MULTIFUNCTION EQUIPMENT IN CORPORATE HEADQUARTERS OF MAJOR COMPANIES

INPUT

ABOUT INPUT

THE COMPANY

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

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INPUT

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I INTRODUCTION

- Electronic computers, communications and graphics systems have several common equipment requirements. These include control, or central processing units, power supplies, switches, keyboards, and display devices. A basic multifunction system (MFS) is composed of these common elements. Specialized components are added to the basic system to provide the same functions as two or more individual, standalone systems. Savings in cost and space are realized by this approach. Examples of MFS are:

  - Business data processing system with added word and text processing functions.

  - Text editing system with added computational functions.

  - Copier system with added facsimile and output printer functions.

  - PABX system with added data and text processing functions.

  - Communications network system with added information processing functions.

  - Timesharing system with added communications functions.

- Technically, the possible combinations are almost limitless. However, the transmission of information is subject to government regulation, so some

combinations may be prohibited by the Federal Communications Commission (FCC). Currently the FCC is establishing new rules governing computers, and Congress is considering a rewrite of the 1934 Communications Act.

- This report does not analyze the regulatory issues. The report does consider whether end users would purchase such systems if they were available.

- The first phase of this study examined the small establishment market for MFS. A Phase I report was published in February 1979. This report is part of the Small Establishments Service (SES) program.

- This second phase of the study examines the large organization corporate headquarters market for MFS. This report is not part of any program of INPUT.

- INPUT selected several Fortune 500 companies for Phase II. The companies' managers of data processing, communications and office services were interviewed. Not all of the corporations interviewed have managers with these titles. However, they all do have management people whose job functions and responsibilities closely fit the descriptive titles.

- INPUT's decision to interview three managers rather than a single executive for each company was based on the assumption that:

  - The purchase process will be a "team" decision. Attitudes of all participants must be understood.

  - For large corporations the data processing, communications, and office equipment requirements are too numerous and diverse for one individual to have detailed knowledge of them.

  - It was further assumed that no one individual would have detailed knowledge of the vendors and equipment available to meet these requirements.

- The validity of these assumptions was verified by the interviews. INPUT found that in some companies the three primary interviewees had to consult with subordinates to provide or verify some of the details involved in their responses, and that purchase decisions are indeed a "team" process.

- All of the corporations interviewed have defined their system requirements and have extensive systems in place. However, many of them are aware that their communications systems are outmoded, their data processing systems should be expanded or upgraded, and their office services should be automated.

  - Substantial savings could result from combining suitable functions in each category into a multifunction system or systems. These savings make the multifunction concept very attractive and could provide cost justification for managers who wish to upgrade their equipment and services.

- The report separately analyzes the views of the three types of managers then combines and analyzes these views to provide a composite picture.

- The same multifunction equipment and system descriptions were used when interviewing participants who were employed by:

  - Small establishments.

  - Major corporations.

  In addition, the questionnaires used in the research were essentially identical.

  - Thus, comparisons can be made between both services.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. KEY CONCLUSIONS

- Large corporate users and potential users readily accept the multifunction system concept. They are familiar with all of the potential systems discussed in the reports as noted in Exhibit II-1.

  - This is in contrast to respondents from small establishments who were most positive toward system #1 than to other systems.

- In large corporations multifunction systems will be installed into existing networks and into locations where other equipment is installed. Thus, interface compatibility is a key requirement. This contrasts with small establishments where the multifunction equipment will usually be standalone.

- Information processing and communications managers in large companies think that multifunction systems will be ideal for their branches.

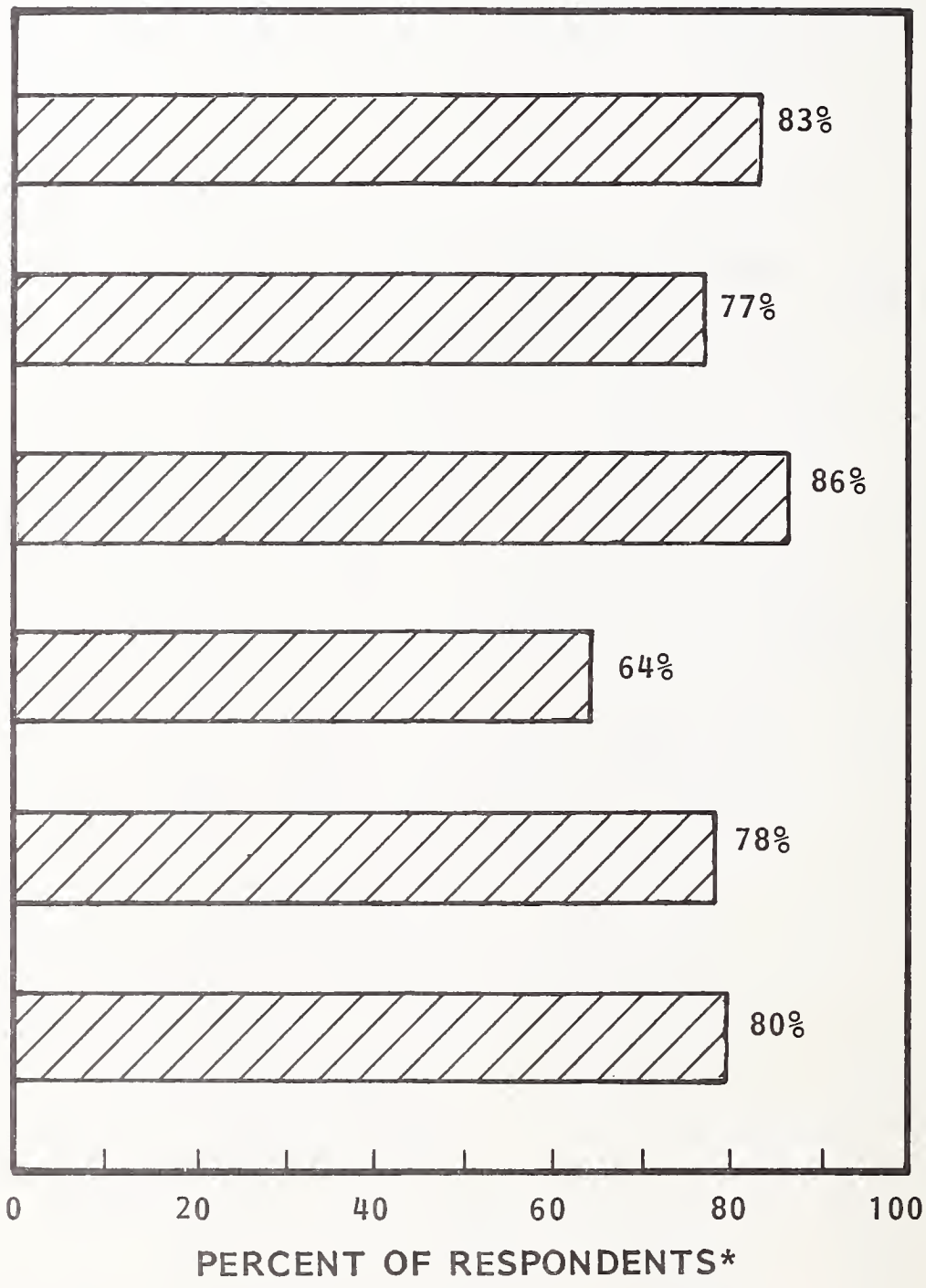
- Functional capabilities and the resultant improvement in people efficiency are more important than equipment cost savings.

- In large corporations the market for multifunction equipment is driven by vendors and supported by knowledgable users; this contrasts with the small establishment marketplace in which the drive will come only from the vendors.

EXHIBIT II-1

ACCEPTANCE OF MULTIFUNCTION SYSTEMS AND SERVICES (BY SYSTEM)

- SYSTEM #1-SMALL BUSINESS COMPUTER WITH ADD-ON TEXT PROCESSING
- SYSTEM #2-TEXT PROCESSOR WITH ADD-ON COMPUTATION
- SYSTEM #3-COPIER WITH ADD-ON FACSIMILE AND OUTPUT PRINTER
- SYSTEM #4-PABX WITH ADD-ON COMPUTATION AND TEXT PROCESSING
- SYSTEM #5-COMMUNICATIONS NETWORK WITH ADD-ON INFORMATION PROCESSING
- SYSTEM #6-TIMESHARING WITH ADD-ON COMMUNICATIONS SERVICES



*PERCENT OF ALL RESPONDENTS WHO WOULD CONSIDER BUYING SUCH A SYSTEM (COMBINED DATA PROCESSING, COMMUNICATIONS, AND OFFICE SERVICES RESPONDENTS)

- Sales of multifunction systems to large corporations will be complex.

- From the vendors' viewpoint, there are no technical barriers to multifunction systems. However, there are some regulatory problems involved with systems which combine communications and computation.

B. LOGICAL MULTIFUNCTION SYSTEMS AND SERVICES

- The multifunction systems and services investigated in this study are identical to those investigated in the study of multifunction equipment and systems in small establishments. This choice was made so that direct comparisons could be made between the attitudes of small establishments and the attitudes of large corporations.

- The systems selected for analysis in this study were picked because vendors will enter the multifunction market with systems expanded from their present products rather than develop an all new product spectrum.

- It is more reasonable that a small business computer manufacturer adds text processing capability to the computer, and that a copier manufacturer add computer output functions to the copier rather than the other way around. For this reason, the multifunction systems and services investigated in this study were selected and defined as follows (see detailed definitions in Chapter IV):

  - System #1 - A small business computer with the added functions of text processing - a logical entry for companies such as IBM, NCR, DEC, MAI.

  - System #2 - A shared logic, multi-station text processor with added data processing functions - a logical entry for companies such as Wang, 3M, Burroughs/Redactron.

- System #3 - An office copier system with added facsimile and output printing functions - a logical entry for companies such as Xerox, Kodak and IBM.

- System #4 - A PABX system with added data or text processing functions - a logical entry for companies such as Northern Telecom and ITT.

- System #5 - A communications network system with added information processing functions - a logical extension of service for value added carriers such as Graphnet, Telenet and Tymnet (if regulatory agencies allow).

- System #6 - A timesharing system with added communication services - logical offerings for companies such as GE, National CSS, and Tymshare (if regulatory agencies allow).

- During the field research for this study, users were asked which systems they would purchase, what features they want, and what they would pay for these systems.

C. ACCEPTANCE OF MULTIFUNCTION SYSTEMS BY USERS

- Many large corporations are already in contact with vendors offering multifunction systems. This is particularly so where an MFS vendor has single function equipment presently installed.

  - Most large corporations are familiar with the concept of MFS, and many keep abreast of vendors' latest offerings. This familiarity is because of the "professional" level of data processing, communications, and office services managers in large corporations, articles in trade journals, and vendor sales efforts.

- In comparison, small establishments were not generally familiar with the concepts. However, when they were introduced to the idea of multifunction equipment they immediately understood it.

- The users' overall response to multifunction systems is presented in Exhibit II-1 by equipment type.

  - The System #1 small business computer based concept is well accepted by a large number of users. It is considered to be most useful at remote locations in a decentralized data processing environment.

    . The use of a System #1 at remote locations could be beneficial to both corporate headquarters and the remote site. The information processing load at the corporate data center could be reduced and information for exclusive use at the remote site could be more rapidly processed.

  - The System #2 text processor concept is acceptable to a fairly large number of potential users. It could be particularly valuable for users with high volume document production.

    . These systems are far more valuable if they can communicate with the corporate data processor and with each other. They are useful in either a centralized or decentralized environment.

  - The System #3 copier-based concept is viewed with the highest degree of acceptance by all information processing users interviewed (although the difference with other systems is not great).

    . The copying and facsimile capabilities both have applications throughout the corporation.

    . It is viewed as being capable of immediately lessening paper processing and distribution problems.

- The System #4, PABX based concept is slightly less readily accepted than any of the other systems. (However it is well accepted, particularly by communications managers.)

  . Generally it is not easy for most users to see text or computational capabilities linked to a PABX system.

  . Communications oriented users could visualize a PABX based system with additional capabilities, particularly for text processing.

- System #5, Communications Network based concept, and System #6, Timesharing Services based concept, are both readily accepted by almost all users. The FCC regulatory limitations were not addressed. However, if the FCC permits combining voice network and data processing systems, most corporations will be ready to go with the combination.

• In both corporate headquarters of large companies and small establishments the major driving force for multifunction equipment and systems are related to cost savings for people. User perceptions of multifunction systems are highlighted in Exhibit II-2.

- The advantages summarized by users are improved performance through better responsiveness and fewer operations. Vendors should emphasize these advantages.

- The disadvantages expressed by the users are (both large and small) the possibility of equipment failure impairing several functions, and concern about the system being too complicated to operate easily. Vendors can and should deal directly with both issues.

  . The reliability issue can be met by good equipment design and solid field maintenance organizations.

EXHIBIT II-2

USER PERCEPTIONS OF MULTIFUNCTION SYSTEMS

- KEY ADVANTAGES AS PERCEIVED BY USERS:
  - BETTER RESPONSIVENESS FOR INFORMATION
  - FEWER OPERATIONS REQUIRED TO PROCESS INFORMATION - EASIER TO OPERATE
  - MORE CAPABILITIES FOR EACH FUNCTION
  - LOWER OVERALL COST
- KEY DISADVANTAGES AS PERCEIVED BY USERS:
  - POSSIBILITY OF EQUIPMENT FAILURE WITHOUT BACKUP
  - COMPLEXITIES IN USING EQUIPMENT
  - ONLY ONE FUNCTION HANDLED WELL
  - LARGE INITIAL EXPENSE

. The system complexity issue can also be met by good equipment design, human factors engineering, and customer training.

- Because people savings is the main advantage which users see in MFS they are very reasonable in what they are willing to pay for multifunction systems, as shown in Exhibit II-3.

  - Many users are willing to pay the equivalent of the replaced costs by combining two systems into one. Vendors should be able to meet this goal.

  - Many users want a savings over current costs. The 20% savings indicated is reasonable and attainable.

D. VENDOR ATTITUDES

- The multifunction systems market will be driven by vendors, and vendors show a strong interest in this area. Vendors interviewed believe that they must get into the field and move into other vendors' markets before the other vendors move into their markets. Vendors interviewed believe that:

  - Users will benefit from improved performance as well as cost savings.

  - Office and paper oriented businesses are prime candidates.

  - Marketing and support will be a problem.

- All vendors interviewed are now offering or planning to offer multifunction systems.

EXHIBIT II-3

RESPONDENTS' WILLINGNESS TO PAY FOR
MULTIFUNCTION SYSTEMS

SYSTEM TYPES	PERCENT OF RESPONDENTS WILLING TO PAY AT LEAST AS MUCH AS REPLACED COSTS	COST SAVINGS REQUIRED AS PERCENT OF CURRENT COST
• SYSTEM #1-SMALL BUSINESS COMPUTER WITH ADD-ON TEXT PROCESSING	31%	20%
• SYSTEM #2-TEXT PROCESSING WITH ADD-ON COMPUTATION	33%	20%
• SYSTEM #3-COPIER WITH ADD-ON FACSIMILE AND OUTPUT PRINTER	INSUFFICIENT DATA	20%
• SYSTEM #4-PABX WITH ADD-ON COMPUTATION AND TEXT PROCESSING	50%	20%
• SYSTEM #5-COMMUNICATIONS NETWORK WITH ADD-ON INFORMATION PROCESSING	50%	INSUFFICIENT DATA
• SYSTEM #6-TIMESHARING WITH ADD-ON COMMUNICATIONS SERVICES	25%	INSUFFICIENT DATA

RESPONDENTS ARE: DATA PROCESSING MANAGERS-SYSTEMS#1&#6;
OFFICE SERVICES MANAGERS-SYSTEMS #2 & #3;
COMMUNICATIONS MANAGERS-SYSTEMS #4 & #5.

E. VENDOR RECOMMENDATIONS

- Vendors should be discussing multifunction systems with large corporate users. These discussions should include:

  - Future or present vendor offerings of MFS.

  - Interface requirements for existing single function vendor offerings.

- Sales literature should emphasize how products can work with a variety of systems. Literature should be written so that it can be understood by a broad range of user managers.

- A marketing approach must be developed to relate to the multidisciplinary corporate teams which are now frequently employed to consider the purchase of information processing equipment and services.

- Vendors should have a national accounts sales structure to coordinate sales of MFS between corporate headquarters and branch offices.

- Vendors should become involved with the users before the decision phase begins. Salesmen and technical support personnel should be assisting the users' technical experts during the early planning stage.

- Sales approaches should emphasize productivity through improved functions, fewer operations and system responsiveness. These improvements should then be translated into cost savings.

- The vendor approach to MFS in large corporations should stress that installation of new products can be accomplished without dislocating or disrupting current operations.

- Products should be modular so that users can develop their own systems at rates they can choose.

III THE UNIQUE PROBLEMS AND OPPORTUNITIES OF LARGE ORGANIZATIONS

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A. INFORMATION CHARACTERISTICS

- Most large organizations have two problems in common: Continuous growth of information processing requirements and intermittent integration of new technologies into their existing systems.

- The data processing installation handles an increasing volume of business accounting, government reporting, and administrative data.

  - Data processing equipment has gone through several generations to take advantage of newer, greater capacity, faster computers.

  - Most large corporations perform the bulk of their computer operations in-house rather than at service bureaus.

- The volume of data and consequent delays in processing have led many corporations toward decentralized computing operations.

  - Decentralization allows individual departments to establish priorities.

  - On-line machine to machine operations are faster than batch processing. Turnaround time is shorter.

- Some terminals may be operated in a standalone mode as well as on-line. This allows some tasks to be performed more efficiently (simpler programming) than they would be on the large machine.

- The disadvantage of decentralization is possible loss of control. Overall supervision must be exercised to avoid equipment incompatibilities and maintain line discipline (protocol).

- The growth of business communications is as explosive as the growth of business computing. Business communications include both voice and paper communications.

- Telephone equipment has incorporated new technologies to increase efficiency and reduce costs while maintaining responsiveness and providing additional services.

- The new telephone systems are easier to operate, occupy less space and are more esthetically pleasing than older systems. They also consume less energy and require less maintenance.

  - Although older telephone equipment is expensive to maintain and operate, replacing an entire system in a short period of time is expensive and disruptive. The equipment is spread throughout the company and is vital to most operations.

  - The problem any corporation has is to maintain responsiveness while replacing or upgrading its telephone system to take advantage of technological improvements.

- Despite predictions for the future, the paperless society has not yet arrived. In fact, there has been an exponential increase in the amount of information processed and distributed on paper.

- Paper processing of information is the least automated of the three methods considered in this study, although high-speed copiers and word processing terminals are fairly common. Most corporations have a variety of each while still maintaining hundreds of typewriters. Distribution is still largely accomplished by messenger and routing slips - a time consuming process with built-in delays.

- Although the aggregate cost of office services equipment is quite large, the price of individual items is seldom large enough to attract top management attention and the aggregate is diffused throughout the company. For this reason, office service management is the least structured of the three areas.

  - Administrative managers frequently establish loose requirements for paper information processing without strict equipment definition.

  - The acquisition of suitable equipment is left to the purchasing department where price often outweighs suitability.

  - As a result, a large variety of equipment is used for dictating, typing, copying and duplicating information. This equipment varies widely in quality and reliability. Quite often, equipment used by one group is not compatible with equipment used by another. This makes it difficult to distribute the work load and maintain a continuous flow.

- Text and word processing equipment is beginning to expedite the production of documents and their reproduction is being improved by new copying and duplicating equipment.

  - Some organizations with in-house printing facilities are using a systems approach wherein the word processor outputs are directly connected to the input of a computer-controlled phototypesetter. The capital expenditures for such a system are large enough to attract management attention. Consequently, control is being exercised to assure equipment compatibility and avoid unnecessary duplication of facilities.

- Many large organizations have well developed plans to merge data processing and voice communications. Most of these plans are in various stages of implementation.

  - There is a growing awareness that including word processing in the merger is highly desirable. Many corporations have pilot programs underway to investigate this possibility.

- The resulting system would be a "system of systems" providing a compatible, flexible total communications capability.

  - A few corporations have formal planning committees to investigate the possibilities for such a system. User departments as well as information services managers are represented on the committee.

- Contradictory as it may be, the technology that makes these systems possible is the principal impediment to their creation. Corporations are reluctant to invest the required money and resources in a system that may soon be outstripped by newer systems with even more advanced technology.

  - Vendors who can form a total system, which is essentially an EDP system, a communications system, and a word processing system tied together with software, will have a winner providing: they can demonstrate that incorporating improvements and additional features will be largely a matter of software changes with minimal new hardware or modifications.

B. CURRENT INFORMATION SYSTEMS USE

- Exhibits III-1 through III-4 show how the information processing requirements of large corporation headquarters are currently being met. The exhibits reflect the viewpoints of managers in three separate areas of corporate responsibility:

  - Data processing equipment and computer services.

  - Communications and telecommunications equipment and services.

  - Administrative office equipment and services.

- Ninety-seven managers at 43 corporate headquarters were interviewed. Their combined viewpoints are also presented. The information in the exhibits should be compared to the respondents' attitudes towards multifunction equipment as discussed in Chapter VI.

- The data processing respondents manage departments which include responsibility for equipment, personnel and outside services. The average size of staff is 263 employees including systems and applications programmers, data entry operators, technicians, and supervisors or managers for each group.

- The communications respondents manage departments which include the responsibility for equipment, personnel, and outside services. There are generally less than 20 company employees in the communications area. The telephone company equipment is maintained and serviced by its own employees.

- The office service respondents usually have highly decentralized, broad service operations, which are the least structured of the three areas.

EXHIBIT III-1

CURRENT INFORMATION SYSTEMS USAGE
DATA PROCESSING

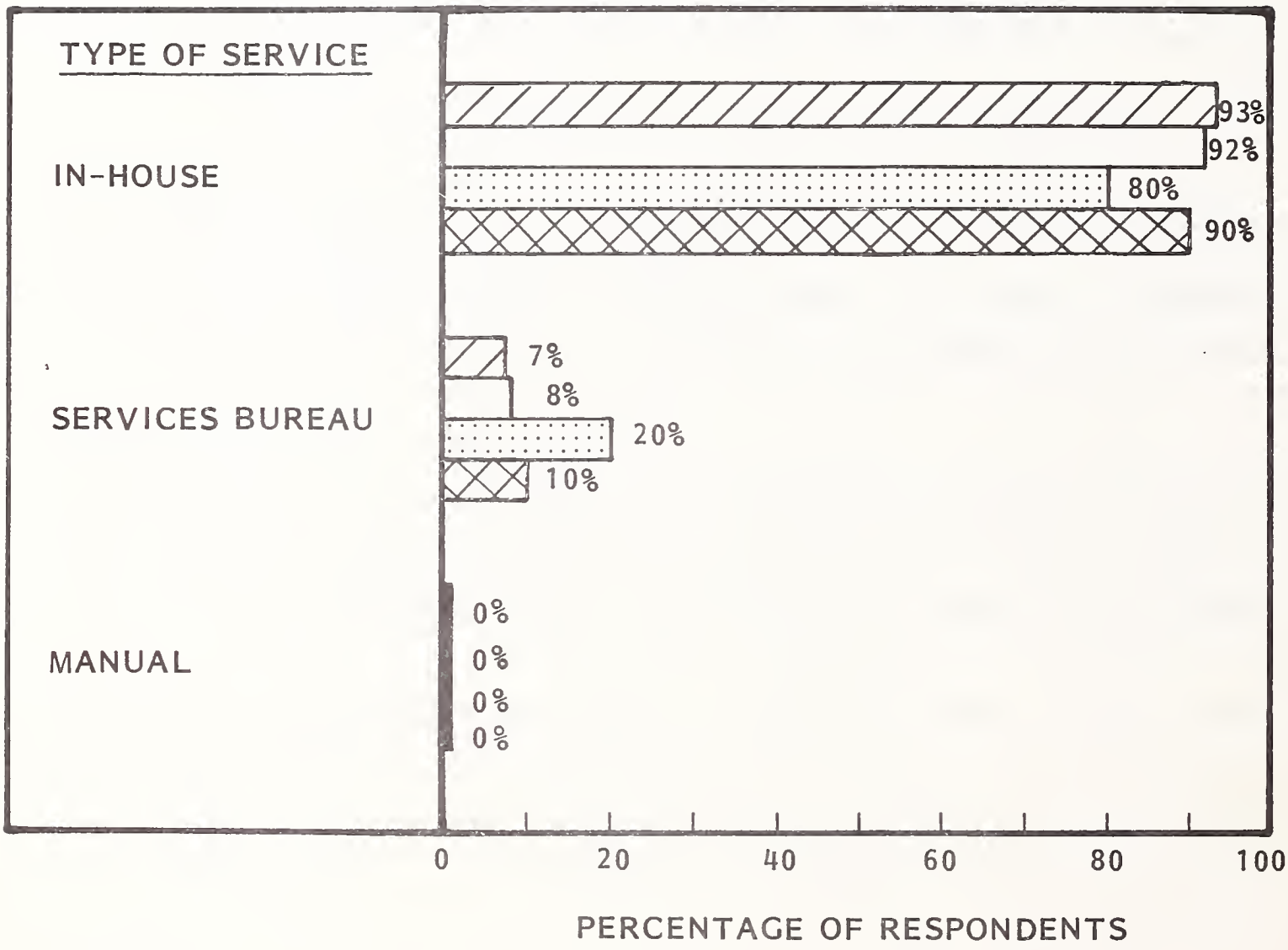
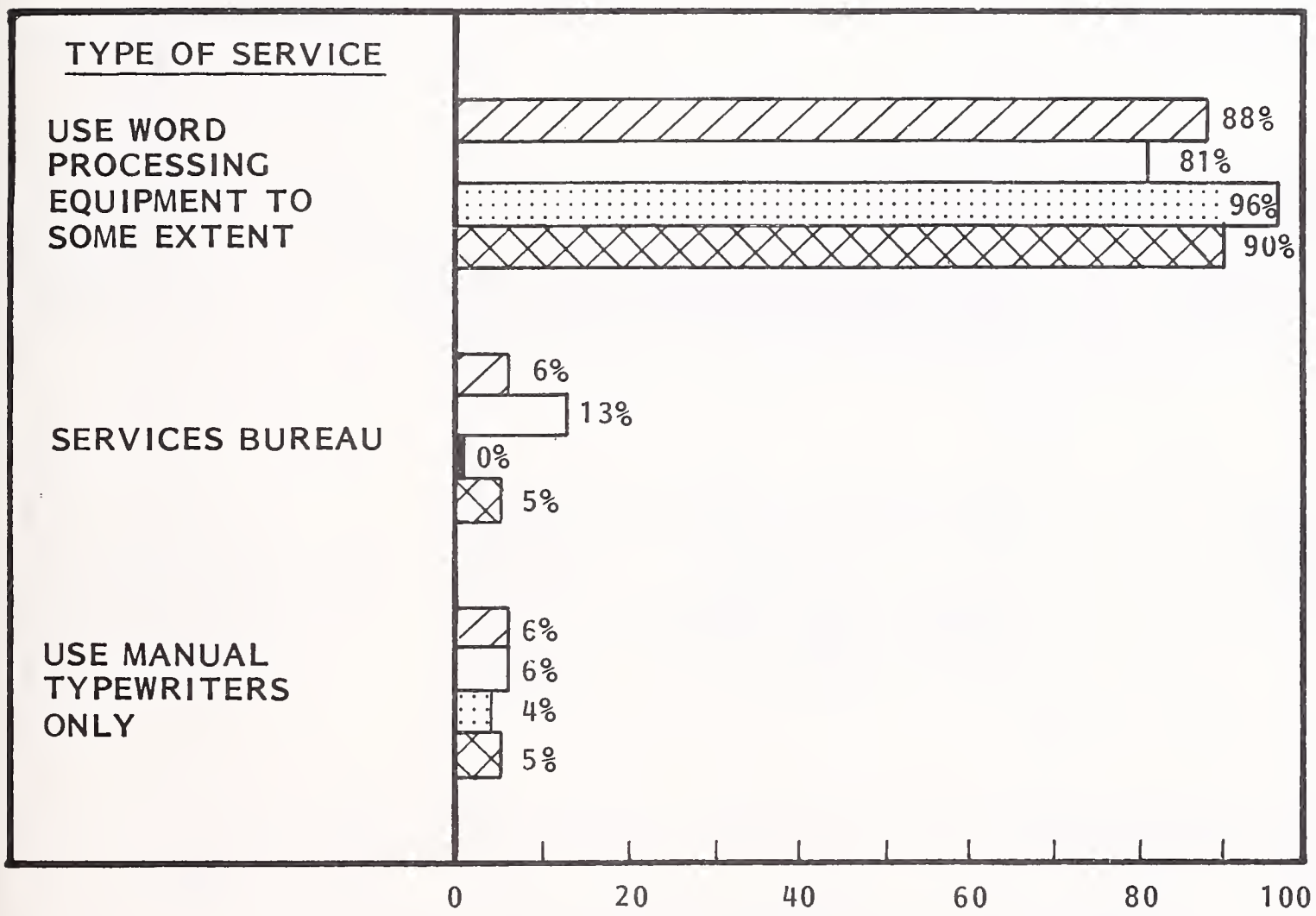


EXHIBIT III-2

CURRENT INFORMATION SYSTEMS USAGE
WORD PROCESSING



DATA PROCESSING RESPONDENTS

COMMUNICATIONS RESPONDENTS

OFFICE SERVICES RESPONDENTS

COMBINED RESPONSES

EXHIBIT III-3

CURRENT INFORMATION SYSTEMS USAGE
VOICE COMMUNICATIONS

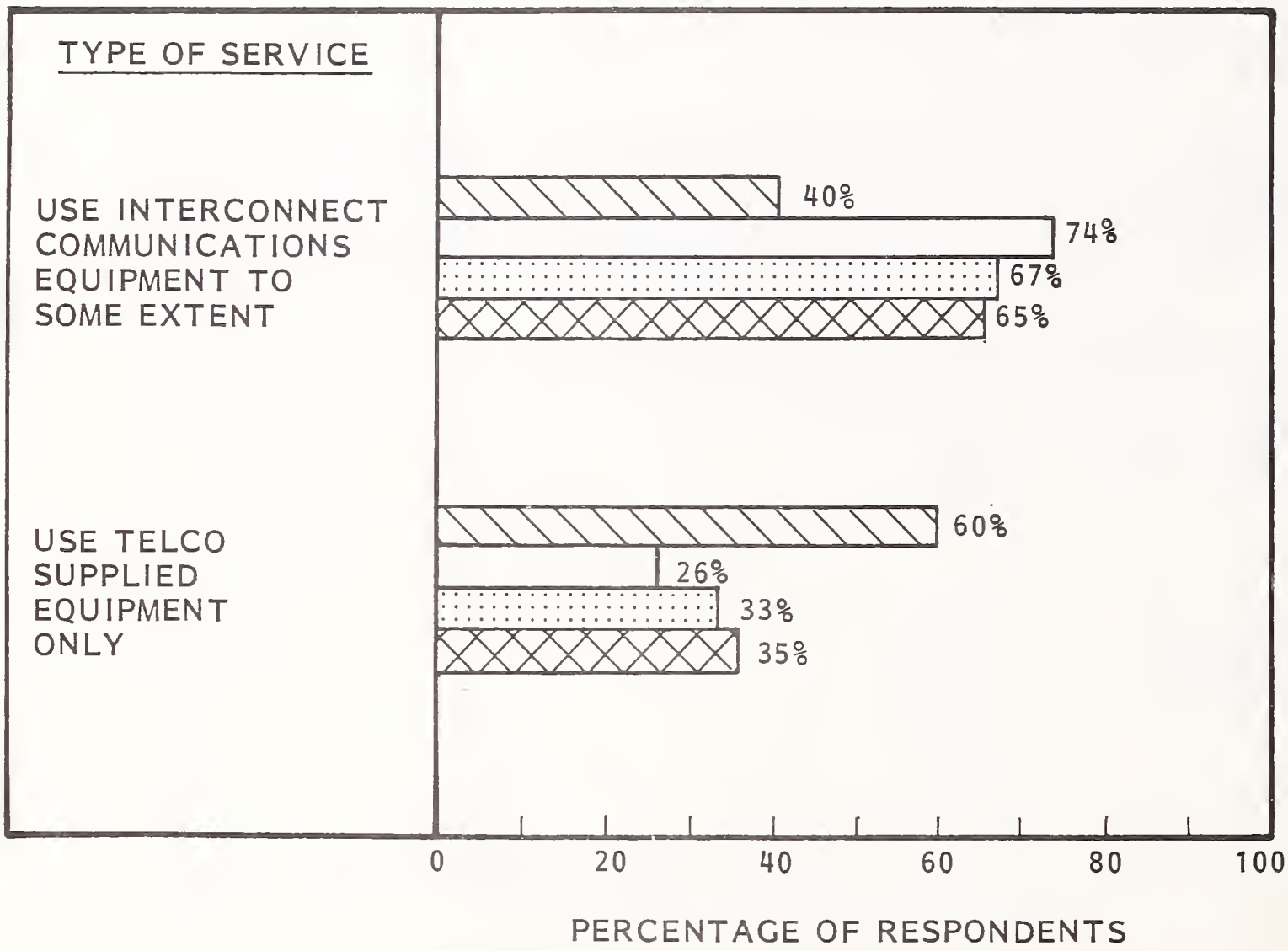
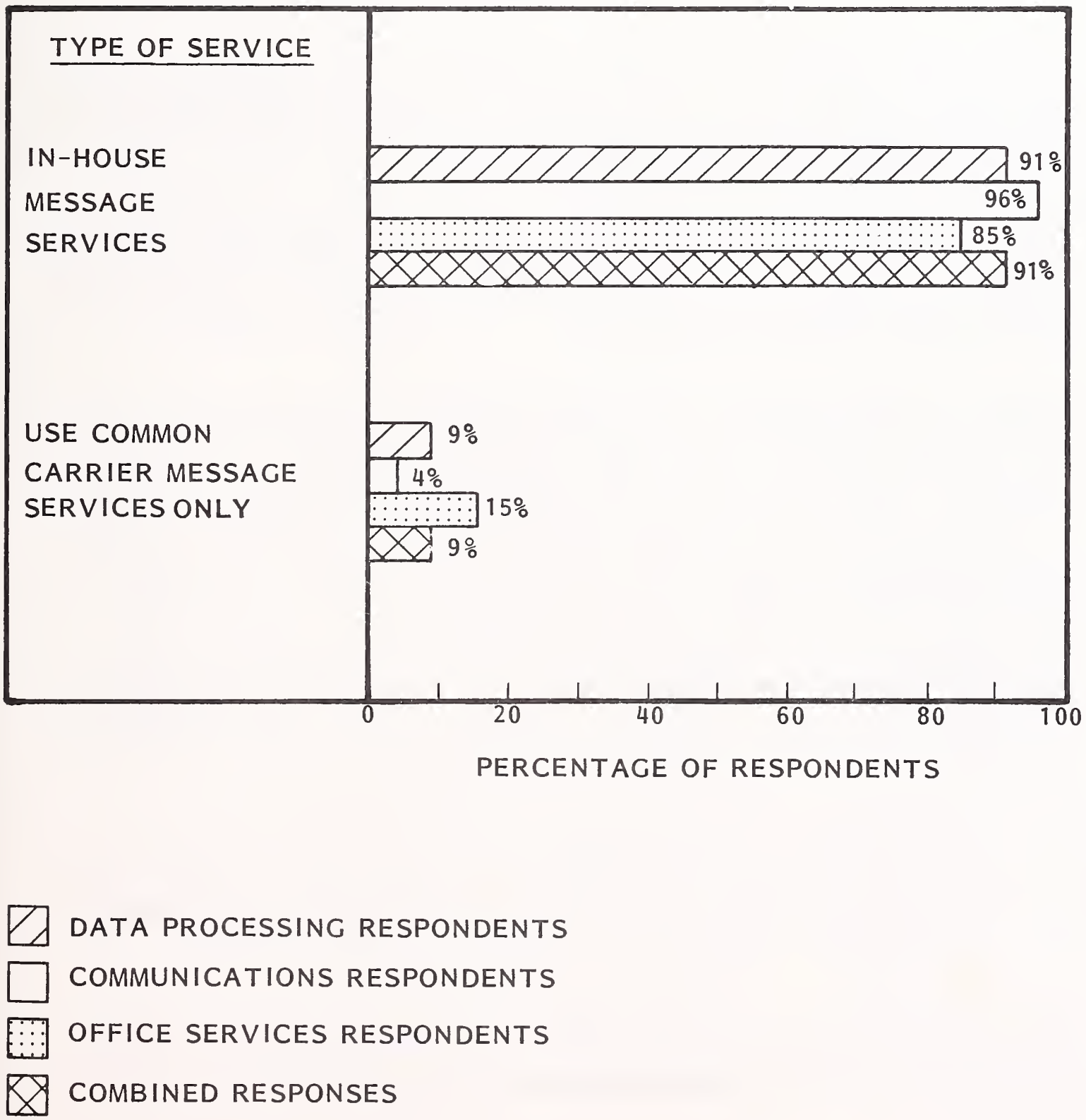


EXHIBIT III-4

CURRENT INFORMATION SYSTEMS USAGE
COMMUNICATIONS MESSAGE SERVICES



- Exhibit III-1 shows that:

  - Ninety-three percent of the large corporations interviewed use in-house computers for data processing operations.

- This accounts for the large staff employed to operate, maintain, and provide programming support. The corporate data center may be in a different location from corporate headquarters, and the data processing may be decentralized but the operation is considered to be in-house.

- Exhibit III-2 shows the responses of all three groups to the use of word processing equipment. The office services interviewees indicated 96% of the companies interviewed on intelligent typewriters.

- Every corporation interviewed has a variety of copying and duplicating equipment installed. These range from table top convenience copiers to high speed copying and collating equipment.

- Exhibit III-3 shows 74% of the communications departments use voice communications equipment other than equipment supplied by the telephone company. The response from communications managers shows that often a combination of telephone company and private line services from specialized common carriers is in use.

- Exhibit III-4 shows that 96% of the corporate headquarters interviewed have established their own intracompany message services. Four percent were using only message services supplied by the telephone company.

  - The use of an in-house computer network for internal facsimile and electronic messages was frequently mentioned by communications respondents.

- Among the companies interviewed, 52% had timesharing capabilities in-house, as indicated by data processing respondents.

- Many respondents indicated a combination of an in-house timeshared computer and the purchase of commercial timesharing services.

- The use of in-house computers for timesharing is increasing. The applications are for scientific calculations, problem solving and program development.

C. INFORMATION REQUIREMENTS

- The information processing requirements of Fortune 500 size companies are large, diverse, and complex. In any healthy, growing organization, the growth is reflected in profits and felt in the persistently increasing need for more information processing including:

  - Data processing.

  - Communications handling.

  - Paper oriented processing.

- Corporations of this large size have a great deal of data processing and communications equipment installed and operating under the supervision of well-defined and organized departments. Office services equipment is not as well organized.

  - There is a large variety and quantity of equipment serving the company paper-oriented processing requirements. However, only recently has there been an effort to put all of the paper-oriented processing equipment and services under one management.

- Many corporate managers are trying to achieve systems compatibility in the areas of communicating, computing, text editing, collecting and reproducing.

New equipment must be able, or adaptable, to interface with the existing computer and communications network.

I. DATA PROCESSING

- For years, large organizations have been using mainframe computers for administrative data. Over the years, additional computer applications have been put to use within the corporation. Today computer applications can be categorized into four major areas:

  . Administrative.

  . Operational.

  . Problem solving.

  . Program development.

  - The corporate EDP installation usually handles the administrative data processing by a central computer or a distributed data processing network. Either system may be combined with timesharing services for specialized applications.

  - Data processing for operations applications is usually performed by distributed systems or local standalone computers.

  - Problem solving computation is usually handled by timesharing, small standalone scientific computers or desk top programmable calculators.

  - Program development activity is most often performed on interactive timesharing terminals.

- The complexity and variety of methods and equipment used for computing within a large organization has grown proportionately with the growth of data processing requirements.

  - The EDP manager is increasingly faced with the need for equipment compatibility. This is particularly true for remote locations. The Multifunction Systems (MFS) vendor must be knowledgeable of the corporation's installed system when dealing with computer managers.

  - Data processing managers are beginning to coordinate system plans not only with communications managers but with office services managers. All are looking at the potential of integrated information processing.

- The vendor of multifunction systems should keep in mind the compatibility requirements for all types of information processing systems.

- Vendors selling in the lucrative remote site market have to know the characteristics of the equipment at other sites. If the sites are to be connected by data communications links, the vendor must also be familiar with EIA standards RS 232C, RS 422 and RS 423. If he is dealing in the international market, he must be familiar with CCITT recommendations V24, V28 and V35. He should also consult the local licensing authority to be sure there are no other recommendations or regulations governing interconnections.

2. TEXT PROCESSING AND COPIER BASED SYSTEMS

- Standalone and shared logic word processors are common in large organizations. The requirement is for more systems with greater storage capacity and more intelligence, without increasing the complexity of operation.

  - The problem in many organizations is the lack of compatibility among the word processing systems installed. Furthermore, the growing desire and need is to interface to the central computer.

- Many office services managers are now considering pilot projects for systems that will interact with computers, photocomposers and telecommunications equipment. These managers are coordinating closely with the managers of data processing and telecommunications for:

  - Equipment compatibility.

  - Communications protocols.

  - Interchangeable storage media.

- Copier systems with incorporated intelligence are only penetrating the surface of large organizations. The advantages of such a system are not too apparent to office services managers. Their primary concern is that of reproduction quality.

  - However, all respondents agreed that facsimile output is the function they would want most on a copier based MFS.

3. PABX AND COMMUNICATIONS EQUIPMENT AND SERVICES

- For large organizations, the problem is always how to modernize their communication system cost effectively. In recent years, the need for integrating data and voice communications has increased.

  - Communications managers are familiar with leased line and interconnect tariffs and with sophisticated computerized PABX.

  - The need to integrate voice, data, and text into the corporate communications network is leading many communications managers to hire communications systems consultants to assist in the integration.

- The vendors of MFS equipment based on a PABX or a communications network will need to demonstrate the integration capabilities of their systems.

- Vendors will gain a marketing advantage if their systems provide video conferencing as an option or future add-on, for use when wide band communication networks are installed.

D. ORGANIZATION OF LARGE CORPORATION HEADQUARTERS

- Large corporations are highly structured organizations with many layers of management. Each department has its own management hierarchy, reporting to a higher corporate management level. The approval for large purchases of capital equipment is often a time consuming process and can be frustrating to vendors and line managers alike.

  - In a large company there is often a manager of information, or administrative services at the Vice Presidential level to whom the managers of information processing departments report. The department recommendations must be approved by this Vice President before submission to budget and finance.

  - The department's professional staff must prepare a detailed technical and financial justification for the acquisition. Vendors are often asked to supply data and exhibits to support these justifications.

- Once approval is obtained, actual purchase may be delayed a year or more by budgetary considerations.

- Substantial purchases are usually subject to competitive bidding.

E. EXPENDITURES OF LARGE ORGANIZATIONS ON INFORMATION PROCESSING EQUIPMENT AND SERVICES

- Expenditures of large companies for information processing equipment and services are well established budget items.

  - Departmental budgets normally include equipment, service and salary expenditures. These are expected to increase between 10-15% annually through 1981. Few corporations have made budget estimates beyond that year.

- Data processing budgets for the companies interviewed for this study ranged from $1 million to $5 million for 1978, excluding the extremes. Temporary increases of 15-25% over the previous years' budget coincided with the purchase of new equipment.

  - Data processing department staffs are normally much larger than either communications or office services, often 5-10 times larger.

- Communications budgets for the companies interviewed are only slightly smaller than data processing budgets. However, the size of employee staff in communications is much smaller. So higher proportion of the budget is allocated to equipment and services. (Mostly communications services.)

  - Excluding the extremes, communications budgets for companies interviewed ranged from $750,000 to $5 million in 1978. Annual budget increases of 6-10% are anticipated through 1981. (Considerably greater for data communictions.)

- Office services budgets for the companies interviewed are slightly smaller than communications budgets. The size of employee staff is about the same as for communications; often 5-10 times smaller than the data processing staff. However, the majority of equipment operators are spread throughout the organization rather than under the supervision of office services.

  - Excluding the extremes, office services budgets ranged from $275,000 to $4 million in 1978. Annual budget increases of 6-8% are anticipated through 1981.

F. SECRETARIAL COSTS

NOTE: The information presented in this Section (F) was extracted from a previous INPUT report "Multifunction Equipment in Small Establishments" dated January 1979.

- INPUT has completed a study on the quantity of documents prepared by secretarial employees. Availability of data was made possible through an INPUT staff member who is also a member of the National Secretaries Association.

  - Using a portion of the membership list of the National Secretaries Association, INPUT mailed out questionnaires to a small list of organization members. This report section is a summary of some key results obtained from 30 completed questionnaires.

- The research on secretarial work rates and wage rates was undertaken to obtain data by which to judge the benefits of multifunction data/text equipment. It provides information about how much money is spent on typing so that the value of equipment to increase the efficiency of typing can be derived.

- Although the sample is relatively small and wage rates and time spent typing is quite variable by sector and job assignment, the study shows that there is a considerable opportunity to justify multifunction equipment by time saved only. Note that there are many other advantages to MFS (Chapter VI).

- The respondents stated that about 22% of office personnel are secretaries. This result also agrees with data obtained from the United States Census Bureau.

  - Secretarial personnel are divided into two categories: executive secretaries and clerk/typists.

    . Sixty-seven percent of the secretarial personnel are clerk/typists.

    . Thirty-three percent of the secretarial personnel are executive secretaries.

  - Exhibit III-5 shows that an executive secretary spends about 32.5% of her time performing typing functions and earns (summer 1978) from $595 to $1,300 per month. A clerk/typist spends about 60% of her time typing and earns from $520 to $1,031 per month.

  - Exhibit III-6 shows typing rates, percentage of time spent retyping (which can be very significantly reduced by text processing and is now 9.3%) and number of copies per typed page (2.6 copies).

- The key analysis of this section is shown in Exhibits III-7 and III-8. Exhibit III-7 shows the cost factors involved in typing. By taking an average secretary's salary and adding 50% overhead, a cost per week for an executive secretary, and for a clerk/typist can be derived. Utilizing the percentage of time spent typing, the cost per month for typing is obtained. For a:

EXHIBIT III-5

SECRETARIAL AND CLERICAL COSTS
AND TIME DISTRIBUTION

SALARIES AND TIME DISTRIBUTION	SECRETARIES	CLERK/ TYPISTS
SALARIES ($ PER MONTH)		
AVERAGE ($ PER MONTH)	$1,025.	$765.
RANGE ($ PER MONTH)	595.-1,300.	520.-1,031.
TIME DISTRIBUTION		
HOURS PER DAY (% OF TIME)		
ADMINISTRATIVE	2.8-(35%)	0.5-(6.25%)
TYPING	2.6-(32.5%)	4.8-(60%)
DICTATION	0.5-(6.25%)	-
COPYING	0.6-(7.5%)	1.2-(15%)
PHONE	1.5-(18.75%)	1.5-(18.75%)

EXHIBIT III-6

SECRETARIAL AND CLERICAL TYPING RATES

TYPING STATISTICS	WORK OUTPUT
TYPING RATE (TYPED PAGES PER HOUR)	6.4 PAGES
PERCENT OF PAGES RETYPED	9.3%
EFFECTIVE TYPING RATE (PAGES PER MINUTE MINUS PAGES WHICH MUST BE RETYPED)	5.8 PAGES
COPIES/TYPED PAGE	2.6 COPIES

EXHIBIT III-7

COST FACTORS INVOLVED IN TYPING

JOB TITLES	COST
• CLERK/ TYPIST	
AVERAGE SALARY	$183 PER WEEK
AVERAGE COST AT 50% OVERHEAD	$273 PER WEEK
AVERAGE COST PER HOUR	$6.8 PER HOUR
AVERAGE COST FOR TYPING PER WEEK (60% TIME TYPING)	$164 PER WEEK
AVERAGE COST FOR TYPING PER MONTH (4.3 WEEKS PER MONTH)	$705 PER MONTH
• EXECUTIVE SECRETARY	
AVERAGE SALARY	$232 PER WEEK
AVERAGE COST AT 50% OVERHEAD	$348 PER WEEK
AVERAGE COST PER HOUR	$8.7 PER HOUR
AVERAGE COST FOR TYPING PER WEEK (32.5% TIME TYPING)	$113 PER WEEK
AVERAGE COST FOR TYPING PER MONTH (4.3 WEEKS PER MONTH)	$486 PER WEEK

EXHIBIT III-8

VALUE OF ADDING TEXT EDITING

NUMBER OF EMPLOYEES PERFORMING TYPING FUNCTIONS	COST/MONTH SPENT TYPING (IN DOLLARS)	AT 20% SAVINGS VALUE/MONTH OF TEXT EDITING	TOTAL VALUE AMORTIZED OVER 36 MONTHS
1 CLERK/TYPIST	$705	$141	$5,076
2 CLERK/TYPIST	1,410	282	10,152
1 EXECUTIVE/ SECRETARY	486	97	3,492
2 EXECUTIVE/ SECRETARY	972	194	6,984
3 EXECUTIVE/ SECRETARY	$1,458	$291	$10,476

- Clerk/typist, this is $705 per month and at 5.8 pages per hour is $1.21 per page (including retyping).

- Executive secretary, this is $486 per month and at 5.8 pages per hours is $1.55 per page (including retyping).

- Exhibit III-8 shows that assuming a 20% decrease in typing cost can be obtained through text editing, the savings equated in equipment amortized over three years are:

  - $5,076 for each clerk/typist.

  - $3,492 for each executive secretary.

- This cost is quite conservative as an estimate of the value of adding text editing to another type of system, and even if it is assumed that a user will want to obtain even greater cost savings, the cost benefit for text editing multifunction equipment exists now. Work station add ons at a cost of $3,500 to $5,000, are now obtainable with a typewriter output device or with a keyboard and CRT display.

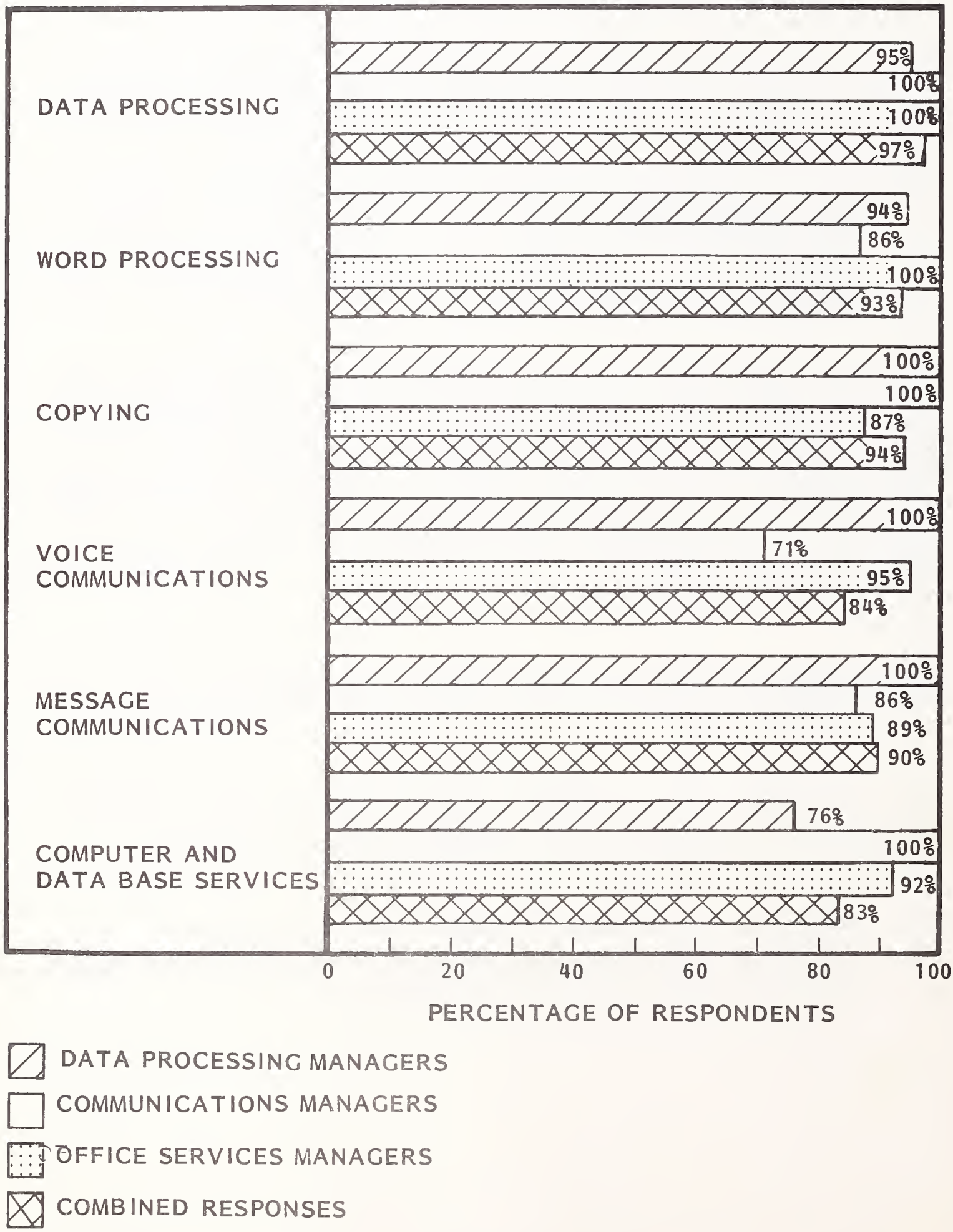
G. USER SATISFACTION WITH CURRENT PRODUCTS AND SERVICES

- Interviewees were asked whether or not they were generally satisfied with current products and services. The results are presented in Exhibit III-9.

  - The results are generally favorable. This was expected since most interviewees have a major influence upon the selection of the products and services within their specific operating areas.

EXHIBIT III-9

PERCENTAGE OF RESPONDENTS EXPRESSING SATISFACTION
WITH CURRENT PRODUCTS OR SERVICES



- Despite the general satisfaction reflected by Exhibit III-9, respondents in each group expressed dissatisfaction in at least one area of their equipment responsibilities.

  - Data processing managers are dissatisfied with timesharing computation services.

  - Communications managers are dissatisfied with voice communications equipment.

  - Office services managers are dissatisfied with copying equipment.

- Another apparent contradiction to the expressed satisfaction is the number of changes which are in progress or contemplated. However, some of these changes are simply upgrading or expanding existing equipment. Exhibit III-10 shows the change factor in each area as a percentage of its total respondents.

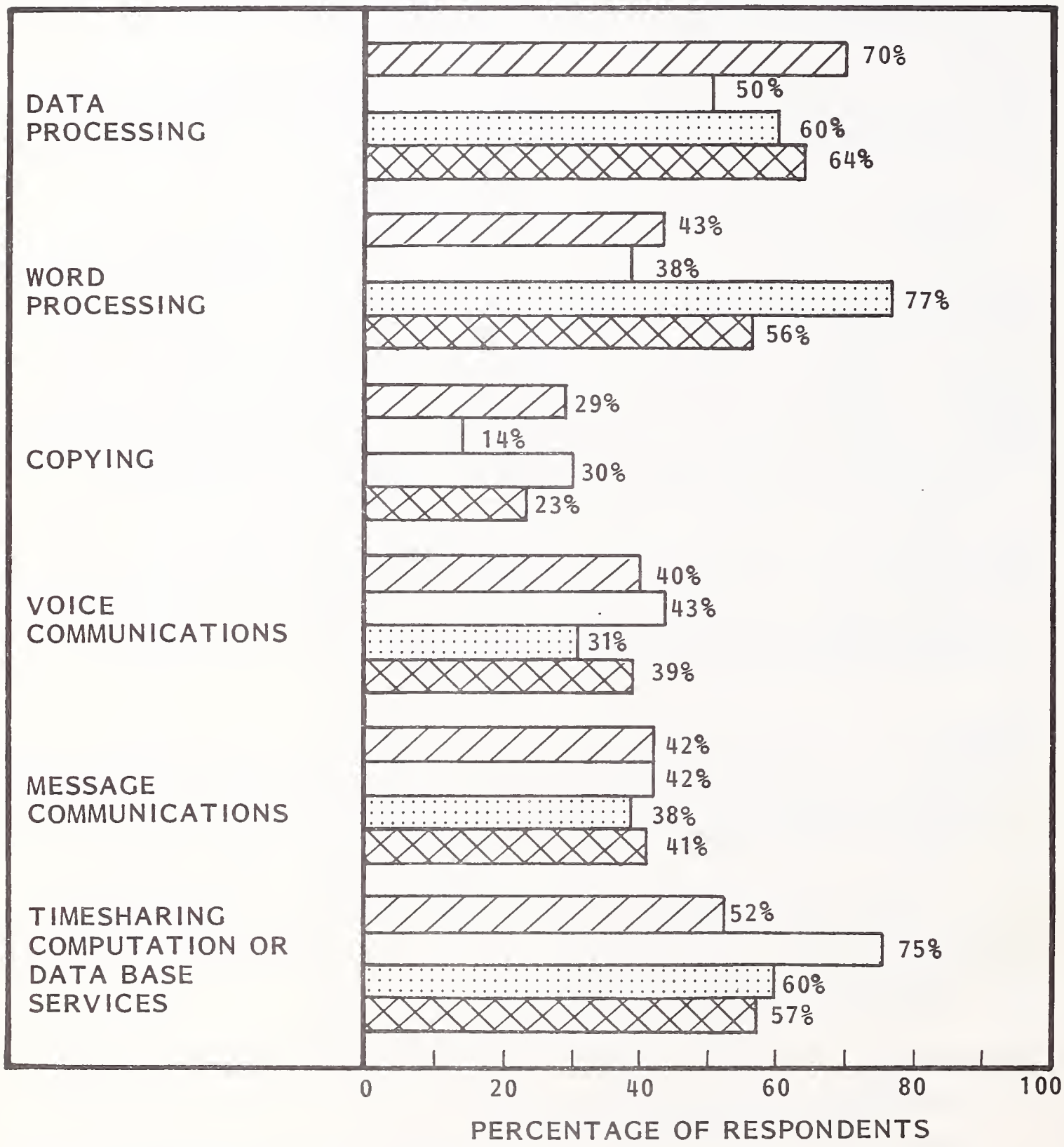
  - Ninety-five percent of the data processing respondents expressed satisfaction with their present system. However, 70% indicated changes were planned; generally to upgrade or expand the mainframe and to provide more memory storage capacity.

  - All office service managers expressed satisfaction with their current word processing operations. However, 77% are planning changes and many have pilot projects underway or scheduled. Most often, the changes are to add new, computer-based, standalone or shared logic word processors. Many of the new systems will be compatible with the data processing computer system.

  - By way of contrast, 87% of office service managers expressed satisfaction with copying equipment. However, of office services respondents, only 30% indicated plans for change. The principal area of dissatisfaction is the reproduction quality of convenience copiers.

EXHIBIT III-10

PERCENTAGE OF RESPONDENTS PLANNING OR CONSIDERING A CHANGE IN CURRENT PRODUCTS OR SERVICES



- Among communications respondents 43% are planning changes in their phone system, even though 71% expressed satisfaction. Changes mostly call for upgrading outmoded equipment. The complaints centered around the higher cost of maintaining and servicing outmoded equipment.

- A higher percentage of communications respondents, 86%, expressed satisfaction with electronic message services, other than voice. However, 42% are considering adding some kind of electronic mail capability, such as facsimile, to supplement or largely replace their current message communication services.

- Among data processing respondents 76% expressed satisfaction with their timesharing services. However, 52% are planning changes in the service. Most of the changes involve doing more of the interactive computing on their in-house, time-shared computers. This is considered to be more cost effective than commercial timesharing services.

- Although all respondents expressed a general satisfaction with current systems, it was often qualified by statements such as:

  - "More satisfied than dissatisfied."

  - "Need to expand and upgrade."

- Both telephone and on-site interviews revealed specific areas of dissatisfaction as shown by the following paraphrased comments.

  - Data processing equipment services need to be faster and have more memory storage capacity.

  - We need to move towards distributed data processing, to bring the computer access closer to the user.

- Our communications equipment and services need upgrading - they are obsolete and costly. Monitoring and control equipment are sorely needed.

- Copying equipment and services are too inefficient and costly. There are lots of maintenance problems - even with the best of equipment.

IV DEFINING MULTIFUNCTION SYSTEMS FOR POTENTIAL USERS

IV DEFINING MULTIFUNCTION SYSTEMS FOR POTENTIAL USERS

A. THE CONCEPT AND IMPETUS

- The users interviewed (in large corporations, for this study) were first asked questions concerning their current information handling systems, associated costs for each system and any changes planned or under consideration for each system. Then the concepts and potential advantages of each of the six multifunction systems were discussed.

- The availability of relatively low cost small computers for specific purposes (data processing, word processing, communications control, consumer products) was discussed. All of those interviewed were aware of these trends, and usually knowledgeable of specific systems.

- The current trends in communications are well understood. These trends include Value Added Networks (VANs) Satellite Business Systems (SBS), and Bell Systems' Advanced Communications Service (ACS). The appreciable cost savings afforded by these trends were recognized.

- The merging of computer and communications technologies into integrated systems was well understood. Most interviewees are planning or already involved in merging these two technologies within their current systems.

- The concept of using common terminals for communications, word and/or data processing was familiar. No one questioned the technical feasibility of multifunction systems or services. A large number of those interviewed agreed that such systems were desirable.

B. THE POTENTIAL ADVANTAGES OF MFS FOR LARGE ORGANIZATIONS

- A number of potential advantages of multifunction systems were discussed with interviewees. The following information was gathered.

- The cost effectiveness of multifunction systems was generally acknowledged, particularly for remote locations with light to moderate usage requirements.

- Less space would be required with fewer pieces of equipment.

- The general office environment would be improved by isolating noisy equipment.

- Following system selection, the user would have fewer vendors (possibly only one) to deal with for sales, service and support.

- At this point in the discussion of multifunction systems many respondents offered the following paraphrased comments:

  - Present operation and maintenance of equipment is far too costly -MFS might help.

  - Centralized data processing is becoming unrealistic - MFS will be a must.

  - The sooner MFS is available, the better for the paper processing operations.

- MFS would be useful at remote locations, for decentralized operations.

- Any MFS would be useful as long as it is compatible with our present system.

- A number of communications managers said their need for MFS existed several years ago when they were planning changes to their system.

C. DESCRIPTION OF SELECTED SYSTEMS

- A series of six potential types of multifunction systems or services were discussed with each interviewee.

- The theory behind the design of the selected systems is that a vendor will move from his existing product offerings toward adding other logical functions to the system. For example, a small business computer can be augmented with software and hardware to perform text editing. This increases the system versatility, the equipment market, and the vendor revenues.

  - The expansion of system functions matches the logical market expansion pattern of a typical vendor. The vendor sells: first, additional equipment functions to his existing customer base; second, to additional sites in his existing customer base; and third, to new customers.

  - Expanding the functions of an existing product saves engineering costs of the initial product design provided for expansion. There can also be training costs savings for field sales and maintenance personnel.

  - The multifunction approach lends itself to modular design. The building block concept of this design is a cost effective approach to an expandable system.

- The multifunction system is advantageous to vendor and end user alike and should strengthen the vendor/customer relationship.

- The six systems selected for this study are:

  - System #1 - Small business computer with text processing as an added function.

  - System #2 - Text editing system with data computation as an added function.

  - System #3 - Office copier with facsimile and output printer as added functions.

  - System #4 - PABX with data or text processing as an added function.

  - System #5 - Communications network with added information processing functions.

  - System #6 - Timesharing systems with added communications functions.

- Each of these systems represents the potential entry of a class of vendors into the MFS market, and is discussed in the following pages.

I. SMALL BUSINESS COMPUTER WITH ADD-ON TEXT PROCESSING FUNCTIONS

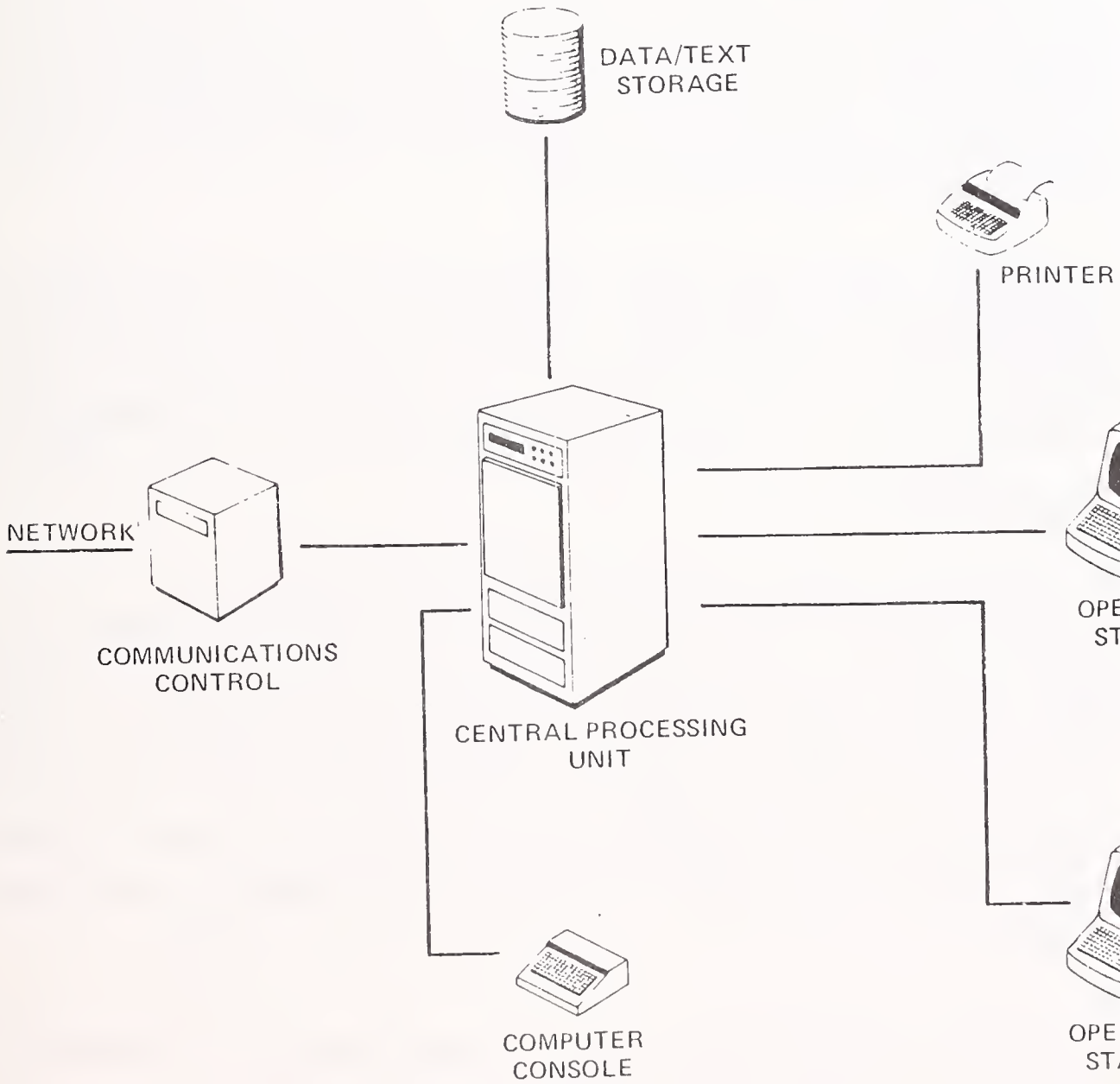
- This system consists of the central processing unit (CPU), storage unit, communications control unit, output printer and operator stations of a small business computer combined with the text oriented work stations and office quality printer of a text editor (Exhibit IV-1).

- This is a popular multifunction system because of the large installed base, the many small business computer vendors, and the capability of the CPU to perform additional functions.

EXHIBIT IV-1

SMALL BUSINESS COMPUTER SYSTEM WITH ADD-ON TEXT PROCESSING FUNCTIONS

SYSTEM I PRIMARY FUNCTION: DATA PROCESSING
DERIVED FUNCTION: TEXT EDITING/WORD PROCESSING



- Multifunction systems of this type are now being sold by IBM, MAI, and Wang.

- The system is quite flexible and can perform numerous functions.

  - The computer portion of a small business system has ample capability to handle real time interrupts from sensors of heat, power, as well as time clocks and data entry devices. These real time interrupts can be serviced by the computer, including physical and security sensors, and time clocks.

  - The internal memory and external magnetic storage memory (such as disk of a computer provides ideal storage for the correspondence of a small business computer text processing system. As electronic memory becomes less expensive than paper storage (including access cost), text storage will become a prime function.

  - Automatic letter and invoice writing can be considered a "limited function" type of text editing. However, it is very important to many business sectors such as insurance and wholesale distribution. This function implies a high speed and high quality output printer such as a "daisy wheel" or ink jet.

  - As a text editing unit by utilizing the CPU to perform the sentence and paragraph analysis and the office quality printer to output the letters and memos. Note that the memory and logic capability of the computer can result in a superior text editing unit. This function was mentioned by many respondents from INPUT's surveys and is a key added function for small business computer-based multifunction systems.

  - As a private electronic mail terminal using the communications control, memory storage, and output printer.

- Voice communications can be monitored and controlled by the CPU of the small business system. This can result in cost control by billing communications cost to the appropriate department. Cost reduction is achieved by optimum routing of calls among WATS, leased line, and direct dial communications services. The implementation of these functions requires an interface with the PABX communications system.

2. TEXT EDITING SYSTEM WITH ADD-ON COMPUTATION (SMALL BUSINESS FUNCTIONS)

- The text editing system (Exhibit IV-2) is quite similar to the small business computer system (Exhibit IV-1) in its block diagram and implementation. There is little difference between the two systems in their functional diagrams when considering numbers and text only as information to be processed.

- However, the text editing system has high quality printers and CRT displays which handle both upper and lower case alphanumerics, and display a reasonable portion of a page of text. Along with text processing this system can perform data processing functions such as:

- Computation and data storage which require arithmetic logic, application programs, and high level language programming aids.

- Data and file storage can be accomplished by the text storage portion of a text editing system. The functions are similar.

- The inclusion of a communications control unit in an "intelligent" text processing system allows it to interface to communications networks and perform the functions of:

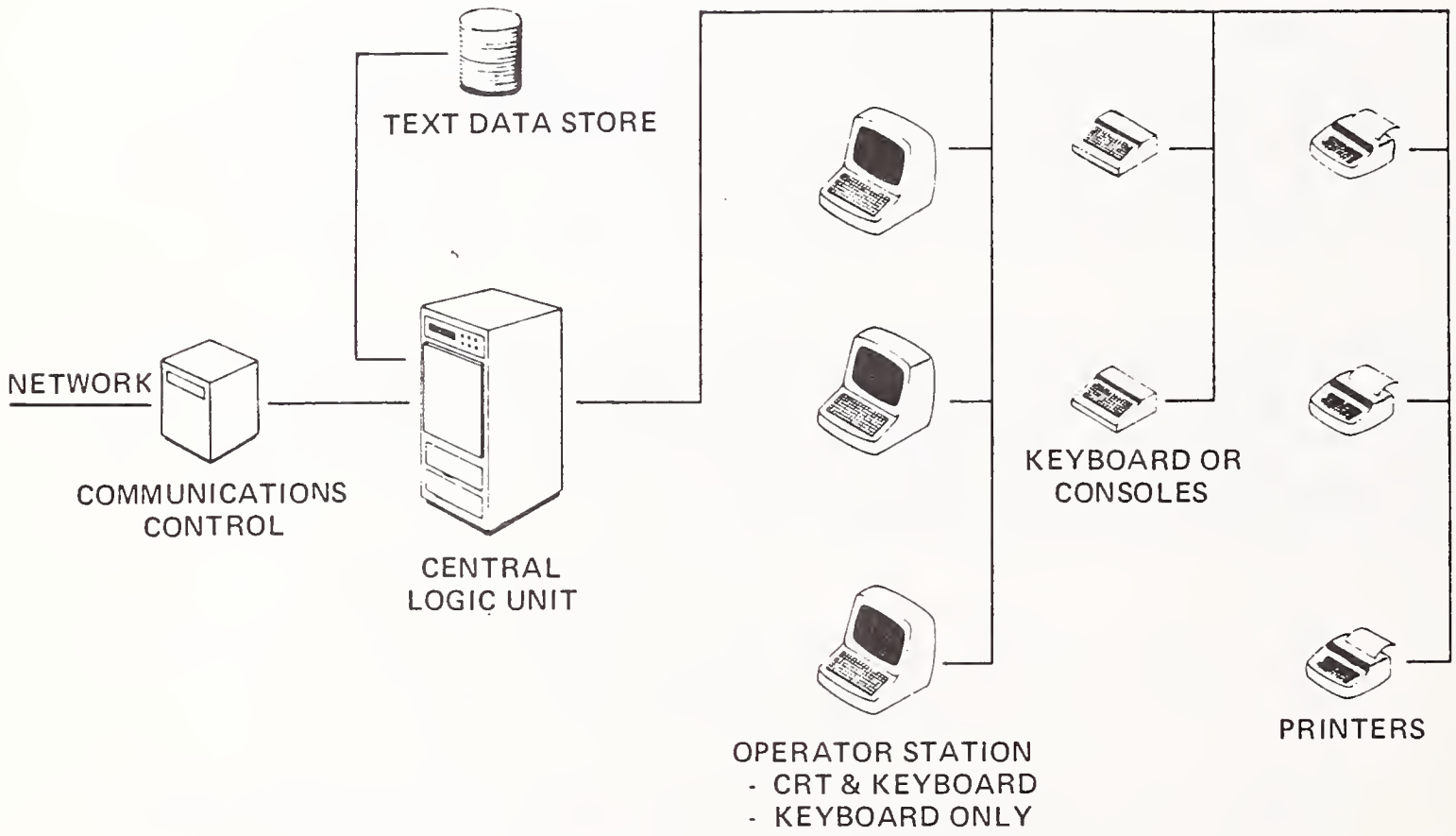
  . Data terminals.

  . Electronic mail terminals.

EXHIBIT IV-2

TEXT EDITING SYSTEM WITH ADD-ON COMPUTATION FUNCTIONS

SYSTEM II PRIMARY FUNCTION: TEXT EDITING/WORD PROCESSING
DERIVED FUNCTION: DATA PROCESSING-TERMINALS



. Message control.

- The high quality displays, keyboards and output printers of a text processing system make it ideal for an electronic mail terminal.

3. COPIER SYSTEM WITH ADD-ON FACSIMILE AND OUTPUT PRINTER FUNCTIONS

- A sophisticated copier already performs the complex functions of image transfer, paper control and movement. In many cases these are the most difficult and expensive functions to implement.

- If an electronic character or graphics generator is added to the system (such as a laser to mark images) then additional functions can be performed.

- Because copiers are used in every office and are supplied by major vendors such as 3M, IBM, Kodak and Xerox, they are an important entry point into multifunction systems.

- Few copier based multifunction systems have reached the market as yet. IBM recently announced its 6670 document distributor system and a number of other major vendors are logical entrants to the market.

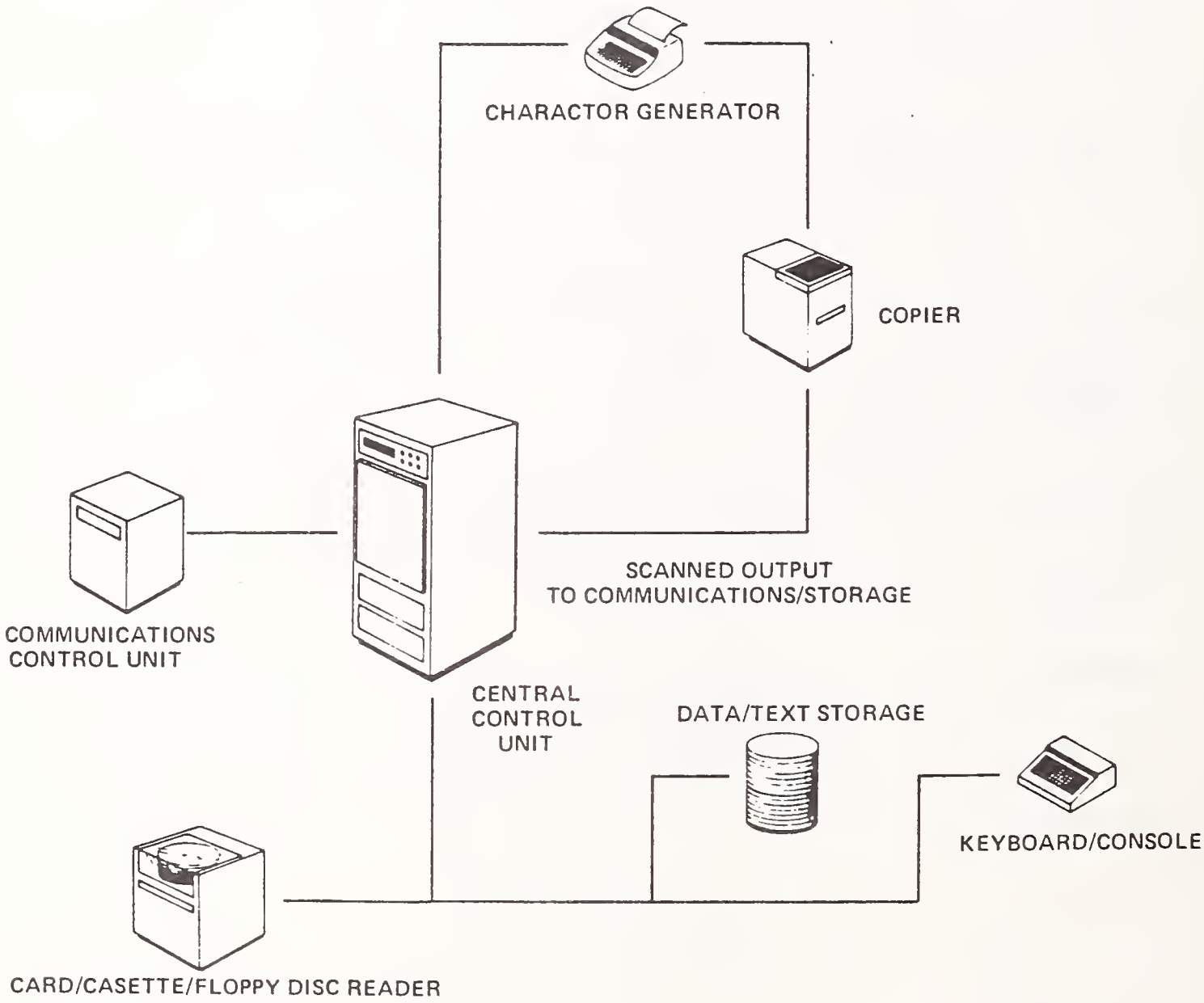
- The copier based system (Exhibit IV-3) includes the copier itself plus an electronic character generator and central control unit which converts the copier into an output device. Once the output device exists, ancillary logic determines the specific function to be performed. These functions include:

  - Facsimile - when the optical scanner of the copier provides the system input and the character generator plus the copier provide the system output.

EXHIBIT IV-3

COPIER SYSTEM WITH ADD-ON FACSIMILE AND OUTPUT PRINTER FUNCTIONS

SYSTEM III PRIMARY FUNCTION: COPIER
DERIVED FUNCTION: FAX COPIER TO FAX



- The memory and character generator allow the device to be a high speed output printer for a computer or text processing system. Average copiers can operate at a speed of one page per second, or 50 lps, or 3,000 lpm, providing very fast printer output.

- An electronic mail terminal exists when a communications control unit is added to the system. This can include graphics as well as text, an important feature for electronic mail.

- Text justification and photocomposition can be performed by the system, as they both involve the ability to change graphics electronically.

4. PABX SYSTEM WITH ADDED DATA OR TEXT PROCESSING FUNCTIONS

- The modern PABX uses a computer to control communications functions. The computer can also be used for data or text processing. A block diagram of a PABX system is presented in Exhibit IV-4.

- Advanced digital PABX systems are available from major communication vendors such as AT&T, GTE, and Northern Telecom. These provide access to a variety of business, communication and information processing services, as well as standard telephone services.

- Using the computer to perform information processing operations, the PABX can also perform the functions of:

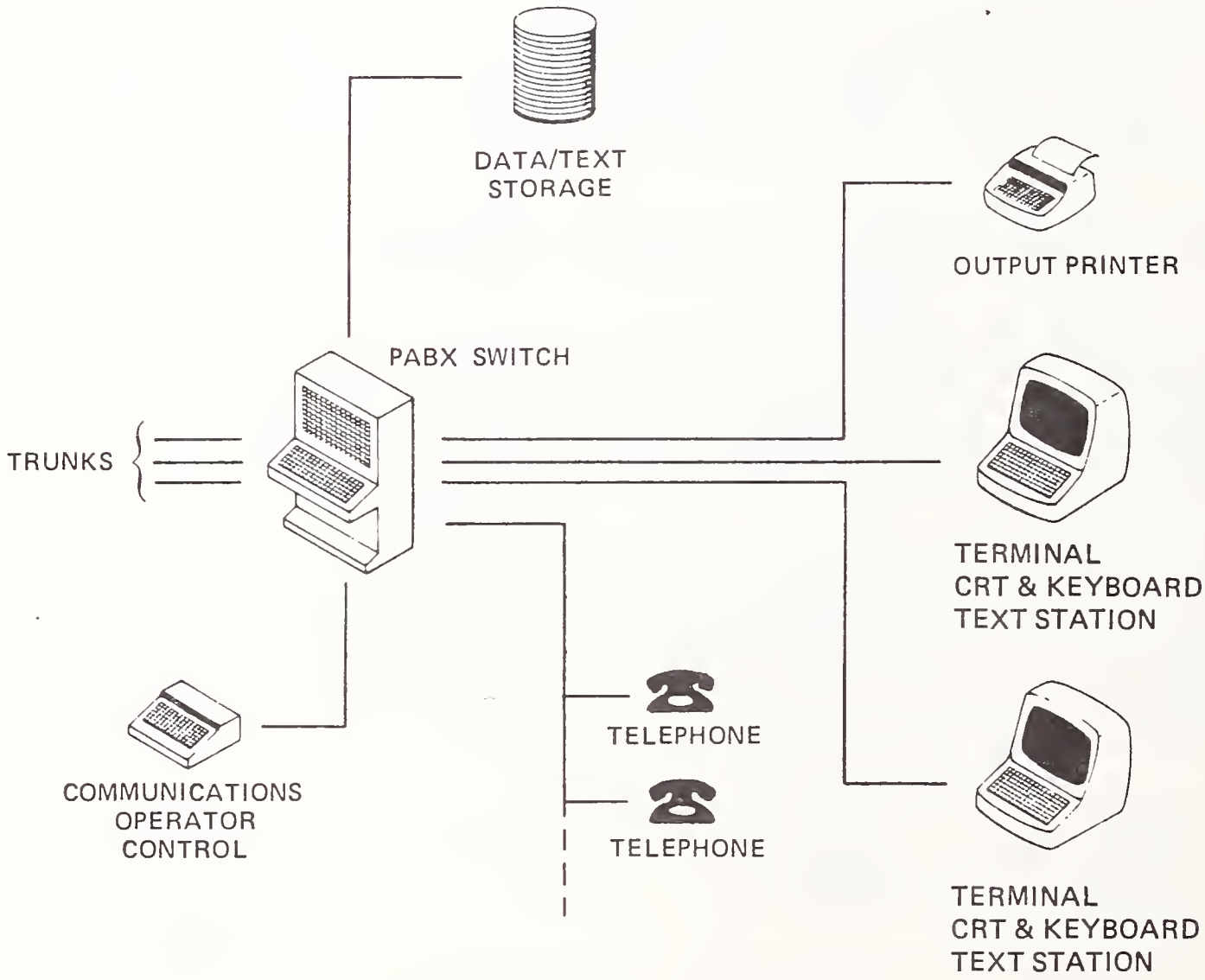
  - Communications control which includes automatic billing of communications services used, and least cost routing.

  - Data processing which uses the PABX computer as the central data processing unit, and adds terminals for input/output.

EXHIBIT IV-4

PABX SYSTEM WITH ADD-ON DATA OR TEXT PROCESSING FUNCTIONS

SYSTEM IV PRIMARY FUNCTION: PABX
DERIVED FUNCTION: TEXT OR DATA PROCESSING



- Text processing, which is similar to a data processing system with a high quality output printer.

- Specialized display terminals and electronic mail operations.

5. COMMUNICATIONS NETWORK SYSTEM WITH ADDED INFORMATION PROCESSING FUNCTIONS

- In the communication network class of systems (Exhibit IV-5) the central processing unit used to operate the network is also used for processing information. At the present time there are many legal and regulatory restrictions which prohibit the full use of a comprehensive communication network system. However, this study shows the user's receptivity to such a system, if the regulatory issues are resolved.

- Intelligent network services such as packet switching use computers to store, format and move information. A multifunction system based upon a communications network would take a further step and operate upon the information. The system would perform the functions of:

  - Timesharing data analysis.

  - Remote text editing and processing.

  - Computerized intra-company message system.

  - Data base distribution by the network and data base access control. The data base can be owned by either the communications vendor, the user, or a third party.

6. TIMESHARING SYSTEM WITH ADDED COMMUNICATION FUNCTIONS

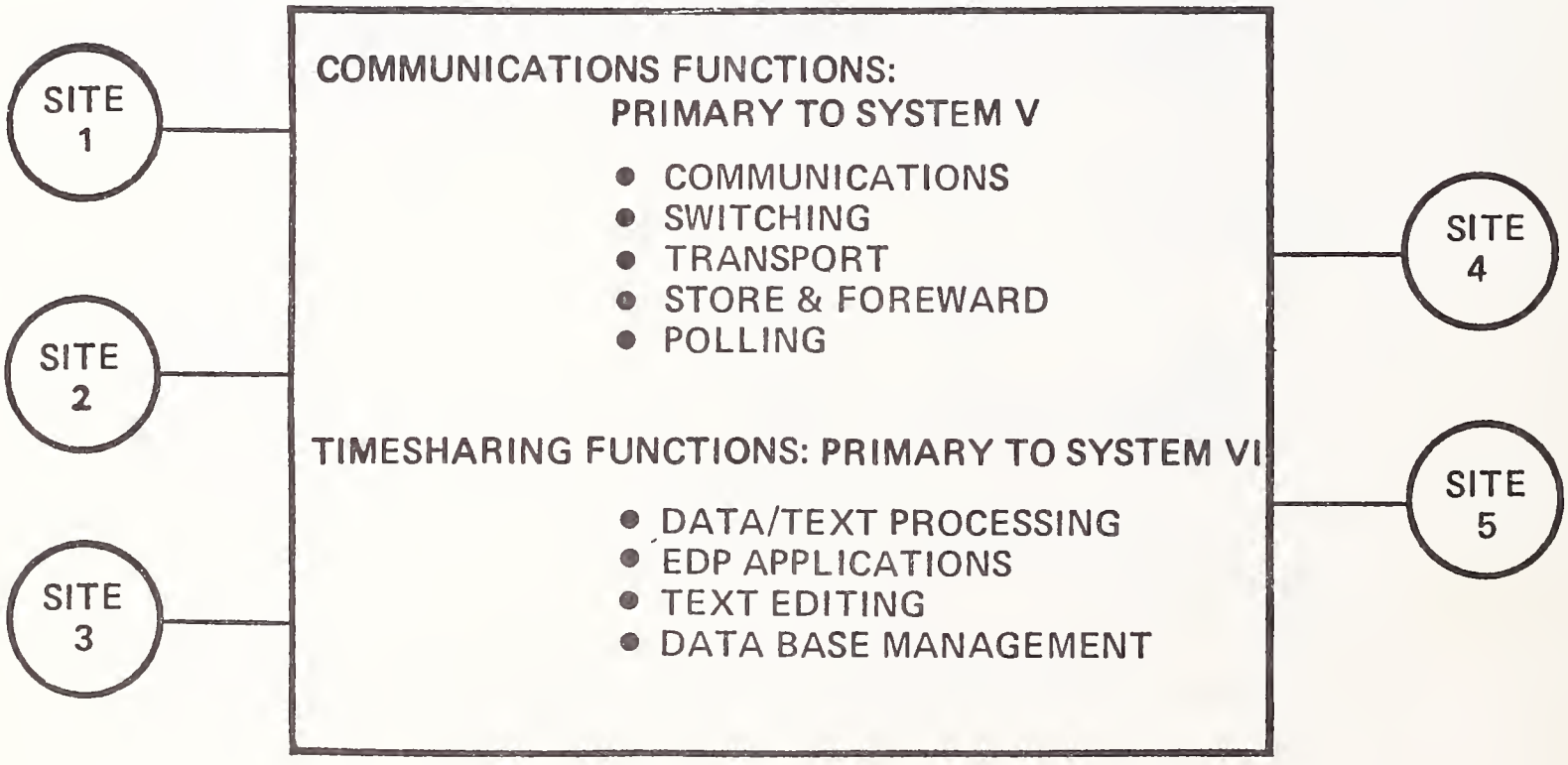
- Timesharing systems performing communications network services are similar to communications network systems performing remote computing services,

EXHIBIT IV-5

COMMUNICATION NETWORK SYSTEM PLUS INFORMATION PROCESSING
OR
TIMESHARING SYSTEM PLUS COMMUNICATIONS FUNCTIONS

SYSTEM V PRIMARY FUNCTION: COMMUNICATIONS
VI PRIMARY FUNCTION: REMOTE COMPUTATION

- COMMUNICATIONS
- INFORMATION PROCESSING & STORAGE
- TEXT PROCESSING
- DATA PROCESSING
- INFORMATION STORAGE



shown in Exhibit IV-5. The only difference is the vendor, a commercial timesharing company rather than a communications common carrier.

- The same regulatory agencies that prevent communications companies from selling computer services prevent timesharing companies from selling communications services. This study only addresses the question of the users' interest in this type of multifunction system.

- The functions which could be provided through the timesharing facilities are:

  - Electronic mail and message services, including:

    . Information distribution.

    . On-line or off-line message preparation.

    . Message retrieval on demand.

    . Long-term storage and delayed message delivery at user terminals.

  - Communications services including:

    . Packet switching.

    . Store and forward switching.

    . Compatibility of equipment and protocols.

V VENDOR AND INDUSTRY ANALYST REACTION TO MULTIFUNCTION SYSTEMS AND SERVICES

V VENDOR AND INDUSTRY ANALYST REACTION TO MULTIFUNCTION SYSTEMS AND SERVICES

NOTE: The information presented in this chapter was extracted from a previous INPUT report, "Multifunction Equipment in Small Establishments," dated January 1979. During the field research for that study, vendors were asked about their attitudes on providing multifunction equipment/systems to both large and small users.

A. THE SIGNIFICANCE OF MULTIFUNCTION SYSTEMS AND SERVICES

- The best way to gauge the significance of MFS is by the actions of the competitors rather than by what they say. None of the systems presented in the previous chapters are original concepts of this study. All were prompted by technical developments already announced or reported by one or more vendors.

- The following announcements were made recently. They show examples of multifunction services:

  - Xerox announced plans for a domestic digital communications network (Xten) using leased satellite channels for intercity transmission and radio links for local distribution. The network would be available for "document distribution, data transmission and teleconferencing." System #3 would certainly be enhanced by such a network.

- The Bell System explained some of the Advanced Communications Services (ACS). ACS would relieve host CPU's of certain tasks (depending upon user application), but ACS itself could not be used as a data base system. However, the user's bill would be based on: packets or bytes transmitted; network resource units (NRU's) used; network storage used as a function of time, and elapsed network time. Substitute input/output (I/O) for packets, computer resource units for NRU's and on-line storage for network storage, and you have all the elements to develop a billing algorithm for a computer services company.

- GE Information Services Division announced Marklink which supports distributed processing with "transaction processing-oriented systems." While emphasis is on the processing, message store-and-forward is an easily developed application.

- The Postal Service is "progressing" on electronic mail which is part of the Postal Service's Electronic Computer-Oriented Mail (ECOM). This prompts considerable speculation about what the difference is between "electronic mail" and "electronic message services." There are many who shun the use of the term "electronic mail" for fear the U.S. Postal Service will claim sole responsibility for service.

- The important fact is that as communications and computer technologies merge, all major corporations in both technologies must position themselves to take advantage of the opportunities which will become available. IBM showed it's recognition of this fact when it invested in Satellite Business Systems.

- All vendors and analysts were obviously familiar with the competitive environment and consider MFS as an inevitable trend. Comments included:

  - "No stopping it."

  - "Yes, data processing and word processing are the same."

- "Yes, it is certainly shaking up traditional concepts in the FCC."

- "No one vendor has the solution, but they are all heading in that direction."

- "If you consider carving up the biggest potential market in the world a major trend, yes."

- "I saw secretaries in IBM invent multifunctional equipment using ATS terminals to send messages and documents around the country - and yes, the same terminals could be used for timesharing."

- "It's more than a major trend, we have lists of major trends in this industry.

- Vendors were asked whether users wanted MFS. Comments are as follows:

  - "Yes, intuitively, but they don't understand MFS and they don't understand their real requirements."

  - "They need it and will want it once they understand."

  - "They are already using it - this is not new."

  - "If they don't, now they will."

  - "We may have to explain the advantages to them."

  - "There is nothing complicated about it in its simplest form and, yes, users do want it."

- the primary benefit to users was practically universally agreed to be cost savings. But other benefits were identified as well:

- "Communications are still clumsy. Combining data processing and communications will help."

- "It will make people in an office environment more responsive."

- "Management control will be improved - this is a tangible benefit."

- "Sending paper all over the place creates confusion - MFS, if properly applied, will simplify the end user's problems - that's what it's all about."

- "Jimmy Carter said he could read faster than he could talk. Whether face to face or on the phone, voice communication is not necessarity the best in every situation. MFS will provide alternatives (other than paper)."

- "It will improve employee productivity."

- "It will make new services available - especially to the small user."

- There was practically universal agreement that all sizes and types of industries would be attracted to MFS. However, one interviewee stated the following types of organizations would be most attracted to MFS:

  - Small organizations or large organizations with small branches.

  - Any office-oriented, paper-oriented business.

- Vendors stated the following advantages of MFS:

  - "Open up new market areas, such as offices."

  - "Grow current customers by adding functions."

- "Expand product line."

- "Increase sales."

- The disadvantages of MFS from the vendor's point of view were described as follows:

  - "Marketing is a problem. We've got systems people and staff who have sold office equipment - neither group can sell the new products."

  - "MFS forces complex products - especially the software."

  - "It's difficult to support and maintain."

  - "You can really build a Kluge."

  - "Without standards, the whole thing is going to be a mess."

  - "Some vendors will promise anything and not deliver - this could kill some good concepts."

  - "Too complex for some users."

  - "Systems development to solve new problems."

  - "Everybody wants something different, and the computer industry is still selling black Model Ts in software."

  - "It's complicated to make things simple."

  - "The government is going to get more involved in the business but we have to go that way."

- "If the user can't use the additional function, the product isn't competitive."

B. THE COMPETITIVE ENVIRONMENT AND POTENTIAL IMPACTS

- As would be expected, many interviewees used the symbolic representation of IBM and Bell as the most serious confrontation between the computer and communications industries. However, some of the remarks were significant:

  - "It's like watching World War II in slow motion."

  - "I'm not worried about IBM and Bell; I'm worried about the little guys in between."

  - "The biggest confrontation may be between private enterprise and the United States Government."

  - "IBM and Bell aren't going to hurt each other that much."

  - "Confrontation, what confrontation?"

  - "IBM doesn't have to wait for SBS, they can exploit the area which isn't regulated - the office communications equipment."

  - "It's hard to feel sorry for a $37 billion corporation, but I think IBM has Bell over a barrel."

  - "All carriers and all computer companies are involved - and don't forget the other big guys like Exxon sniffing around."

  - "Don't forget the Postal Service, they are getting more aggressive, and the courts are already getting involved."

- There seems to be a growing opinion in some areas that the competitive enviornment will be determined by regulation rather than technology.

C. MARKET AND TECHNICAL ANALYSIS BY SYSTEM

- Since they are personally involved, the vendors interviewed obviously had their own points of view concerning the relative merits of the six systems specified in the previous chapter. There are so many points of view that statistical tabulation of results are meaningless. However, it is possible to establish a general consensus.

- Consensus opinions concerning the various systems were established by evaluating both the answers to questions and the source. The results are presented in Exhibit V-1.

- It was felt that all systems were technically feasible, but less confidence was expressed about Systems #4 and #5. The reasons are as follows:

  - PABX was not felt to be a logical building block for the types of systems under consideration. Comments included:

    . "IBM isn't going to do it, and Bell can't - the rest are too small."

    . "If they start building complex systems on that basis they will really be in trouble."

    . "It's like the tail wagging the dog."

    . However, it was felt that: "You can't isolate it from the total communications problem."

  - Coments concerning System #5 included:

EXHIBIT V-1

CONSENSUS OPINIONS ON
SYSTEMS VIABILITY

SYSTEM TYPE	IS IT A REASONABLE APPROACH (TECHNICALLY)	PROBABILITY OF SUCCESS?	WHICH INDUSTRIES?	WHICH VENDORS? (1)
SYSTEM #1	YES	EXCELLENT	ALL	MAJOR VENDORS
SYSTEM #2	YES	GOOD	LEGAL PUBLISHING	MANY VENDORS
SYSTEM #3	YES	FAIR-EXCELLENT	NEARLY ALL	IBM XEROX
SYSTEM #4	DOUBTFUL-MAYBE	POOR-FAIR	ALL	NO CONSENSUS
SYSTEM #5	REASONABLE, BUT NOT PRACTICAL	ISSUE IN DOUBT	ALL	EXISTING PLUS NEW ENTRIES
SYSTEM #6	YES	FAIR-EXCELLENT	ALL - EMPHASIS ON SMALL	ALL CURRENT PLUS OTHERS

(1) FOR HARDWARE SYSTEMS THE RESPONDENTS DID NOT CONSIDER THE DISTRIBUTION CHANNELS (SYSTEMS INTEGRATORS).

- "It won't come from that direction."

- "They (VANs) will be left in the starting gate."

- "Bell will push as far as possible, but they can't afford to go over the line."

- The probability of success of the various systems in the marketplace can be summarized as follows:

  - System #1 - The small business computer is already successful in some instances (respondents did not necessarily identify exactly what a "small business system" was) and it was considered the best logical building block.

  - System #2 - The word processing system is considered to be appropriate in circumstances where the most immediate cost savings could be achieved from text processing.

  - System #3 - The copier system is considered to be a doubtful success for implementing conventional word processing. However, copiers being used as facsimile terminals are considered inevitable.

  - System #4 - The PABX voice communications system should be loosely connected to the other system. If PABX is extended to provide word processing and/or data processing, the possibility for failure of System #4 is considered great.

  - System #5 - The communications network system is considered to place communications carriers at a disadvantage because of the regulatory situation.

- System #6 - Timesharing computer services companies are considered to be in an excellent position to exploit the MFS market, but to quote one respondent: "I don't know whether they have the 'smarts'."

- Generally speaking, the MFS systems are considered to have universal potential with the following exceptions:

  - System #2 was thought to be especially appropriate for legal and publishing firms.

  - One respondent stated: "Text processors got started in the big law firms. Anyone developing a text processing system for small firms which could handle their accounting (complicated by hourly billing) would have a tremendous market."

  - Respondents still had the general impression that computer services companies were especially appropriate for providing network services for small users.

- The question of which vendors were predominant was distorted by careful answers reflecting sensitivity to competition (or lack thereof).

  - All "major vendors," either mainframe or minicomputer, were felt to have an excellent possibility with System #1. The reservations about small hardware suppliers were based primarily on their marketing, software systems development, and maintenance and support capabilities. (Once again, alternatives for such activities were not considered.)

  - It was felt that the word processing market would continue to attract new vendors. The basic software support was thought to be reasonably generalized and the business data processing requirements could be satisfied. (The consensus rating for System #2 considers the industry specializations.)

- IBM and Xerox stood above all others in the office copier based System #3.

- It was impossible to obtain consensus on System #4. Current vendors such as Rolm and Northern Telecom were mentioned, but the general feeling was that the system is not sufficiently attractive to users to make it viable unless Bell or IBM offered it, and that for both companies the legal and regulatory environment was too complex to encourage much development along this path.

- Responses to System #5 considered only Bell (ACS) and IBM (SBS) as potential vendors, but again the legal and regulatory obstacles were cited as substantial barriers to an early implementation of this approach by these carriers. New entrants could be more successful.

- System #6 by contrast was felt to be a more feasible approach with Tymshare the most likely vendor. ADP and MCAUTO could also play a significant role, as could other new entrants.

- Technical (hardware) problems are not considered to be the barrier to successful introduction of MFS, as far as vendors are concerned. If the specific hardware is not already available (many respondents feel that it is), at least the underlying technology is known.

  - Reliability is the major technical concern. To paraphrase one respondent, users are accustomed to computers going down, but not to their telephone system being out of order or their typewriter not working.

  - Since the real power of MFS comes from integrating all aspects of information processing (text, computation, graphics, and communications), interface standards will be a critical issue. It has not yet been adequately addressed. Systems can't be "thrown together," but must be planned for integration from the beginning.

- Ideally, the user should be able to assemble MFS from modular components, much as one might assemble a stereo set. Users with more imagination, more complex needs, or simply greater wants and higher budgets can put together sophisticated systems while other users will be satisfied with basic capabilities and standard packaging.

- One implication of this approach is that it is the end user terminal which will be multifunctional, rather than the large central processor. This level of sophistication in terminal technology already exists, but the overriding question of systems architecture is less settled.

- The quality of the software, therefore, can make or break MFS. Small vendors are at their greatest disadvantage in this area because of the necessity to pioneer in tying together the diverse areas mentioned above into a maintainable architectural form.

  - Experienced communications software designers are still a rare commodity, especially when the requirement involves familiarity with more than one of the major communications techniques.

  - Maintenance and support of the resulting software impose huge additional burdens with which smaller vendors can rarely cope.

  - Later establishment of a different de facto standard has doomed many a smaller vendor who chose not to wait and see what the major vendors did.

- On the other hand, no super operating system is required or desired by the smaller user. The use of multiple dedicated microprocessors can simplify the software design for each component and may allow a "black box" kind of approach to each of the multifunctions.

- The software problem is not insoluble by any means. Once the communications services become available, the most difficult interfaces will have been defined and the rest should be comparatively easy.

- In any case, it is felt that software development will represent the significant portion of the vendor's cost, rather than the hardware.

  - Consequently, it may be necessary to impose an explicit charge for the software, depending on its capabilities and use, rather than to sell the MFS at a bundled price.

- Applications support is also a software problem area. While there is some optimism that the problem will be solved ("It always is," says one respondent), the applications area is really more difficult for the small hardware vendor than is the systems software area.

  - Specific knowledge and analysis of industry applications is lacking.

  - The fact that there are many different application packages available for IBM hardware is an indication to one respondent that the basic problem has not yet been solved.

  - Customization, especially for small users, will always be required.

  - Current data base systems are not suitable for use in a DDP environment, and there is some feeling that a totally new approach will be necessary.

- No potential MFS vendor can afford to ignore the question of application support. At the same time, no MFS vendor is enthusiastic about tackling this difficult area.

- The most likely immediate solution will be a marketing and distribution approach that makes use of local system houses and analogous channels to provide end user customization and applications support.

- Maintenance is also a distributed function that poses problems for the small vendor. Reliability was cited earlier as the touchstone of success for MFS because the user has come to expect nearly total availability of the office functions which MFS would perform.

  - At the very least, maintenance on site would have to be provided, either by the original vendor organization or a service organization. Telephone maintenance provides a sort of de facto model in the minds of several respondents for the quality level of service that users would expect and require.

  - Other recent studies by INPUT indicate that a possible alternative acceptable to users is a set of built-in diagnostics that can be activated by the user, either resulting in or facilitating plug-board replacement by the user or a local repairman. This solution is more approppriate to electronic than to mechnical problems, however, whereas the mechnical problems are more likely to occur in the MFS.

  - Integration of the many maintenance people who are now calling on offices for typewriter repair, copier repair, telephone repair, or computer repair may simplify the service problem rather than complicate it further. Most users would rather deal with a single service agency if the level of service is adequate.

- Respondents were very polarized as to the potential marketing complexities that may be experienced with MFS.

  - One group felt that marketing would be no problem if the proper functions are offered. Marketing emphasis would continue to be placed on the primary functions, since these are all that some users want or

need. Secondary function capabilities could then be used to upgrade the account after the intial placement had been made.

- In supporting this point of view, one respondent said, "Customers are smarter than vendors. If the right systems are available, the customer will buy."

- Another respondent put it this way: "If it (the MFS) does the job, selling it won't be complex.

- The other group took the opposite point of view. Marketing requires a combination of skills by definition. It is a difficult area to begin with, and a new concept such as MFS may require a new marketing approach.

  - One current vendor emphasized that they consistently tried to keep their qualified salesmen from migrating from one product to another, because that had found separate talents were required in each product area.

  - Selling from the top down is a successful approach not only for large accounts, but even more so for small establishments. Again, the implication is that the major vendors who are able to reach top management in the large accounts are more likely to account for the large volume sales.

- Few vendors were able to speak knowledgeably outside their own product area about unique features and characteristics that would be essential in the alternative MFS, but Exhibit V-2 presents a compendium of responses for each system.

EXHIBIT V-2

KEY MFS FUNCTIONS AND SUPPORT REQUIREMENTS

SYSTEM TYPE	KEY FUNCTIONS AND REQUIREMENTS
SYSTEM #1 - SMALL BUSINESS COMPUTER PLUS TEXT EDITING	• FILE MANAGEMENT FOR BOTH TEXT AND DATA • TRAINING AND SUPPORT IN WORD PROCESSING • INTEGRATION OF TEXT AND DATA BASES • COMMUNICATIONS SUPPORT INCLUDING ACCOMODATION OF MAJOR NETWORK INTERFACES • APPLICATIONS SUPPORT FOR SMALL USERS • DATA MANAGEMENT SYSTEM WHICH CAN BE UNDERSTOOD BY A FILE CLERK • BUILT-IN DATA DICTIONARIES AND DIRECTORY
SYSTEM #2 - TEXT PROCESSOR PLUS COMPUTATION AND COMMUNICATIONS	• APPLICATIONS SUPPORT FOR DATA PROCESSING • MESSAGE SERVICE SOFTWARE (ELECTRONIC MAIL) • COMMUNICATIONS HARD COPIES • INTEGRATION OF TEXT AND DATA BASES • COMMUNICATIONS SUPPORT INCLUDING ACCOMODATION OF MAJOR NETWORK INTERFACES • KNOWLEDGEABLE SALESMEN WHO UNDERSTAND BUSINESS APPLICATIONS • SYSTEM WHICH TREATS TEXT LIKE DATA AND DATA LIKE TEXT
SYSTEM #3 - COPIER PLUS FACSIMILE AND ACCESS TO COMPUTER	• COMMUNICATION OF TEXT AND GRAPHICS • WORD PROCESSING AND ELECTRONIC MAIL INTERFACES • VERY HIGH RELIABILITY AND MAINTENANCE SUPPORT • COMMUNICATIONS SUPPORT
SYSTEM #4 - PABX PLUS COMPUTATION, DATA TERMINAL, AND TEXT EDITING	• EASE OF USE • HUMAN FACTOR ENGINEERING • DATA RETRIEVAL VOICE RESPONSE • STANDARDIZED INTERFACES • INTEGRATION OF MESSAGE AND WORD PROCESSING • AUTOMATIC (PUSHBUTTON) IDENTIFICATION OF CALLER WHEN LEAVING A MESSAGE
SYSTEM #5 AND #6 NETWORK BASED DATA AND TEXT PROCESSING	• REMOTE WORD PROCESSING NOT ESSENTIAL • REMOTE SUPPORT AND MAINTENANCE IS ESSENTIAL • GOOD DATA BASE SYSTEMS • PROPRIETARY DATA BASES • INDUSTRY INTERFACES • LOWER COSTS THAN AT PRESENT

- On the question of vendor strategies, there is extensive agreement that computing and communications will become more entwined, not less. All of the major vendors appear to be moving as far into the others' area as legal and regulatory restrictions will allow. Meanwhile, the smaller vendors continue to seek out niches to penetrate while they can, before they are overwhelmed.

  - The underlying drive is to integrate functions while distributing intelligence.

  - MFS is, therefore, inevitable; the only question really is how fast the applications can catch up to the technology.

- The integration of functions is a natural step, and the increased competition that will result is considered beneficial to end users. However, there is a considerable minority opinion that is concerned about the survival of small vendors.

  - Only the large firms have the resources to influence the final outcome before Congress, the FCC, and the courts where the real decision will be made.

  - Small companies cannot afford the time and expense of preparing lengthy testimony or responses to Federal inquiries, nor can they afford to delay R&D and marketing decisions while the government ponders its rulings. Thus, the small companies are caught in the middle.

  - The FCC is felt to be overloaded and not technically equipped to deal adequately with the complexities of the situation and, therefore, likely to add to the confusion rather than resolve it.

  - While the final outcome is still in doubt, the majority opinion feels that IBM is better placed than Bell to compete in the MFS market. However, Bell will likely retain its backbone network prominence, together with some enhanced services through the 1980s, even though there will be other new entrants into the private and shared business network arena.

VI USER REACTIONS TO MULTIFUNCTION SYSTEMS

VI USER REACTIONS TO MULTIFUNCTION SYSTEMS

A. GENERAL INTEREST IN MULTIFUNCTION SYSTEMS

- This phase of the Multifunction System study examines the reaction and attitudes of diverse managers of data processing, communications and office services in large organizations toward these systems.

  - Data processing equipment and services.

  - Communications and telecommunications equipment and services.

  - Office equipment and services.

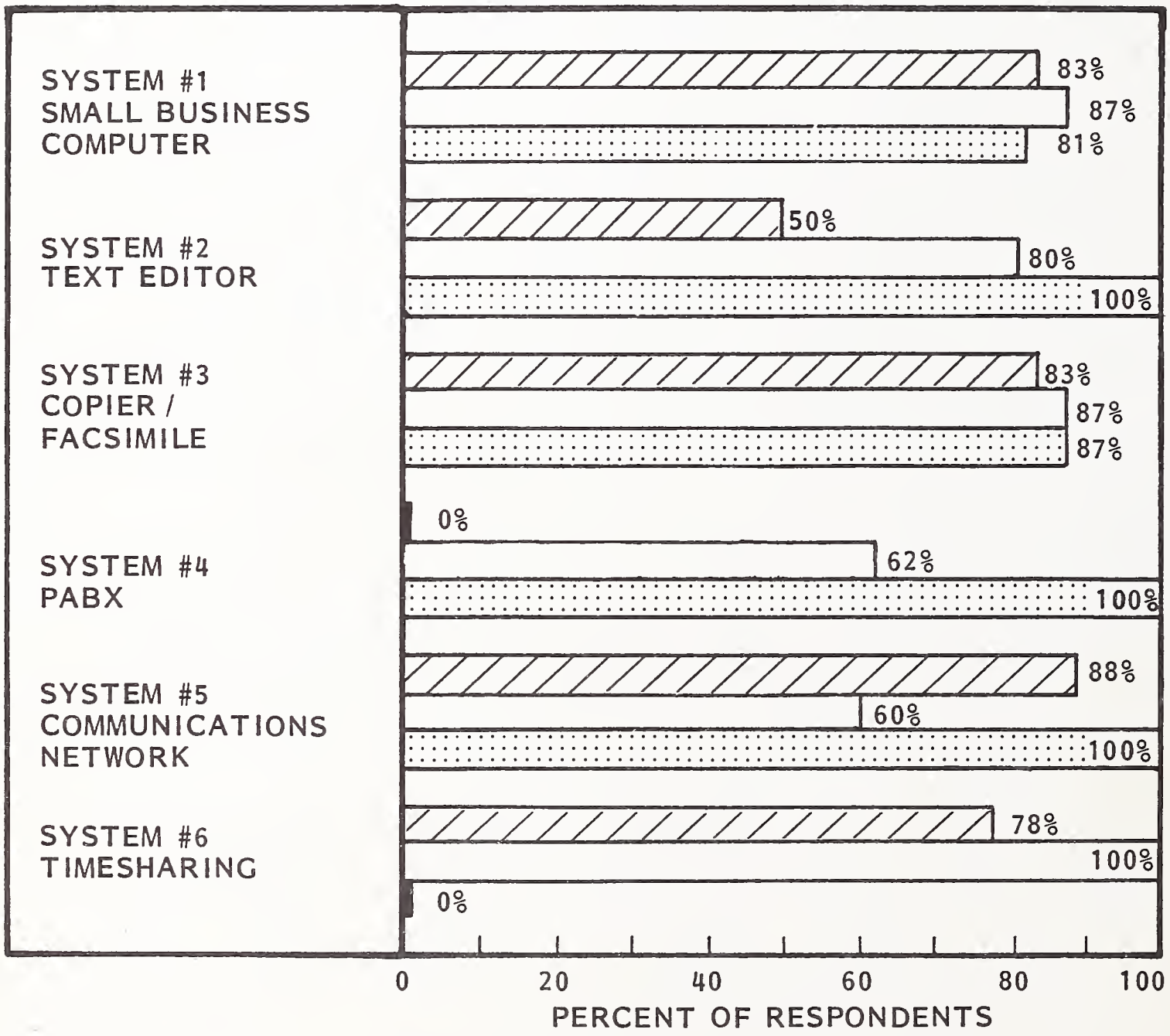
- The manager's attitudes and reactions to the multifunction concept are presented on the following pages. The features they consider most desirable on each system are also presented.

- As shown in Exhibit VI-1, data processing managers are interested in multifunction systems as a concept and in each of the systems except the PABX based System #4.

  - These managers also show a relatively high level of satisfaction with their data processing equipment (Exhibit III-10).

EXHIBIT VI-1

PERCENT EXPRESSING INTEREST
(BY SYSTEM)



- Many of the planned data processing changes call for equipment upgrading and expansion rather than a system change. Their plans for changes are among the highest of all the groups (Exhibit III-11).

- The interest expressed in System #1 is for its use at remote locations when the conversion to decentralized data processing occurs. In fact, many small business computers are already installed at remote locations.

- Communications managers expressed considerable interest in other multifunction systems as well as their own PABX and network based Systems #4 and 5.

  - Of the three groups of managers, communications showed the least satisfaction with their own systems. However, they are planning fewer changes because changes in communications equipment must be gradual to avoid disruption of service and inordinate expense.

- Office services managers showed the highest overall interest in all multifunction systems, except the timesharing computation based System #6.

  - However, from the viewpoints of purchase justification and availability of improved equipment, they are more optimistic about acquiring word processing systems than they are about copying devices.

- Comparing the percentage of each groups' interest in MFS (Exhibit VI-1), against those considering change (Exhibit III-11) shows:

  - Seventy percent of the data processing respondents are considering a change to their current large, central data processing system, but 83% expressed interest in System #1 (small business computer performing text editing).

- Seventy-seven percent of the office services respondents are considering new word processing equipment, and 100% expressed interest in System #2. (Text processing system performing data processing.)

- Thirty percent of the office services respondents are considering new office copiers, and 87% expressed interest in System #3. (Copier performing facsimile and computer output.)

- Forty-three percent of the communications respondents are considering changes in their telephone system and 62% expressed interest in System #4. (PABX performing data and text processing.)

- Forty-two percent of the communications respondents are considering changes in message services, but 60% expressed interest in System #5. (Communications network performing data or text processing.)

- Fifty-two percent of the data processing respondents are considering changes in their timesharing services and 78% expressed interest in System #6. (Timesharing services performing communications services.)

• All six systems generated an overall interest in considering new systems solutions. Combining the interests of all three information processing groups reveals a keen interest in MFS when compared to their combined plans for equipment changes.

  - Eighty-three percent of all respondents showed interest in System #1, while only 64% indicated plans for change in data processing.

  - Seventy-seven percent of all respondents expressed interest in System #2, while only 56% were considering new word processing systems.

  - Eighty-six percent of all respondents showed interest in System #3, while only 23% were considering new copier systems.

- Sixty-four percent of all respondents expressed interest in System #4, while only 39% are considering new telephone systems.

- Seventy-eight percent of all respondents expressed interest in System #5, while only 41% are considering a change in message services.

- Eighty percent of all respondents expressed interest in System #6, while only 57% are planning changes in timesharing and data base services.

B. THE RELATIVE IMPORTANCE OF MFS FEATURES AND FUNCTIONS

- Users were asked how important they considered specific system features and functions. Since all features and functions could be of equal importance, rankings were not forced. However, relative importance was established by giving a rating of 100 to the most important feature or function identified for each system.

- System #1, Small Business Computer Performing Text Processing, ranked the second most interesting to all respondents. Eighty-three percent indicated they would buy such a system. It is topped only by the copier System #3, at 86%.

- Exhibit VI-2, Relative Importance of Hardware Features and Functional Capabilities of System #1 shows:

  - All groups considered a communications controller to be required.

  - All are in close agreement with the need for an office quality printer, mostly for correspondence. The data processing group needs storage only slightly more than an office quality printer. This is possibly due to their greater knowledge of storage requirements.

EXHIBIT VI-2

RELATIVE IMPORTANCE OF HARDWARE FEATURES AND FUNCTIONS - SYSTEM #1-SMALL BUSINESS COMPUTER PERFORMING TEXT PROCESSING FUNCTIONS

FEATURES AND FUNCTIONS	RELATIVE IMPORTANCE*			
	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS	ALL RESPONDENTS
FEATURES				
OFFICE QUALITY PRINTER	86	72	88	83
STORAGE	89	42	62	73
HIGH SPEED PRINTER	58	57	64	59
COMMUNICATIONS CONTROLLER	100	100	100	100
FUNCTIONS				
TEXT EDITING	81	100	98	100
AUTOMATIC LETTERS AND INVOICES	100	24	24	64
TEXT STORAGE	56	100	87	82
ELECTRONIC MAIL SERVICE	85	74	100	97
SENSOR CONTROL	15	24	22	58
COMMUNICATIONS MONITORING	93	24	39	58
COMMUNICATIONS CONTROL	63	24	22	42

*THE MOST IMPORTANT FEATURE OR FUNCTION IS GIVEN A RELATIVE IMPORTANCE OF 100.

- All three groups agree text editing functions, and other volume word information processing, are highly desirable. Variations in rating the functions reflect the differences in group business information needs:

  - Data processing users consider automatic letters and invoices the most important functions.

  - The communications group considers text editing and storage the most important functions.

  - Office services users consider electronic mail service and text editing the most important functions.

- System #2, Text Processor Performing Computation, shows less overall respondent interest (77%) than do several other systems. However, individually office services users considerd it one of three fundamental starting systems (see Exhibit VI-1). The relative importance of hardware features and functional capabilities for System #2 are listed in Exhibit VI-3.

  - Data storage, multiple terminals, and again, a communications controller are all considered to be relatively important to the three groups. Data processing storage is the most important hardware feature overall.

  - Input/output terminal devices clearly take the lead in important functions overall. The one exception is the communication group's need for EDP applications and storage. Variations in the individual ratings reflect specific group's information processing requirements:

    . Terminals for electronic mail service are the most important function to both data processing and office services users.

    . Terminals for data processing are the most important input/output device for the communications group. The

EXHIBIT VI-3

RELATIVE IMPORTANCE OF HARDWARE FEATURES AND FUNCTIONS - SYSTEM #2 - TEXT PROCESSOR PERFORMING COMPUTATION FUNCTIONS

FEATURES AND FUNCTIONS	RELATIVE IMPORTANCE*			
	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS	ALL RESPONDENTS
FEATURES				
COMMUNICATIONS CONTROLLER	75	80	100	89
ARITHMETIC UNIT	25	40	63	27
DATA PROCESSING STORAGE	74	100	100	100
10 KEY PAD	51	40	63	33
SENSOR MULTIPLEXOR	25	40	25	32
MULTI-TERMINAL	100	80	88	97
HIGH SPEED PRINTER	74	40	63	41
FUNCTIONS				
EDP APPLICATIONS	43	100	25	47
EDP STORAGE	43	100	25	47
TERMINALS FOR DATA PROCESSING	83	100	75	82
TERMINALS FOR MESSAGES	85	67	51	61
TERMINALS FOR ELECTRONIC MAIL	100	0	100	100

*THE MOST IMPORTANT FEATURE OR FUNCTION IS GIVEN A RELATIVE IMPORTANCE OF 100.

communications group also felt an equally high need for EDP functions. To the communications group data processing capability is of more importance as a derived function than message services. Many of them have experimental electronic mail services through their communications network.

- Communications monitoring and control are more important to data processing users than to communications and office services users.

- All three groups consider sensor control availability to be of relatively low importance, as a function of System #1. The attitude was that environmental monitoring and control do not need to be a part of any MFS, since these functions are being performed by other equipment in the building.

- System #3, Copier Performing Facsimile and Output Printer Functions, ranked the most interesting to all respondents. This high interest results in part from the general frustration with present copiers.

  - Also, the added functional capabilities seem desirable and technically feasible to most respondents. Their rankings of the importance of System #3's hardware features and functional capabilities are shown in Exhibit VI-4.

  - All three groups consider a communications controller to be the primary hardware feature; just as they did for systems #1 and #2.

  - Facsimile output is rated the most important function.

  - Other terminal outputs for messages is nearly as important as facsimile. This reflects a strong desire to speed up document distribution, and reduce the manual operations involved.

EXHIBIT VI-4

RELATIVE IMPORTANCE OF HARDWARE FEATURES AND FUNCTIONS - SYSTEM #3 - COPIER PERFORMING FACSIMILE AND OUTPUT PRINTER FUNCTIONS

FEATURES AND FUNCTIONS	RELATIVE IMPORTANCE*			
	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS	ALL RESPONDENTS
FEATURES				
CHARACTER GENERATION LASER SCANNER	25	33	85	43
COMMUNICATIONS CONTROLLER	100	100	100	100
DATA STORAGE	49	55	28	43
FUNCTIONS				
FACSIMILE OUTPUT	100	100	100	100
MESSAGE/TERMINAL OUTPUT	67	99	100	85
HIGH SPEED PRINTER	67	37	71	61
JUSTIFICATIONS/TYPE-SETTING	50	28	53	44

* THE MOST IMPORTANT FEATURE OR FUNCTION IS GIVEN A RELATIVE IMPORTANCE OF 100.

- High speed printing is of greater importance to both data processing and office services users than to the communications group. The data processing and communications groups' requirements call for high speed and volume output.

- Justification and typesetting take a less important place in this system. These needs are at least partially being met elsewhere in the company.

- System #4, PABX Performing Text and Data Processing, generated the least interest of all systems, among all respondents (64%). However the communications group could understand and foresee the possible application of this system more than the data processing group.

  - Most respondents understand the system concept and its technical feasibility. However, they do not see it as fulfilling a need in the information processing requirements for their own company.

- The relative importance of hardware features and functional capabilities are listed in Exhibit VI-5.

  - CRTs and keyboards are listed as the most important hardware features of this system. Data and/or text storage are considered somewhat desirable.

  - Data terminals for data entry and information retrieval are the most important function to all respondents.

  - Text editing capabilities are considered fairly important as an added function.

  - Small business computer functions are seldom visualized or desired as an added capability to this system.

EXHIBIT VI-5

RELATIVE IMPORTANCE OF HARDWARE FEATURES AND FUNCTIONS - SYSTEM #4 - PABX PERFORMING TEXT PROCESSING OR DATA PROCESSING FUNCTIONS

FEATURES AND FUNCTIONS	RELATIVE IMPORTANCE*			
	DATA** PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE** SERVICES RESPONDENTS	ALL** RESPONDENTS
FEATURES				
CRT'S	INSUF-FICIENT DATA	100	INSUF-FICIENT DATA	100
KEYBOARDS		88		89
DATA/TEXT STORAGE		36		41
OFFICE QUALITY PRINTER		12		21
HIGH SPEED PRINTER		33		40
FUNCTIONS				
SMALL BUSINESS COMPUTER		37		34
TEXT EDITING		58		63
DATA TERMINALS		100		100

* THE MOST IMPORTANT IMPORTANT FEATURE OR FUNCTION IS GIVEN A RELATIVE VALUE OF 100.

** THE NUMBER OF RESPONDENTS FOR DATA PROCESSING AND OFFICE SERVICES WAS TOO LOW FOR INDIVIDUAL MEANING BUT INFLUENCED THE TOTALS.

- System #5, Communications Network Providing Computation Functions, generated a fairly high degree of interest among all respondents (78%). Although all groups expressed enthusiasm for the basic system concept, office services managers were reluctant to comment because they are not familiar with the specific computational services. The relative importance of service offerings are listed in Exhibit VI-6.

  - Proprietary data base services are considered the most important service to all users.

  - Timesharing data analysis services are very important to data processing users. Another data processing activity involving timesharing servics is program development.

  - A remote text editing capability is more important to the communications group than timesharing data analysis. Text editing has less attraction for data processing and particularly office services users who have available in-plant word processing equipment.

- System #6, Timesharing System Performing Communications Functions, generates a slightly higher overall interest (80%) than system #6.

  - Only the office services users showed little interest in timesharing services as a basic building block. This is most likely due to inexperience with using any timesharing services in the past.

  - However, this group is certainly interested in the add on functions, electronic mail and message services.

- The relative importance of service offerings are listed in Exhibit VI-7.

  - Message services are considered to be the most important service to data processing users.

EXHIBIT VI-6

RELATIVE IMPORTANCE OF SERVICE OFFERINGS - SYSTEM #5 - COMMUNICATIONS NETWORK PERFORMING COMPUTATION FUNCTIONS

SERVICE OFFERINGS	RELATIVE IMPORTANCE*			
	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE** SERVICES RESPONDENTS	ALL** RESPONDENTS
SYSTEM #5			INSUFFI-CIENT DATA	
SERVICE OFFERINGS				
REMOTE TEXT EDITING	29	66		35
TIMESHARING DATA ANALYSIS	98	42		70
PROPRIETARY DATA BASES	100	100		100

* THE MOST IMPORTANT SERVICE OFFERING IS GIVEN A RELATIVE IMPORTANCE OF 100.

** THE NUMBER OF RESPONDENTS FOR OFFICE SERVICES WAS TOO LOW FOR INDIVIDUAL MEANING BUT INFLUENCED THE TOTALS.

EXHIBIT VI-7

RELATIVE IMPORTANCE OF SERVICE OFFERINGS - SYSTEM #6 - TIMESHARING SYSTEM PERFORMING COMMUNICATIONS FUNCTIONS

SERVICE OFFERINGS	RELATIVE IMPORTANCE*			
	DATA PROCESSING RESPONDENTS	COMMUNI.** CATIONS RESPONDENTS	OFFICE** SERVICES RESPONDENTS	ALL** RESPONDENTS
SYSTEM #6		INSUFFICIENT DATA		
SERVICE OFFERINGS				
ELECTRONIC MAIL	83			86
MESSAGE SERVICES	100			100
PACKET SWITCHING	73			78

* THE MOST IMPORTANT SERVICE OFFERING IS GIVEN A RELATIVE IMPORTANCE OF 100.

** THE NUMBER OF RESPONDENTS FOR COMMUNICATIONS AND OFFICE SERVICES WAS TOO LOW FOR INDIVIDUAL MEANING BUT INFLUENCED THE TOTALS

- Electronic mail follows close behind messages in importance to data processing users.

- As shown in Exhibit VI-7, all respondents gave the same order of importance to the services offered.

C. VALUE OF THE SYSTEMS AS PERCEIVED BY USERS

- Users often cannot provide specific information on how much they would pay for a proposed new system. It is difficult to obtain exact or even meaningful dollar estimates on systems which are not only incomplete, but often unfamiliar to the respodent.

- This is generally true even in larger corporations, although they have been through many capital equipment purchase cycles and prepared numerous cost justification analyses.

  - They are familiar with the cost of single function equipment already installed and they keep up with new system costs. However, they are also aware that the cost of one multifunction system does not equal the cost of two or more single function systems performing the same functions.

- For the above reasons, users were asked to estimate the potential value of the systems in several ways. The results provided some meaningful information, but also pinpointed an important problem area for vendors; there may be a substantial gap between "user perception" and actual potential benefits.

- Systems #1 values are somewhat based on the respondents' knowledge of small business computers. Results are presented in Exhibit VI-8.

EXHIBIT VI-8

THE VALUE OF MFS AS PERCEIVED BY USERS - SYSTEM #1 - SMALL BUSINESS COMPUTER SYSTEM PERFORMING TEXT PROCESSING FUNCTIONS

VALUE	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS
PERCENT WILLING TO PAY "AT LEAST AS MUCH" AS REPLACE-MENT COSTS	31%	N.A.	N.A.
AVERAGE PURCHASE PRICE	$60,000	N.A.	N.A.
AVERAGE MONTHLY COST	$1,000-$1,500	N.A.	N.A.
COST SAVINGS:			
PERCENT OF CURRENT COSTS	20%	N.A.	N.A.
DOLLAR SAVINGS PER MONTH	$2,000	$2,500	N.A.

- Thirty-one percent of the respondents stated they would be willing to pay as much as their current costs. However, this frequently is qualified by desiring improved employee productivity and better system responsiveness. This is reflected in the anticipated monthly cost savings.

- Data processing managers usually see System #1 as applicable at remote locations only, where many small business computers have already been installed.

- Average monthly cost is frequently stated as dependent on the size of the location.

- They would be willing to pay $500 per month for a small remote site and up to $1,500 per month for a large remote location.

- The purchase price was only indicated once at $60,000.

- The value was more often stated as anticipated cost savings.

  . Some respondents expected savings to be 20% of current costs.

  . Other respondents indicated an expected average savings of $2,000 per month.

- Most of the responses are qualitative in nature. These amounted to a willingness to pay replacement costs if productivity is improved.

- In all cases the responses to system values are so scattered they are inadequate for establishing system price ranges. A full analytical study as well as test marketing would be required for more meaningful results (see Chapter III-Section F, detailing Secretarial Cost).

- Users could provide only limited information concerning the value of the other MFS systems and services. Whatever quantitative data which could be derived from the responses is presented in Exhibits VI-9 through VI-13.

  - Thirty-three percent of the respondents to System #2 indicated a willingness to pay at least as much as the replacement cost. Data processing and office services users would expect a savings of 20% over current costs. Dollar savings per month ranged from $1,000 to $2,500, as shown in Exhibit VI-9.

  - Only 6% of the respondents to System #3 value questions indicated a willingness to pay at least the replacement costs. Office services respondents expected a cost savings of 20% or, in one case $9,000, as shown in Exhibit VI-10.

  - Fifty percent of the respondents to System #4 expressed a willingness to pay as much as the replacement costs. Both communications and office services respondents anticipated a savings of 20% over current costs. Dollar savings averaged $8,000 per month, as shown in Exhibit VI-11.

- The value of multi-service systems offered in Systems #5 and #6, is even more difficult to quantify than Systems #1 through #4 for the following reasons:

  - Expenditures for message and data communication services are based on usage and/or transactions and rates were not discussed.

  - Fifty percent of all users responding to System #5 indicated willingness to pay at least as much as they are now. Cost savings indicated by the communications group showed a 50% return on investment over a period of several years. One data processing respondent would expect a $75,000 savings per month, as shown in Exhibit VI-12.

EXHIBIT VI-9

THE VALUE OF MFS AS PERCEIVED BY USERS - SYSTEM #2 - TEXT PROCESSING SYSTEM PERFORMING COMPUTATION FUNCTIONS

VALUE	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS
PERCENT WILLING TO PAY "AT LEAST AS MUCH" AS REPLACE-MENT COSTS	N.A.	N.A.	33%
COST SAVINGS:			
PERCENT OF CURRENT COSTS	20%	N.A.	20%
DOLLAR SAVINGS PER MONTH	$2,500	$1,000	$1,000

EXHIBIT VI-10

THE VALUE OF MFS AS PERCEIVED BY USERS - SYSTEM #3 - COPIER SYSTEM PERFORMING FACSIMILE AND OUTPUT PRINTER FUNCTIONS

VALUE	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS
PERCENT WILLING TO PAY "AT LEAST AS MUCH" AS REPLACE-MENT COSTS	6%	INSUFFICIENT DATA	N.A.
COST SAVINGS:			
PERCENT OF CURRENT COSTS	N.A.		20%
DOLLAR SAVINGS PER MONTH	N.A.		$9,000

EXHIBIT VI-11

THE VALUE OF MFS AS PERCEIVED BY USERS - SYSTEM #4 - PABX SYSTEM PERFORMING TEXT PROCESSING OR DATA PROCESSING FUNCTIONS

VALUE	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS
PERCENT WILLING TO PAY "AT LEAST AS MUCH" AS REPLACE-MENT COSTS	INSUFFICIENT DATA	50%	N.A.
COST SAVINGS:			
PERCENT OF CURRENT COSTS		20%	20%
DOLLAR SAVINGS PER MONTH		$8,000	N.A.

EXHIBIT VI-12

THE VALUE OF MFS AS PERCEIVED BY USERS - SYSTEM #5 - COMMUNICATIONS NETWORK PERFORMING INFORMATION PROCESSING FUNCTIONS

VALUE	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS
PERCENT WILLING TO PAY "AT LEAST AS MUCH" AS REPLACE-MENT COSTS	50%	50%	50%
COST SAVINGS:			
PERCENT OF CURRENT COSTS	N.A.	50%*	N.A.
DOLLAR SAVINGS PER MONTH	$75,000	N.A.	N.A.

*RETURN ON INVESTMENT

EXHIBIT VI-13

THE VALUE OF MFS AS PERCEIVED BY USERS - SYSTEM #6 - TIMESHARING SYSTEM PERFORMING COMMUNICATIONS FUNCTIONS

VALUE	DATA PROCESSING RESPONDENTS	COMMUNI-CATIONS RESPONDENTS	OFFICE SERVICES RESPONDENTS
PERCENT WILLING TO PAY "AT LEAST AS MUCH" AS REPLACE-MENT COSTS	25%	50%	INSUFFICIENT DATA ↓
COST SAVINGS:			
PERCENT OF CURRENT COSTS	N.A.	N.A.	
DOLLAR SAVINGS PER MONTH	$2,000	N.A.	

- Twenty-five percent of data processing respondents and 50% of communications respondents to System #6 indicated a willingness to pay as much as their present service costs. Data processing users would expect a monthly cost savings of $2,000, as shown in Exhibit VI-13.

- The above discussion and charts point out that it may be difficult for potential users to place a dollar value on multifunction systems at this time.

- Those respondents who express a willingness to spend as a percentage of cost savings are on firmer ground. A potential 20 to 25% savings is usually considered sufficient reason to change equipment.

D. EVALUATION OF MULTIFUNCTION SYSTEMS

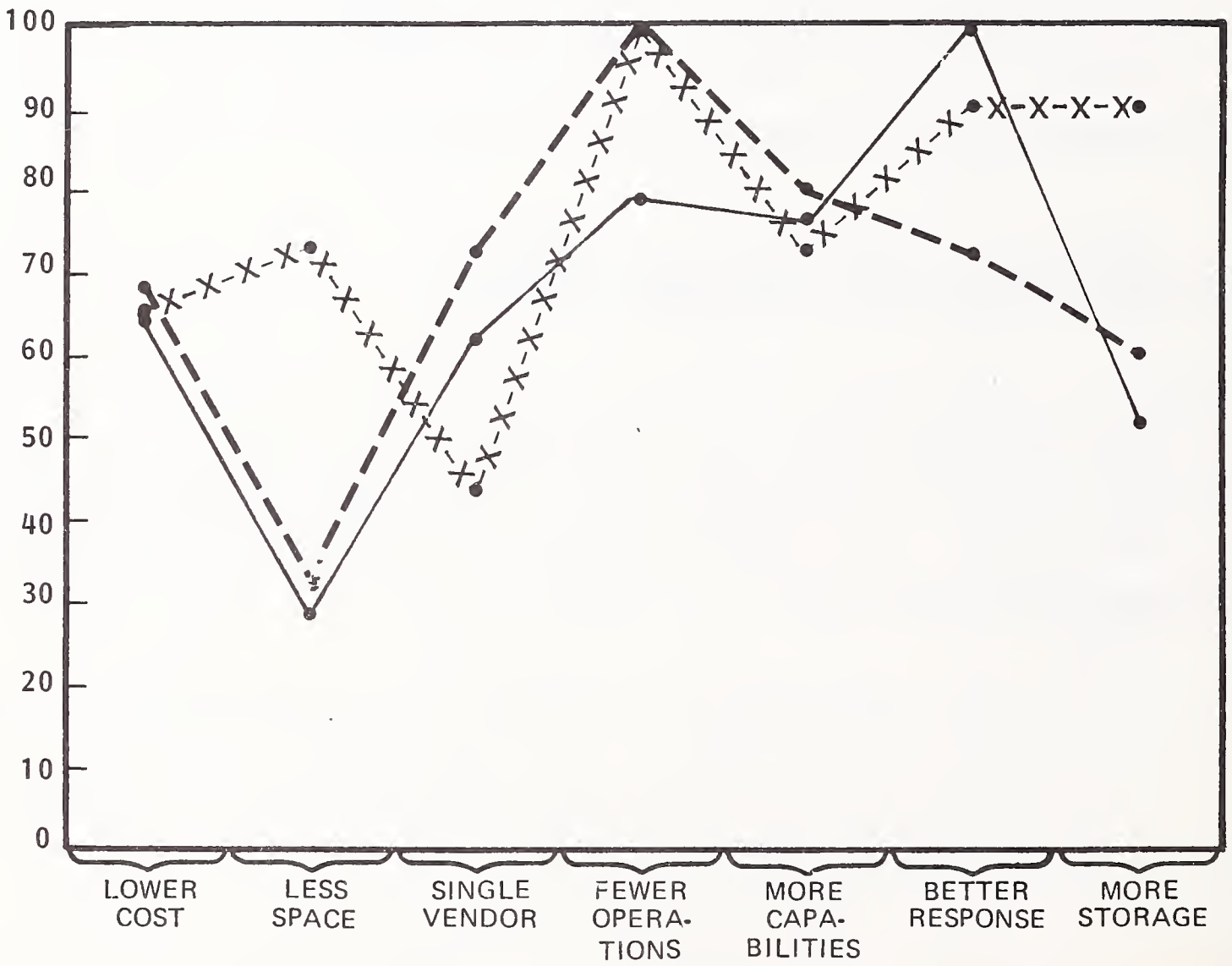
- Respondents were asked their overall opinion of potential advantages and disadvantages of multifunction systems, without regard to specific features and functions. The relative importance of the potential advantages is presented in Exhibit VI-14.

- All three groups rated better responsiveness and fewer operations most important. Data processing respondents rated better responsiveness most important. Both Communications and Office Services respondents rated fewer operations most important.

- All three groups consider a single vendor relationship moderately important. The communications group valued this relationship higher than the other two groups. The data processing group considered such a relationship moderately valuable but the office services group considered dealing with a single vendor the least important potential advantage of MFS.

EXHIBIT VI-14

RELATIVE IMPORTANCE OF MFS ADVANTAGES



——— DATA PROCESSING RESPONDENTS
– – – – COMMUNICATIONS RESPONDENTS
X-X-X-X- OFFICE SERVICES RESPONDENTS

*THE MOST IMPORTANT CHARACTERISTIC IS RATED 100

- Both the data processing and communications groups rated less space requirements the least important advantage. This factor is much more important to the office services respondents.

- All the other advantages were rated moderately high by all three groups. This reflects a generally positive attitude towards the multifunction concept.

  - All three groups rated functional capabilities above cost savings. However, if the systems included all the features and functions described, a substantial cost savings would result.

  - Office services respondents placed a high value on additional storage, rating it only below fewer operations. However data processing and communications respondents placed little value on additional storage, rating it only above less space requirements.

- Respondents were asked to rank the relative seriousness of potential disadvantages of multifunction systems. The results are presented in Exhibit VI-15.

  - All respondents rated equipment failure without backup the most serious of all the potential disadvantages. Their primary concern is the possibility of several functions being down simultaneously.

  - Data processing and office services respondents rated as moderately serious the possibility that only one function is handled well. The communications respondents were less concerned with this possibility.

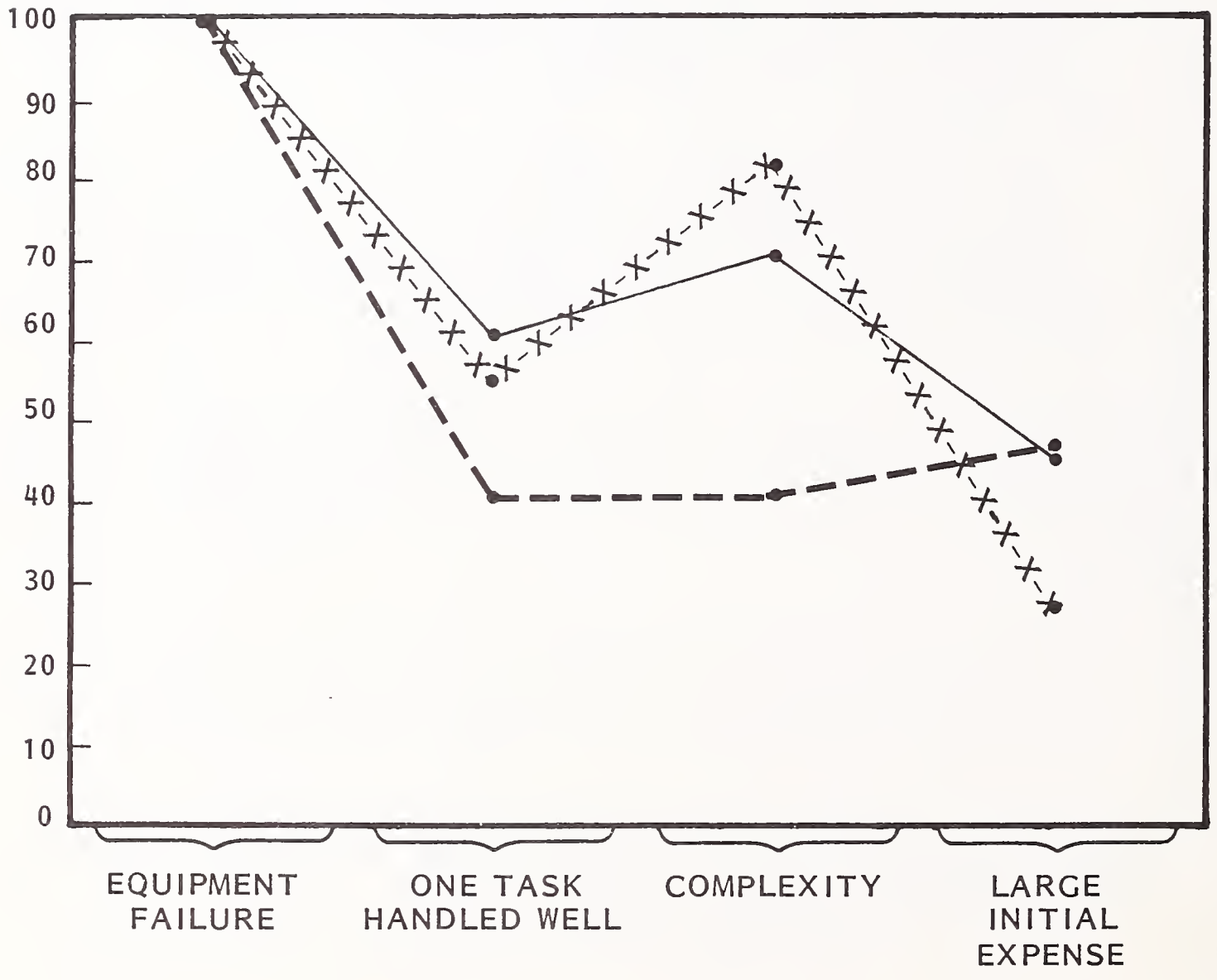
- Two opposing attitudes were expressed:

  - If all the functions do not work equally well, the system loses its value.

  - The motivating factor for purchase is the system's primary function. So, that function should work best.

EXHIBIT VI-15

RELATIVE IMPORTANCE OF POTENTIAL MFS DISADVANTAGES



——— DATA PROCESSING RESPONDENTS

– – – – COMMUNICATIONS RESPONDENTS

-X-X-X-X OFFICE SERVICES RESPONDENTS

* THE MOST IMPORTANT CHARACTERISTIC IS RATED 100

- Data processing and office services respondents considered the possibility of the system being too complex a serious disadvantage, second only to the possibility of equipment failure. The communications respondents rated this factor as much less important.

  - The data processing and office services attitude is:

    . The system must be easy to operate. If it is too complex, it will not be purchased.

  - Initial expense is rated as the least important disadvantage by data processing and office services respondents. Communications respondents rated it fairly low but more serious than complexity or single function.

    . This is compatible with the general attitude about cost. The initial cost is not the driving force. Improved productivity and efficiency are the driving forces which are reflected in cost savings.

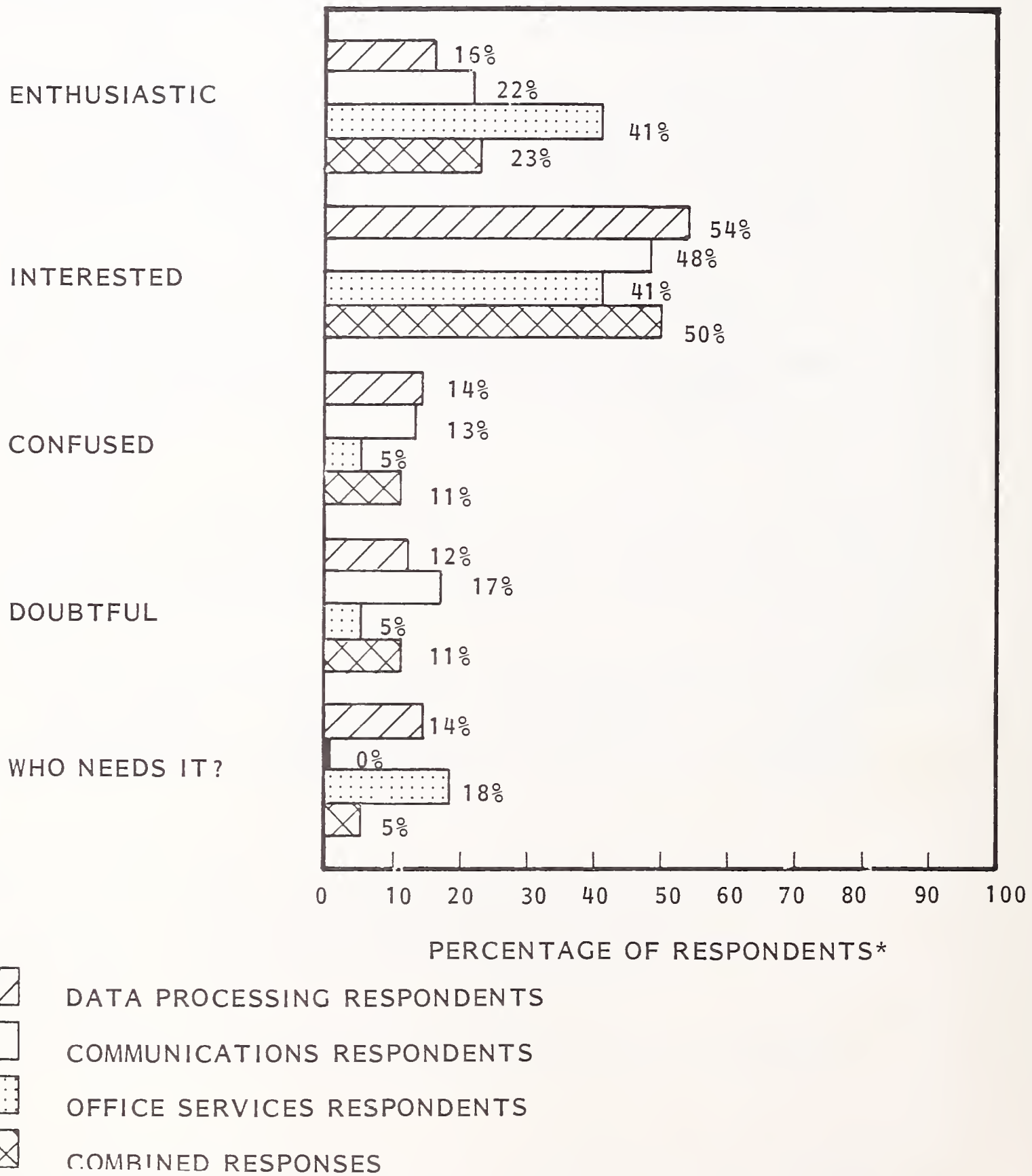
- At the end of the interview respondents were asked to summarize their general reaction to MFS. Half of all the respondents expressed an interest in MFS. Individual group reactions are varied. The results are presented in Exhibit VI-16.

  - Fewer data processing respondents expressed enthusiasm than did communications and office services respondents.

    . Many data processing people could not see how MFS would benefit their data processing center. Their interest is more related to the use of MFS in remote locations.

EXHIBIT VI-16

GENERAL REACTION TO MFS



*MAY ADD TO MORE THAN 100 AS RESPONDENTS OFTEN HAD MORE THAN ONE REACTION

IN

- Office services respondents are the most enthusiastic about MFS. They visualized the systems as directly and quickly improving their daily office operations.

- Nearly half of the respondents expressed an interest in MFS. However, some doubts and confusion were expressed at the same time.

  - Many respondents feel MFS is going to happen, is happening, or has to happen as a step along the way towards achieving total information processing integration.

  - Concern was expressed as to how this is all going to happen. Considerable doubt was expressed that changeovers could be made without dislocating and disrupting operations.

E. WHAT ARE THE POTENTIAL EXPENDITURES

1. THE PROBLEM

- As stated in the beginning, almost an infinite variety of multifunction systems could be designed. The six systems used were selected as logical combinations for general and specific areas of office automation at large corporate headquarters.

- Potential users of the systems had difficulty in placing a value on these systems. The systems are new and few users have seen demonstrations. There is difficulty in measuring the multifunction systems value against the value of already installed single function equipment.

- Most interviewees said that while placing a value on multifunction systems might seem to be a problem, it would be solved by a detailed cost analysis. This analysis would be required before a purchase was made. Some respon-

dents said they would expect vendors to supply data and support for the analysis.

2. LEASE VERSUS PURCHASE

- Users were asked whether they would purchase or lease if new systems of established value were available. The results are presented in Exhibit VI-17.

  - Leasing is favored over purchasing for all of the multifunction systems.

  - Favoring lease over purchase of MFS is true for all respondents as well as the individual groups. In a few instances there is a fifty-fifty tie; however, these are from respondents for systems outside their normal domain.

EXHIBIT VI-17

LEASE VERSUS PURCHASE PREFERENCE BY SYSTEM

SYSTEM TYPE	PREFER LEASE	PREFER PURCHASE
SYSTEM #1 - SBC		
DATA PROCESSING	56%	44%
COMMUNICATIONS	58	42
OFFICE SERVICES	60	40
COMBINED	58	42
SYSTEM #2 - TEXT		
DATA PROCESSING	50%	50%
COMMUNICATIONS	67	33
OFFICE SERVICES	78	22
COMBINED	72	28
SYSTEM #3 - COPIER		
DATA PROCESSING	80%	20%
COMMUNICATIONS	60	40
OFFICE SERVICES	70	30
COMBINED	70	30
SYSTEM #4 - PABX		
DATA PROCESSING	N.A.	N.A.
COMMUNICATIONS	73%	27%
OFFICE SERVICES	100	-
COMBINED	75	25

VII MARKET ANALYSIS AND REQUIREMENTS

VII MARKET ANALYSIS AND REQUIREMENTS

A. COMPETITIVE ENVIRONMENT OF MFS

- Companies already actively marketing information processing equipment and services see an opportunity for growth in the enormous expenditures businesses make for these products and services.

  - Information processing is a prime target for further automation.

  - Logical combinations of two or more functions on one multifunction system increases the system's value to the customer.

- Examples of vendors already moving toward multifunction systems and services include:

  - Computer and office equipment manufacturers seeking to establish communications networks: IBM with Satellite Business Systems and Xerox XTEN telecommunications Network.

  - Computer service companies providing value added network (VAN) functions: Tymshare/Tymnet.

  - Computer service companies providing hardware: ADP, GE, NCSS and others.

- Communications companies acquiring peripheral hardware companies with a view towards providing integrated voice and data communications services: Northern Telecom's acquisition of Data 100 and Sycor.

- The small business computer/word processing combination represented by Systems #1 and #2 has numerous suppliers. Examples are Wang, Burroughs/Redactron, Lexitron/RDS, Datapoint (ARC), and Four Phase.

- All of the examples show vendors' approaches toward the integration of voice, data processing and data communications.

- Most vendors are pushing to establish a firm position in the office automation and distributed processing markets where tremendous growth is anticipated.

  - Competition is for greater market share in the existing enviornment.

  - Vendors feel that they must expand into other vendors' markets before the reverse occurs.

- It should be clearly understood that growth in this market area must be supported primarily by improved productivity of the customers' employees or put in another way, by reducing the customer's costs for personnel.

  - Vendors cannot achieve significant growth by merely replacing existing hardware or services without increasing the value by adding functions.

- Large corporations are far from being saturated with information processing equipment and services. They represent a growth market for MFS. Several factors and trends in large corporations contribute to this potential MFS market:

  - Increasing use of remote distributed data and word processing.

- Increasing need for high speed document processing and distribution.

- Increasing use of high speed electronic message transmission; e.g., electonic mail and facsimile.

- Competition between present and future vendors for these virtually untapped markets will increase far beyond its present level.

B. GENERAL MARKETING REQUIREMENTS FOR MFS IN LARGE CORPORATION HEADQUARTERS

- An understanding of certain general company characteristics is a valuable tool for penetrating the potentially attractive MFS market. Respondents were asked questions about the organizational responsibilities for large capital equipment purchase decisions. Questions about the structure of the information processing department were also asked.

- Corporations of the size examined in this second MFS study have a management structure for each of the three information processing areas.

  - Most companies have an individual manager for data processing and communications responsibilities.

  - A few companies have a single manager responsible for both data processing and communications. However, the one manager carries both titles.

  - Companies use different titles for office services responsibilities such as:

    . Office Services Manager.

. Adminstrative Services Manager.

. Manager of Office Automation.

However, the general responsibility for office equipment belongs to the individual in charge of office services, regardless of title.

- The authority and importance of office services managers is increasing as corporations acquire more expensive automated office equipment. For example, a sophisticated, high-speed copier may cost $100,000.

- All of the corporations surveyed have a corporate financial officer who functions as a controller.

- The participation of different levels of corporate management in the decision-making process used to consider large capital equipment purchases was analyzed.

  - Top management participation is about equal in all three information processing areas. This is to be expected since most corporations require high level approval for large expenditures.

  - The individual information managers' strongest involvement is in their own area of competence. This, too, is to be expected.

  - The relatively strong involvement of the EDP manager in the purchase decisions for communications equipment and the communications manager in the purchase of EDP equipment reflects the fact that these two types of equipment frequently interface with each other. In fact, the dividing line between these two functions is becoming increasingly blurred.

- The lesser involvement of office services managers in the purchase process for other areas reflects the fact that their department is less structured and their status is not quite equal to their fellow managers.

- The relative weakness of the office services manager's position partially accounts for the heavier involvement of "others" in the purchase decisions for office services equipment. Another factor is widely dispersed usage. Nearly every department in the corporation uses office services equipment. These users naturally want to be involved in equipment selection.

- Most department managers would like to participate more in the decision for other areas; not only because of the increasing interface requirements. They are also aware that there is only so much money available for equipment. Each one wants to be sure his department gets its share.

- This fact presents a marketing opportunity for MFS. Managers who cannot justify a standalone system may be amenable to "piggy-backing" on some other system. Better still is the situation where neither of two managers can justify standalone systems. An MFS system which meets both departments requirements and offers a substantial savings compared to the total cost of two separate systems could be the best solution.

- A great deal of effort has taken place before the decision-making process reaches the decision level. The need for the equipment has been established in terms of cost effectiveness, increased productivity and operational efficiency. The general performance parameters required to meet the need have been listed in order of importance. Commercially available equipment has been researched to determine how closely it fits the parameters and at what cost. Most of this work is accomplished by technical experts below the department manager's level.

- Vendors should make a determined effort to get involved at this stage. They can be most helpful in establishing the cost-effectiveness of MFS. They should provide complete specifications for their equipment and be prepared to answer technical questions. "Typical operating" as well as guaranteed specifications should be furnished if available. Ample test data should be available to "back up" the specifications since they might be subject to examiniation by competitors. Illustrations and process diagrams are helpful, particularly if they can be incorporated in the department manager's presentation to top management. Equipment demonstrations are excellent, particularly if they involve "hands on" participation by the customer.

- Before meeting with the corporate officers, the department manager usually has documented the need and the desired parameters. The availability of equipment to meet the cost of two or three systems, including a recommended "best buy" is listed. The completeness of this information and how well it is presented often determines whether or not a purchase will be made.

- The following information was derived from the interviews:

  - Responsibility for selection, evaluation and testing usually lies with technical and professional staff members. As a part of their preliminary effort, they review product literature, read articles and advertisements in trade journals and attend trade shows.

- Respondents indicated that direct visits by a vendor, followed by equipment demonstrations are most valuable.

  - What little involvement top management has in the selection process is generally limited to reviewing recommendations presented by department managers.

  - Most often, top management is only involved in the final decision.

- Several respondents for highly centralized corporations said their companies were using a team approach to the purchase of information processing equipment.

  - The permanent members of the team are the specific information processing department managers. Rotating members are technical and professional experts from various groups. A financial officer often attends the team meetings.

  - The team approach usually resolves problems of system compatibility and financial justification before a recommendation is formulated to present to top management for a yes or no answer.

  - This final answer is often dependent upon how completely and thoroughly the recommendation has been prepared.

- In contrast to the above, several respondents from highly decentralized corporations reported that the choice of equipment for remote sites was left up to personnel at those sites. The exceptions were equipment involving communications protocols and end-to-end compatibility of systems in a network.

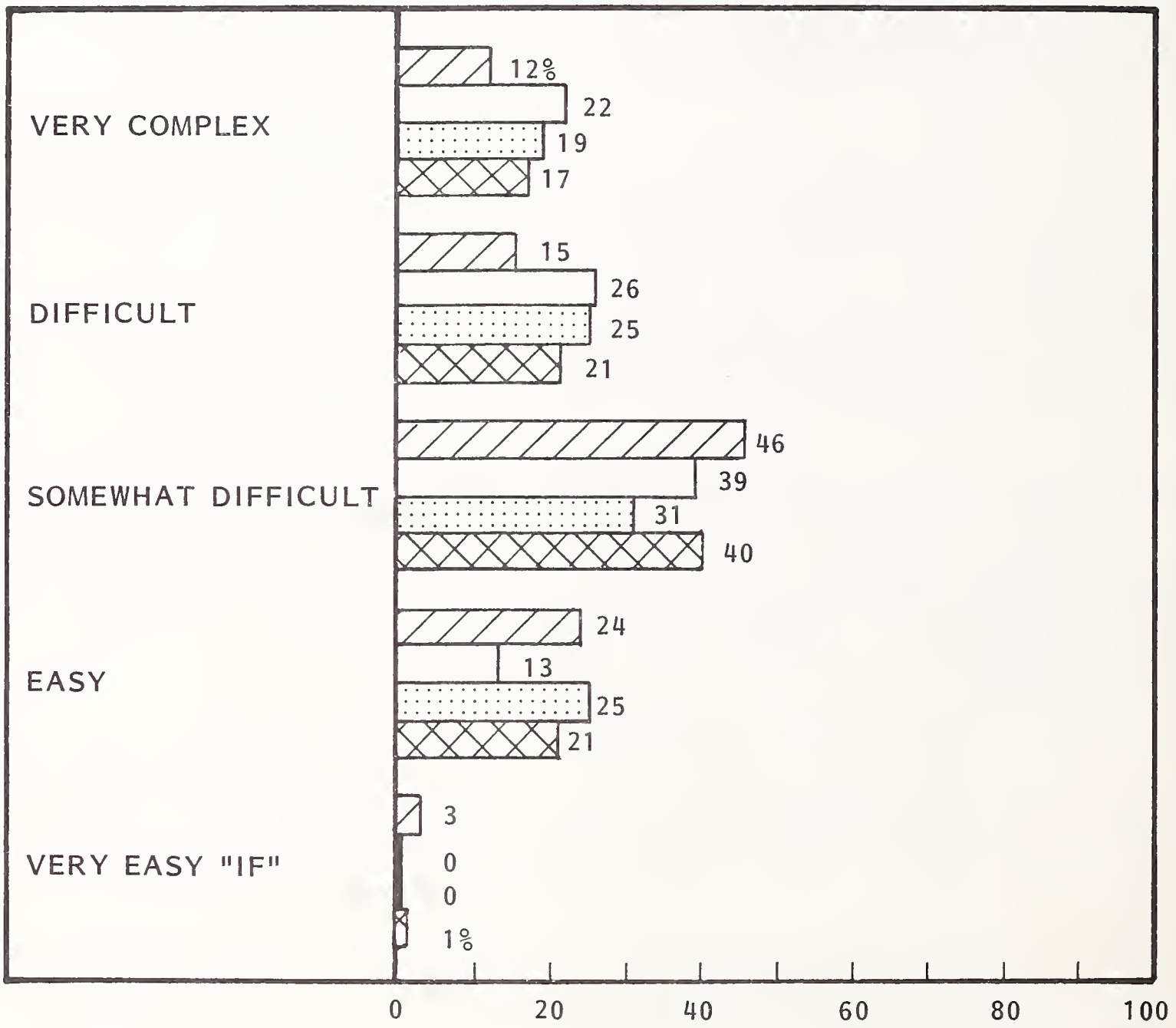
  - One highly decentralized corporation's principal respondent rather wistfully remarked, "All the remote sites use corporate headquarters for is an information source and advisory council!"

- During the interviews, a question was asked about the difficulty or complexity of marketing within corporate headquarters. The results are presented in Exhibit VII-1.

  - Seventeen percent of the combined responses felt that marketing MFS to their company would be "very complex."

EXHIBIT VII-1

COMPLEXITY OR DIFFICULTY OF MARKETING MFS



- Twenty-one percent felt that marketing MFS to their company would be "difficult."

- Forty percent felt that marketing MFS would be "somewhat difficult."

- Twenty-one percent felt that it would be "easy."

- One percent felt that it would be "very easy - if."

- Exhibit VII-2, VII-3, and VII-4 present typical quotations from respondents in each of the three information processing groups. The comments indicate some characteristics and attitudes of large corporation headquarters.

- The following general comments about vendors are common to respondents in all areas and summarize the concerns of information processing managers.

  - The largest consideration is service and support which must be proven.

  - The vendor must make a specific and well researched proposal.

  - Compatibility with existing systems must be demonstrated.

  - The product must be able to satisfy the users' needs.

  - Vendors must have a proven track record for product reliability and company stability.

  - Vendors must understand the structure of the company's information processing operations.

  - The vendor must demonstrate improved productivity to justify the investment.

EXHIBIT VII-2

INTERVIEW COMMENTS WHICH CHARACTERIZE
LARGE COMPANY CORPORATE HEADQUARTERS ATTITUDES
DATA PROCESSING

- "IT IS DEFINITELY GOING TO BE NEEDED - WE ARE TRYING TO GO THAT WAY."
- "WE ARE LOOKING AT BETTER WAYS TO HANDLE OUR NEEDS ALL THE TIME."
- "WE ARE DOING STUDIES ON MFS RIGHT NOW. WE HAVE 2 OR 3 TERMINALS DOING DIFFERENT JOBS IN OUR REMOTE LOCATIONS AND IT'S TOO COSTLY."
- "THE DEVELOPMENTS SOUND GREAT, BUT I HAVE RESERVATIONS ABOUT COMBINING MANY FUNCTIONS BECAUSE OF INTERFERENCE BETWEEN FUNCTIONS. I SEE THIS AS A POTENTIAL PROBLEM AND WANT TO SEE IT RESOLVED BEFORE PURCHASING."
- "THE PRESENT USE OF EQUIPMENT IS TOO COSTLY - MFS MIGHT HELP."
- "IT IS HARD TO FIND PEOPLE EXPERIENCED IN MANY AREAS TO RUN MFS."
- "WE'RE DECENTRALIZED SO EACH SUBSIDIARY DECIDES FOR THEMSELVES."
- "SINCE WE SET UP SEPARATE DIVISIONS, EACH WITH THEIR OWN DATA CENTER, 'CORPORATE' HAS BECOME MORE OF AN INFORMATION INTERCHANGE."
- "CENTRALIZED DATA PROCESSING IS GETTING UNREALISTIC - MFS WILL BE A MUST."
- "CORPORATE SYSTEMS WILL PROVIDE THE TECHNICAL SUPPORT, RESEARCH AND ADVICE WITH CORPORATE CENTRAL COORDINATING CONTROL."
- "HOW DO YOU ASSIGN PRIORITIES ON A SYSTEM LIKE THIS? WE HAVE TROUBLE DOING IT ON THE COMPUTER NOW."
- "WE ARE A VERY TRADITIONAL FIRM AND I DON'T SEE US USING SOMETHING LIKE THIS FOR A WHILE. IT'S VERY INTERESTING."
- "WE ARE LOOKING INTO THIS SERIOUSLY."
- "WE NEED DDP NOW. WE ARE PRESENTLY DOING 90% HERE AND WE NEED REMOTE PROCESSING."

EXHIBIT VII-2 (CONTD)

INTERVIEW COMMENTS WHICH CHARACTERIZE
LARGE COMPANY CORPORATE HEADQUARTERS ATTITUDES
DATA PROCESSING

- "THE PHYSICAL MARRIAGE OF EQUIPMENT SUCH AS THIS IS NECESSARY, DESIRABLE AND INEVITABLE. THERE'S NO REASON WHY ONE COMPUTER COULDN'T HANDLE COMBINED FUNCTIONS."

- "I DOUBT IF A SMALL BUSINESS COMPUTER CAN BRING POWER TO THE PEOPLE."

- "WITH HARDWARE PRICE FALLING, I EXPECT TO MOVE AWAY FROM MFS."

EXHIBIT VII 3

INTERVIEW COMMENTS WHICH CHARACTERIZE
LARGE COMPANY CORPORATE HEADQUARTERS ATTITUDES
COMMUNICATIONS

- "WE'RE WORKING ON THE NETWORK. IT IS THE TREND. I THINK IT ALL HAS TO START WITH COMMUNICATIONS."
- "I'D LIKE TO FIND EQUIPMENT, OR PREFERABLY A SERVICE TO BUY, WHICH PULLS ALL THE TELECOMMUNICATIONS CONNECTIONS AND FUNCTIONS TOGETHER, WHICH WOULD BE COMPATIBLE WITH OUR PRESENT CENTRAL SYSTEM, NOT REMOTE."
- "WE'RE HEADED TOWARD IT ALREADY."
- "WHY WASN'T A REPORT SUCH AS THIS DONE TWO YEARS AGO WHEN WE STARTED TO INTEGRATE DATA PROCESSING AND TELECOMMUNICATIONS. THERE WASN'T ANY, SO WE DID OUR OWN EVALUATIVE STUDY AND HAVE BEEN DEVELOPING OUR SYSTEM EVER SINCE."
- "NETWORK SWITCHING - WE'RE GETTING INTO THIS RIGHT NOW, SO THIS WOULD BE A STEP IN THE FUTURE."
- "FROM MY VIEW, A PABX SYSTEM IS NECESSARY TO BEGIN WITH."
- "MUST CONSIDER MERGER OF THE TECHNOLOGIES."
- "WE HAVEN'T SEEN ANY! I'VE BEEN LOOKING. WE HAVEN'T FOUND ONE THAT WILL HANDLE OUR NEEDS."
- "I COULD BE ENTHUSIASTIC IF I COULD SEE IT DOWN THE ROAD. OUR OPERATION CHANGES SO FAST BETWEEN CONCEPTION AND THE REALITY."
- "WE'RE VERY CONCERNED. WE HAVE MUCH NEED FOR THIS NOW. THE OTHER THING IS EDUCATION WITH THE CONCEPT. IN OUR FIRM DEPARTMENTS MUST COMMUNICATE. WE ALL MUST GET INVOLVED; DATA PROCESSING, WORD PROCESSING, AND COMMUNICATIONS. WE ARE PRESENTLY INSTALLING A 'TELELIFT' SYSTEM - IT IS POSSIBLY THE FORERUNNER TO ELECTRONIC MAIL/MESSAGE COMMUNICATIONS. IT'S NOT VERY ADVANCED, BUT IT'S A START. COMMUNICATIONS DEPARTMENTS WILL BE THE FORERUNNERS."
- "IT ALLOWS INTERCOMPANY TRANSFER OF INFORMATION."

EXHIBIT VII-3 (CONTD)

INTERVIEW COMMENTS WHICH CHARACTERIZE
LARGE COMPANY CORPORATE HEADQUARTERS ATTITUDES
COMMUNICATIONS

- "WE ARE CURRENTLY EXPERIMENTING WITH GAINING BETTER ACCESS TO TELEX-TWX EQUIPMENT. WE'RE NOW DOING MESSAGE SWITCHING ON IBM 3032 AS OPPOSED TO STANDALONE. WE'RE ALSO EXPERIMENTING WITH USING 3270 CRTs INTO TSO TO INPUT TELETYPE AND SENDING 'INTERNATIONAL' THIS WAY - MUCH PREFERABLE TO PAPER TAPE."
- "IT'S WHAT WE NEED TODAY."
- "ATT IS ALWAYS COMING UP WITH ALL THESE GREAT IDEAS LIKE DIMENSION. THEY STARTED TALKING TO US ABOUT THE CONCEPT 20 YEARS AGO AND ITS JUST RECENTLY AVAILABLE. I WOULD SAY MFS IS A GREAT IDEA BUT IF VENDORS WANT TO SELL IT, IT BETTER BE AVAILABLE WHEN USERS NEED IT."
- " I THINK THEY ARE GOING TO 'BLACK BOX' IT PIECE BY PIECE. IT WILL BE A TIME COMING BEFORE ALL THE FUNCTIONS ARE INTEGRATED."
- "IT'S A NECESSITY BUT I'M NOT WILDLY ENTHUSIASTIC. IT WILL BE USED IN A WAY BEST SUITED TO YOUR OPERATIONS. IT'S NOT STATE-OF-THE ART EQUIPMENT, BUT WE'RE NOT REALLY A STATE-OF-THE ART COMPANY IN TERMS OF THE EQUIPMENT WE USE."
- "IT'S GOING TO HAPPEN."

EXHIBIT VII-4

INTERVIEW COMMENTS WHICH CHARACTERIZE
LARGE COMPANY CORPORATE HEADQUARTERS ATTITUDES
OFFICE SERVICES

- "MFS MAKES SENSE. WE HAVE TO TIE IN REMOTE CENTERS AND THIS WOULD BE THE MOST COST EFFECTIVE WAY."
- WE'RE LOOKING INTO THIS RIGHT NOW. THIS IS THE DIRECTION WE'RE ALL GOING IN - COLLECTIVELY." (WORD PROCESSING)
- "IT'S COMING WHETHER WE WANT IT OR NOT - WE'D BETTER START PLANNING FOR IT."
- "WE'RE GOING TO TEST THE 'ELECTRONIC BLACKBOARD' FROM BELL TO SEE IF THE COST IS JUSTIFIED. IF IT WORKS IT WILL CUT 'DOWN TIME' AND TRAVEL EXPENSES."
- "I'VE ATTENDED SEMINARS ALREADY ON IBM's LASER TECHNOLOGY AND I THINK IT'S UNBELIEVABLE"..."MFS WILL DEFINITELY BE A REALITY FOR US IN THE FUTURE."
- "SINCE WE DON'T HAVE A NETWORK WE WOULDN'T NEED AS MANY FUNCTIONS."
- "WE CHOSE FOUR PHASE FOR WORD PROCESSING BECAUSE OF COST EFFECTIVENESS LOWER INITIAL COST, AND RESPONSE TIME. WE HAD TO HAVE RJE CAPABILITY FOR OUR BATCH OPERATIONS, SHARED LOGIC CAPABILITY, AND EFFICIENT WORD PROCESSING."
- "I'D LIKE TO SEE THE RESULTS OF THIS BECAUSE WE'RE IN THE PROCESS OF IMPLEMENTING SOME OF THESE THINGS NOW."
- "WE'VE ADVANCED TO THE STAGE OF SENDING 'IMAGES', OUR NETWORK IS THAT GOOD. A COPIER SYSTEM WOULD BE PRACTICAL."
- "COULD BE MOST APPROPRIATE FOR OUR REMOTE DATA CENTER - BUT WHEREVER - IT HAS TO TIE TO, OR BE COMPATIBLE WITH IBM 3033."
- "I DON'T UNDERSTAND IT ALL, BUT WE NEED IT AND I'M ANXIOUS TO GET THERE. I SEE IT AS AN OPPORTUNITY TO ELIMINATE BORING JOBS AND REDUCING 'PIECES' OF EQUIPMENT."
- "THE SOONER THE BETTER. WE'RE GETTING INUNDATED WITH PAPER, AND TOO MANY PEOPLE CARRYING IT FROM FLOOR TO FLOOR - IT'S TOO TIME CONSUMING."

EXHIBIT VII-4 (CONTD)

INTERVIEW COMMENTS WHICH CHARACTERIZE
LARGE COMPANY CORPORATE HEADQUARTERS ATTITUDES
OFFICE SERVICES

- "I'M SOLD ON THE IDEA. IT'S VERY BASIC." (COPIER.)

- "YOU PACKAGE UP THE SYSTEM PERFECTLY. YOU CAN RUN COPIES, EDIT, AND FAX ALL AT ONCE - IT'S GREAT! (COPIER.)

- Large corporations will accept multifunction systems if they have the following characteristics:

  - Compatibility with existing systems.

  - Reliability with established local maintenance and service.

  - Applications support tailored to individual users' requirements.

  - Demonstratable cost advantages in employee productivity and/or system performance.

  - Multiprogramming and multiprocessing capability to support simultaneous functions.

  - Easily operated with clear concise operating instructions provided.

C. ANALYSIS OF MARKET REQUIREMENTS BY SYSTEM

- It is assumed that the general market requirements for MFE apply to all systems. However, the importance of some of the general requirements may vary from system to system.

- The most important requirements will be those which apply to the primary function, and then those which apply to the added functions considered most important by the respondents. (it is assumed necessary hardware features will be incorporated into the system.) This section will explore briefly the most important requirements for each system.

- System #1 (small business computer with add on text functions) generated a high degree of interest and attests to the importance all information processing groups place on data processing functions.

- Therefore, the most important requirement is for easy to use applications systems which are tailored to the specific user set. Ideally, data elements, display and report formats, and educational materials should be in terms which are familiar to the end user.

- Cost justification for systems can be specifically identified with improved personnel effectiveness in both clerical and professional ranks through improved communications functions (correspondence, reports, and communications expenses). It is probable that cost savings are important for secondary functions and not on the primary function.

- Education in the potential savings on voice communications is especially important since this potential benefit was largely ignored.

- Simultaneously, support of multiple functions is especially important in this system since it is apparent that data processing would coexist with text processing during normal working hours.

- System #2 (text editing system with add on computation functions) was well received in this study. Most large corporations find the production of technical documents and other volume publications is of great importance. They should find text processing systems an attractive primary building block for a multifunction system.

  - The system should be oriented towards more effective use of both clerical and professional personnel. The system should support casual use by professional personnel (as opposed to operators who would be trained in detailed functions) for purposes of document retrieval, review, and correction.

- System #3 (copier performing facsimile and output printer functions), is based on an office copier which is familiar to everyone and everyone wants to design a better system. This system generated the greatest overall interest of any of the systems.

- The most important requirement if to demonstrate reliability and have established credibility for maintenance and service. Convenience items have a way of becoming necessities, and as vital communication functions are integrated, failure could become critical.

- Personnel costs of copying are substantial (considering professional use in addition to clerical time). Careful systems design could make System #3 cost effective.

- System #4 (PABX with add on functions of computation or text processing) generated the least interest of any system. It was generally not considered a good primary building block by users.

  - The primary requirement is for clearly demonstrable advantages in terms of cost savings and/or employee productivity.

  - The second requirement is to package the system so that management will be able to recognize the cost savings and/or improved productivity.

  - In other words, marketing is the most important problem with the system.

  - The secondary functions must be easily understood (and appreciated) since they will be available to practically all office personnel.

- System #5 (communications network with add on information processing functions) generated substantial interest among all the information processing groups since they must communicate with multiple locations.

  - Reliability, maintenance, and service are the most important factors in the marketplace, and here image can be important.

- The underlying communication functions must be as economical as they would be with other communications services (leased line, regular switched networking, private network, etc.).

- The operational aspects of the secondary functions must be clearly understood so they can be easily exercised by casual users (in other words, complex logic must not be required to extract or analyze data).

- Last, but not least, regulatory approval is an essential requirement to market entry.

- System #6 (timesharing with add on communications functions) also generated considerable overall interest on the part of data processing and communications users. The degree of overall interest was comparable to that of System #5 (80% versus 78%) and seems to indicate combined computer/communications services are desirable on either basis.

  - Reliability, maintenance, and service are also important factors for computer services companies. In fact, it is even more important than for communications services companies. The reliability of communications services is generally conceded to be superior to computer operations. As multifunction services are provided, the reputation of the primary function will initially prevail.

  - The secondary service of intra- and inter-company electronic message (electronic mail) services requires economic or convenience justification.

  - And, of course, regulatory approval is essential.

APPENDIX A: INTERVIEW PROGRAM

APPENDIX A

INTERVIEW PROGRAM

INTERVIEW TYPE	NUMBER OF		USER RESPONSES-MANAGERS			TOTAL USER RESPONSES	VENDORS
	COMPANIES	INTERVIEWS	DATA PROCESSING	COMMUNI-CATIONS	OFFICE SERVICES		
ON-SITE	9	15	9	7	6	22	--
TELEPHONE	34	54	32	24	19	75	13
TOTAL	43	69	41	31	25	97	13

	RESPONSES
DATA FROM SECRETARIAL WORK HABITS SURVEY	
DATA FROM ADDITIONAL INPUT REPORTS (SES) IN 1978	30

APPENDIX B: DEFINITIONS

APPENDIX B: DEFINITIONS

- Computer services are vendor supplied data processing functions using the vendor's computer or vendor supplied assistance to users performing these functions on their own computers. The services can include remote computing, batch processing, facilities management, professional services, and software products.

- Computer equipment is defined as, and includes, any locally installed terminal, general purpose minicomputer or mainframe; local processing intelligence, not including desk top calculators or accounting machines.

- Communications equipment includes Keyset or PABX. Communications automation is defined as interconnect, which is the attachment and use of non-telephone company equipment together with telephone company equipment or services.

- Communications services include direct dial long distance (DDD), wide area telephone services (WATS), leased lines, tie lines, Telex/TWX, or other regulated transmission of voice or data.

- Office equipment includes word processing, photocopying, duplicating and facsimile equipment.

- Office automation is defined as the use of word processing/text editing equipment in either single station or multi-station configurations.

- Centralized data processing is defined as data processing performed at a single, central location on data obtained from several geographic locations or managerial levels.

- Decentralized data processing is defined as the storage and processing of data by individual subdivisions of an organization or at each geographic location of the parts of an organization.

- Distributed data processing systems are defined as a computer complex having many separate computing facilities all working in a cooperative manner, rather than a single computer at a single location.

- Industry specific EDP applications are defined as EDP applications which are important automatable functions of an industry or group of industries; e.g., interline payables (transportation) and bill of materials (discrete piece manufacturing).

APPENDIX C: QUESTIONNAIRES

CATALOG NO. XMFS___

☐ D.P. Equipt. Mgr.
☐ Commn's Mgr.
☐ Office Mgr.
☐ MIS Mgr.
☐ _____

USER QUESTIONNAIRE (ON-SITE)

MULTIFUNCTION EQUIPMENT IN CORP. HQ.

DEFINITION OF MULTIFUNCTION EQUIPMENT

MULTIFUNCTION EQUIPMENT (MFE) IS AN INFORMATION PROCESSING AND DISTRIBUTION SYSTEM THAT AMALGAMATES VARIOUS INFORMATION PROCESSING AND COMMUNICATIONS TASKS BY MEANS OF THE ADDITION OF SUPPLEMENTAL EQUIPMENT TO AN EXISTING INFORMATION PROCESSING OR COMMUNICATIONS SYSTEM SUCH AS:

- DATA PROCESSING (System I) — Exhibit No. I
- TEXT/WORD PROCESSING (System II) — Exhibit No. II
- COPYING/DUPLICATING (System III) — Exhibit No. III
- PABX (System IV) — Exhibit No. IV
- COMMUNICATIONS/COMPUTER SERVICES (Systems V & VI) — Exhibit No. V

USER QUESTIONNAIRE (ON-SITE)

1. How do you currently handle your requirements for the following?

	In-house (Type)	Service Bureau (Name)	Manual (# of people)	Cost* ($ Per Mo.)
a) Data Processing ☐ Satisfied ☐ Dissatisfied				
b) Text (Word) Processing ☐ Satisfied ☐ Dissatisfied				
c) Copying ☐ Satisfied ☐ Dissatisfied				
d) Voice Communications Satisfied Dissatisfied				
e) Message Communications ☐ Satisfied ☐ Dissatisfied				
f) Computation Timesharing ☐ Satisfied ☐ Dissatisfied				

*Includes salaries and equipment

1A. Why satisfied or dissatisfied?

_____

_____

_____

2. Are you currently considering/planning changes in the way you handle the following requirements?

	Specify changes/Why changed?
Data Processing ☐ Yes ☐ No	
Text (Word) Processing ☐ Yes ☐ No	
Copying ☐ Yes ☐ No	
Voice Communications ☐ Yes ☐ No	
Message Communications ☐ Yes ☐ No	
Computation (Time/Share) ☐ Yes ☐ No	

Comments: _____

_____

_____

_____

_____

3. Explain technology and MFE concept:

- Small cheap computers (minis and micros)
- Cheap electronic communications (satellite, packet)
- Merging of computer and communications technologies
- The possibility of multi-function equipment
- Potential advantages (cost, space, one vendor)

For example, it is possible to start with any of the office products or services we've discussed and obtain additional functions and benefits. We would like your comments on the six types of systems described:

I. Data Processing: _____

_____

_____

II. Text (Word) Processing: _____

_____

_____

III. Copy/Duplicating: _____

_____

_____

IV. PABX: _____

_____

_____

V. Communications (Time Share) Service: _____

_____

_____

VI. Computation Service: _____

_____

_____

4. A. System #1 - SMALL BUSINESS COMPUTER WITH ADD ON FUNCTIONS

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
Office Quality Printer			
Storage			
High Speed Printer			
Communications Control			
Additional Functions			
Text Editing/Word Processing			
Automatic Letter/Invoice Generation			
Text Storage			
Message/Text (Electronic Mail)			
Environmental Sensor Control			
Telephone Voice Communications Monitoring and Billing			
Telephone communications control			

II. What other functions would you like to see in such a system?

_____

_____

III. Would you consider buying a small business computer system? as you just described?

Yes ☐ No ☐

Why? _____

_____

_____

How Soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____ %

V. Would you prefer to: ☐ purchase or
☐ lease

4. B. System #II - TEXT EDITING/WORD PROCESSING WITH ADD ON FUNCTIONS

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
Communications Control			
Arithmetic Unit			
Text Storage			
Data Input/10 key pad			
Environment Sensor Control			
Multi-Terminal Data Entry			
High Speed Printer			
Additional Functions EDP Applications			
EDP Storage			
Terminal Function (Data)			
Terminal Function (Message)			
Electronic Mail			

II. What other functions would you like to see in such a system?

_____

_____

INP

III. Would you consider buying a text editing system as you just described?

Yes ☐ No ☐

Why? _____

_____

How Soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____ %

V. Would you prefer to: ☐ purchase or
☐ lease

4. C. System #III - OFFICE COPIER WITH ADD ON FUNCTIONS

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
Character Generator/ Laser Scanner			
Communications Controller			
Data Storage			
Additional Functions			
Facsimile Output			
Message/Terminal Output			
High Speed Printer			
Justification/Type Setting			

II. What other functions would you like to see in such a system?

_____

III. Would you consider buying such a system?

Yes ☐ No ☐

Why? _____

_____

How soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____%

V. Would you prefer to: ☐ purchase or
☐ lease

4. D. System #IV - PABX WITH ADD ON FUNCTIONS

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
CRT's			
Keyboards			
Data/Test Storage			
Office Quality Printer			
High Speed Printer			
Additional Functions			
Small Business Computer			
Text Editor			
Data Terminals			

II. What other functions would you like to see in such a system?

_____

III. Would you consider buying such a system?

Yes ☐ No ☐

Why? _____

_____

How soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____%

V. Would you prefer to: ☐ purchase or

☐ lease

4. E. System #V - COMMUNICATIONS SERVICES WITH ADD ON COMMUNICATIONS FUNCTIONS

I. How important do you consider the following additional features and derived functions:

Hardware Features	Very Important	Important	Not Important
Installed Terminals			
Additional Functions			
Remote Text Editing			
Timesharing Data Analysis			
Proprietary Data Bases			

II. What other functions would you like to see in such a PBAX system?

_____

_____

III. Would you consider buying such a system?

Yes ☐ No ☐

Why? _____

_____

How Soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____%

V. Would you prefer to: ☐ purchase
☐ lease

4. F. System #VI - TIME-SHARE SERVICE WITH ADD ON MESSAGE SERVICES

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
Installed Terminals			
Additional Functions			
Electronic Mail			
Message Service			
Packet Switching			

II. What other functions would you like to see in such a system?

_____

_____

INP

III. Would you consider buying such a system?

Yes ☐ No ☐

Why? _____

_____

How Soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____%

V. Would you prefer to: ☐ purchase

☐ lease

EQUIPMENT GENERAL

5. A. What is your title? _____
(title)

B. To whom do you report? _____
(title)

C. To whom do the following report?

D.P. Equipment Manager _____
(title)

Communications Manager _____
(title)

Office Manager _____
(title)

MIS _____
(title)

D. Who reports to you?

_____
(title)

_____
(title)

_____
(title)

6. A. What is your charter (what is your division responsible for)?

_____

_____

B. Is there a budget for your function?

Yes ☐ No ☐

What was/will be the budget in:

1978 $_____

1979 $ _____

1980 $ _____

1981 $ _____

1982 $ _____

7. How is information processed at corporate headquarters?

☐ Centralized ☐ Decentralized

☐ Other (specify) _____

_____

_____

A. Does the corporate headquarters process information for other areas of the company?

Yes ☐ No ☐

B. Please describe: _____

_____

_____

_____

C. Are there any other sites processing information in a unique way? (i.e.different from corporate headquarters?)

☐ Yes _____
(Specify depts)

☐ No

D. Please describe: _____

_____

_____

_____

8. Who in your firm would be involved in the purchase of Multifunction equipment and/or services? (check all that apply)

	Involved	Final Decision
EDP Head		
Office Manager		
Communications Head		
Controller		
Top Management		
Other(specify) _____		

9. What would a vendor have to do to make a sale? (How complex, or difficult a sale would it be?)

_____

_____

_____

_____

10. Who should be contacted first? _____
(title)

11. What would be the best strategy?

- ☐ Advertisment
- ☐ Mail Literature
- ☐ Trade show exhibits
- ☐ Direct visit
- ☐ Equipment demonstration
- ☐ Other _____

_____

12. Would this Multifunction Equipment be bought for:

Corporate headquarters	☐ Yes	☐ No
Remote locations	☐ Yes	☐ No

13. What functions would it perform?

	Corporate Headquarters	Remote locations
Data Processing		
Word Processing		
Copying		
Facsimile		
Voice Communication		
Message Communication		
Other		

14. Who are your present suppliers? _____

_____

_____

15. How do you handle telecommunications?

_____

_____

_____

INF

16. A. Is the corporate headquarters the centralized corporate communication point?

☐ Yes ☐ No

B. What other organization/location is your company's centralized communication point?

_____

_____

17. Since the systems are modular in nature, they can be initiated and built in numerous ways.

Rank your preference for the primary building block (I-VI), and the most important derived function.

System	Priority	Function	Priority
Business Computer/text (System #I)		Text Editing	
		Electronic Mail	
Text/Word Processing (System #II)		Small Business Computer	
		Data Terminal	
Copier (System #III)		Facsimile	
		Data or Text Output	
		Electronic Mail System	
PABX (System #IV)		Text Editing	
		Small Business Computer	
		Data Terminal	
Communications (System #V)		Computer Services	
		Text Editing (Remote)	
Computer Services (System #VI)		Text Editing	
		Electronic Mail	

18. Rate the claimed advantages of Multifunction Equipment:
(5 = Very important - 1 = Unimportant)

	Rating	Ranking of #5's
Total cost lower		
Less space required		
Single vendor		
Fewer operations		
More capabilities for each function		
Better responsiveness		
More storage can be Accomodated		
Other		

19. There are some possible disadvantages of MFE. How important are they?
(5 = Very important - 1 = Unimportant)

	Rating	Comment
Equipment failure (no backup)		
Only one function handled well		
Complexities		
Large initial expense		
Other		

INP

20. How would you describe your overall reaction to MFE?

Enthusiastic _____

Interested _____

Confused _____

Doubtful _____

Who needs it? _____

21. Any other general comments?

CATALOG NO. XMES[ ][ ]

☐ D.P. Equipt. Mgr.
☐ Commn's Mgr.
☐ Office Mgr.
☐ MIS Mgr.
☐ _____

USER QUESTIONNAIRE (PHONE)

MULTIFUNCTION EQUIPMENT IN CORP. HQ.

DEFINITION OF MULTIFUNCTION EQUIPMENT

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- COPYING/DUPLICATING (System III) — Exhibit No. III
- PABX (System IV) — Exhibit No. IV
- COMMUNICATIONS/COMPUTER SERVICES (Systems V & VI) — Exhibit No. V

EXHIBIT I

MULTIFUNCTION EQUIPMENT

SYSTEM I PRIMARY FUNCTION: DATA PROCESSING
DERIVED FUNCTION: TEXT EDITING/WORD PROCESSING

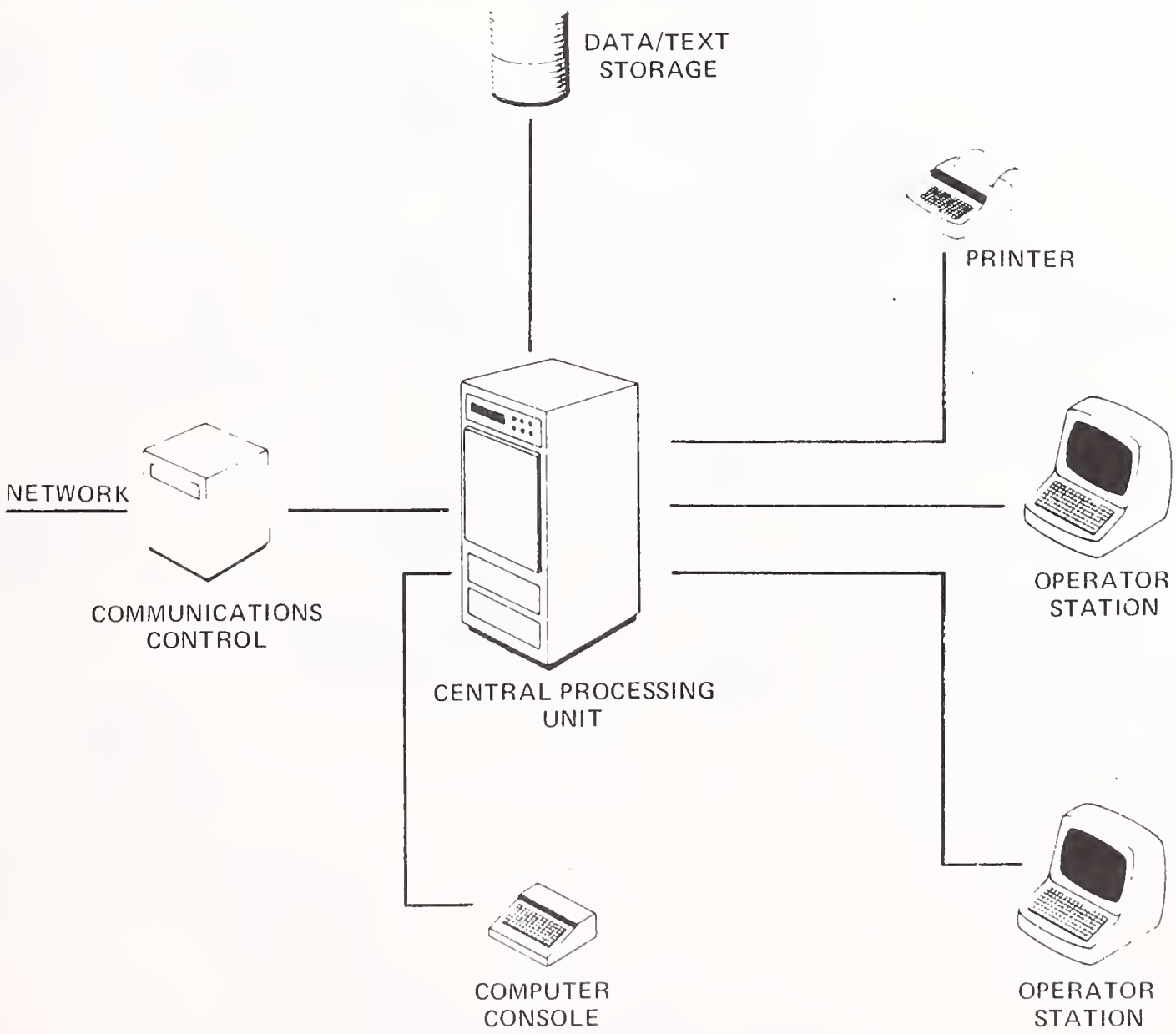


EXHIBIT II

MULTIFUNCTION EQUIPMENT

SYSTEM II PRIMARY FUNCTION: TEXT EDITING/WORD PROCESSING
DERIVED FUNCTION: DATA PROCESSING-TERMINALS

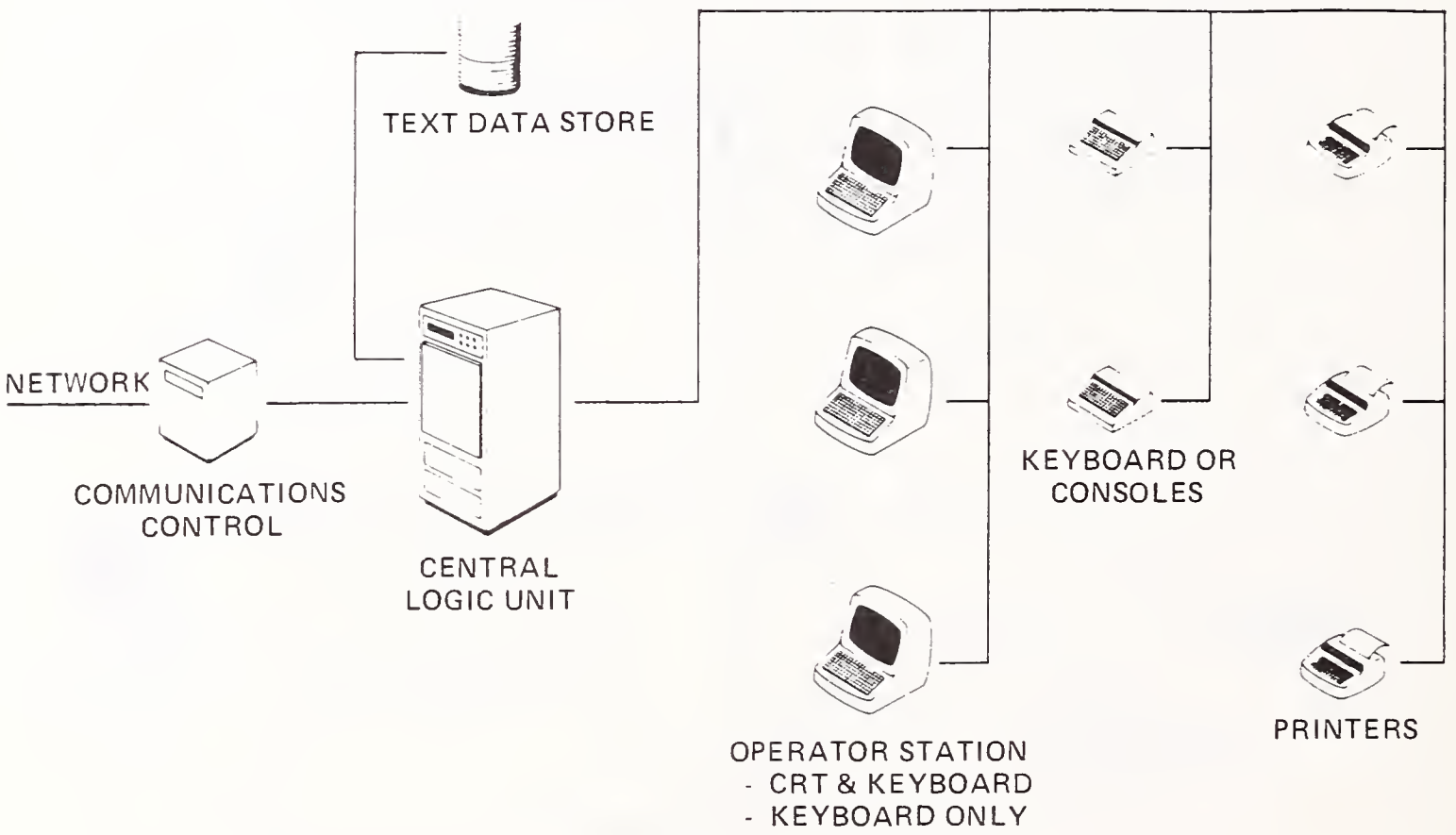


EXHIBIT III

MULTIFUNCTION EQUIPMENT

SYSTEM III PRIMARY FUNCTION: COPYING/DUPLICATING
DERIVED FUNCTION: FAX COPIER TO FAX

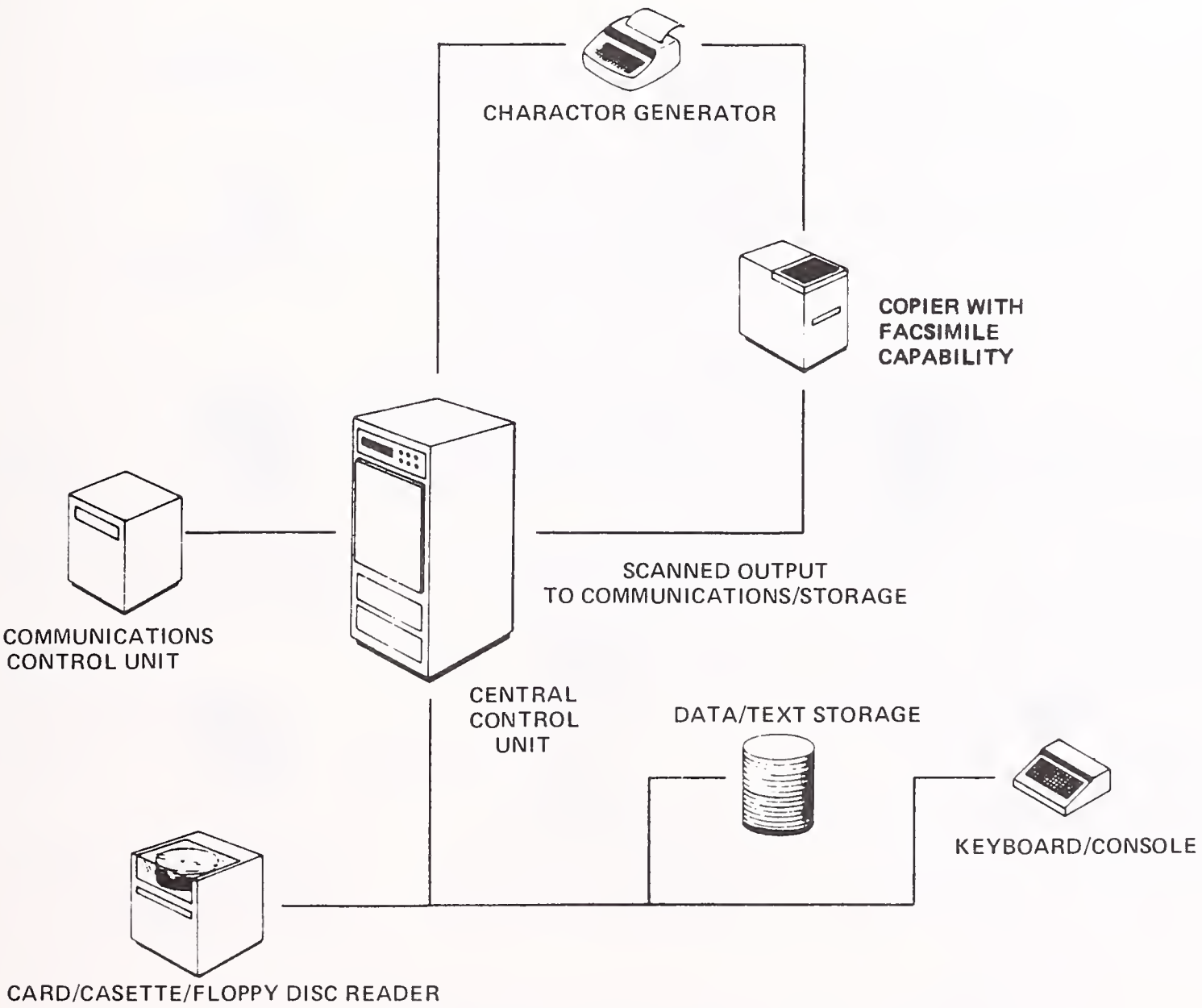


EXHIBIT IV

MULTIFUNCTION EQUIPMENT

SYSTEM IV PRIMARY FUNCTION: PABX
DERIVED FUNCTION: TEXT OR DATA PROCESSING

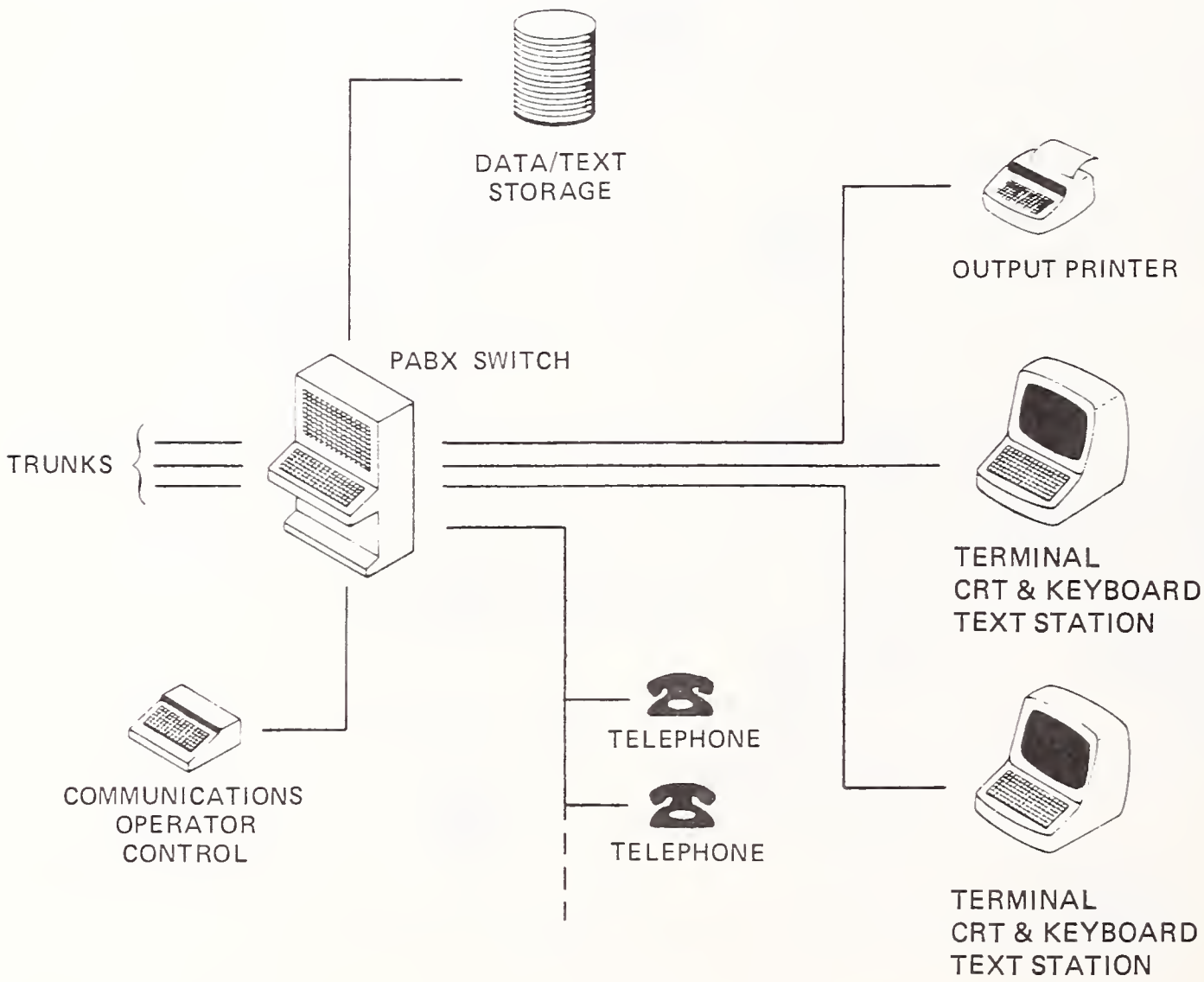
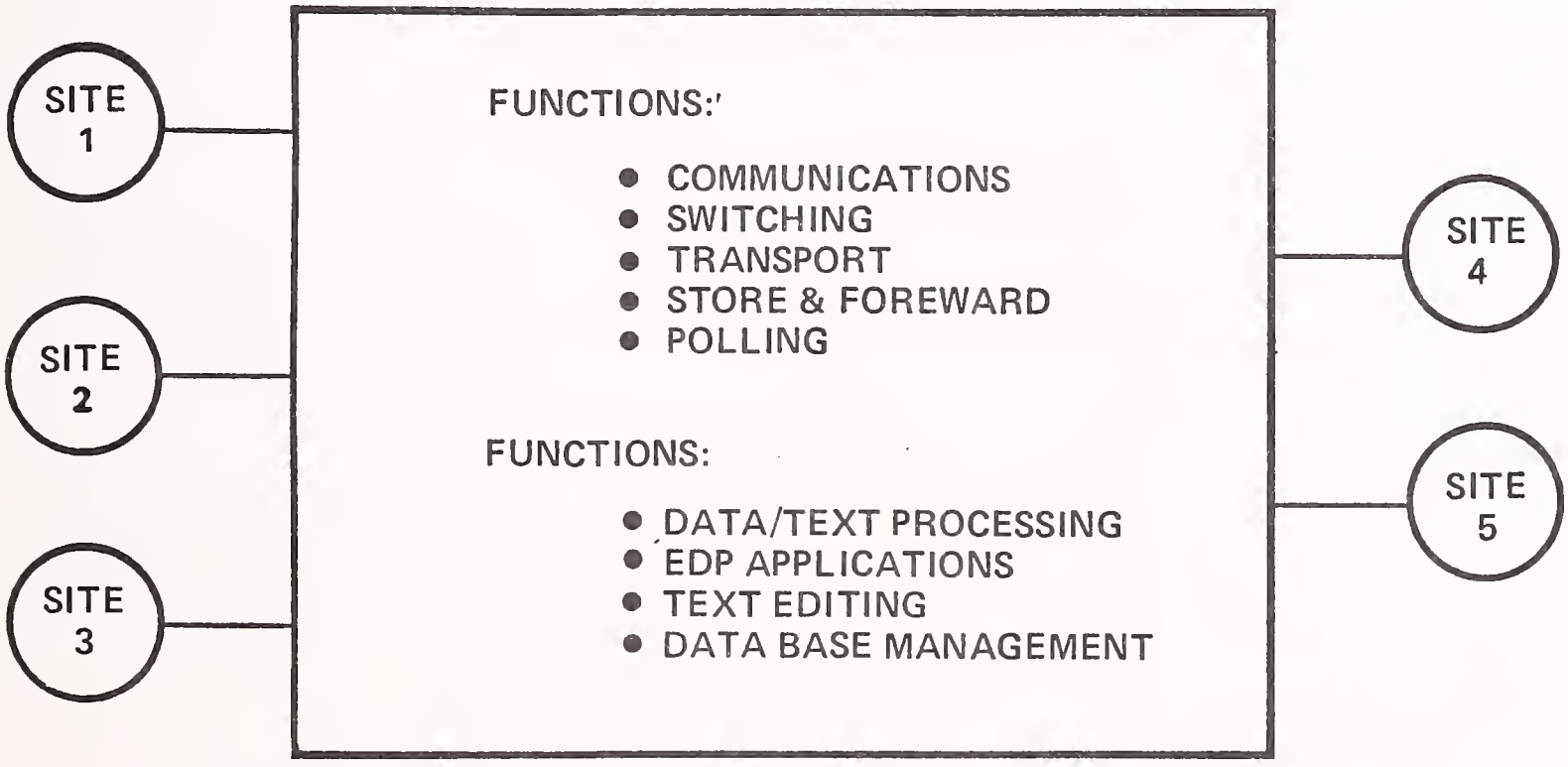


EXHIBIT V

MULTIFUNCTION EQUIPMENT

SYSTEM V PRIMARY FUNCTION: COMMUNICATIONS
IV PRIMARY FUNCTION: REMOTE COMPUTATION

- COMMUNICATIONS
- INFORMATION PROCESSING & STORAGE
- TEXT PROCESSING
- DATA PROCESSING
- INFORMATION STORAGE



USER QUESTIONNAIRE (PHONE)

1. How do you currently handle your requirements for the following?

	In-house (Type)	Service Bureau (Name)	Manual (# of people)	Cost* ($ Per Mo.)
a) Data Processing ☐ Satisfied ☐ Dissatisfied				
b) Text (Word) Processing ☐ Satisfied ☐ Dissatisfied				
c) Copying ☐ Satisfied ☐ Dissatisfied				
d) Voice Communications ☐ Satisfied ☐ Dissatisfied				
e) Message Communications ☐ Satisfied ☐ Dissatisfied				
f) Computation Timesharing ☐ Satisfied ☐ Dissatisfied				

*Includes salaries and equipment

1A. Why satisfied or dissatisfied?

_____

_____

_____

2. Are you currently considering/planning changes in the way you handle the following requirements?

	Specify changes/Why changed?
Data Processing ☐ Yes ☐ No	
Text (Word) Processing ☐ Yes ☐ No	
Copying ☐ Yes ☐ No	
Voice Communications ☐ Yes ☐ No	
Message Communications ☐ Yes ☐ No	
Computation (Time/Share) ☐ Yes ☐ No	

Comments: _____

_____

_____

_____

_____

3. Explain technology and MFE concept:

- Small cheap computers (minis and micros)
- Cheap electronic communications (satellite, packet)
- Merging of computer and communications technologies
- The possibility of multi-function equipment
- Potential advantages (cost, space, one vendor)

For example, it is possible to start with any of the office products or services we've discussed and obtain additional functions and benefits. We would like to know which of the following possibilities would be of interest to you:

Primary System + Add On Functions	Very Interested	Interested	Not Interested
I. SBC + Text processing, "electronic mail," & voice communications control			
II. Text editing/word processing + Data Processing, Data Entry & "Electronic Mail"			
III. Office Copier + Communications (Facsimile), Data & Test Output, & "Electronic mail"			
IV. PABX + Text Editing, Data Processing & Data Entry			
V. Communications Services + Data Processing, Text Editing & Proprietary Data Bases			
VI. Time Share Services + EMS, Text Editing, "pocket switching"			

3. A. Which two of the possible systems are of most value to you?

1. _____

2. _____

Why?

FILL OUT DETAIL ON TWO SELECTED

4. A. System #1 - SMALL BUSINESS COMPUTER WITH ADD ON FUNCTIONS

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
Office Quality Printer			
Storage			
High Speed Printer			
Communications Control			
Additional Functions			
Text Editing/Word Processing			
Automatic Letter/Invoice Generation			
Text Storage			
Message/Text (Electronic Mail)			
Environmental Sensor Control			
Telephone Voice Communications Monitoring and Billing			
Telephone communications control			

II. What other functions would you like to see in such a system?

_____

_____

III. Would you consider buying a small business computer system? as you just described?

Yes ☐ No ☐

Why? _____

_____

_____

How Soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____ %

V. Would you prefer to: ☐ purchase or
☐ lease

4. B. System #II - TEXT EDITING/WORD PROCESSING WITH ADD ON FUNCTIONS

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
Communications Control			
Arithmetic Unit			
Text Storage			
Data Input/10 key pad			
Environment Sensor Control			
Multi-Terminal Data Entry			
High Speed Printer			
Additional Functions EDP Applications			
EDP Storage			
Terminal Function (Data)			
Terminal Function (Message)			
Electronic Mail			

II. What other functions would you like to see in such a system?

_____

_____

III. Would you consider buying a text editing system as you just described?

Yes ☐ No ☐

Why? _____

_____

How Soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____ %

V. Would you prefer to: ☐ purchase or
☐ lease

4. C. System #III - OFFICE COPIER WITH ADD ON FUNCTIONS

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
Character Generator/ Laser Scanner			
Communications Controller			
Data Storage			
Additional Functions			
Facsimile Output			
Message/Terminal Output			
High Speed Printer			
Justification/Type Setting			

II. What other functions would you like to see in such a system?

_____

III. Would you consider buying such a system?

Yes ☐ No ☐

Why? _____

_____

How soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____%

V. Would you prefer to: ☐ purchase or
☐ lease

4. D. System #IV - PABX WITH ADD ON FUNCTIONS

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
CRT's			
Keyboards			
Data/Test Storage			
Office Quality Printer			
High Speed Printer			
Additional Functions			
Small Business Computer			
Text Editor			
Data Terminals			

II. What other functions would you like to see in such a system?

_____

III. Would you consider buying such a system?

Yes ☐ No ☐

Why? _____

_____

How soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____%

V. Would you prefer to: ☐ purchase or
☐ lease

4. E. System #V - COMMUNICATIONS SERVICES WITH ADD ON COMMUNICATIONS FUNCTIONS

I. How important do you consider the following additional features and derived functions:

Hardware Features	Very Important	Important	Not Important
Installed Terminals			
Additional Functions			
Remote Text Editing			
Timesharing Data Analysis			
Proprietary Data Bases			

II. What other functions would you like to see in such a PBAX system?

_____

_____

III. Would you consider buying such a system?

Yes ☐ No ☐

Why? _____

_____

How Soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____%

V. Would you prefer to: ☐ purchase
☐ lease

4. F. System #VI - TIME-SHARE SERVICE WITH ADD ON MESSAGE SERVICES

I. How important do you consider the following hardware features and derived functions:

Hardware Features	Very Important	Important	Not Important
Installed Terminals			
Additional Functions			
Electronic Mail			
Message Service			
Packet Switching			

II. What other functions would you like to see in such a system?

_____

_____

III. Would you consider buying such a system?

Yes ☐ No ☐

Why? _____

_____

How Soon? _____

IV. Assuming better service and employee productivity, how much would you be willing to spend for such a system?

Approximate: $ _____ per month

At least as much as replaced costs _____

Would require cost savings of _____%

V. Would you prefer to: ☐ purchase

☐ lease

EQUIPMENT GENERAL

5. A. What is your title? _____
(title)

B. To whom do you report? _____
(title)

C. To whom do the following report?

D.P. Equipment Manager _____
(title)

Communications Manager _____
(title)

Office Manager _____
(title)

MIS _____
(title)

D. Who reports to you?

_____
(title)

_____
(title)

_____
(title)

6. A. What is your charter (what is your division responsible for)?

_____

_____

B. Is there a budget for your function?

Yes ☐ No ☐

What was/will be the budget in:

1978 $_____

1979 $_____

1980 $_____

1981 $_____

1982 $_____

7. Who in your firm would be involved in the purchase of Multifunction equipment and/or services? (check all that apply)

	Involved	Final Decision
EDP Head		
Office Manager		
Communications Head		
Controller		
Top Management		
Other(specify) _____		

8. What would a vendor have to do to make a sale? (How complex, or difficult a sale would it be?)

_____

_____

_____

_____

9. Who should be contacted first? _____
(title)

10. What would be the best strategy?

- ☐ Advertisment
- ☐ Mail Literature
- ☐ Trade show exhibits
- ☐ Direct visit
- ☐ Equipment demonstration
- ☐ Other _____

_____

11. Would this Multifunction Equipment be bought for:

Corporate headquarters	Yes ☐	No ☐
Remote locations	Yes ☐	No ☐

12. What functions would it perform?

	Corporate Headquarters	Remote locations
Data Processing		
Word Processing		
Copying		
Facsimile		
Voice Communication		
Message Communication		
Other		

13. Who are your present suppliers? _____

_____

_____

14. Since the systems are modular in nature, they can be initiated and built in numerous ways.

Rank your preference for the primary building block (I-VI), and the most important derived function.

System	Priority	Function	Priority
Business Computer/text (System #I)		Text Editing	
		Electronic Mail	
Text/Word Processing (System #II)		Small Business Computer	
		Data Terminal	
Copier (System #III)		Facsimile	
		Data or Text Output	
		Electronic Mail System	
PABX (System #IV)		Text Editing	
		Small Business Computer	
		Data Terminal	
Communications (System #V)		Computer Services	
		Text Editing (Remote)	
Computer Services (System #VI)		Text Editing	
		Electronic Mail	

15. Rate the claimed advantages of Multifunction Equipment:
(5 = Very important - 1 = Unimportant)

	Rating	Ranking of #5's
Total cost lower		
Less space required		
Single vendor		
Fewer operations		
More capabilities for each function		
Better responsiveness		
More storage can be Accomodated		
Other		

16. There are some possible disadvantages of MFE. How important are they?
(5 = Very important - 1 = Unimportant)

	Rating	Comment
Equipment failure (no backup)		
Only one function handled well		
Complexities		
Large initial expense		
Other		

17. How would you describe your overall reaction to MFE?

Enthusiastic _____

Interested _____

Confused _____

Doubtful _____

Who needs it? _____

18. Any other general comments?

INTERVIEW GUIDE MFE (VENDORS)

1. It appears that computer vendors, word processing vendors, office copiers, communications carriers and equipment vendors, and computer service companies are all becoming increasingly competitive. (Give examples.)

   a. Do you think this is really a major trend?

   b. Where is the most serious confrontation going to occur?

   c. Can any class of vendors be excluded as being serious competitors in other markets?

2. a. Do you feel users really want MFE?

   b. What are its main benefits to users?

   c. What types of organizations (size and industry) are especially attracted to MFE?

3. a. From a vendor's point-of-view, what are the advantages of MFE?

b. What are the disadvantages?

4. What is your opinion of the viability of the following specific systems?

	Reasonable Approach (Technically)	Probability of Success and When (Marketing)	Which Industries	Which Vendors
System #1				
System #2				
System #3				
System #4				
System #5				
System #6				

5. What is your opinion of multifunction equipment?

a. Technically (Hardware)

b. Software Systems

c. Applications Support

d. Maintenance Complexities (Hardware and Software)

e. Marketing Complexity

6. What are the key functions and support requirements for:

a. System #1

b. System #2

c. System #3

d. System #4

e. System #5

f. System #6

7. a. What do you see as the primary vendor strategies?

b. Why are these strategies developing?

c. What do you think of these strategies?

d. What will probably happen?

8. What are you going to do?

INF