265	24%
PROCESS MANUFACTURING	22	30	36	35	45	60	70	90	25
TRANSPORTATION	15	15	0	17	20	25	30	40	22
UTILITIES	9	10	11	12	15	18	22	27	22
BANKING & FINANCE	102	126	24	143	160	180	200	215	11
INSURANCE	25	30	20	40	47	54	60	70	18
MEDICAL	17	22	29	30	38	45	57	70	26
EDUCATION	8	9	13	10	14	20	23	29	26
RETAIL	17	26	53	30	45	63	75	90	28
WHOLESALE	38	45	18	60	75	97	120	150	27
FEDERAL GOVERNMENT	13	15	0	20	24	30	40	50	27
STATE & LOCAL GOVERNMENT	10	12	20	14	19	25	29	35	24
SERVICES	16	21	31	23	26	29	34	40	14
OTHER	18	22	22	29	37	45	54	64	24
TOTAL	$380	$473	24%	$578	$710	$876	$1,029	$1,235	21%

- IBM's 5110 was announced with general ledger and accounts payable packages.

- Data General's new CS/20, also a low priced offering with a full system announced at $13,820, has COBOL capability.

- The proliferation of these and other small computers represents a major software product.

- Basic Four claims to have over 1,000 software packages, including industry specialized applications, in its library in support of its small business computer.

H. PROFESSIONAL SERVICES MARKETS

- Professional services, particularly custom programming, will continue to grow through the forecast period as shown in Exhibit III-26:

  - The federal government actually increases its portion of the total from 26% in 1978 to 29% in 1983, as this sector continues its use of outside programming and systems design talent.

  - Insurance is an interesting opportunity, growing at 16% from a current small base.

- The professional services companies who reponded to the 1978 ADAPSO survey were far more optimistic than the industry average, forecasting growth rates in the 25% average range. This higher forecast is misleading because it includes acquisitions and overseas revenues, but it is indicative that there is high growth potential in some segments of the professional services sector.

EXHIBIT III-26

PROFESSIONAL SERVICES TOTAL MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983

INDUSTRY SECTOR	MARKET FORECAST BY INDUSTRY SECTOR, 1978-1983								
	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
DISCRETE MANUFACTURING	$ 190	$ 210	11%	$ 230	$ 255	$ 280	$ 320	$ 360	11%
PROCESS MANUFACTURING	110	115	5	120	135	155	175	200	12
TRANSPORTATION	24	28	17	30	33	36	40	44	9
UTILITIES	59	66	12	70	76	82	90	100	9
BANKING & FINANCE	100	130	30	140	170	200	230	260	15
INSURANCE	68	82	21	95	110	125	145	170	16
MEDICAL	40	46	15	50	56	65	75	86	13
EDUCATION	34	36	6	38	39	40	40	41	3
RETAIL	40	50	25	55	70	85	100	110	17
WHOLESALE	37	42	14	45	50	58	66	75	12
FEDERAL GOVERNMENT	300	350	17	400	460	530	620	725	16
STATE & LOCAL GOVERNMENT	127	142	12	160	176	200	222	250	12
SERVICES	9	11	22	12	15	19	19	20	6
OTHER	49	54	10	60	67	75	83	91	11
TOTAL	$1,187	$1,362	15%	$1,505	$1,712	$1,950	$2,225	$2,532	13%

I. RECENT VENDOR ACTIVITY ACROSS INDUSTRY SECTORS

- Although much has been written about vendor activity with small computers, some services vendors are exploring the capabilities of the new large mainframes.

  - United Computing Systems' scheduled installation of the first commercial Cray-1 computer, a large-scale, high speed mainframe, is set for September 1978. UCS has already confirmed its intent to order a second unit.

  - CARS and others have installed the Amdahl and Itel alternatives to IBM large mainframes.

- The major announcements of service/hardware from ADP and NCSS were treated in some detail in INPUT's study, "RCS Companies Plans For User Site Computers." Summary conclusions of this study were:

  - Software and networking capabilities are the key value added.

  - RCS vendors must re-evaluate their relationship with EDP managers.

  - RCS vendors have the total capability to succeed in offering hardware but must carefully consider:

    . The maintenance aspect.

    . The impact on current services and their present sales forces.

- Control Data, with its dual emphasis on equipment and services, is in the market at several points:

  - With IBM compatible mainframes.

- With a division specifically formed to develop and market peripherals for the IBM Series/1.

- With a company specifically targetted to develop computer aided education products and services.

- Xerox Computer Services, a leading vendor of interactive services, has announced an intelligent terminal to be installed at the user site:

  - The terminal includes a microprocessor, CRT screen, printer and four floppy disk drives.

  - The price of the system is actually higher than some minicomputer systems and in fact has similar capabilities.

- Computer Sciences Corporation has announced plans to market small computer systems linked to the Infonet timesharing network.

- Not all attempts at marketing hardware are successful with Cincinnati Milacron and Storage Technology both selling or de-emphasizing their small computer efforts.

- A unique arrangement was announced by Systems Development Corporation and Computer Transmission Corporation (TRAN):

  - The two companies will use their combined capabilities in product development and manufacturing.

  - They will aim at the commercial market sector in data processing and data communications.

  - As part of the agreement, SDC made a financial investment in TRAN, providing another example of a services company investing in the hardware business.

- Another dimension of the industry is the increasing use of electronically based information systems by small establishments.

  - DEC and Texas Instruments have both established retail stores.

  - IBM is testing a retail store chain.

  - Services companies with their marketing knowledge can also look in the direction of the smaller user. INPUT is studying this opportunity in its Small Establishment Service Program.

- Certainly the computer services industry has opportunity and challenge in hardware, small establishments, consumer markets, etc.

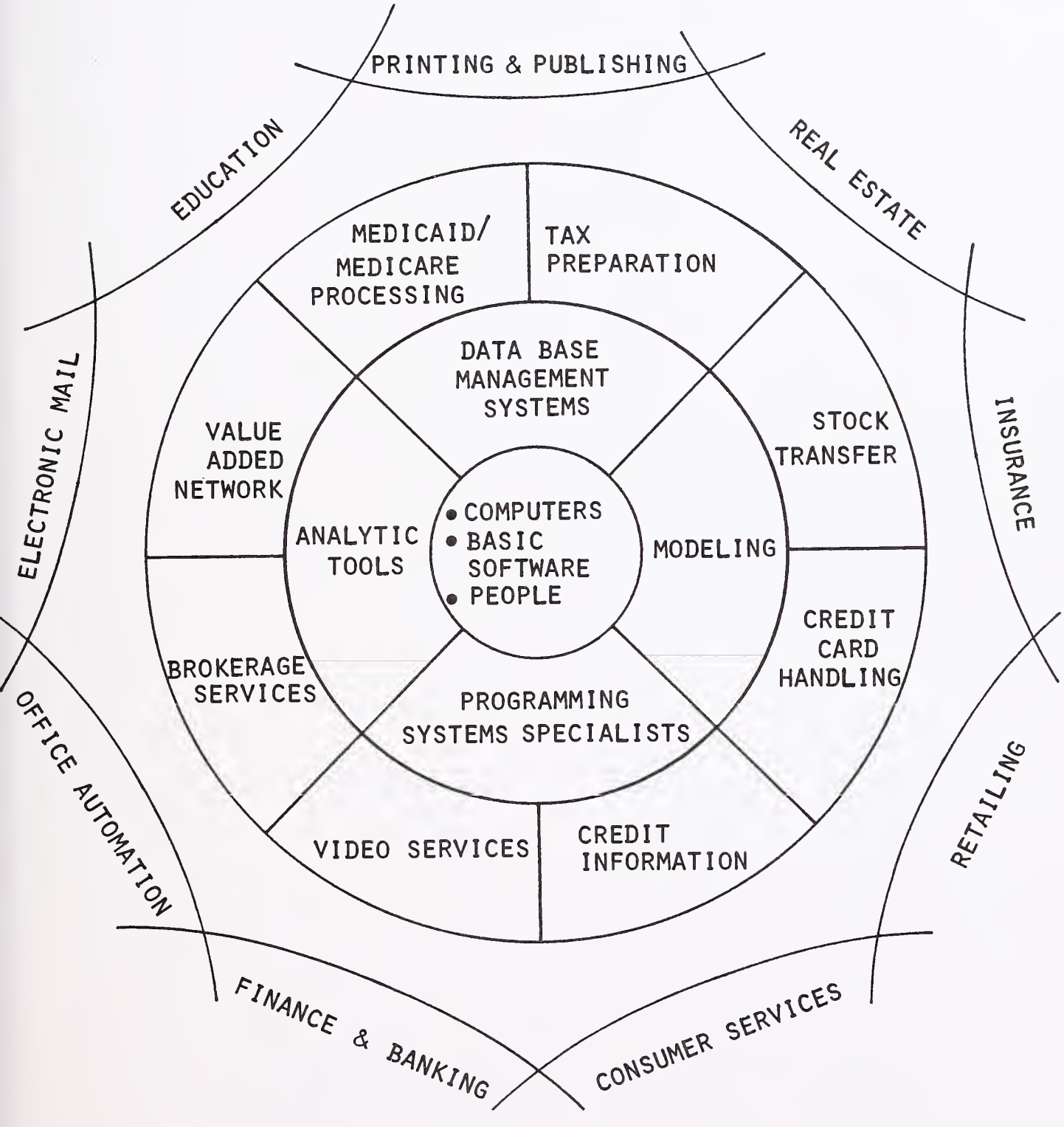
  - Exhibit III-27 depicts the widening spectrum of products and services that is emerging from the earliest combination of computers and people in the 1960s.

  - Some services companies are already in the outer markets depicted in the Exhibit, such as Dun and Bradstreet in printing and publishing and CDC in education.

  - In the following sections an integrated analysis of the role of the EDP manager and separate analyses of fourteen sector markets are presented.

EXHIBIT III-27

EMERGING MARKETS FOR COMPUTER SERVICES COMPANIES



IV CURRENT STATUS OF IN-HOUSE EDP IN MAJOR COMPANIES AND INSTITUTIONS

IV CURRENT STATUS OF IN-HOUSE EDP IN MAJOR COMPANIES AND INSTITUTIONS

A. DESCRIPTION OF INPUT's USER PANEL

- In early 1978 INPUT recognized the need for current and comprehensive information related to a key factor in computer services markets - the status and future direction of in-house EDP. A detailed questionnaire was constructed (included in the Appendix of this report), a program to increase response rate was devised, and a telephone follow-up campaign was implemented.

  - At the time results were tabulated for inclusion in this report, over 430 responses had been received, grouped as follows by industry sector:

Industry Sector	Numer Of Respondents	Percent
Discrete manufacturing	83	18.9%
Process manufacturing	75	17.1
Transportation	17	3.9
Utilities	20	4.6
Banking and finance	48	11.0
Insurance	59	13.5
Education	69	15.8
Retail	23	5.3
Wholesale	19	4.3
Services	19	4.3
Other	6	1.4
	486	100.0%

- In 1979, INPUT intends to recontact 1978 respondents to develop a tracking capability.

- Also in 1979, INPUT intends to expand the coverage to the remaining sectors (medical, federal government and state and local government) and expand coverage in the dominant services markets, particularly banking and finance.

- The response to the 1978 survey is not large enough to claim statistical validity. However, the results have significant value in presenting:

  . A very current profile of the status of a significant number of EDP installations.

  . A unique combination of data and analysis of the combined spectrum of services, software, hardware, applications, budgets and management.

- A snapshot of similarities and differences among user industry sectors.

- Some insight into what EDP managers say they intend to do.

B. OBJECTIVES, APPLICATIONS PLANS, EXPENDITURE PATTERNS

- EDP managers in the user panel were asked to state in their own words their goals for 1978-1980. Responses were grouped in categories and results are presented in Exhibit IV-1.

  - Half of the objectives are applications related, with the dominant trend being to implement on-line applications.

  - In the industry sector discussions, which are in the later sections of this report, further detail is presented.

  - There is a remarkable degree of consistency in responses across industry sectors, reflecting a widespread pressure on EDP managers to provide on-line applications which satisfy user demands for more timely information.

  - Distributed data processing (DDP) is mentioned in only 7% of the objectives in spite of the high publicity given to the subject. DDP is treated in detail in INPUT's 1978 MAS report, "Distributed Data Processing: Applications, Performance and Architecture."

  - The services sector, which is dominated by responses from computer services firms, is atypical with a high percentage of new applications objectives.

EXHIBIT IV-1

OBJECTIVES OF RESPONDENT EDP MANAGERS, 1978-1980, BY INDUSTRY SECTOR

OBJECTIVE MENTIONED	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING & FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	SERVICE	OTHER	TOTAL
DATA BASE DEVELOPMENT	11%	9%	2%	11%	8%	9%	12%	6	12%	0%	16%	9%
DESIGN/INSTALL DDP	8	8	0	9	3	11	4	1	7	5	16	7
INSTALL NEW APPLICATIONS	22	19	18	16	18	18	14	19	18	26	0	18
INSTALL/ON-LINE APPLICATIONS	18	20	26	17	20	26	28	30	25	37	32	23
INSTALL/ UPGRADE MAINFRAME	11	13	15	14	19	14	23	18	13	16	5	16
INSTALL MINIS	4	2	11	4	1	2	>1	3	7	0	11	3
INSTALL NEW OPERATING SYSTEMS	6	3	11	0	6	5	2	1	5	0	0	4
IMPROVE OPERATIONS	13	11	11	9	11	6	5	12	3	5	10	9
CENTRALIZE OR DECENTRALIZE	3	9	4	6	5	1	2	0	3	0	0	4
OTHER	4	6	2	14	9	8	10	10	7	11	10	7
TOTAL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NUMBER OF RESPONSES	207	207	46	70	142	182	193	73	60	38	19	1,237

- While objectives are similar across industry sectors, applications being installed are not, as shown in Exhibit IV-2:

  - Banking and finance, and insurance are working on applications which are predominantly industry specific.

  - Data base applications are highest in the utilities sector.

  - Personnel related and inventory control applications have relatively more importance in the retail sector.

  - Order entry and billing are relatively more important in the manufacturing industries and in wholesaling.

  - Scientific and engineering, an established applications area, is low in priority in all sectors.

- User panel members reported on their use of resources as presented in Exhibit IV-3.

  - For both computer resources and applications programmers there is an approximately 50/50 split between new applications development and maintenance of existing programs.

  - Differences among industry sectors are discussed in the chapters which follow.

- User Panel respondents varied significantly by industry sector regarding the degree of centralization versus decentralization of the EDP organization.

  - As shown in Exhibit IV-4, the retail and insurance sectors are most highly centralized. These sectors are also characterized by a high degree of clerical functions.

EXHIBIT IV-2

APPLICATIONS TO BE DEVELOPED BY RESPONDING EDP MANAGERS

NEW APPLICATIONS TO BE DEVELOPED IN THE NEXT TWO YEARS	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING & FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE
ACCOUNTING & FINANCE	18%	20%	20%	17%	17%	15%	21%	19%	21%
MARKETING & SALES	5	5	2	0	2	5	0	8	2
SCIENTIFIC & ENGINEERING	0	1	4	3	0	1	1	0	2
WORD PROCESSING	1	1	0	0	0	0	1	0	0
PERSONNEL RELATED/ PAYROLL	7	12	15	11	5	7	11	16	5
INVENTORY CONTROL	9	10	9	11	3	2	6	19	26
COST SYSTEMS	5	5	6	3	2	1	1	0	0
ORDER ENTRY/ BILLING	14	16	4	5	1	2	3	10	18
MODELLING & FORECASTING	3	3	0	9	1	1	6	2	4
DATA BASE APPLICATIONS	3	5	4	19	9	8	8	5	5
PERFORMANCE	1	0	0	0	0	0	0	0	0
GRAPHICS	1	1	0	0	1	0	3	0	0
PURCHASING	6	4	0	2	0	0	3	6	5
OTHER (INDUSTRY SPECIFIC)	28	17	37	20	59	58	37	16	12

EXHIBIT IV-3

UTILIZATION OF COMPUTER RESOURCES AND APPLICATION PROGRAMMERS BY RESPONDENTS

USE	PERCENT COMPUTER RESOURCES	PERCENT APPLICATION PROGRAMMERS
PRODUCTION RUNS	67	--
NEW APPLICATIONS PROGRAM DEVELOPMENT	15	51
MAINTENANCE OF EXISTING PROGRAMS	13	46
OTHER	5	3
TOTAL	100	100

EXHIBIT IV-4

DEGREE OF CENTRALIZATION OF CORPORATE EDP

BY INDUSTRY SECTOR

INDUSTRY SECTOR	PERCENT CENTRAL-IZED	PERCENT PARTIALLY CENTRAL-IZED	PERCENT DECENT-RALIZED	NO. OF RESPON-DENTS
DISCRETE MANU-FACTURING	54%	39%	7%	83
PROCESS MANU-FACTURING	48	40	12	73
TRANSPORTATION	88	12	-	17
UTILITIES	84	16	-	19
BANKING & FINANCE	85	11	4	47
INSURANCE	90	10	-	59
EDUCATION	70	29	1	69
RETAIL	91	9	-	23
WHOLESALE	74	21	5	19
OTHER	67	17	17	6
TOTAL				415

- The manufacturing sectors, with a higher investment per employee, allowed a greater degree of autonomy to remote locations and are least centralized.

- The level of centralization is a key part in installing DDP in that the less centralized industry sectors will require greater involvement with the remote locations.

- The composition of EDP budgets of respondents is predicted by them to change significantly over the next two years in several respects, as shown in Exhibit IV-5:

  - Small computer and programmable terminal expenditures will double.

  - Non-programmable terminals will increase by one-third.

  - Communications costs will increase by two-thirds.

  - The combination of the above three items will increase from 9% of current budgets to 15% of 1980 budgets, at the expense of main computers, personnel and "other" expenditures. These figures do not include the effect of growth of EDP budgets; a question which will be addressed in the 1979 survey.

  - The figures are significant in that they reflect in budgets what the EDP managers stated in objectives and applications relative to increased on-line development.

EXHIBIT IV-5

ANTICIPATED PERCENTAGE CHANGES IN EDP BUDGETS OF RESPONDENTS BY CATEGORY OF EXPENDITURE, 1978-1980

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	28.0	27.0	25.4	26.8	(9)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	3.1	4.5	5.6	4.4	81
NON-PROGRAMABLE TERMINALS	3.3	3.4	3.7	3.5	12
COMMUNICATIONS	3.3	4.3	5.0	4.2	52
SOFTWARE (PURCHASE/LEASE)	3.6	4.1	4.3	4.0	19
PERSONNEL	46.0	45.7	44.1	45.3	4
OTHER	11.8	10.3	8.5	10.2	28
TOTAL	100%	100%	100%	100%	-

C. USE OF SERVICES BY EDP MANAGERS

1. BY MODE OF SERVICE

- The continued effort by EDP managers to convert processing services revenues to in-house is reflected by Exhibit IV-6; some services opportunities are also shown in the exhibit.

  - The small number of respondents in the processing services categories (other than interactive services) reflects the relatively minor role EDP managers currently play in the purchase of such services.

  - The stable position of input/output services reflects the lesser vulnerability of these services (COM,etc.) relative to being moved in-house.

  - The systems software and applications software expenditures growth is almost identical to INPUT's forecast although INPUT's forecast was created prior to the tabulation of user panel results; the close correlation adds support to the forecast.

- Education is particularly strong with a high response rate and a good growth of 22%; education deserves re-evaluation as an opportunity to vendors of related services.

- Maintenance services are also an interesting opportunity with a 25% growth between 1978 and 1979 over a relatively high base. Maintenance is being considered in-depth in a current multiclient study being carried out by INPUT.

2. RESPONDENTS' USE OF SERVICES VENDORS BY INDUSTRY SECTOR

- In Exhibit IV-7 the changes in expenditures for services by respondents are defined by industry sector:

EXHIBIT IV-6

AVERAGE ANNUAL EXPENDITURES PER RESPONDING EDP MANAGER FOR OUTSIDE SERVICES AND SOFTWARE IN 1977 AND 1978 BY CATEGORY OF SERVICE

CATEGORY OF SERVICE	1977 EXPENDITURES AVERAGE IN THOUSANDS	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVERAGE IN THOUSANDS	NUMBER OF RESPONDENTS	PERCENT CHANGE IN EXPENDITURES 1977 vs. 1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$174	116	$147	121	(16)%
REMOTE BATCH	253	30	156	37	(38)
BATCH	263	28	158	29	(40)
INPUT/OUTPUT	41	92	41	96	-
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	37	212	44	215	19
APPLICATIONS SOFTWARE	43	161	52	178	21
PROFESSIONAL SERVICES					
CONTRACT PROGRAMMING AND DESIGN	111	104	116	103	5
EDP CONSULTING	63	49	47	60	(25)
EDUCATION	23	179	28	186	22
OTHER	10	9	15	11	50
FACILITIES MANAGEMENT	123	2	123	2	-
MAINTENANCE	107	137	134	136	25

NOTE: THE DECLINE IN PROCESSING SERVICES REFLECTS THE INTENT OF EDP MANAGERS, WHO IN FACT DO NOT CONTROL THE MAJOR PORTION OF PROCESSING SERVICES REVENUES. THEREFORE, THIS DECLINE IS NOT INCONSISTENT WITH INPUT'S FORECAST OF GROWTH IN PROCESSING SERVICES; THIS GROWTH TAKES PLACE PREDOMINANTLY IN AREAS OTHER THAN THE IN-HOUSE EDP ESTABLISHMENT.

EXHIBIT IV-7

ANTICIPATED CHANGES IN EXPENDITURES FOR SERVICES BY RESPONDENT EDP MANAGERS, 1978 VERSUS 1977 BY INDUSTRY SECTOR

TYPE OF SERVICE	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING & FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	ALL INDUSTRIES
PROCESSING SERVICES											
INTERACTIVE TIMESHARING	(30)%	3 %	(7)%	9 %	18 %	(32)	16 %	(55)%	(14)	7 %	(16)%
REMOTE BATCH	(60)	(21)	-	45	(12)	176	16	-	6	0	(38)
BATCH	(55)	0	40	33	(25)	(7)	8	11	36	0	(40)
INPUT/OUTPUT	3	1	83	(16)	0	(9)	40	13	(11)	0	0
SOFTWARE PRODUCTS											
SYSTEMS SOFTWARE	18	14	(32)	12	(8)	25	76	(21)	36	16	19
APPLICATIONS SOFTWARE	31	92	(17)	36	7	42	(20)	(1/)	(34)	29	21
PROFESSIONAL SVCS.											
CONTRACT PROGRAMMING AND DESIGN	(6)	56	53	(50)	113	16	8	9	6	0	5
EDP CONSULTING	(43)	(30)	-	6	0	(14)	(29)	(85)	(76)	422	(25)
EDUCATION	26	30	20	19	20	21	38	0	140	(20)	22
OTHER	-	50	56	(50)	-	-	16	-	183	-	50
MAINTENANCE	37	28	60	20	5	23	20	15	(7)	45	25

- This chart is included to illustrate the wide variation among sectors.

- Further detail is included in the individual industry sector sections of this report.

- Although the relatively small total of 138 responses does not allow any detailed analysis, the processing services vendors mentioned are of interest in order to better understand the significance of the responses, and are tabulated in Exhibit IV-8.

  - GE and SBC represent almost half of the responses.

  - A total of 26 vendors were mentioned.

- With regard to software vendors, 53 were mentioned as shown in Exhibit IV-9.

  - Manufacturing and insurance accounted for over one-half of the mentions.

  - IBM is the dominant vendor with approximately one-third of the mentions.

  - Independent software vendors, such as MSA and Cincom, are mentioned far more often than other mainframe vendors, such as Burroughs or Honeywell.

- Among vendors of education services, IBM again dominates with over half of the mentions, as shown in Exhibit IV-10. Deltak, an Oak Brook, Illinois vendor of video-based training programs, received 13% of the mentions.

  - Deltak offers over 4,000 courses with a major portion aimed at EDP skills ranging from systems and applications development through supervisory and management techniques.

EXHIBIT IV-8

PROCESSING SERVICES VENDORS TO RESPONDENTS BY INDUSTRY SECTOR

VENDOR	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL
BURROUGHS		1					1				2
RAPIDATA	3	2				2		1			9
GENERAL ELECTRIC	8	10	1	4	1	3		1	1		29
AUTOMATIC DATA PROCESSING, INC.	2	1		1	1						5
NATIONAL CSS INC.	3	1			1			1			6
THE SERVICE BUREAU COMPANY	5	8		2	4	10	1	1	1		32
HONEYWELL	1	1									2
TYMSHARE	1	2			1	2	1		1		8
JCS		1									1
COMPUTER SCIENCES CORPORATION		1									1
CONTROL DATA CORPORATION	6			1			5		1		13
BOEING COMPUTER SERVICES	3	2				1					6
FIRST DATA	1										1
COMSHARE	1		1		1			1			4
BOEING		1								1	2
DATA RESOURCES, INC.				1					1		2
INTERACTIVE DATA CORPORATION				1							1
TIME-SHARING SYSTEMS INC.		1		1							2
UNITED COMPUTING		2									2
XEROX		1									1
ISI						1					1
ANACOMP		1							1		2
ZYTON	1	1				1					3
UNIVAC							1				1
CRC	1										1
DATAFILM				1							1
TOTAL MENTIONS	36	37	2	12	9	20	9	5	7	1	138

EXHIBIT IV-9

SOFTWARE PRODUCTS VENDORS TO RESPONDENTS BY INDUSTRY SECTOR

VENDOR	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL
MANAGEMENT DECISION SYSTEMS, INC.	2										2
WHITLOW	1	1		1	3	3	1				10
BURROUGHS	1	1								1	3
INFORMATICS	2	2				2	2		1		9
GENERAL ELECTRIC		1						1			2
MANAGEMENT SCIENCE AMERICA	4	4	3	1	4	2	1	1	3	2	25
J.L. WALKER										2	2
PANSOPHIC	2	3		2	2	5	3				17
CINCOM	9	2	1		1	2	2	1	2	1	21
IBM	29	17	2	8	8	22	13	2	8	1	110
APPLIED DATA RESEARCH, INC.	1	2	1		3	5	1				13
HONEYWELL	1	2				2					5
INFONATIONAL	2	1	1						1		5
COMPUTER ASSOCIATION	3		1				1		1		6
SOFTWARE DESIGN, INC.	4	1			1			1			7
CULLINANE	6	6	1		1			1			15
WESTINGHOUSE	7	1		1	1	3	1		1		15

EXHIBIT IV-9 (contd.)

SOFTWARE PRODUCTS VENDORS TO RESPONDENTS BY INDUSTRY SECTOR

VENDOR	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL
COMPUTER SCIENCE CORPORATION	1							1			2
CONTROL DATA CORPORATION	1					3	1				5
DIGITAL EQUIPMENT CORPORATION	1						5				6
TMG				1			1				2
SOFTWARE INTERNATIONAL	2		1	1							4
COMPUTER ASSOCIATES				1		1					2
GBA	1								1		2
COMSERV	2	1									3
OXFORD	3										3
BOOLE & BABBAGE			1		1	1					3
MCCORMACK & DODGE	2	5							1		8
WANG		2	2								4
TELECOMMUNICATIONS INC.	3	3									6
ISI		1				2	1				4
WHITESIDE	2										2
INFORMATION SCIENCES, INC.		1		1	1						3
VENDORS MENTIONED ONCE	5	7	1	1		1		1	2	2	20
TOTAL MENTIONS	97	64	15	18	26	54	33	9	21	9	346

EXHIBIT IV-10

EDUCATION VENDORS MENTIONED BY RESPONDENTS BY INDUSTRY SECTOR

VENDOR	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL
BURROUGHS		1				1					2
INFORMATICS						1					1
NCR								1			1
IBM	9	6	4	1	5	9	4	4	4		46
UNIVAC	1										1
HONEYWELL	2			1		1	1				5
HEWLETT PACKARD	1										1
DELTAK	3	2		1	1	2			1		10
INFORMATION SCIENCE INCORPORATED								1			1
DATA PRO	1										1
ASI TELEPROCESSING INCORPORATED	2			1		1	3				7
EDUTRONICS					1	2			1		4
TOTAL MENTIONS	19	9	4	4	7	17	8	6	6		80

- Courses combine text, audio and video media.

- Deltak's U.S. and Canadian revenues have grown at an almost 50% annual rate from $2.3 million in 1973 to $12 million in 1977.

- A similar profile of IBM dominance is shown among maintenance vendors with IBM receiving 66% of the mentions, as shown in Exhibit IV-11.

  - Interestingly, among the other major mainframe vendors, Honeywell received the second highest number of mentions for software, education and maintenance.

  - Among all maintenance vendors, Sorbus was mentioned 16% of the time, second to IBM.

  - Of twelve vendors mentioned, three (Informatics, ADR and MDSI) are software vendors.

  - Although not mentioned by the 1978 user panel, TRW made several recent additions to the product lines it maintains, including Applied Digital Data Systems (ADDS), Wiltek and Docutel.

  - NCR announced an agreement in March 1978, to maintain Quantor equipment, which was followed more recently by NCR's announcement of its acquisition of Quantor.

  - Remote diagnostics are becoming more evident with Western Union adding it to its Termicare system, and ADP including it as part of its on-site system announcement.

  - The profit potential in maintenance depends to a large extent on vendor's ability to pass on increasing costs in terms of price increases such as those announced by IBM in late 1977 of up to 18% on some maintenance and support services.

EXHIBIT IV-11

MAINTENANCE VENDORS MENTIONED BY RESPONDENTS BY INDUSTRY SECTOR

VENDOR	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL
BURROUGHS	1					1					2
INFORMATICS		1									1
NCR								1			1
IBM	9	9	3	2	5	10	6	3	3	1	51
UNIVAC	1						1				2
ADR						1					1
HONEYWELL				1		2			1		4
HEWLETT-PACKARD	1										1
CDC	1						1				2
MDSI		1									1
SORBUS	2	3				1	2				8
DEC							3				3
TOTAL MENTIONS	15	14	3	3	5	15	13	4	4	1	77

D. USE OF HARDWARE BY EDP MANAGERS

- The user panel approximates the estimated actual IBM mainframe penetration with 67% of reported mainframes being IBM as shown in Exhibit IV-12.

  - The 519 mainframes in the sample, while small compared to the total population, do provide an interesting current profile of vendor penetration by industry sector; all of the data was collected in 1978.

  - Users of this report may also find Exhibit IV-12 useful in further interpreting the information regarding maintenance, education, etc.

  - Some mainframes which can be considered minicomputers were reported by panel members as mainframes; they are included in the exhibit to reflect the user's perception of his equipment as being interchangeable with traditional general purpose mainframes.

- The number of operating systems reported by the user panel is almost identical to the number of mainframes, as shown in Exhibit IV-13.

- As expected, the reported use of minicomputers represents a broader spectrum of suppliers than mainframes, as shown in Exhibit IV-14.

  - DEC and IBM, in addition to being the largest suppliers of minicomputers with 22% and 16% of the responses respectively, are unique in being mentioned at least once in every industry sector.

  - A total of 59 vendors were mentioned.

- An uncanny correlation exists between number of minicomputers installed and the number of terminals installed by industry sector as can be seen by comparing Exhibits IV-15 and IV-16:

EXHIBIT IV-12

INSTALLED MAINFRAME HARDWARE BY RESPONDENTS BY INDUSTRY SECTOR

VENDOR	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
AMDAHL V - 6	1					1	1				3	-
AMDAHL V - 5							1				1	-
BURROUGHS B-6700	1						1			1	3	-
BURROUGHS B-4700	2	2			2	2	3	2			13	3%
BURROUGHS B-2771	1	1									2	-
BURROUGHS 3771		2									2	-
BURROUGHS B-3700	1	1			1						3	-
BURROUGHS OTHER	2	2	1	1	2	2	1				11	2
CDC CYBER 171	1						1				2	-
CDC CYBER 172	1						1				2	-
CDC 6400							2				2	-
CDC OTHER	2					1	5			1	9	2
PDP 11 - 70	2						2				4	1
DEC 2040					1	2					3	-
DEC 1040 - 50							2				2	-
DEC 10	1						2				3	-
DEC OTHER	2						1				3	-
HONEYWELL H - 2040	1					1	2				4	1
HONEYWELL H - 2050	2					1			1		4	1
HONEYWELL H-64-3		1						1			2	-
HONEYWELL H-66-2		1				1					2	-
HONEYWELL H-66-4	1			1							2	-

EXHIBIT IV-12 (contd.)

INSTALLED MAINFRAME HARDWARE BY RESPONDENTS

BY INDUSTRY SECTOR

VENDOR	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATON	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
HONEYWELL OTHER	5	6		1		3	2	2			19	4
IBM 370 - 125	1	3					1	2	1		8	2
IBM 370 - 135	14	6		1	4	7	4	2	2	2	42	8
IBM 370 - 138	11	13	1	1	5	4	2		3	1	41	8
IBM 370 - 145	9	6	2	3	9	7	2	5	3	1	47	9
IBM 370 - 148	10	7	5	1	5	10	5	2	4		49	9
IBM 370 - 155	2	2	1	3	4		5	1			18	3
IBM 370 - 158	12	12	2	2	10	7	4	3			52	10
IBM 370 - 165			2	2		2					6	1
IBM 370 - 168	4	4	2	5	3	5	3				26	5
IBM 360 - 30	2	2				3	3				10	2
IBM 360 - 40	3	3				2	3	1	1		13	3
IBM 360 - 50	5	4		1	1	2	1	1	1		16	3
IBM 360 - 65	3	1			1	1	2	1			9	2
IBM 2770				1	1						2	-
IBM 3135					2	1					3	-
IBM 370 - 115		1					1				2	-
IBM SYSTEM 3		1							1		2	-
IBM OTHER	1	2			1	3	2				9	2
NCR CENTURY 151	1							1			2	-
NCR CENTURY 201		1			2				1		4	1
NCR CENTURY 251					2						2	-

EXHIBIT IV-12 (contd.)

INSTALLED MAINFRAME HARDWARE BY RESPONDENTS

BY INDUSTRY SECTOR

VENDOR	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
NCR OTHER		2			1			1			4	1%
SINGER	2										2	-
SPERRY UNIVAC 1110			1			1	1				3	-
SPERRY UNIVAC 9400		1					1				2	-
SPERRY UNIVAC 90-30	1	3					1		1		6	1
SPERRY UNIVAC 90-60	1	1	1				1				4	1
SPERRY UNIVAC 418 I	1	1									2	-
SPERRY UNIVAC 1108	1						1				2	-
SPERRY UNIVAC SPECTRA 70						2	1				3	-
SPERRY UNIVAC 90-80	1					1					2	-
SPERRY UNIVAC OTHER			1		3		1	1			6	1
HEWLETT PACKARD		1			1		1	1			4	1
INTERDATA 32	1										1	-
ICL 1902	1										1	-
MOHAWK 2410						1					1	-
PRIME 400							1				1	-
HARRIS OTHER	1						1				2	-
RCA 110 A							1				1	-
SEL							1				1	-
XEROX SIGMA 6							3				3	-
XEROX 550 - 560	1						1				2	-
XEROX OTHER							2				2	-
TOTAL	115	93	19	23	62	74	81	27	19	6	519	100%

EXHIBIT IV-13

INSTALLED OPERATING SYSTEMS BY RESPONDENTS BY INDUSTRY SECTOR

OPERATING SYSTEM	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
MCP	6	3		1	2		3			1	16	3 %
OS - 3	2	2									6	1
MCPV	1	5			2	2	1	2			13	3
VM			2				2			1	5	1
DOS-VS	39	25	3	4	20	30	6	8	10	3	148	29
GCOS	3	5		3		4	1	1			17	3
B4		1			1						2	0.4
UNIVAC OS		2									2	0.4
VS-OS		2			2			2			6	1
OS-VSI	6	10	1	5	4	3	9	1	1		40	8
DOS	12	9	1		5	6	7	2	3		45	9
OS	6	3		1	2	4	2	1	1		20	4
OS-SVS	1	1	1	1		1					5	1
SCOPE	2										2	0.4
VS	1						1				2	0.4
EDOS	4	1	1		3	1		1	2		13	3
OS-MVT	1	3	2				10	2			18	4
EXEC-8	2		1	1	2		3	1			10	2
IN-HOUSE							2				2	0.4

EXHIBIT IV-13 (contd.)

INSTALLED OPERATING SYSTEMS BY RESPONDENTS BY INDUSTRY SECTOR

OPERATING SYSTEM	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
B3	1	1			3				1		6	1
OS-MFT		1	1		3		1				6	1
VM-OS						2	2				4	1
PSVS-1		1						1			2	0.4
TDOS					1	1					2	0.4
NOS-BE	2						1				3	0.6
TOPS 10					1		3				4	1
TOPS 20							2		1		3	0.6
VS9		1	1				1				3	0.6
CP-V	1						5				6	1
OS-4	1						1				2	0.4
MODI	2										2	0.4
CIF					1		1				2	0.4
BTM											2	0.4
OS-VS2	11	9	4	9	9	13	4	1		1	61	12
KRONOS							2				2	0.4
OPERATING SYSTEM MENTIONED ONCE	4	2	2	2	2	1	8	4		1	26	5
TOTAL	108	87	20	27	63	68	81	27	20	7	508	100 %

EXHIBIT IV-14

SUPPLIERS OF MINICOMPUTERS BY INDUSTRY SECTOR

SUPPLIER	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
BURROUGHS	2	2			2	2	4	2	2	1	17	4%
CMC			1		1						2	-
COMPUTER MACHINE				1			1				2	-
DEC	24	14	3	5	8	1	37	2	4	1	99	22
DATA 100	1	1	1	2				1			6	1
DATA GENERAL	7	4	2			1	8	2	2	1	27	6
DATAPOINT	8	8	1		3	1	1				22	5
ENTREX	2				2				1	1	6	1
FOUR PHASE	5	6	1	1	2	4	1		1		21	5
GENERAL AUTOMATION					1		1		1		3	-
HARRIS		1		1							2	-
HEWLETT-PACKARD	11	7		7	1		7				33	7
HONEYWELL	3	7	1			3	1	1			16	4
IBM	15	29	2	1	8	7	1	4	4	1	72	16
ICL	1	1									2	-
IMSAI							3				3	-
INFOREX	1	2	1	1	3						8	2

EXHIBIT IV-14 (contd.)

SUPPLIERS OF MINICOMPUTERS BY INDUSTRY SECTOR

SUPPLIER	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
INTERDATA		2									2	-
MICRODATA						1	2		1		4	1
MODCOMP	1							2	1		4	1
MOHAWK	2	2	1		1	1	1				8	2
NCR	1	1			2	1		8			13	3
NIXDORF	1	1									2	-
PERIPHONICS				2							2	-
PRIME	1						1				2	-
QANTEL		1			1						2	-
RAYTHEON	1					1					2	-
SPERRY UNIVAC					2	1	2	1			6	1
SYCOR	3	3				2					8	2
TEXAS INSTRUMENTS	1	1				1		2	1		6	1
VARIAN	1		1	1	1		1				5	1
WANG	1	3		1	3	1	1		1		11	2
SUPPLIERS MENTIONED ONCE	4	4	2	5	2	1	8	1			27	6
TOTAL	97	100	17	26	45	29	81	26	19	5	445	100%

EXHIBIT IV-15

NUMBER OF MINICOMPUTERS INSTALLED BY RESPONDENTS BY INDUSTRY SECTOR

NUMBER PER RESPONDENT	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
NONE	22	17	5	7	11	32	20	5	3	1	123	31%
1 - 5	30	28	7	8	28	20	31	12	11	4	179	44
6 - 10	11	10	1	3	2	2	8	2	3	1	43	11
11 - 20	8	12	3	1	1	3	2	1	0	0	31	8
21 - 50	1	6	1	0	3	0	1	0	1	0	13	3
51 - 100	1	0	0	0	0	0	1	0	0	0	2	-
> 100	2	1	0	1	2	1	3	2	0	0	12	3
TOTAL NUMBER OF RESPONDENTS	75	74	17	20	47	58	66	22	18	6	403	-
PERCENT	19%	18%	4%	5%	12%	14%	16%	6%	5%	1%	-	100%

EXHIBIT IV-16

NUMBER OF TERMINALS INSTALLED BY INDUSTRY SECTOR

NUMBER PER RESPONDENT	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL	PERCENT
NONE	3	7	1	0	1	5	3	5	1	0	26	6%
1 - 10	19	22	2	2	5	14	13	2	8	3	90	22
11 - 50	43	30	3	6	17	20	27	8	10	2	166	40
51 - 100	4	9	4	5	9	10	11	3	0	1	56	14
101 - 500	9	6	6	4	14	6	13	1	0	0	59	14
7500	2	1	1	3	2	2	2	2	0	0	15	4
TOTAL NUMBER OF RESPONDENTS	80	75	17	20	48	57	69	21	19	6	412	-
PERCENT	19%	18%	4%	5%	12%	14%	17%	5%	5%	1%	-	100%

- The percentage distribution of minicomputers and terminals by industry sector is almost identical.

- The distribution of installations per respondent differs in that 75% of the respondents had five or fewer minicomputers, while only 28% of the respondents had five or fewer terminals.

- Clearly the terminal marketplace and the marketplace for minicomputers with communications capabilities are in parallel and the two products compete one with the other.

E. EDP MANAGERS' CURRENT AND ANTICIPATED INVOLVEMENT IN OFFICE AUTOMATION

- To determine EDP managers' current attitudes regarding involvement in office automation, respondents were asked to estimate their involvement in each of the following four functions: electronic mail, word processing, copying/duplicating, and facsimile.

  - Office automation actually often is a combination of some or all of the above functions. Exhibit IV-17 was constructed by accumulating the number of "yes" responses to any of the four functions meaning an individual respondent could give up to four mentions.

  - Forty-five percent of the mentions indicated involvement in these functions by 1983, up from 26% involved now.

  - Of ten major industry sectors, process manufacturing showed the most anticipated involvement while retail showed the least.

    . It is significant that process manufacturing, as mentioned earlier, is the least centralized from an EDP organization viewpoint, while retail is most centralized.

EXHIBIT IV-17

RESPONDENTS' INVOLVEMENT IN ONE OR MORE OFFICE AUTOMATION FUNCTIONS CURRENTLY AND ANTICIPATED BY 1983 BY INDUSTRY SECTOR

RESPONDENTS	DISCRETE MANUFACTURING	PROCESS MANUFACTURING	TRANSPORTATION	UTILITIES	BANKING AND FINANCE	INSURANCE	EDUCATION	RETAIL	WHOLESALE	OTHER	TOTAL
INVOLVED NOW	57	57	11	12	44	23	43	15	8	5	275
INVOLVED BY 1979	5	8	5	1	7	4	8	1	3	-	42
INVOLVED BY 1980	17	17	1	3	9	13	11	6	2	1	80
INVOLVED BY 1981	8	11	-	4	4	8	14	1	3	-	53
INVOLVED BY 1982	5	3	-	-	2	3	2	-	3	-	18
INVOLVED BY 1983	2	3	-	-	1	-	3	3	-	-	12
PERCENT INVOLVED BY 1983	44%	54%	41%	49%	42%	49%	40%	37%	43%	60%	45%
NOT INVOLVED BY 1983	122	86	24	21	92	54	121	45	26	4	595
TOTAL	216	185	41	41	159	105	202	71	45	10	1,075

. Evidently, the less centralized EDP managers feel more inclined to involve themselves in the related office functions.

- Video conferencing, an element of office automation now just beginning to be discussed, is not viewed by the EDP manager as within his area of responsibility, with 191 out of 209 respondents expecting not to be involved by 1983.

- These results indicate a small but growing involvement of EDP managers in the mix of data and text processing.

- Services vendor activities to capitalize on the merging of text, graphics, and data processing, an evident prime thrust of IBM and other equipment vendors, is just beginning.

  - MCAUTO offers Vividata for computer-based image generation from a graphics terminal.

  - PRC Information Sciences Company announced the development of Tele-Fiche, a technology which converts micrographic data to digital form.

    . The data can then be transmitted and reconstituted into hard or soft copy at the other end.

    . The product is the result of a joint effort with Dacom, Inc., a manufacturer of facsimile equipment.

  - On-Line Systems was the winner among mini competitors to develop a correspondence management system for the Senate Committee on Rules and Administration; the value of the commitment is estimated to be between $4 million and $9 million depending on system usage.

    . Thirty to forty offices will be supported initially.

- Up to 330,000 letters per month will be produced by these offices with a system expansion capability up to 80 offices and one million letters per month.

- California Computer Products, a peripheral manufacturer, has entered the services field offering COM, microfiche and plotter services.

- Value added networks (VANS) are also entering the field by offering facsimile services.

  - ITT is introducing FAX/PAK.

  - Southern Pacific Communications already offers a facsimile service.

- Xerox made an organizational move which may indicate a coming emphasis on office related services by including Xerox Computer Services in their new Business Systems Operation. Xerox offers all of the equipment necessary to carry out the functions on which Exhibit IV-17 is based.

- Other hardware vendors are putting together the functions to handle text and graphics. Two recent examples are:

  - Honeywell is marketing Ultratext, a system based on its level 6 small computer. The software is being licensed from a subsidiary of Advanced Computing Techniques, New York.

  - Four Phase Systems announced a new multi-function system which operates on their System IV/90 and offers word processing, 3270 inquiry, COBOL processing and data entry.

- One of the more significant developments in information systems over the next five years will be the form and rate of text, graphics and data combinations.

- INPUT intends to do research on this subject in 1979.

- Driving the move to office automation are statistics such as:

  . Office workers now account for 22% of the U.S. labor force.

  . Office costs are growing at 6-8% per year while productivity is increasing at only 4% a year according to industry sources.

V DISCRETE MANUFACTURING INDUSTRY SECTOR MARKETS

V DISCRETE MANUFACTURING INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- The discrete manufacturing industry sector is characterized by companies who manufacture products which are sold as units; e.g., automobiles, calculators, rather than bulk products such as petroleum or cement. The latter products are covered in the next section, process manufacturing.

- 1976 revenues from shipments totalled almost $540 billion, as shown in Exhibit V-1.

- Characteristics of discrete manufacturing include:

  - Very high employment, exceeding 10 million employees in 1976.

  - A wide variation in the implementation of technology, from a low level in industry subsectors such as apparel, to a medium level in industry subsectors such as printing, to a high level in the electronics industry subsector.

  - Widely varying management styles by industry subsector, which affect the implementation of EDP within each subsector.

EXHIBIT V-1

DISCRETE MANUFACTURING INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
ALL	ALL	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$538.1 BILLION 184,642 10.7 BILLION
23	APPAREL	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$34.8 BILLION 22,638 1.3 MILLION
25	FURNITURE	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$14.2 BILLION 8,529 425,600
27	PRINTING	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$42.8 BILLION 40,713 1.08 MILLION
31	LEATHER	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$7.1 BILLION 2,846 247,100
34	METAL	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$77.5 BILLION 28,459 1.5 MILLION
35	MACHINERY	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$105.5 BILLION 40,620 1.95 MILLION
36	ELECTRONICS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$73.9 BILLION 12,062 1.57 MILLION
37	TRANSPORTATION	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$141.0 BILLION 8,246 1.7 MILLION

EXHIBIT V-1 (CONTD)

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
38	SCIENTIFIC AND CONTROL INSTRUMENTS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	25.0 BILLION 6,074 518,000
39	MISCELLANEOUS MANUFACTURERS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$16.3 BILLION 14,455 410,000

- The largest industry subsector is transportation with 1976 revenues totaling 26% of the total, and dominated by the automotive industry.

- While most industries are being pressed to increase prices due to rising cost of labor and materials, electronics companies in particular are using technology to reduce product prices.

- The distribution of firms by size is shown in Exhibit V-2. The large number of firms with sales under $20 million is notable.

- For a discussion of the use of EDP in discrete manufacturing, refer to pages 91 through 99 in INPUT's "1977 Computer Services Industry Annual Report," and to INPUT's 1977 report, "Computer Services Markets In Discrete Manufacturing."

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- The market for computer services in the discrete manufacturing sector will grow at slightly less than the industry average, or 15%, as shown in Exhibit V-3.

- All modes of service except batch grow through the forecast period with RCS leading the way, as shown in Exhibit V-4.

  - Large companies use financial services and the like.

  - Small companies, to the extent that they use RCS rather than batch, tend to use basic applications starting with payroll and general accounting.

EXHIBIT V-2

DISCRETE MANUFACTURING ORGANIZATIONS -

DISTRIBUTION BY SIZE

SIC	INDUSTRY NAME	ANNUAL SALES			
		< $20 M	$20-100 M	$100-300 M	> $300 M
		SMALL	MEDIUM	LARGE	VERY LARGE
23	APPAREL	18,745	4,262	18	9
25	FURNITURE	8,542	133	8	2
27	PRINTING	40,059	244	22	9
31	LEATHER	2,885	59	2	1
34	METAL	28,399	363	47	26
35	MACHINERY	40,063	681	64	61
36	ELECTRONICS	11,548	709	42	41
37	TRANSPORTATION	7,921	454	29	28
38	SCIENTIFIC AND CONTROL INSTRUMENTS	5,770	161	21	14
39	MISCELLANEOUS MANUFACTURING	14,483	21	12	3
	TOTAL	178,415	7,087	265	194

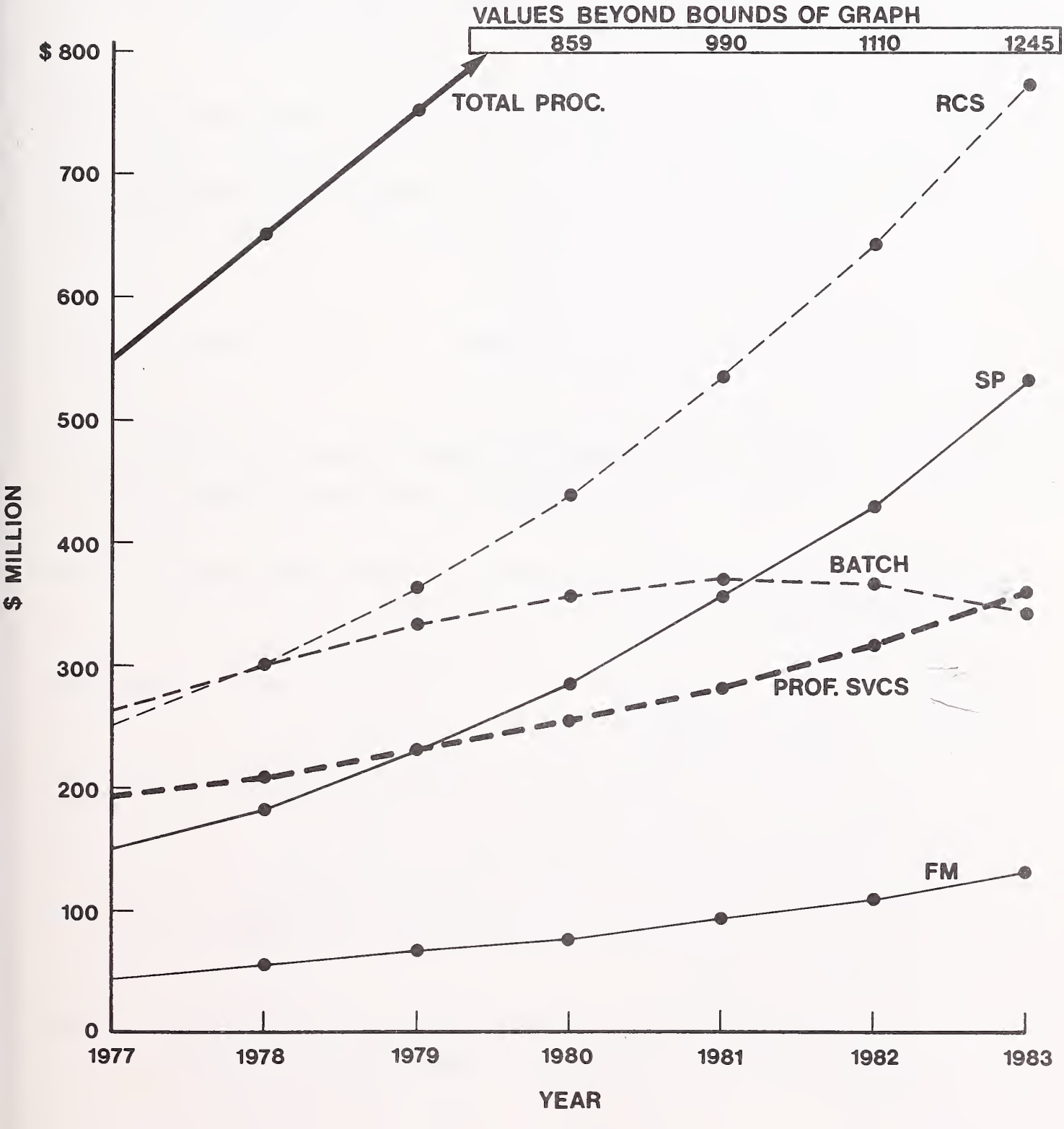
EXHIBIT V-3

COMPUTER SERVICES MARKET FORECAST FOR DISCRETE MANUFACTURING, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	36	45	25	55	70	90	115	140	25
	SCI. & ENG.	40	50	25	58	65	80	100	125	20
	IND. SPEC.	113	135	19	165	200	245	295	350	21
	UTILITY	60	70	17	82	95	115	130	155	17
	TOTAL	249	300	20	360	430	530	640	770	21
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.	4	5	25	6	8	10	15	20	32
	IND. SPEC.	22	26	18	31	37	45	55	65	20
	UTILITY	16	20	25	24	29	35	40	45	18
	TOTAL	42	51	21	61	74	90	110	130	21
BATCH	GEN. BUS.	145	170	17	195	215	225	215	200	4
	SCI. & ENG.	21	21	-	21	20	20	15	10	(16)
	IND. SPEC.	50	60	20	69	78	85	90	95	10
	UTILITY	43	50	16	45	42	40	40	40	(5)
	TOTAL	259	301	16	330	355	370	360	345	4
TOTAL PROCESSING	GEN. BUS.	181	215	19	250	285	315	330	340	10
	SCI. & ENG.	65	76	17	85	93	110	130	155	15
	IND. SPEC.	185	221	19	265	315	375	440	510	18
	UTILITY	119	140	18	151	166	190	210	240	11
	TOTAL	550	652	19	751	859	990	1,110	1,245	14
SOFTWARE PRODUCTS	SYSTEM	80	95	19	115	140	175	215	275	24
	APPLICATION	70	90	29	115	145	185	215	265	24
	TOTAL	150	185	23	230	285	360	430	540	24
PROFESSIONAL SERVICES		190	210	11	230	255	280	320	360	11
TOTAL	TOTAL	890	1,047	18	1,211	1,399	1,630	1,860	2,145	15

EXHIBIT V-4

INDUSTRY MARKETS BY MODE OF SERVICE -
DISCRETE MANUFACTURING INDUSTRY SECTOR



- General business batch applications, currently 80% of total general business processing applications, are particularly vulnerable to replacement by small standalone systems. Basic Four and others are exploitng this market.

- Scientific and engineering processing services continued to grow from a modest base as entrenched competitors enhance current products or add related products.

  - CDC added dynamic analysis to its EASE 2 structural analysis program.

  - Some new products such as a special series of programs for the decision and analysis of sea structures from United Computing Systems, Inc., have been introduced recently.

- Industry specialty applications represent the largest and fastest growing type of service.

  - Xerox Computer Services increased its already extensive interactive offerings with a production control system announced in early 1978.

  - Graphics based systems such as MCAUTO's CADD system are particularly active.

  - UCC announced CINTURN II, a numerical control service developed by Cincinnati Milacron.

- Bowne Time Sharing introduced COMSPEC, and FAA maintained master specification for airport construction.

- Utility based services show modest growth with DBMS based services outperforming the average.

- Software products grow at the fastest rate of any services category. Graphics software is particularly active, with a range of recent announcements.

- Synthavision was introduced by Mathematical Applications Group, Inc., of Elmsford, New York. The package lets users generate a 3-D mathematical model, slice through it at any point from any angle and produce line drawings of any cross section needed.

- IBM also came out with graphics software originally designed by Lockheed Corporation.

- NCR introduced a comprehensive application software program called MISSION (Manufacturing Information Systems Support Integrated On-Line) and targetted at 3,500 manufacturing companies which employ over 500 persons.

  - The support systems include the Cincom DBMS, TOTAL.

  - Emphasis is on on-line applications.

- Digital Equipment Corporation, recognizing that software is often a limiting factor in computer usage, has set up a software referral service designed to help engineering users exchange programs.

- Xerox Computer Services moved to capitalize on the fast growing software products market by acquiring Arista, a Winston-Salem, North Carolina software and batch services firm.

- In the professional services area, Software International introduced a nationwide consulting group with expertise in the manufacturing area.

- The modest growth rate for professional services in this industry sector of 11% is partly a reflection of the higher use of software products, which to an extent replace outside custom programming.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- INPUT's 1978 user panel includes 83 EDP managers in the discrete manufacturing sector. Their responses to a detailed questionnaire are the basis for this section.

- With regard to objectives, EDP managers in this sector had an unusually high interest in installing new applications, compared to other industry sector EDP managers.

  - Designing and installing DDP is growing from a small 1978 interest level to a significant 1980 interest level as shown in Exhibit V-5.

  - Data base development precedes DDP in importance, consistent with the results of other INPUT research.

- EDP managers expected applications specific to manufacturing to approximate 25% of applications to be developed in the next two years, as shown in Exhibit V-6.

- Pressures within the industry sector to control costs are reflected by the continued emphasis on inventory control which was mentioned as top priority by 26% of the respondents with inventory control applications planned.

- Order entry and billing, two seemingly established applications, are given a lot of attention with an average priority rating second only to manufacturing applications (such as MRP).

- The absence of any applications development in-house on scientific and engineering applications reflects both the maturity of this area and the penetration outside services have made.

EXHIBIT V-5

OBJECTIVES OF RESPONDING EDP MANAGERS
IN THE DISCRETE MANUFACTURING INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	6	7%	10	14%	6	12%
DESIGN/INSTALL DDP	2	2	6	8	9	18
INSTALL NEW APPLICATIONS	19	23	16	22	10	20
INSTALL ON-LINE APPLICATIONS	14	17	12	16	11	22
INSTALL/UPGRADE MAINFRAME	12	14	10	14	1	2
INSTALL MINI	4	5	4	5	1	2
INSTALL NEW OPERATING SYSTEM	9	11	2	3	2	4
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	15	18	8	11	4	8
CENTRALIZE OR DECENTRALIZE	2	2	3	4	1	2
SUBTOTAL	83	99%	71	97%	45	90%
OTHER (SPECIFY)						
INTERNATIONAL COMMUNICATIONS	-	-	1	1%	1	2%
REWRITE APPLICATIONS	-	-	1	1	4	8
OFFICE OF THE FUTURE	-	-	1	1	-	--
TOTAL	83	99%	74	100%	50	100%

EXHIBIT V-6

APPLICATIONS TO BE DEVELOPED BY RESPONDING EDP MANAGERS IN THE DISCRETE MANUFACTURING INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY*	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	41	18%	7	15%
MARKETING & SALES	12	5	3	25
SCIENTIFIC & ENGINEERING	-	-	-	-
WORD PROCESSING	2	1	-	-
PERSONNEL RELATED/ PAYROLL	17	7	2	12
INVENTORY CONTROL	23	9	6	26
COST SYSTEMS	13	5	3	23
ORDER ENTRY/BILLING	36	14	15	42
MODELLING FORECASTING	7	3	-	-
DATA BASE APPLICATIONS	7	3	-	-
PERFORMANCE MEASUREMENT	3	1	1	33
GRAPHICS	2	1	-	-
PURCHASING	15	6	3	20
SUBTOTAL	184	72	40	
OTHER (OFTEN INDUSTRY SPECIFIC)				
MANUFACTURING	60	23	21	35
SCHEDULING	7	3	1	14
ELECTRONIC MAIL	3	1	-	-
DISTRIBUTION	3	1	-	-
SUBTOTAL	73	28	22	
TOTAL	257	100%	62	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

- Data base applications rate low compared to other industries, being the lowest relative percentages (3%) of the ten sectors surveyed. This will change as indicated by the higher interest in data base development in the objectives discussed above.

- The shift in expenditures from large computers to minis is shown by a change in expenditure patterns shown in Exhibit V-7. Communications expenditures will increase significantly, approaching the cross-industry average of 6%.

- Remote batch services and batch services being sold to EDP managers are most vulnerable to being brought in-house as shown by results presented in Exhibit V-8. As in other industry sectors, however, EDP managers are often not successful in their efforts to bring processing services in-house.

  - Applications software shows good growth at 31%, again reflecting the pressure for new in-house applications development.

  - Education and maintenance services also show good growth potential.

- Reasons for terminal acquisition center on source input and data base inquiry as shown in Exhibit V-9.

  - Remote job entry and interactive timesharing have high "intermediate" ratings, indicating that these are secondary uses.

  - Graphics is rated low. This indicates that graphics are being provided by computer services vendors rather than by the in-house facility.

- The utilization of personnel and computer resources in this industry sector parallels the total user panel response as shown in Exhibit V-10. The slightly higher utilization of applications programmers in new applications development is consistent with the emphasis on new applications described earlier.

EXHIBIT V-7

ANTICIPATED CHANGES IN EDP BUDGETS OF RESPONDENTS IN THE DISCRETE MANUFACTURING INDUSTRY

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	27%	25%	23%	25%	(15)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	3	5	6	5	100
NON-PROGRAMABLE TERMINALS	3	4	4	4	33
COMMUNICATIONS	5	6	6	6	20
SOFTWARE (PURCHASE/LEASE)	3	4	4	4	33
PERSONNEL	45	45	45	45	-
OTHER	13	11	9	11	(31)
TOTAL	100%	100%	100%	100%	

EXHIBIT V-8

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE BY RESPONDENT EDP MANAGERS IN THE DISCRETE MANUFACTURING INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs.1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$473	25	$330	28	(30)%
REMOTE BATCH	687	9	277	13	(60)
BATCH	674	8	301	8	(55)
INPUT/OUTPUT	33	27	34	28	3
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	38	48	45	49	18
APPLICATIONS SOFTWARE	42	37	55	36	31
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	303	20	284	20	(6)
EDP CONSULTING	167	10	95	14	(43)
EDUCATION	42	46	53	44	26
OTHER	0	1	6	1	-
FACILITIES MANAGEMENT	6	1	-	-	-
MAINTENANCE	65	32	89	32	37

EXHIBIT V-9

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE DISCRETE MANUFACTURING INDUSTRY SECTOR

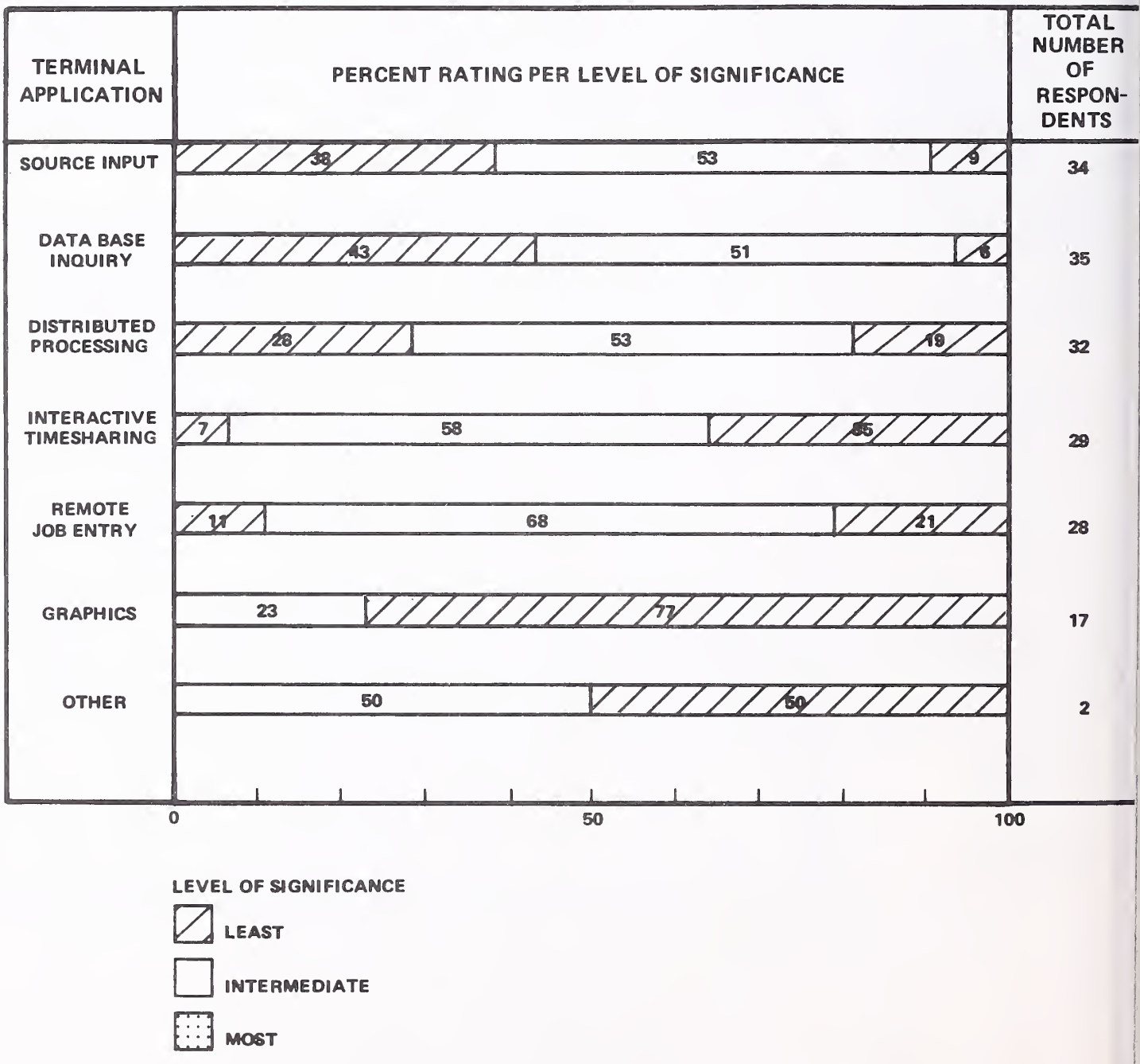


EXHIBIT V-10

UTILIZATION OF COMPUTER RESOURCES AND PROGRAMMERS BY RESPONDENTS IN THE DISCRETE MANUFACTURING INDUSTRY SECTOR

USE	PERCENT COMPUTER RESOURCES		PERCENT APPLICATION PROGRAMMERS	
	DISCRETE MFG.	TOTAL USER PANEL	DISCRETE MFG.	TOTAL USER PANEL
PRODUCTION RUNS	67%	67%	-	-
NEW APPLICATIONS - PROGRAM DEVELOPMENT	16	15	58	51
MAINTENANCE OF EXISTING PROGRAMS	13	13	40	46
OTHER	4	5	2	3
TOTAL	100%	100%	100%	100%

- With all of the current publicity being given to the merging of data and text, over half of responding EDP managers do not see themselves being involved in office automation elements by 1983, as shown in Exhibit V-11.

  - Copying/duplicating and voice communications are the last to get EDP manager involvement, according to respondents.

  - Word processing already has significant EDP involvement and 63% of responding EDP managers expect to be involved by 1983.

D. RECENT VENDOR ACTIVITIES

- Martin Marietta Data Systems (MMDS), a leading services supplier in this industry sector, announced the availability of MAS-80, presented as a new generation for the 1980s.

  - It includes the traditional manufacturing applications plus a data base capability.

  - It is designed to run on mainframes or minicomputers.

  - MMDS also announced a professional services contract to provide minicomputer based manufacturing software systems to EXXON Enterprises.

- Informatics capitalized on a data and text capability and announced that it will prepare four "New Issue" parts catalogs for Ford Motor Company.

- A.O. Smith Data Systems continues to emphasize services to this industry sector.

EXHIBIT V-11

RESPONDING EDP MANAGERS' ANTICIPATED INVOLVEMENT WITH ELEMENTS OF OFFICE AUTOMATION IN THE DISCRETE MANUFACTURING INDUSTRY SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	10	2	5	5	22	44
WORD PROCESSING	16	2	7	4	17	46
COPYING/ DUPLICATING	10	-	-	6	28	44
VOICE COMMUNI-CATIONS	9	-	3	1	29	42
FACSIMILE	12	1	2	2	26	43
TOTAL	57	5	17	18	122	219

- Systems Development Corporation introduced Text II-20, an electronic publishing system designed for small to medium sized newspapers:

  - The system in addition to accomplishing production of news and ads, handles ad accounting, billing, accounts receivable and management reports.

  - The system integrates communications lines, CRTs, OCR readers and phototypesetters.

- Digital Equipment Corporation continued to be active in the publishing field with its new DECedit-620 and DECset-620 systems for newspapers. These systems also integrate elements similar to the SDC system.

- Among manufacturers of small computers, Wang Laboratories, Inc., is one of many promoting its system to discrete manufacturing companies. Wang introduced an inventory control and bill of materials package called Manufacturing Management System (MMS).

- Software vendors are adapting their products to minicomputers. Comserv's adaptation of its Amaps system to the Hewlett-Packard System 3000 is an example.

- Calma Co, Inc., of Sunnyvale, CA introduced an interactive graphics system which is designed to produce a bill of materials from a designer's drawing. Calma is now in the process of being acquired by United Computing Systems.

- Microprocessors will impact services markets in this sector as in others with announcements such as General Automation's Spectrum system, a lower cost numerical control system replacing its higher priced Adapt-A-Path line.

- Other vendor activities are described on pages 105 through 108 of INPUT's "1977 Computer Services Industry Annual Report."

VI PROCESS MANUFACTURING INDUSTRY SECTOR MARKETS

VI PROCESS MANUFACTURING INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- Products produced by companies in this sector tend to be sold in volume measures (petroleum, cement) rather than the unit measures (automobiles, television sets) characteristic of discrete manufacturing companies.

- The industry sector is characterized by fewer companies with high revenues per establishment particularly in the tobacco and petroleum subsectors as shown in Exhibit VI-1.

- Food products is the largest subsector, both in value of shipments and number of employees. Its products have some of the characteristics of discrete manufacturing, and it does not typify other subsectors which market mainly in non-consumer areas such as chemicals and paper.

- The size distribution of companies varies significantly by subsector.

  - Size distribution is shown in Exhibit VI-2.

  - This size distribution is very significant when designing products targetted at subsectors.

EXHIBIT VI-1

PROCESS MANUFACTURING INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
ALL	ALL	VALUE OF SHIPMENTS NUMBER OF ESTABLISHMENTS NUMBER OF EMPLOYEES	$882.7 BILLION 144,560 8.0 MILLION
10	METAL MINING	VALUE OF SHIPMENTS (1975) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$5.2 BILLION 775 92,300
11	ANTHRACITE MINING	VALUE OF SHIPMENTS (1975) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$198.5 MILLION 70 3,600
12	COAL MINING	VALUE OF SHIPMENTS (1975) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$12.5 BILLION 3,801 198,000
13	OIL AND GAS EXTRACTION	VALUE OF SHIPMENTS (1975) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$34.8 BILLION 13,257 335,700
20	FOOD PRODUCTS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$180.9 BILLION 24,500 1.5 MILLION
21	TOBACCO	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1976) NUMBER OF EMPLOYEES (1976)	$8.7 BILLION 166 64,800
22	TEXTILE PRODUCTS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$36.4 BILLION 6,693 875,800
24	LUMBER AND WOOD PRODUCTS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$31.2 BILLION 22,943 628,700

EXHIBIT VI-1 (CONTD)

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
26	PAPER PRODUCTS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$48.2 BILLION 5,874 614,800
28	CHEMICALS	NUMBER OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$104.1 BILLION 10,957 851,200
29	PETROLEUM	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$82.3 BILLION 1,977 144,500
30	RUBBER AND PLASTICS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$31.8 BILLION 9,425 627,400
32	STONE, GLASS CLAY	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$30.6 BILLION 15,553 599,000
34	PRIMARY METALS	VALUE OF SHIPMENTS (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$77.5 BILLION 28,459 1.5 MILLION

EXHIBIT VI-2
PROCESS MANUFACTURING ORGANIZATIONS -
DISTRIBUTION BY SIZE

SIC	INDUSTRY NAME	ANNUAL SALES			
		< $20 M	$20-100 M	$100-300 M	> $300 M
		SMALL*	MEDIUM*	LARGE**	VERY LARGE**
10	METAL MINING	770	213	14	17
11	ANTHRACITE MINING	230	-	-	-
12	BITUMINOUS COAL AND LIGNITE MINING	3,364	50	-	-
13	OIL AND GAS EXTRACTION	13,293	23	4	6
20	FOOD AND KINDRED PRODUCTS	24,971	277	60	75
21	TOBACCO MANUFACTURERS	276	17	2	5
22	TEXTILE MILL PRODUCTS	6,500	415	21	15
24	LUMBER AND WOOD PRODUCTS, EXCEPT FURNITURE	31,253	70	-	-
26	PAPER AND ALLIED PRODUCTS	5,735	162	26	31
28	CHEMICALS AND ALLIED PRODUCTS	10,814	244	35	67
29	PETROLEUM REFINING AND RELATED INDUSTRIES	1,976	22	9	28
30	LEATHER AND LEATHER PRODUCTS	9,273	179	10	8
32	STONE, CLAY, GLASS, AND CONCRETE PRODUCTS	15,691	166	18	15
33	PRIMARY METAL INDUSTRIES	6,506	364	30	35
	TOTAL	130,652	2,202	229	302

* NUMBER OF ESTABLISHMENTS **NUMBER OF ORGANIZATIONS

- For a discussion of current use of EDP in this industry sector, refer to pages 114 through 121 of INPUT's "1977 Annual Report Of The Computer Services Industry."

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- The average overall growth of computer services revenues in the process manufacturing sector will be 15%, slightly less than the overall computer services industry average as shown in Exhibit VI-3.

- With regard to modes of service, RCS shows the strongest growth, reflecting the dispersed nature of establishments in this industry sector, and their increasing need to communicate.

  - Shifts in the mix of modes of service are shown graphically in Exhibit VI-4.

  - RCS accounts for 69% of the total processing services market to this sector by 1983, up from 57% in 1977.

  - Financial consolidation and cash management services have high potential.

- Batch services will be impacted by a move to in-house, but a market remains for batch/RCS combinations at smaller establishments.

- Scientific and engineering processing services continue their modest growth with the petroleum industry subsector being dominant with almost half of the revenues.

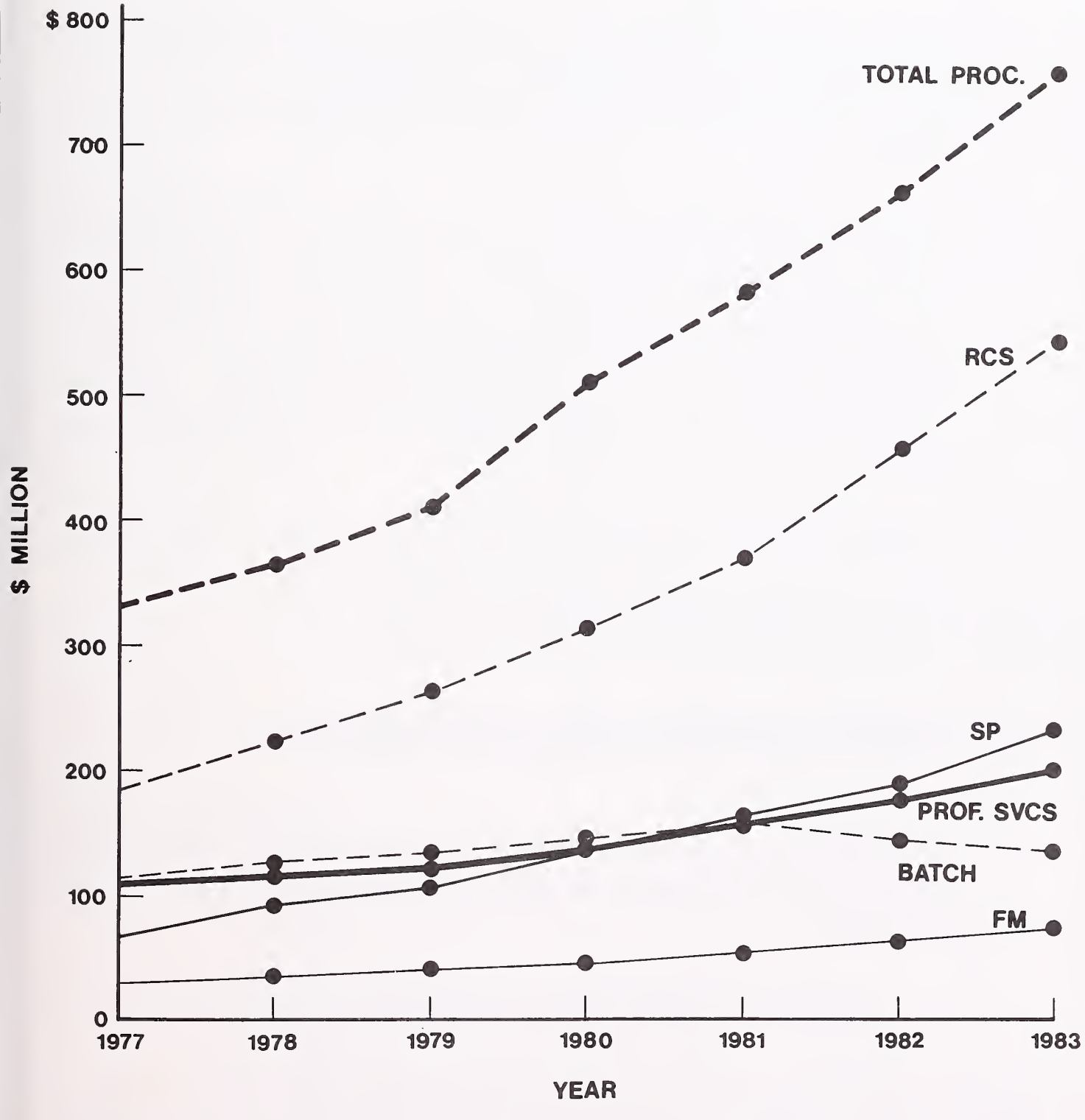
  - ChemShare, of Houston, Texas, has designed a business specifically for this subsector.

EXHIBIT VI-3
COMPUTER SERVICES MARKET FORECAST
FOR PROCESS MANUFACTURING, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	28	35	25	39	50	60	72	86	20
	SCI. & ENG.	26	30	15	35	43	50	60	72	19
	IND. SPEC.	68	82	21	100	122	145	180	220	22
	UTILITY	65	79	22	91	103	115	143	169	16
	TOTAL	187	226	21	265	318	370	455	547	19
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.	2	2	-	2	3	3	3	3	8
	IND. SPEC.	23	27	17	30	37	44	52	60	17
	UTILITY	4	5	25	6	7	9	10	12	19
	TOTAL	29	34	17	38	47	56	65	75	17
BATCH	GEN. BUS.	45	52	16	55	65	70	65	60	4
	SCI. & ENG.	12	13	8	13	14	14	10	10	(5)
	IND. SPEC.	24	27	13	30	36	40	40	38	7
	UTILITY	33	35	6	34	32	30	30	28	(5)
	TOTAL	114	127	11	132	147	154	145	136	2
TOTAL PROCESSING	GEN. BUS.	73	87	19	94	115	130	137	146	11
	SCI. & ENG.	40	45	13	50	60	67	73	85	14
	IND. SPEC.	115	136	18	160	195	229	272	318	19
	UTILITY	102	119	17	131	142	154	183	209	12
	TOTAL	330	387	17	435	512	580	665	758	14
SOFTWARE PRODUCTS	SYSTEM	48	65	35	75	90	105	120	140	17
	APPLICATION	22	30	36	35	45	60	70	90	25
	TOTAL	70	95	36	110	135	165	190	230	19
PROFESSIONAL SERVICES		110	115	5	120	135	155	175	200	12
TOTAL	TOTAL	510	597	17	665	782	900	1,030	1,188	15

EXHIBIT VI-4

INDUSTRY MARKETS BY MODE OF SERVICE
PROCESS MANUFACTURING INDUSTRY SECTOR



- ChemShare includes extensive professional services support.

- MCAUTO Offshore is another example.

- CDC is promoting usage pricing in this sector as well as in other sectors on programs such as APEX III, a linear programming service.

- Industry specialty is the fastest growing type of processing service with applications such as route accounting for the dairy industry, and seismic data processing for petroleum, being examples of the diversity of programs being offered.

- Among software products, applications software has the highest growth rate, although combinations are appearing which blur the line between applications and systems software. An example is the combination of IFIPS (Interactive Financial Planning Systems from Execucom Systems Corporation), TOTAL (a DBMS from Cincom), and Environ, a teleprocessing monitor. The user is Caltex Petroleum. Environ was developed as a joint effort by the three parties.

- Professional services are being provided to companies such as Amoco Oil Co. who used outside software developers to automate its fuel truck loading operations based on the IBM Series/1.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- The advanced state of EDP expertise in this industry sector is evidenced by the relatively high frequency of mention of DBMS and DDP as objectives for 1978-1980.

  - Results of user panel responses are presented in Exhibit VI-5.

EXHIBIT VI-5

OBJECTIVES OF RESPONDING EDP MANAGERS
IN THE PROCESS MANUFACTURING INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	8	10%	5	7%	6	12%
DESIGN/INSTALL DDP	4	5	6	8	7	14
INSTALL NEW APPLICATIONS	16	19	13	18	10	20
INSTALL ON-LINE APPLICATIONS	15	18	18	24	8	16
INSTALL/UPGRADE MAINFRAME	10	12	8	11	9	18
INSTALL MINI	2	2	2	3	-	-
INSTALL NEW OPERATING SYSTEMS	2	2	2	3	2	4
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	13	15	6	8	3	6
CENTRALIZE OR DECENTRALIZE	6	7	9	12	4	8
SUBTOTAL	76	90%	69	94%	49	98%
OTHER (SPECIFY)						
DEVELOP LONG RANGE PLANS	6	7%	3	4%	-	-
DOWNGRADE MAINFRAME	1	1	-	-	-	-
REDUCE HARDWARE COST	-	-	1	1	-	-
ELECTRONIC MAIL	-	-	1	1	-	-
GRAPHICS	1	1	-	-	-	-
TOTAL	84	100%	74	100%	49	98%

- There is a growing interest in DDP in this industry sector with DDP being mentioned in 14% of the 1980 objectives.

- As in discrete manufacturing, there is a high interest in inventory control applications as shown in Exhibit VI-6:

  - Order entry/billing continues to be highest in number of mentions and priority even after the large amounts of effort expended on these applications in recent years.

  - Data base applications tend to be high priority where they are under development.

- Differences between this industry sector and others with regard to changes in EDP budgets as shown in Exhibit VI-7 are several:

  - There is more relative growth expected in non-programmable terminals than in programmable terminals/small computers.

  - There is a very high growth in communications and software products.

  - These differences relate to the heavy emphasis on inventory control and order entry which often require central control and limited remote programmability.

- Respondent EDP managers in this industry sector expect to purchase increasing amounts of most services, as shown in Exhibit VI-8.

  - The high growth in applications software and contract programming shows a willingness to spend for outside help in getting applications running.

  - Education and maintenance show good growth, somewhat higher than the cross-industry average for respondents.

EXHIBIT VI-6

APPLICATIONS TO BE DEVELOPED BY RESPONDING EDP MANAGERS IN THE PROCESS MANUFACTURING INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY*	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	52	20%	11	21%
MARKETING & SALES	13	5	2	15
SCIENTIFIC & ENGINEERING	3	1	-	-
WORD PROCESSING	2	1	-	-
PERSONNEL RELATED/ PAYROLL	32	12	4	13
INVENTORY CONTROL	26	10	8	31
COST SYSTEMS	12	5	2	17
ORDER ENTRY/BILLING	40	16	17	43
MODELLING FORECASTING	8	3	-	-
DATA BASE APPLICATIONS	13	5	4	31
PERFORMANCE MEASUREMENT	-	-	-	-
GRAPHICS	1	1	-	-
PURCHASING	11	4	1	9
SUBTOTAL	213	83	49	
OTHER (OFTEN INDUSTRY SPECIFIC)				
MANUFACTURING	29	-	7	24
SCHEDULING	4	2	3	75
ELECTRONIC MAIL	-	-	-	-
DISTRIBUTION	8	3	2	25
COMMUNICATIONS	4	2	0	0
SUBTOTAL	45	11	12	
TOTAL	258	100%	61	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

EXHIBIT VI-7

ANTICIPATED CHANGES IN EDP BUDGETS OF RESPONDENTS IN THE PROCESS MANUFACTURING INDUSTRY

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	27%	26%	26%	26%	(4)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	6	7	9	7	50
NON-PROGRAMABLE TERMINALS	2	3	4	3	100
COMMUNICATIONS	3	4	6	4	100
SOFTWARE (PURCHASE/LEASE)	3	4	5	4	67
PERSONNEL	46	45	43	45	(7)
OTHER	10	9	7	9	(30)
TOTAL	100%	100%	100%	100%	

EXHIBIT VI-8

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE BY RESPONDENT EDP MANAGERS IN THE PROCESS MANUFACTURING INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs.1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$61	30	$63	30	3 %
REMOTE BATCH	19	3	15	5	(21)
BATCH	4	3	4	4	-
INPUT/OUTPUT	10	18	11	20	1
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	30	36	34	38	14
APPLICATIONS SOFTWARE	25	25	48	34	92
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	36	28	56	25	56
EDP CONSULTING	20	9	14	11	(30)
EDUCATION	10	28	13	30	38
OTHER	12	2	18	2	50
FACILITIES MANAGEMENT	-	-	-	-	-
MAINTENANCE	75	17	96	17	28

- Reasons for acquiring terminals again related to the applications under development with source input being dominant as shown in Exhibit VI-9.

  - DDP was a "most" or "intermediate" reason for 85% of those responding.

  - Interactive or RJE were low as reasons for terminal acquisitions, indicating they are implemented on existing rather than new terminals.

- Utilization of computer resources and applications programmers paralleled the cross industry average as shown in Exhibit VI-10.

- Other than word processing, the majority of responding EDP managers do not expect to be involved in office automation elements by 1983 as shown in Exhibit VI-11.

D. RECENT VENDOR ACTIVITIES

- CompuServe announced the availability of Medsystem (Numerical Evaluation and Design System) which was developed by Mintec, Inc., a firm specializing in developing computer applications for the mineral industry. Medsystem creates mine designs, production schedules and financial analyses for mining projects.

- An overseas company entering the U.S. market is Compeda, a company backed by the British Government; it is offering a software system aimed at plant design for the petroleum industry.

- In the professional services area, a typical application was developed by Graham Computer Enterprises, Inc., of Birmingham, Alabama, for Colonial Industries, Inc.

EXHIBIT VI-9

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE PROCESS MANUFACTURING INDUSTRY SECTOR

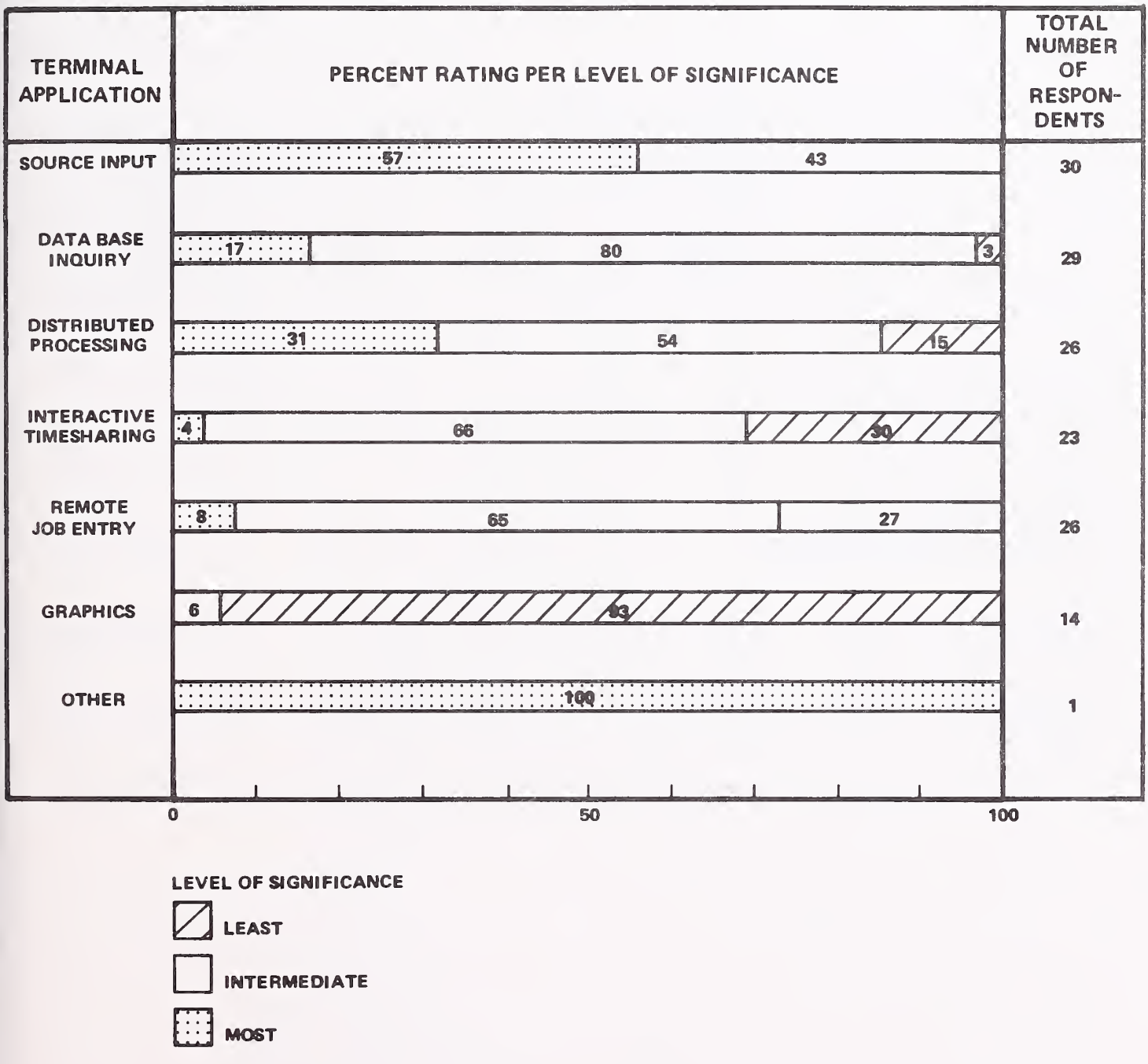


EXHIBIT VI-10

UTILIZATION OF COMPUTER RESOURCES AND PROGRAMMERS BY RESPONDENTS IN THE PROCESS MANUFACTURING INDUSTRY SECTOR

USE	PERCENT COMPUTER RESOURCES		PERCENT APPLICATION PROGRAMMERS	
	PROCESS MFG.	TOTAL USER PANEL	PROCESS MFG.	TOTAL USER PANEL
PRODUCTION RUNS	67%	67%	-	-
NEW APPLICATIONS - PROGRAM DEVELOPMENT	16	15	54	51
MAINTENANCE OF EXISTING PROGRAMS	14	13	43	46
OTHER	3	5	3	3
TOTAL	100%	100%	100%	100%

EXHIBIT VI-11

RESPONDING EDP MANAGERS' ANTICIPATED INVOLVEMENT WITH ELEMENTS OF OFFICE AUTOMATION IN THE PROCESS MANUFACTURING INDUSTRY SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	6	1	7	5	17	36
WORD PROCESSING	12	6	6	2	10	36
COPYING/ DUPLICATING	8	-	-	4	24	36
VOICE COMMUNI-CATIONS	11	1	3	2	20	37
FACSIMILE	20	-	1	3	15	39
TOTAL	57	8	17	16	86	184

- The installed system is built around IBM Series/1 minis because of the maintenance availability for this computer.

- Also in the system are Hazeltine 1510 CRTs.

- The system controls loading of petroleum products, invoicing, bill of lading preparation, credit checking, and the like.

- A distributed processing system using Datapoint equipment was installed by National Chemsearch Corp., a specialized chemical products maker. The system links the firm's sales offices in the U.S. and overseas for reporting, accounting and other information.

- Other vendor activities are presented on pages 121 through 126 of INPUT's "1977 Annual Report Of The Computer Services Industry."

VII TRANSPORTATION INDUSTRY SECTOR MARKETS

VII TRANSPORTATION INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- From the standpoint of use of technology, airlines dominate this sector and this is reflected in the relatively advanced use of EDP in the airlines subsector.

- Motor freight has the highest revenues but is a fragmented subsector with only 127 firms not regulated by ICC and 368 firms regulated by ICC, having revenues of $100,000 or more in 1976 out of the approximately 65,000 firms operating the the U.S.

  - These firms, however, account for almost half of the industry revenues.

  - This subsector also accounts for almost one-third of the employees in this sector and one-third of the revenues.

- A comparison of revenues, number of establishments and number of employees in each subsector is presented in Exhibit VII-1.

- Over half of the industry revenues were derived by the "Fortune 50" transportation companies which include 16 airlines, 16 railroads, 14 motor freight companies, and four water transportation companies.

EXHIBIT VII-1

TRANSPORTATION INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
ALL	ALL	OPERATING REVENUES NUMBER OF ESTABLISHMENTS NUMBER OF EMPLOYEES	$75.9 BILLION 134,559 3.1 MILLION
40	RAILROADS	OPERATING REVENUES (1975) NUMBER OF OPERATING COMPANIES (1974) NUMBER OF EMPLOYEES (1974)	$17.7 BILLION 341 541,000
41	LOCAL AND SUBURBAN TRANSIT	OPERATING REVENUES (1974) NUMBER OF ESTABLISHMENTS (1975) NUMBER OF EMPLOYEES (1975)	$1.4 BILLION 13,181 308,000
42	MOTOR FREIGHT (NON ICC)	OPERATING REVENUES (1972) NUMBER OF ESTABLISHMENTS (1972) NUMBER OF EMPLOYEES (1972)	$7.8 BILLION 63,000 328,000
42	MOTOR FREIGHT (ICC CLASS I)	OPERATING REVENUES (1973) NUMBER OF ESTABLISHMENTS (1973) NUMBER OF EMPLOYEES (1973)	$16.6 BILLION 1,500 580,000
43	U.S. POSTAL SERVICE	OPERATING REVENUES (1976) NUMBER OF POST OFFICES (1976) NUMBER OF EMPLOYEES (1976)	$12.8 BILLION 30,521 679,000
44	WATER TRANSPORTATION	OPERATING REVENUES (1975) NUMBER OF ESTABLISHMENTS (1975) NUMBER OF EMPLOYEES (1975)	$946.0 MILLION 5,841 184,000
45	AIR TRANSPORTATION	OPERATING REVENUES (1975) NUMBER OF AIR CARRIERS (1975) NUMBER OF EMPLOYEES (1976)	$15.4 BILLION 4,738 370,000
46	PIPELINES	OPERATING REVENUES (1975) NUMBER OF ESTABLISHMENTS (1975) EMPLOYEES (1975)	$1.9 BILLION 437 19,400

EXHIBIT VII-1 (CONTD)

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
47	TRANSPORTATION SERVICES	OPERATING REVENUES (1972) NUMBER OF ESTABLISHMENTS (1975) NUMBER OF EMPLOYEES (1975)	$1.4 BILLION 15,000 136,000

- The widely different structures of these subsectors have retarded cross-subsector applications development.

- The rate structures, particularly in the trucking industry, are extremely complex and have not been automated to their full potential.

- The railroads and pipeline companies typically use their rights of way to carry communications systems.

  - Southern Pacific, through Southern Pacific Communications Company (SPCC), is selecting communications services commercially.

  - SPCC functions as a Value Added Network (VAN), selling voice, data and facsimile services.

- Other information concerning the use of EDP in the transportation sector is presented on pages 130 through 135 of INPUT's "1977 Computer Services Industry Annual Report."

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- The 1977 computer services market in the transportation sector is one of the smaller markets, totalling only 2.5% of the overall market. Detailed forecasts for the sector are presented in Exhibit VII-2.

- Among the modes of service RCS accounts for 52% and is the fastest growing, accounting for 68% by 1983.

  - Batch is not expected to grow beyond 1980, and will remain concentrated on general business applications such as payroll in the motor freight sector.

EXHIBIT VII-2

COMPUTER SERVICES MARKET FORECAST FOR TRANSPORTATION, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	7	9	29	10	16	20	25	30	27
	SCI. & ENG.	3	3		3	4	5	5	5	11
	IND. SPEC.	32	40	25	50	65	80	100	125	26
	UTILITY	18	22	22	26	30	35	40	45	15
	TOTAL	60	74	23	89	115	140	170	205	23
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	20	25	25	27	31	35	40	45	13
	UTILITY									
	TOTAL	20	25	25	27	31	35	40	45	13
BATCH	GEN. BUS.	13	16	23	17	19	20	18	17	1
	SCI. & ENG.	2	2	-	2	1	-	-	-	-
	IND. SPEC.	13	16	23	18	20	23	27	28	12
	UTILITY	7	7	-	7	7	7	5	5	7
	TOTAL	35	41	17	44	47	50	50	50	5
TOTAL PROCESSING	GEN. BUS.	20	25	25	27	35	40	43	47	14
	SCI. & ENG.	5	5	-	5	5	5	5	5	-
	IND. SPEC.	65	81	25	95	116	138	167	198	20
	UTILITY	25	29	16	33	37	42	45	50	12
	TOTAL	115	140	22	160	193	225	260	300	16
SOFTWARE PRODUCTS	SYSTEM	15	17	13	18	20	25	30	35	16
	APPLICATION	15	15	-	17	20	25	30	40	22
	TOTAL	30	32	7	35	40	50	60	75	19
PROFESSIONAL SERVICES		24	28	17	30	33	36	40	44	9
TOTAL	TOTAL	169	200	18	225	266	311	360	419	16

- Forecasts are presented graphically in Exhibit VII-3.

- Software products grow steadily from a modest base with systems software being sold primarily to the railroad and airline subsectors.

- Applications software is sold to all subsectors with the airline industry subsector being characterized by a few large ticket systems; an example is the Eastern Airlines version of PARS which sells for over $1 million.

- Professional services remain a small market with transportation companies continuing to depend heavily on internal software development.

- With regard to types of service, industry specialty is the largest and fastest growing as shown in Exhibit VII-2.

  - Airlines account for 60%, motor freight 30%, and railroads less than 10%.

  - Key applications are freight billing, vehicle scheduling, and vehicle acquisition analyses.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- The conservative nature of the transportation industry is reflected in the objectives of INPUT's user panel respondents as shown in Exhibit VII-4.

  - Only one respondent indicated any activity in DBMS or DDP through 1980.

  - The clearest trend is the increasing emphasis on on-line applications.

EXHIBIT VII-3

INDUSTRY MARKETS BY MODE OF SERVICE -

TRANSPORTATION INDUSTRY SECTOR

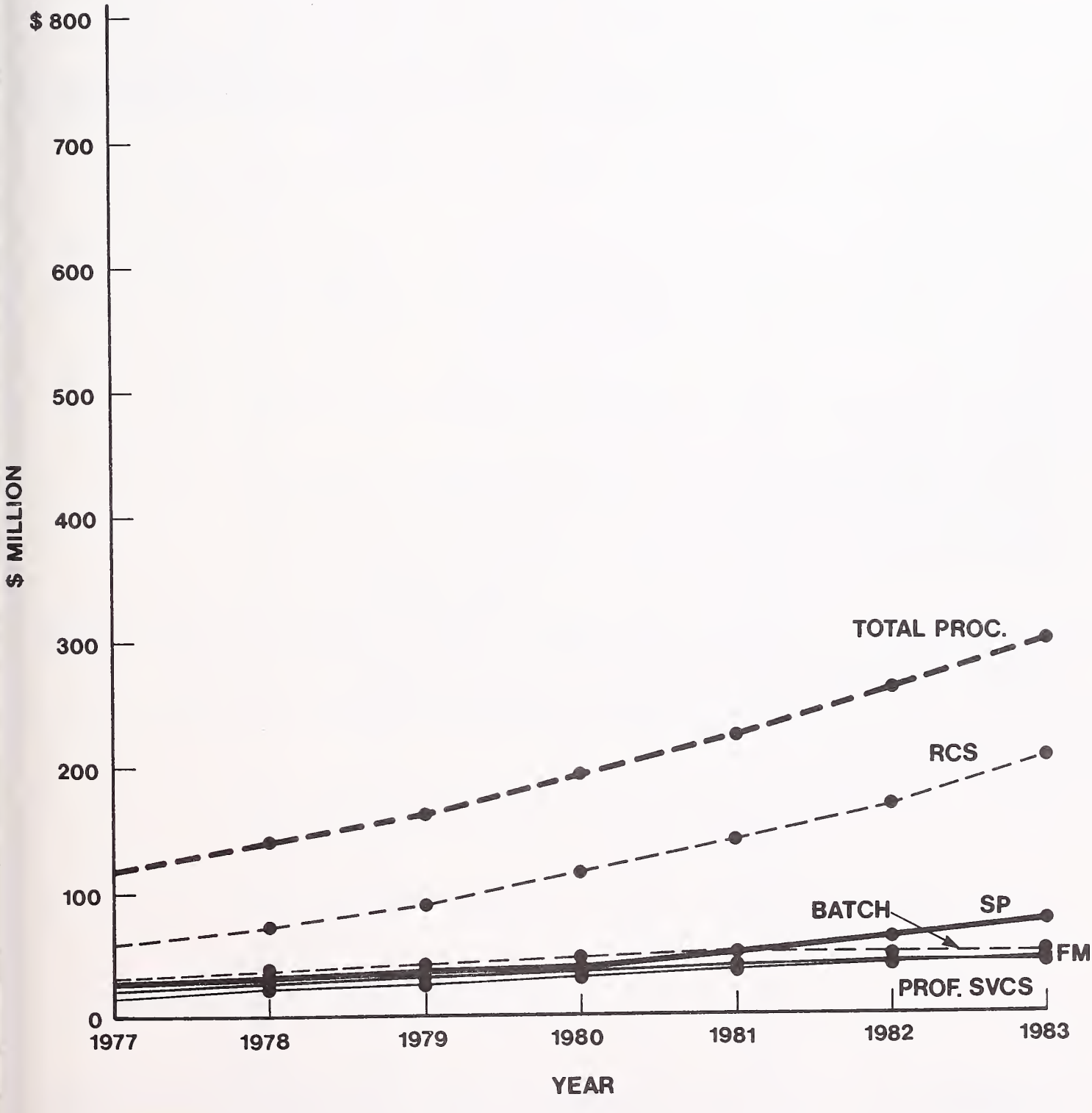


EXHIBIT VII-4

OBJECTIVES OF RESPONDING EDP MANAGERS
IN THE TRANSPORTATION INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	1	5%	-	-	-	-
DESIGN/INSTALL DDP	-	-	-	-	-	-
INSTALL NEW APPLICATIONS	4	20	3	18	1	11
INSTALL ON-LINE APPLICATIONS	3	15	4	24	5	56
INSTALL/UPGRADE MAINFRAME	3	15	3	18	1	11
INSTALL MINI	1	5	3	18	1	11
INSTALL NEW OPERATING SYSTEMS	3	15	1	6	1	11
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	3	15	2	12	-	-
CENTRALIZE OR DECENTRALIZE	1	5	1	6	-	-
SUBTOTAL	19	95%	17	102%	9	100%
OTHER (SPECIFY)						
LONG RANGE PLANS	1	5%	-	-	-	-
TOTAL	20	100%	17	102%	9	100%

- The low level of response to questions relating to applications development reduces the value of data presented in Exhibit VII-5.

  - The high interest in personnel related applications reflects the high labor content in some segments of the industry.

  - As shown in Chapter XII, the profile of applications in transportation closely parallels that in education, another lagging sector in terms of use of EDP.

- The shifts in in-house EDP budgets show several significant changes (see Exhibit VII-6).

  - Non-programmable terminal expenditures are actually declining, reflecting a shift to placing more intelligence in remote locations.

  - Use of software products is projected to increase.

  - Communications as a percent of the total is expected to decline consistent with the shift to small computers/programmable terminals, but inconsistent with the heavy amount of on-line applications development mentioned earlier.

- The user panel responses regarding use of outside services is also hindered by the small number of responses as shown in Exhibit VII-7.

  - This exhibit does show, however, a relatively higher interest in software products, contract programming and education.

  - The significant expected increase in maintenance services of 60% is notable.

EXHIBIT VII-5

APPLICATIONS OF RESPONDING EDP MANAGERS IN THE TRANSPORTATION INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY*	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	11	20%	5	45%
MARKETING & SALES	1	2	-	-
SCIENTIFIC & ENGINEERING	2	4	-	-
WORD PROCESSING	-	-	-	-
PERSONNEL RELATED/ PAYROLL	8	15	1	13
INVENTORY CONTROL	5	9	1	20
COST SYSTEMS	3	6	-	-
ORDER ENTRY/BILLING	2	4	1	50
MODELLING FORECASTING	-	-	-	-
DATA BASE APPLICATIONS	2	4	-	-
PERFORMANCE MEASUREMENT	-	-	-	-
GRAPHICS	-	-	-	-
PURCHASING	-	-	-	-
SUBTOTAL	34	64	8	
OTHER (OFTEN INDUSTRY SPECIFIC)				
INDUSTRY SPECIAL-IZED	17	31	4	24
SCHEDULING	3	6	1	33
SUBTOTAL	20	37	5	
TOTAL	54	100%	13	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

EXHIBIT VII-6

ANTICIPATED CHANGES IN EDP BUDGETS OF
RESPONDENTS IN THE TRANSPORTATION INDUSTRY

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	26%	28%	20%	25%	(23)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	3	4	4	4	33
NON-PROGRAMABLE TERMINALS	6	3	3	4	(50)
COMMUNICATIONS	6	5	4	5	(33)
SOFTWARE (PURCHASE/LEASE)	3	5	6	5	100
PERSONNEL	45	48	48	47	7
OTHER	5	5	5	5	-
TOTAL	100%	100%	100%	100%	

EXHIBIT VII-7

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE BY RESPONDENT EDP MANAGERS IN THE TRANSPORTATION INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs. 1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$ 83	3	$ 77	3	(7)%
REMOTE BATCH	-	-	-	-	-
BATCH	5	1	7	1	40
INPUT/OUTPUT	6	1	11	1	83
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	44	6	30	6	(32)
APPLICATIONS SOFTWARE	72	3	60	4	(17)
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	106	4	162	2	53
EDP CONSULTING	0	1	12	1	-
EDUCATION	15	6	18	5	20
OTHER	9	2	13	3	56
FACILITIES MANAGEMENT	-	-	-	-	-
MAINTENANCE	501	5	802	4	60

- With regard to reasons for terminal acquisition, the transaction driven nature of the transportation industry is reflected in the responses presented in Exhibit VII-8.

  - Source input dominates.

  - Interactive is second, supporting the solid growth in RCS services mentioned earlier.

- Use of computer resources and applications programmers tends to be more on new applications than on maintenance as shown in Exhibit VII-9.

- EDP managers in this industry sector do not see themselves getting involved in electronic mail (see Exhibit VII-10) even though transportation is heavily message dependent. The low response to questions related to office automation reduces the value of further analysis of Exhibit VII-10.

D. RECENT VENDOR ACTIVITIES

- MCAUTO announced a fleet vehicle route optimizing service that incorporates a CRT graphics terminal in the fleet scheduler's office for viewing and fine tuning computer generated routes.

  - MCAUTO estimates the service, processed on the Interactive Scheduling System (IVESS), developed by Decision Graphics of Nashville, will save the user twice what he pays for the service.

  - Savings come from fuel, maintenance and wages.

- Marine Management Systems in Stamford, Connecticut is offering a new on-line marine information service:

EXHIBIT VII-8

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE TRANSPORTATION INDUSTRY SECTOR

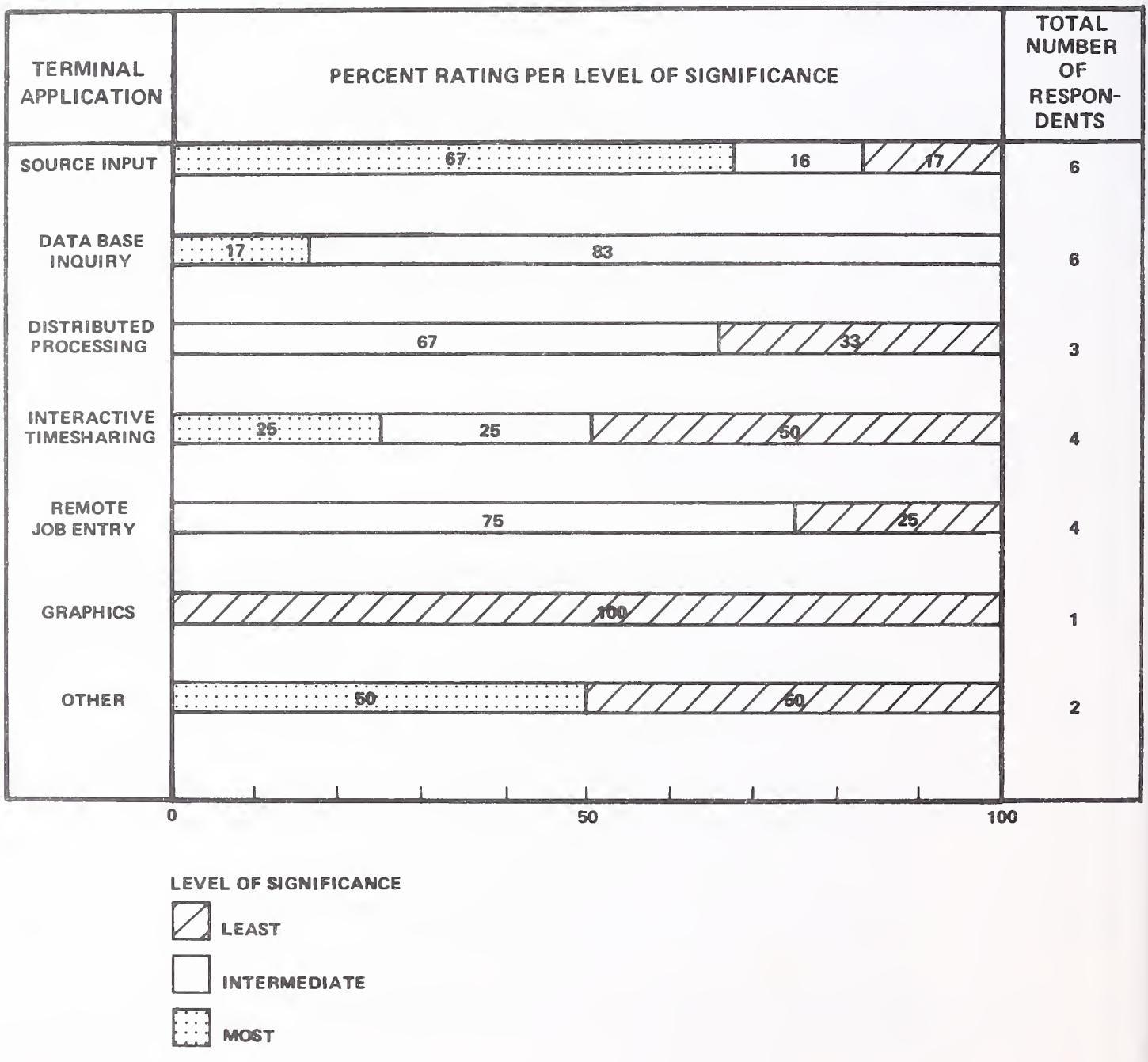


EXHIBIT VII-9

UTILIZATION OF COMPUTER RESOURCES
AND PROGRAMMERS BY RESPONDENTS
IN THE TRANSPORTATION INDUSTRY SECTOR

USE	PERCENT COMPUTER RESOURCES		PERCENT APPLICATION PROGRAMMERS	
	TRANS-PORTATION	TOTAL USER PANEL	TRANS-PORTATION	TOTAL USER PANEL
PRODUCTION RUNS	66%	67%	-	60%
NEW APPLICATIONS - PROGRAM DEVELOPMENT	19	15	56	51
MAINTENANCE OF EXISTING PROGRAMS	11	13	41	46
OTHER	4	5	3	3
TOTAL	100%	100%	100%	100%

EXHIBIT VII-10

RESPONDING EDP MANAGERS' ANTICIPATED INVOLVEMENT
WITH ELEMENTS OF OFFICE AUTOMATION
IN THE TRANSPORTATION INDUSTRY SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	-	1	-	-	7	8
WORD PROCESSING	2	3	1	-	3	9
COPYING/ DUPLICATING	3	-	-	-	5	8
VOICE COMMUNI-CATIONS	4	1	-	-	3	8
FACSIMILE	2	-	-	-	6	8
TOTAL	11	5	1	-	24	41

- It includes a variety of maritime data bases designed for commercial and governmental use.

- It will be offered via General Electric Information Services worldwide Mark 3 network.

- American Airlines shifted its AAIMS airline information system to Boeing Computer Services. AAIMS consists of a data base derived from CAA Board Form 41 information, and can be used to produce reports on various aspects of the airline industry.

- DBMS software is beginning to penetrate the industry with Cincom's TOTAL getting publicity for its installation at Ryder Truck Lines:

  - The system is run by Transportation Teleprocessing Systems, Inc., Ryder's former DP department.

  - The network includes 206 terminals and 27 data circuits.

- Further information about vendor activities in the transportation industry is presented on pages 135 through 137 of INPUT's "1977 Computer Services Industry Annual Report."

VIII UTILITIES INDUSTRY SECTOR MARKETS

VIII UTILITIES INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- Over half of the revenues in the utilities industry sector come from the gas and electric subsectors as shown in Exhibit VIII-1. Other subsectors include:
  - Telephone and telegraph.
  - Water supply.
  - The broadcasting industry.
- Eighty percent of the electric power capacity is privately owned.
  - The industry is more dispersed than is generally known with the "Fortune 50" companies accounting for only 60% of total revenues.
  - The National Rural Electric Cooperative Association represents 1,000 small electrical utilities.
  - The Electric Power Research Institute in Palo Alto, California, does R&D on behalf of the industry.

EXHIBIT VIII-1

UTILITIES INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
ALL	ALL	OPERATING REVENUES NUMBER OF ESTABLISHMENTS NUMBER OF EMPLOYEES	$127.7 BILLION 22,140 1.9 MILLION
481	TELEPHONE COMMUNICATIONS	OPERATING REVENUES (1976) NUMBER OF COMPANIES (1976) NUMBER OF EMPLOYEES (1976)	$39.0 BILLION 1,622 930,000
482	TELEGRAPH COMPANIES	OPERATING REVENUES (1975) NUMBER OF COMPANIES (975) NUMBER OF EMPLOYEES (1976)	$821 MILLION 7 19,000
483	RADIO AND T.V. BROADCASTING	OPERATING REVENUES (1976) NUMBER OF STATIONS (1975) NUMBER OF EMPLOYEES (1976)	$6.8 BILLION 6,228 157,000
489	COMMUNICATIONS SERVICES (N.E.C.)	OPERATING REVENUES (1974) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$1.0 BILLION 2,422 35,000
491	ELECTRIC SERVICES	OPERATING REVENUES (1976) NUMBER OF PLANTS (1975) NUMBER OF EMPLOYEES (1976)	$53.5 BILLION 3,769 315,000
492	GAS PRODUCTS AND SERVICES	OPERATING REVENUES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$23.7 BILLION 1,675 160,000
493	COMBINED GAS AND ELECTRIC	OPERATING REVENUES (1974) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$1.9 BILLION 877 194,000
494/ 495	WATER SUPPLY/ SANITATION	OPERATING REVENUES (1974) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1976)	$1.0 BILLION 5,547 67,000

- The telephone subsector is dominated by AT&T with its over 20 operating companies.

- There is an emerging conflict between cable TV in the broadcasting subsector and the telephone companies since both have the capability to deliver voice, image and data messages.

- The industry is unique in that almost all participants are:

  - Heavily regulated with the regulation increasing in the "energy" sector.

  - Geographically biased, in that almost all participants are limited by regulation as to the areas they are allowed to cover.

  - Limited in the products/services they can offer.

  - Strongly influenced by accounting principles which are used to set rates, depreciate equipment and justify returns on investment.

- Other information about the use of EDP in the utilities sector is presented on pages 143 through 145 of INPUT's "1977 Computer Services Industry Annual Report."

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- The dominant characteristic of services markets in the utilities industry is the high percentage of RCS, 77% of total processing services in 1977. This percentage grows to 89% in 1983, as shown in Exhibit VIII-2.

- Other than RCS, the markets available for processing services are small with the remaining batch market declining at the end of the forecast period. This is shown graphically in Exhibit VIII-3.

EXHIBIT VIII-2

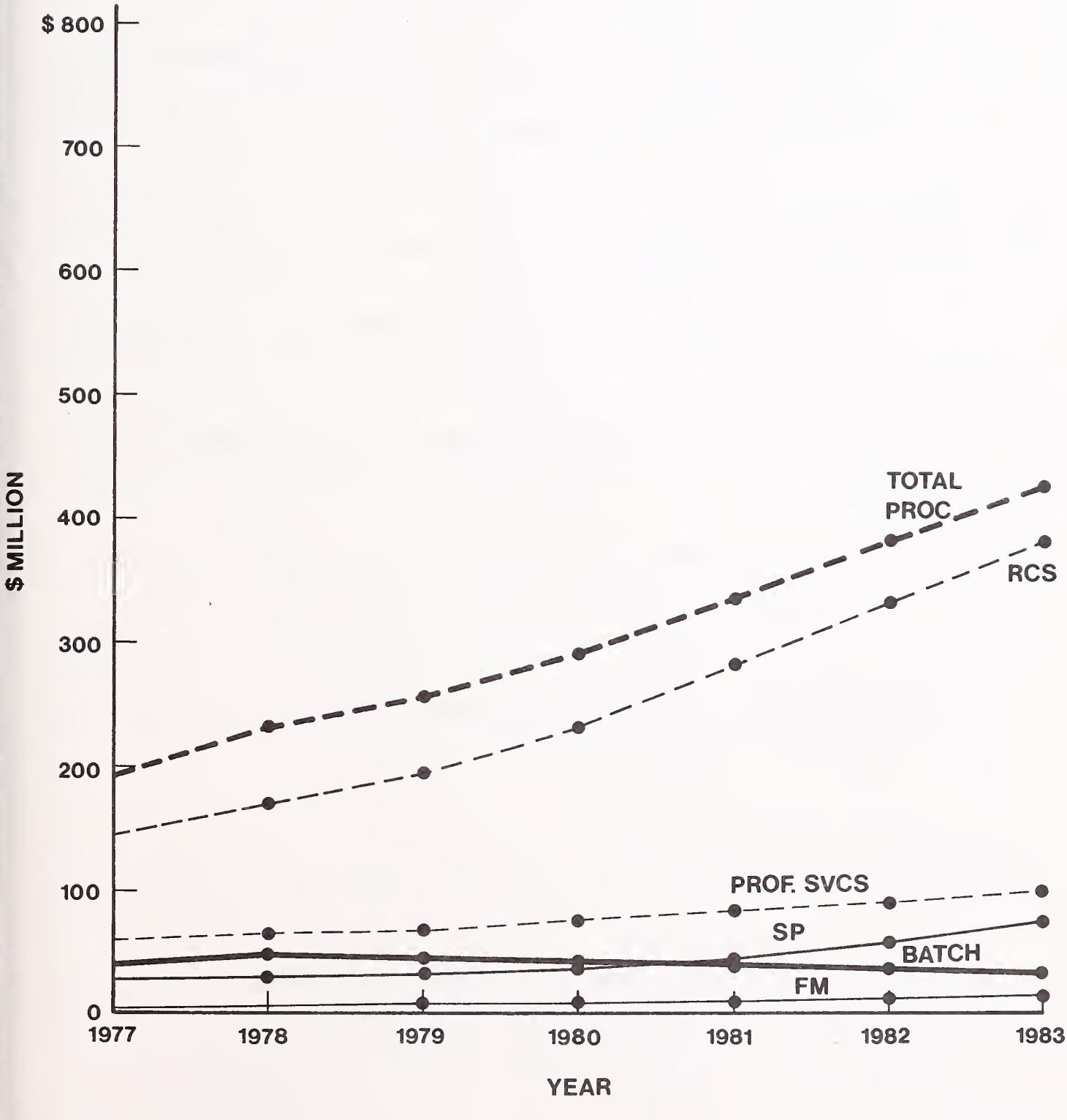
COMPUTER SERVICES MARKET FORECAST FOR UTILITIES, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	7	10	43	11	15	20	24	29	24
	SCI. & ENG.	40	45	13	52	60	70	75	80	12
	IND. SPEC.	33	42	27	55	70	90	120	150	29
	UTILITY	66	75	14	80	90	100	111	120	10
	TOTAL	146	172	18	198	235	280	330	379	17
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.	2	2	-	3	3	3	3	3	6
	IND. SPEC.									
	UTILITY	4	5	25	6	7	9	11	11	17
	TOTAL	6	7	17	9	10	12	14	14	15
BATCH	GEN. BUS.	7	10	43	10	9	8	6	6	(11)
	SCI. & ENG.	13	18	38	15	15	12	12	10	(12)
	IND. SPEC.	7	8	14	10	12	10	10	10	5
	UTILITY	11	14	27	13	11	10	8	6	(19)
	TOTAL	38	50	32	48	47	40	36	32	(9)
TOTAL PROCESSING	GEN. BUS.	14	20	43	21	24	28	30	35	12
	SCI. & ENG.	55	65	18	70	78	85	90	93	7
	IND. SPEC.	40	50	25	65	82	100	130	160	26
	UTILITY	81	94	16	99	108	119	130	137	8
	TOTAL	190	229	21	255	292	332	380	425	13
SOFTWARE PRODUCTS	SYSTEM	17	20	18	22	26	30	38	48	19
	APPLICATION	9	10	11	12	15	18	22	27	22
	TOTAL	26	30	15	34	41	48	60	75	20
PROFESSIONAL SERVICES		59	66	12	70	76	82	90	100	9
TOTAL	TOTAL	275	325	18	359	409	462	530	600	13

EXHIBIT VIII-3

INDUSTRY MARKETS BY MODE OF SERVICE -

UTILITIES INDUSTRY SECTOR



- Software products are forecast to grow at the total industry rate of 22% but from a small base.

  - Sales will increase toward the end of the period as the large central EDP departments, which are typical of this sector, increase their use of systems and applications packages.

  - AT&T sales of software will have some impact on the market also. The Software Industry Association (SIA), part of ADAPSO, is contesting AT&T's entry into software package markets.

- With regard to types of processing services, general business processing services are minor as most of this processing is done in-house.

  - Scientific and engineering, currently significant, grows at a modest 7% rate.

  - Industry sepcialty grows most rapidly, following a trend in other sectors.

  - Heavy use of DBMS based services is the prime reason for the current heavy use of utility services.

- Professional services opportunites continue, derived largely by the need for utilities companies to go outside to obtain systems development services.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- The relatively small response received from user panel members in the utilities industry sector limits the analysis which can be done on the results; however, some useful information is contained in the following exhibits, and they provide a basis for some comparison with the more extensive response in other industry sectors.

- In Exhibit VIII-4 the interest in data base development is relatively high. The high 1980 interest in DDP is notable.

- The interest in data base development is even more clearly stated in Exhibit VIII-5 which deals with applications under development.

- The relatively high percentage of EDP budgets expended on personnel is expected to come down by 1980 as shown in Exhibit VIII-6. Also, the percentage spent on communications doubles, although it does not reach the cross industry average of 5% shown earlier in Exhibit IV-5.

- Expenditures for services as shown in Exhibit VIII-7 are distorted by responses from a few very large companies. However, the expected continued use of RCS and the rapid growth in applications software are significant.

- Data base applications again dominate as a reason for terminal acquisition as shown in Exhibit VIII-8. Graphics are unusually strong compared to other sectors.

- Use of computer and programmer resources parallel the total industry as shown in Exhibit VIII-9.

- With regard to office automation functions, responding EDP managers show an unusually high current involvement in word processing as shown in Exhibit VIII-10. Otherwise, their responses followed the pattern in other industries.

EXHIBIT VIII-4

OBJECTIVES OF RESPONDING EDP MANAGERS
IN THE UTILITIES INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	3	11%	2	10%	3	14%
DESIGN/INSTALL DDP	1	4	1	5	4	19
INSTALL NEW APPLICATIONS	4	14	5	24	2	10
INSTALL ON-LINE APPLICATIONS	3	11	5	24	4	19
INSTALL/UPGRADE MAINFRAME	3	11	3	14	4	19
INSTALL MINI	1	4	1	5	1	5
INSTALL NEW OPERATING SYSTEMS	-	-	-	-	-	-
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	5	18	1	5	-	-
CENTRALIZE OR DECENTRALIZE	2	11	2	10	-	-
SUBTOTAL	22	84%	20	97%	18	86%
OTHER (SPECIFY)						
COMMUNICATIONS NETWORK (GROWTH)	1	4%	-	-	1	5%
LONG RANGE PLANNING	4	14	1	5	-	-
AUTOMATED OFFICE	-	-	-	-	1	5
REWRITE APPLICATIONS	1	4	-	-	-	-
INSTALL WORD PROCESSORS	-	-	-	-	1	5
TOTAL	28	106%	21	102%	21	101%

EXHIBIT VIII-5
APPLICATIONS OF RESPONDING EDP MANAGERS IN THE UTILITIES INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY*	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	11	17%	3	27%
MARKETING & SALES	-	-	-	-
SCIENTIFIC & ENGINEERING	2	3	-	-
WORD PROCESSING	-	-	-	-
PERSONNEL RELATED/ PAYROLL	7	11	1	14
INVENTORY CONTROL	7	11	2	29
COST SYSTEMS	2	3	-	-
ORDER ENTRY/BILLING	3	5	1	33
MODELLING FORECASTING	6	9	-	-
DATA BASE APPLICATIONS	12	19	3	25
PERFORMANCE MEASUREMENT	-	-	-	-
GRAPHICS	-	-	-	-
PURCHASING	1	2	1	100
SUBTOTAL	51	80	11	
OTHER (OFTEN INDUSTRY SPECIFIC)				
INDUSTRY SPECIFIC	11	17	2	18
DISTRIBUTION	2	3	-	-
SUBTOTAL	13	20	2	
TOTAL	64	100%	13	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

EXHIBIT VIII-6

ANTICIPATED CHANGES IN EDP BUDGETS OF RESPONDENTS IN THE UTILITIES INDUSTRY SECTOR

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	27%	26%	25%	26%	(7)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	3	4	5	4	67
NON-PROGRAMABLE TERMINALS	3	3	3	3	-
COMMUNICATIONS	2	3	4	3	100
SOFTWARE (PURCHASE/LEASE)	2	3	3	3	50
PERSONNEL	49	44	46	46	(6)
OTHER	12	10	8	10	(33)
TOTAL	100%	100%	100%	100%	

EXHIBIT VIII-7

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE BY RESPONDENT EDP MANAGERS IN THE UTILITIES INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs. 1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$404	8	$440	8	9 %
REMOTE BATCH	11	4	16	4	45
BATCH	150	1	200	1	33
INPUT/OUTPUT	74	6	62	5	(16)
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	76	13	85	12	12
APPLICATIONS SOFTWARE	45	6	61	6	36
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	204	5	101	7	(50)
EDP CONSULTING	98	6	104	7	6
EDUCATION	32	11	38	11	19
OTHER	20	1	10	1	(50)
FACILITIES MANAGEMENT	-	-	-	-	-
MAINTENANCE	513	5	618	5	20

EXHIBIT VIII-8

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE UTILITIES INDUSTRY SECTOR

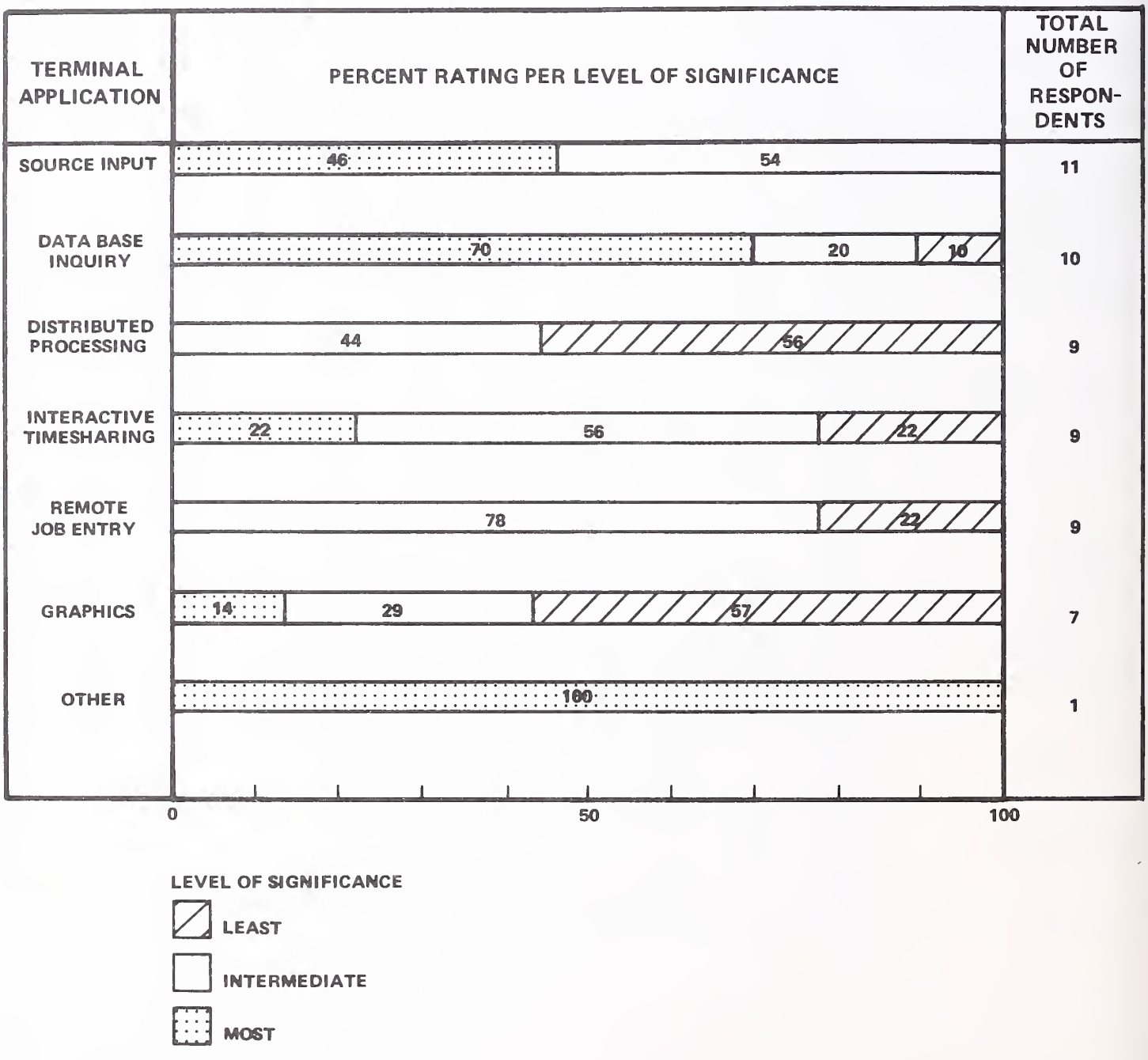


EXHIBIT VIII-9

UTILIZATION OF COMPUTER RESOURCES
AND PROGRAMMERS BY RESPONDENTS
IN THE UTILITIES INDUSTRY SECTOR

USE	PERCENT COMPUTER RESOURCES		PERCENT APPLICATION PROGRAMMERS	
	UTILITIES	TOTAL USER PANEL	UTILITIES	TOTAL USER PANEL
PRODUCTION RUNS	67%	67%	-	-
NEW APPLICATIONS - PROGRAM DEVELOPMENT	13	15	47	51
MAINTENANCE OF EXISTING PROGRAMS	10	13	48	46
OTHER	10	5	5	3
TOTAL	100%	100%	100%	100%

EXHIBIT VIII-10

RESPONDING EDP MANAGERS' ANTICIPATED INVOLVEMENT WITH ELEMENTS OF OFFICE AUTOMATION IN THE UTILITIES INDUSTRY SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	-	-	2	1	4	7
WORD PROCESSING	6	-	-	3	-	9
COPYING/ DUPLICATING	3	-	1	-	5	9
VOICE COMMUNI-CATIONS	1	-	1	-	7	9
FACSIMILE	2	-	1	-	5	8
TOTAL	12	-	5	4	21	42

D. RECENT VENDOR ACTIVITIES

- CDC, a major supplier to the power and gas utility area announced several products on its Cybernet network:

  - A circuit analysis program called SCAN to solve ground faults on electric power networks.

  - An integrated family of applications programs for electric power system programming.

  - A training program called Control Data Training Simulator which provides "hands on" training similar to cockpit simulators used in the aircraft industry.

- NCR introduced a software package for utilities which allows faster response to customer inquiries and automatically handles associated paperwork.

- Delta Resources, a supplier of electronic graphic arts systems for yellow and white page directories, among other systems, was acquired by Itel.

- Zytron, a leading COM services vendor who also supplies a turnkey system to utilities, was acquired by National CSS.

- AT&T introduced a software package (ETS) which allows Dimension PBX's to function as customer-premise nodes in private corporate networks.

- AT&T's offering is partially in response to the success of vendors such as Danray who are successfully installing computerized telephone systems at headquarters' locations of firms such as Time, Inc., and Equitable Life.

- The offering of equipment by services companies is not limited to computer services companies.

- United Telecommunications joined other telephone companies in the sale of telephones to home subscribers.

- Northern Telecom, a subsidiary of Bell Canada, has aggressively begun to market a whole line of communications equipment in the U.S.

- National Data Corporation has implemented a system with WTCQ in Atlanta whereby National handles the audience phone responses to the TV company's advertisers. The advertisers pay rates related to the response which is furnished daily via computerized listings.

- CDC announced a service for telephone companies called CDC SAVE (Serving Area Value Engineering) aimed at central offices who have to plan subscriber expansion programs.

- Digital Equipment Corporation joined the vendors who are targetting this industry sector by forming a Telephone and Utilities group by broadening the charter of the previous Telephone Industry Products group.

- Additional information on vendor activities in the utilities industry sector is contained on pages 146 through 149 of INPUT's "1977 Computer Services Industry Annual Report."

IX BANKING AND FINANCE INDUSTRY SECTOR MARKETS

IX BANKING AND FINANCE INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- In banking and finance more than any other industry sector, EDP has achieved penetration to a point where it is truly a top management subject.

- As shown in Exhibit IX-1, commercial banks continue to dominate with over half of the employees in the sector.

  - Savings and loan associations' growth outpaces commercial banks growth by a wide margin, as shown in Exhibit IX-2.

  - The differences between the types of institutions is diminishing due to competitive, regulatory and technological changes.

  - A recent example is the sharing of an EFT network in Kansas by a group of seven commercial banks and the state's largest S&L.

    . National Sharedata, a part of Western Union, designed and implemented the system.

    . Also involved in the system are point-of-sale terminals located in supermarkets in the state.

EXHIBIT IX-1

BANKING AND FINANCE INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
ALL	ALL	NUMBER OF ESTABLISHMENTS NUMBER OF EMPLOYEES	110,512 2.1 MILLION
60	BANKS	NUMBER OF ESTABLISHMENTS (1975) NUMBER OF EMPLOYEES (1976)	39,431 1,299,000
601	FEDERAL RESERVE BANKS	ASSETS (1976) NUMBER OF BANKS (1976) NUMBER OF EMPLOYEES (1975)	129.3 BILLION 5,758 27,271
602	COMMERCIAL BANKS	ASSETS (1976) DEPOSITS (1976) NUMBER OF BANKS (1976) NUMBER OF BANKING OFFICES (1976) NUMBER OF EMPLOYEES (1975)	1,040.1 BILLION 845.1 BILLION 14,698 48,654 1.1 MILLION
603	MUTUAL SAVINGS BANKS	ASSETS (1976) DEPOSITS (1976) NUMBER OF BANKS (1976) NUMBER OF EMPLOYEES (1975)	134.8 BILLION 123.7 BILLION 473 42,084
61	CREDIT AGENCIES	NUMBER OF ESTABLISHMENTS (1975) NUMBER OF EMPLOYEES (1976)	52,027 463,000
612	SAVINGS & LOAN ASSOCIATIONS	ASSETS (1976) NUMBER OF ASSOCIATIONS (1976) NUMBER OF EMPLOYEES (1975)	392.0 BILLION 4,900 154,982
614	CREDIT UNIONS	ASSETS (1976) NUMBER (FEDERALLY CHARTERED) NUMBER (OTHERS)	44.8 BILLION 12,833 9,836
62	SECURITY AND COMMODITY BROKERS	NUMBER OF ESTABLISHMENTS (1975) NUMBER OF EMPLOYEES (1976)	8,382 176,000
67	HOLDING & OTHER INVESTMENT COS.	NUMBER OF ESTABLISHMENTS (1975) NUMBER OF EMPLOYEES (1975)	10,672 147,014

EXHIBIT IX-2

TOTAL ASSETS OF FINANCIAL INTERMEDIARIES

FINANCIAL INTERMEDIARY	1965 ($B)	1970 ($B)	1965-1970 % GROWTH	1975 ($B)	1970-1975 % GROWTH	1976 ($B)
COMMERCIAL BANKS	$377.3	$ 576.2	52.7%	$ 958.4	66.3%	$1,040.1
SAVINGS & LOAN ASSOCIATIONS	129.6	176.2	36.0	338.4	92.1	392.2
LIFE INSURANCE COMPANIES	158.9	207.3	30.5	289.1	39.5	321.6
MUTUAL SAVINGS BANKS	58.2	79.0	35.7	121.0	53.2	134.8
FINANCE COMPANIES	44.8	62.5	39.5	92.5	48.0	106.8
INVESTMENT COMPANIES	35.2	47.6	35.2	42.2	11.3	48.0
CREDIT UNIONS	10.6	17.8	67.9	38.3	115.2	43.0
PRIVATE PENSION FUNDS	73.6	110.8	50.5	156.5	41.2	181.0
STATE & LOCAL PENSION FUNDS	33.2	58.1	75.0	106.4	83.1	125.0
TOTAL	$921.4	$1,335.5	44.9%	$2,142.8	60.4%	$2,402.9

- Branch banking continues to grow with only Texas and Illinois resisting the trend among major states, as shown in Exhibit IX-3.

- Correspondent banking services, mainly among commercial banks but increasingly involving S&Ls, is a growing services opportunity.

  - For further details refer to INPUT's 1978 MAS report, "Computer Servcies Opportunities In The Computer Services Industry."

  - Similarly, S&Ls were addressed in INPUT's 1977 MAS Report, "Computer Services Opportunities In The Savings And Loan Industry."

- For a discussion of the use of EDP in banking and finance, refer to pages 156 through 165 in INPUT's "1977 Computer Services Industry Annual Report."

B. COMPUTER SERVICES MARKET FORECAST, 1978-1983

- The banking and finance sector will maintain its dominant position as the largest computer services user by growing at the total industry rate of 16% as shown in Exhibit IX-4.

- The shifts in the modes of service are shown graphically in Exhibit IX-5. Since this sector is by far the largest in terms of computer services revenues, and since the scale on the chart was kept constant between sectors so the reader could do visual comparisons between sizes of various industry markets, both total processing and RCS revenues are beyond the scale on the chart. The values beyond the bounds of the chart are shown immediately under the Exhibit title. The strong growth in facilities management is a result of banks using the expertise of services companies, for example:

  - Security Bank and Trust of Southgate (Michigan) signing a $15 million contract with National Sharedata.

EXHIBIT IX-3

BRANCH BANKING STATUS - 1976

ALL BANKS	
NUMBER OF BANKS	14,671
NUMBER OF BRANCHES	31,121
STATES WITH STATEWIDE BRANCH BANKING	
ALASKA, ARIZONA, CALIFORNIA, CONNECTICUT, DELAWARE, HAWAII, IDAHO, MAINE, MARYLAND, NEVADA, NEW JERSEY, NEW YORK, NORTH CAROLINA, OREGON, RHODE ISLAND, SOUTH CAROLINA, SOUTH DAKOTA, UTAH, VERMONT, VIRGINIA, WASHINGTON, WASHINGTON, D.C.	
NUMBER OF BANKS	1,914
NUMBER OF BRANCHES	16,722
STATES WITH LIMITED BRANCH BANKING	
(LIMITED USUALLY TO COUNTY WHERE BANK'S HEAD OFFICE IS LOCATED OR TO CONTIGUOUS COUNTIES)	
ALABAMA, ARKANSAS, GEORGIA, INDIANA, IOWA, KENTUCKY, LOUISIANA, MASSACHUSETTS, MICHIGAN, MISSISSIPPI, NEW HAMPSHIRE, NEW MEXICO, OHIO, PENNSYLVANIA, TENNESSEE, WISCONSIN	
NUMBER OF BANKS	5,384
NUMBER OF BRANCHES	12,797
STATES WITH UNIT BANKING	
(BRANCH BANKING STRICTLY LIMITED OR PROHIBITED)	
COLORADO, FLORIDA, ILLINOIS, KANSAS, MINNESOTA, MISSOURI, MONTANA, NEBRASKA, NORTH DAKOTA, OKLAHOMA, TEXAS, WEST VIRGINIA, WYOMING	
NUMBER OF BANKS	7,373
NUMBER OF BRANCHES	1,602

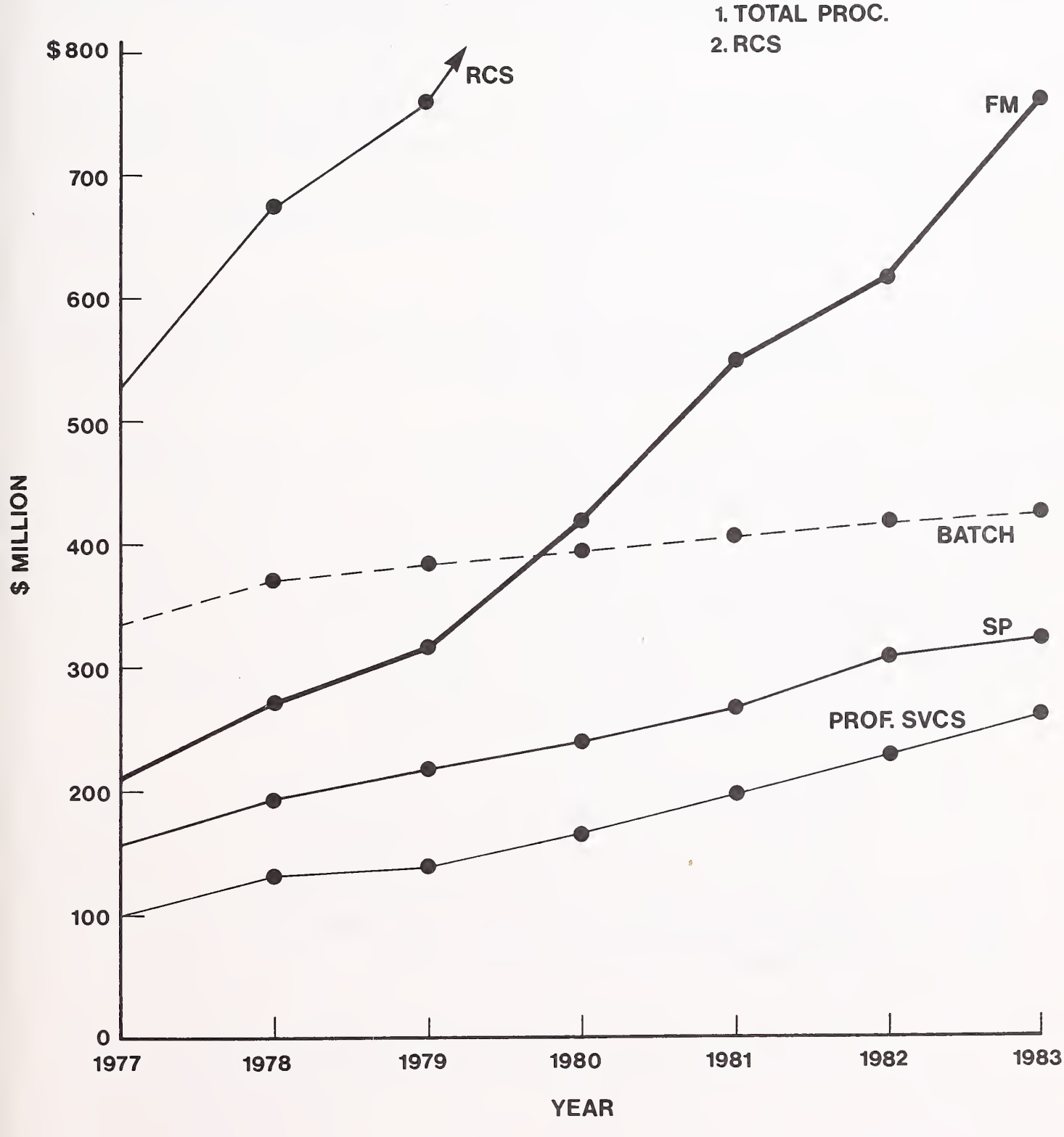
EXHIBIT IX-4
COMPUTER SERVICES MARKET FORECAST FOR BANKING AND FINANCE, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	19	24	26	30	38	50	60	76	26
	SCI. & ENG.									
	IND. SPEC.	417	540	29	595	750	920	1,125	1,380	21
	UTILITY	90	108	20	131	150	170	200	230	16
	TOTAL	526	672	28	756	938	1,140	1,385	1,686	20
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	210	270	29	315	420	550	620	760	23
	UTILITY	-	-		-	-	-	-	-	-
	TOTAL	210	270	29	315	420	550	620	760	23
BATCH	GEN. BUS.	12	14	17	15	18	20	20	20	7
	SCI. & ENG.									
	IND. SPEC.	298	335	12	340	350	365	380	385	3
	UTILITY	24	24	-0-	24	25	25	20	20	(4)
	TOTAL	334	373	12	379	393	310	420	425	3
TOTAL PROCESSING	GEN. BUS.	31	38	23	45	56	70	80	96	20
	SCI. & ENG.									
	IND. SPEC.	925	1,145	24	1,250	1,520	1,835	2,125	2,525	17
	UTILITY	114	132	16	155	175	195	220	250	14
	TOTAL	1,070	1,315	23	1,450	1,751	2,100	2,425	2,871	17
SOFTWARE PRODUCTS	SYSTEM	58	67	16	72	80	90	110	135	15
	APPLICATION	102	126	24	143	160	180	200	215	11
	TOTAL	160	193	21	215	240	270	310	350	13
PROFESSIONAL SERVICES		100	130	30	140	170	100	230	260	15
TOTAL	TOTAL	1,330	1,638	23	1,805	2,161	2,570	2,965	3,481	16

EXHIBIT IX-5
INDUSTRY MARKETS BY MODE OF SERVICE -
BANKING AND FINANCE INDUSTRY SECTOR

VALUES BEYOND BOUNDS OF GRAPH

1.	1070	1315	1450	1751	2100	2425	2871
2.				938	1140	1385	1686



- First Security National Bank and Trust Company of Lexington (Kentucky) signing a five-year contract with Metridata.

- Banks are using more than one vendor; for example, the same bank as mentioned in the above paragraph also signed a contract with U.S. Datacorp (Portland, Oregon) for installation and operation in-house of Datacorp's computer output microfilm (COM) system.

- Industry specialty is by far the dominant type of business in all of the modes of processing, reflecting the relatively advanced state of EDP in this sector.

  - Commercial bank processing accounts for approximately one-third of this processing.

  - Securities processing, data bases, and S&Ls each account for approximately 15%.

  - The market is very competitive with services companies and banks marketing aggressively.

- Software products have a strong position in this industry sector and continue to grow although at a slower rate than the total industry.

  - University Computing continues to introduce products into its line, such as a new MICR capture and reporting system.

  - Much of the software comes from smaller companies such as Huntley Associates (Andover, Massachusetts) which announced a simulation model for financial institutions and McCracken Computer (Lexington, Massachusetts) which announced a nine-module package for savings banks based on the IBM System 34.

  - IBM continues to announce products such as a display program for bank statistics called Bank Comparison Application for Trend Analyses/370.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- Objectives of EDP managers on INPUT's User Panel, as presented in Exhibit IX-6, reflect the pressure to provide access to data more quickly with almost one-third of the mentions involving installing on-line applications.

  - The growing use of DBMS is significant.

  - Minis are not mentioned in objectives until 1980, unlike other sectors. This reflectes the heavy emphasis in this sector on special terminals, rather than minis.

- Applications being installed are heavily industry specialized as shown in Exhibit IX-7. Interestingly, two non-specialized applications, personnel and inventory control, had a high priority when mentioned.

- The strong move to on-line applications is reflected in Exhibit IX-8 with 50% and more increases expected from 1978-80 in terminal and communications costs expressed as a percent of total EDP budgets.

- With regard to use of services, EDP managers responding expected to increase their use of interactive services, as shown in Exhibit IX-9, further reflecting the pressure for on-line access.

  - The significant use of contract programming and education is notable.

  - Input/output services remain constant.

- The dominant reasons for terminal acquisition are source input and data base inquiry, as shown in Exhibit IX-10, reflecting the transaction-based nature of the sector.

EXHIBIT IX-6

OBJECTIVES OF RESPONDING EDP MANAGERS
IN THE BANKING AND FINANCE INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	2	3%	5	8%	4	13%
DESIGN/INSTALL DDP	1	2	2	3	1	3
INSTALL NEW APPLICATIONS	10	17	12	20	4	13
INSTALL ON-LINE APPLICATIONS	17	29	12	20	10	31
INSTALL/UPGRADE MAINFRAME	12	20	12	20	3	9
INSTALL MINI	-	-	-	-	2	6
INSTALL NEW OPERATING SYSTEMS	4	7	3	5	1	3
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	5	8	7	12	4	13
CENTRALIZE OR DECENTRALIZE	3	5	1	2	3	9
SUBTOTAL	54	91%	54	90%	32	100%
OTHER (SPECIFY)						
COMMUNICATIONS (NETWORK)	2	3	1	2	-	-
REWRITE SOFTWARE	1	2	3	5	-	-
LONG RANGE PLANNING	1	2	2	3	-	-
WORD PROCESSOR	1	2	1	2	-	-
TOTAL	59	100%	59	102%	32	100%

EXHIBIT IX-7

APPLICATIONS TO BE DEVELOPED BY RESPONDING EDP MANAGERS IN THE BANKING AND FINANCE INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	21	17%	4	19%
MARKETING & SALES	3	2	-	-
SCIENTIFIC & ENGINEERING	-	-	-	-
WORD PROCESSING	-	-	-	-
PERSONNEL RELATED/ PAYROLL	6	5	2	33
INVENTORY CONTROL	4	3	2	50
COST SYSTEMS	3	2	-	-
ORDER ENTRY/BILLING	1	1	-	-
MODELLING FORECASTING	1	1	-	-
DATA BASE APPLICATIONS	12	9	2	17
PERFORMANCE MEASUREMENT	-	-	-	-
GRAPHICS	1	1	-	-
PURCHASING	-	-	-	-
SUBTOTAL	52	41	10	
OTHER (OFTEN INDUSTRY SPECIFIC)				
SPECIAL BANKING	25	20	6	24
LOANS	16	13	4	25
DEPOSITS	17	13	6	35
PERSONAL TRUST	4	3	-	-
BRANCH/TELLER TERMINALS	13	10	4	31
SUBTOTAL	75		20	
TOTAL	125	100%	30	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

EXHIBIT IX-8

ANTICIPATED CHANGES IN EDP BUDGETS OF RESPONDENTS IN THE BANKING AND FINANCE INDUSTRY SECTOR

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	30%	29%	25%	28%	(17)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	3	4	5	4	67
NON-PROGRAMABLE TERMINALS	4	3	3	3	(25)
COMMUNICATIONS	4	6	6	5	50
SOFTWARE (PURCHASE/LEASE)	5	3	3	4	(40)
PERSONNEL	41	40	35	39	(15)
OTHER	15	12	8	12	(47)
TOTAL	100%	100%	100%	100%	

102% 97% 85% 95%

IN

EXHIBIT IX-9

AVERAGE EXPENDITURES FOR SERVICES

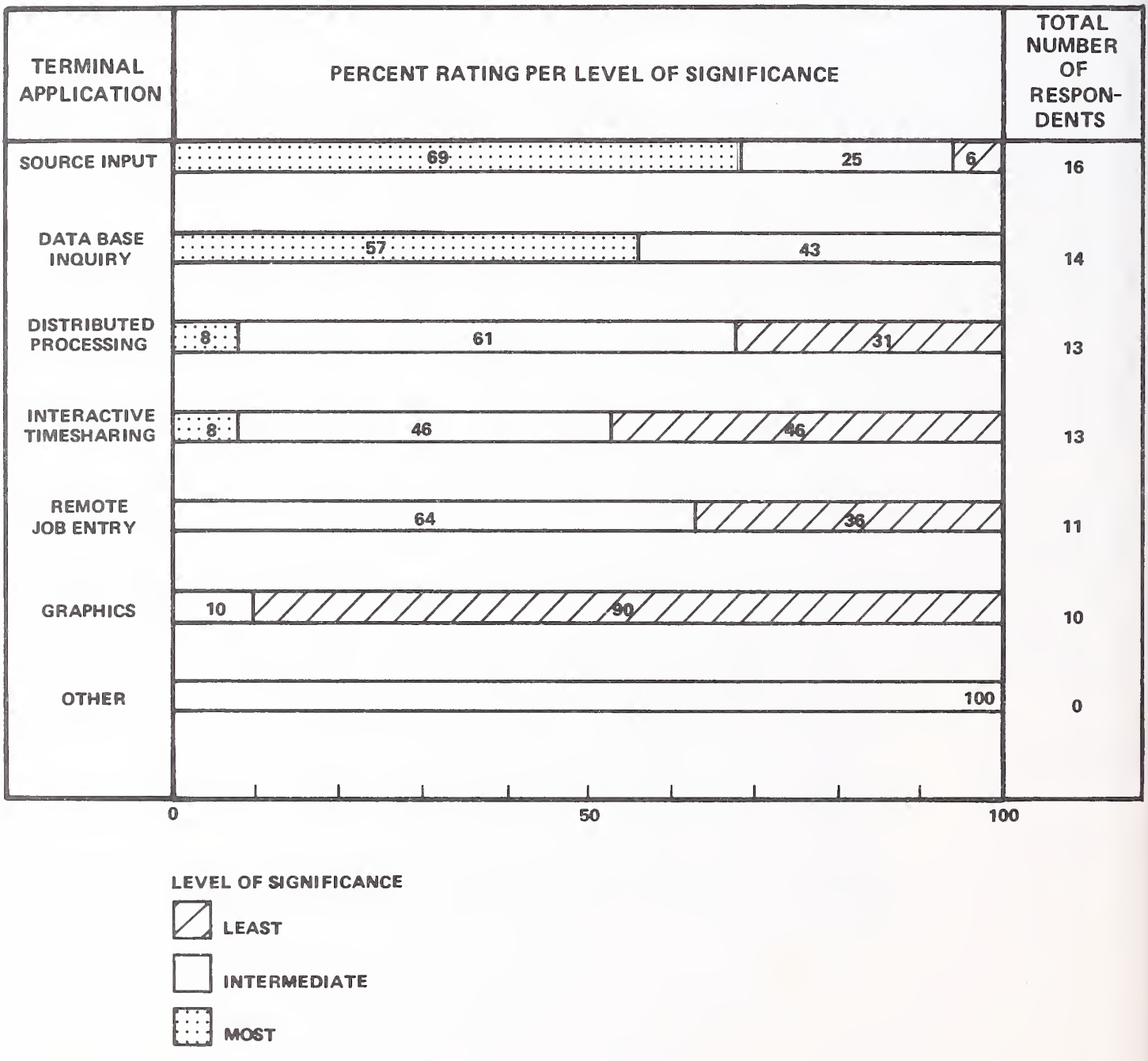
AND SOFTWARE BY RESPONDENT EDP MANAGERS

IN THE BANKING AND FINANCE INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs. 1978
PROCESSING SERVICES					
INTERACTIVE	$ 91	14	$107	13	18 %
REMOTE BATCH	300	1	263	2	(12)
BATCH	53	2	40	2	(25)
INPUT/OUTPUT	21	6	21	7	-
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	50	19	46	16	(8)
APPLICATIONS SOFTWARE	83	20	89	20	7
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	40	12	85	11	113
EDP CONSULTING	51	5	51	4	-
EDUCATION	15	18	18	18	20
OTHER	-	-	-	-	
FACILITIES MANAGEMENT	-	-	-	-	-
MAINTENANCE	129	11	136	11	5

EXHIBIT IX-10

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE BANKING AND FINANCE INDUSTRY SECTOR



- The utilization of computer resources and programmers closely parallels the total user panel, as shown in Exhibit IX-11.

- With regard to involvement in office automation functions, responding EDP managers generally interface with word processing and voice communications but not other aspects, as shown in Exhibit IX-12.

D. RECENT VENDOR ACTIVITIES

- Acquisition activity continues to be heavy as vendors position themselves to capitalize on this largest computer services market sector.

  - Tymshare acquired Western States Bankcard Association (WSBA), a credit card processing operation which serves about 280 member banks, 200,000 merchant outlets, and 6 million MasterCharge, BankAmericard and Visa cardholders.

  - Itel acquired certain assets of Bankputer Corporation, a Connecticut based data processing company that provides services to commercial and savings banks, credit unions and S&Ls.

  - TRW announced plans to buy the Teller-Matic operation of Mosler Safe Co., thereby adding Automatic Teller Machines (ATMs) to TRW's line of equipment and service.

  - Western Union agreed in principle to acquire Telstat Systems, Inc.; Telstat Systems provides computerized information services to the financial community.

  - Comshare, Inc., acquired Trust Management Systems, Inc., a Charlotte, North Carolina firm specializing in software development and systems consulting for bank trust department operations and administration.

EXHIBIT IX-11

UTILIZATION OF COMPUTER RESOURCES AND PROGRAMMERS BY RESPONDENTS IN THE BANKING AND FINANCE INDUSTRY SECTOR

USE	PERCENT COMPUTER RESOURCES		PERCENT APPLICATION PROGRAMMERS	
	BANKING & FINANCE	TOTAL USER PANEL	BANKING & FINANCE	TOTAL USER PANEL
PRODUCTION RUNS	70%	67%	-	-
NEW APPLICATIONS - PROGRAM DEVELOPMENT	12	15	49	51
MAINTENANCE OF EXISTING PROGRAMS	12	13	48	46
OTHER	6	5	3	3
TOTAL	100%	100%	100%	100%

EXHIBIT IX-12

RESPONDING EDP MANAGERS' ANTICIPATED

INVOLVEMENT WITH ELEMENTS OF OFFICE

AUTOMATION IN THE BANKING AND FINANCE INDUSTRY SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	3	-	2	2	18	25
WORD PROCESSING	13	5	3	2	8	31
COPYING/ DUPLICATING	9	-	1	2	15	27
VOICE COMMUNI-CATIONS	10	1	2	2	14	29
FACSIMILE	9	-	1	-	19	29
TOTAL	44	6	9	8	74	141

TMS also developed a mini-based turnkey system for trust administration.

- Harris Corporation announced an agreement to acquire 19% of the shares of Quotron Corporation from Dun & Bradstreet. Quotron is involved in data collection, communication and information processing services to securities traders and other financial firms.

- As communications increase in importance, many vendors capitalize through offering network based services. Some recent examples are:

  - MJK Associates, a small timesharing firm in Santa Clara, California, doubled its customer base through use of Tymnet, Tymshare's value added network (VAN) service.

  - Citibank announced its own internal VAN called Citinet; it is a packet network based on technology used in Arpanet.

  - A. O. Smith Data Systems provides a network for 180 terminals on an EFTS system in Wisconsin.

    . The system carries 300,000 transactions per month.

    . A. O. Smith also markets the software.

  - CSC is actively marketing a family of banking services over its Infonet network.

- A number of joint ventures were announced, many involving combinations of hardware and services.

- Diebold and Bunker Ramo entered a joint marketing agreement covering Diebold's automatic teller machines (ATMs), cash dispensers, and Bunker Ramo's teller terminals, administration terminals and minicomputer control units.

- Bradford National Clearing Corporation and the Pacific Exchange, Inc., signed a letter of intent prior to a joint venture to provide automated DP and recordkeeping services for brokerage firms throughout the nation.

- Bank Computer Network Corporation has held preliminary negotiations with TRW whereby TRW would market or manufacture Bank Computer's Bankette automatic teller.

- The credit card continues to grow as a vehicle for services.

  - Columbus Bank and Trust Company (Georgia) announced that the People's National Bank (Seattle, Washington) had agreed to use its credit card computer services bringing to 663,000 transactions per month the processing being done by banks under the system.

    . The Washington bank enters data via an IBM 3747 terminal which is transmitted via dial-up WATS line to CB&T's IBM System 370 Model 135.

    . Descriptive billing is a special feature of the service.

  - National Data, which offers a variety of credit card services, recently added Fred Meyer Savings and Loan (Portland, Oregon) on a service whereby the S&L offers a special VISA card carrying unique features, primarily a 10% interest charge on unpaid credit balances.

  - American Express has entered the field through its nationwide cash dispensing system.

- Pay-by-phone systems, after early failures, are growing.

  - IBM is offering software designed to enable bank customers to pay bills using their telephones. It is a system originally developed by Commercial Federal Savings and Loan Association in Omaha.

  - Telephone Computer Service in Seattle, Washington, is offering a turnkey system based on a DEC 11/34 processor and leasing for $1,500 per month.

- Data bases offered on networks as discussed in Section III are an excellent opportunity and several new announcements offering such services in banking and finance include:

  - Oases, which provides current and historical financial and descriptive information for approximately 30,000 security issues from On-Line Systems.

  - Telerate historical data base containing more than 8,000 daily and weekly time series on domestic credit markets and supply factors which affect interest rates from Rapidata.

  - Financial System One, a news quotation and financial information service from GTE.

- Lower cost hardware was the main thrust of many announcements, such as:

  - A desk top mini from Olivetti Corporation of America aimed at financial markets for prices beginning at $2,300.

  - A teller terminal from Datatrol, Inc. (Hudson, Massachusetts) with a built in controller which eliminates the need for a branch level controller. The average cost per terminal for the system called FT-3244, is $2,500.

- Remote diagnostics are part of a new, dedicated, on-line banking system at Seattle First National Bank; the network diagnostic control system is from General DataCom Industries of Wilton, Connecticut.

- Related banking equipment continues to grow in capability such as CDC's new processing unit for magnetically encoded checks offering a capacity of more than 60,000 per hour.

- Consumer markets are emerging with vendors offering financial services to individuals. A pioneer is Wall Street Concepts in New York with roughly 2,000 individual clients.

- Additional detail on vendors is contained on pages 170 through 181 of INPUT's "1977 Computer Services Industry Annual Report."

X INSURANCE INDUSTRY SECTOR MARKETS

X INSURANCE INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- The dominant form of insurance, in terms of permiums written, is property and liability, as shown in Exhibit X-1.

- Approximately three times as many people work for insurance companies as work for agents and brokers, with all being clerical labor intensive.

- Within the health insurance industry, the trend to public health insurance continues and private companies are participating in Medicaid/Medicare programs in order to protect their interests under National Health Insurance (NHI).

- There are many insurance companies, but total assets are concentrated.

  - Of life insurance companies, $250 billion of the $300 billion in total assets were concentrated in the top 50 companies.

  - There are approximately 1,800 life insurance companies.

- Further details on insurance industry characteristics and use of EDP are presented on pages 182 through 189 of INPUT's "1977 Computer Services Industry Annual Report."

EXHIBIT X-1

INSURANCE INDUSTRY SECTOR -
DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
63	INSURANCE (LIFE, HEALTH, PROPERTY, CASUALTY)	NUMBER OF EMPLOYEES (1976)	$1.1 MILLION
		NUMBER OF ESTABLISHMENTS (1975)	25,516
		PROPERTY AND LIABILITY PREMIUMS WRITTEN (1975)	$49.9 BILLION
		LIFE INSURANCE, PREMIUM RECEIPTS (1976)	$31.4 BILLION
		ANNUITY INSURANCE, PREMIUM RECEIPTS (1976)	$14.0 BILLION
		HEALTH INSURANCE, PREMIUM RECEIPTS (1976)	$21.1 BILLION
		INVESTMENT INCOME (o976)	$22.2 BILLION
64	INSURANCE AGENTS, BROKERS AND SERVICE	NUMBER OF EMPLOYEES (1976)	342,341
		NUMBER OF ESTABLISHMENTS (1976)	68,156

EXHIBIT X-2

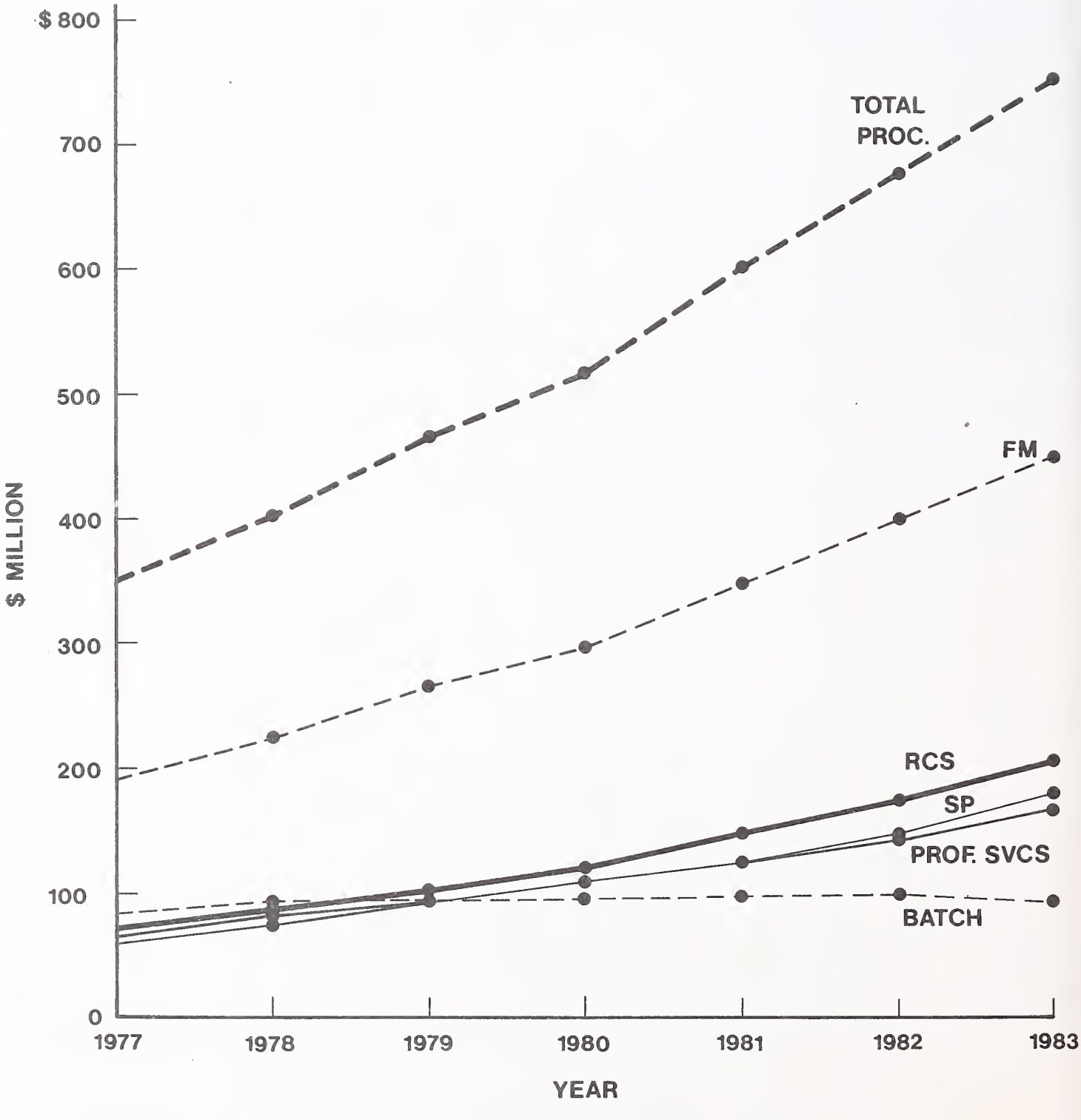
COMPUTER SERVICES MARKET FORECAST
FOR INSURANCE INDUSTRY, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	11	14	27	16	20	25	32	40	23
	SCI. & ENG.									
	IND. SPEC.	35	42	20	50	60	75	83	96	18
	UTILITY	24	30	25	35	42	50	60	70	18
	TOTAL	70	86	23	101	122	150	175	206	19
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	197	225	14	269	297	350	400	450	15
	UTILITY									
	TOTAL	197	225	14	269	297	350	400	450	15
BATCH	GEN. BUS.	7	8	14	9	9	10	10	10	5
	SCI. & ENG.									
	IND. SPEC.	58	63	8	66	68	70	70	68	1
	UTILITY	18	19	6	20	20	20	20	18	(1)
	TOTAL	83	90	8	95	97	100	100	96	1
TOTAL PROCESSING	GEN. BUS.	18	22	22	25	29	35	42	50	18
	SCI. & ENG.									
	IND. SPEC.	290	330	14	385	425	495	553	614	13
	UTILITY	42	49	17	55	62	70	80	88	12
	TOTAL	350	401	15	465	516	600	675	752	13
SOFTWARE PRODUCTS	SYSTEM	37	45	22	55	63	71	90	110	20
	APPLICATION	25	30	20	40	47	54	60	70	18
	TOTAL	62	75	21	95	110	125	150	180	19
PROFESSIONAL SERVICES		68	82	21	95	110	125	145	170	16
TOTAL	TOTAL	480	558	16	655	736	830	970	1,102	15

EXHIBIT X-3

INDUSTRY MARKETS BY MODE OF SERVICE -

INSURANCE INDUSTRY SECTOR



B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- A unique characteristic of modes of processing services to the insurance industry sector is the relatively low percentage of RCS processing services as shown in Exhibit X-2 and depicted graphically in Exhibit X-3.

  - This is a reflection of the tendency of insurance companies to do processing in-house and heavily on a batch basis (this is changing).

  - The sizeable FM revenues result primarily from large contracts awarded for Medicaid, Medicare, and Champus, and exlude direct federal government expenditures.

  - Batch services are being impacted by standalone, turnkey systems.

- Software products already well established will grow at slightly less than the total industry average; some systems software, particularly DBMS, will grow at above average rates.

- With regard to types of processing services, general business applications in the personnel area and services related to marketing and sales have good potential as shown by the 23% growth rate for RCS-based general business services.

  - Industry specialty, already 83% of processing services, will grow at a slower rate of 13%.

  - Utility services have modest growth; these include input/output services such as COM.

- Professional services have continued growth as complex systems are designed or modified and in-house staffs of FM contractors need programming and consulting assistance.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- Insurance industry executives are second only to those in banking and finance with regard to degree of involvement in EDP. Therefore, in-house EDP in the insurance sector tends to be more advanced and more involved with the mainstream of the business.

- Objectives of responding EDP managers reflect the industry as shown in Exhibit X-4.

  - DDP is a rapidly growing objective passing the objective of simpler on-line applications in the early 1980s.

  - The large central site orientation is reflected in the high interest in mainframes and the low (and slowly growing) interest in minis.

- Applications under development (see Exhibit X-5) still concentrate on the accounting/finance area.

  - Data base is the second in frequency of mention.

  - Personnel and marketing, two areas mentioned earlier as RCS opportunities, are also prominent as in-house applications.

- The EDP budget profile shown in Exhibit X-6 also reflects a change from an absence of small computers and programmable terminals to something approaching the U.S. industry average in the early 1980s as far as percentage of total EDP budgets.

  - The relatively high personnel expenditure reflects the complexity of the systems and also explains some of the reason for the success of FM in this industry sector.

EXHIBIT X-4

OBJECTIVES OF RESPONDING EDP MANAGERS
IN THE INSURANCE INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO .OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	3	5%	7	11%	7	13%
DESIGN/INSTALL DDP	2	3	8	12	9	17
INSTALL NEW APPLICATIONS	12	18	12	18	9	17
INSTALL ON-LINE APPLICATIONS	19	29	17	26	11	21
INSTALL/UPGRADE MAINFRAME	15	23	5	8	6	11
INSTALL MINI	-	-	1	2	2	4
INSTALL NEW OPERATING SYSTEMS	3	5	4	6	2	4
IMPROVE OPERATIONS (PRODUCTIVITY,SERVICE,SECURITY)	6	9	3	5	2	4
CENTRALIZE OR DECENTRALIZE	1	2	1	2	-	-
SUBTOTAL	61	94%	58	90%	48	92%
OTHER (SPECIFY)						
NETWORKING	2	3%	3	5%	3	6%
REWRITE SOFTWARE	2	3	4	6	1	2
TOTAL	65	100%	65	101%	52	100%

EXHIBIT X-5

APPLICATIONS TO BE DEVELOPED BY RESPONDING

EDP MANAGERS IN THE INSURANCE INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY*	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	25	15%	4	16%
MARKETING & SALES	8	5	1	13
SCIENTIFIC & ENGINEERING	1	1	-	-
WORD PROCESSING	-	-	-	-
PERSONNEL RELATED/ PAYROLL	11	7	-	-
INVENTORY CONTROL	4	2	-	-
COST SYSTEMS	1	1	-	-
ORDER ENTRY/BILLING	4	2	1	25
MODELLING FORECASTING	2	1	-	-
DATA BASE APPLICATIONS	14	8	-	-
PERFORMANCE MEASUREMENT	-	-	-	-
GRAPHICS	-	-	-	-
PURCHASING	-	-	-	-
SUBTOTAL	70	42	6	
OTHER (OFTEN INDUSTRY SPECIFIC)				
SPECIAL INSURANCE	71	43	19	27
UNDERWRITING CONTROL	4	2	1	25
CLAIMS	20	12	9	45
SUBTOTAL	95	58	29	
TOTAL	165	100%	35	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

EXHIBIT X-6

ANTICIPATED CHANGES IN EDP BUDGETS OF RESPONDENTS IN THE INSURANCE INDUSTRY

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	26%	24%	21%	24%	(19)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	1	3	3	2	200
NON-PROGRAMABLE TERMINALS	3	3	4	3	33
COMMUNICATIONS	2	3	4	3	100
SOFTWARE (PURCHASE/LEASE)	5	5	5	5	-
PERSONNEL	48	50	47	48	(2)
OTHER	13	11	9	11	(30)
TOTAL	100%	100%	100%	100%	

- As expected, mainframe expenditures decline somewhat, and communications costs increase from a small base.

- With regard to purchases of services by responding EDP managers, the main points to be gained from Exhibit X-7 are:

  - Interactive timesharing services will continue to move in-house if the EDP manager has his way.

  - Remote batch is mentioned only twice by respondents.

  - Input/output services, a major market in this sector, may lose ground to in-house systems also.

  - The market for software products is strong, particularly applications software.

  - As in other sectors, maintenance is a growing, significant market.

- Reasons for terminal acquisition as presented in Exhibit X-8 reflect the transaction driven nature of the industry sector with source input dominating.

  - DBMS is a strong reason.

  - DDP is higher than in other industry sectors, indicating that some DDP systems are in the equipment procurement stage.

- With regard to utilization of programmer resources, an unusually high percentage is used for maintenance, as shown in Exhibit X-9. This again reflects the complexity of some of the systems, and the need to modify them as regulations and other variables change.

- Responding EDP managers in the insurance industry sector were relatively heavily involved in office automation functions, as presented in Exhibit X-10.

EXHIBIT X-7

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE BY RESPONDENT EDP MANAGERS IN THE INSURANCE INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs.1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$ 34	16	$ 23	17	(32)%
REMOTE BATCH	113	2	312	2	176
BATCH	15	3	14	3	(7)
INPUT/OUTPUT	110	14	100	15	(9)
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	32	34	40	36	25
APPLICATIONS SOFTWARE	57	31	81	30	42
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	127	12	147	12	16
EDP CONSULTING	22	7	19	7	(14)
EDUCATION	28	34	34	34	21
OTHER	-	-	-	-	-
FACILITIES MANAGEMENT	241	1	241	1	-
MAINTENANCE	95	26	117	26	23

EXHIBIT X-8

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE INSURANCE INDUSTRY SECTOR

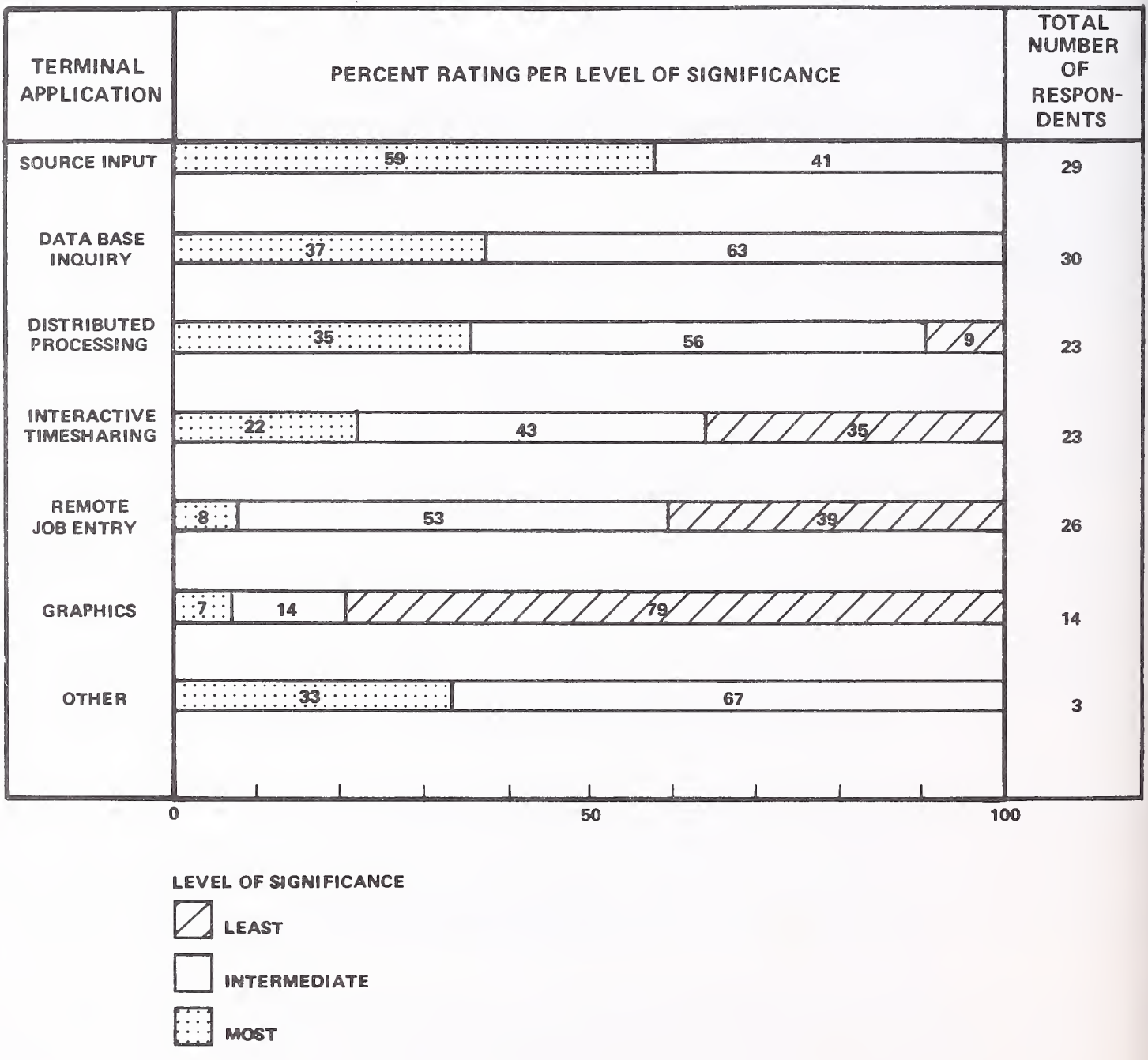


EXHIBIT X-9

UTILIZATION OF COMPUTER RESOURCES AND PROGRAMMERS BY RESPONDENTS IN THE INSURANCE INDUSTRY SECTOR

USER	PERCENT COMPUTER RESOURCES		PERCENT APPLICATION PROGRAMMERS	
	INSURANCE	TOTAL USER PANEL	INSURANCE	TOTAL USER PANEL
PRODUCTION RUNS	70%	67%	-	-
NEW APPLICATIONS				
- PROGRAM DEVELOPMENT	12	15	36	51
MAINTENANCE OF EXISTING PROGRAMS	13	13	51	46
OTHER	5	5	13	3
TOTAL	100%	100%	100%	100%

EXHIBIT X-10

RESPONDING EDP MANAGERS' ANTICIPATED INVOLVEMENT
WITH ELEMENTS OF OFFICE AUTOMATION
IN THE INSURANCE INDUSTRY SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	2	-	5	6	11	24
WORD PROCESSING	11	3	3	1	8	26
COPYING/ DUPLICATING	6	-	-	3	17	26
VOICE COMMUNI- CATIONS	1	-	2	4	18	25
FACSIMILE	3	1	3	-	18	25
TOTAL	23	4	13	14	72	126

- Electronic mail and facsimile reflect some involvement now.

- A large number, however, do not expect to be involved by 1983, indicating EDP manager resistance and/or organizational issues are still retarding the merging of data and text based applications in many organizations.

D. RECENT VENDOR ACTIVITIES

- Brandon Applied Systems (now called Rand Systems) purchased the assets of Montgomery McDonald, Inc. MMI provides data services to casualty insurance companies and brokers.

- Itel Data Services combined several acquisitions in the insurance industry under a single management organization.

- Insco, the computer services arm of Continental Insurance, decided to direct its efforts in-house rather than seek outside markets.

- Turnkey systems, particularly for agents, proliferated.

  - Insurance Systems, Inc. (ISI), of Irvine, California, offers a system which allows the agent to compare rates between companies.

  - Wang has built a system around its Lifeline software.

  - National Fire Adjustment Company in Buffalo, moved software developed on a timesharing system onto a Prime minicomputer.

  - Philips Business Systems has combined its Visual I software with hardware under a package which leases for $540 per month on a five-year lease.

- Other information on vendor activity in the insurance industry sector is contained on pages 192 through 197 of INPUT's "1977 Computer Services Industry Annual Report."

XI MEDICAL INDUSTRY SECTOR MARKETS

XI MEDICAL INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- Medical is the second largest industry in the U.S. accounting for about 9% of the GNP. Industry statistics are presented in Exhibit XI-1.

- Total health care expenditures in 1978 will be over $180 billion with hospitals accounting for about 48% of these costs.

- Health care costs continue to increase despite pressures from the federal government to hold down costs.

- From a base of $39 million in 1965, the projected $180 billion in 1978 is expected to continue at a rate of 10% per year.

- Major contributors to these increasing health care costs other than inflation are:

  - Quality of diagnostic and treatment programs within clinics and hospitals have increased.

  - Medical malpractice insurance for physicians have increased greatly in cost.

EXHIBIT XI-1

MEDICAL INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
80	MEDICAL	HEALTH EXPENDITURES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975(	$120.4 BILLION 255,141 3.9 MILLION
801	PHYSICIANS	HEALTH EXPENDITURES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$26.4 BILLION 121,171 545,000
802	DENTISTS	HEALTH EXPENDITURES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	8.6 BILLION 74,054 235,000
803	OSTEOPATHS	NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	4,359 14,787
804	HEALTH PRACTITIONERS, NEC	HEALTH EXPENDITURES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	2.4 BILLION 20,770 50,000
805	NURSING HOMES	HEALTH EXPENDITURES (1976) NUMBER OF HOMES (1975) NUMBER OF EMPLOYEES (1975)	10.6 BILLION 11,879 684,000
806	HOSPITALS	HEALTH EXPENDITURES (1976) NUMBER OF HOSPITALS (1975) NUMBER OF EMPLOYEES (1975)	55.4 BILLION 5,380 2.1 MILLION

- Medical treatment through outpatient clinics continues to increase at about 10-15% per year while the number of total registered AHA beds showed a decrease of about 1.5% from 1976 to 1977.

- These decreases are for the majority in other than community hospitals.

  - Long-term tuberculosis and psychiatric hospitals have shown decreases of over 50% since 1965.

  - Community hospitals above 100 beds have shown an increase in number of hospitals and beds per hospital.

- Outpatient clinics are becoming an integral part of most community hospitals.

- Exhibit XI-2 provides a breakdown of major medical expenditures for health and medical services.

- Additional information about medical industry characteristics and use of EDP is contained on pages 198 through 214 of INPUT's "1977 Computer Services Industry Annual Report" and in INPUT's 1978 study, "Computer Services Markets in Hospitals."

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- The medical industry sector will maintain a 16% AAGR with the major change occurring in the decline of batch delivery of processing services. Detailed forecasts are presented in Exhibit XI-3.

  - The decline in batch services will be absorbed by both remote computing services and facilities management. This is shown graphically in Exhibit XI-4.

EXHIBIT XI-2

HEALTH AND MEDICAL SERVICES: TRENDS AND PROJECTIONS, 1977-1978

SERVICE	1977*	1978*	PERCENT CHANGE 77-76	PERCENT CHANGE 77-78
HOSPITAL CARE	$ 63.7	$ 72.8	15%	14%
PHYSICIANS SERVICES	30.0	34.0	15	13
DENTISTS SERVICES	9.4	10.3	9	9
OTHER PROFESSIONAL SERVICES	2.6	2.8	9	9
DRUGS & DRUG SUNDRIES	12.2	13.3	9	9
EYEGLASSES & APPLIANCES	2.2	2.4	10	9
NURSING HOME CARE	12.3	13.4	16	16
EXPENSES FOR PREPAYMENT & ADMINISTRATION	8.5	9.7	16	14
GOVERNMENT PUBLIC HEALTH ACTIVITIES	3.6	4.0	11	11
OTHER HEALTH SERVICES	4.5	5.1	14	13
SUBTOTAL	149.0	168.7	13	13
RESEARCH	3.7	4.1	11	11
CONSTRUCTION	5.3	5.7	7	8
SUBTOTAL	9.0	9.9	6	10
TOTAL	$158.0	$178.6	13%	13%

* ESTIMATED BY BUREAU OF DOMESTIC COMMERCE

EXHIBIT XI-3

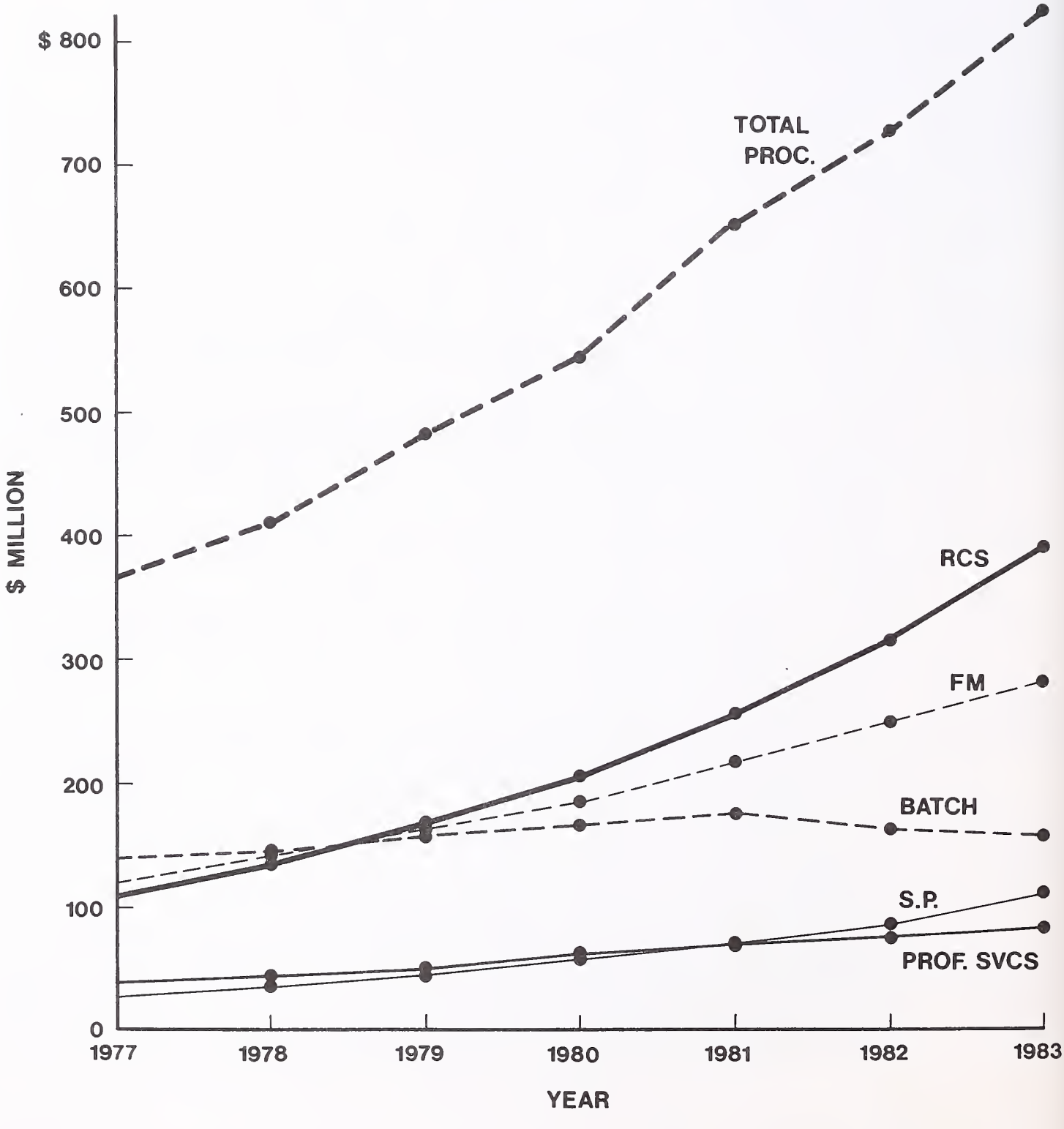
COMPUTER SERVICES MARKET FORECAST FOR THE MEDICAL INDUSTRY SECTOR, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	7	9	28	11	13	16	20	25	23
	SCI. & ENG.	1	2	100	3	4	5	5	7	29
	IND. SPEC.	96	115	19	147	177	222	275	340	24
	UTILITY	5	6	20	8	10	12	15	20	27
	TOTAL	109	132	21	169	204	255	315	392	24
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	120	135	13	160	180	220	250	280	16
	UTILITY									
	TOTAL	120	135	13	160	180	220	250	280	16
BATCH	GEN. BUS.	16	17	6	18	19	20	20	18	1
	SCI. & ENG.									
	IND. SPEC.	114	120	5	133	140	150	135	130	2
	UTILITY	6	6		5	5	5	5	5	(4)
	TOTAL	136	143	5	156	164	175	160	153	1
TOTAL PROCESSING	GEN. BUS.	23	26	13	29	32	36	40	43	11
	SCI. & ENG.	1	2	100	3	4	5	5	7	29
	IND. SPEC.	330	370	12	440	497	592	660	750	15
	UTILITY	11	12	9	13	15	17	20	25	16
	TOTAL	365	410	12	485	548	650	725	825	15
SOFTWARE PRODUCTS	SYSTEM	8	11	37	15	17	20	28	40	30
	APPLICATION	17	22	29	30	38	45	57	70	26
	TOTAL	25	33	32	45	55	65	85	110	27
PROFESSIONAL SERVICES		40	46	15	50	56	65	75	86	13
TOTAL	TOTAL	430	489	14	580	659	760	885	1,021	16

EXHIBIT XI-4

INDUSTRY MARKETS BY MODE OF SERVICE -

MEDICAL INDUSTRY SECTOR



- This trend is the result of many organizations within the medical sector, particularly hospitals and clinics, moving to on-line applications and developing integrated information systems for hospital-wide use.

- Other batch services will be replaced by on-site mini-based hardware that is actively being marketed by RCS vendors as well as mainframe suppliers.

- Industry specialty will continue to be the dominant type of application purchased by users in this industry sector. Hospitals will have about 91% of their applications in this category.

- Although computing services represent the clear majority of this market (82%), the sale of software products will grow at an AAGR of 27%. DBMS based products will show the most significant growth as large medical data bases are established by larger clinics and hospitals.

- Distributed data processing will increase in importance both for in-house developed systems and vendor supplied systems. Application products will be specially tailored for small clinics and incorporated physicians' offices.

- Government actions to slow the increased cost of all medical industry activities will result in more EDP load in terms of reporting of expenditures and monitoring of resource utilization.

- Software products markets grow rapidly from a small base as more small computers provide a growing opportunity and the larger in-house installations become more sophisticated.

C. RECENT VENDOR ACTIVITIES

- MCAUTO and Shared Medical Systems (SMS) continued as the two dominant firms supplying remote computing services to the medical industry.

- MCAUTO, through its Medical Services Division, derives about half of its outside revenues from support to hospitals, clinics and physicians' offices and offers a complete range of financial and patient applications.

- During the past year MCAUTO extended the facilities available under its hospital services network to include Physician Data Services (PDS), an interactive financial system to handle accounts receivable and collections for medical groups and clinics.

- SMS is primarily dedicated to the hospital subsector of this industry and increased its 1977 revenues to $45.6 million, which was an increase of 29% over 1976.

- INPUT estimates that MCAUTO currently supports 430 hospitals with approximately 97,000 beds while SMS has about 410 hospitals with 119,000 beds.

- MCAUTO also provides data processing support to 300 clinics and physicians' groups.

  - Per patient charges for both firms run between $1.00 and $5.00 per day depending on services purchased by the hospital.

  - These per patient charges are expected to increase over the next five years and may increase to as much as $9.00 per patient day.

- TYMSHARE is continuing to increase its market penetration in this industry sector through acquisition.

- TYMSHARE acquired Medical Information, Inc., a Dallas-based computer services firm specializing in shared services and on-site information systems for hospitals.

- TYMSHARE's hospital activity has been primarily concentrated in the Northeast through the past acquisition of Medical Information, Inc. This new acquisition will increase its hospital base by about 50.

- Itel Corporation made its second acquisition in the medical industry, United Medical Data Systems of Long Beach, California.

  - Earlier, Itel had acquired Medical Arts Office Services, a company that provides automated billing services for hospital associated physicians.

  - Both of these acquisitions are part of Itel's Data Services Group.

- Computer Sciences Corporation (CSC) acquired the commercial claims processing operations of Paid Prescriptions, a California non-profit corporation. Paid Prescriptions will be a unit of CSC's Data Services Group.

- HBO & Company increased sales of its Four Phase mini-based system to $18 million in 1977. The system provides various patient management applications and has been successfully interfaced with RCS supplied business management applications and in-house systems.

- Burroughs has introduced its first on-line hospital information system.

  - The software is transaction oriented and is designed to operate on a B 6700 or larger system with at least two megabytes of main memory.

  - The software can be purchased in modules with a total complement of financial, patient, and clinical management systems.

- IBM has added Health Care Support DL/I Patient Care System to its list of over 37 packages available to the hospital and clinic market.

  - This program was developed by Duke University Medical Center as an installed user program; it collects and distributes patient information through interactive terminals installed throughout the hospital.

  - The software carries a monthly license fee of $2,900 which is waived after 24 payments.

- NCR has announced serveral new software products for the medical sector:

  - The NCR Hospital Payroll system for the I-8220 which will handle up to 2,000 employees.

  - The NCR billing and accounts receivable package for anesthesiologists can handle the billing requirements of nine to twelve doctors and operates on the NCR 499.

  - The NCR Utilization Review System which is designed to satisfy the Professional Standards Review Organization reporting requirements.

  - A software package designed to automate the processing of information generated in a typical medium to large hospital laboratory.

- Digital Equipment Corporation (DEC) has also expanded its services to the medical sector.

  - DEC has developed an ANSI-Standard MUMPS language for its mid-to high-end PDP/11 minicomputer systems. DSM-11 (Digital Standard Mumps) is a data base oriented high level programming language originally developed by Massachusetts General Hospital for medical information storage and retrieval.

- DEC has announced two new software packages that run under DSM-11 and were developed at the Arizona Health Sciences Center. The Medical Records Index (MRI) and Admission-Discharge-Transfer (ADT) programs are currently running at the University Hospital.

- DEC has announced a light weight, fully portable computer system for hospital use in acquiring data from gamma cameras for use in nuclear cardiology applications.

- Honeywell, Inc., has introduced an array processor for use with medical systems that handles high speed on-line image processing. The array processor is used in conjunction with radioisotope photography and ultrasound image enhancement.

- Control Data Corporation's PATHLAB system continues to be incorporated into hospital information systems as the nucleus of a complete clinical management system. Mercy Hospital in Des Moines, Iowa has integrated PATHLAB with its IBM business management system.

- National Data Corporation has introduced a computerized pharmacy which is currently being used in the Southeastern U.S. and Canada. It assists the pharmacist in patient screening, patient compliance monitoring, and maintaining patient profiles.

- ISUM has introduced a patient billing, accounting and payroll package for physicians' offices for use on a 32K Data General Nova.

- A discussion of other vendor activities is presented on pages 214 through 220 of INPUT's "1977 Computer Services Industry Annual Report."

XII EDUCATION INDUSTRY SECTOR MARKETS

XII EDUCATION INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- In perspective, the education sector employs approximately one-half as many people as the insurance sector, and one-third as many as the federal government sector. Data is presented in Exhibit XII-1.

- Growth in education is being limited by:

  - Declining enrollment in primary schools.

  - Reduced spending at the state and local levels due to taxpayer resistance.

  - Entrenched current faculty and administration who often resist change.

- Still, education remains an industry sector with a promising long-term future for electronic products and services as vehicles to provide lower cost solutions to the education of many people.

EXHIBIT XII-1

EDUCATION INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
82	ALL	NUMBER OF EMPLOYEES (1975)	957,131
	ELEMENTARY/ SECONDARY	SCHOOL EXPENDITURES (1977) ENROLLMENTS (1976)	$81.9 BILLION 47.7 MILLION
		NUMBER OF SCHOOLS (1975) NUMBER OF SCHOOL DISTRICTS (1975-1976)	107,000 16,400
	HIGHER EDUCATION	SCHOOL EXPENDITURES (1977)	$49.2 BILLION
		ENROLLMENTS (1977) NUMBER OF COLLEGES (1976)	11.4 MILLION 2,785

EXHIBIT XII-2

COMPUTER SERVICES MARKET FORECAST FOR EDUCATION INDUSTRY, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	7	9	29	10	12	15	18	21	19
	SCI. & ENG.	6	7	17	8	9	10	10	11	9
	IND. SPEC.	5	6	20	8	10	12	15	19	26
	UTILITY	13	16	25	19	20	21	22	24	9
	TOTAL	31	38	23	45	51	58	65	75	15
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	14	17	21	21	24	30	35	41	19
	UTILITY									
	TOTAL	14	17	21	21	24	30	35	41	19
BATCH	GEN. BUS.	7	8	14	10	12	14	14	15	13
	SCI. & ENG.	2	2	-	2	3	3	3	4	15
	IND. SPEC.	15	17	13	19	21	25	28	29	11
	UTILITY	7	8	14	10	8	6	5	5	(10)
	TOTAL	31	35	13	41	44	48	50	53	9
TOTAL PROCESSING	GEN. BUS.	14	17	21	20	24	29	32	36	16
	SCI. & ENG.	8	9	13	10	12	13	13	15	11
	IND. SPEC.	34	40	18	48	55	67	78	89	17
	UTILITY	20	24	20	29	28	27	27	29	3
	TOTAL	76	90	18	107	119	136	150	169	13
SOFTWARE PRODUCTS	SYSTEM	14	16	14	20	24	30	37	46	23
	APPLICATION	8	9	13	10	14	20	23	29	26
	TOTAL	22	25	14	30	38	50	60	75	25
PROFESSIONAL SERVICES		34	36	6	38	39	40	40	41	2
TOTAL	TOTAL	132	151	14	175	196	226	250	285	14

EXHIBIT XII-3

INDUSTRY MARKETS BY MODE OF SERVICE -

EDUCATION SECTOR

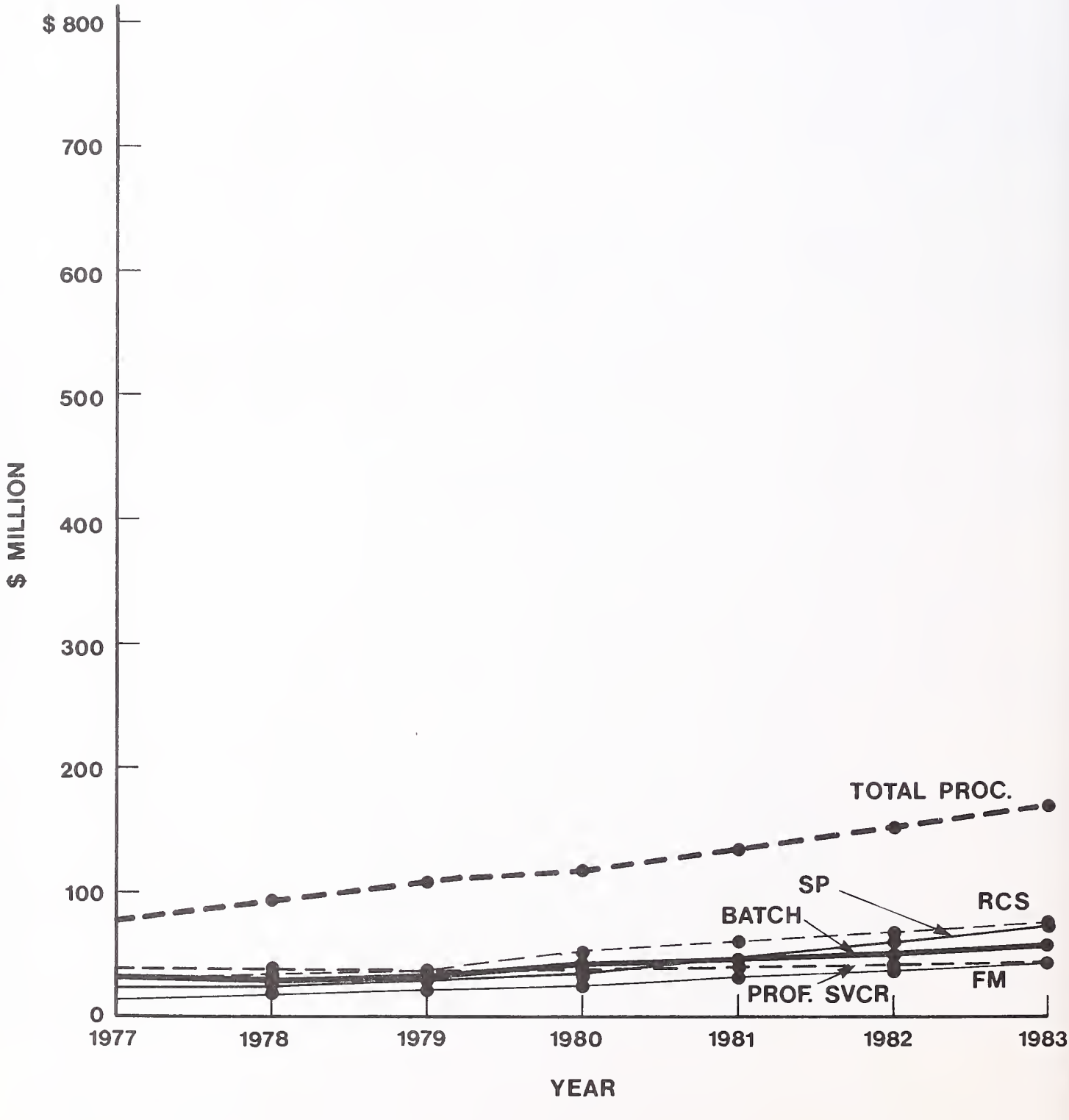


EXHIBIT XII-4

OBJECTIVES OF RESPONDING EDP MANAGERS
IN THE EDUCATION INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	5	6%	12	16%	6	12%
DESIGN/INSTALL DDP	2	3	2	3	4	8
INSTALL NEW APPLICATIONS	14	18	6	8	7	14
INSTALL ON-LINE APPLICATIONS	17	22	24	32	13	25
INSTALL/UPGRADE MAINFRAME	15	19	18	24	11	22
INSTALL MINI	-	-	1	1	-	-
INSTALL NEW OPERATING SYSTEMS	2	3	-	-	2	4
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	10	13	5	7	4	8
CENTRALIZE OR DECENTRALIZE	2	3	2	3	-	-
SUBTOTAL	67	87%	70	94%	47	93%
OTHER (SPECIFY)						
COMMUNICATIONS NETWORKING	7	9%	3	4%	3	6%
REWRITE APPLICATIONS	3	4	1	1	1	2
LONG RANGE PLANNING	1	1	-	-	-	-
TOTAL	78	101%	74	99%	51	101%

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- As a market for computer services, education is the smallest, approximating 10% of the largest segment (banking and finance) and 2% of the total computer services industry. Details are presented in Exhibit XII-2.

- The growth potential for services in education is not great within the forecast period, as shown graphically in Exhibit XII-3.

- The major opportunity for services is in the industry specialty area for applications such as student scheduling, CAI (Computer Assisted Education), and CMI (Comuter Managed Education).

- Some opportunity exists in general business applications as schools look for efficiencies in the face of tighter budgets.

- Software products will continue to grow from a modest base.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- Although not a rapidly growing services market, the education sector does include many leading edge in-house applications, particularly at the university level.

- Objectives of EDP managers on INPUT's user panel are reflecting a strong orientation toward a large central site as shown in Exhibit XII-4:

  - There is heavy interest in mainframe upgrade, little in minis.

  - Data base applications are more important through the 1980 period than DDP.

- The heavy interest in 1979 in on-line applications represents a response to the desire for more people to have access to the computer.

- Applications under development, as presented in Exhibit XII-5, are heavily cost related, concentrating on accounting/finance and personnel related/payroll, reflecting the cost control pressures on the sector.

- With regard to EDP budgets, respondents see moderate changes as shown in Exhibit XII-6. There is a shift from mainframes to terminals.

- Purchase of services by EDP managers in this sector showed modest but generally increasing expenditures as presented in Exhibit XII-7.

  - The heavy interest in education is notable.

  - Systems software shows a high response and a high growth consistent with the advanced state of many of the large EDP centers in this sector.

- The heavy emphasis on CAI and CMI is reflected in the role of interactive timesharing in terminal acquisition decisions (see Exhibit XII-8). Data base is also a strong driving force as indicated earlier.

- Use of computer resources in this industry sector shows a high "other" and a low "production" compared to other sectors, reflecting the more esoteric environment of the sector. (See Exhibit XII-9.)

- As would be expected, most EDP managers anticipate involvement in office automation as shown in Exhibit XII-10, reflecting the merging of data, text and graphics in the education sector, and the willingness of the EDP manager to get involved.

EXHIBIT XII-5

APPLICATIONS TO BE DEVELOPED BY RESPONDING EDP MANAGERS IN THE EDUCATION INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY*	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	34	21%	10	29%
MARKETING & SALES	-	-	-	-
SCIENTIFIC & ENGINEERING	1	1	-	-
WORD PROCESSING	1	1	1	100
PERSONNEL RELATED/ PAYROLL	18	11	4	22
INVENTORY CONTROL	9	6	2	22
COST SYSTEMS	1	1	-	-
ORDER ENTRY/BILLING	4	3	1	25
MODELLING FORECASTING	10	6	-	-
DATA BASE APPLICATIONS	13	8	5	38
PERFORMANCE MEASUREMENT	-	-	-	-
GRAPHICS	4	3	1	25
PURCHASING	5	3	1	20
SUBTOTAL	100	65	25	
OTHER (OFTEN INDUSTRY SPECIFIC)				
FINANCIAL AID	9	6	1	11
REGISTRATION	14	9	4	29
COMPUTER AID INSTRUCTION	8	5	1	13
ADMISSIONS	7	4	1	14
STUDENT RECORD KEEPING	18	11	8	44
POINT OF SALE	3	2	1	33
SUBTOTAL	59	37	16	
TOTAL	159	100%	41	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

EXHIBIT XII-6

ANTICIPATED CHANGES IN EDP BUDGETS OF RESPONDENTS IN THE EDUCATION INDUSTRY SECTOR

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	32%	31%	30%	31%	(6)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	2	3	4	3	100
NON-PROGRAMABLE TERMINALS	4	4	4	4	-
COMMUNICATIONS	3	3	4	3	33
SOFTWARE (PURCHASE/LEASE)	3	5	4	4	33
PERSONNEL	47	48	46	47	2
OTHER	10	10	7	9	(30)
TOTAL	100%	100%	100%	100%	

EXHIBIT XII-7

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE BY RESPONDENT EDP MANAGERS IN THE EDUCATION INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs.1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$36	9	$ 42	9	16 %
REMOTE BATCH	97	7	113	7	16
BATCH	49	3	53	3	8
INPUT/OUTPUT	35	12	49	12	40
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	29	29	51	31	76
APPLICATIONS SOFTWARE	15	10	12	24	(20)
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	25	9	27	12	8
EDP CONSULTING	21	3	15	7	(29)
EDUCATION	8	18	11	20	38
OTHER	19	1	22	1	16
FACILITIES MANAGEMENT	-	-	-	-	-
MAINTENANCE	69	26	83	25	20

EXHIBIT XII-8

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE EDUCATION INDUSTRY SECTOR

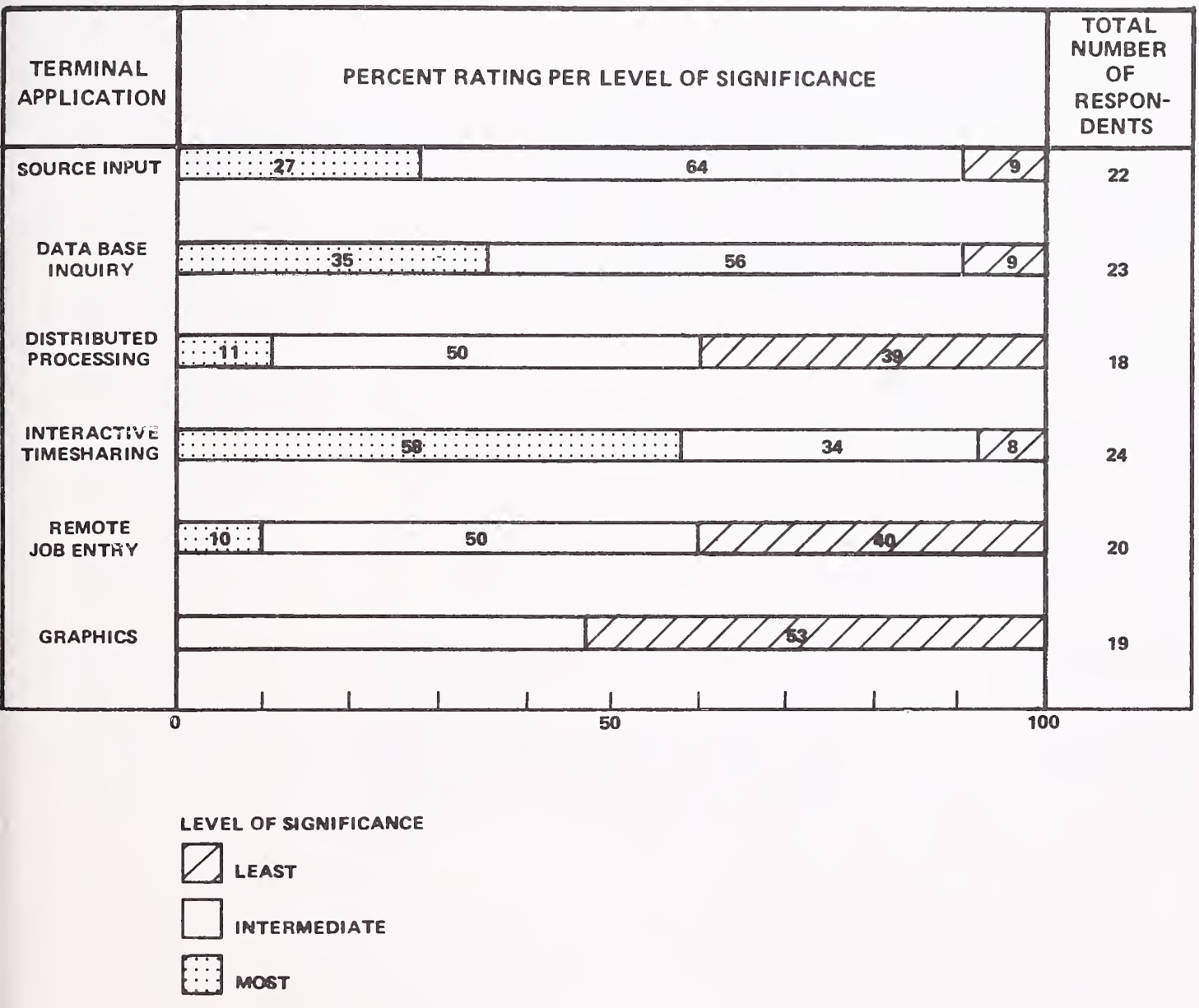


EXHIBIT XII-9

UTILIZATION OF COMPUTER RESOURCES AND
PROGRAMMERS BY RESPONDENTS
IN THE EDUCATION INDUSTRY SECTOR

USE	PERCENT COMPUTER RESOURCES		PERCENT APPLICATION PROGRAMMERS	
	EDUCATION	TOTAL USER PANEL	EDUCATION	TOTAL USER PANEL
PRODUCTION RUNS	51%	67%	-	-
NEW APPLICATIONS - PROGRAM DEVELOPMENT	17	15	49	51
MAINTENANCE OF EXISTING PROGRAMS	16	13	46	46
OTHER	16	5	5	3
TOTAL	100%	100%	100%	100%

EXHIBIT XII-10

RESPONDING EDP MANAGERS' ANTICIPATED INVOLVEMENT WITH ELEMENTS OF OFFICE AUTOMATION IN THE EDUCATION SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	6	1	4	3	25	39
WORD PROCESSING	20	6	6	7	4	43
COPYING/ DUPLICATING	10	-	-	4	28	42
VOICE COMMUNI-CATIONS	3	-	-	5	33	41
FACSIMILE	4	1	1	3	31	40
TOTAL	43	8	11	22	121	205

D. RECENT VENDOR ACTIVITIES

- Control Data Corporation continues to be the most active vendor in this sector, particularly through the Control Data Education Company.

- CDC recently reduced the price of its PLATO terminal to $5,300 and added locations into which clients can connect, thereby reducing costs further to many users.

- PLATO was determined by the U.S. Office of Education to accelerate the learning process for functionally illiterate adults.

- The University of Delaware completed installation of a 60 terminal system linked to a Control Data Cyber 173; more than 100 University of Delaware faculty members are involved in developing additional courses for the system.

- PLATO is also being used for vocational training, specifically for nursing and industrial mechanics.

- CDC also is active in promoting the use of a central computer system by many schools:

  - A center serves 700 schools in Texas.

  - Ten state supported universities in Illinois also jointly support a large scale computer system.

- NCR announced a software package (Interactive Stores Inventory Control System) designed specifically for schools, colleges, government offices, and hospitals.

- NCR also announced a new version of SCHOLARS (School Automated Records System), a data base oriented student record management system.

- A software package designed to track student financial aid applications was developed by Systems Research, Inc., and is now being marketed through Education Methods, Inc. of Denver, Colorado.

- A minicomputer-based communications network operated by OCLC, Inc. of Columbus, Ohio has introduced a service for libraries which catalogs book titles and provides other library services. Currently, 1,300 libraries in 46 states are reported to use the service.

- Olivetti announced a small teaching accounting machine aimed at bookkeeping students in secondary, vocational school and community college levels.

- Additional information about the education sector is presented on pages 221 through 228 of INPUT's "1977 Annual Report of the Computer Services Industry."

XIII RETAIL INDUSTRY SECTOR MARKETS

XIII RETAIL INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- A most significant statistic relative to the retailing industry sector is the large number of establishments, 1.2 million, as shown in the demographic data in Exhibit XIII-1.

- Over half of industry revenues come from three subsectors: general merchandise, food stores, and automotive dealers/gasoline service stations.

- Compared to other industries, there are no really dominant companies.

  - The 50 largest retailing companies accounted for less than 20% of industry revenues in 1976.

  - Only in the general merchandise subsectors are there a significant number of companies with over 1,000 employees, as shown in Exhibit XIII-2.

- Average sales per employee varies widely by industry subsector, from $16,900 in eating and drinking to $108,300 in automobile dealers and gasoline service stations. The higher sales per employee tends to indicate a higher potential for services.

EXHIBIT XIII-1

RETAIL INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
ALL	RETAIL TRADE	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$651.9 BILLION 1.2 MILLION 12.3 MILLION
52	BUILDING MATERIALS, HARDWARE	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975) AVERAGE SALES/EMPLOYEE	$38.8 BILLION 59,817 413,000 $93,900
53	GENERAL MERCHANDISE	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975) AVERAGE SALES/EMPLOYEE	$104.2 BILLION 41,817 1.9 MILLION $54,800
54	FOOD STORES	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975) AVERAGE SALES/EMPLOYEE	$141.0 BILLION 159,710 1.8 MILLION $78,300
55	AUTOMOTIVE DEALERS & GASOLINE SERVICE STATIONS	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975) AVERAGE SALES/EMPLOYEE	$28.6 BILLION 231,294 1.6 MILLION $108,300
56	APPAREL & ACCESSORIES	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975) AVERAGE SALES/EMPLOYEE	$28.6 BILLION 109,291 810,000 $35,300
57	FURNITURE, HOME FURNISHINGS EQUIPMENT	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975) AVERAGE SALES/EMPLOYEE	$29.0 BILLION 78,327 472,000 $16,400
58	EATING & DRINKING	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975) AVERAGE SALES/EMPLOYEE	$52.3 BILLION 265,118 3.1 MILLION $16,900
59	MISCELLANEOUS RETAIL	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975) AVERAGE SALES/EMPLOYEE	$46.0 BILLION 235,465 1.6 MILLION $28,800

EXHIBIT XIII-2

RETAIL ORGANIZATIONS - DISTRIBUTION BY SIZE, 1975

INDUSTRY SIC	INDUSTRY NAME	NUMBER OF ESTABLISHMENTS (SALES RANGES) BY NUMBER OF EMPLOYEES			
		1-99	100-249	250-999	1000 & OVER
52	BUILDING MATERIALS HARDWARE	59,724	85	8	-
53	GENERAL MERCHANDISE	37,053	3,139	1,536	89
54	FOOD STORES	158,641	1,005	64	-
55	AUTO DEALERS AND GASOLINE SERVICE STATIONS	230,697	584	12	1
56	APPAREL AND ACCESSORIES	108,927	310	52	2
57	FURNITURE, HOME FURNISHINGS AND EQUIPMENT	78,196	115	15	1
58	EATING AND DRINKING	263,698	1,280	137	3
59	MISCELLANEOUS RETAIL	235,001	367	77	20

- The trend to large discount stores which carry many lines of merchandise, including food, is blurring the distinctions between subsectors.

- Additional information about the retailing industry sector is contained in INPUT's "1977 Computer Services Industry Annual Report," pages 229 through 237.

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- Computer services markets in the retail industry sector are growing at the same rate as the total U.S. computer services market, 16%, as shown in Exhibit XIII-3. The size of the retail industry market, however, is still relatively small, equaling 6% of the total market.

- With regard to modes of service, RCS dominates with 60% of processing services.

  - Batch still has a large position.

  - Batch will decline after 1981 as shown graphically in Exhibit XIII-4, as small retailers switch either to RCS or to in-house.

- FM has not been a factor in retail and this will continue to be the case as in-house EDP remains dominant.

- Industry specialty is the dominant type of processing service with 68% of 1977 revenues and growing to 75% by 1983.

  - Applications such as credit authorization have continued potential.

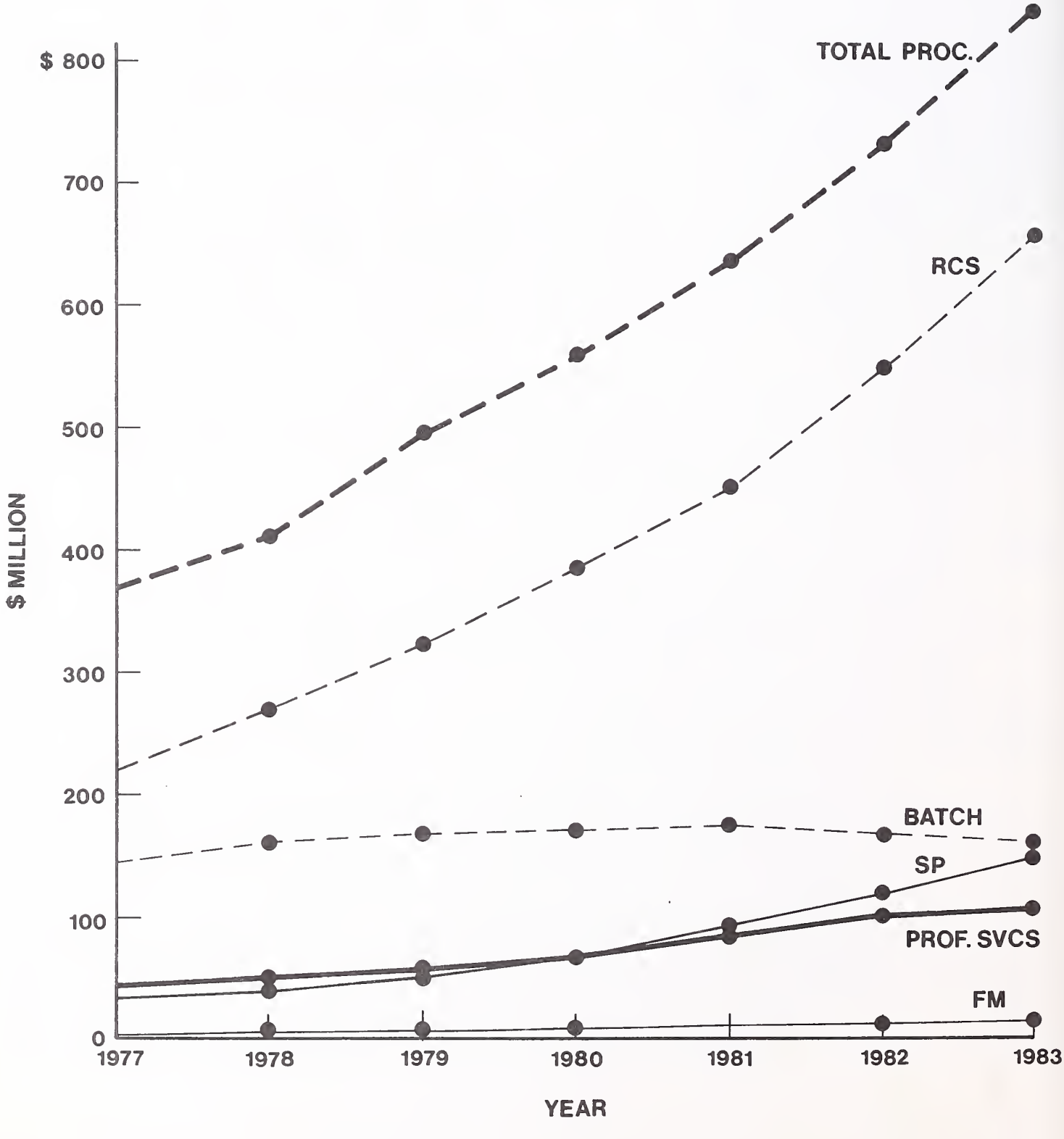
EXHIBIT XIII-3

COMPUTER SERVICES MARKET FORECAST FOR RETAIL INDUSTRY, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	15	20	33	25	31	40	50	64	26
	SCI. & ENG.									
	IND. SPEC.	184	225	22	268	316	370	450	540	19
	UTILITY	21	25	19	30	36	40	50	60	19
	TOTAL	220	270	22	323	383	450	550	664	20
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	4	5	25	6	8	10	13	15	24
	UTILITY									
	TOTAL	4	5	25	6	8	10	13	15	24
BATCH	GEN. BUS.	60	65	8	65	68	70	65	60	(2)
	SCI. & ENG.									
	IND. SPEC.	62	70	13	76	77	80	77	76	2
	UTILITY	24	25	4	25	24	25	25	25	-
	TOTAL	146	160	10	166	169	175	167	161	-
TOTAL PROCESSING	GEN. BUS.	75	85	13	90	99	110	115	124	8
	SCI. & ENG.									
	IND. SPEC.	250	300	20	350	401	460	540	631	16
	UTILITY	45	50	11	55	60	65	75	85	11
	TOTAL	370	435	18	495	560	635	730	840	14
SOFTWARE PRODUCTS	SYSTEM	13	16	23	20	25	32	45	60	30
	APPLICATION	17	26	53	30	45	63	75	90	28
	TOTAL	30	42	40	50	70	95	120	150	29
PROFESSIONAL SERVICES		40	50	25	55	70	85	100	110	17
TOTAL	TOTAL	440	527	20	600	700	815	950	1,100	16

EXHIBIT XIII-4

INDUSTRY MARKETS BY MODE OF SERVICE -
RETAIL INDUSTRY SECTOR



- Special applications for subsectors such as automobile dealers have been growth opportunities; with cheaper hardware, other subsectors such as fast food become approachable.

- Point-of-sale, however, remains almost totally an in-house application.

- General business applications via RCS have potential from a current small base, with banks having an inside track because of the relationship of POS and EFTS.

- Software products show a good growth percentage, but from a small base:

  - Software products are only 6.8% of services revenues in the retail industry sector versus 12% for the total U.S. computer services industry.

  - Some new software packages in this sector are being offered by vendors of hardware.

- The increasing need for communications based applications is the main driving force for the growth in professional services since the capability to install such applications cannot be met totally with in-house talent.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- The pressure to install on-line applications is shown clearly in the objectives of responding user panel EDP managers as tabulated on Exhibit XIII-5.

  - Almost half of 1977 mentions were in this category.

  - On-line does not mean distributed and this is reflected by the almost total absence of DDP as an objective through 1980.

EXHIBIT XIII-5

OBJECTIVES OF RESPONDING EDP MANAGERS

IN THE RETAIL INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	1	3%	1	4%	2	10%
DESIGN/INSTALL DDP	1	3	-	-	-	-
INSTALL NEW APPLICATIONS	6	21	3	13	5	25
INSTALL ON-LINE APPLICATIONS	7	24	11	46	4	20
INSTALL/UPGRADE MAINFRAME	5	17	3	13	5	25
INSTALL MINI	2	7	-	-	-	-
INSTALL NEW OPERATING SYSTEMS	1	3	-	-	-	-
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	3	10	4	17	2	10
CENTRALIZE OR DECENTRALIZE	-	-	-	-	-	-
SUBTOTAL	26	88%	22	93%	18	90%
OTHER (SPECIFY)						
REWRITE SOFTWARE	1	3%	-	-	-	-
COMMUNICATIONS (NETWORKING)	1	3	2	8	2	10
LONG RANGE PLANNING	1	3	-	-	-	-
TOTAL	29	97%	24	101%	20	100%

- The low priority given to mini installation results largely from the dominance of specialty terminals, particularly POS.

- Applications under development continue to concentrate on the cost elements of inventory and personnel which dominate retailing.

  - Exhibit XIII-6 shows that these applications are also often highest priority.

  - Little data base activity is visible at this point among respondents.

- The move to on-line is also revealed in the shift in EDP expenditures presented in Exhibit XIII-7.

  - Communications expenditures double as a percent of the budget between 1978 and 1980.

  - Programable terminals/small computers increase 50%.

- Although the response shown in Exhibit XIII-8 related to purchase of outside service is too small to support much analysis, the relatively higher response regarding systems software is notable.

  - The EDP manager is beginning to look to outside software to help implement more complex systems.

  - Similarly there was a relatively high response to education services, most likely for the same reason.

- Source input and data base inquiry are the dominant reasons for terminal acquisition, as shown in Exhibit XIII-9.

EXHIBIT XIII-6
APPLICATIONS TO BE DEVELOPED BY RESPONDING EDP MANAGERS IN THE RETAIL INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY*	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	12	19%	2	17%
MARKETING & SALES	5	8	-	-
SCIENTIFIC & ENGINEERING	-	-	-	-
WORD PROCESSING	-	-	-	-
PERSONNEL RELATED/ PAYROLL	10	16	3	30
INVENTORY CONTROL	12	19	3	25
COST SYSTEMS	-	-	-	-
ORDER ENTRY/BILLING	6	10	3	50
MODELLING FORECASTING	1	2	1	100
DATA BASE APPLICATIONS	3	5	-	-
PERFORMANCE MEASUREMENT	-	-	-	-
GRAPHICS	-	-	-	-
PURCHASING	4	6	1	25
SUBTOTAL	53	85	13	
(OTHER OFTEN INDUSTRY SPECIFIC)				
POINT OF SALE	6	10	2	33
ENERGY CONTROL	2	3	-	-
DISTRIBUTION	2	3	1	50
SUBTOTAL	10	16	3	
TOTAL	63	100%	16	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

EXHIBIT XIII-7

ANTICIPATED CHANGES IN EDP BUDGETS OF RESPONDENTS IN THE RETAIL INDUSTRY SECTOR

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	28%	26%	23%	26%	(18)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	2	4	3	3	50
NON-PROGRAMABLE TERMINALS	2	2	1	2	(50)
COMMUNICATIONS	2	2	4	3	100
SOFTWARE (PURCHASE/LEASE)	2	3	3	3	50
PERSONNEL	47	45	45	46	(4)
OTHER	16	16	19	17	19
TOTAL	100%	100%	100%	100%	

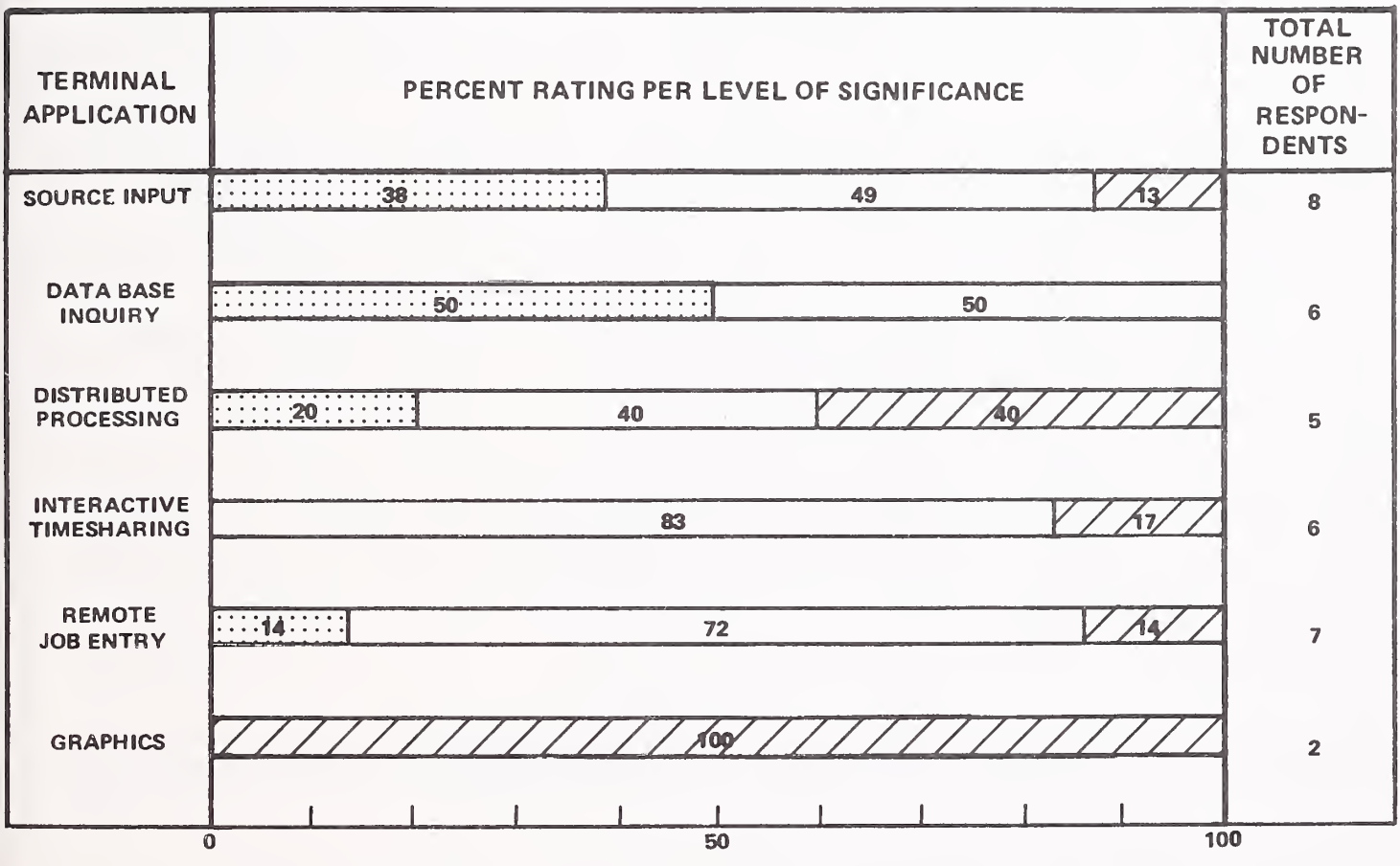
EXHIBIT XIII-8

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE BY RESPONDENT EDP MANAGERS IN THE RETAIL INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs. 1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$143	5	$ 64	5	(55)%
REMOTE BATCH	-	-	-	-	-
BATCH	18	3	20	3	11
INPUT/OUTPUT	30	4	34	4	13
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	42	10	33	9	(21)
APPLICATIONS SOFTWARE	41	4	34	7	(17)
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	114	4	124	3	9
EDP CONSULTING	41	3	6	1	(85)
EDUCATION	6	7	6	9	-
OTHER	-	-	-	-	-
FACILITIES MANAGEMENT	-	-	4	1	-
MAINTENANCE	27	8	31	7	15

EXHIBIT XIII-9

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE RETAIL INDUSTRY SECTOR



LEVEL OF SIGNIFICANCE

- LEAST
- INTERMEDIATE
- MOST

- The response regarding involvement in office automation functions also reflects a relatively non-aggressive attitude among EDP managers in this industry sector.

  - Exhibit XIII-10 shows that only 37% of responses were affirmative as to involvement by 1983.

  - This is counter to the potential for combining office functions which are heavily clerical in retailing.

D. RECENT VENDOR ACTIVITIES

- NCR continues its role as a leading vendor in this industry sector with a series of announcements in both services and hardware.

  - Education courses are being offered at universities under the sponsorship of NCR for training in improved efficiency at check-out counters; fees are $285 for the first participant and $250 for each additional participant.

  - NCR announced the NCR 2160 food service system for fast food shops which includes four terminals, a controller and a remote printer for under $16,000.

  - An enhanced version of the NCR 255 terminal was announced, the NCR 2552, with increased flexibility; over 50,000 NCR 255 terminals have been installed worldwide.

- An interesting combined effort is MSD, Inc., a wholly owned subsidiary of Chart House, a fast food corporation.

EXHIBIT XIII-10

RESPONDING EDP MANAGERS' ANTICIPATED INVOLVEMENT
WITH ELEMENTS OF OFFICE AUTOMATION
IN THE RETAIL INDUSTRY SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	-	-	3	1	9	13
WORD PROCESSING	3	-	2	2	8	15
COPYING/ DUPLICATING	4	1	-	-	9	14
VOICE COMMUNI-CATIONS	5	-	-	1	9	15
FACSIMILE	3	-	1	-	10	14
TOTAL	15	1	6	4	45	71

- MSD, Inc., provides services both to the parent corporation and to the First National Bank of Lafayette, Louisiana.

- This is a unique example of the growing overlap of retailing and banking through the POS, EFTS, and credit applications.

- National Data announced a number of new clients in the retail sector for its deposit reporting system.

- Reynolds and Reynolds enhanced its already successful service for automobile dealers with its VIM II on-line system utilizing Western Union Data Services EDT 300 teminals.

- TRW, IBM, National Semiconductor, GTE and others all announced new POS terminals which offer increased capabilities such as programmability, often at lower prices than the products they replaced.

- The IBM Series/1 is being considered by K-Mart as an in store computer but K-Mart will also consider the NCR 8230 for other locations to avoid a single source posture.

- Additional information on vendors is presented on pages 237 through 241 of INPUT's "1977 Computer Services Industry Annual Report."

XIV WHOLESALE INDUSTRY SECTOR MARKETS

XIV WHOLESALE INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- Seventy percent of industry revenues come from merchant wholesalers (those wholesalers who are not part of a larger company which often also does manufacturing).

- Of the $482.5 billion in revenues in 1976 from merchant wholesalers, 56% was for non-durable goods with the remainder from durable goods as shown in Exhibit XIV-1.

- Average sales per employee are high with sales of non-durable goods being approximately double per employee compared to durable goods. Food products are the major contributor in non-durable goods.

- An important characteristic of the wholesale industry sector is the preponderance of small establishments:

  - As shown in Exhibit XIV-2, 99% of establishments have fewer than 250 employees.

  - Only 36 companies have 1,000 or more employees.

EXHIBIT XIV-1

WHOLESALE INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
ALL	ALL	TOTAL SALES (1975 SALES (MERCHANT WHOLESALERS) (1976) TOTAL NUMBER OF ESTABLISHMENTS NUMBER OF ESTABLISHMENTS (MERCHANT WHOLESALERS) (1972)	$840 BILLION $482.5 BILLION 349,812 290,000
50	DURABLE GOODS	SALES (MERCHANT WHOLESALERS) (1976) NUMBER OF ESTABLISHMENTS (1975) NUMBER OF EMPLOYEES	$211 BILLION 200,509 2.4 MILLION
		SALES BREAKDOWN (1976) MOTOR VEHICLES (1976) ELECTRICAL GOODS (1976) FURNITURE, HOME FURNISHINGS HARDWARE, PLUMBING, HEATING LUMBER, CONSTRUCTION MACHINERY, EQUIPMENT, SUPPLIES METALS, METALWORK (EXCEPT SCRAP) SCRAP, WASTE MATERIALS OTHER	 38.8 MILLION 28.9 MILLION 7.7 MILLION 19.3 MILLION 20.1 MILLION 56.4 MILLION 26.8 MILLION 9.6 MILLION 3.3 MILLION

EXHIBIT XV-I (CONTD.)

WHOLESALE INDUSTRY SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
51	NON-DURABLE GOODS	SALES (MERCHANT WHOLESALERS) (1976)	$271.7 BILLION
		NUMBER OF ESTABLISHMENTS(1975)	144,601
		NUMBER OF EMPLOYEES (1975)	1.7 MILLION
		SALES BREAKDOWN (1976)	
		GROCERIES AND RELATED	93.9 MILLION
		BEER, WINE AND DISTILLED ALCOHOLIC BEVERAGES	21.6 MILLION
		DRUGS, CHEMICAL, ALLIED	16.8 MILLION
		TOBACCO, TOBACCO PRODUCTS	8.7 MILLION
		DRY GOODS, APPAREL	17.3 MILLION
		PAPER PRODUCTS (EXCLUDING WALLPAPER)	13.1 MILLION
		FARM PRODUCTS (RAW MATERIALS)	45.2 MILLION
		OTHER	55.1 MILLION

EXHIBIT XIV-2

WHOLESALE INDUSTRY ORGANIZATIONS - DISTRIBUTION BY SIZE

NUMBER OF EMPLOYEES	SALES RANGE	NUMBER OF ESTABLISHMENTS
DURABLE GOODS (SIC 50): AVERAGE SALES PER EMPLOYEE $75,500		
1 - 249	$ 75,500 - 18,799,500	199,387
250 - 499	$ 18,875,000 - 37,674,500	335
500 - 999	$ 37,775,000 - 77,422,500	101
1000 - 1499	$ 77,498,000 - 116,172,500	14
1500 - 2499	$116,248,000 - 188,674,500	5
2500 - 4999	$188,750,000 - 377,424,500	1
NON-DURABLE GOODS (SIC 51): AVERAGE SALES PER EMPLOYEE $143,500		
1 - 249	$ 143,500 - 35,731,500	151,025
250 - 499	$ 35,875,000 - 71,606,500	237
500 - 999	$ 71,750,000 - 143,356,500	55
1000 - 1499	$143,500,000 - 215,106,500	12
1500 - 2499	$215,250,000 - 358,606,500	3
2500 - 4999	$358,750,000 - 717,356,500	1

- The total sales of the industry are spread over a range of company sizes as shown in Exhibit XIV-3.

- The effect of size distribution and other factors are treated in more detail in INPUT's 1977 MAS report, "Computer Services Opportunities in the Wholesale Distribution Industry."

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- A unique characteristic of the wholesale industry segment is the large size of batch processing services revenues relative to RCS as tabulated in Exhibit XIV-4 and shown graphically in Exhibit XIV-5.

  - This is a result of the historic relationship between the local batch service bureau and the local wholesaler.

  - The stable product lines of most wholesalers and the emphasis on standard general business applications have allowed this business to endure.

  - Also much of the batch work is customized because of the different characteristics of different types of wholesalers.

  - However, now the need for faster information on inventory control, credit shipping information, etc., is pushing some of these revenues to RCS.

  - The batch revenues are also most vulnerable to replacement by on-site hardware, particularly if communications capability is not required, which is often the case with smaller wholesalers who are single site.

  - RCS revenues will exceed batch revenues after 1981.

EXHIBIT XIV-3

MERCHANT WHOLESALERS - DISTRIBUTION BY SIZE

ANNUAL SALES RANGE ($MILLION) (1972)	NUMBER OF ESTABLISHMENTS	TOTAL SALES ($BILLION)
LESS THAN 1	209,000	$ 66
1 - 5	57,000	116
5 - 10	6,400	44
10 - 20	2,500	34
OVER 20	1,500	78
NOT OPERATED ALL YEAR	13,800	16
TOTAL (ROUNDED)	290,000	$354

EXHIBIT XIV-4

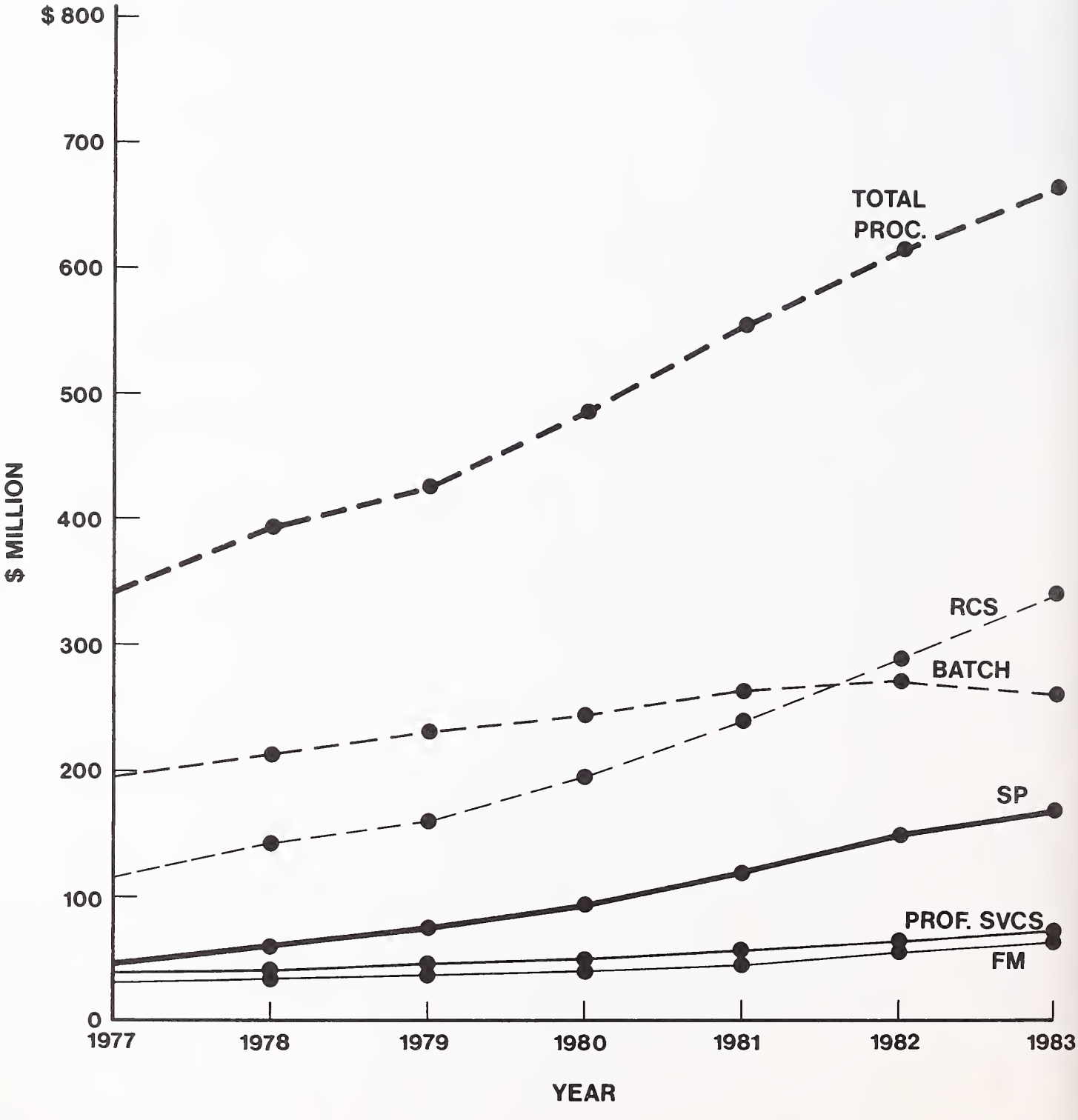
COMPUTER SERVICES MARKET FORECAST FOR THE WHOLESALE INDUSTRY SECTOR, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	42	51	21	59	72	86	109	128	20
	SCI. & ENG.									
	IND. SPEC.	59	74	25	81	100	124	145	175	19
	UTILITY	16	19	19	20	25	29	35	40	16
	TOTAL	117	144	23	160	197	239	289	341	19
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	26	29	12	31	38	42	48	54	13
	UTILITY	3	4	33	4	5	6	7	8	15
	TOTAL	29	33	14	35	43	48	55	62	13
BATCH	GEN. BUS.	98	107	9	116	125	135	140	134	5
	SCI. & ENG.									
	IND. SPEC.	25	32	28	33	34	36	36	36	2
	UTILITY	71	78	10	81	88	94	94	92	3
	TOTAL	194	217	12	230	247	265	270	262	4
TOTAL PROCESSING	GEN. BUS.	140	158	13	175	197	221	249	260	11
	SCI. & ENG.									
	IND. SPEC.	110	135	23	145	172	202	229	265	14
	UTILITY	90	101	12	105	118	129	136	140	7
	TOTAL	340	394	16	425	487	552	614	665	11
SOFTWARE PRODUCTS	SYSTEM	10	12	20	15	18	23	30	40	27
	APPLICATION	38	45	18	60	75	97	120	150	27
	TOTAL	48	57	19	75	93	120	150	190	12
PROFESSIONAL SERVICES		37	42	14	45	50	58	66	75	12
TOTAL	TOTAL	425	493	16	545	630	730	830	930	14

EXHIBIT XIV-5

INDUSTRY MARKETS BY MODE OF SERVICE -

WHOLESALE INDUSTRY SECTOR



- With regard to type of processing service, industry specialty (such as order entry and inventory control) will grow at a rate slightly greater than general business (14% versus 11%) but neither will grow at the overall computer services rate of 16% (14% for all wholesaling).

  - The wholesale industry sector computer services market will actually shrink from 6.2% in 1977 to 5.5% in 1983, relative to the total U.S. computer services market.

  - Some of these revenues will be captured by turnkey systems.

- Software product sales will grow at 27%, greater than the industry average for software products.

  - This growth will be fed by the spread of small on-site computers.

  - Hardware vendors are offering applications specialized software for wholesalers.

  - Turnkey vendors are also users of packaged software.

  - DBMS software is starting to grow in the systems software segment.

  - Professional services and FM have small market positions in wholesaling, reflecting the relatively uncomplicated nature of most applications in this industry sector.

C. CHARACTERISTICS OF IN-HOUSE EDP ORGANIZATIONS

- The trend to on-line applications is clear from the following exhibits which are based on responses from INPUT's user panel.

- Installing on-line applications is the major objective of EDP managers, as shown in Exhibit XIV-6.

  - Data base and DDP get significant mention reinforcing earlier market forecasts regarding systems software.

  - The strong 1980 mention of new applications development is one driver in the growth of applications software.

- With regard to applications under development, inventory control is dominant both in terms of number of mentions and priority as shown in Exhibit XIV-7.

- The growth in small computers/programmable terminals and communications is reflected in the EDP budget profile presented in Exhibit XIV-8.

- Although the number of responses is too small to support detailed anlaysis, the use of services as presented in Exhibit XIV-9 reveals strong support for systems software and unusually high interest in education.

- Reasons for terminal acquisition center on source input, as shown in Exhibit XIV-10.

- Respondents do not anticipate a heavy involvement in office automation functions as shown in Exhibit XIV-11.

D. RECENT VENDOR ACTIVITIES

- NLT Computer Services has introduced a line of small systems which supplement its on-line network offerings to the wholesale industry sector.

  - Called the First Family, it is based on Data General Nova 3 computers.

EXHIBIT XIV-6

OBJECTIVES OF RESPONDING EDP MANAGERS

IN THE WHOLESALE INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	3	12%	3	13%	1	9%
DESIGN/INSTALL DDP	1	4	2	8	1	9
INSTALL NEW APPLICATIONS	3	12	4	17	4	36
INSTALL ON-LINE APPLICATIONS	6	24	7	29	2	18
INSTALL/UPGRADE MAINFRAME	3	12	4	17	1	9
INSTALL MINI	2	8	1	4	1	9
INSTALL NEW OPERATING SYSTEMS	3	12	-	-	-	-
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	2	8	-	-	-	-
CENTRALIZE OR DECENTRALIZE	-	-	1	4	1	9
SUBTOTAL	23	92%	22	92%	11	99%
OTHER (SPECIFY)						
NETWORK	-	-	2	8%	-	-
REWRITE SOFTWARE	1	4	-	-	-	-
LONG RANGE PLAN	1	4	-	-	-	-
TOTAL	25	100%	24	100%	11	99%

EXHIBIT XIV-7

APPLICATION TO BE DEVELOPED BY RESPONDING EDP MANAGERS
IN THE WHOLESALE INDUSTRY SECTOR

APPLICATION	MENTIONS		MENTIONED AS NO. 1 PRIORITY*	
	TOTAL	(%)	TOTAL	(%)
ACCOUNTING/FINANCE	12	21%	3	25%
MARKETING & SALES	1	2	-	-
SCIENTIFIC & ENGINEERING	1	2	-	-
WORD PROCESSING	-	-	-	-
PERSONNEL RELATED/ PAYROLL	3	5	1	33
INVENTORY CONTROL	15	26	7	47
COST SYSTEMS	-	-	-	-
ORDER ENTRY/BILLING	10	18	3	30
MODELLING FORECASTING	2	4	-	-
DATA BASE APPLICATIONS	3	5	-	-
PERFORMANCE MEASUREMENT	-	-	-	-
GRAPHICS	-	-	-	-
PURCHASING	3	5	1	33
SUBTOTAL	50	88	15	
OTHER (OFTEN INDUSTRY SPECIFIC)				
MANUFACTURING	6	11	-	-
SCHEDULING	1	2	-	-
SUBTOTAL	7	12	-	-
TOTAL	57	100%	15	

*Respondents were asked to list applications in order of priority. This column totals the number of times the application was mentioned as No. 1 priority. The percentage represents the number of times it was mentioned as No. 1 priority relative to the total number of times mentioned.

EXHIBIT XIV-8

ANTICIPATED CHANGES IN EDP BUDGETS OF RESPONDENTS IN THE WHOLESALE INDUSTRY SECTOR

CATEGORY	PERCENT OF TOTAL EDP BUDGET				INCREASE OR (DECREASE) 1978 TO 1980 (%)
	1978	1979	1980	AVG.	
MAIN COMPUTERS	28%	27%	25%	27%	(11)%
SMALL COMPUTERS/ PROGRAMABLE TERMINALS	2	2	4	3	100
NON-PROGRAMABLE TERMINALS	4	4	4	4	-
COMMUNICATIONS	4	4	6	5	50
SOFTWARE (PURCHASE/LEASE)	4	4	4	4	-
PERSONNEL	45	47	47	46	4
OTHER	14	11	11	12	(21)
TOTAL	100%	100%	100%	100%	

EXHIBIT XIV-9

AVERAGE EXPENDITURES FOR SERVICES AND SOFTWARE BY RESPONDENT EDP MANAGERS IN THE WHOLESALE INDUSTRY SECTOR

TYPE OF SERVICE	1977 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	1978 EXPENDITURES AVG. IN THOUS.	NUMBER OF RESPONDENTS	% CHANGE IN EXPENDITURES 1977 vs.1978
PROCESSING SERVICES					
INTERACTIVE TIMESHARING	$ 43	4	$ 37	6	(14)%
REMOTE BATCH	17	3	18	3	6
BATCH	147	3	200	3	36
INPUT/OUTPUT	9	3	8	3	(11)
SOFTWARE PRODUCTS					
SYSTEMS SOFTWARE	22	13	30	14	36
APPLICATIONS SOFTWARE	32	8	21	9	(34)
PROFESSIONAL SERVICES					
CONTRACT PROGRAM AND DESIGN	34	9	36	9	6
EDP CONSULTING	17	3	4	5	(76)
EDUCATION	5	10	12	12	140
OTHER	6	2	17	3	183
FACILITIES MANAGEMENT	-	-	-	-	-
MAINTENANCE	46	3	43	6	(7)

EXHIBIT XIV-10

REASONS FOR TERMINAL ACQUISITION OVER THE NEXT THREE YEARS ACCORDING TO RESPONDENTS IN THE WHOLESALE INDUSTRY SECTOR

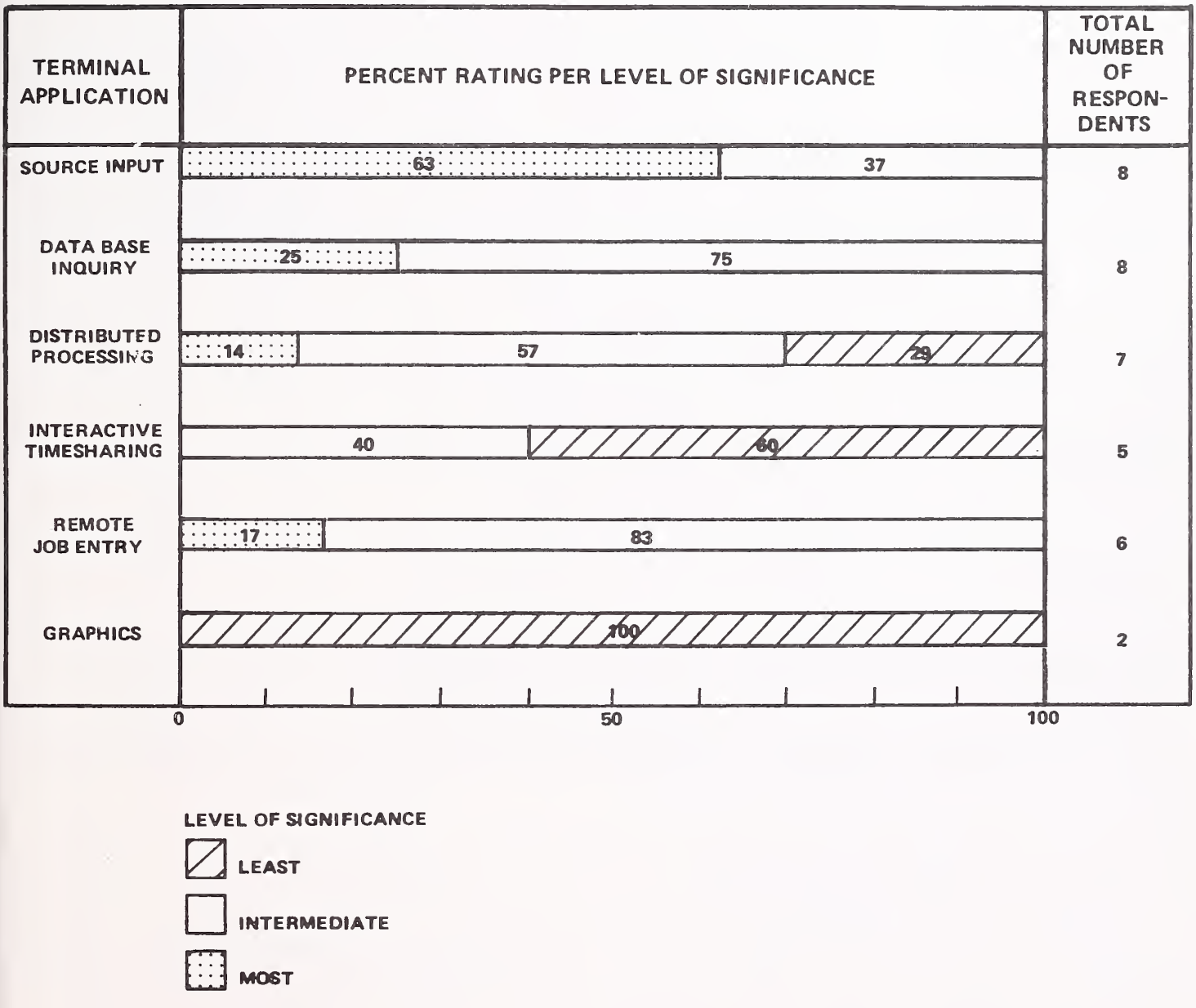


EXHIBIT XIV-11

RESPONDING EDP MANAGERS' ANTICIPATED INVOLVEMENT WITH ELEMENTS OF OFFICE AUTOMATION IN THE WHOLESALE INDUSTRY SECTOR, 1978-1983

OFFICE AUTOMATION ELEMENT	INVOLVEMENT - NUMBER OF RESPONSES					
	INVOLVED NOW	INVOLVED BY 1979	INVOLVED BY 1980	INVOLVED BY 81-83	NOT INVOLVED BY 1983	TOTAL
ELECTRONIC MAIL	1	-	-	2	5	9
WORD PROCESSING	2	1	-	1	4	8
COPYING/ DUPLICATING	2	1	1	1	4	9
VOICE COMMUNI- CATIONS	1	-	-	-	8	9
FACSIMILE	2	-	-	1	5	8
TOTAL	8	2	2	5	26	43

- Software including accounts payable, general ledger, payroll, inventory control, purchasing, order entry, open order processing, and sales reporting were part of the product announcement.

- Pricing of seven different configurations will range from $43,400 to $240,000.

- Distribution Management Systems, Inc. (DMS), of Bedford, Massachusetts, is offering a turnkey system based on PDP-11 or IBM Series/1 minis aimed at warehouse functions.

- Genuine Parts Company of Atlanta, Georgia (GPC) is offering National Automotive Parts Association (NAPA) jobbers a turnkey minicomputer system which ties into GPC's network for order entry and inventory control.

  - The turnkey system is based on a Data General Nova 3.

  - The GPC Center has IBM mainframes.

- NCR announced a series of special systems and software for:

  - Plumbing and heating firms.

  - Fuel and petroleum distributors.

  - Food distributors.

  - Beer distributors.

  - Electrical distributors.

- Distronics, now part of Western Union, announced a program to install microprocessor-based CRT terminals in each of its wholesaler clients.

- It is furnished at no additional cost to clients.

- It is presented as the beginning of an advanced structure of Distronics services.

- Some of the difficulties in bringing in a turnkey system from a standing start is represented by the experience of Micro Business Applications, Inc., of La Jolla, California, which was formed in late 1977 and expected first deliveries to the wholesale and manufacturing industries in late 1977. Deliveries are actually being made on a test basis in the second half of 1978.

- Other information on vendor activities in this industry sector is presented on pages 251 through 254 of INPUT's "1977 Computer Services Industry Annual Report."

XV FEDERAL GOVERNMENT SECTOR MARKETS

XV FEDERAL GOVERNMENT SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- Total federal government expenditures in 1977 were $402 billion, as presented in Exhibit XV-1.

- During fiscal year 1978, EDP costs (operating and capital) of the federal government were $3.8 billion:

  - Total Department of Defense (DOD) costs accounted for 53% ($2 billion) of the total cost.

- The highest non-DOD users were NASA ($186 million) and HEW ($179 million).

- Total inventory of computers increased to 11,124 units, a 12% increase over the previous year.

- Additional information about the characteristics and uses of EDP in the federal government sector is presented on pages 255 through 266 of INPUT's "1977 Computer Services Industry Annual Report."

- The energy area was studied in detail in INPUT's 1978 report, "Computer Services Opportunities in Federal Energy Programs."

EXHIBIT XV-1

FEDERAL GOVERNMENT INDUSTRY SECTOR -

DEMOGRAPHIC DATA

TYPE OF STATISTIC	DATA* FISCAL 1977
NUMBER OF EMPLOYEES	2.7 MILLION
RECEIPTS	$356.9 BILLION
EXPENDITURES	$401.9 BILLION

BUDGET OUTLAYS BY FUNCTION
1965-1977

TYPE OF STATISTIC	DATA ($B)		
	1965	1970	1977
TOTAL BUDGET OUTLAYS	$118.4	$196.6	$401.9
NATIONAL DEFENSE	48.6	78.6	95.6
HUMAN RESOURCES	35.4	73.5	214.8
INCOME SECURITY	25.7	43.1	137.0
HEALTH	1.8	13.1	38.8
VETERAN BENEFITS & SVCS.	5.7	8.7	18.0
EDUCATION, TRAINING, EMPLOYMENT & SOCIAL SVCS.	2.1	8.6	21.0
OTHER NON-DEFENSE	34.5	68.5	91.5
PHYSICAL RESOURCES	15.1	20.7	40.6
COMMERCE & TRANSPORTATION	6.9	9.1	14.6
NATURAL RESOURCES, ENVIRONMENT AND ENERGY	3.2	4.0	14.2
COMMUNITY & REGIONAL DEV.	1.1	2.4	6.3
AGRICULTURE	3.9	5.2	5.5
INTEREST PAID	8.6	18.3	38.1
ALL OTHER	10.7	8.8	12.8

* OFFICE OF MANAGEMENT AND BUDGET, BUDGET IN FISCAL YEAR 1979

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- Federal government expenditures will increase at a 17% AAGR, slightly faster than the average of segments per Exhibit XV-2.
  - Total processing services (RCS, FM and Batch) accounted for 54% of 1977 government expenditures for services.
  - Batch services will decrease from an already low level over the forecast period as agencies continue to move to other modes of delivery.
  - Professional services will continue to dominate this sector as shown graphically in Exhibit XV-3, but will be passed by RCS services after 1983.
  - Software products account for 11% of total expenditures and will increase to 13% by 1983.
- This marketplace continues to be of minor interest to many vendors because of the requirements for participation. These requirements are:
  - Long marketing cycles.
  - Expensive proposal preparation.
  - Low profit margins on much of the business.
  - The need for a Washington, D.C. office.
- Recent studies of federal government data processing have been conducted and indicate serious management and resource utilization problems.

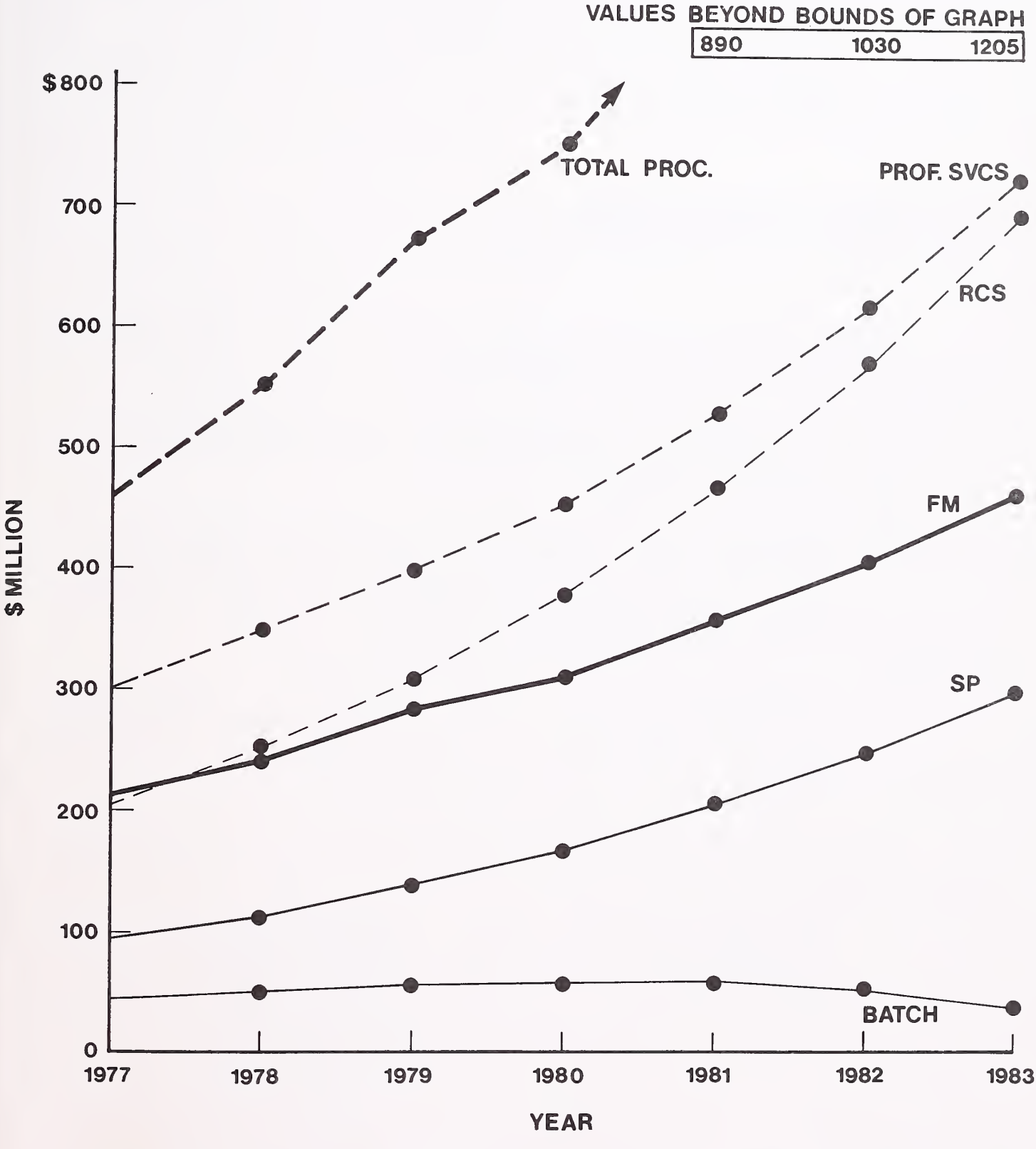
EXHIBIT XV-2
COMPUTER SERVICES MARKET FORECAST
FOR FEDERAL GOVERNMENT, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	18	21	17	26	31	40	45	55	21
	SCI. & ENG.	43	50	16	58	67	80	90	100	15
	IND. SPEC.	14	17	21	20	24	30	35	40	19
	UTILITY	128	164	28	207	255	320	400	500	25
	TOTAL	203	252	24	311	377	470	570	695	22
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.	85	92	8	102	108	120	128	135	8
	IND. SPEC.									
	UTILITY	128	153	20	180	205	240	280	330	17
	TOTAL	213	245	15	282	313	360	408	465	12
BATCH	GEN. BUS.									
	SCI. & ENG.	7	8	14	9	10	10	7	5	(10)
	IND. SPEC.									
	UTILITY	42	45	7	48	50	50	45	40	(2)
	TOTAL	49	53	8	57	60	60	52	45	(3)
TOTAL PROCESSING	GEN. BUS.	18	21	17	26	31	40	45	55	21
	SCI. & ENG.	135	150	11	169	185	210	225	240	10
	IND. SPEC.	14	17	21	20	24	30	35	40	19
	UTILITY	298	362	21	435	510	610	725	870	19
	TOTAL	465	550	18	650	750	890	1,030	1,205	17
SOFTWARE PRODUCTS	SYSTEM	82	100	22	120	146	175	210	250	20
	APPLICATION	13	15	15	20	24	30	40	50	27
	TOTAL	95	115	21	140	170	205	300	21	21
PROFESSIONAL SERVICES		300	350	17	400	460	530	620	725	16
TOTAL	TOTAL	860	1,015	18	1,190	1,380	1,625	1,900	2,230	17

EXHIBIT XV-3

INDUSTRY MARKETS BY MODE OF SERVICE -

FEDERAL GOVERNMENT INDUSTRY SECTOR



- Restructuring has been proposed but the outcome is undetermined at this time since a lengthy review process must be implemented before presidential approval can be obtained.

- One aspect, if approved, would increase the amount of work that could be contracted for by local agencies without GSA approval. The increase in dollar amount if local procurement authority is approved is still under study.

C. RECENT VENDOR ACTIVITIES

- Computer Sciences Corporation (CSC) continues as the major supplier of computer services to the federal government.

- Of CSC's 1978 annual revenues of $276.8 million, 71% were derived from federal government contracts:

  - Fifty-four percent of data services revenues ($77.8 million) were from the federal government with GSA accounting for 30%, and Department of Defense 29% of this total.

  - Seventy-eight percent of Contract Services revenues ($199.1 million) were from various government agencies with NASA as the prime customer.

- Among the major new awards to CSC during the past year were the following:

  - $40 million, three-year contract with NASA Johnson Space Flight Center for computer system engineering and data processing support.

- $22 million, three-year contract from GSA for computer related support services at the Interagency Data Systems Facility in Huntsville, Alabama.

- $10.5 million contract with the Defense Communications Agency for system engineering and computer support for the next three years.

- $7.2 million computer support contract with the Naval Weapons Center in China Lake, California.

- $9 million, three-year contract with the Naval Air Development Center in Warminster, Pennsylvania for engineering analysis and computer services support.

- Systems Development Corporation (SDC) captured about $70 million in federal government business in 1978. In addition to its strong position with the Air Force, it captured important contracts with DOE and HEW.

- Planning Research Corporation (PRC) continues as an important supplier of computer services to the federal government, particularly DOD agencies.

- Other major computer services related activities are masked in large aerospace prime contracts paricularly from Litton, Ford Aerospace, Lockheed and Boeing.

- GSA has awarded 32 Multiple Award Service Contracts (MASC) and 58 Basic Agreements (BA) under the Teleprocessing Services Program.

- Informatics won important contracts from several departments including Transportation and HEW.

- Other vendor activity is described on pages 266 through 269 of INPUT's "1977 Computer Services Industry Annual Report."

XVI STATE AND LOCAL GOVERNMENT SECTOR MARKETS

XVI STATE AND LOCAL GOVERNMENT SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- State and local government expenditures in 1976 were $304.7 billion as shown in Exhibit XVI-1.

  - The major sources of expenses were:

. Education	31.8%
. Welfare	10.7%
. Highways	7.8%
. Unemployment compensation	6.2%

  - Education expenditures declined about 2% from last year while unemployment compensation costs rose from 2.9% to over 6%. However, education remained by far the largest expense category.

- Employment levels continue to be about four times the size of the federal government with state and local government employing 12.7 million personnel.

EXHIBIT XVI-1

STATE AND LOCAL GOVERNMENT - DEMOGRAPHIC DATA

TYPE OF STATISTIC	DATA	
REVENUES (1975/1976)	$304.7 BILLION	
EXPENDITURES (1975/1976)	$305.3 BILLION	
NUMBER OF EMPLOYEES (1977)	12.7 MILLION	
NUMBER OF STATES (1977)	51	
NUMBER OF MUNICIPALITIES (1972)	18,517	
NUMBER OF TOWNSHIPS (1972)	16,991	
EXPENDITURES BY FUNCTION FISCAL 1975/1976	EXPENDITURES ($B)	PERCENT
DIRECT GENERAL EXPENDITURES	$255.6	83.7%
EDUCATION	97.2	31.8
INSTITUTIONS OF HIGHER EDUC.	24.3	8.0
LOCAL SCHOOLS	67.7	22.2
HIGHWAYS	23.9	7.8
PUBLIC WELFARE	32.6	10.7
HEALTH	4.7	1.6
HOSPITALS	15.7	5.2
POLICE PROTECTION	9.5	3.1
LOCAL FIRE PROTECTION	3.9	1.3
NATURAL RESOURCES	4.7	1.5
SANITATION & SEWAGE	8.2	2.7
HOUSING & URBAN RENEWAL	3.2	1.0
LOCAL PARKS & RECREATION	3.9	1.3
FINANCIAL ADMINISTRATION	5.7	1.9
GENERAL CONTROL	10.3	3.4
UTILITY & LIQUOR STORE EXPEND.	19.5	6.4
WATER SUPPLY SYSTEM	5.9	1.9
ELECTRIC POWER SYSTEM	6.4	2.1
TRANSIT SYSTEM	4.4	1.5
GAS SUPPLY SYSTEM	0.7	0.2
LIQUOR STORES	2.1	0.7
INSURANCE TRUST EXPENDITURES	29.0	9.5
EMPLOYEE RETIREMENT	8.4	2.8
UNEMPLOYMENT COMPENSATION	18.9	6.2

B. COMPUTER SERVICES MARKET FORECASTS, 1978-1983

- State and local government expenditures will increase at a 17% AAGR as shown in Exhibit XVI-2.

  - Although RCS has a small base of $46 million in 1978, it is expected to increase at an AAGR of 32% as a result of pressures to hold down spending at the state level which will retard expenditures for in-house systems while demanding that more efficient procedures be implemented.

  - Professional services which represents 46% of total processing services in 1978 will decline to 37% by 1983 as budget monies continue to be tight. This is shown graphically in Exhibit XVI-3.

  - Software products are expected to increase slightly in their share of the marketplace over the next five years with increased purchase of both application system packages. The use of DBMS products is expected to increase for both welfare and health care claims processing.

- State and local government is not a high interest area for computer services vendors. Major contributors to this low interest level are:

  - Long and expensive procurement cycles.

  - Low profit margins.

  - Required legislative actions for major procurements.

- These factors coupled with the expected "tax payer's revolt" (Proposition 13) will cause this industry to be of limited interest to computer services vendors.

EXHIBIT XVI-2

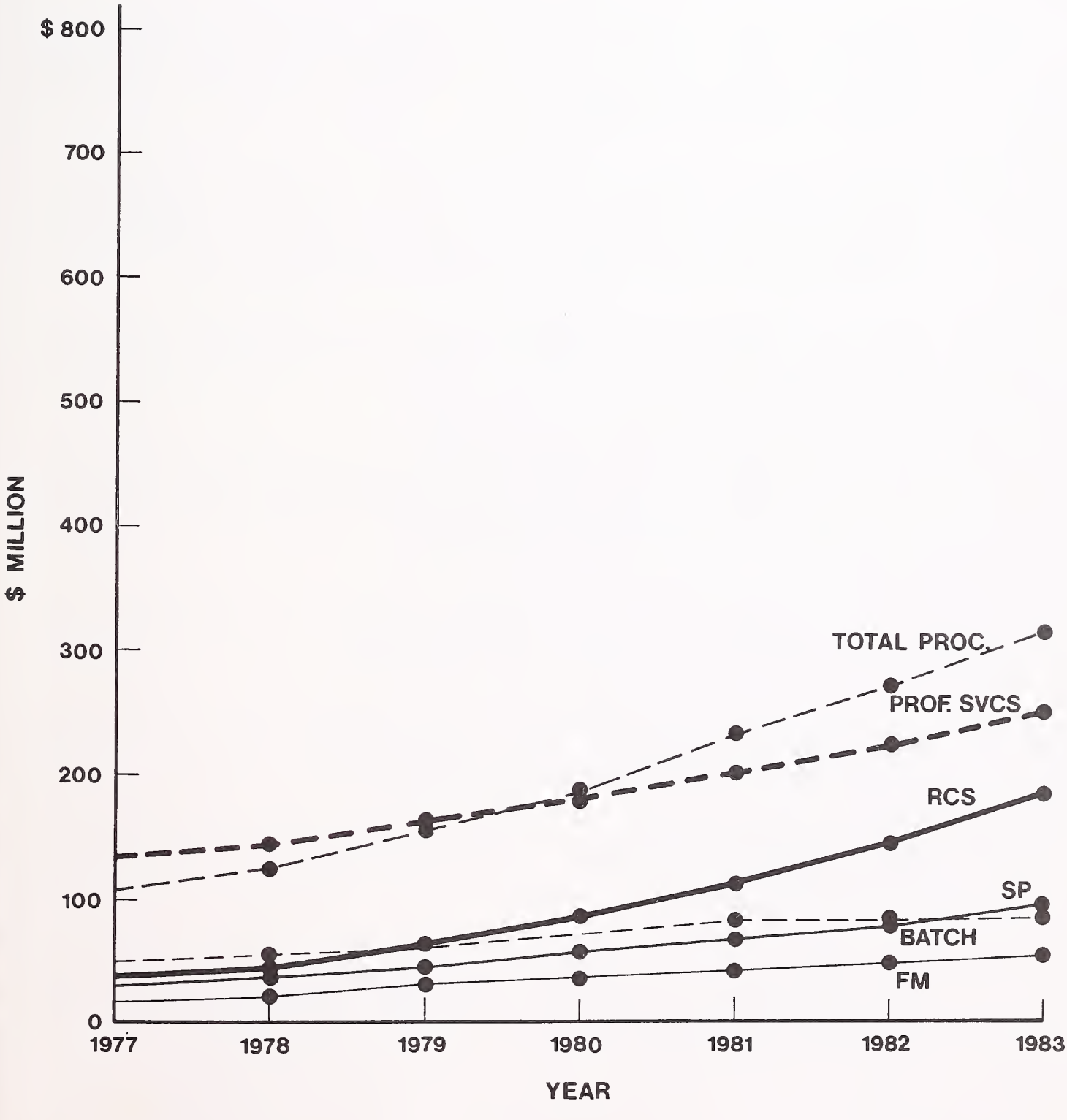
COMPUTER SERVICES MARKET FORECAST
FOR STATE AND LOCAL GOVERNMENT, 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	8	10	25	13	18	22	30	40	32
	SCI. & ENG.	4	5	25	8	10	13	18	22	35
	IND. SPEC.	5	7	4	10	14	20	25	32	36
	UTILITY	19	24	26	33	41	57	72	88	30
	TOTAL	36	46	28	64	83	112	145	182	32
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	4	5	25	7	8	10	15	20	32
	UTILITY	17	19	12	22	24	27	30	32	11
	TOTAL	21	24	14	29	32	37	45	52	17
BATCH	GEN. BUS.	8	10	25	12	14	15	15	15	9
	SCI. & ENG.									
	IND. SPEC.	7	10	43	13	18	25	30	35	29
	UTILITY	34	35	3	37	38	41	35	31	(2)
	TOTAL	49	55	12	62	70	81	80	81	8
TOTAL PROCESSING	GEN. BUS.	16	20	25	25	32	37	45	55	22
	SCI. & ENG.	4	5	25	8	10	13	18	22	35
	IND. SPEC.	16	22	38	30	40	55	70	87	32
	UTILITY	70	78	11	92	103	125	137	151	14
	TOTAL	106	125	18	155	185	230	270	315	20
SOFTWARE PRODUCTS	SYSTEM	22	26	18	31	35	40	49	60	18
	APPLICATION	10	12	20	14	19	25	29	35	24
	TOTAL	32	38	19	45	54	65	78	95	20
PROFESSIONAL SERVICES		127	142	12	160	176	200	222	250	12
TOTAL	TOTAL	265	305	15	360	415	495	570	660	17

EXHIBIT XVI-3

INDUSTRY MARKETS BY MODE OF SERVICE -

STATE AND LOCAL GOVERNMENT INDUSTRY SECTOR



C. RECENT VENDOR ACTIVITIES

- Computer Sciences Corporation was awarded a $129.6 million contract by the State of California for processing Medi-Cal insurance claims. This contract started September 1, 1978, and will run for five and one-half years.

- System Development Corporation was awarded a three-year contract worth $13.5 million to develop and operate a Medicaid Management Information System for the State of Florida.

- The city of Los Angeles selected the System Development Corporation to develop a computer based police communications system. The initial contract is valued at $28.5 million and will require four years to develop.

- NCR has announced two packages for county and city property tax processing and recording:

  - The NCR 499 Tax Billing System creates the files, analyzes the information, and prints the documents associated with the administration of a property tax program.

  - The NCR I-8200 is an interactive tax system which provides similar capabilities but operates in an on-line mode.

- American Management Systems, Inc., has developed a financial management system software package for local governments.

- Itel has installed two AS/5s for the state of New Jersey for the Department of Law and Public Safety.

- IBM's General Systems Division has introduced a public budgeting and accounting software package for its System/34 small business system to be used by local governments.

- Additional information on state and local government markets is contained on pages 270 through 276 of INPUT's "1977 Computer Services Industry Annual Report."

XVII SERVICES INDUSTRY SECTOR MARKETS

XVII SERVICES INDUSTRY SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- Although total revenues for this sector total only approximately $75 billion per year it is an important services market due largely to the high information content of the work done by the subsector groups.

  - Further details are contained in INPUT's report "Computer Services Markets in the Services Industries, Part 1 Architects and Engineers, Part 2 Accountants and CPAs."

  - Demographic data is presented in Exhibit XVII-1.

- There are over 10,000 R&D centers in industry and government in the U.S.; INPUT includes the captive centers in their respective industry sectors leaving 6,000 centers in this sector.

- Accounting firms continue to get an increasing amount of revenues from management advisory services.

  - Arthur Andersen is a significant vendor of software.

  - Peat Marwick offers a broad range of services.

EXHIBIT XVII-1

SERVICES INDUSTRY SECTOR -
DEMOGRAPHIC DATA

SERVICE	TYPE OF STATISTIC	DATA
ACCOUNTANTS & CPAs	ESTIMATED REVENUES (1976) PROJECTED REVENUES (1981) NUMBER OF ESTABLISHMENTS	$ 9 BILLION $ 18 BILLION 35,000
ARCHITECTS & ENGINEERS	ESTIMATED REVENUES (1976) PROJECTED REVENUES (1981) NUMBER OF ESTABLISHMENTS NUMBER OF EMPLOYEES	$ 18 BILLION $ 30 BILLION 25,000 300,000
BUSINESS CONSULTANTS	ESTIMATED REVENUES (1976) PROJECTED REVENUES (1981) NUMBER OF FIRMS	$ 14 BILLION $ 31 BILLION 23,000
LAWYERS	ESTIMATED REVENUES (1976) PROJECTED REVENUES (1981) NUMBER OF FIRMS	$ 15 BILLION $ 31 BILLION 78,000
RESEARCH INSTITUTIONS	ESTIMATED REVENUES (1976 PROJECTED REVENUES (1981) NUMBER OF ESTABLISHMENTS NUMBER OF EMPLOYEES	$ 19 BILLION $ 35 BILLION 6,000 194,000

- Lawyers are increasingly important as a subsector with growing involvement in issues resulting from new legislation impacting human resources management.

- Additional information about the services industry sector is contained on pages 277 through 286 of INPUT's "1977 Computer Services Industry Annual Report."

B. COMPUTER SERVICES MARKET FORECAST, 1978-1983

- The computer services market in the services industry sector closely parallels the overall computer services market in terms of growth rate and product mix as shown in Exhibit XVII-2.

  - Batch is still a significant mode of delivery for processing services as presented graphically in Exhibit XVII-3.

  - The batch services are primarily payroll and accounting applications to small firms.

- With regard to type of service, industry specialty accounts for over one-half of processing services revenues.

  - Tax processing is the dominant industry specialty.

  - Legal search services are growing.

  - Scientific and engineering services, primarily structural analysis, grow at a modest but solid 11% rate.

  - Utility based RCS services grow at the same 25% rate as general business and industry specialty, with DBMS based services being strong.

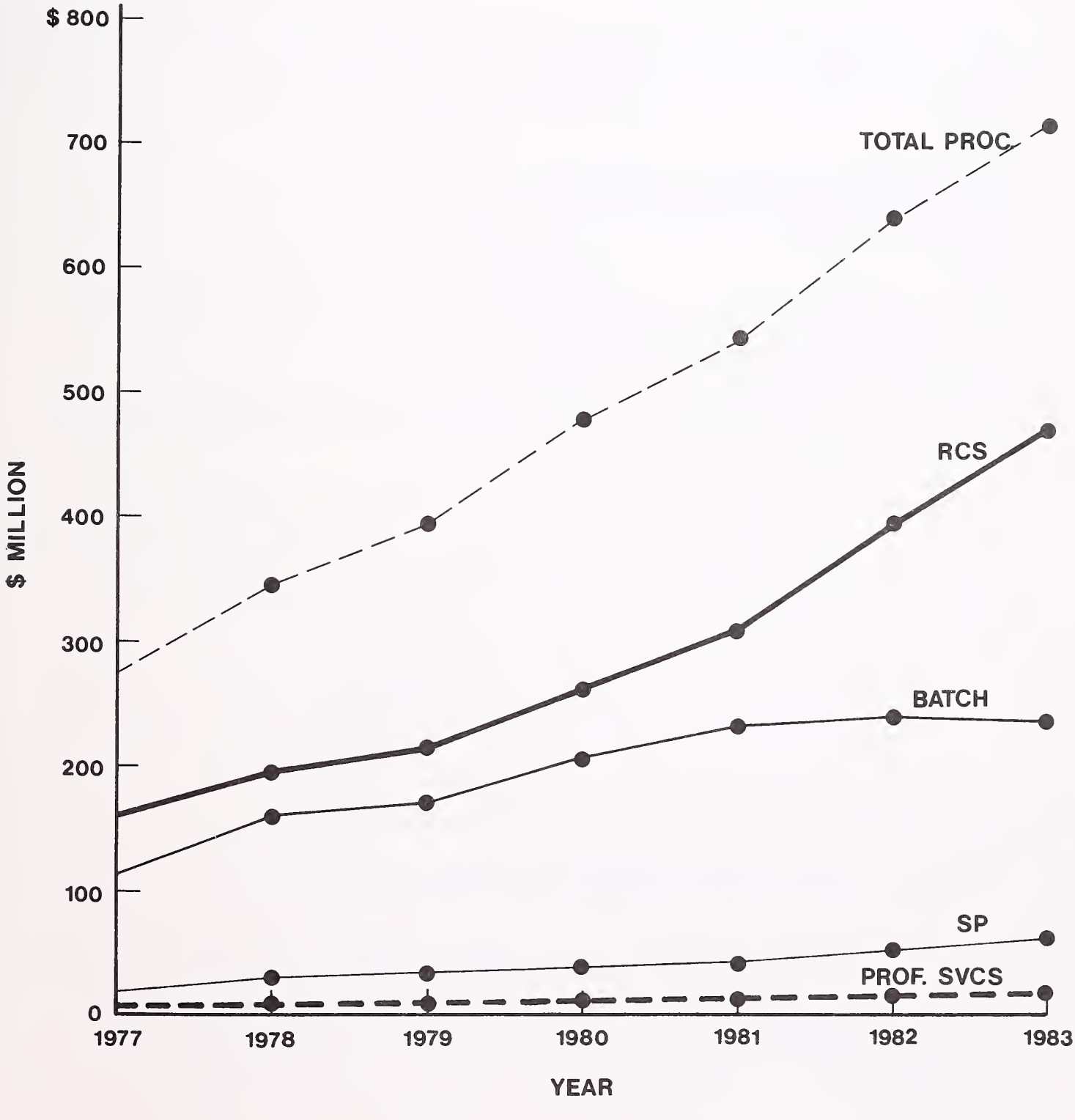
EXHIBIT XVII-2

COMPUTER SERVICES MARKET FORECAST FOR SERVICES 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/ 1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/ 1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	15	18	20	22	28	38	44	54	25
	SCI. & ENG.	72	82	14	92	103	115	131	150	13
	IND. SPEC.	42	56	33	60	83	93	140	170	25
	UTILITY	28	34	21	42	54	69	86	104	25
	TOTAL	157	190	21	216	268	315	401	478	20
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.									
	UTILITY									
	TOTAL									
BATCH	GEN. BUS.	5	6	20	8	10	12	16	16	22
	SCI. & ENG.	11	12	9	13	13	12	12	10	(4)
	IND. SPEC.	90	125	39	140	180	203	210	210	11
	UTILITY	12	15	25	13	9	6	6	6	20
	TOTAL	118	158	39	174	212	233	244	242	9
TOTAL PROCESSING	GEN. BUS.	20	24	20	30	38	50	60	70	24
	SCI. & ENG.	83	94	13	105	116	127	143	160	11
	IND. SPEC.	132	181	37	200	263	296	350	380	16
	UTILITY	40	49	23	55	63	75	92	110	18
	TOTAL	275	348	27	390	480	548	645	720	16
SOFTWARE PRODUCTS	SYSTEM	6	8	33	10	12	15	17	20	20
	APPLICATION	16	21	31	23	26	29	34	40	14
	TOTAL	22	29	32	33	38	44	51	60	16
PROFESSIONAL SERVICES		9	11	22	12	15	19	19	20	13
TOTAL	TOTAL	306	388	27	435	533	611	715	800	16

EXHIBIT XVII-3

INDUSTRY MARKETS BY MODE OF SERVICE -
SERVICES INDUSTRY SECTOR



- Software products grow at 16% less than the industry average.
  - Two-thirds of expenditures are by A&E and R&D firms, and this is a mature applications software market.
  - Systems software is growing more rapidly from a smaller base.
- Professional services and FM are insignificant in this sector as services companies either do it themselves or buy a packaged service.

C. RECENT VENDOR ACTIVITIES

- Tymshare acquired Autotax, a services firm specializing in preparing income tax returns on computers:
  - This respresents the third tax service Tymshare has acquired since 1974.
  - Tymshare now operates a total of 20 tax service centers around the country who serve about 7,000 accounting firms and income tax services.
- Comshare acquired Valuation Systems Corporation, a consultant firm specializing in services for replacement cost and current value measurement.
- ADP acquired Association Service Corporation (ASC).
  - ASC provides unemployment tax control services.
  - The acquisition is an extention of ADP's extensive payroll services offering.

- New types of services companies such as Autoword of Parsippany, New Jersey offering word processing services continue to be formed. Like accounting firms, companies like Autoword are both potential users and vendors of computer based services.

- Two vendors of legal systems announced the availability of both services from a single terminal:

  - The Westlaw system from West Publishing allows inquiry regarding U.S. Supreme Court and other court decisions.

  - Aspen Systems provides litigation support services including automatic indexing, on-line retrieval and text editing, linked to a data base containing thousands of documents.

  - Under the joint effort, Aspen provides the technical interface which allows clients to connect between the Westlaw data base and the Aspenet timesharing network.

- Firms continued to announce services for engineering firms:

  - UCC, a major vendor, announced the installation of the Halcon Piping Material Control System (PMCS) on UCC's national computer network; the service is particularly suited for petrochemical and power plant design and construction.

  - PMCS contains a data base of over 2 million unique piping items.

  - Bowne Timesharing expanded marketing of Comspec, a computer-aided specifying system, to the western U.S.

  - Swanson Analysis Systems announced the availability of their Ansys system for engineering analysis on Prime minicomputers, one of several examples of firms offering engineering software on minicomputers.

- Turnkey systems aimed at subsectors such as lawyers and accountants were announced, such as the general ledger system based on an IBM Series/1 from Applied Computer Services, Inc., of North Hollywood, California.

- Rolm Corporation announced a telephone for lawyers which features an eight digit LED display which tracks time spent on client calls by billing number.

- CDC, already a leading vendor of services to engineers, continued its expansion of offerings to the services industry sector.

  - A centralized data base of patents called the International Inventor's Registry was announced.

  - Cybersearch, a recruiting tool is a unique service on their national network.

- Additional information and vendor activities in the services sector is presented on pages 286 through 293 of INPUT's "1977 Computer Services Industry Annual Report."

XVIII OTHER INDUSTRIES SECTOR MARKETS

XVIII OTHER INDUSTRIES SECTOR MARKETS

A. INDUSTRY CHARACTERISTICS

- This sector, which includes everything that is not included in the previously described 13 sectors, is a mix of widely differing subsectors, as shown in Exhibit XVIII-1.

  - Construction is a large subsector dominated by large international companies like Bechtel and Fluor.

  - Auto repair is an example of a much smaller subsector with many small vendors.

  - Agriculture, forestry and fishing are high in revenues but characterized by a relatively small use of information services; this is changing as agribusiness grows.

  - Real estate is the largest single subsector, accounting for 54% of industry sector revenues.

- Several subsectors, notably hotels, personal services, motion pictures and recreation, provide an entry point to consumer services.

EXHIBIT XVIII-1
OTHER INDUSTRIES SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
ALL		SALES NUMBER OF ESTABLISHMENTS NUMBER OF EMPLOYEES	$460 BILLION 2.3 MILLION 10.2 MILLION
01-09	AGRICULTURE, FORESTRY, FISHING	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$101 BILLION 39,979 195,145
15-17	CONSTRUCTION	SALES NUMBER OF ESTABLISHMENTS (1975 NUMBER OF EMPLOYEES (1975	$161.1 BILLION 363,725 3.3 MILLION
65	REAL ESTATE	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$88.6 BILLION 159,640 789,707
66	REAL ESTATE, INSURANCE	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$247 MILLION 7,514 28,776
70	HOTELS, ETC.	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$12.2 BILLION 45,060 839,699
72	PERSONAL SERVICES	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$16.7 BILLION 161,058 875,056
75	AUTO REPAIR	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$19.0 BILLION 84,814 409,979
76	MISCELLANEOUS REPAIR	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$6 MILLION 44,435 227,399

EXHIBIT XVIII-1 (CONTD.)
OTHER INDUSTRIES SECTOR - DEMOGRAPHIC DATA

INDUSTRY SIC	INDUSTRY NAME	TYPE OF STATISTIC	DATA
78	MOTION PICTURES	SALES (1976) NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$3.0 BILLION 14,515 181,241
79	RECREATION	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$8.7 MILLION 42,732 522,563
83	SOCIAL SERVICES	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$2.9 BILLION 39,893 647,918
84	MUSEUMS, ETC.	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES	$150 MILLION 790 21,779
86	MEMBERSHIP ORGANIZATIONS	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPOOYEES (1975)	$12.2 BILLION 131,255 1.0 MILLION
89	MISCELLANEOUS SERVICES	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$7.3 BILLION 62,883 617,914
99	NON-CLASSIFIABLE	SALES NUMBER OF ESTABLISHMENTS(1975) NUMBER OF EMPLOYEES (1975)	$4.8 BILLION 204,319 496,244

- Additional information about this sector is contained on pages 294 through 303 of INPUT's 1977 Computer Services Industry Annual Report.

B. COMPUTER SERVICES MARKET FORECAST, 1978-1983

- Of all sectors, the "other" category retains the most dominant position for batch services, reflecting the continued use of these services by local, or decentralized, subsectors such as auto repair and recreation.

  - Details of the forecast are presented in Exhibit XVIII-2 which shows batch to be 61% of total processing services in 1977.

  - RCS is growing and will equal batch after 1983 as subsectors such as hotel/motel, real estate and advertising demand more timely information processing. This eventual crossover is shown graphically in Exhibit XVIII-3.

- Software products show continued strong growth from a small base led by applications products tailored to individual subsectors.

  - Turnkey systems will be an important market.

  - Engineering packages in the construction industry will be strong as the construction industry continues to prosper.

- Agriculture has market potential for services but is impacted by services offered at reduced rates or at no charge by federal, state and local agencies and by colleges, particularly "agricultural" colleges.

- Industry specialty applications delivered in an RCS mode have high growth potential, particularly in subsectors with higher current automation such as advertising and construction.

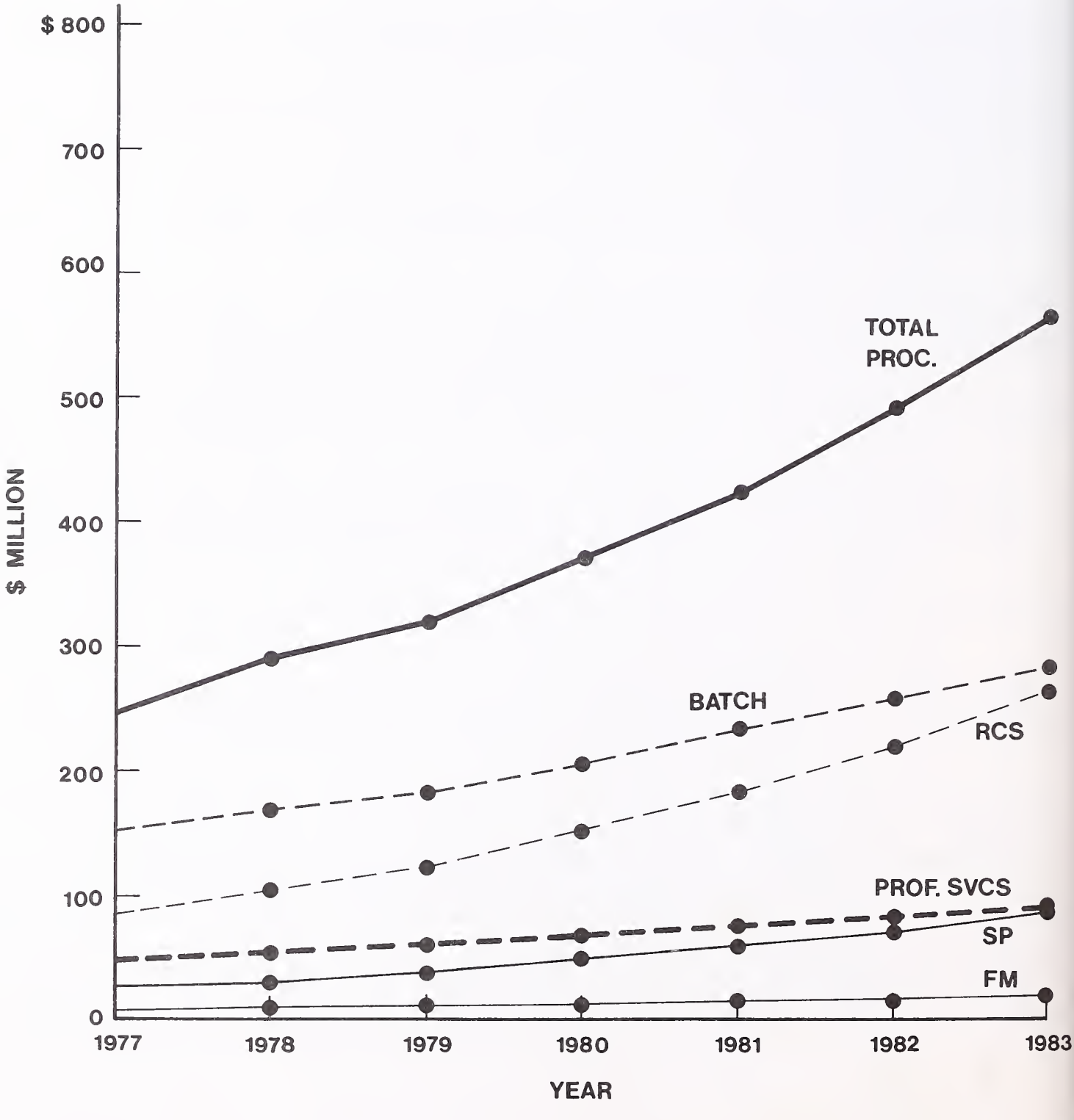
EXHIBIT XVIII-2

COMPUTER SERVICES MARKET FORECAST
FOR OTHER 1978-1983

COMPUTER SERVICE		USER EXPENDITURES								
MODE	TYPE	1977 ($M)	1978 ($M)	GROWTH 1978/1977 (%)	1979 ($M)	1980 ($M)	1981 ($M)	1982 ($M)	1983 ($M)	AAGR 1983/1978 (%)
REMOTE COMPUTING SERVICES	GEN. BUS.	7	8	14	10	12	13	16	19	19
	SCI. & ENG.	23	27	17	33	40	47	57	68	20
	IND. SPEC.	17	22	29	26	33	38	52	63	23
	UTILITY	40	48	20	56	68	82	97	115	19
	TOTAL	87	105	21	125	153	180	222	265	20
FACILITIES MANAGEMENT	GEN. BUS.									
	SCI. & ENG.									
	IND. SPEC.	6	7	17	7	8	9	10	11	9
	UTILITY	3	4	33	4	5	6	8	10	20
	TOTAL	9	11	22	11	13	15	18	21	14
BATCH	GEN. BUS.	50	58	27	65	70	78	90	104	22
	SCI. & ENG.	17	17		18	18	19	19	18	1
	IND. SPEC.	73	85	14	87	105	118	130	146	12
	UTILITY	12	13	8	14	14	15	16	15	3
	TOTAL	152	173	14	184	207	230	255	283	10
TOTAL PROCESSING	GEN. BUS.	57	66	16	75	82	91	106	123	13
	SCI. & ENG.	40	44	10	51	58	66	76	86	14
	IND. SPEC.	96	114	19	120	146	165	192	220	14
	UTILITY	55	65	18	74	87	103	121	140	17
	TOTAL	248	289	17	320	373	425	495	569	15
SOFTWARE PRODUCTS	SYSTEM	8	10	25	11	13	15	18	21	16
	APPLICATION	18	22	22	29	37	45	54	64	24
	TOTAL	26	32	23	40	50	60	72	85	22
PROFESSIONAL SERVICES		49	54	10	60	67	75	83	91	11
TOTAL	TOTAL	323	375	16	420	490	560	650	745	15

EXHIBIT XVIII-3

INDUSTRY MARKETS BY MODE OF SERVICE -
OTHER INDUSTRY SECTOR



C. RECENT VENDOR ACTIVITIES

- National CSS is offering a demographic data base from Urban Decisions, Inc., over NCSS's national network.
  - The user can also use the data base by phoning Urban Decision Systems, Inc., in which case a written report is mailed before the next business day.
  - The data base is claimed to offer information on "any site in the country."
- In the recreation subsector several products were announced:
  - Rodeo Communications of America of Ft. Collins, Colorado, is a service firm that specializes in entering competitors in rodeos organized by the Professional Rodeo Cowboys Association.
  - Brunswick signed a $20 million contract with Honeywell for mini-computers configured for an Integrated Retail Bowling Information System designed to provide statistics supporting league bowling with more features to come.
- An early entry in the consumer services sector is from Cableguard of Dayton, Inc., which is offering a home security system:
  - A central computer is connected to subscribers via TV cable.
  - The system is designed to summon police, fire or rescue departments automatically.
  - The installation fee is $625 with an extra $15.95 per month to cover maintenance and monitoring fees.

EXHIBIT XVIII-4

OBJECTIVES OF RESPONDING EDP MANAGERS

IN THE OTHER INDUSTRY SECTOR

OBJECTIVE	YEAR TO BE ATTAINED					
	1978		1979		1980	
	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT	NO. OF MENTIONS	PERCENT
DATA BASE DEVELOPMENT	-	-	1	17%	2	40%
DESIGN/INSTALL DDP	1	13	-	-	2	40
INSTALL NEW APPLICATIONS	-	-	-	-	-	-
INSTALL ON-LINE APPLICATIONS	2	25	3	50	1	20
INSTALL/UPGRADE MAINFRAME	1	13	-	-	-	-
INSTALL MINI	1	13	1	17	-	-
INSTALL NEW OPERATING SYSTEMS	-	-	-	-	-	-
IMPROVE OPERATIONS (PRODUCTIVITY, SERVICE, SECURITY)	2	25	-	-	-	-
CENTRALIZE OR DECENTRALIZE	-	-	-	-	-	-
SUBTOTAL	7	89%	5	84%	5	100%
OTHER (SPECIFY)						
NETWORKING	-	-	1	17%	-	-
WORD PROCESSING	1	13	-	-	-	-
TOTAL	8	102%	6	101%	5	100%

APPENDIX A: DEFINITIONS

APPENDIX A: DEFINITIONS

- **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 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" of "Systems Management.") The management of all or 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 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 control, and special purpose packages, such as personal trust, airline scheduling, and demand deposit accounting.

- PROCESSING SERVICES

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.

- INDUSTRY SPECIALTY 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 industry specialty applications are: seismic data processing, numerically-controlled machine tool software development, and demand deposit accounting.

- UTILITY services are those where the vendor provides access to a computer and/or communications network with basic software that enables 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 answeer 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 A-1.

- 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 A-2.

EXHIBIT A-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 A-2

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
DISCRETE MANUFACTURING	23	APPAREL
	25	FURNITURE
	27	PRINTING
	31	LEATHER
	34	METAL
	35	MACHINERY
	36	ELECTRONICS
	37	TRANSPORTATION
	38	SCIENTIFIC AND CONTROL INSTR.
	39	MISCELLANEOUS MANUFACTURING
PROCESS MANUFACTURING	10	METAL MINING
	11	ANTHRACITE MINING
	12	COAL MINING
	13	OIL AND GAS EXTRACTION
	20	FOOD PRODUCTS
	21	TOBACCO
	22	TEXTILE PRODUCTS
	24	LUMBER AND WOOD PRODUCTS
	26	PAPER PRODUCTS
	28	CHEMICALS
	29	PETROLEUM
	30	RUBBER AND PLASTICS
	32	STONE, GLASS, CLAY
	33	PRIMARY METALS

EXHIBIT A-2 (CONTD.)

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
TRANSPORTATION	40	RAILROAD
	41	LOCAL TRANSIT
	42	MOTOR FREIGHT
	43	U.S. POSTAL SERVICE
	44	WATER TRANSPORTATION
	45	AIR
	46	PIPELINES
	47	TRANSPORTATION SERVICES
UTILITIES	48	COMMUNICATION
	49	ELECTRIC, GAS, AND SANITARY
BANKING AND FINANCE	60	BANKS
	61	CREDIT AGENCIES
	62	SECURITY AND COMMODITY BROKERS
	67	HOLDING AND INVESTMENT OFFICES
INSURANCE	63	INSURANCE (LIFE, HEALTH, ETC.)
	64	INSURANCE AGENTS
MEDICAL	80	HEALTH SERVICES

EXHIBIT A-2 (CONTD.)

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
OTHER INDUSTRIES	01-09	AGRICULTURE, FORESTRY, AND FISHING
	15-17	CONSTRUCTION
	65	REAL ESTATE
	66	COMBINATIONS OF REAL ESTATE, INSURANCE, LOANS, LAW OFFICES
	70	HOTELS, ROOMING HOUSES, CAMPS, AND OTHER LODGING PLACES
	72	PERSONAL SERVICES
	75	AUTOMOTIVE REPAIR, SERVICES, AND GARAGES
	76	MISCELLANEOUS REPAIR SERVICES
	78	MOTION PICTURES
	79	AMUSEMENT AND RECREATION SERVICES, EXCEPT MOTION PICTURES
	83	SOCIAL SERVICES
	84	MUSEUMS, ART GALLERIES, BOTANICAL AND ZOOLOGICAL GARDENS
	86	MEMBERSHIP ORGANIZATIONS
	89	MISCELLANEOUS SERVICES

EXHIBIT A-2 (CONTD.)

INDUSTRY SECTOR DEFINITIONS

INDUSTRY SECTOR	INDUSTRY SIC	INDUSTRY NAME
EDUCATION	82	EDUCATIONAL SERVICES
RETAIL	52	BUILDING MATERIALS, HARDWARE
	53	GENERAL MERCHANDISE
	54	FOOD
	55	AUTOMOTIVE AND GAS STATIONS
	56	APPAREL
	57	FURNITURE
	58	EATING AND DRINKING
	59	MISCELLANEOUS RETAIL
WHOLESALE	50	DURABLE GOODS
	51	NON-DURABLE GOODS
STATE AND LOCAL GOVERNMENT	91-97	AS APPROPRIATE
FEDERAL GOVERNMENT	91-97	AS APPROPRIATE
SERVICES	73	BUSINESS SERVICES

APPENDIX B: RELATED INPUT REPORTS

APPENDIX B: RELATED INPUT REPORTS

1977/1978 MARKET ANALYSIS SERVICE (MAS)

IMPACT AND INDUSTRY REPORTS

ANNUAL REPORT	Year
• Computer Services Industry - 1977	1977

IMPACT REPORTS	
• Distributed Data Processing - Applications, Performance, Architecture	1978
• Trends In Services And Software Pricing	1978
• Acquisition Strategies For Computer Services Companies	1978
• Opportunities In Integrating Hardware And Services	1978
• Marketing Compensation Plans In The Computer Services Industry	1977
• New Hardware Economics: Plug Compatible Mainframes	1977
• Small Business Computers: Their Impact On Processing Services	1977

CROSS INDUSTRY REPORTS	
• Data Base Management Software Markets	1978
• Data Base Management Software Services Markets	1977
• Remote Computing Services Markets In Europe	1978
• Financial Planning Services And Software	1978

VERTICAL INDUSTRY REPORTS	Year
• Computer Services Markets In Hospitals	1978
• Computer Market Opportunities In Correspondent Banking	1977
• Computer Services Markets In Discrete Manufacturing	1977
• Computer Services Markets In Wholesale Distribution	
• Computer Services Markets In Federal Energy Programs	1977

MULTICLIENT STUDIES	
• Value Added Networks	1978
• Maintenance Requirements	1978

APPENDIX C: USER PANEL QUESTIONNAIRES

CODE NO. | U | P | 7 | 8 | 2 | | | |

EDP USER QUESTIONNAIRE

GENERAL INFORMATION

Primary SIC (if available)_____ Total Number of Employees_____
Primary Business_____ Number of EDP Employees_____
Annual Sales_____ Today's Date_____

EDP PLANS

1. Please indicate the level of centralization of EDP in your company.
   A) ☐ Centralized B) ☐ Partially centralized C) ☐ Decentralized

2. What major objectives do you have for EDP?
   In 1978_____
   _____
   In 1979_____
   _____
   In 1980_____
   _____

3. What are the most significant EDP problems in your organization which you would like to see resolved?
   _____
   _____
   _____
   _____

4. In order of priority, what will be the new applications you will develop or require within the next 2 years?
   1._____
   2._____
   3._____
   4._____
   5._____

5. Do you do comparison studies on the cost of outside services/software versus performing these functions in-house?
   A) ☐ Yes B) ☐ No

6. Please indicate any questions you would like to see addressed in studies of EDP users._____
   _____
   _____
   _____

EXPENDITURES

A. Overall EDP Budget

1. What is your total annual EDP budget? (If you can't give an absolute figure, please list as a percentage of total company sales.)
   A) $_____ or B)_____%

2. Please indicate in percentages how your EDP budget will be spent in 1978 and anticipated changes in 1979 and 1980, if known.

CATEGORY	% OF TOTAL EDP BUDGET		
	1978	1979	1980
A) Main computer processors	____%	____%	____%
B) Small computers/programmable terminals	____%	____%	____%
C) Non-programmable terminals	____%	____%	____%
D) Communications	____%	____%	____%
E) Software (purchase/lease)	____%	____%	____%
F) Personnel	____%	____%	____%
G) Other_____	____%	____%	____%
	100%	100%	100%

B. Outside Computer Services and Software Expenditures

1. If you use outside computer services or software, please complete the following chart. (Select the application codes from the list provided below.)

TYPE OF SERVICE	1977 EXPENDITURES	1978 EXPENDITURES	% CHANGE 1978 TO 1980	VENDOR(S)	APPLICATION CODE(S)
PROCESSING SERVICES					
A) Interactive timesharing	$_____	$_____	_____%	_____	_____
B) Remote batch	$_____	$_____	_____%	_____	_____
C) Batch	$_____	$_____	_____%	_____	_____
D) Input/output (com, data, entry, etc)	$_____	$_____	_____%	_____	_____
SOFTWARE PRODUCTS					NAMES OF PRODUCTS ACQUIRED IN 1977
E) Systems software (incl. DBMS)	$_____	$_____	_____%	_____	_____
F) Applications software	$_____	$_____	_____%	_____	_____
PROFESSIONAL SERVICES					
G) Contract programming & design	$_____	$_____	_____%	_____	
H) EDP consulting	$_____	$_____	_____%	_____	
I) Education	$_____	$_____	_____%	_____	
J) Other	$_____	$_____	_____%	_____	
FACILITIES MANAGEMENT					
K)	$_____	$_____	_____%	_____	
MAINTENANCE					
L)	$_____	$_____	_____%	_____	

Total expenditures for outside services $_____ $_____

APPLICATION CODES:

1. Vendor data bases
2. Program development
3. Network consolidation
4. Raw computer time
5. Planning & modeling
6. Finance & accounting
7. Marketing & sales
8. Scientific & engineering
9. Industry specialty application
10. Other (specify)_____

2. If you do not use outside services, are there any EDP functions or application processing you would consider contracting out?
   A) ☐ Yes B) ☐ No
   If yes, please specify_____
   If no, why not?_____

3. Have you replaced or considered replacing any outside data processing service with an in-house minicomputer or microcomputer?
   A) ☐ Yes, we have replaced.
   Reason:_____
   B) ☐ We have considered replacement.
   Reason:_____
   C) ☐ No, replacement has not occurred nor have we considered it.

4. Are you looking for application software to assist in implementing or developing new applications?
   A) ☐ Yes B) ☐ No
   If yes, which application areas?_____
   If no, why not?_____

5. Have you considered or would you consider facilities management?
   A) ☐ Yes B) ☐ No

6. Under which conditions might you consider facilities management?_____

INSTALLED HARDWARE

1. Please identify the major computers you have installed (equivalent of a 370/135 or larger).

	MANUFACTURER	MODEL NUMBER	QUANTITY	OPERATING SYSTEM
A)				
B)				
C)				

2. Please identify the number of minicomputers installed (include small business computers and process control units).
   0) ☐ None 1) ☐ 1-5 2) ☐ 5-10 3) ☐ 10-20 4) ☐ 20-50 5) ☐ 50-100 6) ☐ >100
   A. Projected installation growth between 1977/78 A)_____% 1978/80 B)_____%

3. Major suppliers of your minicomputers:

	MANUFACTURER	MODEL NUMBER	QUANTITY
A)			
B)			
C)			

4 How many terminals (total number) do you have installed?
   0) ☐ None 1) ☐ 1-10 2) ☐ 10-50 3) ☐ 50-100 4) ☐ 100-500 5) ☐ >500
   A. Projected installation growth between 1977/78 A)_____% 1978/80 B)_____%

EDP ISSUES

CODE NO. U P 7 8 2 | | |

A. RCS Vendors Offering Hardware

1. A number of remote computing services (RCS) vendors are currently offering or plan to offer EDP hardware as an addition to these services:
   A. Are you aware of these offerings? A) ☐ Yes B) ☐ No
   Please identify the RCS vendors _____
   B. Would you consider purchasing EDP hardware from an RCS vendor? A) ☐ Yes B) ☐ No
   Please explain _____
   _____
   C. Have you made such a procurement or commitment? A) ☐ Yes B) ☐ No
   If yes: Name of vendor _____
   Estimated installation date _____

B. Financial Planning Services and Software

1. Please identify any financial planning services and software which you currently have installed:
   Check here if none. ☐

NAME OF SOFTWARE PACKAGE OR SERVICE	CHECK ONE: SOFTWARE PACKAGE	CHECK ONE: SERVICE	NAME OF VENDOR	DATE INSTALLED	SATISFACTION LEVEL 1 = HIGH, 5 = LOW
A) _____	☐	☐	_____	_____	_____
B) _____	☐	☐	_____	_____	_____
C) _____	☐	☐	_____	_____	_____
D) _____	☐	☐	_____	_____	_____

2. Are you currently evaluating a financial planning:
   A) ☐ Product B) ☐ Service C) ☐ Neither
   If yes, please identify the product(s) under evaluation: _____
   _____

C. Office of the Future

1. Please identify your involvement in the following relative to the office of the future, particularly as regards applications involving text/graphics, input/output, and retrieval.

TYPE	EDP INVOLVEMENT
Electronic Mail	A) ☐ EDP involved now B) ☐ EDP will be involved by the year_____ C) ☐ EDP will not be involved by 1983
Word Processing	D) ☐ EDP involved now E) ☐ EDP will be involved by the year_____ F) ☐ EDP will not be involved by 1983
Copying/Duplicating	G) ☐ EDP involved now H) ☐ EDP will be involved by the year_____ I) ☐ EDP will not be involved by 1983
Data Communications	J) ☐ EDP involved now K) ☐ EDP will be involved by the year_____ L) ☐ EDP will not be involved by 1983

TYPE	EDP INVOLVEMENT
Voice Communications	M) ☐ EDP involved now N) ☐ EDP will be involved by the year_____ O) ☐ EDP will not be involved by 1983
Facsimile	P) ☐ EDP involved now Q) ☐ EDP will be involved by the year_____ R) ☐ EDP will not be involved by 1983
Video Conferencing	S) ☐ EDP involved now T) ☐ EDP will be involved by the year_____ U) ☐ EDP will not be involved by 1983
Other (Identify)_____ _____	V) ☐ EDP involved now W) ☐ EDP will be involved by the year_____ X) ☐ EDP will not be involved by 1983

D. Utilization Issues

1. What percent of your computer resources are used for:
   A) Production Runs _____%
   B) New applications development _____%
   C) Maintenance of existing programs _____%
   D) Other (Specify)_____ _____%
   100 %

2. What percent of your application programmers are assigned to:
   A) Development of new programs _____%
   B) Maintenance of existing programs _____%
   C) Other (Specify)_____ _____%
   100 %

3. What measures are you taking to reduce the time and costs associated with new applications development?
   _____
   _____