

EDP PLANS AND BUDGETS FOR 1977

INPUT

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Formed in 1974, INPUT has rapidly grown to become a leading business consulting company in the information processing industry. It specializes in market research, planning services, and special analyses for users and vendors of computer, and communications, and office products and services.

The company carries out continuous in-depth research with vendors and users in the industry. Our staff analyze and interpret the data derived from this research, based on their experience. The information is presented concisely and understood. Useful recommendations and access to tions.

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M-1977
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EDP PLANS AND BUDGETS FOR 1977

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INTRODUCTION

INTRODUCTION

- In March 1975, INPUT completed a study called "IMPACT OF THE RECESSION ON U.S. EDP BUDGETS IN 1975 and 1976". With the easing of the economic situation during 1976, clients of this study asked INPUT to find out what changes with respect to EDP budgets and plans were taking place.

- This study, "EDP PLANS AND BUDGETS FOR 1977", is, in part, an update of the earlier project. As before, the data for this study was obtained through direct interviews with EDP Managers of very large (Fortune 500/50 organizations in ten sectors.

- | | |
|-------------------------|----------------------------|
| ● INSURANCE | ● DISCRETE MANUFACTURING |
| ● DIVERSIFIED FINANCIAL | ● PROCESS MANUFACTURING |
| ● BANKING | ● UTILITIES |
| ● RETAIL | ● FEDERAL GOVERNMENT |
| ● TRANSPORTATION | ● STATE & LOCAL GOVERNMENT |

- In addition to the interviews with EDP Managers, a lesser number of interviews were conducted with top financial executives in each sector in order to obtain some perspectives on how top management perceives its company's EDP facilities and expenditures.

- In addition to those questions relating to finance and budgets, a number of questions dealing with operational plans and problems were posed during the interviews. Responses to these questions are summarized in the industry sector chapters. The interview forms are contained in the Appendix.
- Approximately 80% of the companies interviewed for this study were the same as those interviewed for the 1975 edition, providing clients of both studies a good basis of comparison when analyzing changes in industry spending patterns over time.
- This report is produced by INPUT as part of the Market Analysis Service. Inquiries and comments on the information presented in this report are requested from clients.

I. SCOPE AND METHODOLOGY

I SCOPE AND METHODOLOGY

A. SCOPE OF THE STUDY

The interview survey concentrated on large organizations contained in the annual 'Fortune 500' lists of industrials, banks, insurance companies, etc. In addition, the survey covered the Federal Government and large state and local governments as single sectors. (See Exhibit I - 1.)

This survey population was selected because it controls over 60% of all expenditures for EDP, and tends to be at the "leading edge" in the utilization of new products, systems and technologies. These organizations tend to be less affected by short-term economic changes and events than smaller organizations. Therefore, changes in their business activity patterns do not (typically) swing or fluctuate dramatically in short periods of time. In addition, the numbers were small enough that an adequate sample could be obtained for in-depth interviews within the study budget. These facts add validity to the use of the data and information presented in this study as an indicator of general industry trends.

EXHIBIT 1 - 1

DEFINITION OF INDUSTRY SECTORS

- LIFE INSURANCE -- 50 largest life insurance companies.
- DIVERSIFIED FINANCIAL -- 50 largest diversified financial companies in terms of assets. Included are brokerage, finance, and savings and loan companies, as well as non-life insurance companies.
- BANKING -- 50 largest commercial banking companies in terms of assets.
- RETAILING -- 50 largest retailers in terms of sales.
- MANUFACTURING -- 500 largest industrial corporation

| DISCRETE MANUFACTURING (300) | PROCESS MANUFACTURING (200) |
|---|---|
| Shipbldg., Railroad Equip., Mobile Homes Apparel Printing & Publishing Broadcasting & Motion Pictures Aircraft & Parts Appliances, Electronics Motor Vehicles & Parts Office Machinery Metal Products Farm & Industrial Machinery Measuring, Scientific & Photo Equipment Furniture Jewelry & Silverware Musical Instruments, Toys, Sporting Goods | Petroleum Refining Mining Rubber Textiles Glass, Cement, Gypsum, Concrete Chemicals Soaps, Cosmetics Food Beverages Pharmaceuticals Tobacco Paper and Wood Products Metal Manufacturing Leather & Leather Products |

- TRANSPORTATION -- 50 largest transportation companies in terms of operating revenues. Included are airlines, railroads, trucking, shipping and moving companies.
- UTILITIES -- 50 largest utilities in terms of assets, including telephone, electric power, gas, and natural gas companies.
- FEDERAL GOVERNMENT -- All non-security related functions and activities are included in a total of 40 agencies.
- STATE AND LOCAL GOVERNMENT -- 15 largest states, and 5 largest cities in budgetary terms.

B. SURVEY PROCEDURES

The distribution of interviews by type and industry sector is shown in Exhibit I - 2. Typically, the title of the executives interviewed were V. P. Finance or Controller. The EDP Managers interviewed were the heads or assistant heads of the company's or agency's central data processing facilities.

Nearly all interviews were conducted on the telephone by persons experienced in data processing management. A typical interview took approximately one hour to complete. In a few cases, the interviewees asked that the questionnaire be sent to them. In these cases, the forms were completed in-house and returned by mail.

The extent to which the interview samples are representative of an industry sector is illustrated in Exhibit I - 3, which compares the size of the sample measured by sales, assets, etc. to the Fortune list data.

C. ANALYSIS

Interviews were grouped by industry sector and the responses tabulated question-by-question. In some cases, information given in response to one question conflicted with an answer(s) given in another. In this event, the respondent was checked independently or the conflicting information discounted.

Depending on the industry, some judgment about the relative changes of

EXHIBIT 1 - 2

INTERVIEW SAMPLE BY SECTOR

| INDUSTRY SECTOR | EDP MANAGER | FINANCIAL MANAGER | TOTAL |
|------------------------|----------------|----------------------|-------|
| PROCESS MANUFACTURING | 12 | 4 | 16 |
| DISCRETE MANUFACTURING | 7 | 4 | 11 |
| BANKING | 8 | 3 | 11 |
| LIFE INSURANCE | 8 | 2 | 10 |
| DIVERSIFIED FINANCIAL | 6 | 4 | 10 |
| RETAIL | 9 | 3 | 12 |
| TRANSPORTATION | 9 | 5 | 14 |
| UTILITIES | 10 | 3 | 13 |
| FEDERAL GOVERNMENT | 8 | 0 | 8 |
| STATE/LOCAL GOVERNMENT | 8 | 0 | 8 |
| TOTAL | 85 | 28 | 113 |

INTERVIEW SAMPLE COMPARED TO TOTAL POPULATION

| Industry Sector | Measurement Basis | 1976 Industry Size (\$ Billion) | Sample Size (\$ Billion) | % of Industry Represented By Sample | No. of Interviews |
|-----------------------------------|-------------------|---------------------------------|--------------------------|-------------------------------------|-------------------|
| PROCESS MFG. } DISCRETE MFG. } | Sales | 865.2 | 73.6 | 8.5 | 16 |
| | Sales | | | | 11 |
| BANKING | Assets | 536.5 | 153.9 | 28.7 | 11 |
| INSURANCE | Assets | 232.3 | 86.1 | 37.1 | 10 |
| DIV. FINANCIAL | Assets | 143.2 | 36.4 | 25.4 | 10 |
| RETAIL | Sales | 121.7 | 30.3 | 24.9 | 12 |
| TRANSPORTATION | Op. Rev's | 38.6 | 13.4 | 34.7 | 14 |
| UTILITIES | Sales | 232.2 | 127.3 | 54.8 | 13 |
| FED. GOV'T. | N/A | N/A | N/A | N/A | 8 |
| STATE/LOCAL GOV'T. | N/A | N/A | N/A | N/A | 8 |
| TOTAL | | | | | 113 |

individual budget items was applied, particularly when no real "norm" could be established or where the data was especially skimpy. In applying judgment, factors such as anticipated industry growth, technological development and experience within other industry sectors were taken into consideration.

Other than these situations requiring "judgment calls", the expenditure changes were computed by averaging the responses and extrapolating to account for the entire industry using the Fortune list bases.

D. DEFINITIONS AND ASSUMPTIONS

The EDP expenditure items covered by this report are as follows:

Equipment. Expenditures for the rental or lease of items of equipment from manufacturers or third parties. Expenditures for outright purchases are factored to convert to an equivalent rental basis.

Maintenance charges are included in equipment costs.

Main Computer Processors. Central processing units, memories, channel controllers, consoles and other devices integral to computer processors which are used to process major business and scientific applications.

Secondary Computer Processors. Equipment similar to that included in Main Computer Processors, where the computers perform stand-alone processing or parts of applications processed on the main computers. It includes mostly smaller computers such as satellite computers, minicomputers used for control and special applications, and turnkey systems.

Peripherals. Includes all input, output, and storage devices other than main memory, which are locally connected to the main processor and are not normally included in other categories such as terminals.

Terminals. Input, output, storage and processing devices which have as their main function feeding data to and/or from main or secondary computer processors over communications lines. It includes intelligent terminals as well as CRTs, remote batch terminals, and teletypewriters.

Data Communications Equipment. Equipment used for the routing and controlling of data flow via telecommunications links, which does not include that used by the carrier for its transmission and switching purposes. Primarily composed of communications controllers, minicomputers for network management, modems, and multiplexors.

Data Entry/Output. Equipment used for the transposition of data from various sources to computer readable media such as punched cards, magnetic tape, paper tape, magnetic disc or discette. Includes equipment for processing of output data such as COM units.

Outside Services. Expenditures to vendors for products and services which perform data processing functions or assist the user in the performance of such functions.

Facilities Management. (FM) The management of all or part of a user's data processing functions under a long term (not less than one year) contract. To qualify as facilities management, the contractor must directly plan and control, as well as operate, the data processing facility provided to the user on-site, through communications lines, or in mixed mode. Simply providing resources, even though under a long term contract and/or for all of a user's processing needs does not qualify as FM.

Remote Computing Services. (RCS) This includes general, problem solving interactive use of terminals (timesharing), use of remote batch devices for remote job entry or remote data entry, and data base services such as stock quotation and credit systems.

Professional Services. Management consulting related to EDP, systems consulting, systems design and programming, and other professional services provided on a daily rate or fixed price basis, are included here. Temporary help is included under 'Personnel' together with agency fees.

Software Products. Systems and applications packages which are sold by equipment manufacturers, independent vendors and others to computer users. The figures quoted are for user expenditures and include lease and purchase amounts. This category also includes fees for work performed by the vendor to implement the package at the user site. Fees for work performed by organizations other than the package vendor are counted in Professional Services.

Batch Services. Includes data processing performed at vendors' sites of user data which has been physically transported (as opposed to electronically by communications lines) to those sites. Data entry and data output services, such as COM processing, are also included.

Education Services. Expenditures by corporations and other organizations for EDP education and training courses offered by outside vendors. These include seminars and courses given through audio-visual and publication media. They do not include purchases of books, manuals and other publications not specifically part of a course of study.

Personnel. Expenditures for management, computer operations, systems analysis, and programming staff are contained in this category. Direct and indirect labor costs are included, as also are agency fees and temporary personnel.

Data Communications. Direct expenditures by organizations for use of data transmission links and share of combined voice/data communications costs appropriate to data transmission, whether or not charged directly to the EDP budget in any particular organization.

Other. These expenditures are primarily those for supplies, including discs, tapes, paper and punch cards, but also include utilities. Only those expenditures charged to EDP are included.

II. MANAGEMENT SUMMARY

II MANAGEMENT SUMMARY

- Among the large organizations studied in this survey, EDP Budgets will grow an average of 10.2% in 1977. Process Manufacturing, Banking and Utilities are the fastest growing sectors at 12%, while the Retail industry is the slowest at only 6%. The sector growth rates are compared in Exhibit II - 1.
- In the post-1977 time frame, EDP Budget growth is expected to slow to 9% over all sectors surveyed. The Process Manufacturing sector, led by the Petroleum industry, will continue at 12% in this time frame while Retail establishments budgets will just keep up with inflation.
- The ratio of EDP expenditures to revenues shows that Airlines (Transportation Sector) because of their on-line reservation requirements, tend to use computers more extensively than any other industry. Computers today are as integral a part of a modern airline as are jet airplanes. (See Exhibit II - 2).
- The Discrete and Process Manufacturing Sectors are the biggest spenders on EDP based on per company expenditure; the main reasons for this are:

EXHIBIT II - 1

PERCENTAGE CHANGE IN
TOTAL EDP BUDGETS 1976-1977

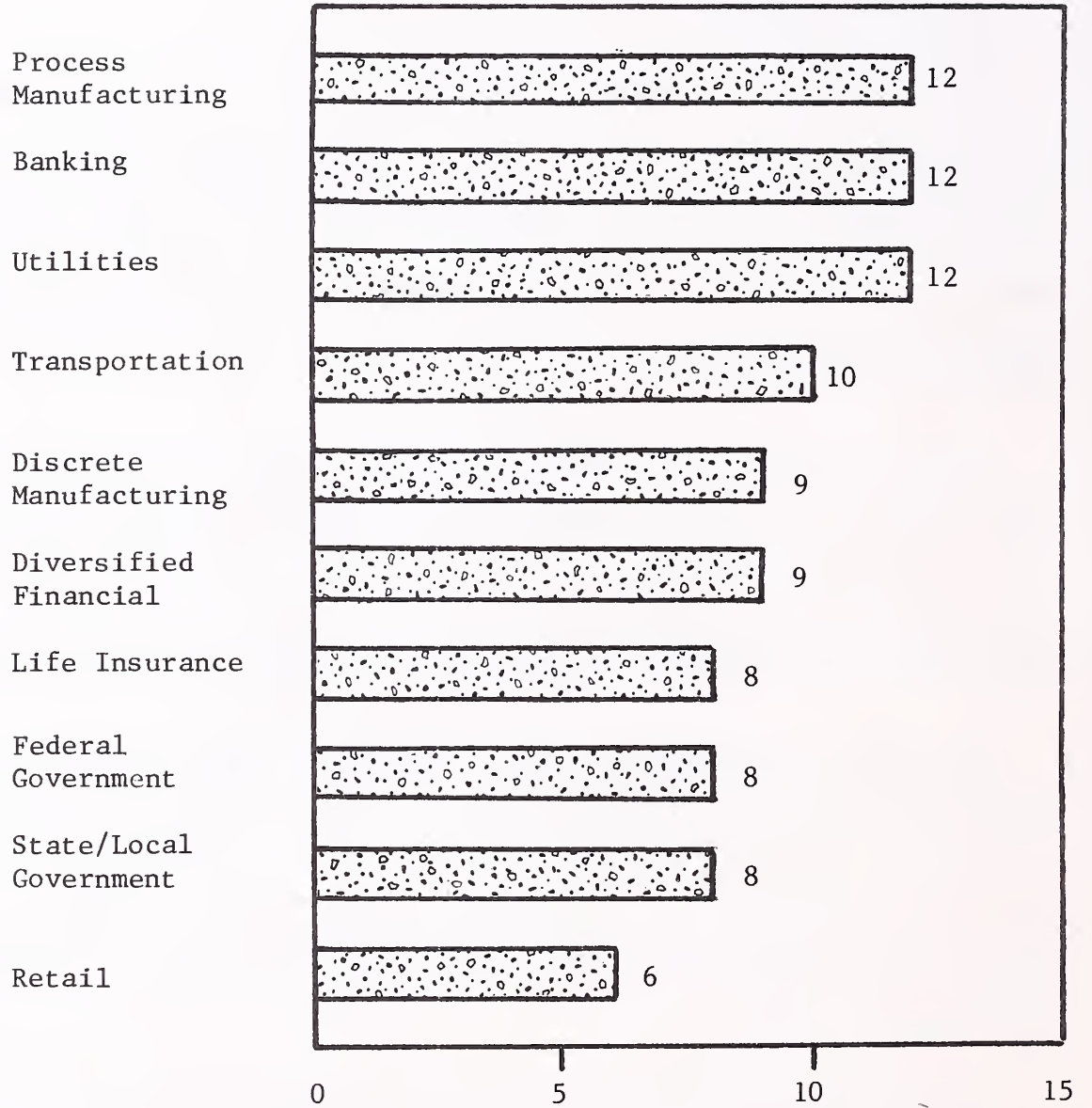


EXHIBIT II - 2

RATIO OF EDP EXPENDITURES
TO COMPANY REVENUES OR ASSETS
BY INDUSTRY SECTOR
(FOR COMPANY SIZES COVERED)
IN 1976

| INDUSTRY SECTOR | TOTAL REVENUES (\$B) | TOTAL EDP EXPENDITURES (\$M) | EDP AS % OF REVENUES | AVERAGE EDP EXPENDITURE PER COMPANY (\$M) |
|------------------------|----------------------|------------------------------|----------------------|---|
| INSURANCE* | 232 | 700 | 0.3 | 14.0 |
| DIVERSIFIED FINANCIAL* | 143 | 680 | 0.5 | 13.6 |
| BANKING* | 537 | 800 | 0.2 | 16.0 |
| RETAIL | 122 | 475 | 0.4 | 9.5 |
| DISCRETE MANUFACTURING | 482 | 5765 | 1.2 | 19.2 |
| PROCESS MANUFACTURING | 383 | 4325 | 1.1 | 21.6 |
| TRANSPORTATION | 39 | 696 | 1.8 | 13.9 |
| UTILITIES | 232 | 1050 | .5 | 21.0 |
| FEDERAL GOVERNMENT | N/A | 3545 | - | 88.6** |
| STATE/LOCAL GOVERNMENT | N/A | 700 | - | 35.0*** |

* MEASURED IN ASSETS
** PER AGENCY AVERAGE
*** PER GOVERNMENT UNIT

- Pervasiveness of applications such as production and inventory control.
 - Growing utilization of computers for control processes.
 - Intense utilization of computers for administrative applications.
 - Dispersed facilities requiring integration of data.
-
- The surveyed users indicated that proportionately the highest industry user of outside services is the Banking industry (large banks), which spends 27% of its EDP dollar on outside services. This is followed by the Insurance industry with 19.2%, the Utility industry with 15.7% and Diversified Financial firms with 13.5%. (See Exhibit II - 3).
 - Discrete and Process Manufacturing and Transportation spend 5.2%, 5.7% and 11.8% of their budgets respectively on outside services.
 - The surveyed Federal Government agencies are the largest (per unit) spenders on outside services. On average, agencies spend 21.8% of each EDP dollar on outside services.
 - The reasons for these results seem to be that industries like Banking and Insurance, where salaries are relatively low, must rely on outside services to supplement their in-house capabilities. In addition, non-branch banking states with bank headquarters in small towns have a difficult time attracting competent EDP professionals.
 - The use of computer services by the Federal Government allows agencies to perform the required services without exceeding their fiscal year budgets. At the same time, they often avoid the need to

EXHIBIT II - 3

EDP EXPENDITURES
PER COMPANY
IN 1977
(LARGEST COMPANIES ONLY)

| INDUSTRY SECTOR | AVERAGE EXPENDITURE PER COMPANY (\$M) | | | | |
|--------------------------------------|---------------------------------------|-----------|------------------|-----------|-------|
| | TOTAL EDP | EQUIPMENT | OUTSIDE SERVICES | PERSONNEL | OTHER |
| INSURANCE | 15.1 | 4.7 | 2.9 | 5.9 | 1.6 |
| DIVERSIFIED FINANCIAL | 14.8 | 3.9 | 2.0 | 6.6 | 2.2 |
| BANKING | 17.8 | 5.7 | 4.8 | 5.6 | 1.8 |
| RETAIL | 10.1 | 3.9 | 1.2 | 4.1 | .8 |
| DISCRETE MANUFACTURING | 20.9 | 8.0 | 1.1 | 9.9 | 1.9 |
| PROCESS MANUFACTURING | 24.2 | 10.0 | 1.4 | 10.3 | 2.5 |
| TRANSPORTATION | 15.4 | 5.4 | 1.7 | 6.1 | 2.2 |
| UTILITIES | 23.5 | 8.7 | 3.7 | 9.3 | 1.8 |
| NORM FOR ALL COMMERCIAL SECTORS | 19.9 | 7.5 | 1.8 | 8.6 | 2.0 |
| FEDERAL GOVERNMENT (40 agencies) | 95.6 | 18.8 | 20.9 | 47.5 | 8.4 |
| STATE/LOCAL GOVERNMENT (20 units) | 37.8 | 16.5 | 3.0 | 14.4 | 3.9 |

go through the lengthy budget justification and approval procedure required to obtain their own computers.

- Those industries which spend a high percentage of their budgets on outside services such as Banking, Insurance and the Federal Government are also heavy users of Facilities Management services; for example, banks spend 31% of their total EDP dollar on Facilities Management (as shown in Exhibit II - 4) while firms in the Utilities industry spend almost 63% of their outside dollars on Remote Computing and less than 4% on Facilities Management.

Other Conclusions

- Half the firms interviewed by INPUT indicated a high level of activity in installing Distributed Processing Systems, ranging from secondary processors in remote locations to intelligent terminals used for a variety of applications.
- The activity is not always centrally coordinated, and minicomputer systems are sometimes purchased locally to solve single applications without regard to the overall corporate EDP plan.
- Users are generally unhappy with IBM's Network and Data Base Management Software. Major complaints are that the programs are difficult to learn, to implement and to maintain.

Strategies and Opportunities

- Large companies can provide as much as \$200K to \$500K revenues per

AVERAGE EDP EXPENDITURES
FOR OUTSIDE SERVICES
PER ORGANIZATION IN 1977

| INDUSTRY SECTOR | EXPENDITURES PER ORGANIZATION (\$K) | | | | | | | INDUSTRY TOTAL (\$M) |
|---------------------------|-------------------------------------|------|-------|----------------------|--------------------------|-----------|-------|----------------------------|
| | RCS | FM | BATCH | SOFTWARE PRODUCTS | PROFESSIONAL SERVICES | EDUCATION | TOTAL | |
| INSURANCE | 1120 | 620 | 220 | 260 | 600 | 120 | 2920 | 146 |
| DIVERSIFIED FINANCIAL | 1600 | 40 | 60 | 100 | 160 | 60 | 2020 | 101 |
| BANKING | 1820 | 1500 | 200 | 580 | 560 | 140 | 4800 | 240 |
| RETAIL | 880 | 40 | 120 | 40 | 120 | 20 | 1220 | 61 |
| DISCRETE MANUFACTURING | 557 | 23 | 120 | 120 | 200 | 63 | 1083 | 325 |
| PROCESS MANUFACTURING | 855 | 40 | 90 | 120 | 155 | 100 | 1360 | 272 |
| TRANSPORTATION | 860 | 140 | 200 | 240 | 200 | 40 | 1680 | 84 |
| UTILITIES | 2300 | 140 | 220 | 340 | 580 | 80 | 3660 | 183 |
| FEDERAL GOVERNMENT | 5000 | 5625 | 1200 | 1225 | 7625 | 225 | 20900 | 836 |
| STATE/LOCAL GOVERNMENT | 1050 | -- | 350 | 300 | 1250 | 50 | 3000 | 60 |

year to a service company. This volume of revenue deserves a 'national account' marketing system to maintain and expand that revenue base.

- The Federal Government is a major consumer of EDP services. Any company desiring to do business with the Government should dedicate one or more salesmen to this market.
- FM opportunities are limited to selected industries such as Banking and Insurance and to companies which are located in remote areas and cannot attract the EDP professionals.
- Dissatisfaction with IBM's data base and network software offers software product opportunities to vendors who can develop more efficient or easier to use programs.
- Distributed processing is or will be a reality in a high percentage of large organizations. Equipment firms must recognize this trend and emphasize new product development for terminals, communications equipment and small processors. Services firms should emphasize software and system designs that facilitate data gathering and analysis from remote data bases.

III. RESULTS OF THE SURVEY --
CROSS-SECTOR ANALYSIS

III. RESULTS OF THE SURVEY -- CROSS-SECTOR ANALYSIS

A. GENERAL ECONOMIC GROWTH ASSUMED BY RESPONDENTS

- All respondents in the survey were asked a few questions aimed at
 - 1) discerning their views towards the general U.S. economic picture;
 - 2) growth of their industries relative to the overall economy; and,
 - 3) their expectation as to how their company would do in 1977 with respect to their industry. The answers ranged widely, reflecting a general uncertainty among U.S. business executives as to what will really happen in 1977.

A qualitative summary of the responses might be described by the oft-seen phrase "cautious optimism."

- With few exceptions, EDP Managers had little or no concept of the general economic picture, nor did it seem to matter to them. When asked about their company's growth rate, most said they 'didn't know' or selected a nominal figure that appeared to be something they read in the newspapers.

- Most of the companies who had imposed restrictions on hiring and expenses during the recession have lifted the restrictions or expect to do so in 1977. A few companies found they could get along well on 'less' and are planning to leave the recession - initiated restrictions in force "permanently".

- On average, Executives foresee the general economic growth rate at about 8% for 1977, with inflation at about 6%.
- The financial group, which includes the INSURANCE, DIVERSIFIED FINANCIAL, and BANKING sectors, sees growth faster than the overall economy, at 10% or greater.
- The industrial group, comprised of the RETAIL, MANUFACTURING, TRANSPORTATION, and UTILITY sectors, generally sees growth at the national rate. Retail tends to be "bearish", while Manufacturing tends to be "bullish".

B. EDP BUDGET GROWTH

1. 1975-1976

- In order to find out how much "statistical confidence" could be placed in INPUT's forecasting methodology, survey respondents in 1976 were asked what happened in 1975-76 in order that the results of the original 1975 study could be compared against the actual real world results.
- Exhibit III - 1* shows that, across all sectors, respondents said

*NOTE: Exhibits III - 1, III - 2, III - 3 need some explanation: the first 8 columns summarize the responses as given directly by the people interviewed. These people answered growth rate related questions by giving a quantitative answer (1st 4 columns), or a qualitative answer (2nd 4 columns). Under % Growth Average, the "Reported" column gives growth rates based on the response specified in columns 1-8. The "Est." column takes the reported results and modifies them according to various judgment factors. It includes the elimination of responses greater or less than '3σ' from the norm.

REPORTED EDP BUDGET GROWTH, 1975-76

| INDUSTRY SECTOR | NOS. OF RESPONDENTS REPORTING CHANGES | | | | | | | | | | % GROWTH AVERAGE | | |
|------------------------|---------------------------------------|-----|-------|------|-------------------|--------|------|-----------------|---------|------------|------------------|--|--|
| | GROWTH RATE, (%) | | | | GROWTH INDICATION | | | REPT. | ** EST. | 1975 STUDY | | | |
| | <0 | 0-9 | 10-19 | > 19 | 'DOWN' | 'SAME' | 'UP' | | | | | | |
| INSURANCE | | 3 | 1 | 1 | | | | 12 | 13 | 13 | | | |
| DIVERSIFIED FINANCIAL* | | 1 | 3 | | | | | 11 | 11 | 13 | | | |
| BANKING | 1 | 1 | 2 | 3 | | | | 12 | 12 | 13 | | | |
| RETAIL | 2 | 3 | | 1 | | 2 | | 3 | 4 | 11 | | | |
| DISCRETE MFG. | | 3 | 2 | 1 | | | | 14 | 9 | 8 | | | |
| PROCESS MFG. | | 1 | 6 | 1 | | 1 | | 12 | 12 | 12 | | | |
| TRANSPORTATION | | 3 | 2 | 2 | | 2 | | 11 | 10 | 14 | | | |
| UTILITIES | | 3 | 2 | 2 | | 1 | | 21 ⁺ | 10 | 9 | | | |
| FED. GOVERNMENT | | 4 | 1 | 1 | | 1 | | 8 | 8 | 12 | | | |
| STATE/LOCAL GOVERNMENT | | 2 | 4 | 1 | | | | 12 | 13 | 9 | | | |
| TOTAL | 3 | 24 | 23 | 13 | | 7 | | 13 | 11.9 | 11.4 | | | |

+ Includes a "100% Growth" response, factored out on adjustment.

* Diversified Financial grouped with Insurance in 1975 study.

** Estimated % growth average based on 'DOWN' = -5%, 'SAME' = +5%, 'UP' = +15%, 'WAY UP' = +25%.

that EDP budgets grew 11.9% from 1975 to 1976. This figure compares very favorably to the 11.4% projected rate forecast by INPUT in the original 1975 study. Based on this analysis, INPUT believes the growth rate figures and forecasts given in this current study are within reasonable levels of statistical confidence.

2. 1977-1981

- EDP Managers were also asked to project EDP budget growth in the post 1977 period. Their responses, summarized in Exhibit III - 2, show an overall expected growth rate of 9.0%.
- In nearly all cases, however, EDP Managers did not have a clear view or even a semi-formal plan projecting EDP budgets for more than 12 months ahead! Their answers appeared to be seat-of-the-pants guesses for the most part.

3. 1976-1977

- Most of the survey questions were directed at learning the short term plans of the respondents. EDP budget growth, based on respondents answers to questions about overall budget growth, is 10.2% over all sectors as shown in Exhibit III - 3.
- In addition to the questions asked concerning overall budget growth, respondents were also asked about short-term changes in expenditures for 24 categories of equipment, outside services, personnel and other cost items. An analysis of the respondents' answers to these

REPORTED EDP BUDGET GROWTH, 1977-81

| INDUSTRY SECTOR | NOS. OF RESPONDENTS REPORTING CHANGES | | | | | | | % GROWTH AVERAGE | | | | | |
|------------------------|---------------------------------------|-----|-------|------|-------------------|---|---|------------------|--------|------|----------|-------|--------|
| | GROWTH RATE, (%) | | | | | | | 'DOWN' | 'SAME' | 'UP' | 'WAY UP' | REPT. | EST.** |
| | < 0 | 0-9 | 10-19 | > 19 | GROWTH INDICATION | | | | | | | | |
| INSURANCE | | 2 | 1 | 1 | | 1 | | 1 | | | 7 | 7 | |
| DIVERSIFIED FINANCIAL* | | 1 | 2 | | | 3 | | | | | 12 | 12 | |
| BANKING | | 2 | 2 | | | | 1 | | | | 7 | 7 | |
| RETAIL | | 4 | 1 | | | | | | | | 3 | 3 | |
| DISCRETE MFG. | | 1 | 3 | 1 | | | | | | | 11 | 11 | |
| PROCESS MFG. | | 2 | 5 | 2 | | | 1 | | | | 12 | 12 | |
| TRANSPORTATION | | 2 | 4 | 1 | | | | | | | 11 | 11 | |
| UTILITIES | | 5 | 3 | 1 | | 1 | | | | | 9 | 9 | |
| FED. GOVERNMENT | | 3 | 2 | | | | | | | | 8 | 8 | |
| STATE/LOCAL GOVERNMENT | | 3 | 2 | 1 | | | | | | | 11 | 11 | |
| TOTAL | | 25 | 25 | 7 | | | 5 | 3 | | | 10.4 | 9.0 | |

* Diversified Financial grouped with Insurance in 1975 study.

** Estimated % growth average based on 'DOWN' = -5%, 'SAME' = +5%, 'UP' = +15%, 'WAY UP' = + 25%.

EXHIBIT III - 3

REPORTED EDP BUDGET GROWTH, 1976-77

| INDUSTRY SECTOR | NOS. OF RESPONDENTS REPORTING CHANGES | | | | | | | | | | % GROWTH AVERAGE | | |
|------------------------|---------------------------------------|-----|-------|-----|--------|-------------------|------|---|--|--|------------------|-----------------|--------|
| | GROWTH RATE, (%) | | | | | GROWTH INDICATION | | | | | 'WAY UP' | REPT. | EST:** |
| | <0 | 0-9 | 10-19 | >19 | 'DOWN' | 'SAME' | 'UP' | | | | | | |
| INSURANCE | | 3 | | 1 | | 1 | | | | | | 10 | 10 |
| DIVERSIFIED FINANCIAL* | | 3 | 1 | | | | | | | | | 8 | 8 |
| BANKING | | 2 | 1 | 1 | | | 2 | | | | | 10 | 8 |
| RETAIL | 2 | 3 | 1 | | | 1 | | 1 | | | | 0 | 2 |
| DISCRETE MFG. | | 3 | 1 | 2 | | | | | | | | 15 | 10 |
| PROCESS MFG. | | 2 | 4 | 2 | | 1 | | 1 | | | | 15 | 12 |
| TRANSPORTATION | | 5 | 2 | 1 | | | | | | | | 9 | 9 |
| UTILITIES | 1 | 1 | 5 | 2 | | 1 | | | | | | 19 ⁺ | 9 |
| FED. GOVERNMENT | | 4 | 4 | | | | | | | | | 8 | 8 |
| STATE/LOCAL GOVERNMENT | 1 | 3 | 2 | 1 | | | | | | | | 9 | 9 |
| TOTAL | 4 | 29 | 21 | 10 | 1 | 3 | 4 | | | | | 10.8 | 10.2 |

+ Includes a "100% Growth" response, factored out on adjustment.

* Diversified Financial grouped with Insurance in 1975 study.

** Estimated % growth average based on 'DOWN' = -5%, 'SAME' = +5%, 'UP' = +15%, 'WAY UP' = +25%.

latter questions produced an overall EDP budget growth rate of 9.5%, as shown in Exhibit III - 4. This chart also repeats the last two columns of Exhibit III - 3 for comparison purposes. Note that all three forecasting techniques compare reasonably well.

4. 1975-1981

- The three time-period growth rates given in Exhibits III - 1, III - 2, and III - 3 are compared in Exhibit III - 5. The numbers show that EDP budgets increased faster in 1975-1976 than they will in 1976-1977. This is because of the impact of the recession in 1973-1975. As the recession ended, spending which had been deferred was released, with the result that a great deal of money was spent in 1976 as companies tried to make up for the lean years in a hurry. The decrease in budget growth of from approximately 12% in 1975-1976 to about 10% in 1976-1977 indicate that many companies have "caught up" and are beginning to taper off new spending.
- The further decrease in budget growth (to 9%) anticipated in the post-1977 period simply reflects the same general trend. Expansion of EDP in the future will be slower than in the past, at least for the largest, most sophisticated organizations.

EXHIBIT III - 4
 EDP BUDGET GROWTH RATES
 1976-1977
 BY INDUSTRY SECTOR
 (LARGEST COMPANIES ONLY)

| Industry Sector | Number of Organizations Covered | Growth Rate (%) | | |
|---------------------------|---------------------------------|-------------------------------------|-------------------------|---------------------------------------|
| | | As Directly Reported By Respondents | INPUT Adjusted Estimate | Based On Reported 'Line Item' Changes |
| Insurance | 50 | 10 | 10 | 8 |
| Diversified Financial | 50 | 8 | 8 | 9 |
| Banking | 50 | 10 | 8 | 12 |
| Retail | 50 | 0 | 2 | 6 |
| Discrete Manufacturing | 300 | 15 | 10 | 9 |
| Process Manufacturing | 200 | 15 | 12 | 12 |
| Transportation | 50 | 9 | 9 | 10 |
| Utilities | 50 | 19 | 9 | 12 |
| Federal Government | 40 Agencies | 8 | 8 | 8 |
| State/Local Government | Top 15 States Top 5 Cities | 9 | 9 | 8 |
| Total, All Sectors | 860 | 10.8 | 10.2 | 9.5 |

EXHIBIT III - 5

EDP BUDGET GROWTH RATES

BY INDUSTRY SECTOR

AS REPORTED BY 1976 RESPONDENTS

| INDUSTRY SECTOR | GROWTH RATE (%) * | | |
|------------------------|-------------------|-----------|-----------|
| | 1975-1976 | 1976-1977 | 1977-1981 |
| Insurance | 13 | 10 | 7 |
| Diversified Financial | 11 | 8 | 12 |
| Banking | 12 | 8 | 7 |
| Retail | 4 | 2 | 3 |
| Discrete Manufacturing | 9 | 10 | 11 |
| Process Manufacturing | 12 | 12 | 12 |
| Transportation | 10 | 9 | 11 |
| Utilities | 10 | 9 | 9 |
| Federal Government | 8 | 8 | 8 |
| State/Local Government | 13 | 9 | 11 |
| Total All Sectors | 11.9 | 10.2 | 9.0 |

* Using INPUT's adjusted estimates.

C. EDP EXPENDITURES

1. INDUSTRY SUMMARY

- As shown in Exhibit III - 6, the Process Manufacturing, Banking, and Utilities sectors have the fastest growing EDP budgets, about 12%. All other sectors are growing at 8-10%, except Retail which is expected to just keep pace with the inflation rate at about 6%.
 - The Process Manufacturing sector is growing rapidly because of a rapid build-up of on-line services demanded by the dispersed geographic nature of a typical company in this industry.
 - Banking, one of the leaders in INPUT's earlier survey, is growing rapidly because of a continued build-up of on-line teller terminals, correspondent banking services, and government-required systems.
 - The Utilities sector is led by the communication industry, principally AT&T, who is rapidly building up EDP facilities for a host of communications-related applications.
 - The Retail industry, hard hit by the recession, and continually 'suspicious' of EDP, remains low in growth ranking. Expenditures would be even lower but for the fact that POS system installations are continuing at a relatively stable rate. The installations will taper off after 1977.

EXHIBIT III - 6

EDP BUDGETS

1976 - 1977

BY INDUSTRY SECTOR

FOR

TOTAL EDP EXPENDITURES

| Industry sector | 1976-1977 Growth Rate (%) * | 1976 Budget (\$M) | 1977 Budget Forecast (\$M) |
|------------------------|-----------------------------|-------------------|----------------------------|
| Insurance | 8.0 | 700 | 756 |
| Diversified Financial | 9.0 | 680 | 739 |
| Banking | 12.0 | 800 | 892 |
| Retail | 6.0 | 475 | 503 |
| Discrete Manufacturing | 9.0 | 5765 | 6265 |
| Process Manufacturing | 12.0 | 4325 | 4844 |
| Transportation | 10.0 | 696 | 768 |
| Utilities | 12.0 | 1050 | 1176 |
| Federal Government | 8.0 | 3545 | 3822 |
| State/Local Government | 8.0 | 700 | 755 |
| Total, All Sectors | 9.5 | 18,736 | 20,520 |

* Using 'Line Item' changes.

2. EQUIPMENT

- Equipment expenditures will increase 11.6%, from \$6,368M to \$7,105M from 1976 to 1977, as shown in Exhibit III - 7. Industries growing faster than average include Utilities, Banking and Process Manufacturing. Transportation and Life Insurance are about average. All other sectors are below average. The Federal Government and Diversified Financial sectors show very slow growth (approximately inflation) at around 6%. The relative growth rates are shown graphically in Exhibit III - 8.
- As a percentage of total EDP expenditures, equipment ranges from a low of 20% for the Federal Government to a high of 43% for State and Local Government as shown in Exhibit III - 9.
- Among specific equipment categories, expenditures for terminals, secondary processors and data communications equipment are the fastest growing. This reflects the continuing user development of on-line systems and remote computing applications, together with installations of hardware for distributed processing systems. Exhibit III - 10 shows cross-industry totals for all types of equipment.

EXHIBIT III - 7

EDP BUDGETS
 1976 - 1977
 BY INDUSTRY SECTOR
 FOR
 EQUIPMENT

| Industry sector | 1976-1977 Growth Rate (%) | 1976 Budget (\$M) | 1977 Budget Forecast (\$M) |
|------------------------|---------------------------|-------------------|----------------------------|
| Insurance | 11.3 | 212 | 236 |
| Diversified Financial | 6.5 | 184 | 196 |
| Banking | 18.3 | 240 | 284 |
| Retail | 7.7 | 181 | 195 |
| Discrete Manufacturing | 9.2 | 2200 | 2405 |
| Process Manufacturing | 15.6 | 1730 | 2000 |
| Transportation | 11.5 | 243 | 271 |
| Utilities | 19.1 | 367 | 437 |
| Federal Government | 5.8 | 710 | 751 |
| State/Local Government | 9.6 | 301 | 330 |
| Total, All Sectors | 11.6 | 6368 | 7105 |

EXHIBIT III-8

PERCENTAGE CHANGE
IN EQUIPMENT EXPENDITURES
1976-1977

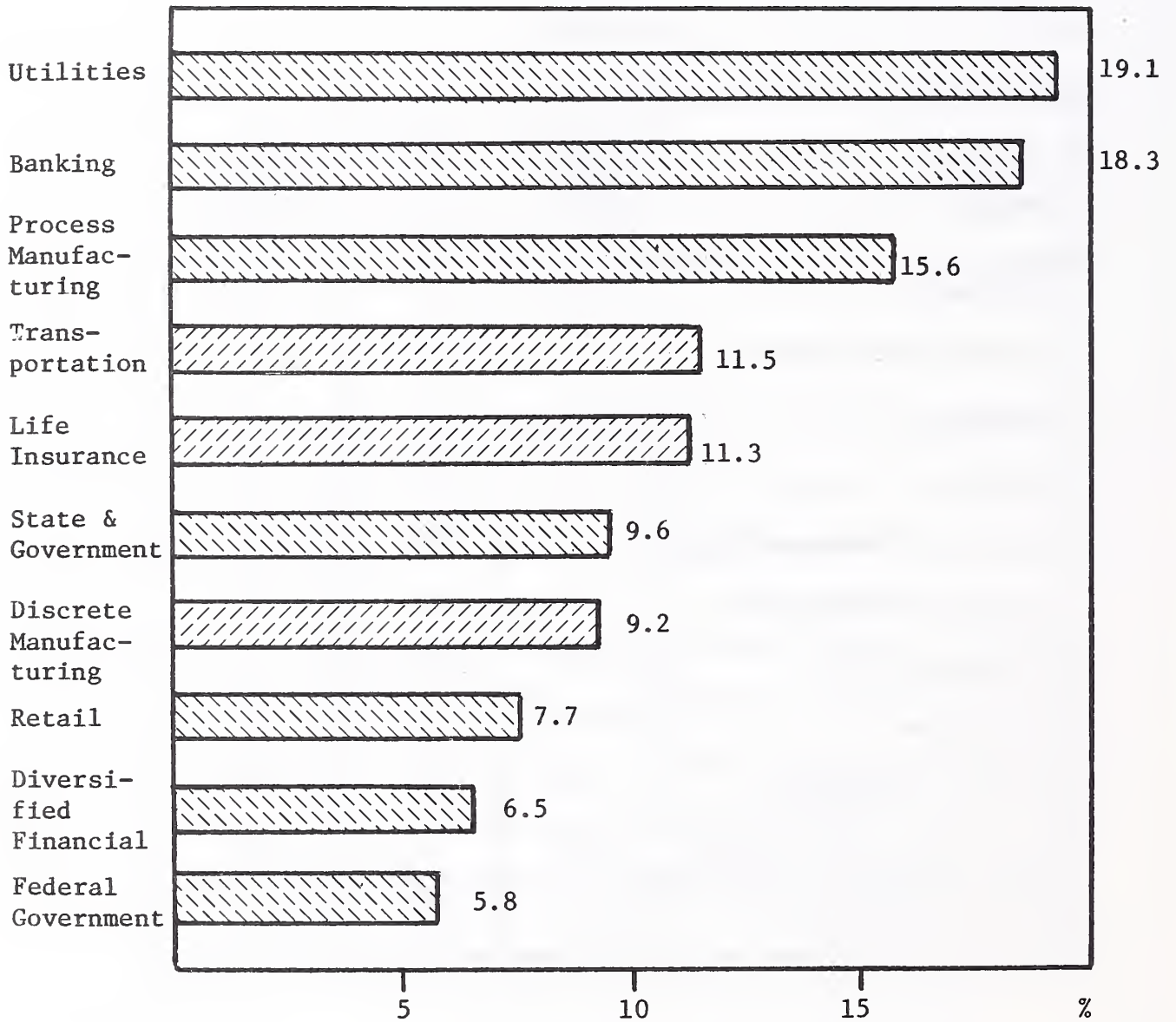


EXHIBIT III - 9

EQUIPMENT EXPENDITURES

AS A PERCENT OF TOTAL

EDP EXPENDITURES

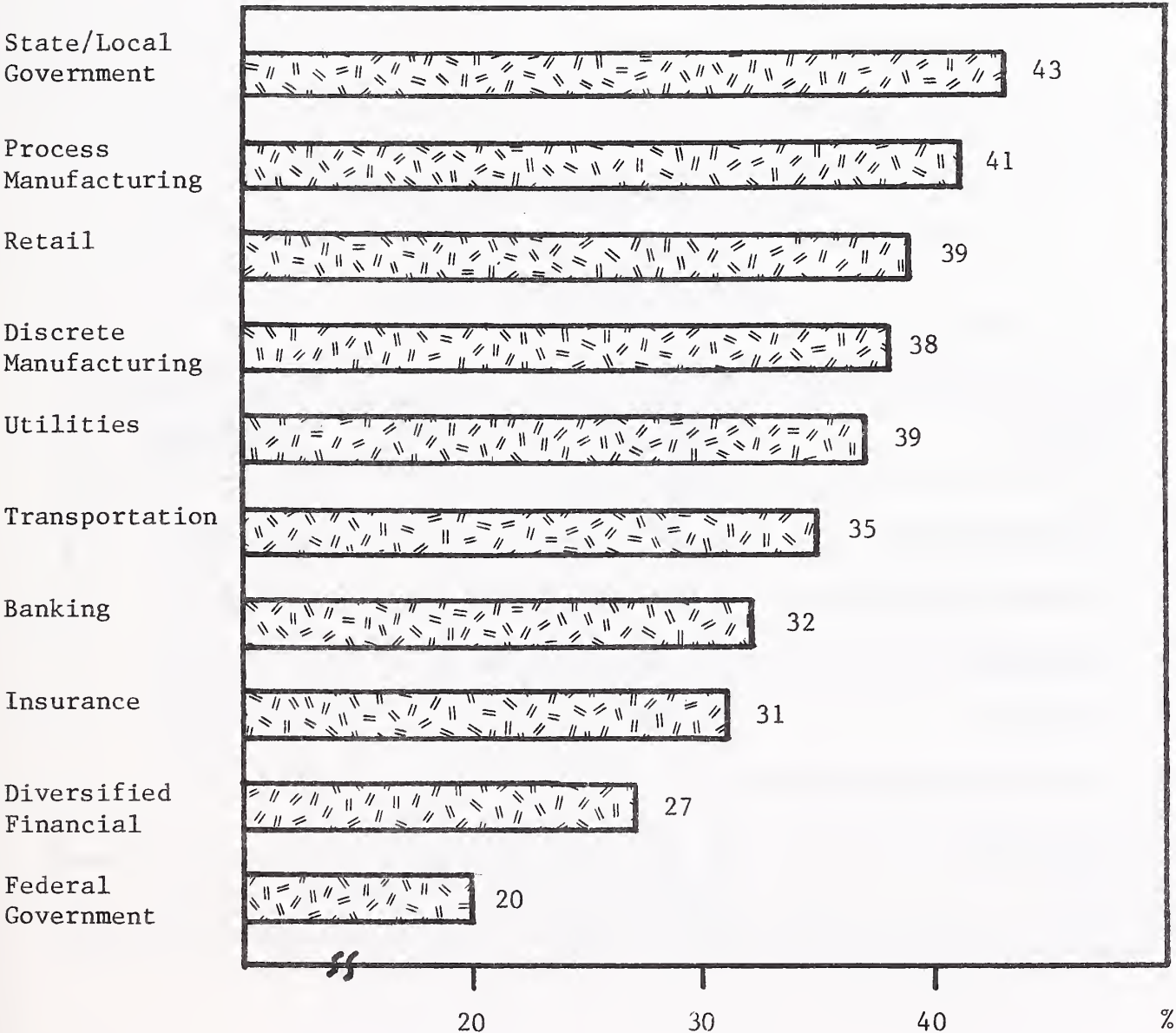


EXHIBIT III - 10

1976-1977 EQUIPMENT EXPENDITURES
 BY TYPE OF EQUIPMENT
 FOR ALL INDUSTRIES SAMPLED

| Type of Equipment | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|----------------------------|-------------------|---------------|------------|----------------------|
| | | (\$M) | % of Total | |
| Main Processors | 1940 | 2151 | 30.2 | 10.8 |
| Secondary Processors | 492 | 578 | 8.1 | 17.5 |
| Peripherals | 1762 | 1919 | 27.0 | 8.9 |
| Terminals | 1068 | 1294 | 18.2 | 21.2 |
| Data Communications Equip. | 301 | 348 | 4.9 | 15.6 |
| Data Entry | 805 | 815 | 11.5 | 1.2 |
| Total | 6368 | 7105 | 100 | 11.6 |

3. OUTSIDE SERVICES

- Expenditures for Outside Services will increase 16%, from \$1,989M to \$2,308M as shown in Exhibit III - 11. Industries growing faster than average include Diversified Financial, Banking, Federal Government and State and Local Government. The Manufacturing sectors (who account for over 25% of expenditures) are about average, and all other sectors are much lower than average. The relative growth rates by sector are shown graphically in Exhibit III - 12.
- As a percentage of total EDP expenditures, services range from a low of 5% in the Discrete Manufacturing sector to a high of 27% in the Banking sector as shown in Exhibit III - 13.
- All categories of Outside Service expenditures, except for Batch Processing, will grow faster than 10% as shown in Exhibit III - 14. Software Products and Remote Computing Services are the growth leaders at 20%.

EXHIBIT III - 11

EDP BUDGETS
 1976 - 1977
 BY INDUSTRY SECTOR
 FOR
 OUTSIDE SERVICES

| Industry sector | 1976-1977 Growth Rate (%) | 1976 Budget (\$M) | 1977 Budget Forecast (\$M) |
|------------------------|---------------------------|-------------------|----------------------------|
| Insurance | 11.5 | 131 | 146 |
| Diversified Financial | 21.7 | 83 | 101 |
| Banking | 20.6 | 199 | 240 |
| Retail | 7.0 | 57 | 61 |
| Discrete Manufacturing | 14.4 | 284 | 325 |
| Process Manufacturing | 15.7 | 235 | 272 |
| Transportation | 10.5 | 76 | 84 |
| Utilities | 10.9 | 165 | 183 |
| Federal Government | 18.1 | 708 | 836 |
| State/Local Government | 17.6 | 51 | 60 |
| Total, All Sectors | 16.0 | 1989 | 2308 |

EXHIBIT III - 12

PERCENTAGE CHANGE IN
EXPENDITURES FOR OUTSIDE SERVICES

1976-1977

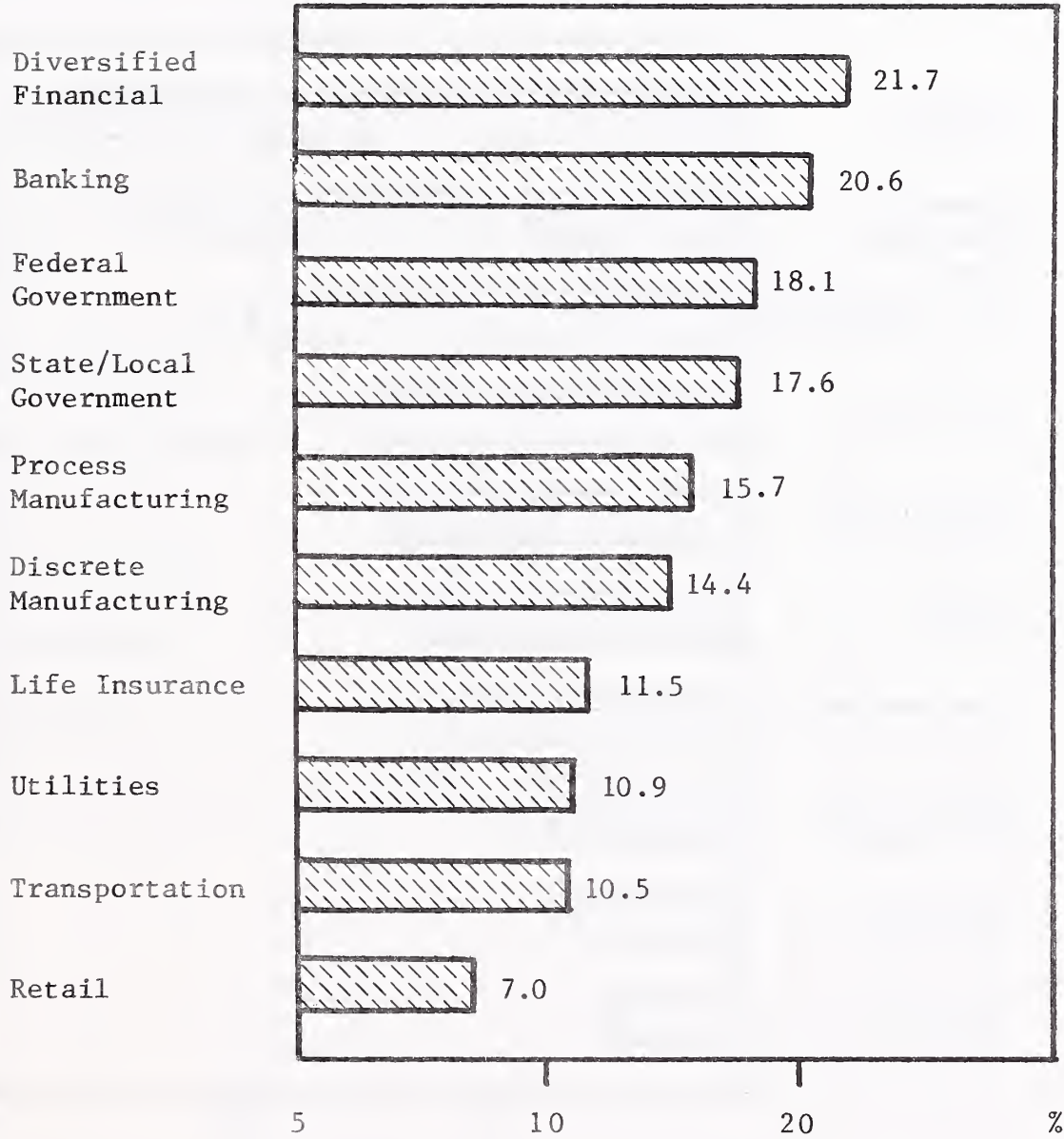


EXHIBIT III - 13

EXPENENDITURES FOR OUTSIDE
SERVICES AS A PERCENTAGE
OF TOTAL EDP EXPENDITURES
IN 1977

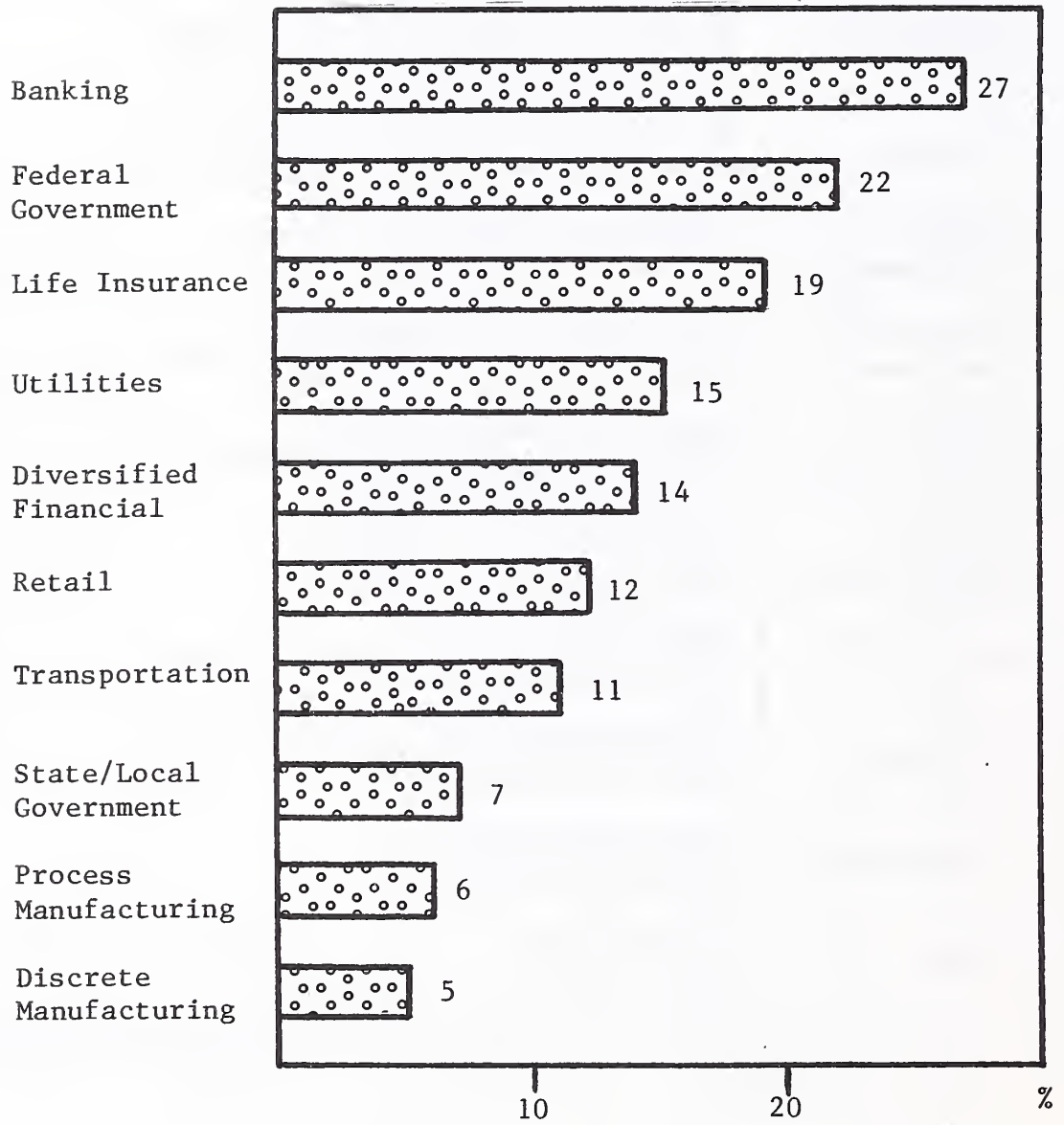


EXHIBIT III - 14

1976-1977 OUTSIDE SERVICES EXPENDITURES
 BY TYPE OF SERVICE
 FOR ALL INDUSTRIES SAMPLED

| Type of Service | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|-----------------------|-------------------|---------------|------------|----------------------|
| | | (\$M) | % of Total | |
| Remote Computing | 823 | 988 | 43 | 20.0 |
| Facilities Management | 325 | 364 | 16 | 12.0 |
| Batch | 147 | 160 | 7 | 8.8 |
| Software Products | 161 | 193 | 8 | 19.9 |
| Professional | 468 | 532 | 23 | 13.7 |
| Education | 65 | 72 | 3 | 10.8 |
| Total | 1989 | 2309 | 100 | 16.0 |

4. PERSONNEL

- Over all sectors, Personnel expenditures will grow at 6.5%, from approximately \$8.5 billion to slightly over \$9 billion as shown in Exhibit III - 15. This growth rate is approximately the same as the inflation rate, meaning that there will be little real growth in this category. Those sectors growing faster than average include Transportation, Process and Discrete Manufacturing, and Utilities. The Federal Government, Retail, Insurance, State and Local Governments, and Banking sector rates are all 5% or less, indicating a net loss of personnel in these industries. Sector rankings are shown in Exhibit III - 16.
- As a percentage of total EDP expenditures, personnel ranges from a low of 31% in Banking to a high of 50% in the Federal Government. The Banking sector's reliance on FM accounts for its very low personnel ratio. Exhibit III - 17 shows the relative importance of personnel expenditures for each sector.

EXHIBIT III - 15

EDP BUDGETS
 1976 - 1977
 BY INDUSTRY SECTOR
 FOR
 PERSONNEL (IN-HOUSE)

| Industry Sector | 1976-1977 Growth Rate (%) | 1976 Budget (\$M) | 1977 Budget Forecast (\$M) |
|------------------------|---------------------------|-------------------|----------------------------|
| Insurance | 3.0 | 287 | 296 |
| Diversified Financial | 6.1 | 311 | 330 |
| Banking | 0 | 280 | 280 |
| Retail | 3.5 | 200 | 207 |
| Discrete Manufacturing | 7.2 | 2761 | 2960 |
| Process Manufacturing | 8.6 | 1900 | 2063 |
| Transportation | 10.1 | 277 | 305 |
| Utilities | 7.0 | 434 | 464 |
| Federal Government | 5.1 | 1808 | 1900 |
| State/Local Government | 3.0 | 280 | 288 |
| Total, All Sectors | 6.5 | 8538 | 9093 |

EXHIBIT III - 16

PERCENTAGE CHANGE IN
EXPENDITURES FOR IN-HOUSE PERSONNEL
1976-1977

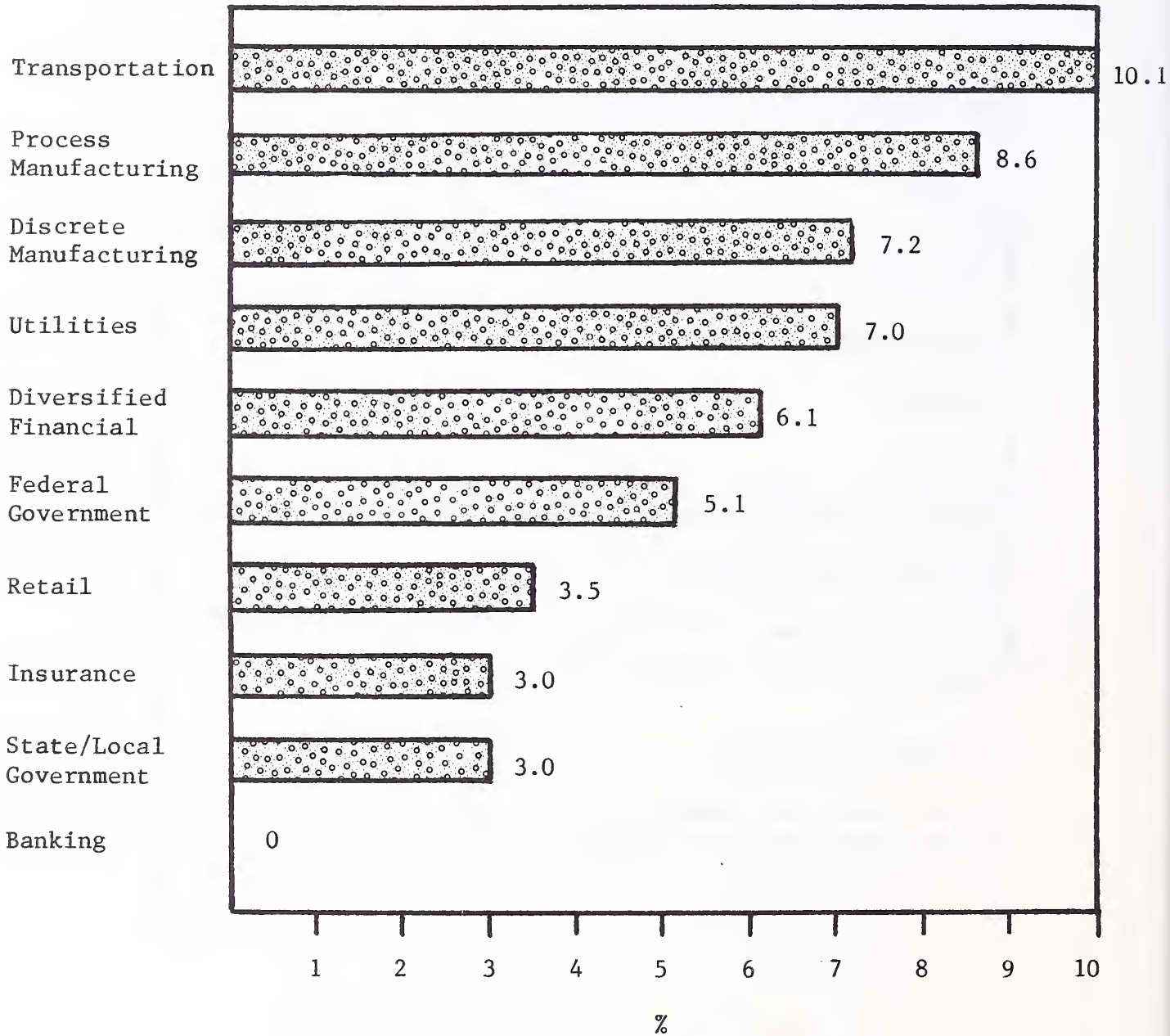
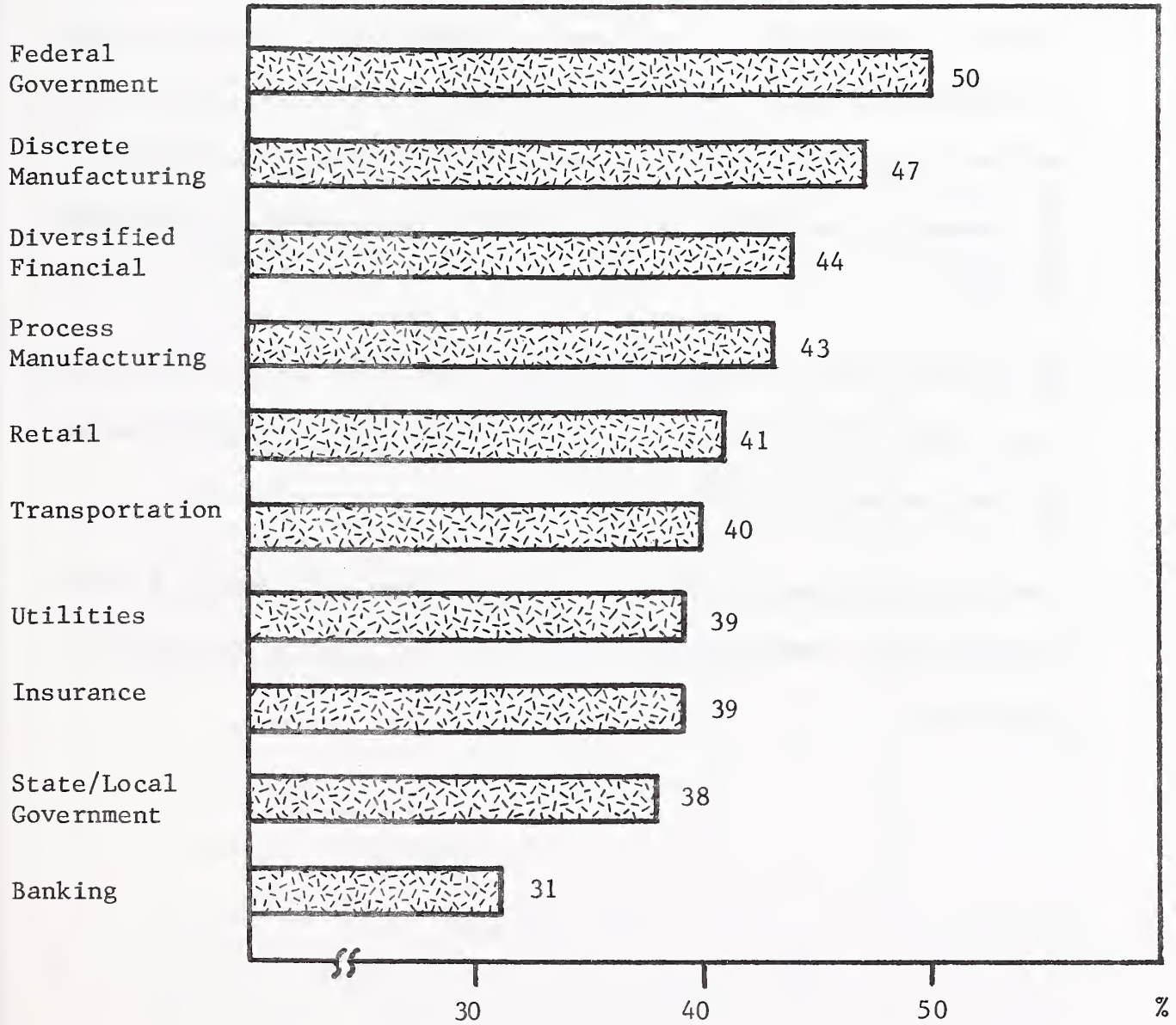


EXHIBIT III - 17

EXPENDITURES FOR PERSONNEL
(IN-HOUSE) AS A PERCENTAGE OF
TOTAL EDP EXPENDITURES
IN 1977



5. OTHER COSTS

- The 'Other' category of EDP budget items is primarily made up of supplies and utilities. As shown in Exhibit III - 18, this category is expected to grow at 9.3% from \$1,842M in 1976 to \$2,014M in 1977. Most sector growth rates fall into the 8-11% range. The Federal Government is the lowest at 5%. The Insurance industry the highest at 12%.
- There were no paper shortage problems reported by any of the respondents. Paper prices appear to have stabilized and are not expected to increase more than 6% or 7% in 1977.
- Most of the increase in this category derives from increased utilization of data communications services as a result of expanding on-line usage.

EXHIBIT III - 18

EDP BUDGETS

1976 - 1977

BY INDUSTRY SECTOR

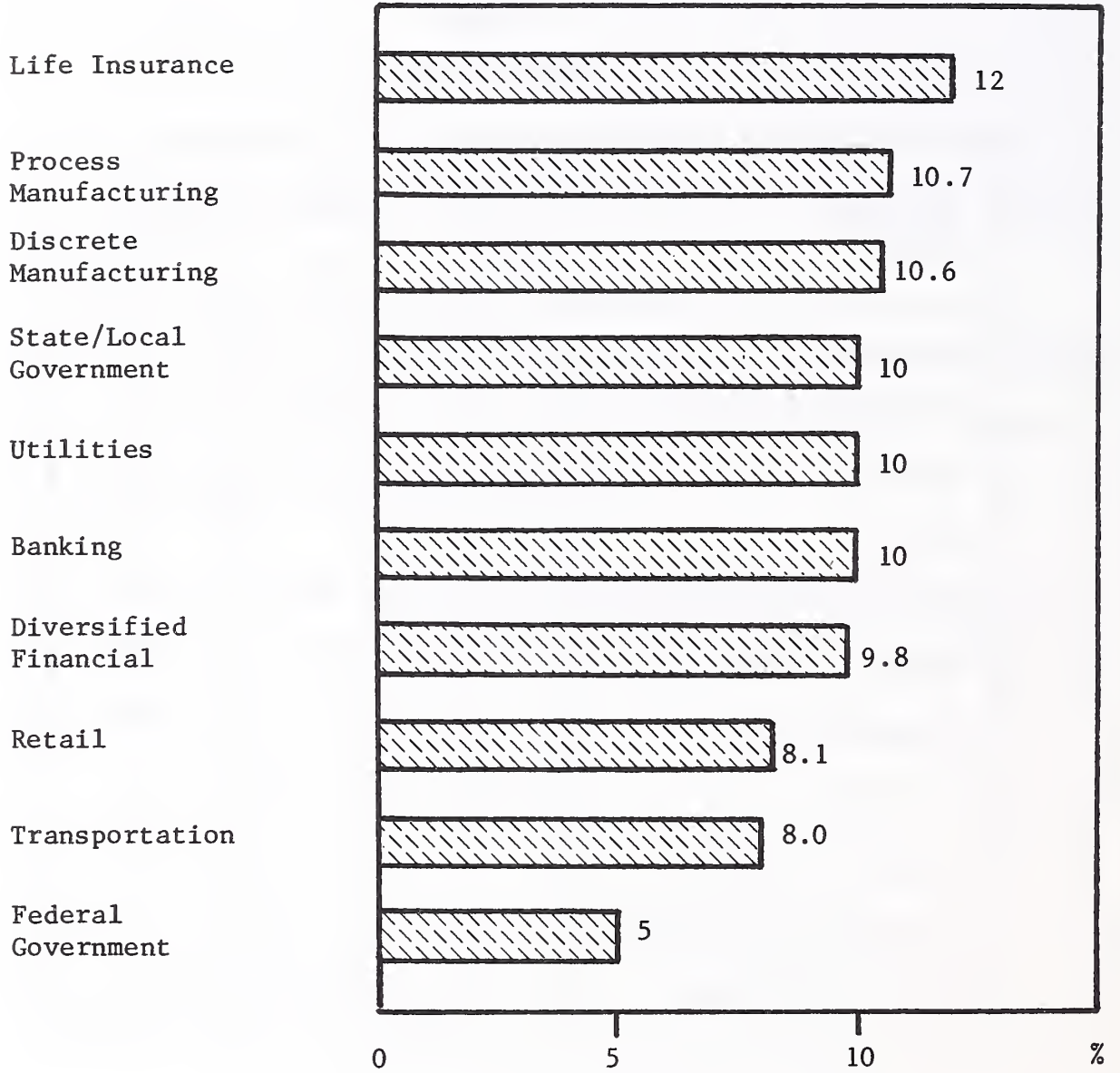
FOR

"OTHER COSTS"

| Industry Sector | 1976-1977 Growth Rate (%) | 1976 Budget (\$M) | 1977 Budget Forecast (\$M) |
|------------------------|---------------------------|-------------------|----------------------------|
| Insurance | 12.0 | 70 | 78 |
| Diversified Financial | 9.8 | 102 | 112 |
| Banking | 10.0 | 80 | 88 |
| Retail | 8.1 | 37 | 40 |
| Discrete Manufacturing | 10.6 | 520 | 575 |
| Process Manufacturing | 10.7 | 460 | 509 |
| Transportation | 8.0 | 100 | 108 |
| Utilities | 10.0 | 84 | 92 |
| Federal Government | 5.0 | 319 | 335 |
| State/Local Government | 10.0 | 70 | 77 |
| Total, All Sectors | 9.3 | 1,842 | 2,014 |

EXHIBIT III - 19

PERCENTAGE CHANGE IN
EXPENDITURES FOR "OTHER" COSTS
1976-1977



D. CENTRALIZATION

- As shown in Exhibit III - 20, almost two-thirds of the EDP Managers reported that EDP control was centralized in their organizations.
- The Manufacturing industry sectors were the major exceptions to this, with half the respondents indicating they were partially centralized. Several very large manufacturers were decentralized, with individual divisions controlling their own EDP.
- The extent of the decentralization in the large manufacturers is reflected by the fact that 18 respondents of this category operated 84 major (IBM System 370/Model 135 or larger) EDP sites in 1976; this number will be practically unchanged in 1978, as shown in Exhibit III - 21. Of these respondents, 5 planned to increase the number of major sites they operated, while 4 planned decreases.
- Other industry sectors with multiple major sites per respondent are the government sectors.
- Of these respondents, 10 planned to increase their number of major sites and 9 to decrease them by 1978. There are few discernible trends by industry, level of EDP sophistication, or by state of centralized control. There is some evidence of major site consolidation by large retailers.
- For minor sites, almost a third of the respondents with complete answers indicated they would increase their number by 1978, while only

EXHIBIT III - 20
DISTRIBUTION OF RESPONSES
TO EDP CONTROL QUESTION

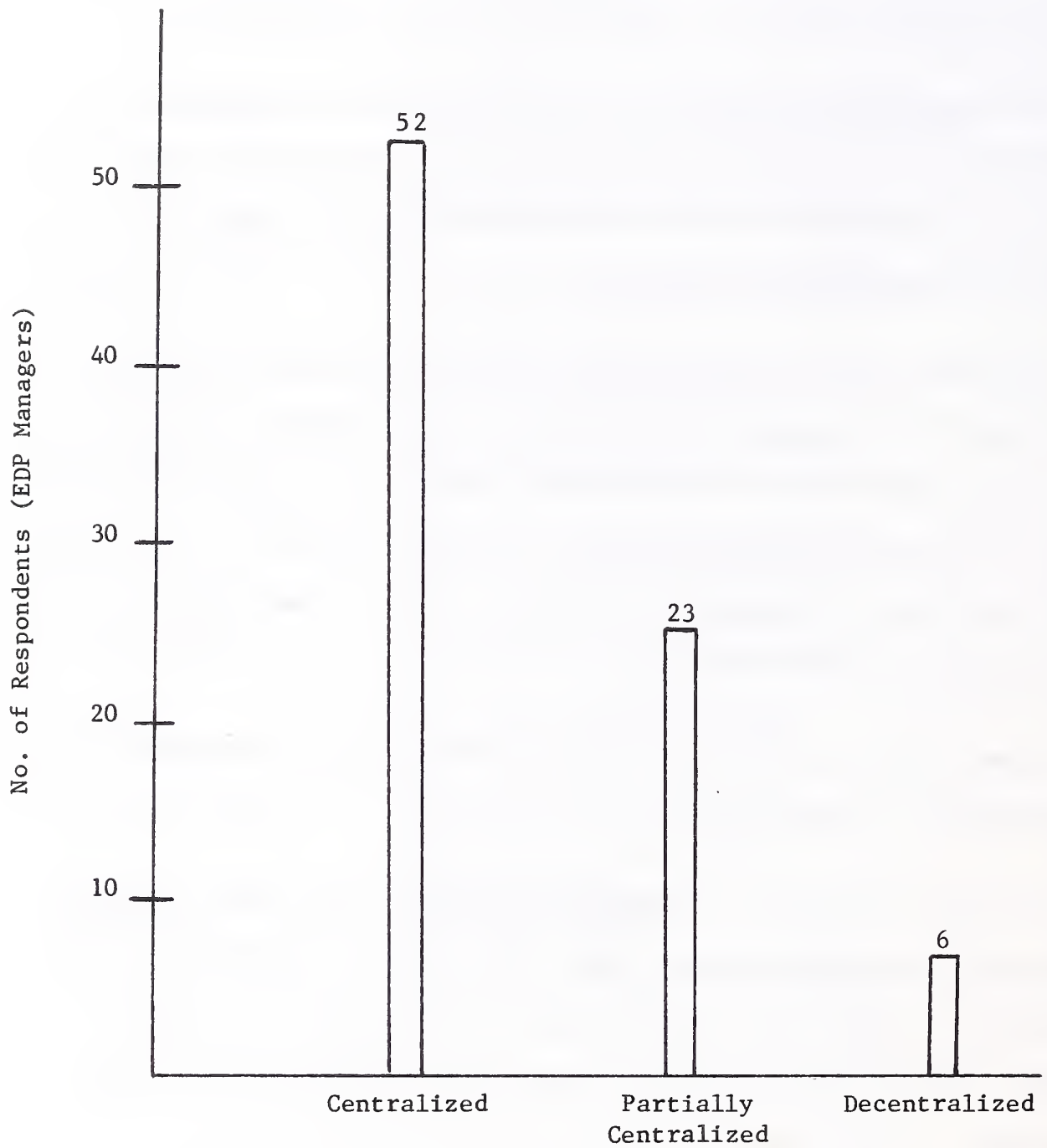


EXHIBIT III - 21

MAJOR COMPUTER SITES OPERATED BY RESPONDENTS

| Industry Sector | No. of Respondents | No. of Major* Computer Sites | |
|------------------------|--------------------|---------------------------------|------|
| | | 1976 | 1978 |
| Process Manufacturing | 11 | 43 | 48 |
| Discrete Manufacturing | 7 | 41 | 40 |
| Banking | 6 | 15 | 16 |
| Insurance | 8 | 12 | 14 |
| Diversified Financial | 6 | 12 | 13 |
| Retail | 7 | 17 | 11 |
| Transportation | 9 | 12 | 9 |
| Utilities | 10 | 20 | 17 |
| Federal Government | 7 | 50 | 51 |
| State/Local Government | 6 | 27 | 22 |
| Total | 77 | 249 | 241 |

* \geq IBM System/370 Model or Equivalent.

10% indicated a decrease. The actual number of such sites is expected to increase by 25% by 1978 as shown in Exhibit III - 22.

- As expected, the number of minicomputer sites shows the most rapid gain over the next two years as shown in Exhibit III - 23. The number of minicomputer sites (not installations) is expected to increase by almost 150% in this period by respondents.
- The large gain, however, comes primarily from a few respondents; one process manufacturer with 15 mini sites expects to have 200 by 1978, a discrete manufacturer with 10 sites now expects to have 250 by 1978, and a retailer with 13 mini sites expects to have 100 by 1978. Discounting these three, the respondents reported a 50% increase in the number of sites by 1978.
- Only 60% of respondents could give figures for the number of mini-computer sites in their organizations in 1976 and estimates for 1978. In many cases the 1976 figures were estimates; answers such as 'a lot', 'many', 'a multitude' were fairly common.

MINOR COMPUTER SITES OPERATED BY RESPONDENTS

| Industry Sector | No. of Respondents | No. of Minor* Computer Sites | |
|------------------------|--------------------|---------------------------------|------|
| | | 1976 | 1978 |
| Process Manufacturing | 7 | 60 | 57 |
| Discrete Manufacturing | 6 | 53 | 56 |
| Banking | 8 | 37 | 41 |
| Insurance | 8 | 11 | 15 |
| Diversified Financial | 6 | 2 | 11 |
| Retail | 6 | 22 | 29 |
| Transportation | 8 | 11 | 18 |
| Utilities | 8 | 8 | 11 |
| Federal Government | 5 | 136 | 181 |
| State/Local Government | 7 | 22 | 37 |
| Total | 69 | 362 | 456 |

* < IBM System/370 Model 135 Equivalent.

EXHIBIT III - 23

MINICOMPUTER SITES OPERATED BY RESPONDENTS

| Industry Sector | No. of Respondents | No. of Mini-computer Sites | |
|------------------------|--------------------|----------------------------|------|
| | | 1976 | 1978 |
| Process Manufacturing | 6 | 49 | 256 |
| Discrete Manufacturing | 4 | 37 | 314 |
| Banking | 6 | 41 | 81 |
| Insurance | 4 | 61 | 68 |
| Diversified Financial | 5 | 55 | 63 |
| Retail | 4 | 19 | 112 |
| Transportation | 6 | 10 | 15 |
| Utilities | 8 | 32 | 37 |
| Federal Government | 4 | 156 | 169 |
| State/Local Government | 5 | 53 | 148 |
| Total | 52 | 513 | 1263 |

E. SYSTEMS SOFTWARE

- In 1977, an extremely significant percentage of large organizations will upgrade or change operating systems in order to accommodate a much greater on-line workload.
- Out of the approximately 79 installations with large-scale IBM equipment who responded to the question concerning system software changes, 38 sites (48%) are upgrading from OS to VS (10 sites) or VS to MVS (28 sites).
- Out of the same sample, 12 sites have already installed MVS. Thus, a total of 63% of the sample is prepared for or is preparing for heavy EDP usage on networks.
- The Banking sector tends to be the most advanced overall, with Insurance second. The Retail sector appears to be the least advanced.

F. OUTSIDE SERVICES

- The distribution of expenditures for each category of Outside Services by industry sector is given in Exhibit III - 24. This section discusses some of the ramifications of the budget figures by type of service.

1. REMOTE COMPUTING SERVICE (RCS)

- Remote Computing Services include timesharing, remote batch, and data base inquiry services. It is the largest category representing 43% of the total volume of Outside Services.
- The bulk of the \$988M to be spent on RCS in 1977 will come from time-sharing services, perhaps as much as 70%. Approximately \$150M, 15%, will come from data base inquiry services (\$85M in stock quotations) and the balance in remote batch.
- The Federal Government will account for over 20% of RCS expenditures. This total can be expected to increase when the GSA Teleprocessing Services contracting program is completed in mid-1977.
- The Manufacturing industries account for nearly 35% of RCS expenditures. Most of this goes for timesharing services utilized by departments outside of one central EDP group such as engraving, R&D, etc.
- The financial group (Insurance, Banking, and Diversified Financial) accounts for 23% of expenditures, about \$225M. Half of their total goes for data base inquiry services. Timesharing services are used heavily for financial analysis, reporting and planning.

EXHIBIT III - 24

EDP EXPENDITURES
FOR
OUTSIDE SERVICES
BY INDUSTRY SECTOR IN 1977

| INDUSTRY SECTOR | EXPENDITURES (\$M) | | | | | | | '76 - '77 Growth Rate (%) |
|------------------------|--------------------|-----|-------|-------------------|----------------|-----------|-------|---------------------------|
| | RCS | FM | BATCH | SOFTWARE PRODUCTS | PROF. SERVICES | EDUCATION | TOTAL | |
| INSURANCE | 56 | 31 | 11 | 13 | 30 | 6 | 146 | 11.5 |
| DIV. FINANCIAL | 80 | 2 | 3 | 5 | 8 | 3 | 101 | 21.7 |
| BANKING | 91 | 75 | 10 | 29 | 28 | 7 | 240 | 20.6 |
| RETAIL | 44 | 2 | 6 | 2 | 6 | 1 | 61 | 7.0 |
| DISCRETE MFG. | 167 | 7 | 36 | 36 | 60 | 19 | 325 | 14.4 |
| PROCESS MFG. | 171 | 8 | 18 | 24 | 31 | 20 | 272 | 15.7 |
| TRANSPORTATION | 43 | 7 | 10 | 12 | 10 | 2 | 84 | 10.5 |
| UTILITIES | 115 | 7 | 11 | 17 | 29 | 4 | 183 | 10.9 |
| FEDERAL GOVERNMENT | 200 | 225 | 48 | 49 | 305 | 9 | 836 | 18.1 |
| STATE/LOCAL GOVERNMENT | 21 | - | 7 | 6 | 25 | 1 | 60 | 17.6 |
| TOTAL, ALL SECTORS | 988 | 364 | 160 | 193 | 532 | 70 | 2308 | 16.0 |
| % OF TOTAL | 43 | 16 | 7 | 8 | 23 | 3 | 100 | |
| GROWTH RATE (%) | 20 | 12 | 9 | 20 | 14 | 11 | | |

- The Retail industry uses RCS primarily for credit checking via services offered by such firms as TRW Creditdata.

2. FACILITIES MANAGEMENT (FM)

- As would be expected, most large firms prefer to handle EDP in-house. Exceptions are the Federal Government, Banking and Insurance industries; the former because of the A-76 circular which suggests that government agencies should go to the private sector wherever possible. The Banking and Insurance industries are major buyers of FM because they have difficulty in attracting and keeping qualified EDP personnel.
- All other industry markets among large companies for FM are functional. They are, in most cases, made up of single or very few contracts, each of which should be considered as a 'target of opportunity' rather than a cohesive market.

3. BATCH SERVICES

- The market for Batch Services is \$160M, 7% of the total spent for outside services. It will grow at approximately 9% this year among the large firms.
- 64% of the Batch Services total volume comes from the Manufacturing and Federal Government sectors, where it is used primarily for the following reasons:

- Solution of large scale structural analysis problems using big computers, such as CDC 7600s.
- Overflow processing when users' requirements exceed their peak capacity.
- Processing of administrative applications in remote locations where the in-house EDP facility doesn't reach. (Decreasing with the spread of on-line processing capability).
- Computer Output Microfilm (COM)

4. SOFTWARE PRODUCTS

- The organizations represented by our sample will spend \$193M in 1977 for Software Products, 8% of the total expenditures for Outside Services. This category includes both systems and applications packages.
- The Software Products category will enjoy a 20% growth rate in 1977. Most large companies are very receptive to outside purchases of software. Many companies who would not entertain using any other form of Outside Service were completely open to buying packaged software.
- A large percentage of IBM users that were using IMS and/or other IBM supplied software for data base management stated they were very unhappy with IMS' performance and were actively seeking other packages. A number already were using other systems, notably ADABAS

and TOTAL. Data Base Systems would thus appear to be an excellent opportunity area.

5. PROFESSIONAL SERVICES

- The Professional Services category covers EDP consulting, network/communications systems design, programming, EDP planning and evaluation, etc., wherein the user is effectively purchasing the time of skilled EDP personnel. Next to RCS, this is the largest category of Outside Services. Large users will spend \$532M in 1977, a 14% growth over 1976.
- 57% of all expenditures for this category come from the Federal Government. This stems from freezes on hiring which forces agencies to go outside as their requirements increase. If the Carter administration changes present policies, it could substantially impact government purchase of services in this category.
- Purchase of Professional Services in the commercial sector varies significantly by industry. Banks, Insurance companies, and Utilities average spending in the vicinity of \$500K/year/company. These industries have difficulty in hiring EDP personnel. The Manufacturing and Transportation sectors, on the other hand, have relatively less difficulty in attracting skilled people and average spending about \$200K/year/company. At today's rates, this is only about 4-6 man-years of effort.

6. EDUCATION

- The Education category covers both outside seminars and in-house training courses. It is the smallest category, representing only 3% of total expenditures for Outside Services - a total of \$70M in 1977.
- On a per organization basis, expenditures in this category range from a low of \$20,000 in the Retail sector to a high of \$140,000 in the Banking sector.
- The Education category will grow at a modest 11%.

G. COMMUNICATIONS SOURCES

- The responses to the survey showed that the vast majority of data communication needs is served by the Bell System. Out of 75 respondents who answered the question about communications sources, 63 (84%) said that the Bell System supplied 100% of their data communications requirements.
- INPUT contacted an AT&T representative with this information. The representative stated that these results were not consistent with the information that AT&T knew to be true -- which is that AT&T is losing a substantial amount of the data communications business from large companies. He further stated that AT&T's "losses" were greatest in the Banking sector followed by Manufacturing. INPUT was unable to obtain quantitative data on the amount of AT&T's "lost" business.

H. EDP MANAGERS RESPONSIBILITIES

- EDP Managers were asked what procurement responsibilities they (or their departments) had for procurement of communications services, automated office equipment, minicomputers, remote computing services, and other non-EDP functions.
- Very few EDP Managers had responsibility for voice communications, although 60% had responsibility for data communications.
- The Transportation and Retail industries were exceptional in that the EDP group controlled all communications, voice and data, in about 50% of the cases.
- In general, the central EDP groups have broad responsibility for all automated equipment purchases wherever operations are tightly centralized, such as found in banks and insurance companies. Where operations are dispersed such as in the Manufacturing sectors, central EDP groups are responsible only for their own immediate requirements.

I. IMPORTANT NEW DEVELOPMENTS

● EDP Managers were asked to list what they thought were the most important new developments. Only 60% of the respondents answered the question. Of those that did, few common responses were given. The following list summarizes those items that were mentioned by three or more respondents:

| <u>Development</u> | <u>No. of Mentions</u> |
|-----------------------------------|------------------------|
| Communications Technology Related | 9 |
| S.D.L.C. | 6 |
| Mini/Microcomputer Technology | 5 |
| Competition to IBM | 5 |
| Competition to Bell | 3 |
| Distributed Processing | 3 |

J. PROBLEMS

● EDP Managers were asked what were the most significant problems facing them. Again, there were almost as many answers as respondents. A few areas, however, were mentioned more than once. These are listed as follows:

| <u>Problems</u> | <u>No. of Mentions</u> |
|---|------------------------|
| Communications/Line Protocol | 8 |
| Reliability | 7 |
| Data Base Management | 5 |
| Cost | 4 |
| Political (Government Respondents Only) | 4 |
| No Alternatives to IBM | 4 |
| Programmer Productivity | 4 |
| Keeping Abreast of EDP | 3 |

K. PLANNING FUNCTION

- EDP Managers were asked if their companies had established a formal planning organization for EDP at the corporate level. Forty out of eighty respondents (50%) said they had. This result is astonishing, given the huge EDP budgets of companies in our sample.
- All of the very large federal agencies interviewed had planning functions.
- Commercial sectors were all about 50/50 split between those with planning and those without.

IV. RESULTS OF THE SURVEY --
INDIVIDUAL SECTOR ANALYSIS

IV. RESULTS OF THE SURVEY - - INDIVIDUAL SECTOR ANALYSIS

● This section contains separate reports on the results of the interview program for each sector. Each subchapter in this section is organized in three parts:

- An industry summary containing key points of general interest.
- A quantitative expenditure analysis consisting of a single chart containing 1976 and 1977 figures for each expenditure category.
- A consolidated interview summary of the answers given by respondents to specific questions asked in the survey.

● Subchapters are as follows:

- A. LIFE INSURANCE
- B. DIVERSIFIED FINANCIAL
- C. BANKING
- D. RETAIL
- E. DISCRETE MANUFACTURING
- F. PROCESS MANUFACTURING
- G. TRANSPORTATION
- H. UTILITIES
- I. FEDERAL GOVERNMENT
- J. STATE/LOCAL GOVERNMENT

A. LIFE INSURANCE

- EDP expenditures for the life insurance industry (top 50 companies) will increase 8% from \$700M to \$756M. The average large firm will spend \$15M on EDP in 1977.
- EDP is an important management concern. Obtaining sufficient return on the EDP investment, however, appears to be a key industry issue.
- A major driving force occurring in the industry is the movement towards more on-line services. Over 70% of the \$24M increase in expenditures for equipment will go for terminals and data communications. A stated industry objective is "a terminal in every office".
- Most large insurance firms are implementing large, centrally controlled hierarchial networks. In the post-1977 time frame, distributed processing will be introduced.
- The industry is generally receptive to using outside services. The major items purchased outside are timesharing and professional services. Outside services presently account for nearly 20% of total EDP expenditures. A major factor influencing use of outside services is difficulty in attracting and holding qualified personnel.
- Most significant problems are:
 - lack of standards
 - implementation of remote computing.

- Insurance industry EDP managers generally have broad company-wide responsibilities for communications and office machine procurement.

EXHIBIT IV - 1

EXPENDITURE ANALYSIS

SECTOR: LIFE INSURANCE
('Fortune 50' Only)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|-----------------------------|-------------------------|---------------|------------|-------------------------|
| | | (\$M) | % of Total | |
| Total EDP Expenditures | 700 | 756 | 100 | 8 |
| Equipment (Total) | 212 | 236 | 31 | 11.3 |
| - Main Processors | 66 | 69 | 9 | 5 |
| - Secondary Processors | 10 | 11 | 1 | 10 |
| - Peripherals | 66 | 69 | 9 | 5 |
| - Terminals | 35 | 49 | 6 | 40 |
| - Data Comm. Equipment | 9 | 12 | 2 | 30 |
| - Data Entry | 26 | 26 | 3 | 0 |
| Outside Services (Total) | 131 | 146 | 19 | 11.5 |
| - Remote Computing Services | 48 | 56 | 7 | 17 |
| - Facilities Management | 30 | 31 | 4 | 3 |
| - Batch Services | 11 | 11 | 1 | 0 |
| - Software Products | 11 | 13 | 2 | 15 |
| - Professional Services | 26 | 30 | 4 | 15 |
| - Education | 5 | 6 | 1 | 12 |
| - Personnel | 287 | 296 | 39 | 3 |
| - Other | 70 | 78 | 10 | 12.0 |

| | |
|--|--------------------------------------|
| <p>INTERVIEW SUMMARY</p> <p>RESPONDENTS:</p> | <p>INSURANCE</p> <p>2 EXECUTIVES</p> |
| <p>INDUSTRY AND GENERAL ECONOMIC TRENDS</p> <p>Respondents foresee a slight upturn in the insurance industry and forecast growth rates of 6-10% for their companies.</p> | |
| <p>ROLE OF EDP</p> <p>One executive felt that EDP was a major factor in his company's growth and ranked it "very important" in corporate consideration. He also believes EDP provided distinct competitive advantages. The other executive said that EDP did not contribute to company growth but was still an important corporate consideration.</p> | |
| <p>TOP MANAGEMENT CONCERNS ABOUT EDP</p> <p>In one case the company had just made a substantial investment in EDP. The chief concern was whether they would obtain sufficient payback on the investment. In the second case, this investment was just beginning and management is concerned about its future impact on operations and profitability.</p> <p>Oddly enough for the insurance industry, none of the respondents singled out data security as a concern of special significance.</p> | |
| <p>EDP BUDGETS</p> <p>In all cases, restrictions had been placed on EDP expenditures due to the recession. Executives said these were beginning to be lifted or removed in part. EDP budget increases '76-'77 were expected to range from 5-10%.</p> | |
| <p>ATTITUDES TO USING OUTSIDE SERVICES</p> <p>One executive said his company was "going to more of that" because of an inability to obtain qualified people. The other respondent said that hardware should be in-house but he had no aversion to using outside software.</p> | |

| | |
|--|----------------|
| INTERVIEW SUMMARY | INSURANCE |
| RESPONDENTS: | 8 EDP MANAGERS |
| <p>EDP BUDGET GROWTH Growth rate estimates for the '76-'77 period ranged from 0% to 25%. Beyond '77, respondents were reluctant to forecast budgets although most indicated they believed their companies/business would grow at an average of 10% per year.</p> <p>EDP CONTROL Most indicated control was completely centralized. In no cases was control fully decentralized. Only one respondent said that the number of major system sites would change in the '76-'78 period.</p> <p>Most significantly, 7 out of 8 respondents stated that substantial increases in minor processors and minicomputers were anticipated by 1978 indicating rapid growth of hierarchical network development.</p> | |
| <p>CHANGES IN EDP SPENDING PATTERNS The greatest changes will be for terminals and data communications equipment. Several reported increases as high as 100%. This follows from plans to develop on-line access at the field office level. Data entry expenditures will decrease substantially because more data will be captured at the terminal level. Most users reported only small increases in budgets for main and secondary processors and peripherals. The one exception occurred because of conversion from FM to in-house.</p> | |
| <p>OPERATING SYSTEMS Three out of eight respondents are planning to convert to MVS. Two were already using it. The rest were "arguing about it".</p> <p>Only one respondent expected to change network software next year from BTAM to VTAM. Two had no network and two used custom systems.</p> | |
| <p>DATA BASE MANAGEMENT SYSTEMS Two users have TOTAL, 1 uses ADABAS, two use their own systems, and two use none at all. None of the users expect to change in the next year.</p> | |

INTERVIEW SUMMARY

INSURANCE

RESPONDENTS:

8 EDP MANAGERS (Cont)

APPLICATIONS

Short-term, all the respondents are working on industry specialty applications, such as claim servicing and administration, financial reporting, corporate pension systems, and underwriting services. Most indicated installation or expansion of on-line services as major goals, both short and longer terms.

MAJOR SITE ACQUISITION

Straight purchase and depreciated purchase plans were most commonly encountered in the insurance sector. Only three respondents used vendor leases, and only one used any third party leasing. No changes anticipated.

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

Only two respondents used outside processing services. Both were timesharing services and both spent substantial amounts (\$3M and \$1.14M). Only one used any remote batch services (less than \$100K).

One used FM and was in the process of converting to in-house. None of the other respondents would consider FM.

Most users spent small amounts for outside systems and applications software packages. Substantial changes were not anticipated.

Only one user used outside programming services to the tune of \$1.7M annually. However, he expected this to decrease to \$250K next year. This same user spent \$1.4M annually for outside batch services, and he expected this to increase by 20% next year.

The insurance industry EDP managers were generally receptive to using outside services. One user, typifying the response to this question stated succinctly - "its a straight bottom line make or buy decision".

OUTSIDE SERVICES USAGE BY OTHER DEPARTMENTS

75% of the EDP managers said outside services were in fairly wide use by other departments within their companies. Most of the outside purchases known to the managers were for software and timesharing. Applications mentioned were actuarial, market and corporate planning, and investment analysis.

INTERVIEW SUMMARY

INSURANCE

RESPONDENTS:

8 EDP MANAGERS (Cont)

EDP MANAGERS RESPONSIBILITIES OUTSIDE CENTRAL EDP

50% of the EDP managers controlled the entire communications budget. The balance controlled only data communications.

All of the managers except one said their departments were responsible for procurement of minicomputers/turnkey systems.

60% have responsibility for purchasing office computers.

7 of 8 respondents have full responsibility for procurement of outside services throughout their companies.

COMMUNICATIONS SOURCES

All used the Bell Systems. One company said 5% of its traffic was handled via a value-added carrier.

MOST IMPORTANT NEW DEVELOPMENTS

No common thread could be discerned from the respondents.

One mentioned AMDAHL.

One mentioned increased capacity.

One mentioned 9600 BAUD Transmission.

MOST SIGNIFICANT PROBLEMS

The standout problem mentioned by half of the respondents was the lack of standards in equipment, communications, and systems. One user singled out line costs as his most significant problem. Another mentioned the human element. Two users mentioned that IBM needed more competition and that they resented being locked into one vendor.

NEAR TERM OBJECTIVES

Half the respondents said their most pressing short term objective was to establish or increase on-line remote computing capabilities; the principal applications are data base storage and retrieval oriented.

B. DIVERSIFIED FINANCIAL

- EDP expenditures for the Diversified Financial group of 50 companies will increase 9% from \$680M to \$739M. The average firm will spend \$15M on EDP in 1977.
- EDP is considered very important by top management who believes that it plays a major role in their firm's growth and provides them with competitive advantages.
- The industry is not generally receptive to the use of outside services. A major exception is the use of financial inquiry (stock quotation) services by those firms with substantial brokerage or investment businesses. The use of these services accounts for the bulk of remote computing services as shown in Exhibit IV - 3.
- The more sophisticated companies have begun or are planning to install distributed processing systems.
- Data security is a top ranked issue, along with EDP costs. Improving price/performance is the number one management objective.
- In general, EDP control is centralized. Central EDP managers control all outside expenditures.

EXHIBIT IV - 3

EXPENDITURE ANALYSIS

SECTOR: DIVERSIFIED FINANCIAL
('Fortune 50' Only)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 |
|-----------------------------|-------------------------|---------------|------------|-------------|
| | | (\$M) | % of Total | % Change |
| Total EDP Expenditures | 680 | 739 | 100 | 9 |
| Equipment (Total) | 184 | 196 | 27 | 6.5 |
| - Main Processors | 57 | 60 | 8 | 5 |
| - Secondary Processors | 9 | 11 | 1 | 20 |
| - Peripherals | 57 | 60 | 8 | 6 |
| - Terminals | 30 | 33 | 4 | 10 |
| - Data Comm. Equipment | 8 | 10 | 1 | 20 |
| - Data Entry | 23 | 22 | 3 | 6 |
| Outside Services (Total) | 83 | 101 | 14 | 21.7 |
| - Remote Computing Services | 65 | 80 | 11 | 25 |
| - Facilities Management | 2 | 2 | Neg. | 0 |
| - Batch Services | 3 | 3 | Neg. | 5 |
| - Software Products | 4 | 5 | 1 | 16 |
| - Professional Services | 6 | 8 | 1 | 25 |
| - Education | 3 | 3 | Neg. | 8 |
| - Personnel | 311 | 330 | 44 | 6.1 |
| - Other | 102 | 112 | 15 | 9.8 |

INTERVIEW SUMMARY

DIVERSIFIED FINANCIAL

RESPONDENTS:

4 EXECUTIVES

INDUSTRY AND GENERAL ECONOMIC TRENDS

Executives foresee healthy growth for their industry. One mentioned an AAGR of 10%.

ROLE OF EDP

More than any other industry group, executives felt that EDP plays a major role in their organizations' growth. All executives ranked EDP as Important or Top Priority in corporate considerations. They are also unanimous in declaring that EDP provided their companies with competitive advantages.

TOP MANAGEMENT CONCERNS ABOUT EDP

Executives appeared concerned with their company's ability to "keep up". For example, one said he was extremely concerned about being able to participate in EFTS. Another said "I hope we can catch up with the EDP Industry".

Data Security ranked as the number one issue among all executives. Others singled out as important were EDP costs, Applications, and Network developments.

EDP BUDGETS

Three out of four executives said their companies' EDP Budgets grew about 10% in '75-'76. Only one commented on '76-'77. He expected 15%.

Three of the four executives interviewed said no restrictions were placed on EDP budgets due to the recession. The other indicated that some restrictions had been put into effect and were being lifted in 1976.

ATTITUDES TO USING OUTSIDE SERVICES

Three out of four respondents were opposed to using outside services. The fourth said he "would consider it".

None of the Executives would consider FM or a Computer Utility.

| | |
|--|-----------------------|
| INTERVIEW SUMMARY | DIVERSIFIED FINANCIAL |
| RESPONDENTS: | 6 EDP MANAGERS |
| <p>EDP BUDGET GROWTH</p> <p>Budget changes in '76-'77 were widely distributed in our sample. Two respondents forecast 15%, one 8%, one 2% and two didn't know yet. One of those who didn't know said that salaries would go up 15% next year. All of the managers said their budgets were geared to their company's growth rate.</p> <p>EDP CONTROL</p> <p>All of the managers said that control of EDP operations is completely centralized. One respondent (with a \$40M annual EDP budget) said he would be adding two major computers by 1978. The others expected no change. A significant increase in the number of secondary processors is anticipated by only one of the respondents.</p> <p>One respondent presently has an FM contract. This contract will be eliminated and all EDP brought in-house. However, the manager said he was not certain when this would occur.</p> | |
| <p>CHANGES IN EDP SPENDING PATTERNS</p> <p>Only one of the respondents who is upgrading to a 168 expected significant increases in main processor and peripheral expenditures. Three of the managers forecast 25% increases in expenditures for secondary processors. The new 168 site manager also expected dramatic increases in data communication expenditures.</p> | |
| <p>OPERATING SYSTEMS</p> <p>Five out of the six respondents use OS, one DOS. The DOS site will change to OS next year.</p> <p>Two of the OS sites will install MVS.</p> <p>Four sites use CICS for network software. One site will change to CICS next year.</p> | |
| <p>DATA BASE MANAGEMENT SYSTEMS</p> <p>Two sites have no system. One site uses IMS but is considering changing. The other sites have in-house or non-vendor proprietary packages.</p> | |
| <p>APPLICATIONS</p> <p>Three sites are working on expanding or enhancing their distributed processing capability. Most other reported current applications dealt with financial reporting and loan processing. One respondent mentioned processing of physician's malpractice claims.</p> | |

INTERVIEW SUMMARY

DIVERSIFIED FINANCIAL

RESPONDENTS:

6 EDP MANAGERS (Cont)

APPLICATIONS (Cont)

Five out of six respondents said they had no feel for new applications longer term ('78-'81). The other suggested EFTS.

MAJOR SITE ACQUISITION

Respondents showed a preference for third party leasing plans. One respondent (the biggest in our sample) used all five procurement methods. One respondent purchased all his equipment outright.

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

Two companies said they used outside timesharing services. This was the only use of outside remote processing in our sample. One of the two spent \$500K in '76 and expects to double it next year.

One company has an FM contract but plans to drop it. No others plan to use FM.

Most of the respondents spend relatively minor sums on outside systems software. Four out of the six said they spend \$100K or more annually on applications software.

Only one company (the largest) uses much outside programming services - \$500K/year.

Two respondents use some outside batch services. One planned to eliminate it next year.

With one exception, EDP Managers were negative about using any outside services except purchased software. The exception was the largest company.

OUTSIDE SERVICES USAGE BY OTHER DEPARTMENTS

Three managers who said other departments EDP expenditures were not controlled by the central EDP group stated that EDP services were not being purchased by other departments. Those who did have control of the total EDP Budget company-wide said that some outside timesharing services were being used by other departments. The main applications mentioned were actuarial and investment management.

INTERVIEW SUMMARY

DIVERSIFIED FINANCIAL

RESPONDENTS:

6 EDP MANAGERS (Cont)

EDP MANAGERS RESPONSIBILITY OUTSIDE CENTRAL EDP

50% of the respondents said the EDP Department had control over all communications. The other 50% controlled data communications only.

100% of the respondents said their departments controlled all minicomputer/turnkey systems procurement.

50% said they controlled office computer procurement.

COMMUNICATIONS SOURCES

Two sites have no network. Three use the Bell System for 100% of their data communication. One uses Bell for 80% of its traffic, and an SCC for the rest.

MOST IMPORTANT NEW DEVELOPMENTS

Two of the managers interviewed said they couldn't think of any.

One mentioned digital communications and SDLC.

One mentioned AMDAHL.

One mentioned the 138/148 announcement.

One mentioned APS.

MOST SIGNIFICANT PROBLEMS

One of the more interesting answers to this question was supplied by the manager of the largest company in our sample. He said "the minicomputer area - it is difficult for a centralized processing company dependent on generalized systems to gear up to deal with people who can handle a problem from start to finish". This respondent also mentioned difficulty in migrating to MVS.

Three respondents mentioned reliability. One mentioned costs.

NEAR TERM OBJECTIVES

Most managers stressed improving price/performance for existing applications as the major short-term objective. Three mentioned distributed processing enhancement or installation.

Only two of the respondents said they had a formal EDP planning function.

C. BANKING

- EDP expenditures for the top 50 banks will increase 12% from \$800M to \$892M. The average bank will spend nearly \$18M for EDP in 1977.
- EDP is generally considered important by bank management. It is vital to banking operations, since no contemporary bank can function today without EDP.
- The major EDP issue facing banks today is EFTS.
- Most banks are installing or significantly expanding the use of on-line terminals and on-line applications. Expenditures for terminals are expected to rise 50% from 1976 to 1977. Expenditures for data communications equipment and small computers used for satellite processing or data concentration will rise 35% and 30% respectively.
- Banks are among the largest users of outside services. The average large bank will spend \$4.8M in 1977 for outside services.
- EDP operations in banks are, for the most part, centralized. EDP managers also control expenditures for outside services and data communications.
- Programmer productivity was identified as the most pressing problem. In general, banks have difficulty in motivating and keeping EDP personnel. The industry's pay scales are lower than most, and the conservative nature of banking management is frequently at odds with the attitude of people from the EDP industry. Thus, banks go outside for much of their EDP needs.

EXHIBIT IV - 5

EXPENDITURE ANALYSIS

SECTOR: BANKING
('Fortune 50' Only)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|-----------------------------|-------------------------|---------------|------------|-------------------------|
| | | (\$M) | % of Total | |
| Total EDP Expenditures | 800 | 892 | 100 | 12 |
| Equipment (Total) | 240 | 284 | 32 | 18.3 |
| - Main Processors | 70 | 77 | 9 | 10 |
| - Secondary Processors | 7 | 9 | 1 | 30 |
| - Peripherals | 65 | 69 | 8 | 6 |
| - Terminals | 51 | 77 | 9 | 50 |
| - Data Comm. Equipment | 14 | 19 | 2 | 35 |
| - Data Entry | 33 | 33 | 4 | 1 |
| Outside Services (Total) | 199 | 240 | 27 | 20.6 |
| - Remote Computing Services | 73 | 91 | 10 | 25 |
| - Facilities Management | 62 | 75 | 8 | 21 |
| - Batch Services | 9 | 10 | 1 | 10 |
| - Software Products | 25 | 29 | 3 | 16 |
| - Professional Services | 24 | 28 | 3 | 15 |
| - Education | 6 | 7 | 1 | 17 |
| - Personnel | 280 | 280 | 31 | 0 |
| - Other | 80 | 88 | 10 | 10.0 |

| | |
|---|--------------|
| INTERVIEW SUMMARY: | BANKING |
| RESPONDENTS: | 3 EXECUTIVES |
| <p>INDUSTRY AND GENERAL ECONOMIC TRENDS Bank executives seemed to feel that banking would grow faster than the economy in general. One executive said 10-12% from '76 into the foreseeable future.</p> | |
| <p>ROLE OF EDP All three executives gave different answers. One said 'major', one 'minor', and one 'medium'. All felt that EDP was an important corporate consideration. Two of the respondents said that EDP was a definite factor in providing competitive advantages. The third executive said "It might, as we move along".</p> | |
| <p>TOP MANAGEMENT CONCERNS ABOUT EDP All executives' principal concern about EDP is its cost. One specifically mentioned that he was very concerned about the effect that electronic banking would have on the cost of EDP over the next several years.</p> <p>Other issues singled out as areas of particular concern are data security, people availability and technology development.</p> <p>When asked about specific EDP objectives, one executive replied "a three second response time to any on-line inquiry".</p> | |
| <p>EDP BUDGETS All executives foresee EDP budgets growing at between 5-10% per year for the next several years.</p> | |
| <p>IMPACT OF ECONOMIC RECOVERY One executive said his bank had not placed any restrictions because of the recession. The other two executives said that restrictions had been imposed and were still in effect.</p> | |
| <p>ATTITUDE TO USING OUTSIDE SERVICES One executive was virulently opposed to it. One executive said it was reviewed for each application. One executive said the "bottom line is our only concern - in other words, go do it if it's cheaper".</p> | |

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| INTERVIEW SUMMARY: | BANKING |
| RESPONDENTS | 8 EDP MANAGERS |
| <p>EDP BUDGET GROWTH</p> <p>The 1975-1978 period is a time of substantial change for four out of the eight banks interviewed. For this group, budget increases as high as 25% per year were projected. The four other banks projected budget increases of from 0-10%. The largest bank interviewed (one of the top three) with an annual budget of \$40M, said the EDP budget would grow at 6% per year. Only one manager expected the EDP budget to grow at less than the corporate rate.</p> | |
| <p>EDP CONTROL</p> <p>Two of the respondents said their operations were partially centralized. The rest said they were completely centralized or nearly so. No changes in the number of major processor sites was expected by any of the banks, although one bank planned to upgrade to larger processors. Four banks expected substantial increases in the number of minicomputer-based turnkey systems.</p> | |
| <p>EXPENDITURE CHANGES</p> <p>Five out of the eight managers did not expect that expenditures for main processing equipment would change; the rest showed only modest increases. 50% of the sample indicated that secondary processor expenditures would rise dramatically.</p> <p>Seven out of eight banks will see increases of from 10% to 150% for terminals. Data communications equipment expenditures will also increase in each case, although somewhat less than for terminals. All other equipment categories were relatively flat.</p> | |
| <p>OPERATING SYSTEMS</p> <p>Of the eight banks interviewed, four were using MVS, and four OS. All of the OS sites will be changed to MVS.</p> <p>Four banks use custom network software. The other four used different vendor-supplied systems. None expected any major changes.</p> | |

INTERVIEW SUMMARY:

BANKING

RESPONDENTS:

8 EDP MANAGERS (Cont)

DATA BASE MANAGEMENT SYSTEMS

Four banks use IMS, two use in-house systems, one uses ADABAS and TOTAL, and one uses none at all. One of the banks that has an in-house system said changes were being studied. The rest of the respondents said no changes were being contemplated.

APPLICATIONS

Near term, three of the banks are working on POS/Retail Banking Applications. A host of other applications were mentioned by each bank. These are: commercial loan accounting, installment loans, trust fund management systems, federal book entry, security movement and control, funds transfer (correspondent), and "revenue-generating" systems.

Only three of the banks mentioned EFTS as a long-term consideration.

MAJOR SITE ACQUISITION

Acquisition methods for major site equipment were spread evenly among the banks interviewed between lease and purchase plans. No particular preference could be identified.

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

In marked contrast to other large companies, four of the large banks interviewed are substantial users of outside services.

Although none of the banks used Remote Batch Services, three were heavy timesharing users with outside annual expenditures ranging from \$1-\$2.5M. Two banks expected this to increase 20-25% next year.

Only one bank used FM for a small part of its operations (\$400K/year). None of the other banks would consider FM.

The banks interviewed are also significant buyers of software. One bank (the largest interviewed) spends \$.5M on systems packages and \$3M on applications, although the latter was expected to decrease to \$1M in 1977.

Three of the respondents said they used outside programming services in amounts ranging from \$150-500K per year.

INTERVIEW SUMMARY:

BANKING

RESPONDENTS:

8 EDP MANAGERS (Cont)

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT (Cont)

The use of outside batch services was insignificant.

Four banks spent large sums for education. One bank (not one of the largest) is spending \$500K in 1976 and expects this to increase next year.

OUTSIDE SERVICES USAGE BY OTHER DEPARTMENTS

All except one manager said other departments in his bank used outside processing services. All except one bank said the central EDP department had the authority for purchasing all outside remote processing services.

Other departments used both timesharing and remote batch services for a wide variety of applications. Some of those mentioned were leasing analysis, economic modelling, loan processing, credit card, and various controllership functions.

EDP MANAGERS RESPONSIBILITY OUTSIDE CENTRAL EDP

All of the managers except one had responsibility for data communications. None of the managers had any responsibility for communications other than data.

All the managers except one had partial or complete responsibility for minicomputer/turnkey systems purchases.

Only two of the managers had responsibility for procurement of office computers.

COMMUNICATIONS SOURCES

All of the banks except one used the Bell System for 100% of their data communications. The single exception (the largest bank interviewed) used the Bell System for 60% of its traffic and an SCC for 40%.

MOST IMPORTANT NEW DEVELOPMENTS

Only six managers answered this question. Two felt that on-line audio response systems were the most important. Two mentioned the microcomputer which led to lower cost, smarter terminals. One mentioned "competition to Bell". One mentioned the acceptance of the distributed processing concept.

INTERVIEW SUMMARY:

BANKING

RESPONDENTS:

8 EDP MANAGERS (Cont)

MOST SIGNIFICANT PROBLEMS

Five out of eight respondents cited programmer productivity as their most significant problem. One mentioned that educating users to utilize new systems was his biggest problem. One said deciding what to do in the face of proliferating new releases and products was his biggest headache. One said "hard to discern truth from fiction" in dealing with IBM!

NEAR TERM OBJECTIVES

Four managers had the installation of teleprocessing as their principal objective. The other responses had to do with cost control or reduction. One manager expressed this by saying he wanted to "replace operating expenses with capital expenses".

D. RETAIL

- EDP expenditures for the top 50 Retailers will increase 6% from \$475M to \$503M. The average firm will spend \$10M in 1977.
- The Retail industry spends less per revenue dollar on EDP than any other industry sector. Most retail management appears to feel that EDP is at best a painful, expensive necessity, although the very biggest firms have a much more positive attitude.
- The major force impacting EDP in the Retail industry is Point-of-Sale. Nearly all firms have DOS installed or are in the process of doing so. As a result, expenditures for terminal hardware are expected to grow 70% from 1976 to 1977.
- Most systems in use or being installed are highly centralized. One very sophisticated, very large user is installing a completely decentralized distributed processing system.
- The large retailers are not generally receptive to using outside services. Most of the outside services that are bought are used by departments outside the central EDP group. The relatively substantial amount of remote computing services shown in Exhibit IV - 7 is principally made up of on-line credit checking services.
- EDP managers in the Retail industry generally have broad responsibilities for all EDP and data communications related functions throughout their companies.

- The most significant problems are:
 - Difficulty in handling large data bases
 - Cost
 - Lack of standards.

EXHIBIT IV - 7

EXPENDITURE ANALYSIS

SECTOR: RETAIL
('Fortune 50' Only)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 |
|-----------------------------|-------------------------|---------------|------------|-------------|
| | | (\$M) | % of Total | % Change |
| Total EDP Expenditures | 475 | 503 | 100 | 6 |
| Equipment (Total) | 181 | 195 | 39 | 8 |
| - Main Processors | 64 | 69 | 14 | 8 |
| - Secondary Processors | 7 | 8 | 2 | 15 |
| - Peripherals | 58 | 52 | 10 | -10 |
| - Terminals | 22 | 37 | 7 | 70 |
| - Data Comm. Equipment | 9 | 12 | 2 | 30 |
| - Data Entry | 21 | 17 | 3 | -20 |
| Outside Services (Total) | 57 | 61 | 12 | 7 |
| - Remote Computing Services | 40 | 44 | 9 | 10 |
| - Facilities Management | 2 | 2 | Neg. | 0 |
| - Batch Services | 6 | 6 | 1 | 7 |
| - Software Products | 2 | 2 | Neg. | 10 |
| - Professional Services | 6 | 6 | 1 | 8 |
| - Education | 1 | 1 | Neg. | 10 |
| - Personnel | 200 | 207 | 41 | 3.5 |
| - Other | 37 | 40 | 8 | 8.1 |

EXHIBIT IV - 8A

INTERVIEW SUMMARY:

RETAIL

RESPONDENTS:

3 EXECUTIVES

INDUSTRY AND GENERAL ECONOMIC TRENDS

All respondents foresee a continuation of the economic recovery at least through '77. Two executives believed their companies would grow faster than their industries as a whole. Only one respondent ventured to forecast a growth rate for the next couple of years - 6%.

ROLE OF EDP

None of the respondents believed that EDP was a contributor to company growth, although all felt that EDP was an important corporate consideration. Only one executive (from a major department store chain) said that EDP provided his company with competitive advantages.

TOP MANAGEMENT CONCERNS ABOUT EDP

All of the three respondents were concerned about cost - one said EDP was "growing like Topsy". People availability was also singled out as an area of major concern.

EDP BUDGETS

Two respondents said restrictions had been placed on EDP budgets during the recession. Of these, one said the restrictions were still in place and one said they had been lifted. EDP Budget increases for '76-'77 were rated as "modest" to 10%.

ATTITUDES TO USING OUTSIDE EDP SERVICES

The executives showed a distinct preference for in-house operations. One stated it was "not practical" to go outside because of the complexity of the systems in use. Another saw using outside services only as a last resort.

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| <p>INTERVIEW SUMMARY:</p> <p>RESPONDENTS:</p> | <p>RETAIL</p> <p>9 EDP MANAGERS</p> |
| <p>EDP BUDGET GROWTH</p> <p>Three out of nine managers expected 10% increases in their '76-'77 budget. The balance of our sample reported 5% or less growth. Only one manager (from a major chain) seemed to have any idea of industry or company growth rates. He stated 8% for both. Most managers, however, anticipated that their EDP budgets would grow more slowly than their company's as a whole.</p> | |
| <p>EDP CONTROL</p> <p>Seven out of nine respondents said their EDP operations were completely centralized. One was partially centralized, and one installation in the process of moving to complete decentralization. This last case involves the replacement of 5 major processors with "lots" of minicomputers in a total distributed processing environment. In the partially centralized case, this user was in the process of combining 4 major sites into one and adding several RJE Terminals. Other than these two cases, there were no significant changes in the numbers of processors.</p> | |
| <p>EXPENDITURE CHANGES</p> <p>Seven of the nine respondents indicated substantial increases (25-300%) in terminal expenditures, principally for POS terminals. In general, only small changes in expenditures for processors were noted except for the two cases mentioned above. Along with the addition of so many terminals, data communications equipment expenditures are also expected to increase significantly. Data Entry expenditures will decrease dramatically.</p> | |
| <p>OPERATING SYSTEMS</p> <p>Five users are presently using DOS. Of this group, two are changing to OS. Four users are presently using OS. Of this group two are changing to MVS.</p> <p>Three users use CICS, two IMS, two BTAM, and two use custom systems. No change anticipated.</p> | |
| <p>DATA BASE MANAGEMENT SYSTEMS</p> <p>Three users use IMS and had no system, and the rest of the respondents used a variety of custom and other systems. Only one user, presently using TOTAL, expected to change software next year.</p> | |

INTERVIEW SUMMARY:

RETAIL

RESPONDENTS:

9 EDP MANAGERS (Cont)

APPLICATIONS

For the short term, three users are working on merchandise information systems. Three are working on expanding on-line networks. A number of other applications were mentioned including personnel records, warehouse distribution, pension histories, and customer billing.

Longer term, four of the nine respondents will install POS systems. Our major chain respondent talked about on-line customer oriented applications.

MAJOR SITE ACQUISITION

Vendor and third party leases are the preferred acquisition method. Only one respondent purchased equipment which was a small fraction of his total. Three users used monthly access.

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

None of the respondents used any outside services for processing, nor did any plan to.

None use FM and none intend to.

Expenditures for packaged systems and applications software were negligible. One user spent \$100K for an applications package - a one time charge. Expenditures for outside programming services for all respondents put together were less than \$20K per year.

Only one company used an appreciable amount of outside batch services (\$220K/year) and this will be brought in-house next year.

Only two users had an open attitude towards using outside services. The rest of the respondents were completely negative.

OUTSIDE SERVICES USAGE BY OTHER DEPARTMENTS

Only three managers were aware of outside services used by departments other than their own. In all cases, the service was either timesharing or remote batch processing, and the applications were entirely financial. All of the respondents said their departments had full responsibility for procurement of all outside needs.

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| <p>INTERVIEW SUMMARY:</p> <p>RESPONDENTS:</p> | <p>RETAIL</p> <p>9 EDP MANAGERS (Cont)</p> |
| <p>EDP MANAGERS RESPONSIBILITY OUTSIDE CENTRAL EDP</p> <p>Five managers had responsibility for all communications. Four had responsibility for data communications only.</p> <p>100% of the sample said their departments had full responsibility for all EDP related functions throughout their companies.</p> | |
| <p>COMMUNICATIONS SOURCES</p> <p>All of the respondents except one use the Bell System for 100% of their communications. The sole exception said that a portion of their traffic was handled by a private microwave link.</p> | |
| <p>MOST IMPORTANT NEW DEVELOPMENTS</p> <p>Only three managers gave intelligent answers to this question.</p> <p>One mentioned SDLC.</p> <p>One mentioned 19K BAUD transmissions.</p> <p>One mentioned split stream modems.</p> | |
| <p>MOST SIGNIFICANT PROBLEMS</p> <p>Three managers discussed problems all relating to the ability to handle large data bases at reasonable costs. Other problems mentioned were overall cost of EDP and data communication, and lack of standards for line protocols.</p> | |
| <p>NEAR TERM OBJECTIVES</p> <p>Most managers stressed implementation of new applications and installation or expansion of POS as their major short-term objectives.</p> <p>One user cited replacement of stand-alone main processors with RJE.</p> <p>Five users have formal EDP planning functions. Four do not.</p> | |

E. DISCRETE MANUFACTURING

- EDP expenditures for the Discrete Manufacturing sector (top 300 firms) will increase 9% from \$5,765M to \$6,265M. The average firm in this group will spend \$20.9M in 1977.
- EDP is an important concern of management. However, it is generally not considered vital to company growth. There is a tendency to view the use of computers in an 'esoteric' way. Most executives were concerned with what appears to be the ever-escalating cost of EDP.
- The most significant factor impacting EDP in this sector is that a large percentage of companies are trying to increase their on-line services capability. At least half are planning installations of distributed processing in the 1977-1981 time period and are installing the hardware networks today in order to serve this future requirement.
- EDP control is split between centralized and decentralized installations. As companies attempt to do a better job getting the power into the hands of the user, control will tend to be more and more decentralized.
- Most outside services purchased by this sector are purchased outside of the central EDP department. Control over such purchases is not usually vested in the central EDP group. Within the central EDP department, the attitude towards purchasing outside services is generally negative. Most EDP managers said they hoped to bring in-house much of the work (especially time-sharing) being done outside in their companies.

- The most significant problems are:
 - Communications costs
 - Reliability
 - Lack of standards

- In the Discrete Manufacturing sector, EDP managers had varying amounts of responsibility for items outside the central EDP groups direct purview.

EXHIBIT IV - 9

EXPENDITURE ANALYSIS

SECTOR: DISCRETE MANUFACTURING
('Fortune 500' Companies)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 |
|-----------------------------|-------------------------|---------------|------------|-------------|
| | | (\$M) | % of Total | % Change |
| Total EDP Expenditures | 5765 | 6265 | 100 | 9 |
| Equipment (Total) | 2200 | 2405 | 38 | 9.2 |
| - Main Processors | 679 | 749 | 12 | 10 |
| - Secondary Processors | 158 | 198 | 3 | 25 |
| - Peripherals | 575 | 604 | 10 | 5 |
| - Terminals | 365 | 420 | 7 | 15 |
| - Data Comm. Equipment | 105 | 116 | 2 | 10 |
| - Data Entry | 318 | 318 | 5 | 0 |
| Outside Services (Total) | 284 | 325 | 5 | 14.4 |
| - Remote Computing Services | 143 | 167 | 3 | 17 |
| - Facilities Management | 7 | 7 | Neg. | 0 |
| - Batch Services | 33 | 36 | 1 | 9 |
| - Software Products | 29 | 36 | 1 | 24 |
| - Professional Services | 54 | 60 | 1 | 11 |
| - Education | 18 | 19 | Neg. | 6 |
| - Personnel | 2761 | 2960 | 47 | 7.2 |
| - Other | 520 | 575 | 9 | 10.6 |

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| INTERVIEW SUMMARY: | DISCRETE MANUFACTURING |
| RESPONDENTS: | 4 EXECUTIVES |
| INDUSTRY AND GENERAL ECONOMIC TRENDS All respondents see moderate general economic growth with their companies fitting the national pattern for their industries. | |
| ROLE OF EDP EDP not considered particularly important to corporate growth. One stated unequivocally that proper use of EDP provided competitive advantages. | |
| TOP MANAGEMENT CONCERNS ABOUT EDP Cost and people are major concerns. Some felt there are problems keeping EDP practical in light of "real world" considerations. Data Security ranked high as a concern. | |
| EDP BUDGETS EDP Budgets will keep pace with corporate growth in general. One respondent said his company planned to hold the line on EDP expenses at least through the end of 1977. | |
| IMPACT OF ECONOMIC RECOVERY Recession restrictions on EDP expenditures have been lifted with one exception. Two said their companies never imposed any restrictions to begin with. | |
| ATTITUDES TO USING OUTSIDE EDP SERVICES All felt the only justification for going outside was where necessity dictated they do so. None of the executives would consider using a computer utility or FM for the bulk of internal processing. | |

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| INTERVIEW SUMMARY: | DISCRETE MANUFACTURING |
| RESPONDENTS: | 7 EDP MANAGERS |
| <p>EDP BUDGET GROWTH Average reported increase '75 to '76 is 12%. Most felt this rate would be sustained through '81.</p> | |
| <p>EDP CONTROL Respondents divided between complete centralization, partial centralization, and decentralization. None foresee changes in the number of major sites. All see significant increases in minor sites and minicomputers.</p> | |
| <p>CHANGES IN EDP SPENDING PATTERNS Equipment is now only 25-33% of total spending. Over 50% is spent on in-house personnel. Little change seen for big computers, peripherals, and batch entry. Most said that secondary processors, terminals, and data communications equipment expenditures would rise dramatically. Line costs and utilities are expected to increase. Cost of supplies is expected to decrease slightly due to smaller paper usage.</p> | |
| <p>OPERATING SYSTEMS Most users foresee changes in operating systems, due mostly to expansion of network-oriented applications. One user talked about being "forced" into MVS and MCP.</p> | |
| <p>DATA BASE MANAGEMENT SYSTEMS Most users see little change in Data Base Management Systems where IMS predominated in our sample. Some users have several systems in operation and foresee some dropping out of general use over the next few years.</p> | |
| <p>APPLICATIONS Order Entry, manufacturing, and order fulfillment are the applications receiving most new development attention. Most Managers indicated a move towards centralizing data bases for these applications.</p> <p>One moderate effort is being expended for general administrative applications.</p> | |
| <p>MAJOR SITE ACQUISITION Vendor and third party leases hold a slight edge over direct purchase. No changes seen through '81.</p> | |

INTERVIEW SUMMARY:

DISCRETE MANUFACTURING

RESPONDENTS:

7 EDP MANAGERS (Cont)

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

All respondents said their companies used both interactive and remote batch services from outside vendors. Use of remote batch is expected to decline. Use of interactive timesharing expected to remain constant over the forecast period.

None use FM and none plan to.

All use some outside systems software but said that expenditures in relation to total budget are minor. Some small increases anticipated.

Most use outside applications software and programming services. Again, only minor changes are anticipated.

Attitudes to using outside services were generally negative (as would be expected from EDP Managers).

OUTSIDE SERVICES USAGE BY OTHER DEPARTMENTS

EDP Managers said that timesharing is the major service purchased by other departments within their company. Most indicated a desire to bring these applications in-house and believed this would happen as they increased their internal timesharing facilities.

EDP MANAGER'S RESPONSIBILITIES OUTSIDE CENTRAL EDP

Half the respondents said their departments controlled the total communications budget. The other half had responsibility for data communications only.

Most said they have either complete or partial responsibility for minicomputer and small turnkey systems purchases.

Half have responsibility for small office computers, and have heavy involvement in procurement of other automated office equipments. One Manager said he wanted no part in it.

COMMUNICATIONS SOURCES

All use the Bell System with some minor use of SCC's reported. One respondent uses a value added carrier. One commented that he saw DATRAN's exit as a negative development.

INTERVIEW SUMMARY:

DISCRETE MANUFACTURING

RESPONDENTS:

7 EDP MANAGERS (Cont)

MOST IMPORTANT NEW DEVELOPMENTS

Most Managers saw the improvements in communications handling as the most significant development. One mentioned the cost effectiveness of small computers as the most important.

MOST SIGNIFICANT PROBLEMS

Communications costs, reliability problems, and lack of standardization were the most frequently mentioned problems. One Manager stated his major problem was getting his EDP resources into the hands of users within his company.

NEAR TERM OBJECTIVES

Most EDP Managers said their most important objectives are to provide increased and enhanced capabilities for data base related applications and on-line interactive and remote batch services. The driving force behind these objectives is the placement of ever more responsibility in the hands of the users.

Improved cost controls were another frequently mentioned objective.

F. PROCESS MANUFACTURING

- EDP expenditures for the Process Manufacturing sector (top 200 firms) will increase 12% from \$4,325M to \$4,844M. The average firm in this group will spend \$24M in 1977.
- Executives generally believed that EDP was important to their businesses but were not particularly concerned about it. In sharp contrast to other industries, the cost of EDP is not considered a big problem. This is particularly surprising in view of the fact that, on a per company basis, the process sector spends more than any other industry on EDP.
- The Process Manufacturing industry's EDP expenditures are growing very rapidly in comparison to most other industries. Equipment expenditures will be up 15% or greater in almost all categories. Most companies are increasing their capacity for handling applications on-line and larger data base related applications. Many companies plan to install distributed processing systems, although the use of such systems in a truly distributed environment is two years away in most instances.
- EDP control is split between centralized and decentralized installations. The tendency is to move away from central control and toward giving the user a greater role.
- The industry's attitude toward outside purchases is generally positive (except for facilities management services which would not be considered). The industry is a significant user of remote computing

services. The bulk of these purchases, however, are made by departments outside of the central EDP group.

- EDP managers had varying degrees of responsibilities for procurement of items outside the direct concern of the central EDP group.

- The most significant problems mentioned are:

- Network communications
- Data security

EXHIBIT IV - 11

EXPENDITURE ANALYSIS

SECTOR: PROCESS MANUFACTURING
('Fortune 500' Companies)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|-----------------------------|-------------------------|---------------|------------|-------------------------|
| | | (\$M) | % of Total | |
| Total EDP Expenditures | 4325 | 4844 | 100 | 12 |
| Equipment (Total) | 1730 | 2000 | 41 | 15.6 |
| - Main Processors | 530 | 625 | 13 | 18 |
| - Secondary Processors | 160 | 184 | 4 | 15 |
| - Peripherals | 490 | 578 | 12 | 18 |
| - Terminals | 300 | 346 | 7 | 15 |
| - Data Comm. Equipment | 75 | 83 | 2 | 11 |
| - Data Entry | 175 | 184 | 4 | 5 |
| Outside Services (Total) | 235 | 272 | 6 | 15.7 |
| - Remote Computing Services | 144 | 171 | 4 | 19 |
| - Facilities Management | 8 | 8 | Neg. | 0 |
| - Batch Services | 16 | 18 | Neg. | 10 |
| - Software Products | 20 | 24 | Neg. | 22 |
| - Professional Services | 29 | 31 | 1 | 8 |
| - Education | 18 | 20 | Neg. | 11 |
| - Personnel | 1900 | 2063 | 43 | 8.6 |
| - Other | 460 | 509 | 11 | 10.7 |

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| INTERVIEW SUMMARY: | PROCESS MANUFACTURING |
| RESPONDENTS: | 4 EXECUTIVES |
| INDUSTRY AND GENERAL ECONOMIC TRENDS Respondents were generally guarded and cautious. All saw improvement in '76-'77 compared to '75. One said he thought '76 and '77 would not be as good as '74. The petroleum company executive felt that '77 would be a good year for his 'industry'. | |
| ROLE OF EDP The contribution of EDP to corporate growth could not be identified, in general. One respondent called it "subtle". | |
| TOP MANAGEMENT CONCERNS ABOUT EDP All respondents qualified the importance of EDP in corporate considerations as being "Important". Most managers were not particularly concerned about EDP. One described it as a "black mystery box". Another executive (of a major paper manufacturer) stated he was concerned with data security and government reporting requirements. One executive felt that EDP was moving too fast for top management to absorb. | |
| EDP BUDGETS None of the respondent companies had placed recession-period restrictions on EDP Budgets. EDP Budget growth rates for '75-'76 ranged from 8-12%, while those anticipated for '76-'77 ranged from 0-20%. None of the executives had sound feelings beyond '77. A typical answer was "5-6% plus inflation". | |
| ATTITUDES TO USING OUTSIDE SERVICES All of the respondents except one strongly supported the use of all outside services except FM which would not be considered by anyone. The one exception stated that outside services should be used only when in-house capability did not exist. | |

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| INTERVIEW SUMMARY: | PROCESS MANUFACTURING |
| RESPONDENTS: | 12 EDP MANAGERS |
| <p>EDP BUDGET GROWTH</p> <p>Respondents in the Process sector expected annual EDP budget increases in the range of 5-30% with the average at about 15%. One said his budget had increased 20% per year during the recession and expected that to be curtailed to 6-7% per year over the next five years. Another said his company had its EDP budget pegged at 1% of corporate sales.</p> | |
| <p>EDP CONTROL</p> <p>Four firms were completely centralized, four partially centralized, and three were completely decentralized. Only two respondents anticipated adding major sites. Nearly all respondents anticipated substantial increases in minor sites and minicomputers. One expected to acquire nearly 200 minis in two years. Another respondent anticipated replacing a 168/155 installation with a combination of 30 systems 3's plus DATA 100 remote batch and Mohawk 2400 Intelligent Terminals.</p> | |
| <p>CHANGES IN EDP SPENDING PATTERNS</p> <p>Half the respondents said their main processor budgets would increase from 6-50%. Four in the 20-50% range were acquiring larger processors in concert with efforts to implement larger data base applications. Terminals and data communications purchases by these same companies were expected to increase similarly.</p> | |
| <p>OPERATING SYSTEMS</p> <p>Six out of twelve respondents said they were changing operating systems, principally from OS to MVS. The rest were not sure or said they would not change. None of the respondents in the sample were using MVS.</p> <p>For network software, 5 use CICS, 2 use TCAM, 1 BTAM, 1 HASP, and the rest custom systems. Only one respondent expected to change next year.</p> | |
| <p>DATA BASE MANAGEMENT SYSTEMS</p> <p>Four users employed IMS, four use TOTAL, and two ADATABASE. Four used no generalized system at all. None of the users expected to change their present status.</p> | |

INTERVIEW SUMMARY: PROCESS MANUFACTURING

RESPONDENTS: 12 EDP MANAGERS (Cont)

APPLICATIONS

No clear trend in development of new applications emerged from our sample. There was some emphasis on moving certain applications from batch to on-line. These indicated order entry, accounts receivable, market modeling, and decision support systems. Two respondents mentioned government reporting as applications in need of constant revision.

MAJOR SITE ACQUISITION

75% of the sample used third party leasing, 50% had vendor leases, and 75% had purchase plans. 3 respondents used third party leasing exclusively. Only 2 purchased everything. No changes anticipated.

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

All but one respondent said he used outside interactive time-sharing services. Only two use remote batch. Three said they expected to increase use of outside time-sharing services next year. 75% of the respondents, however, indicated they were trying to bring as much as possible in-house.

None use FM and none plan to.

All but two respondents buy outside systems software packages. Half of those that do expect to spend more next year. Only 1/3 of the respondents buy outside applications software. The amounts spent for both were trivial, with one exception. That user spent \$.5 million annually on systems packages.

Nearly all respondents use outside programming services in relatively small amounts. Only four spent more than \$100K per year.

Use of batch services was practically non-existent.

Attitudes toward using outside services were generally negative.

OUTSIDE SERVICES USAGE BY OTHER DEPARTMENTS

The EDP Managers recognized that, in general, outside services were being purchased by other departments in their companies. Only one EDP Manager said his department had approval authority for purchase of outside services by other divisions. Most respondents didn't really know what was being purchased. One stated "engineering applications" rather vaguely!

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| <p>INTERVIEW SUMMARY:</p> <p>RESPONDENTS:</p> | <p>PROCESS MANUFACTURING</p> <p>12 EDP MANAGERS (Cont)</p> |
| <p>EDP MANAGERS RESPONSIBILITIES OUTSIDE CENTRAL EDP</p> <p>Only two of the EDP Managers had any control or influence on communications except for data. One Manager said he did not even control the data communications budget.</p> <p>Half the Managers said their departments controlled mini-computers/turnkey systems purchases.</p> <p>60% have responsibility for office computer purchases.</p> | |
| <p>COMMUNICATIONS SOURCES</p> <p>All use the Bell System. Five used SCC's to a lesser extent. None use value-added carriers.</p> | |
| <p>MOST IMPORTANT NEW DEVELOPMENTS</p> <p>Most of the responses had to do with improvements in data communications. Two specifically mentioned SDLC by IBM. Two said direct digital transmission.</p> <p>One Manager mentioned AMDAHL.</p> <p>One mentioned the reduced cost of minis.</p> <p>One mentioned the reduced cost of terminals.</p> | |
| <p>MOST SIGNIFICANT PROBLEMS</p> <p>Responses were extremely varied. Problems with network communication and its management in a decentralized system were frequently mentioned. Data Security was another common problem. Educating users and controlling costs were also stated. Only one user directly mentioned reliability as a factor, although several indicated that because systems and networks were getting so complicated, an increasing problem was "where to put the blame" when something went wrong.</p> | |
| <p>NEAR TERM OBJECTIVES</p> <p>Most Managers stressed the need to expand capacity for on-line applications as their most pressing objective in the '76-'78 period. Several mentioned difficulties with their own internal planning and cited the need to improve this function. Over half the respondents said they had no formal EDP planning functions in their companies!</p> | |

G. TRANSPORTATION

- EDP expenditures for the Transportation industry (top 50 companies) will increase 10% from \$696M to \$768M. The average company will spend \$15.4M in 1977 on EDP.
- EDP is considered vital by most industry executives, as would be expected, since the industry is dominated by the airlines. The major concern was cost.
- No particularly new factors will influence EDP growth in this industry. In most cases, it is just "more of the same".
- Most EDP installations are completely centralized and expected to remain so. Although distributed processing is "under study" in some companies, there are few who have any actual installation plans except in hotel subsidiaries.
- The industry's attitude towards using outside services was generally positive. In comparison to some other industries, however, the Transportation sector has little demand for outside services.
- Most EDP departments have at least some responsibility for procurement outside central EDP facilities.
- The most significant problems are:
 - CPU capacity
 - Communication costs

EXHIBIT IV - 13

EXPENDITURE ANALYSIS

SECTOR: TRANSPORTATION
('Fortune 50' Only)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|-----------------------------|-------------------------|---------------|------------|-------------------------|
| | | (\$M) | % of Total | |
| Total EDP Expenditures | 696 | 768 | 100 | 10 |
| Equipment (Total) | 243 | 271 | 35 | 11.5 |
| - Main Processors | 64 | 67 | 9 | 5 |
| - Secondary Processors | 34 | 41 | 5 | 20 |
| - Peripherals | 63 | 69 | 9 | 10 |
| - Terminals | 48 | 57 | 7 | 18 |
| - Data Comm. Equipment | 10 | 12 | 2 | 15 |
| - Data Entry | 24 | 25 | 3 | 5 |
| Outside Services (Total) | 76 | 84 | 11 | 10.5 |
| - Remote Computing Services | 39 | 43 | 6 | 9 |
| - Facilities Management | 7 | 7 | 1 | 0 |
| - Batch Services | 9 | 10 | 1 | 12 |
| - Software Products | 10 | 12 | 2 | 16 |
| - Professional Services | 9 | 10 | 1 | 12 |
| - Education | 2 | 2 | Neg. | 5 |
| - Personnel | 277 | 305 | 40 | 10.1 |
| - Other | 100 | 108 | 14 | 8.0 |

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| INTERVIEW SUMMARY: | TRANSPORTATION |
| RESPONDENTS: | 5 EXECUTIVES |
| <p>INDUSTRY AND GENERAL ECONOMIC TRENDS</p> <p>All respondents foresee growth matching general trends because transportation is a service to the supplying industries. Airline passenger traffic is expected to increase faster than national growth rates. One executive said that after the '76 U.S. presidential elections new legislation and regulation having to do with cargo allocations among countries could significantly impact the transportation industry up or down.</p> | |
| <p>ROLE OF EDP</p> <p>All respondents ranked EDP as Very Important to their corporate thinking. Two said that EDP played a major role in contributing to corporate growth. Two said EDP had at least some influence on growth. Only one executive (from a trucking firm) said EDP's influence was minor. He added "unfortunately". Three executives said that EDP provided their companies with distinct competitive advantages.</p> | |
| <p>TOP MANAGEMENT CONCERNS ABOUT EDP</p> <p>The principal management concern appeared to be cost. Most executives did not feel they were getting a good return on their EDP dollar. The "low productivity" of the EDP function was mentioned several times.</p> <p>Another concern voiced by an executive from a major shipper was government reporting requirements. He felt that much of their EDP dollar was being diverted for government required reports instead of being spent to assist the company in its day-to-day operations.</p> | |
| <p>EDP BUDGETS</p> <p>Respondents cited annual growth rates of 0-20% anticipated for '76 and '77.</p> | |
| <p>IMPACT OF ECONOMIC RECOVERY</p> <p>Only two of the respondents (a trucker and an airline) said restrictions had been imposed on EDP expenditures during the recession. Only the airline executive said the restrictions were still in effect.</p> | |
| <p>ATTITUDES TO USING OUTSIDE EDP SERVICES</p> <p>Three executives strongly believed in using outside services. One said "tread carefully", and one said "minimal". Only one respondent said he would consider a total FM contract.</p> | |

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| INTERVIEW SUMMARY: | TRANSPORTATION |
| RESPONDENTS: | 9 EDP MANAGERS |
| <p>EDP BUDGET GROWTH</p> <p>Respondents cited growth rates of 0-20% with the average at about 8½%. The variation in plans and budgets was particularly diverse in this sector. No firm trends could be established. For example, one major airline with a \$40M annual EDP budget cited a 7-8% rate. Another major airline with approximately the same budget anticipated only 3%.</p> | |
| <p>EDP CONTROL</p> <p>80% of the respondents were completely centralized. None were completely decentralized. None of the respondents planned to add major sites. Changes in minor sites and minicomputers were expected to be minor, with the exception of an airline who will be installing minicomputers in its hotels. A few executives indicated that the subject of small computers was presently "under study". A major freight shipper said that 4 stand-alone major sites would be consolidated into 1 major site by 1978.</p> | |
| <p>CHANGES IN EDP SPENDING PATTERNS</p> <p>Only two respondents said their main processor expenditures would increase significantly (10-20%). Half the respondents said their secondary processor budgets would rise, 3 significantly. All but one respondent said terminal purchases would go up at rates varying from 12-50%.</p> | |
| <p>OPERATING SYSTEMS</p> <p>Five out of nine respondents said they were changing operating systems, all to MVS. Of the four who said they would not change, three use DOS and one OS.</p> <p>Five out of nine respondents said they would be changing network software. Of these, two were going to VTAM, one to CICS. The other said the issue was "under debate".</p> | |
| <p>DATA BASE MANAGEMENT SYSTEMS</p> <p>Only three of the nine respondents used any data base management systems, IMS in all cases. No changes were anticipated by any of our sample, except that one railroad said the issue was being looked at now.</p> | |

INTERVIEW SUMMARY:

TRANSPORTATION

RESPONDENTS:

9 EDP MANAGERS (Cont)

APPLICATIONS

No clear picture emerged. For example, of the three airlines in our sample, one cited maintenance engineering as their major short term effort, one mentioned flight crew scheduling, and the third cited marketing. Two shippers mentioned on-line payroll.

In the longer term, most Managers did not appear to have a good view of applications to be developed. There were several vague references to "more on-line", "operations control", and "management reporting".

MAJOR SITE ACQUISITION

All but one of the sample used third party leasing, four exclusively. Four out of nine used vendor leases, and five purchased equipment. No changes anticipated.

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

Only four of the sample, including two major airlines used any outside processing services. In all cases the firm was principally timesharing with a lesser amount of remote batch. One of the airlines currently spending \$400K annually for outside processing expected this to go up by 200% next year. Two of the respondents using outside processing services expected to bring it all in-house.

None use FM and none plan to.

All but one of the respondents buy outside systems software packages. Of those that do, half expect to spend more next year. Most spent less than \$100K annually, but one user said he spent \$500K per year. Only four use any applications packages. Of these, only two spend over \$100K per year.

With one exception, expenditures for programming services are minor and not much change is anticipated.

EDP Managers' attitudes to using outside services were generally favorable except for FM. Most qualified their response by referring to "certain situations" or "economically justified". Only one Manager said he preferred to bring everything in-house.

INTERVIEW SUMMARY:

TRANSPORTATION

RESPONDENTS:

9 EDP MANAGERS (Cont)

OUTSIDE SERVICES USAGE BY OTHER DEPARTMENTS

Five out of nine Managers said that outside services were being purchased by other departments. One major airline EDP Manager said that every department in his company expect legal and personnel bought outside services. The most common outside service purchased was interactive time-sharing. Applications included Scientific, Engineering, financial planning, operations research, traffic scheduling, and miscellaneous "business applications".

EDP MANAGERS RESPONSIBILITIES OUTSIDE CENTRAL EDP

Four out of nine managers had full control of all communications. Four controlled only data communications.

All but one of the managers said his department controlled purchases of minicomputers and turnkey systems.

Five of nine managers control office computer purchases.

COMMUNICATIONS SOURCES

All but two of the sample use the Bell System 100%. Of those that do not, one said that 10% of its traffic was carried over a private microwave link; the other company, a railroad that has an SCC subsidiary, uses the SCC for 90% of its traffic.

MOST IMPORTANT NEW DEVELOPMENTS

Only six managers answered this question. Four mentioned data communications related developments such as satellites, value-added networks, and "distributed-processing".

One manager mentioned "AMDAHL and the Japanese".

One mentioned minicomputers.

MOST SIGNIFICANT PROBLEMS

Only six managers replied to this question, all differently. Examples are CPU capacity, the instability of the Bell System's pricing structure, dealing with several vendors, and "digital communications".

NEAR TERM OBJECTIVES

Most managers stressed upgrading of hardware and installations of enhancements to existing applications as their most pressing objectives in the '76-'78 time period. Some indicated problems with their own internal planning. Only three of the companies interviewed had formal internal EDP planning functions.

H. UTILITIES

- EDP expenditures for the Utilities sector (top 50 firms) will increase 12% from \$1,050M to \$1,176M. The average firms in this group will spend \$23.5M in 1977. It should be noted that this sector is heavily influenced by the Bell System who accounts for a disproportionate share of the total.
- Management considers EDP as a necessary tool with no direct impact on company growth. Some concerns were expressed about data security. No other general concerns were established.
- Most of the changes and budget increases foreseen in 1976-1977 in the Utilities sector derive from upgrades of existing systems and expansions of on-line services. Expenditures for terminals are expected to increase 60%.
- EDP control is nearly 100% centralized and will remain so.
- In most cases the justification for using outside services was inadequate in-house capacity. Out of the \$183M to be spent on outside services in 1977, \$115M is for remote computing services most of which is straight time-sharing used for scientific/engineering applications. Usage of outside services is expected to grow more slowly than the overall budget.
- In general EDP managers do not influence or control expenditures outside their own departments.
- The most significant problems are:
 - Data Base development and management

EXHIBIT IV - 15

EXPENDITURE ANALYSIS

SECTOR: UTILITIES
('Fortune 50' Only)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|-----------------------------|-------------------------|---------------|------------|-------------------------|
| | | (\$M) | % of Total | |
| Total EDP Expenditures | 1050 | 1176 | 100 | 12 |
| Equipment (Total) | 367 | 437 | 37 | 19.1 |
| - Main Processors | 117 | 132 | 11 | 13 |
| - Secondary Processors | 20 | 22 | 2 | 8 |
| - Peripherals | 109 | 123 | 10 | 13 |
| - Terminals | 51 | 82 | 7 | 60 |
| - Data Comm. Equipment | 21 | 28 | 2 | 35 |
| - Data Entry | 49 | 50 | 4 | 2 |
| Outside Services (Total) | 165 | 183 | 16 | 10.9 |
| - Remote Computing Services | 104 | 115 | 10 | 11 |
| - Facilities Management | 7 | 7 | 1 | 0 |
| - Batch Services | 10 | 11 | 1 | 10 |
| - Software Products | 14 | 17 | 1 | 18 |
| - Professional Services | 27 | 29 | 2 | 9 |
| - Education | 3 | 4 | Neg. | 20 |
| - Personnel | 434 | 464 | 39 | 7 |
| - Other | 84 | 92 | 8 | 10 |

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| INTERVIEW SUMMARY: | UTILITIES |
| RESPONDENTS: | 3 EXECUTIVES |
| INDUSTRY AND GENERAL ECONOMIC TRENDS Executives foresee utilities keeping pace with industry revenue growth at 6-8% per year. One executive felt '76 and '77 would be years of "conspicuous improvement". | |
| ROLE OF EDP Executives viewed EDP as a necessary tool. No direct impact on sales or company growth. | |
| TOP MANAGEMENT CONCERNS ABOUT EDP One executive felt that EDP had caused management to lose touch with the "people" aspects of their business. He also stated that he had had enough of changes in EDP - "Too many cycles". Another respondent was concerned that he was not getting the best information needed to manage his company. Issues considered critical were those of data security and Applications development. When asked if on-line MIS was a concern, one respondent replied "management should find something better to do"! | |
| EDP BUDGETS Executives see very low growth (around 3%/annum) in EDP Budgets in the Utilities industry. One exception was that the EDP Budget would be allowed to grow 5-10% in '76-'77 for one company. | |
| IMPACT OF ECONOMIC RECOVERY One executive said that his company's zero personnel growth policy had been partially lifted. Otherwise, no special recession measures had been implemented by any of the respondents. | |
| ATTITUDES TO USING OUTSIDE SERVICES Respondents all used outside services because in-house capacity could not handle their needs. All preferred to do their processing in-house. None of the executives would consider using a computer utility or FM. | |

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| INTERVIEW SUMMARY: | UTILITIES |
| RESPONDENTS: | 10 EDP MANAGERS |
| <p>EDP BUDGET GROWTH</p> <p>EDP Managers were generally optimistic. 70% of the sample forecast better than 10% growth from '76 to '77. 50% expected 15% or better. One major communications utility company expected his EDP budget to grow at 100% per year every year for the foreseeable future. Only one manager felt that EDP expenditures would grow at less than the corporate growth rate.</p> | |
| <p>EDP CONTROL</p> <p>9 out of 10 respondents said their EDP operations were completely centralized. The one exception was partially centralized but moving toward complete centralization. No significant changes in the <u>numbers</u> of major, minor, or minicomputer sites were noted, although substantial increases in expenditures were anticipated, indicating that many sites will be upgraded.</p> | |
| <p>EXPENDITURE CHANGES</p> <p>Only 60% of the respondents gave satisfactory answers to this question. Of those that did respond, it was apparent that the largest spending increases would be for terminals. Large computer processors and data communications equipment ranked second. Increases in spending for minor computers and peripheral equipment were significant and ranked third.</p> | |
| <p>OPERATING SYSTEMS</p> <p>Only two of the respondents said they were changing operating systems, in both cases from OS to MVS.</p> <p>A variety of network software is being used. Only one user had no network at all. Two said they would change software next year.</p> | |
| <p>DATA BASE MANAGEMENT SYSTEMS</p> <p>Four users employed IMS, two used DMS, the rest used in-house systems or none at all. None of the users expect to change their present systems, although one indicated he would change "if IMS does not improve".</p> | |

INTERVIEW SUMMARY:

UTILITIES

RESPONDENTS:

10 EDP MANAGERS (Cont)

APPLICATIONS

Four respondents mentioned customer information systems and billing as applications under development. Three mentioned facilities management related applications, including material management, inventory control, and plant record systems. Two mentioned systems needed to support construction, particularly for nuclear plants.

Two users looked toward the enhancement or further development of on-line integrated applications as long-term development activities.

MAJOR SITE ACQUISITION

Only 20% of the respondents had purchased systems. All used leasing, split about 50-50 between vendor and third party lease plans. No changes anticipated.

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

All but two respondents use outside remote computing services, primarily interactive time-sharing. Only four respondents spent over \$100K per year on outside remote services. All of these expected to bring at least some of this work in-house by 1977.

None of the users have conventional FM or plan to. One used what he termed an FM vendor for Data Entry but expected to cut this activity next year.

All respondents but two buy outside systems software packages. The amounts spent in all cases were less than \$100K per year. Five expected this to increase in amounts ranging from \$25-\$100K per year.

Most users also buy applications software, again in fairly small amounts. One respondent said he expected to buy a stock records package in 1977 which he expected would cost \$100K.

60% of the respondents use outside programming services. Only one spent a significant amount (\$300K per year).

The use of outside batch services was not significant.

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| <p>INTERVIEW SUMMARY:</p> <p>RESPONDENTS:</p> | <p>UTILITIES</p> <p>10 EDP MANAGERS (Cont)</p> |
| <p>With two exceptions, EDP Managers' attitudes toward using EDP Services were negative. When asked if they would consider using a "computer utility" as an alternative to in-house computers, four users said they would at least consider it.</p> | |
| <p>OUTSIDE SERVICES USAGE BY OTHER DEPARMENTS</p> <p>Only half the EDP Managers were aware of outside services being purchased by other departments. Five claimed their departments had responsibility for such purchases, but had only partial knowledge about what was being bought outside. Applications most frequently mentioned as outside purchase items by other departments were scientific or engineering oriented.</p> | |
| <p>EDP MANAGERS RESPONSIBILITY OUTSIDE CENTRAL EDP</p> <p>None of the managers had responsibility for communications other than data. One had no responsibility for anything to do with communications.</p> <p>Half the managers said their departments had total responsibility or shared responsibility for purchasing minicomputers and turnkey systems.</p> <p>Only 30% have any responsibility for procurement of office computers.</p> | |
| <p>COMMUNICATIONS SOURCES</p> <p>One utility had its own internal microwave system which carries 10% of its load. All other respondents said they used the Bell System 100%.</p> | |
| <p>MOST IMPORTANT NEW DEVELOPMENTS</p> <p>Seven out of ten Managers said they could not think of any important new developments!</p> <p>One mentioned IBM's move into satellites.</p> <p>One mentioned the 168 MP.</p> <p>One mentioned communications processors.</p> | |

INTERVIEW SUMMARY:

UTILITIES

RESPONDENTS:

10 EDP MANAGERS (Cont)

MOST SIGNIFICANT PROBLEMS

The only problem stated by more than one user (three) dealt with the construction of Data Bases and data base retrieval/management systems. Other problems mentioned included programmer productivity, mass storage costs, software quality, and standards.

NEAR TERM OBJECTIVES

Most managers stressed the need to continue new applications development and installation as their continued objective in the '76-'78 time period.

Two users cited installation of a new major site to be used principally for on-line applications.

Only two of the respondents said they had no formal planning functions for EDP.

I. FEDERAL GOVERNMENT

- Security, weapon related and other highly specialized sources of EDP expenditures are not included in the analyses. For "commercial types" of EDP, expenditures will increase 8% from \$3,545M to \$3,822M. The average agency (a total of 40 agencies in this sector) will spend \$95.6M on EDP in 1977.
- As might be expected, planning for EDP is far different than that for commercial enterprises. Most agency EDP Managers have a very short-term view of the future and are seldom able to do any long-term facility planning, in spite of the relatively substantial budgets.
- Present government policy and political pressures are tending to suppress hardware procurement and hiring. Therefore, agencies must turn to outside services to meet their objectives. As a result, outside service expenditures account for 22% of the EDP dollar and are growing at over 18%, three times faster than expenditures for hardware and people.
- Attitudes toward using outside services vary by agency. Older agencies with large in-place installations and in-house staffs tend to look upon outside services with disfavor. Newer agencies (NASA and FEA, for example) tend to be much more open to the use of outside services. Reactions to A-76 vis-a-vis computer services are mixed. The Supreme Court, which is not subject to either executive or congressional pressures, is strictly an in-house operation.

- Very few changes in central processor hardware expenditures are anticipated. The biggest hardware increases will be for terminals, as some agencies continue implementation of network based systems. Some agencies have plans for distributed processing, but these are subject to change with the onset of the new administration.

- The most significant problems mentioned are:

- Government red tape
- Data security
- Reliability

EXHIBIT IV - 17

EXPENDITURE ANALYSIS

SECTOR: FEDERAL GOVERNMENT
(ALL AGENCIES)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|-----------------------------|-------------------------|---------------|------------|-------------------------|
| | | (\$M) | % of Total | |
| Total EDP Expenditures | 3545 | 3822 | 100 | 8 |
| Equipment (Total) | 710 | 751 | 20 | 5.8 |
| - Main Processors | 212 | 218 | 6 | 3 |
| - Secondary Processors | 51 | 54 | 1 | 6 |
| - Peripherals | 207 | 217 | 6 | 5 |
| - Terminals | 104 | 120 | 3 | 15 |
| - Data Comm. Equipment | 35 | 39 | 1 | 12 |
| - Data Entry | 101 | 103 | 3 | 2 |
| Outside Services (Total) | 708 | 836 | 22 | 18.1 |
| - Remote Computing Services | 150 | 200 | 5 | 33 |
| - Facilities Management | 200 | 225 | 6 | 12 |
| - Batch Services | 44 | 48 | 1 | 9 |
| - Software Products | 41 | 49 | 1 | 20 |
| - Professional Services | 265 | 305 | 8 | 15 |
| - Education | 8 | 9 | Neg. | 10 |
| - Personnel | 1808 | 1900 | 50 | 5.1 |
| - Other | 319 | 335 | 9 | 5 |

INTERVIEW SUMMARY

FEDERAL GOVERNMENT

RESPONDENTS:

8 EDP MANAGERS

EDP BUDGET GROWTH

All departments except the Supreme Court foresee budgets growing at 5-15% form '76-'77. HUD expected 15% annual growth for several years to come. FEA and ERDA expect 10%.

EDP CONTROL

Most operations were completely centralized. The Supreme Court is partially centralized. HUD's EDP operations are completely decentralized. No changes in the number of major sites are anticipated. Secondary processors and minicomputers are expected to rise sharply in the '76-'78 period, notably at Commerce, HEW, VA, and ERDA.

EXPENDITURE CHANGES

HUD was the only agency where equipment expenditures were expected to rise across the board with the exception of data entry. All other agencies except the Supreme Court (at zero growth) anticipated increasing hardware expenditures just for terminals and data communications equipment.

OPERATING SYSTEMS

Six of the seven agencies using IBM mainframes (one does not) are using OS. Only one, the VA, is considering a change. The FEA is the only agency using MVS.

For network software, only the CAB in our sample uses a common package, CICS. The other agencies use various in-house and vendor (other than IBM) supplied systems.

DATA BASE MANAGEMENT SYSTEMS

The ERA uses IMS. The VA uses TOTAL. The FEA uses ADABAS. Three agencies, Commerce, FEA, and CAB have no systems. The rest use a number of miscellaneous systems. The CAB and VA are considering changes.

APPLICATIONS

As would be expected, the applications of principal interest were different for each agency. Responses are as follows:

| | | |
|---------------|---|--|
| COMMERCE | - | Scientific Modeling |
| FEA | - | Strategic Oil Reserves, Regulatory Systems |
| CAB | - | Statistical Analysis of Financial and Traffic Data |
| Supreme Court | - | MIS |

INTERVIEW SUMMARY

FEDERAL GOVERNMENT

RESPONDENTS:

8 EDP MANAGERS (Cont)

APPLICATIONS (Cont)

- HUD - Insured Mortgages
- HEW - Support systems and analysis for Social Security, Welfare, Health, etc.
- VA - Pension, Education Benefits
- ERDA - Reporting Systems, Document Distribution and Control, Agency Reporting

Longer term, ERDA plans to put its reporting systems on-line.

MAJOR SITE ACQUISITION

Contrary to popular opinion, the agencies interviewed used a wide variety of lease, rental and purchase plans. The FEA and CAB use vendor leases exclusively. All others use a combination of rental, vendor leases, third-party lease and purchase plans.

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

All agencies except the CAB and Supreme Court use a substantial amount of outside Processing Services, spending from \$.3M to \$2M annually. In most cases these amounts are expected to increase. Although a few agencies indicated minor amounts spent for Remote Batch and Data Base Services, the bulk of the money is spent for timesharing services. HEW spends \$3M annually for Data Base Services and expects this to increase next year.

Three of the agencies interviewed, Commerce, FEA and ERDA have FM contracts. The others do not. No changes anticipated.

Six of the eight agencies interviewed buy outside systems software, in significant amounts. Expenditures for applications packages were insignificant.

All agencies except the Supreme Court buy outside programming services, some in very large amounts. HEW said they spent \$25M in 1976 and expected that to increase to \$35M in 1977.

Use of outside Batch Services is insignificant.

Education expenditures were fairly substantial for six agencies who reported spending between \$90K-\$1.5M annually.

INTERVIEW SUMMARY

FEDERAL GOVERNMENT

RESPONDENTS

8 EDP MANAGERS (Cont)

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT (Cont)

Partly because it is a matter of policy (E.G. OMBA-76), nearly all the agencies interviewed had a very positive attitude toward using outside services. The Supreme Court was opposed because of security reasons. The CAB manager indicated a preference for in-house control. (They are, however, increasing expenditures for outside services). The FEA manager said "I enjoy it".

OUTSIDE SERVICES USAGE BY AGENCY DIVISIONS

Wherever an agency is structured with sizable subdivisions, outside services were being used. For example, the Department of Construction of the VA spent between \$100-500K annually on outside services relating to building specifications. The Supreme Court said separate outside services were being used by its Library. In all cases, the Agency's central EDP Department controlled all expenditures for outside services.

EDP MANAGERS RESPONSIBILITY OUTSIDE CENTRAL EDP

In only three agencies, HEW, VA, and ERDA were all communications controlled by the EDP operation. The others controlled only data communications.

Where applicable, the agency EDP department was responsible for all minicomputer/turnkey systems purchases.

In three agencies, Commerce, FEA, and the CAB, the agency EDP department was responsible for office computer procurement.

COMMUNICATIONS SOURCES

All agencies used the Bell System for 100% of data communications, with the exception of HEW. This agency uses Bell for 90% of its traffic. SCC's and value-added carriers handle the balance.

MOST IMPORTANT NEW DEVELOPMENTS

Two agencies mentioned lower memory costs.

Two agencies mentioned remote computing.

MOST SIGNIFICANT PROBLEMS

Several agencies mentioned government red tape as their most significant problem. A number of other problems were mentioned by different agencies, including data security, equipment reliability, data collection, and "too much software overhead".

INTERVIEW SUMMARY

FEDERAL GOVERNMENT

RESPONDENTS:

8 EDP MANAGERS (Cont)

NEAR TERM OBJECTIVES

Other than improving service and minimizing cost, most agency EDP managers had few major short-term objectives. Three mentioned enhancement of teleprocessing capabilities. Most of the respondents were also vague about longer term objectives. One manager said his priorities were "dictated externally".

HUD, HEW, VA, and Commerce have formal EDP planning functions.

J. STATE AND LOCAL GOVERNMENT

- This sector includes the 15 largest states and 5 largest cities. EDP expenditures for this group will increase 8% from \$700M to \$755M. The average agency in this group will spend \$38 M in 1977.

- None of the EDP managers interviewed had a clear perspective of the future and were unable to plan more than a few months ahead. Expenditures for central processors were generally not expected to change much. The only equipment expenditure categories to increase significantly will be terminals and data communications as existing on-line systems are expanded.

- EDP management is generally opposed to outside services. The only significant category of services used by central EDP groups is for software services, generally "body shop" work purchased to overcome hiring limitations imposed by governments. Some remote computing services are used, but most of the \$21M spent on this category comes from Universities and other government supported educational institutions.

- EDP control is generally centralized and is not expected to change.

- The most significant problems are:
 - "Political"
 - Data Security
 - Software

EXHIBIT IV - 19

EXPENDITURE ANALYSIS

SECTOR: STATE AND LOCAL GOVERNMENT
(LARGEST 15 STATES & 5 CITIES)

| CATEGORY | 1976 Actual (\$M) | 1977 Forecast | | 1976 - 1977 % Change |
|-----------------------------|-------------------------|---------------|------------|-------------------------|
| | | (\$M) | % of Total | |
| Total EDP Expenditures | 700 | 755 | 100 | 8 |
| Equipment (Total) | 301 | 330 | 44 | 9.6 |
| - Main Processors | 81 | 85 | 11 | 5 |
| - Secondary Processors | 36 | 40 | 5 | 11 |
| - Peripherals | 72 | 78 | 10 | 9 |
| - Terminals | 62 | 73 | 10 | 18 |
| - Data Comm. Equipment | 15 | 17 | 2 | 13 |
| - Data Entry | 35 | 37 | 5 | 7 |
| Outside Services (Total) | 51 | 60 | 8 | 17.6 |
| - Remote Computing Services | 17 | 21 | 3 | 25 |
| - Facilities Management | - | - | - | - |
| - Batch Services | 6 | 7 | 1 | 12 |
| - Software Products | 5 | 6 | 1 | 19 |
| - Professional Services | 22 | 25 | 3 | 12 |
| - Education | 1 | 1 | Neg. | 10 |
| - Personnel | 280 | 288 | 38 | 3 |
| - Other | 70 | 77 | 10 | 10 |

| | |
|---|----------------------------|
| INTERVIEW SUMMARY: | STATE AND LOCAL GOVERNMENT |
| RESPONDENTS: | 8 EDP MANAGERS |
| EDP BUDGET GROWTH | |
| Growth rate projections are widely scattered with figures given ranging from 0-25%. No relationship with government budgets overall would be established among our sample. | |
| EDP CONTROL | |
| Five out of seven respondents are completely centralized. The other two are partially centralized. Most respondents said the number of major processor sites would not change. One state data center said the number of main processors was being reduced from 8 to 4. All respondents except two (both of them cities) anticipated adding substantial numbers of secondary processors by 1978. | |
| EXPENDITURE CHANGES | |
| With one exception, none of the respondents anticipated significant increases in main or secondary processor expenditures. Four respondents expected large increases in Terminal expenditures and data entry equipment. | |
| OPERATING SYSTEMS | |
| Six of the seven respondents had IBM main processors. Of these, one is using MVS and the rest are on OS. Two of the OS installations expect to install MVS next year. | |
| Four users employ CICS, one BTAM, and one TCAM for network software. The TCAM user will change to CICS. | |
| DATA BASE MANAGEMENT SYSTEMS | |
| Two users have IMS, one ADABAS. Three have none. The latter group are "looking". | |
| APPLICATIONS | |
| No common answers were given to this question. Applications mentioned by managers included payroll, accounting, police systems, court management, environmental resources, professional licensing, welfare, food stamps, and traffic records. None of the managers had a clear view of future applications. | |
| MAJOR SITE ACQUISITION | |
| Vendor leases and purchase plans are the preferred methods. Only one state used third party leasing. | |

INTERVIEW SUMMARY:

STATE AND LOCAL GOVERNMENT

RESPONDENTS:

8 EDP MANAGERS (Cont)

OUTSIDE SERVICES USAGE BY CENTRAL EDP DEPARTMENT

The only significant expenditure for any outside services is for Systems Software.

One city spends about \$500K annually for programming services. This was the only respondent who had a favorable attitude to using outside services. All other managers were strongly opposed to using any outside services other than packaged software. All but two respondents said central EDP had responsibility for outside services procurement.

EDP MANAGERS RESPONSIBILITY OUTSIDE CENTRAL EDP

Three out of seven respondents had no control over any communications. One (a city) had control over all communications. The other three had control over data communications. Five out of seven said they had full responsibility for procurement of all computers including turnkey systems and minicomputers.

COMMUNICATIONS SOURCES

All respondents use the Bell System for 100% of data communications traffic.

MOST IMPORTANT NEW DEVELOPMENTS

Only four respondents gave usable answers to this question.

One mentioned SDLC.

One mentioned Winchester Technology Disc Drives.

One said prices were coming down.

One mentioned communications controller technology.

MOST SIGNIFICANT PROBLEMS

Three managers gave "political" answers such as: "Unable to get money - I have a 5-year work backlog; and, can't commit to any plans because the legislature won't make any long range decisions".

The other respondents replied in more typical fashion. Problems cited included Data Security, Software compatibility, and inability to keep up with changing technology. One user commented "We need more alternatives to IBM".

NEAR TERM OBJECTIVES

Three respondents have as a near-term objective the improvement of their distributed processing. All others replied "Don't know" or "maintain status quo".

Three of the respondents have formal EDP planning functions. The others do not.

APPENDIX

QUESTIONNAIRES

- EXECUTIVE
- EDP MANAGER

CONFIDENTIAL

INPUT QUESTIONNAIRE

CATALOG. NO.

STUDY TITLE: Information Processing (EDP) Plans

TYPE OF INTERVIEW: User Executive

PURPOSE: The purpose of this interview is to investigate corporate and financial management objectives and plans for, and concerns about, information processing (EDP).

1. How do you view your industry growth in 1976 and 1977? What will be your company's participation in this growth?

2. Is the role of EDP in accomplishing this growth:

Major _____ Medium _____ Minor _____

3. a) Please rank the importance of EDP in corporate considerations:

Top priority _____ Very important _____

Important _____ Less important _____

b) Do computer/communications systems provide your company with competitive advantages?

4. What top management concerns are there about computer or communications developments or activities? Now?

Next five years and/or ten years?

5. What is the most important thing you require from your EDP function?

6. Please rank and comment on the importance of the following factors related to computer/communications use. (1=unimportant, 10=critical)

| Factor | Rank | Comment |
|--------------------------------|------|---------|
| Security of data | | |
| Cost of EDP | | |
| People Availability | | |
| Application development | | |
| On-line Systems for Management | | |
| Use of Computers in the Office | | |
| Technology Developments | | |
| Use of Minicomputers | | |

7. What objectives have you set for your computer/communications functions?

8. What will be the growth of the corporate EDP budget from:

1975 to 1976 _____% 1976 to 1980 _____%

1976 to 1977 _____%

9. In 1975 many organizations, because of the recession, placed restrictions on EDP. If you did so, have these now been removed?

10. What is your attitude to using outside computer services instead of, or as well as, internal EDP?

STUDY TITLE: INFORMATION PROCESSING (EDP) PLANS
TYPE OF INTERVIEW: USER-EDP MANAGER

PURPOSE: This interview will investigate EDP plans and budgets, and the effects of the economic recovery on EDP.

1. a) Please indicate the level of centralization of EDP control in your company:

_____ completely centralized

_____ partially centralized

_____ decentralized

b) For centralization of processing, please indicate how many computer sites your company has/will have:

| | <u>1976</u> | <u>1978</u> |
|---------------------------------|-------------|-------------|
| Major (System 135 or larger) .. | _____ | _____ |
| Minor | _____ | _____ |
| Mini | _____ | _____ |

2. What levels of growth are you using for EDP planning and budgeting purposes?

National 1976 _____

Industry 1976 _____

Company 1976 _____ Company 1977-1981 _____

3. a) Based on these growth levels what will be the growth of the corporate EDP budget?

1975 to 1976 _____

1976 to 1977 _____

1977 to 1981 _____

b) What is the EDP budget per year? \$ _____
Please give as a percentage of sales if you can't give absolute figures. _____%

4. What major objectives do you have for EDP,

... in 1976:

... in 1977:

... in 1980:

5. Please give the percentage change in expenditures from 1976 to 1977 for each of the following categories and items. Please comment on changes you expect.

a) Category No %Total
 Decr. Change Incr. EDP Budget Comments

| | | | | | |
|--|--|--|--|--|--|
| EQUIPMENT | | | | | |
| Main Computer Processors | | | | | |
| Secondary Computer Processors (satellites, Minis, Turnkey Systems) | | | | | |
| Peripherals | | | | | |
| Terminals | | | | | |
| Data Comm. Equipment (Controllers/Modems) | | | | | |
| Data Entry | | | | | |
| Other Equipment | | | | | |
| PERSONNEL | | | | | |
| Systems & Program. | | | | | |
| Operations | | | | | |
| Administrative | | | | | |

INPUT

No
 Decr. Change Incr. % Total
 EDP Budget Comments

| | | | | | |
|-------------------------------------|--|--|--|--|--|
| OTHER | | | | | |
| Data Communications (line costs) | | | | | |
| Supplies | | | | | |
| Utilities | | | | | |
| Other | | | | | |

b) For budget purposes are mainframe expenditures:

_____ monthly access charges _____ outright purchase
 _____ vendor lease _____ depreciated purchase
 _____ third party lease

c) Of the following uses of terminals, please indicate which will be the most significant reasons for terminal acquisition over the next 3 years. (1 = insignificant, 10 = most significant)

Rank Comment

| | | |
|------------------------|--|--|
| Source Input | | |
| Data Base Inquiry | | |
| Distributed Data Bases | | |
| Interactive T/S | | |
| Remote Job Entry | | |
| Other | | |

6. Please indicate your company's level of use of outside services and software in 1976 and future changes you perceive.

| | 1976 Expenditures | suppliers/ \$ amount | 1977 change | comment |
|---|----------------------|-------------------------|----------------|---------|
| Services | | | | |
| Remote computing -Timesharing -Remote Batch -Data Base | | | | |
| Facilities Management | | | | |
| Software Packages - Systems - Applications | | | | |
| Software Svcs. (contract consulting, design, & program.) | | | | |
| Batch Svcs. (overflow, COM Special Services) | | | | |
| Education | | | | |
| Maintenance | | | | |

7. To your knowledge, what departments in your company use remote computing or other outside services or have bought software?

Department Service Amount

8. Does your EDP management have responsibility for:

| | <u>Yes</u> | <u>No</u> | <u>Comment</u> |
|---|------------|-----------|----------------|
| All communications..... | | | |
| Data communications only | | | |
| Minicomputer/turnkey system purchases | | | |
| Remote computing services purchases (timesharing)..... | | | |
| Office computers..... | | | |
| Other non-EDP functions | | | |

9. In each of the following areas please indicate the major software system used now and future changes you project?

| | System | Change | Comment |
|-----------------------------|--------|--------|---------|
| Operating System | | | |
| Network Software | | | |
| Data Base Management System | | | |

10. a) What applications are most important in your development efforts?

| Now | By 1980 |
|-----|---------|
| | |

b) What influence will the availability of proprietary applications products have on new application installations in your Company?

11. a) What EDP functions or applications processing would you consider contracting out? b) Would you consider a 'computer utility' as an alternative to in-house computers?

c) What is your attitude to using outside services; and software?

12. In network operations, what communications sources do you use now and how will this change in future?

| | <u>%</u> | <u>Comment</u> |
|----------------------------------|----------|----------------|
| Standard Bell System..... | | |
| Specialized Common Carrier | | |
| Satellite (AM Satellite)..... | | |
| Other (Datran)..... | | |
| Value Added Carrier | | |
| (e.g., Telenet, Tymnet) | | |

13. What is the most important computer/communications development in the last year from your viewpoint?

