VENDOR COMPETITIVE ANALYSIS

OFFICE PRODUCTS

INPUT

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Planning Services For Management

VENDOR COMPETITIVE ANALYSIS
OFFICE PRODUCTS

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VENDOR COMPETITIVE ANALYSIS
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EXHIBITS

1 INTRODUCTION

I INTRODUCTION

A. SCOPE

- This report was produced as part of INPUT's 1984 Customer Services Program. Its contents are reserved for clients of this study and are protected by copyright.

- The scope of this report covers vendors who manufacture and service personal computers, word processors, workstations, and end-user printers and terminals.

- The goal of this report is to provide analysis of successful service operations in the office products market. Additionally, recommendations for progressive customer service are presented in hopes of improving customer satisfaction and increasing profitability. These recommendations result from a three-pronged effort:

  - Analysis of the marketplace, as affected by technological advances within the products and by strategic advances in the support of the marketplace.

  - Analysis of service operations that the user needs presented in the user service requirements reports.

- Analysis of now market trends within service and how they can be successfully implemented by office products service vendors.

- In order to enhance the profitability of service, this report provides an extensive analysis of successful service operations, including the marketing of service.

- Finally, the report provides in-depth analysis of successful service organization through case studies highlighting the recommended service techniques presented in this report.

B. METHODOLOGY

- This report is the result of extensive research, data gathering, and on-site interviews. The on-site interviews were conducted in April, May, and June of 1984 at the vendors' corporate service headquarters.

- Vendor interviews were based upon the questionnaire presented in the appendix. Additional information presented in this report resulted from secondary research of publicly available information sources, including annual reports, 10K reports, press releases, and other media information.

II EXECUTIVE SUMMARY

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- With the tremendous growth in the office products market, many vendors did not have the time to effectively set up and operate adequate support structures. At first, the desire to quickly assume a share of the rapidly developing market caused a reluctance to acknowledge the need for service for fear of inhibiting sales. Eventually, vendors found that service could contribute to sales, in addition to actually contributing profits into the vendors' financial operations.

- Due to an incredibly diverse and dispersed product base, not all office product vendors' service operations were profitable. Yet the same practices that large- and small-systems vendors used to progress toward transforming their service operations into profit centers can be, with minor modification, adopted by office product vendors in order to bring about improved service quality and profitable operation.

- Currently, office products service is made available to users through three sources: the manufacturer itself, the dealer/distributor, or third-party maintenance organizations. It is important for the vendor to remember that, through whichever delivery source is used, the user associates the quality of service received with the equipment vendor. Therefore, in order to maintain customer satisfaction and to assure future sales, the equipment vendor must assume responsibility for improving the overall service quality.

A. KEY OFFICE PRODUCT VENDOR PERFORMANCE

- The growth in service revenues in the office products market will outstrip the growth in the overall office products market. This growth will be spurred by a number of factors, including increased integration and functionality of equipment, increased centralization of purchasing power within the corporation, increased user perception toward the importance of service, and increased product base.

- Exhibit II-1 provides a list of key office products vendors, giving their service revenues, service growth rate from 1982 to 1983, and the resulting portion of the company that service has become. The exhibit highlights the tremendous growth potential that office product service can offer.

EXHIBIT II-1

KEY OFFICE PRODUCT VENDOR PERFORMANCE

VENDOR	1983 U.S. FIELD SERVICE REVENUES ($ Millions)	PERCENT GROWTH RATE 1982-1983	PERCENT OF TOTAL COMPANY REVENUES 1983
Wang	$ 220	62%	14.0%
CPT	8	60	5.0
Tandy	11	40	0.4
DEC	646	29	25.0
Xerox	1,638	26	19.0
NBI	10	25	8.0
Apple	37	15	4.0
IBM	2,633	14	18.0

B. PERSONAL COMPUTER SERVICE PRICES

- A key trend in office products service administration has been the dramatic changes in service pricing. The most dramatic changes, both in terms of time span and amount of change, have been in the personal computer service market.

- Three key pricing phases can be seen:

  - The first phase, beginning at the introduction of personal computer maintenance and continuing into 1985, is a period of high profitability as personal computer vendors set artificially high service prices that far exceed service costs. During this period, service prices dropped considerably between 1982 and 1984, bringing service pricing more in line with service costs and cutting into profit margins. Key influences in the reduction in service pricing will be user pressure and the resulting price reductions from IBM.

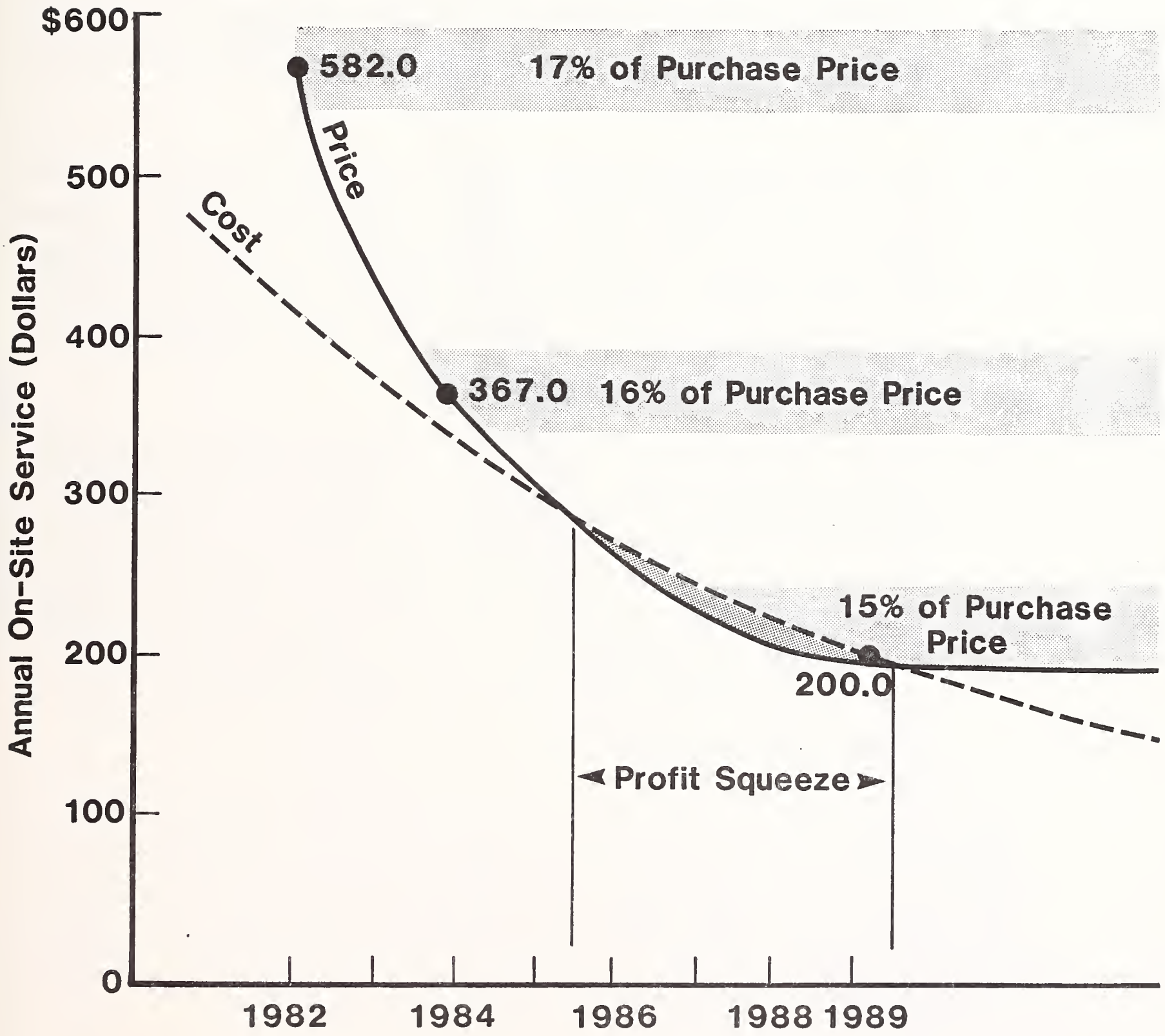
  - During the second phase, the profitability of personal computer service will be severely tested: Service pricing, influenced largely by the removal of the IBM service pricing umbrella, will drop much faster than costs can be reduced. Personal computer service vendors will attempt to build and consolidate their service customer base during this period.

  - Toward the end of the forecast period, service pricing should begin to stabilize. As prices flatten and costs continue to drop, service profitability should reappear.

- It is important to note that even though service pricing will drop faster than service costs, service profitability can be maintained if sufficient product density is achieved.

EXHIBIT II-2

PERSONAL COMPUTER SERVICE PRICES



C. PERSONAL COMPUTER SERVICE PRICING RELATIVE TO RESPONSE TIME

- One key change in the office product service market is the increased requirement for timely, on-site service. In the past, the cost and transportability of office products encouraged users to rely more heavily on depot service as an alternative to the more costly on-site service. Additionally, many office products vendors, especially personal computer vendors, did not even offer on-site service.

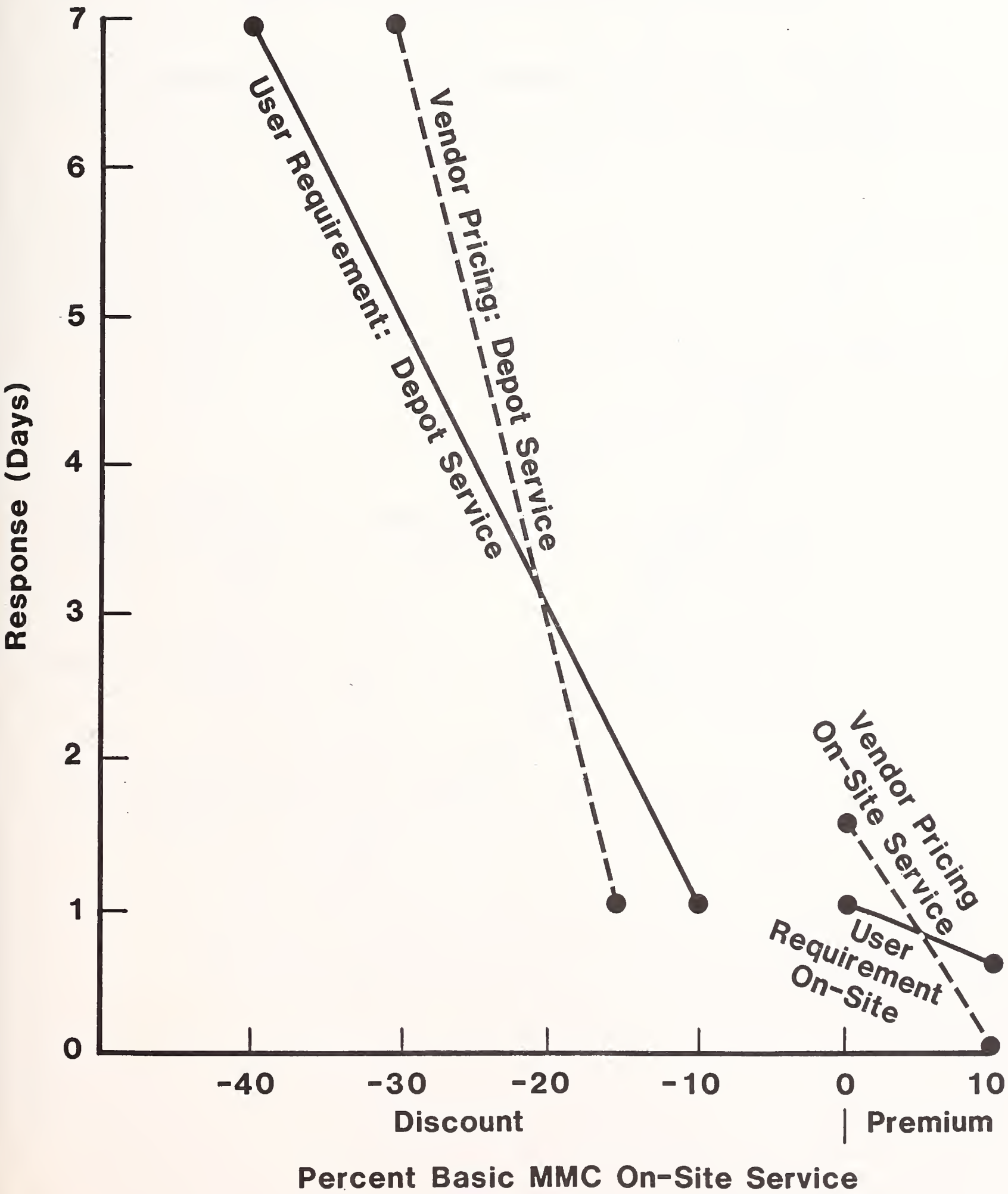
- As the demand for office product service increased, the desire and, in many cases, requirement, for on-site service also increased. At first, vendors offered on-site service at a fairly high premium, usually more than 45% higher than depot service. Vendors could point at the increased costs involved in providing on-site service to a dispersed product base as justification for the high service price.

- Office product user price sensitivity is beginning to influence the service vendors to reduce on-site service pricing. There is a disparity between personal computer service pricing levels (represented by the dashed lines) and personal computer user requirements (represented by the solid lines) for both depot service and on-site service. Note that the users' requirements lines are more horizontal, indicating that users desire more flexible pricing for varying levels of responsiveness, while vendor pricing levels have been more vertical, indicating little service flexibility.

- In order to improve user satisfaction of service pricing, vendors need to gain a better grasp of their users' requirements, not only in the quality of their service, but also in the types of services and the value placed on the service. By successfully determining user needs, service vendors will be able to present a service program that will maximize service positioning, increase service acceptance, and improve user satisfacion with service.

EXHIBIT II-3

PERSONAL COMPUTER SERVICE PRICING RELATIVE TO RESPONSE TIME



D. RAPID GROWTH IN PERSONAL COMPUTER SERVICE BY MANUFACTURERS

- The third-party maintenance of office products is expected to grow at a 20% rate from 1984 through 1989, from $370 million in 1984 to $900 million in 1989. The largest contributor to this growth by far is the personal computer TPM market, which will grow from $330 million to $805 million during the forecast period.

- This growth is slowing due to the increased participation of office product vendors, particularly personal computer manufacturers, in the service market. Direct manufacturer support can be expected to grow from 33% of the personal computer service market in 1984 to 55% in 1989. A number of factors have contributed to this change:

  - A larger yet more controlled product base.

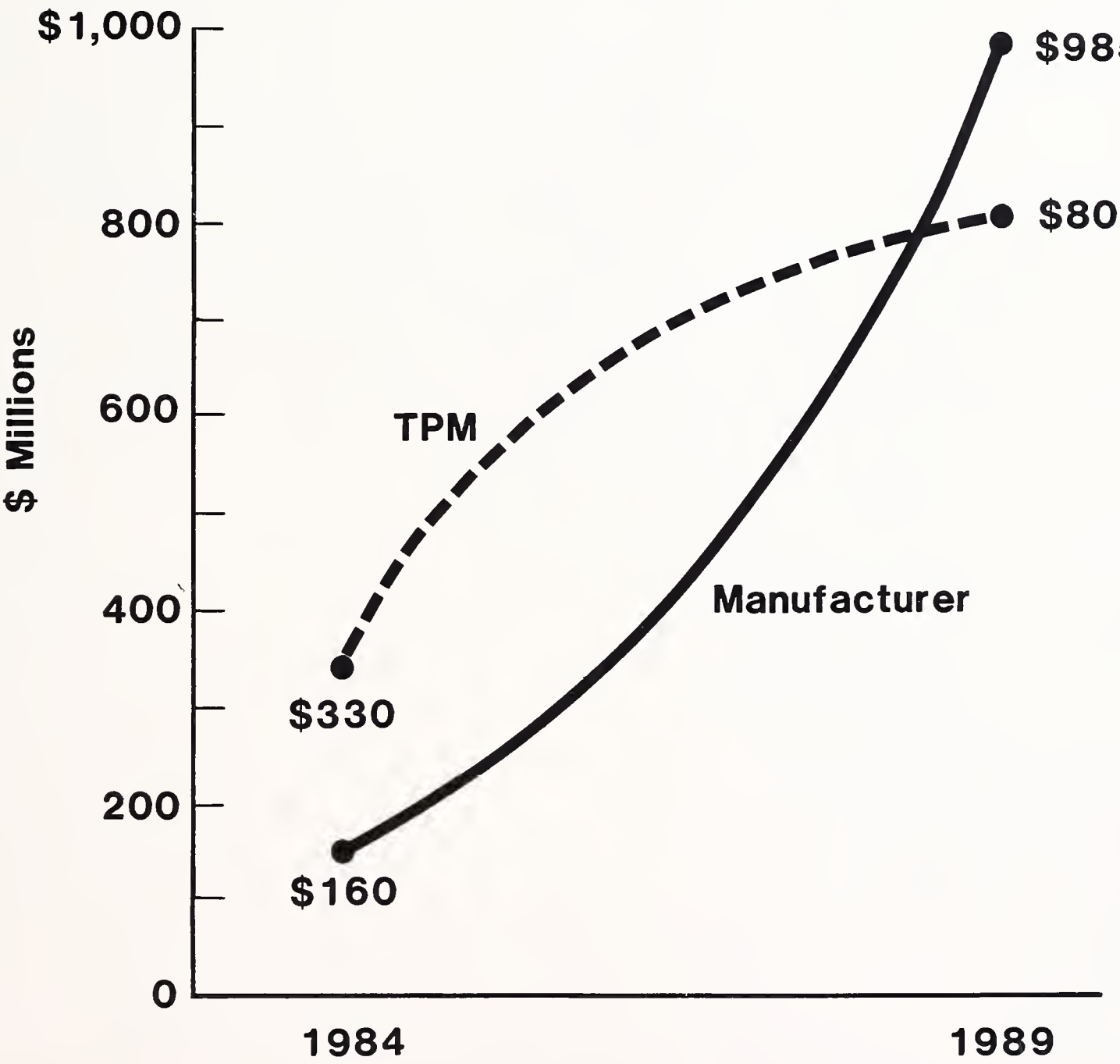
  - More centralized control of the corporate personal computer base, which put the service purchase decision with people who are accustomed to service.

  - More sophisticated products, which begin to approach the value assigned to minicomputers.

  - Growing awareness by the vendors of the increasing demand for service and recognition of the potential for profitability in satisfying user needs.

RAPID GROWTH IN PERSONAL COMPUTER SERVICE BY MANUFACTURERS

- Centralization of Purchasing Power Within Corporation
- Increases in Sophistication of Hardware and Applications
- Denser Product Base to Serve



III PRICING OF OFFICE PRODUCTS SERVICE

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A. EFFECT OF PRODUCT DISPERSION ON SERVICE

- There is a continuing movement toward marketing office automation equipment through retail outlets and other mass merchandise channels. This trend is being fueled by two factors:

  - The rapid entry of new office automation manufacturers into the market who do not have the resources required to provide proper marketing and service support.

  - The measured conclusion of more established equipment vendors that they cannot properly provide marketing and service for their widely dispersed marketplace.

- Traditionally, office products vendors relied on retail stores and distributors to sell their equipment. In 1983 retail stores and independent dealers comprised over 55% of all personal computer and word processor units sold.

- This trend has been acknowledged by even the most traditional direct-service-oriented companies. By the end of 1983 IBM had over 125 IBM Product Centers that marketed IBM personal computers and other office products. Digital Equipment Corporation and Wang are two other major vendors to start up retail stores dedicated to their products.

- The oldest of the personal computer vendors, Tandy Corporation, has the most dispersed distribution coverage. By the end of 1984, Tandy's Radio Shack outlets (with computer centers) and standalone PMS Computer Center outlets will total 1,400.

- With the vast product dispersion resulting from such an extensive product distribution network, office product vendors have been forced to explore new ways of providing service and support for their products. Office product service organizations are being squeezed by the rapidly increasing dispersion of products and by an increasing user demand for increased and improved service. Additionally, service organizations are also looked to for profitable operation.

- As a result of this, office product vendors have provided service to their customers through three routes:

  - Manufacturer supplied - where the equipment vendor provides the service through its own service organization.

  - Distributor or dealer supplied - where the equipment vendor relies on its extensive distribution network to provide the service to users.

  - Third-party supplied - where the equipment vendor signs a third-party maintenance agreement with an established service organization.

- Each of these service delivery routes pose advantages and disadvantages to the equipment vendor, as indicated in Exhibit III-1. Obviously, the most expensive distribution channel for service is through the manufacturer. Such service is expensive because the vendor must set up a service organization of sufficient size and resources to support present and future product mixes. If the manufacturer plans to provide on-site support, the vendor will be required to set up vehicles for dispatching, parts distribution, and other expensive service processes.

EXHIBIT III-1

SERVICE DELIVERY SOURCES

SERVICE SUPPLIER	ADVANTAGES	DISADVANTAGES
Manufacturer	• Source of Revenues • Provides Control of Service	• Expensive; Requires Vast Personnel and Resource Allocation to Match Product Dispersion
Dealer/Distributor	• Already Has Established Organization to Set Up • Can Encourage Service at Point of Sale	• Manufacturer Has Limited Control of Service Provided to Users • Usually Does Not Want to Encourage Service Contract If It Threatens Sale.
Third Party	• Established Service Organization • Can Provide Service on Entire "System"	• Manufacturer Has Virtually No Control over Service • Manufacturer Must Provide Parts and Documentation

- The advantages for the manufacturer providing service itself are the following:

  - The manufacturer can control the service quantity and quality that the user receives.

  - The manufacturer maintains an image of "service orientation" in the users' eyes.

  - The manufacturer can use "service" as a selling point for the equipment.

  - Service itself then can become a source of revenue.

- Unfortunately, the problems inherent in providing service to office products' dispersed user population often leads the manufacturer to look to others to provide service. The majority of service and support of personal computer and word processor equipment comes from independent distributors and dealers. The advantage of this service arrangement is obvious; dealers already have an established accessibility to users, thus providing the service coverage needed by the user base.

- The disadvantage of relying on dealers to provide service to the user stems from the loss of direct control over service quantity and quality. Equipment manufacturers attempt to reduce this by setting up guidelines, pricing and otherwise, through which a certain amount of control over the service is provided to the user. Also, equipment manufacturers set up a dealer support structure from which training, documentation, and spare parts distribution accompanies consulting services to the dealers.

- A supplementary method for providing support for a dispersed product base is the signing of a third-party maintenance agreement with a firm that already

has the service organization in place. This method also provides organized product support at a lower cost; however, the same problem of controlling service quality is present as it was in dealer- and distributor-provided support.

- Both dealer/distributor- and third-party-supplied service offer an additional benefit--in most cases service can be provided on all products within an office system, even if the system contains products from different equipment vendors. This ability provides the user with a single source of support.

B. EFFECT OF PRODUCT PURCHASE PRICE ON SERVICE PRICING

- As the main computer markets (mainframe, minicomputer, etc.) matured, service as a selling point became more competitive. Even though the hardware vendors strove to market machines that targeted particular niches (which resulted in broad purchase price ranges), they realized that service pricing had to be competitive in order to attract an optimum service market. As a result, maintenance pricing was thought of (and sold as) a percentage of the purchase price.

- Basing service price on purchase price had a number of benefits. At product introduction, actual repair costs were not always known. Therefore, pricing service in ratios to purchase price would allow vendors to somewhat cover repair costs (especially spares replacement costs), while maintaining pricing conformity along a product line. As the product matured, service pricing could always be adjusted by fully burdened costs, direct costs, competitors' pricing, or a combination of any/all of the above.

- Also, attaching service pricing to purchase pricing allowed sales and marketing (who most often were responsible for setting service pricing) to be able to estimate and present total system price (including service pricing) to potential customers at sales presentations. It was much easier for sales

people to remember and present service price as a percentage of list price than as an absolute figure. It also was thought that this would be easier for customers to understand and accept.

- As service became more profitable, service organizations began to use the service to purchase price ratio as a method of setting service price and began using costs plus profit margin equations instead. Much more emphasis was placed on making service both competitive and profitable.

- In the office products market the practice of tying service price to purchase price is impractical for many product types and nearly impossible for the personal computer market in particular.

- As stated in the discussion on pricing above, service pricing was often tied into purchase price. This practice assumed that two points existed; first, that a percentage could be set that would be acceptable to users yet would cover expected service costs of the vendor (this assumption has to be true in order to make service profitable), and second, that purchase prices, although highly variable across product line, would be fairly stable for individual products.

- A major factor in the future pricing of service will be product density. As the service base becomes larger and larger, and as the reliability of the product continues to improve, vendors will find that service itself will become profitable enough to set service prices low enough to continue attracting service customers. As products become more reliable, actual service costs will decrease to the point where the constantly increasing group of service customers will pay for an increasingly small number of users who will need service. An example of this trend can be seen in typewriter service, in which a huge product density makes it possible for service vendors to provide very inexpensive service for machines that rarely require service.

- As more users opt for service contracts, the same concern for affordable service pricing that is demonstrated in large- and small-systems service will prompt vendors to explore cost-effective service offerings.

C. EFFECT OF THIRD-PARTY MAINTENANCE ON OFFICE PRODUCT SERVICE

- Third-party maintenance has traditionally been involved in supporting products that the manufacturers could or would not support. In the past, TPM has picked up service on products that the vendor considered too old to service, or on competitive products installed on a mixed-vendor system. This led to the majority of TPM business coming from older products, minicomputers, peripherals, and terminals.

- With the explosive growth of the office product market, TPM has found a new source of products to service, especially in the personal computer market. This market grew for two reasons: first, the demand encouraged small companies to develop new products without worrying about how they would (or could) support them; second, the established office products firms (even IBM) could not effectively service all the products that it was selling. In both instances, TPM firms stepped in to provide maintenance.

- One market that TPM was not and will not be able to penetrate was the word processor market. This might result in part from the overall satisfaction that most word processor users report with the service received from vendors, but to a greater extent is the result of a general lack of interest in this market by TPM vendors.

- Printer/terminal users, on the other hand, have traditionally been attracted to TPM service, often due to the fact that many users attach foreign peripherals to their systems. For this reason, the TPM market for terminals ($110 million), printers ($62 million), and tape/disk/floppy drives ($168 million) is currently the largest market for TPM.

- The fastest growing market for TPM service is personal computers, with a projected annual growth rate of 42%. As previously stated, the reason for this

growth is a direct result of the tremendous demand for new products. TPM penetration into the personal computer service market will continue to grow until personal computer manufacturers develop sufficient structure to support their customer base. This should occur for the following reasons:

- Manufacturers' customer base will continue to grow, providing an attractive source of service revenue.

- Personal computer users will become more aware of the importance of product service, especially as their products mature.

- Corporate buyers will become dominant over individual purchasers within the corporation. Corporate policy will then dictate the desirability of service, since the company already pays for other data processing and office automation equipment.

- Corporate buyers will also tend to buy from one manufacturer, creating larger installations at one site.

- The applications that corporate users dedicate to their personal computers will become more sophisticated, thus encouraging the use of service.

D. SERVICE PRICING OF PERSONAL COMPUTERS/WORKSTATIONS

- The diversity in the ratio of purchase price to service price is best shown in the personal computer/workstation market. Exhibit III-2 provides purchase price and service pricing of five leading single-user business personal computers.

EXHIBIT III-2

SERVICE PRICING RELATIONSHIP TO PURCHASE PRICE - PERSONAL COMPUTERS

VENDOR	MODEL	PURCHASE[1] PRICE	SERVICE[2] PRICE	PERCENT OF SERVICE TO PURCHASE PRICE
Apple	Macintosh	$2,495	$600 [3]	24.0%
DEC	Rainbow +	3,320	396 [4]	11.9
Hewlett-Packard	150	3,995	300	7.5
IBM	PC	2,765	375	13.5
Tandy	2000	2,999	598	19.9

1 = All configurations contain CPU, Keyboard, Two Drives, Monitor
2 = All service prices for On-Site
3 = RCA On-Site Service Price
4 = Basic Service

- The exhibit illustrates the confusion of the personal computer service market, as shown by the wide range of service pricing, even after keeping the service offering (on-site service, the configuration (CPU, keyboard, two disk drives, and monitor), and purchase price constant). This confusion in service pricing is further illustrated by the vast differences in service pricing between two different service vendors on the same products, as shown in Exhibit III-3.

- The causes of the service pricing confusion results from the lack of focus in the office products service market. This lack of focus was in part caused by the relative immaturity of the marketplace itself, indicated by the dramatic purchase price reductions in the past 18 months, but also by a lack of direction in the overall purpose and importance of service in the personal computer market.

- The dramatic purchase price reductions in the personal computer market obviously have contributed heavily to the confusion in service pricing, since service costs remain fully stable, and service productivity changes cannot come close to matching the rapid price changes in the personal computer market.

- However, implementation of service is also affected by the vendor company's basic philosophy toward service. In the recent past, personal computer vendors' service objectives have been influenced by the following factors:

  - The product's reliability with respect to its low purchase cost created the attitude that the personal computer was a "disposable" item.

  - The need to quickly enter the personal computer market, along with the tremendous costs in setting up and maintaining an effective service organization, prohibited many vendors from supplying their own support structure, instead relying on others, such as dealers and third-party maintenance organizations.

EXHIBIT III-3

COMPARATIVE PERSONAL COMPUTER SERVICE PRICING -
MANUFACTURER VERSUS TPM VENDOR

IBM PC	IBM	SORBUS	COMPUTERLAND
YEARLY CONTRACT			
On-Site	$375.00	$408.00	N/A
Depot/Carry-in	$242.00	$244.80	$275.00

Apple IIe	RCA SERVICES (APPLE-AUTHORIZED)	SORBUS	COMPUTERLAND
YEARLY CONTRACT			
On-Site	$432.00	$402.00	N/A
Depot/Carry-in	N/A	$261.00	$162.00

Notes: (1) All prices quoted for CPU, keyboard, monitor and two floppy disk drives (320KB for IBM PC); M-F.

(2) N/A = not available.

- The tremendous product dispersion resulting from the personal computer market explosion prevented even the largest and most developed service organizations from satisfying the tremendous need for service.

- The age-old fear of risking the sale by mentioning the importance of service, which might instill doubts about the product's reliability, caused many personal computer vendors to avoid the thought of service, just as mainframe and minicomputer vendors had in the past.

- These factors affected the service philosophies of the personal computer, causing confusion in the implementation and pricing of service. The smaller, startup personal computers (correctly) relied on their dealers/distributors to provide service on their personal computers; however, most vendors assumed insufficient control of the pricing and delivery of service through their dealer networks. In some cases, the most direct control these vendors assumed was suggesting service price guidelines; however, in most cases the vendors gave their dealers "carte blanche" in setting service policy.

- Some vendors, such as Apple, took the "our computers are so reliable that service is not necessary" approach, as indicated by their early emphasis on product manufacturing and deemphasis of service.

- Even IBM, with the largest service mechanism installed, found it necessary to at first rely on dealers and only later introduced their own on-site service plan. IBM's strategy is to continue to rely heavily on its dealer structure to provide support for the ever-increasing product base.

- Two vendors, DEC and HP, demonstrate service price stability and, considering the completeness of their service offerings, relatively low service prices. This is a reflection of both their excellent service structure and the fact that both have rather controlled or limited product bases, which allow them to be able to provide complete service offerings and still keep prices steady.

- Personal computer service pricing should reflect the continual reduction of purchase prices. Service prices will drop at a much slower pace, as the growing presence of manufacturer-supplied service reaches into the personal computer market. Also contributing to service pricing will be the increased introduction of full-service menus, which will include both reduced and upgraded service level offerings.

E. SERVICE PRICING OF WORD PROCESSING

- The greatest service price uniformity is present in word processor service, as indicated in Exhibit III-4. This can be attributed to the relative maturity of the word processor marketplace, where service has been accepted as an important sales factor that leads to more competitive service pricing.

- The differences in source of service delivery (manufacturer-delivered or dealer/distributor-delivered) account for the range of service pricing in this sample. Both CPT and Phillips rely almost exclusively on distribution sources for supplying service and support, thus enabling them to charge less for service (as a percentage of the purchase price). The majority of each company's service structure is then directed to supporting the service dealers.

- IBM, NBI, Wang, and Xerox all provide a greater amount of user support through their own service structure, accounting for the higher service-price-to-purchase-price ratio. IBM and, to a lesser extent, Xerox can leverage their word processor service prices against service revenues for other products, allowing these companies to maintain low service prices.

- Wang, on the other hand, relies on a rather diverse service menu, allowing users to choose a service level that fits user needs. Wang's relatively high service-to-purchase price reflects the number of service upgrades available to large word processor system users who might need upgraded service levels.

EXHIBIT III-4

SERVICE PRICING RELATIONSHIP TO PURCHASE PRICE - WORD PROCESSORS

VENDOR	MODEL	PURCHASE PRICE	SERVICE PRICE (Annual)	PERCENT OF SERVICE TO PURCHASE PRICE
CPT	8100	$12,000	$ 900	7.5%
IBM	Displaywriter	5,490	588	10.7
NBI	3000	6,900	780	11.3
Philips	Micom 3003	8,900	683	7.6
Wang	Wangwriter	7,700	1,034	13.6
Xerox	860	15,300	1,200	7.8

- Both high overall user satisfaction levels and the maturity of the service market for word processors indicate that service pricing will continue to remain stable in the near future. Word processor vendors have already acknowledged the importance of software support and have correctly reorganized their support structure to facilitate dealer and end-user support in this area.

F. PRINTER/TERMINAL SERVICE PRICING

- Service pricing for printers and terminals differs just as the type of maintenance required differs. Terminals are basically low-maintenance items. The equipment has low maintenance needs, and if a terminal does fail, the unit can be inexpensively swapped out, either at the component level or at the subsystem level. Printers, on the other hand, require a great deal of service due to the large number of moving parts.

- Thus, it is no surprise that terminal service pricing has remained consistently low, as low failure rates and inexpensive service techniques have kept service costs down. Terminal service prices should continue to stay low, as reliance on low cost maintenance techniques should maintain service costs.

- Printer service pricing continues to remain high, as the large number of moving and degradeable parts makes it mandatory to provide a greater amount of service (both remedial and preventive) due to the shorter MTBF.

- Printer service pricing should begin to drop as component design becomes more prevalent and laser printers, which inherently have fewer moving parts, also become popular.

- Exhibit III-5 provides service pricing trends for printers and terminals.

EXHIBIT III-5

SERVICE PRICING RELATIONSHIP TO PURCHASE PRICE -
PRINTERS/TERMINALS

VENDOR	MODEL	PURCHASE PRICE	SERVICE PRICE	PERCENT OF SERVICE TO PURCHASE PRICE
Centronics	6085	$ 8,525	$1,524	17.8%
Decision Data	6665	13,600	1,752	12.9
IBM	5211-2	9,625	1,200	12.5
IBM	3279	3,510	246	7.0
Telex	279	3,750	264	7.0

IV OFFICE PRODUCT SERVICE BUSINESS AND MANAGEMENT ANALYSIS

IV OFFICE PRODUCT SERVICE BUSINESS AND MANAGEMENT ANALYSIS

A. REVENUE SIZE AND GROWTH—PERSONAL COMPUTER/WORKSTATION SERVICE MARKETS

- The personal computer has become firmly entrenched in the corporate marketplace. The explosive growth of PC use has been fueled by a number of factors:

  - Simplicity and convenience of function, allowing end users to automate their applications without going through the corporate data processing department.

  - Sophistication of application software available, which increases end-user productivity and further allows the end user to circumvent the data processing department.

  - Rapid technological advances in hardware, which increase the sophistication and complexity of possible processing, while lowering the overall system price.

  - The continuing interest in networking, both in the sense of linking multiple microcomputers within a local area and in the sense of combining all office automation equipment, including word processing and output devices.

- The most recent interest in linking the microcomputer to the corporation's mainframe. Ironically, this movement brings the end user back to corporate data processing, reversing the decentralization effort that sparked the personal computer market.

- Exhibit IV-1 shows that the growth in personal computer sales will continue until 1985, fueled by anticipated product revisions by IBM and continuing sales of Apple IIe and Macintosh. The peak year for personal computers should prove to be 1985. After 1985 market saturation should become evident.

- Personal computer service should demonstrate increased growth, as also shown in Exhibit IV-5. Service revenues are expected to grow from $490 million in 1984 to $1.6 billion in 1989, representing a 27% annual growth rate. Reasons for such growth in service include:

  - Increased networking of hardware will raise the overall system price and, at the same time, raise the actual dollar value of the processing performed by the personal computer.

  - An increased awareness by the user of the importance of service in maintaining high equipment performance.

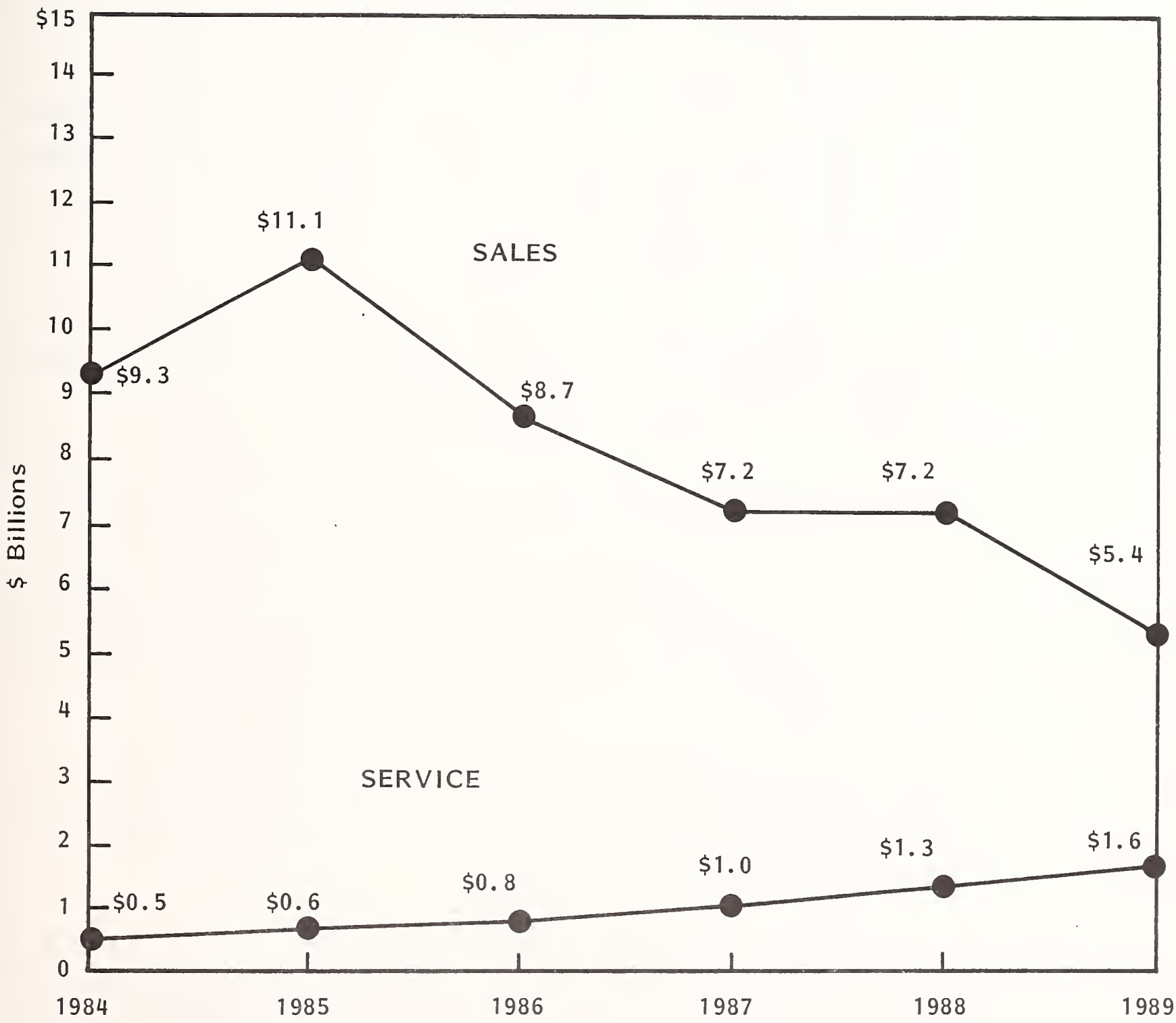
  - An increased involvement by corporate MIS in the selection, installation, and use of personal computers when networked or linked to the corporate mainframe. The data processing manager's awareness of the importance of quality computer support will increase corporate acceptance of service costs.

- Service revenues resulting from the support of personal computers should also increase due to increased application of alternative service delivery methods by service organizations, which will allow personal computer users the ability to choose the level of service needed while encouraging new personal

EXHIBIT IV-1

PERSONAL COMPUTER MARKET AND SERVICE GROWTH

1984-1989



computer users to select service offerings in support of their equipment. Additionally, these alternative service offerings will assist vendors in reducing the cost of supporting the equipment.

- The most dramatic impact on service revenues will result from increased user reliance on service contracts versus time-and-material repair. Exhibits IV-2 and IV-3 demonstrate the shift in both manufacturer-supplied and dealer-/distributor-/TPM-vendor-supplied service. In 1984 only 41% of all personal computer service supplied by the manufacturer is performed on-site. By 1989 on-site service will account for 53% of manufacturer-supplied service. Maintenance prodded by service contracts accounts for the largest part of that growth, going from $20 million in 1984 to just under $390 million in 1989, an average annual growth of 81%.

- On-site service will grow at a similar rate for non-manufacturer-supplied service, as demonstrated in Exhibit IV-3, growing from only 38% of all service in 1984 to 55% of personal computer service in 1989.

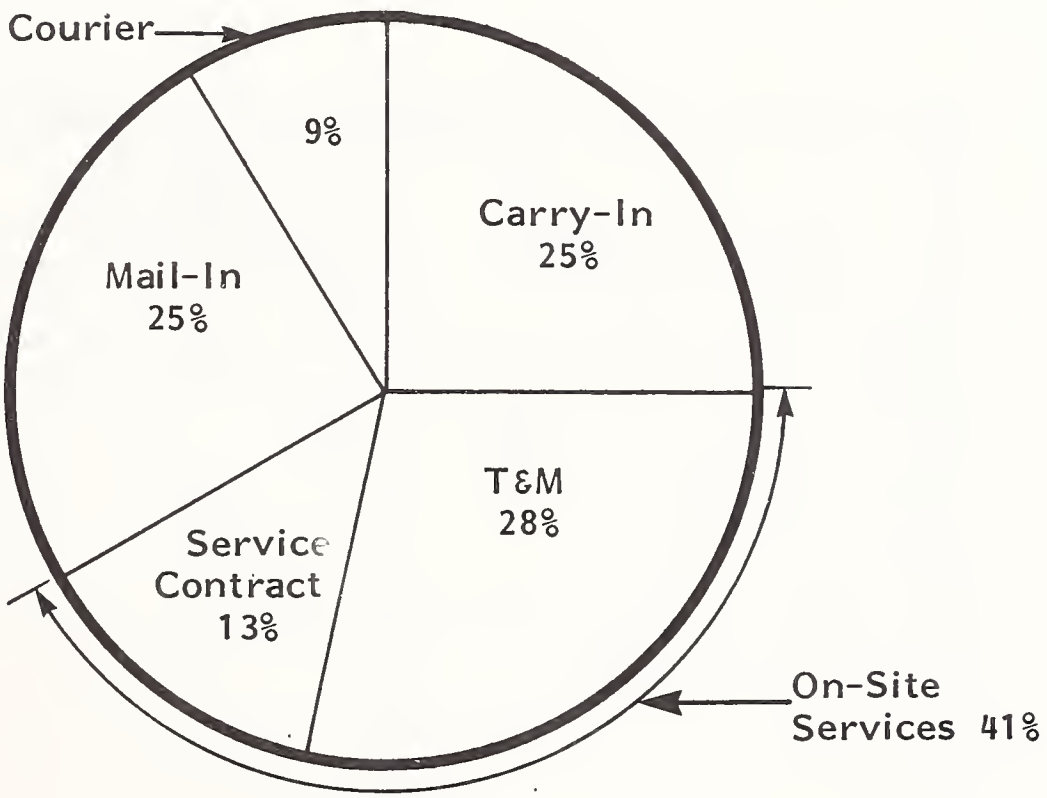
- The rapid growth in on-site service for the personal computer is a result of the users' need for on-site service (rather than depot service) and the vendor's realization that contracted services, in addition to providing a continuous stream of revenues into the service organization, actually reduce service costs by reducing or eliminating itemized billing, collection problems, and credit inquiries.

- Also, since personal computer selection will become more centralized, the costs involved in purchasing service will be lessened through volume discounts for quantity purchases.

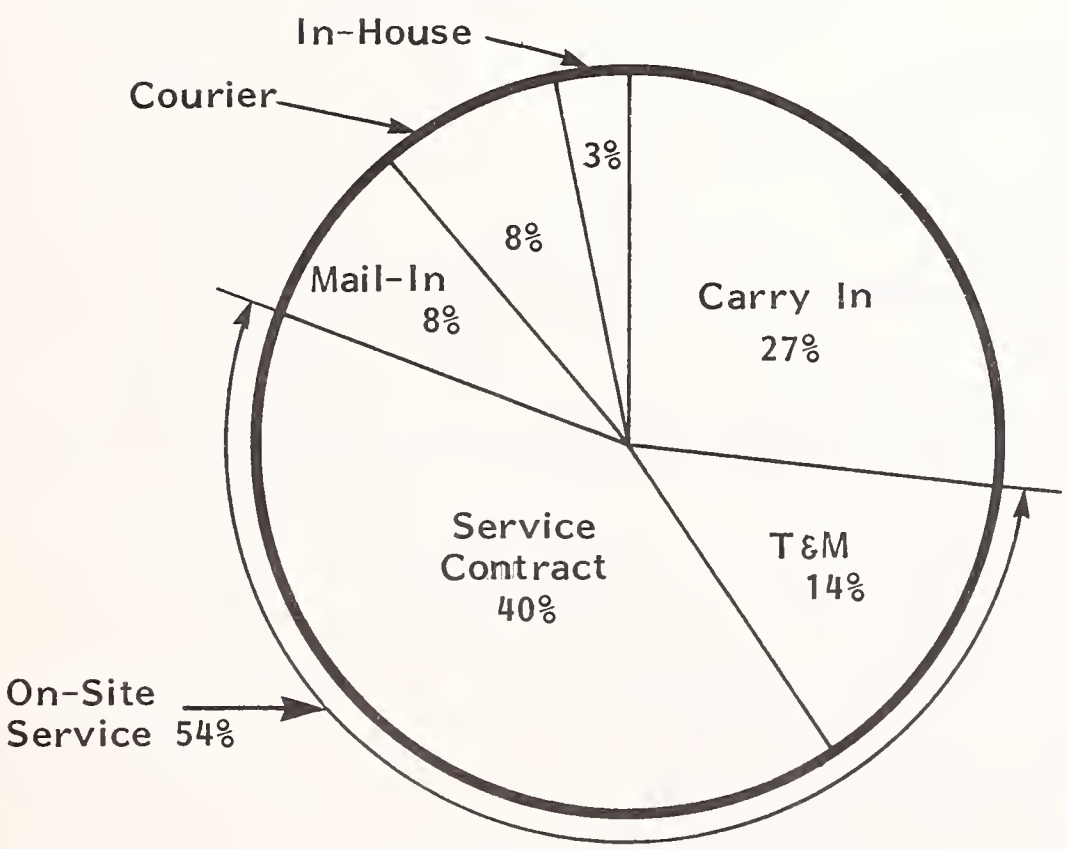
- The evolution of the executive workstation stems from the individual corporate computer user's desire to have an increasingly powerful processing tool that can interact with the company's main computers but also has the ability to perform processing functions independently.

EXHIBIT IV-2

PERSONAL COMPUTER SERVICE MARKETS BY DELIVERY MODE, 1984-1989
MANUFACTURER-PROVIDED



1984 Revenue: $160 Million



1989 Revenue: $989 Million

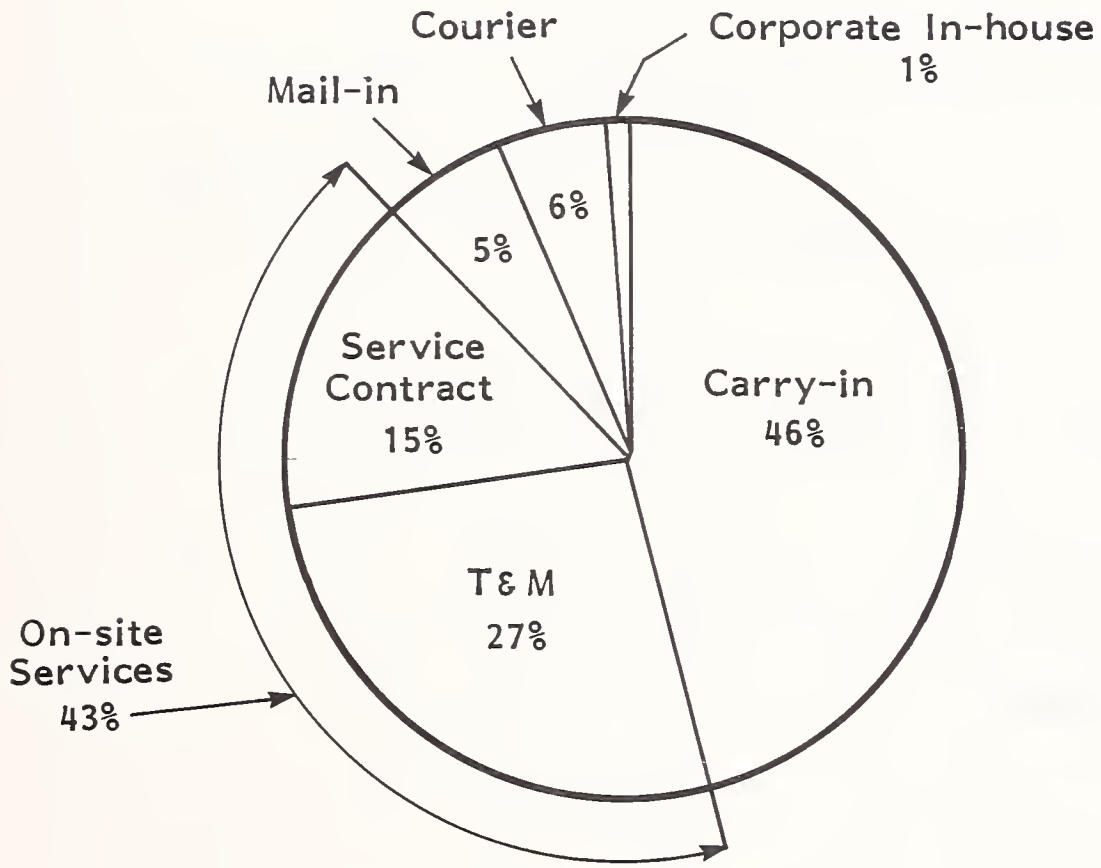
EXHIBIT IV-2 (Cont.)

PERSONAL COMPUTER SERVICE MARKETS BY DELIVERY MODE, 1984-1989
MANUFACTURER-PROVIDED

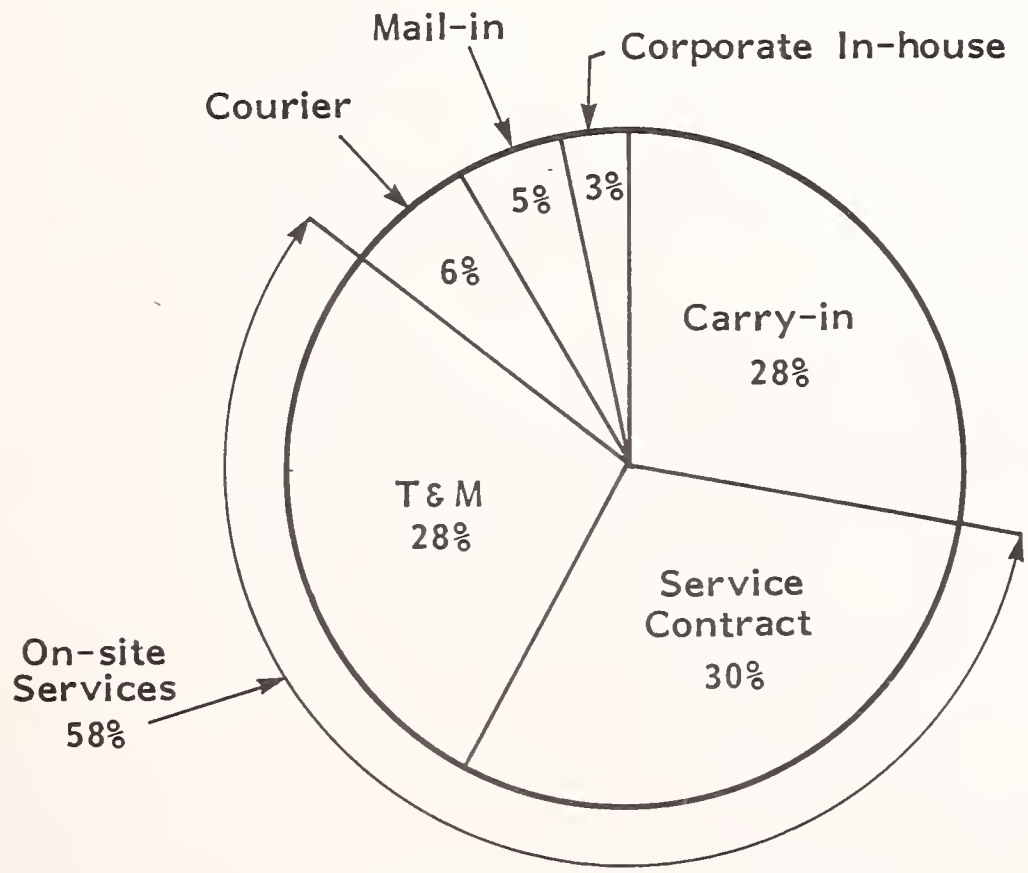
DELIVERY MODE		1984 ($ Millions)	1989 ($ Millions)
ONSITE	Service Contract	$ 20	$389
	T&M	45	140
OTHER	Courier	15	75
	Carry-In	40	280
	Mail-In	40	75
	In-House	-	30
Total		$160	$989

EXHIBIT IV-3

PERSONAL COMPUTER SERVICE MARKETS BY DELIVERY MODE, 1984-1989
TPM- AND DEALER/DISTRIBUTOR-PROVIDED



1984 Revenue: $330 Million



1989 Revenue: $805 Million

EXHIBIT IV-3 (Cont.)

PERSONAL COMPUTER SERVICE MARKETS BY DELIVERY MODE, 1984-1989
TPM – AND DEALER/DISTRIBUTOR-PROVIDED

	DELIVERY MODE	1984 ($ Millions)	1989 ($ Millions)
ON SITE	Service Contract	$ 50	$245
	T & M	90	220
OTHER	Courier	20	50
	Carry-in	150	220
	Mail-in	17	45
	Corporate In-house	3	25
	Total	$330	$805

*TPM Service Vendors, Dealers, and Distributors

†Direct Manufacturer Service

- Workstations originated from computer terminals that had limited processing and memory capabilities. This satisfied the communications requirements of the end user; however, the use of this station required the user to become more trained in computer languages and applications than the user desired. Also, the user did not feel completely independent of corporate data processing, since the selection of software applications was usually limited to what the data processing department purchased or wrote for the company's centralized processing functions.

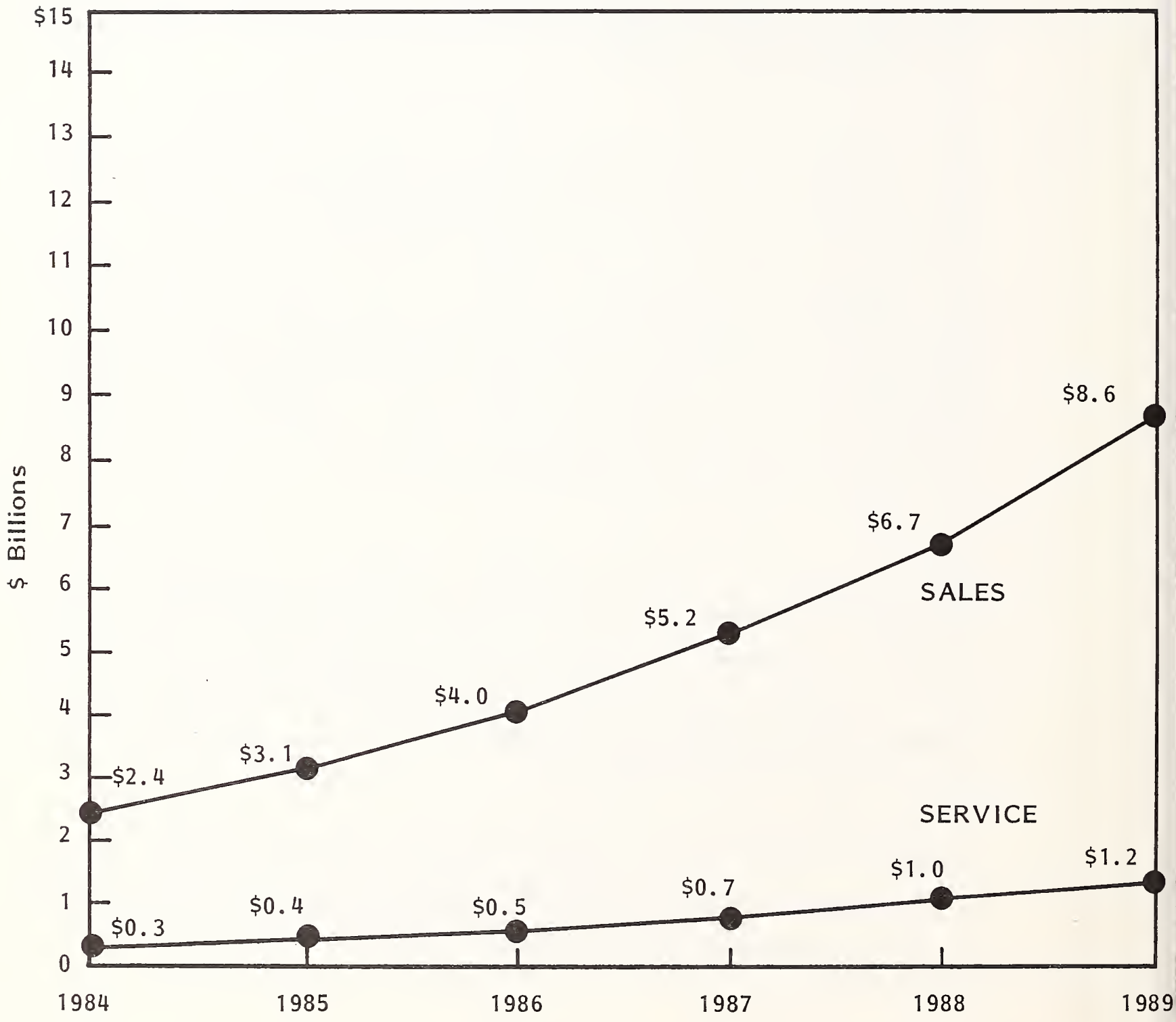
- The introduction of the personal computer created new possibilities for end-user autonomy, since the personal computer user could be responsible for choosing, to a certain extent, which type of productivity applications the end user could run. The early personal computers had definite limitations, especially concerning communications with the company's computer, since users were confined to either turning their personal computers into terminals (with emulation software programs) or being limited to communications with the mainframe on a strictly downloaded basis. Still, the ease of use prompted the use of personal computers as executive workstations.

- Currently, personal computer vendors are offering products with much improved communications capabilities (i.e., IBM 3270 personal computer and XT/370). Continuing advances in hardware (mouse-driven systems, portability, increased memory capabilities) and software (improved communications capability, windowing technology, integration) will increase the use of personal computers as workstations.

- Exhibit IV-4 provides sales and service growth for the workstation marketplace. More and more blending with the personal computer market will occur as more sophisticated personal computers evolve.

EXHIBIT IV-4

WORKSTATION MARKET AND SERVICE GROWTH
1984-1989



B. REVENUE SIZE AND MARKET—WORD PROCESSOR SERVICE MARKET

- In the past, word processing was performed primarily by electric and electronic typewriters. In the late 1970s, word processing technology evolved to the point where the amount of instructions required to store and implement the manipulation of text was economically available in standalone word processing units. The current trend in word processing technology is toward the integration of many multiple-user workstations. Eventually, this trend will extend to the total integration of all text and data processing functions.

- The current market for standalone, single-, and multi-station word processor sales is $2.5 billion (this does not include micro- and minicomputer-based word processing software). The market will grow to $5.9 billion by 1989, as shown in Exhibit IV-5.

- The growth of standalone word processors will be affected by the quality of mini- and micro-based word processing software. To combat this, vendors will need to increase functional integration capabilities within word processing systems so that they will provide both data processing applications and networking capabilities.

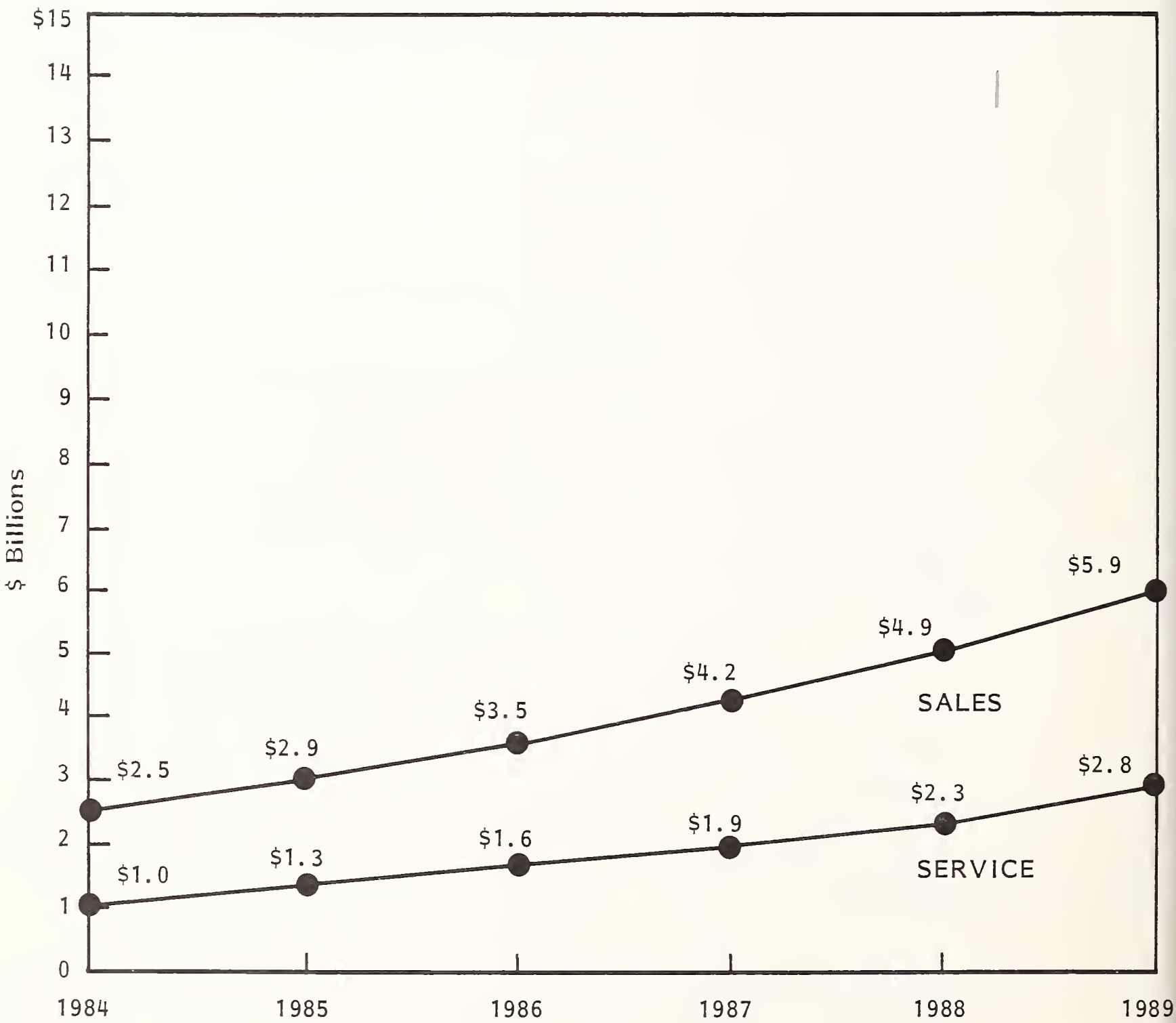
- In contrast with the personal computer market, word processing vendors have traditionally been both responsive and innovative with regard to service and support of their products, perhaps due to the support available to electric and electronic typewriters that word processors compete with. Exhibit IV-5 shows that service revenues derived from the support of word processing equipment can be expected to grow 22% annually, from $1.0 billion in 1984 to $2.8 billion in 1989.

- Word processor service profitability will benefit from increased service offerings, such as telephone support centers for software. In addition, additional service revenue can result from the introduction of continuing training services.

EXHIBIT IV-5

WORD PROCESSOR MARKET AND SERVICE GROWTH

1984-1989



C. REVENUE SIZE AND GROWTH--PRINTER/TERMINAL SERVICE MARKET

- The personal computer explosion has also fueled a dramatic sales growth for serial printers. This growth has been balanced by rather slow years for larger (and more expensive) impact line printers. In the future, the printer market will become dominated by nonimpact printers, such as laser and ink jet.

- As shown in Exhibit IV-6, service for printers can be expected to grow an average of 25%--from $1.0 billion in 1984 to $2.9 billion 1989. This growth will be fueled by the increased modularization of printing equipment, and by the elimination of many post-installation mechanical adjustments.

- An additional technological advance that should increase service profitability is the increased use of printer-embedded diagnostics, which will reduce the diagnostic equipment requirements for performing many on-site repairs.

- Service revenues can be expected to increase as more printer vendors enter the third-party maintenance arena. Servicing competitive products is relatively easy for printer manufacturers, due in part to increased use of modularization in product design and to the similarity in diagnostic and repair processes within the market.

- Terminal service can also expect to grow, but on a slower rate. Exhibit IV-7 shows that terminal service will grow from $600 million in 1984 to $1.8 billion in 1989, representing an average growth rate of 24% per year.

D. OFFICE PRODUCT SERVICE PROFITABILITY

- Service profitability is influenced by a number of organizational and environmental factors. Some of these factors include:

EXHIBIT IV-6

PRINTER MARKET AND SERVICE GROWTH
1984-1989

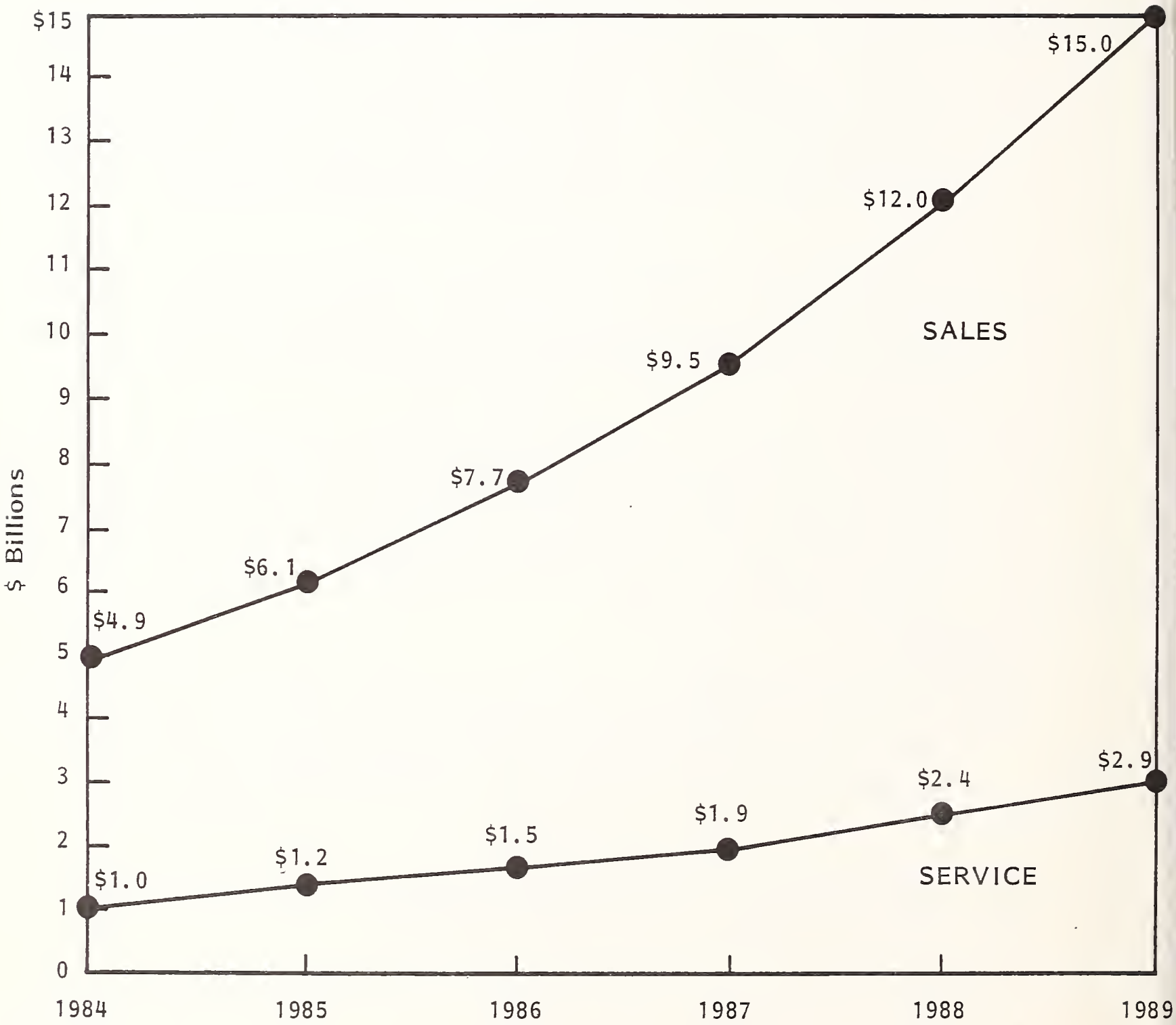
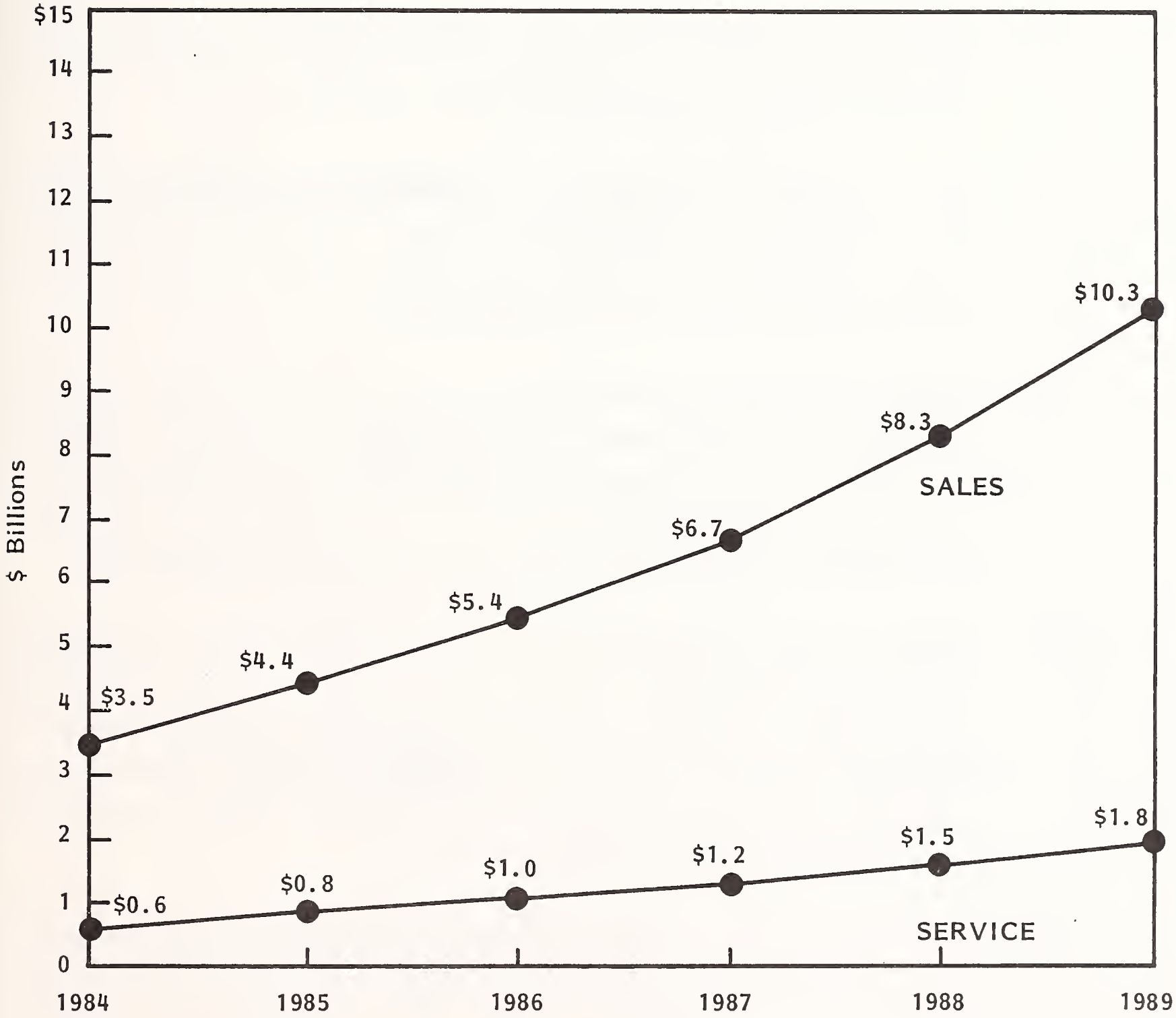


EXHIBIT IV-7

TERMINAL MARKET AND SERVICE GROWTH
1984-1989



- Organizational goals for service.

- Installed base of equipment.

- Organizational structure of the service group.

- Perhaps the most important factor affecting profitability is the vendor's overall goal for service. In the past, vendors commonly treated service as a "necessary evil." This caused service to be run as a cost.

- As service began to be thought of as marketable, the goal of service changed to include marketing strategies like penetration, development, and diversification. Exhibit IV-8 demonstrates the effects of each service goal on the overall profitability of the service organization.

- Market penetration, for example, can initially be unprofitable, since the vendor incurs high costs during the establishment of the service structure and the introduction of new service products. In the long run, however, this strategy sets up the groundwork for a profitable operation, as the vendor gains an established service structure with a larger and more satisfied user base.

- After successful penetration into a service market, market development provides rapid profitability growth, as demonstrated by vendors like DEC and Wang, which have continually developed their service markets by offering a wide range of service offerings, such as supplies sales and upgraded service contracts. Then the only limitation on profitability growth is the growth potential of new service markets.

- The riskiest service strategy involves diversification of service markets. Growth potential is high in that vendors already mired in a low-growth market can diversity their activities into a new market. An example of this would be when Honeywell, in the mainframe and minicomputer market, found its

EXHIBIT IV-8

EFFECT OF SERVICE GOALS ON PROFITABILITY

Market Penetration →

- Initially Unprofitable
- Long-Term Results:
  - Increased User Base
  - Improved Profitability

Market Development →

- Improves Profitability Immediately
- Profitability Limited by Market Growth

Diversification →

- Riskier than Market Penetration
- Requires Extensive Research
- Subject to Long-Term Unprofitability if Competition Is Well Developed
- Potentially Very Profitable

service market stagnating. In order to increase, or at least maintain, its level of machines services, Honeywell adopted a third-party service program diversifying its service base and restoring service profitability.

- The installed base also has a tremendous impact on the profitability of service. As stated in Chapter III, a concentrated and controlled product base is easier to service than a uncontrolled, widely dispersed product base. This is especially evident in the office products marketplace, where users are less likely to be clustered near a service location.

- The profitability that results from a controlled product base stems from reduced expenses in manpower, parts distribution, travel time, and support costs.

- Organizational changes within the overall vendor structure has also led to increased profitability of service. In the past, the service operations of an equipment vendor were often buried in other departments in the company, such as marketing. Even if the service operations were separate from other departments, many important functions (such as personnel, accounting, etc.) were carried out by other departments within the company.

- As the service organizations become more autonomous, the service operations can become more profitable because capital resources can be more efficiently allocated at the local level.

- Except for the office product vendors with established service organizations, (which have usually been put in place to service other products), most office product service administration is carried out by other departments within the corporation. More and more, these administrative functions will be transferred to the service organization, especially as service becomes more competitive. Marketing and strategic planning are two functions already being handled by service organizations for most vendors, resulting in improved operations and better competitive products.

- Two such vendors, Wang and Digital Equipment Corporation, have transferred complete administrative control to their service organization. Not coincidentally, both vendors' service organizations have reported huge profits for the last few years.

- Exhibits IV-9 and IV-10 demonstrate the effect of organizational control on the expense and profit breakdowns of typical office product service organizations. Exhibit IV-9 shows the expense breakdown for manufacturer-supplied service.

  - Direct labor (including support) constitutes the largest expense item; however, with the increased use of alternative support methods (such as telephone support and increased user activity in the service process), this item is likely to decrease in expense.

  - Management salaries are initially high as new service organizations compete for qualified management personnel. Although the recruitment of qualified service management should continue, the maturation of service organizations should eventually stabilize this expense item.

  - Parts and logistics should continue to make up a significant portion of the expense breakdown. Expansion of the user base, engineering changes, and parts depreciation should keep the demand for new parts high.

  - Travel expenses should increase with the increased offering of on-site service but should stabilize as alternative service methods become popular.

- Exhibit IV-10 presents the expense breakdown for dealer/distributor-supplied service.

EXHIBIT IV-9

TYPICAL OFFICE PRODUCT VENDOR EXPENSE BREAKDOWN
MANUFACTURER-SUPPLIED SERVICE

EXPENSE ITEM	PERCENT OF TOTAL EXPENSES
Direct Labor (Salaries) (Includes Support)	35%
Management Salaries	12
All Benefits	10
Parts and Logistics	22
Travel	8
Office and Warehouse Space	3
Overhead	5
Other	5

EXHIBIT IV-10

TYPICAL OFFICE PRODUCT VENDOR EXPENSE BREAKDOWN
DEALER/DISTRIBUTOR-SUPPLIED SERVICE

EXPENSE ITEM	PERCENT OF TOTAL EXPENSES
Direct Labor (Salaries) (Includes Support)	25%
Management Salaries	15
All Benefits	10
Parts and Logistics	35
Travel	0
Office and Warehouse Space	5
Overhead	5
Other	5

- Direct-support salary costs are predominantly from telephone support personnel and service personnel located in depot locations.

- If travel as an expense is completely eliminated, parts and logistics expenses are increased.

- Exhibit IV-11 shows the average breakdown of service-related revenue:

  - Contract revenue is growing for personal computer maintenance, and accounts for the majority of word processor maintenance.

  - Time and material service revenues are declining due to increased reliance on on-site service. TPM vendors will always maintain a significant share of the service in that a large number of office product users will not opt for on-site service.

E. ALTERNATIVE DELIVERY METHODS

- The extended product dispersion has caused many office product vendors to either limit their on-site service offerings or to not offer on-site service at all. This should encourage users and vendors to accept alternative service delivery methods in order to make service inexpensive but profitable.

- User attitudes toward service delivery can be traced back to the type of product and to the size of the installation. Word processing users have the greatest need for on-site service. This can be attributed in part to corporate typewriter users' preference for on-site service. Also, the physical design of many word processing systems prohibits depot service.

- In order to reduce service costs, many word processing vendors are either considering or currently incorporating telephone support, either on a national, toll-free basis or on a regional/local basis.

EXHIBIT IV-11

AVERAGE REVENUE AND PROFIT PROFILE
FOR OFFICE PRODUCT SERVICE ORGANIZATIONS

REVENUE	PERCENT OF TOTAL
Contract	52%
Warranty	10
Installation/Deinstallation	-
Time and Materials	38
Change Order	-
Total	100%
Service-Related Expenses	88%
Profit	12%

- Personal computer vendors, on the other hand, are moving toward more on-site service of their users' equipment, either directly (i.e., IBM Digital, Hewlett Packard, and Xerox) or indirectly through TPM or distributors (i.e., Apple through RCA). As previously stated, product dispersion causes on-site service delivery to be an expensive undertaking, yet the increased sophistication and integration of applications in the corporate environment are beginning to justify the expense of on-site service.

- Exhibit IV-12 demonstrates that personal computer users' need for on-site service is lower than for the other product types. This user requirement can be expected to rise as more vendors begin to offer on-site service.

- Printer/terminal vendors are moving away from on-site service and are relying more on increased use of diagnostics built into their systems.

- The attractiveness of telephone support centers for hardware and software is evident to both users and vendors of office products. Users are attracted to the quick response available, in addition to the perception that the vendor is available to help. Vendors see the benefits of reduced requirements for on-site calls.

I. DEPOT SERVICE

- A traditional alternative to on-site service of computer equipment is depot repair. In the past, depot service was an internal source of support. Recently, spurred by increased modularization and the rise in office products, depot service is being offered to the user as an alternative to on-site service.

- Internal depot service provides the service vendor with a more centralized location where more involved diagnostics and repairs of failed subassemblies can be performed. Advantages are:

EXHIBIT IV-12

USER ATTITUDES TOWARD ALTERNATIVE DELIVERY METHODS - HARDWARE

SERVICE DELIVERY METHOD	USER RATING* BY PRODUCT TYPE			
	Personal Computer Users	Word Processor Users	Work-Station Users	Printer/ Terminal Users
User Involvement in Telephone Diagnosis Working with Support Center	6.0	6.6	5.7	6.2
User Involvement with Remote Diagnostics	4.3	5.6	4.7	5.4
User Replacing Circuit Boards	5.1	4.5	5.0	5.1
Slip-in/Carry-in to Repair Center	5.0	4.8	2.6	3.6
Traditional, On-Site Response to Trouble Calls	7.0	8.9	8.5	8.2

* Rating: 1 = Low, 10 = High

- Reduction in inventories of up to 10%.

- Reduction in the number of highly qualified engineers.

- Reduction in the amount of diagnostic equipment needed to support the product base.

- The rising costs of providing on-site service to a dispersed product base has encouraged many vendors to supplement and, in some cases, replace on-site service with depot repair, whether by user carry-in, user ship-in, or vendor-supplied courier service. There are many advantages to these delivery methods:

  - Reduction of the demand for on-site service, therefore reducing personnel, training, diagnostics, parts, and repair costs.

  - Increase in product visibility, as many depot service locations are located at sales offices.

  - Increase in the potential service market, as it allows users who could not or would not purchase more expensive service offerings.

- As shown in Exhibit IV-13, office product users are by-and-large opposed to depot service, in part due to the expected inconvenience of delivering the failed equipment to the repair facility, and in part to the loss of the premium (on-site) service. As expected, personal computer users, the group with the most experience with depot service, report the greatest tolerance of carry-in and mail-in service.

- Personal computer and printer vendors are currently utilizing depot service as a delivery method. In each case, the reasoning behind the extensive use of depot service as a major delivery method is the increasing product dispersion for each product type and the increased use of modularization in product

EXHIBIT IV-13

USER ATTITUDES TOWARD
ALTERNATIVE DELIVERY METHODS - SOFTWARE

SERVICE DELIVERY METHOD	USER RATING* BY PRODUCT TYPE			
	Personal Computer Users	Word Processor Users	Work-Station Users	Printer/ Terminal Users
User Involvement in Telephone Diagnosis Working with Support Center	6.6	7.1	6.1	N/A
User Involvement with Remote Diagnostics and Software Down-line Loading	4.5	5.7	4.9	N/A
User Performing Software Patches	4.8	4.8	5.3	N/A
Ship-In/Carry-In to Repair Control	5.3	4.5	4.8	N/A
Software Customization	4.8	5.8	4.9	N/A
Traditional, On-Site Response to Trouble Call	6.0	8.4	6.8	N/A

* Rating: 1 = Low, 10 = High
N/A = Not Applicable

design. In contrast, word processors do not currently lend themselves, both in size of total system and in product design, to depot service.

- A relatively new approach to depot service is the advent of specialized service firms that provide external depot support to other service vendors and equipment manufacturers. One such firm is Unitrace, Inc. of Santa Clara (CA). Independent depot repair centers provide both vendors and distributors with subassembly-level repair at costs usually below what the vendors themselves would charge.

- The advantages of this type of service avenue are obvious. First, the costs of setting up a working diagnostic and repair facility is very high, usually between $500,000 and $1 million. In addition, staffing and training costs, especially at the technical level required, further increase the startup costs of depot repair centers. Another high cost factor in setting up a repair facility is the stocking of spares.

2. TELEPHONE SUPPORT CENTERS

- As indicated in Exhibit IV-13, office product users are very receptive to telephone support centers, both for hardware and software. Users are attracted to telephone support for a number of reasons:

  - Telephone support centers provide faster service than on-site or depot repair.

  - Users perceive the availability of support as an indication of the vendor's concern for their operations.

  - Many problems that would have required on-site or depot service can be eliminated by telephone support centers.

- The advantages of telephone support centers to office product vendors are numerous. First, users seem willing to accept telephone support as an alternative to on-site service, which continues to be the most expensive service offering. Telephone support significantly reduces the numbers of "no-fault-found" calls by determining user-caused failures, eliminating the time and expense of an on-site or depot service need. Third, telephone support centers provide new service revenue opportunities from users who cannot or will not opt for more expensive service contracts.

- Telephone support centers are not without their disadvantages. Centralized centers with toll-free numbers are expensive to set up and operate. The costs involved become even greater when users begin to rely on telephone support numbers as an alternative to reading their documentation. Some vendors have instituted local service numbers, usually at depot service locations to replace their centralized support line.

- As user demand for effective support increases, and as the cost of on-site service prevents many users from so contracting, INPUT sees many more office product vendors adopting this service delivery plan.

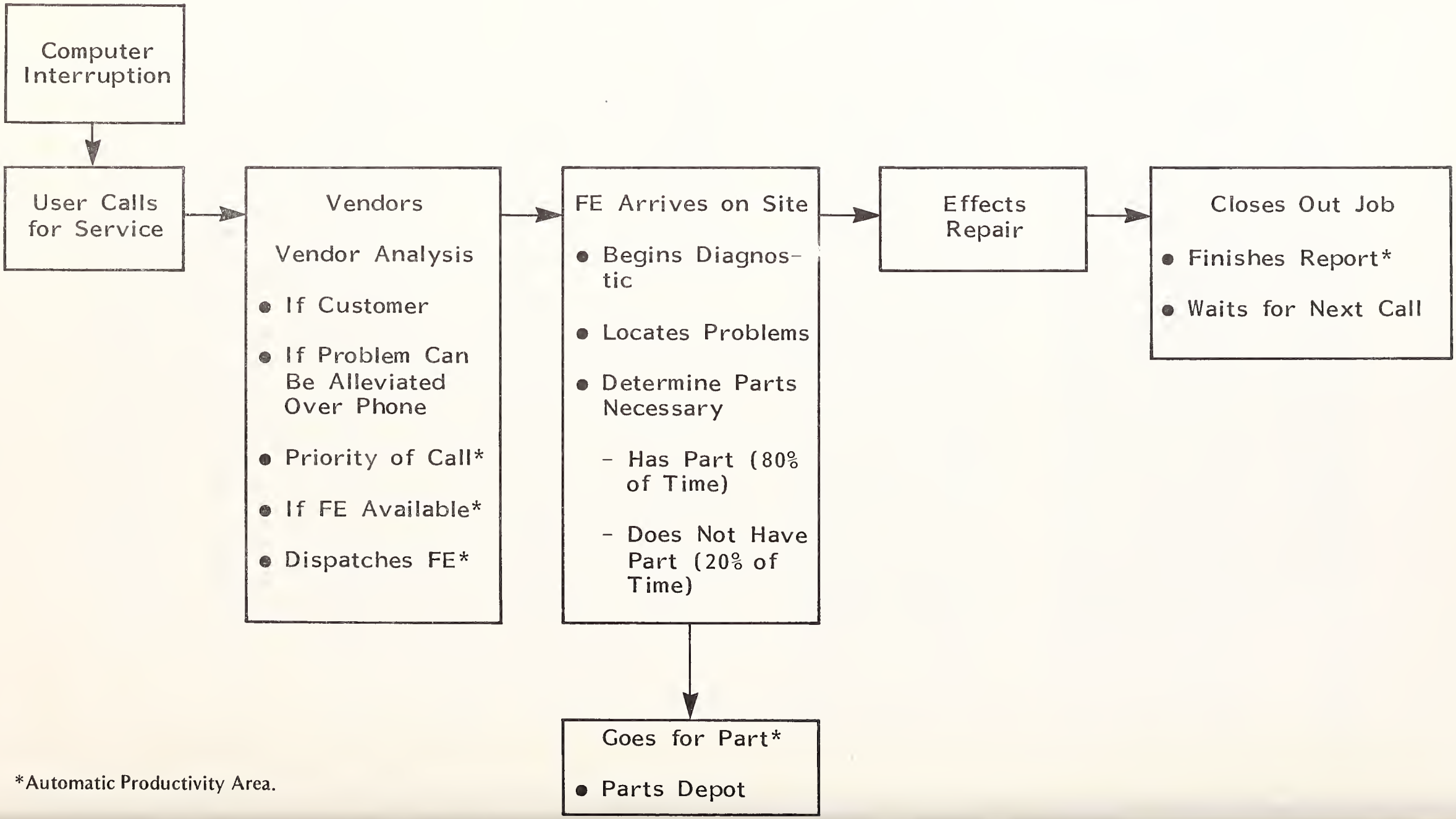
F. TECHNOLOGY ADVANCES IN DISPATCHING

- Customer service management is caught between the user's demand for responsive service and a steadily increasing product dispersion. In order to maintain and improve response times, progressive service vendors have looked toward improving the dispatching process by automating dispatching in combination with other service processes, such as spares inventories. Exhibit IV-14 demonstrates the dispatching process.

- At the least automated level, dispatching was handled by telephone, whereas the customer engineer (CE), at completion of the call, filled out a written

EXHIBIT IV-14

DISPATCHING PROCESS



*Automatic Productivity Area.

report that was entered by batch process at the end of a designated work period, whether it be the end of the day, week, or month. Very often this required that the customer engineer fill out extensive forms, which led to much time consumed at the end of the work period. This process led to incomplete reports

- In order to facilitate batch entry of reports, the written reports were coded and keypunched into storage. This had two effects: first, it further cut down on entered and stored information concerning work performed; second, it required extensive coding to cover the extensive realm of possible problems and appropriate solutions.

- By the early 1970s, physical keypunch was replaced by optical scan input. This sped up input and processing; however, it still required extensive coding and resulted in a loss of detailed historical information.

- The introduction of automatic call closing in the mid-1970s improved the quality of service information stored in that the CE could telephone a report directly to a data entry person at the close of each call, rather than waiting for an accumulation of reports at the end of a work period (i.e., a week). The data entry person would then be responsible for interpreting the report and translating it into code for data entry. This greatly sped up and improved the quality of data received concerning a service call. A disadvantage of this technique was that it increased telephone and computer expenses as the report was delivered. In addition, personnel, data entry time, and software had to be developed or arranged for.

- To further speed up data entry time, the most progressive service organizations looked to eliminating the need for the intermediary data entry person by equipping the customer engineer with a portable terminal. This also eliminated the risk of information being misinterpreted between customer engineer and data entry, thus further improving data collection. The customer engineer was required to know and use extensive coding in translating infor-

mation into the terminal; however, errors could be caught at data entry, and transmission expenses became minimal.

- A further refinement of this type of data entry came as two-way communication between the customer engineer and the service organization's computer. The benefit of this kind of terminal is obvious--not only does it allow almost immediate input of information, but also it provides the customer engineer with up-to-date information on the history of the customer, the equipment, and any work done on the equipment. This two-way communication will eventually be improved so that both diagnostic and service instruction will be provided to the customer engineer.

- There are many benefits of such automated dispatching systems. First, it allows the updating and storage of historical data on the customer, site, equipment, and service provided. Second, historical analysis on the activity of customer engineers can be accumulated, adding a measurement on productivity and profitability that extends to the customer engineers' level. Finally, automated dispatching provides an effective way of managing resources by tracking the location and activities of customer engineers and (if included in the system) parts inventories.

- A dispatching system that includes parts usage is very desirable, since accurate spares inventories can be maintained. This dramatically reduces response and repair time delays, since the customer engineer can quickly locate the whereabouts of specific parts necessary to complete a call. Another benefit of parts tracking through the dispatch system is the additional historical data on parts usage that is automatically updated into the system. This helps track service costs of particular products with regard to the parts inventories necessary to support each product.

- Almost all of the office product service vendors surveyed reported using some form of automated dispatching system.

- Factors affecting the implementation of dispatching include both the size of the service organization and the extent of dispersion of the vendor's product base. For example, the costs involved with the set-up and maintenance of a regionalized dispatching network dictate the use of centralized dispatching for smaller (less than 300 field engineers) service firms.

- Exhibit IV-15 summarizes the advantages of branch, district, and centralized dispatching methods.

G. TRAINING

- Considering that office products users have been traditionally "computer illiterate," the quality and quantity of computer training has been, at best, uneven. This is especially true in the personal computer market. For example, 35% of all personal computer users received a training level below their requirements.

- Office product training traditionally has been provided at the distribution level. What little training that was provided to the user was provided at the time of purchase by the dealer. Vendor control of this training was minimal--usually the vendor provided dealer training at the time when the dealer agreement was signed. Office products vendors like IBM, Data General, and Apple will require their dealers to (at the dealers' expense) participate in a short training program at the vendor's site. It is then the dealers' responsibility to provide user training to the customers.

- There are a number of problems with this method of training users. First, the rapid turnover in dealer personnel causes a dramatic degradation of training as the person training new people rarely receives the original vendor-supplied training. Users then become aware of the dealer's lack of actual familiarity with the product.

EXHIBIT IV-15

COMPARISON OF DISPATCH METHODS

OPERATIONAL CRITERIA	DISPATCH ALTERNATIVES		
	BRANCH	DISTRICT	CENTRAL
Field Management Control of FE	High	Moderate	Low
HQ Management Control of Daily Operations	Little	Moderate	Considerable
Call Escalation (Alert) Procedures	System alterts in sequence: Area/ branch office, district office, regional office, headquarters	System alerts dispatcher who contacts area/branch office, Subsequently district manager, regional office, and headquarters are alerted by FEs.	System only alerts dispatcher; dispatcher alerts in sequence area/branch office, district office, regional office, headquarters.
Ability of District Management to Affect Customer Satisfaction	Good	Very Good	Poor
Ability to Calm Irate Customer	Very	Good	Poor
Awareness of Local Conditions Affecting FE Dispatching	Good	Fair	Poor
Knowledge of Customer	Good	Good to Fair	Fair to Poor
Response of Dispatcher to FE Question	Fast: Branch Phones are Continually Staffed	Fast: District Phones Are Adequately Staffed	Fast: Large Number of Distpatchers
Hardware & Communications Cost	High	Low to Moderate	Low
Off-hour Dispatch	Poor	Poor to Good	Same as Regular Shift
Protection from Loss of Dispatch Center	Adjacent Area Assumes Lost Center's Activity	Redundant Hardware	Redundant Hardware
Manual Backup	Easy	Moderate	Very Difficult

- Perhaps a greater problem in office product training is the actual delivery of training through dealers. Users would have difficulty differentiating between the sale and the training service. More frequently, users require training after the time of purchase (i.e., the training of new personnel).

- A third problem in the delivery of training as a service grows in importance as the personal computer becomes increasingly used within corporate America. Just as maintenance and sales distribution sources will need to change to accommodate the large corporate buyer, training services delivery will need to adapt to accommodate the large purchaser.

- A few companies have already moved in this direction. IBM has attempted to satisfy their corporate users' training needs by offering training sessions at selected Product Centers. These sessions are presented by outside (outside IBM) training firms; however, the fact that IBM offers them at IBM locations indicates IBM's recognition of the necessity of increasing training support.

- Apple offers training sessions in a more direct route to its large corporate customers. Apple targeted its training program to Fortune 1000-size corporations that belong to their national accounts. The one-day program is presented free of charge at any of 12 Apple locations across the U.S.

- Word processing vendors have demonstrated more interest in providing training sessions to its users, realizing that the initial sale often is dependent on the availability of training and that continued customer satisfaction is dependent on the availability of ongoing training and support. Word processor vendors also benefit from providing additional training to users at an additional service charge.

V IMPACT OF MARKETING ON CUSTOMER SERVICE

V IMPACT OF MARKETING ON CUSTOMER SERVICE

A. THE NEED FOR MARKETING OF CUSTOMER SERVICES

- Marketing of customer services is important in all sectors of the computer industry, but is absolutely essential in the office product environment. Office automation is experiencing the most rapid changes--both in technology and marketing--and vendors must use an established service marketing plan to stay in touch with their users.

- By comparison to the relatively stable large- and small-systems market, the office automation market is in virtual chaos. This sector is marked by an almost constantly changing environment, as demonstrated in Exhibit V-1.

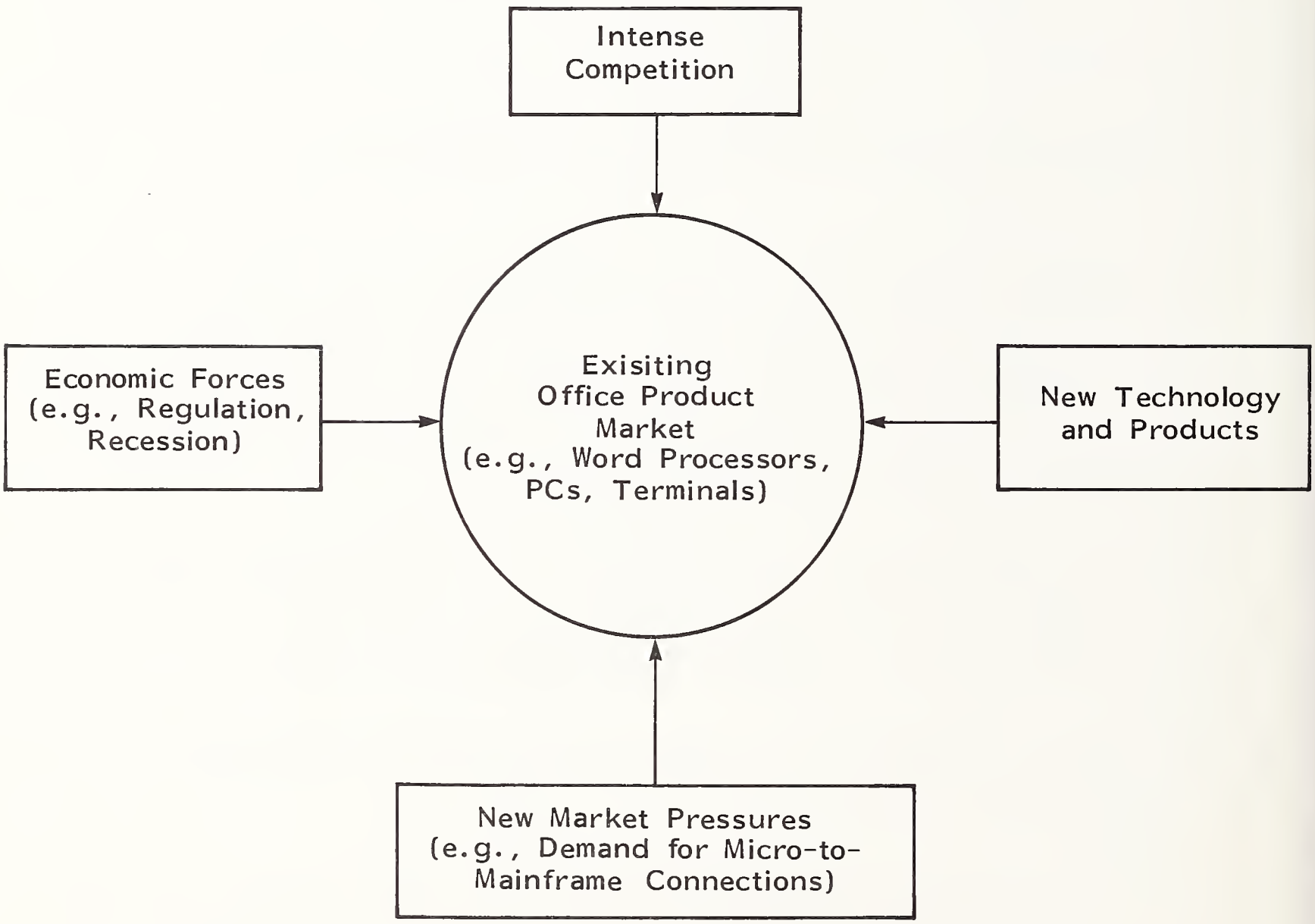
- Within the office product environment there are four major factors that will affect the service market:

  - Intense Competition. This market is particularly susceptive to competitive pressures from established computer manufacturers who see a tremendous growth potential in this area and from new startups who can act due to the relatively low capital requirements necessary for entry into the market.

  - New Technology. Because this is a rapidly growing market with as yet unmet needs, office product users are more accepting of the new technology necessary to satisfy their processing needs.

EXHIBIT V-1

THE DYNAMICS OF THE OFFICE PRODUCTS ENVIRONMENT



- New Market Pressures. As noted above, users are willing to try new technology, but they are also becoming more demanding in their requirements for vendor performance.

- Economic Forces. Perhaps the largest single uncontrollable factor affecting office product service--economic forces, such as recession or inflation--have an immediate impact on the market and must, therefore, be anticipated by the vendor.

- Currently, the office product service market is being dominated by competition and technology. For example, technological innovations such as modularization of parts and improved remote support has resulted in an entirely new method of servicing office products--user replacement of hardware modules such as keyboards.

- Although technological innovation is currently dominating the office product service market, INPUT expects a very substantial increase in user pressure on service vendors. This increased pressure will result from users becoming more dependent on their office data processing equipment and more knowledgeable about service alternatives from competing vendors.

- Overall, the three major reasons for establishing a customer service marketing program are:

  - To stay in touch with rapid technological changes in the service industry.

  - To recognize and adapt to environmental factors.

  - To understand user needs and to develop service products to meet those needs.

B. EVOLUTION OF CUSTOMER SERVICE MARKETING

- Marketing of customer services, even among traditional mainframe and minicomputer manufacturers, is not a common practice. A few vendors, such as Hewlett Packard and Data General, have recently publicized their commitment to service marketing, but most office product vendors have not been active in this area.

- One of the main reasons that office product vendors have not initiated service marketing plans is that they are caught up in the marketing of the product itself rather than any product service or support issues. This is not an uncommon position to be in, particularly at the beginning of the product life cycle.

- Exhibit V-2 demonstrates the typical marketing evolution process. Most office product vendors are in the product orientation stage, whereas some of the more established mini and mainframe vendors have evolved all the way to a total marketing orientation. Most other service vendors are somewhere between the two extremes and moving toward the marketing orientation.

- A greater marketing orientation for service vendors is the direct result of increasing user interest and, therefore, vendor profitability in service. In the past many equipment vendors, in their desire to protect and increase sales, emphasized the quality of the workmanship built into their products while down-playing the issue of service. During this time, perhaps even as a result of this de-emphasis of service, the service organization was often "hidden" in the sales, marketing, or in a few cases, manufacturing arms of the company.

- As it became necessary to acknowledge that even the most reliable of products at some time require service, vendors began to realize that service represented a potentially substantial revenue source. At this stage, service was thought of as an "insurance policy" for the machine.

EXHIBIT V-2

OFFICE PRODUCT SERVICE MARKETING EVOLUTION

MARKETING STAGE	PRODUCT ORIENTATION	SALES ORIENTATION	MARKETING ORIENTATION
Marketing Characteristics	1. Product-Dominated Marketing 2. Product Performance Emphasized by Competition 3. Little, if any, Service Marketing	1. Competition Increases; Vendor Attempts to Differentiate Product 2. Increased Emphasis on Service in Order to Sell Product	1. Corporate Goals Rather than Product Strategy Dominates Marketing Plan 2. Increased Emphasis on Understanding Market Needs 3. Service Becomes an Integral Part of Overall Corporate Strategy

- As service revenues increased, companies began to look at service as a method of enhancing equipment sales, not detracting from them. This was the first indication that the vendor was moving away from a dedicated product marketing strategy and into a sales orientation. Service became a distinct entity within the company, first as a part of the sales group, then eventually as a separate division.

- The services group revenues continued to grow, while at the same time productivity increased, changing the service organization from a cost center to a profit center. Service activities expanded in an attempt to bring in more customers. As competition grew, service became a major selling point of the company. Service became known as a product that now required marketing and sales.

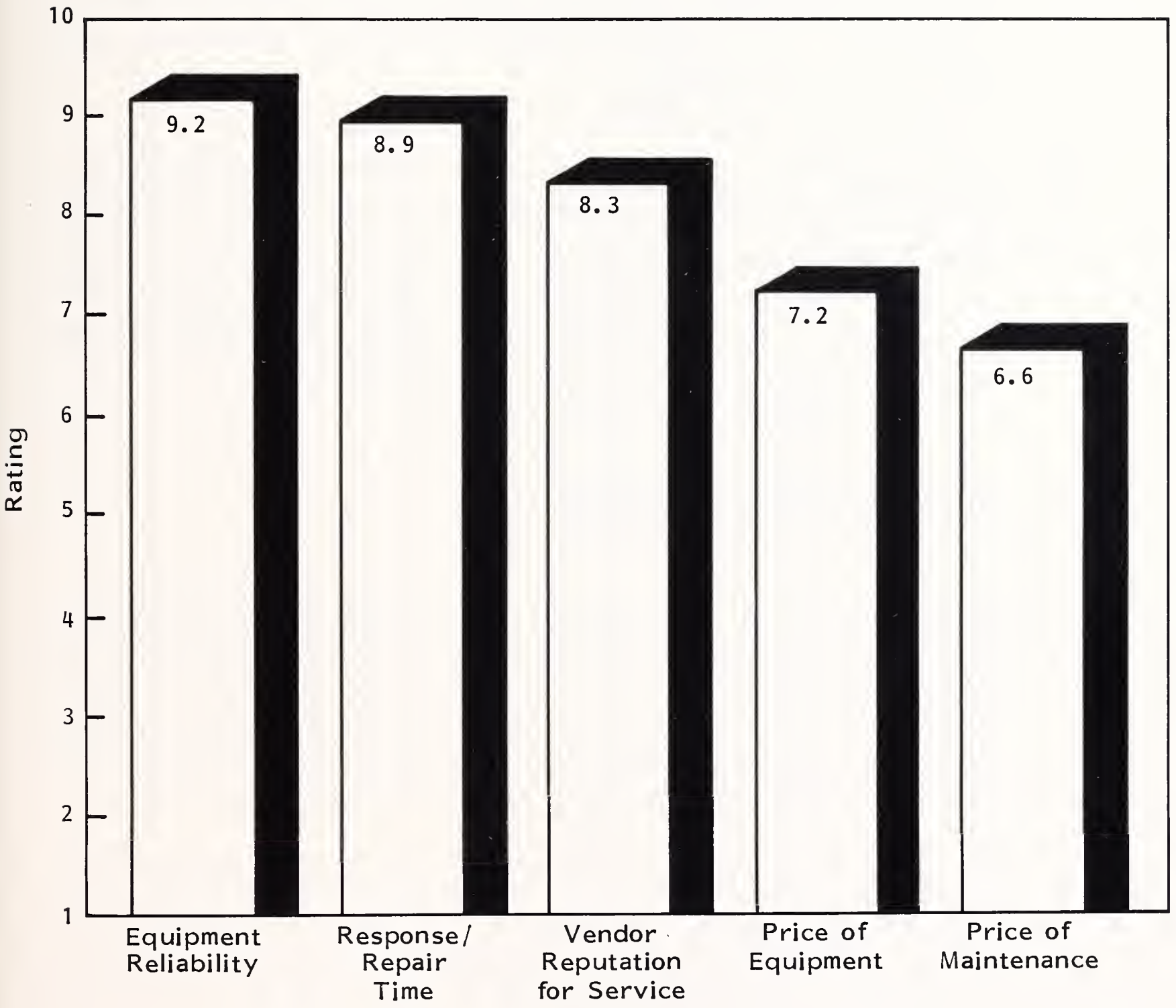
- While vendors were emphasizing service in order to increase sales, users were becoming cognizant of the importance of service in making a purchase decision. Price of service was still an important factor in choosing maintenance, but the actual and perceived cost of downtime encouraged users to evaluate their equipment both on the standpoint of reliability of equipment and on the quality of service available.

- It is this increasing emphasis users place on service as an important component of system selection that will force office product vendors to develop a global marketing approach to service. Exhibit V-3 demonstrates the importance users place on service, as opposed to price of equipment.

- Although the transition between products and marketing orientation is difficult for any vendor, office product vendors are more likely to have a smooth transition than large- or small-systems vendors. The transition will be facilitated by the traditional marketing orientation of office product vendors. More than in any other segment, office product vendors have already established marketing organizations that need only be directed to incorporate service as a marketing group.

EXHIBIT V-3

IMPORTANCE OF MAINTENANCE AND PRICE FACTORS
IN OFFICE PRODUCT PURCHASE DECISIONS



Rating: 1 = Low, 10 = High

- One of the most crucial changes that office product vendors must make to ensure the success of service marketing is to establish an organizational structure that features a marketing orientation. Exhibit V-4 demonstrates that as vendors move away from product orientation, service becomes more autonomous. Ultimately, as vendors recognize that service can represent up to one-third of total revenues, full departmental status is conferred on both service and service marketing.

- A major benefit for an autonomous service marketing unit is the ability to establish realistic goals for service that are not tied directly to equipment sales. Organizations such as DEC and Data General have given their service groups an increasing amount of freedom to develop their own markets. While not successful in every area, these service groups have expanded into new after-sales support areas with excellent financial results.

C. EFFECTIVE SERVICE MARKETING

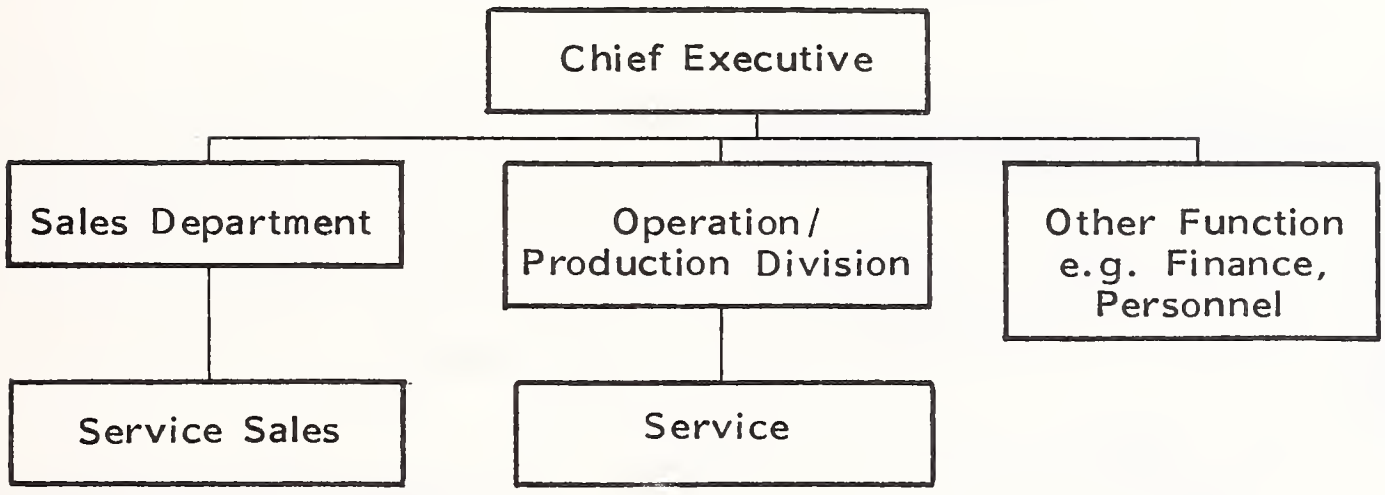
- As previously stated, service evolved from an internal image of "a necessary evil" to the present view that service is an important "product" of the vendor. The concept of product implies that the consumer has a choice. Thus, it is the goal of marketing to make it easier for the consumer, in this case the computer user, to choose a maintenance program.

- To achieve this, the service organization must accomplish a number of activities. First, the service organization, usually by means of a planning group, must study the potential market through customer audits and both internal and external market research. At this time such factors as competition and pricing sensitivity must be analyzed.

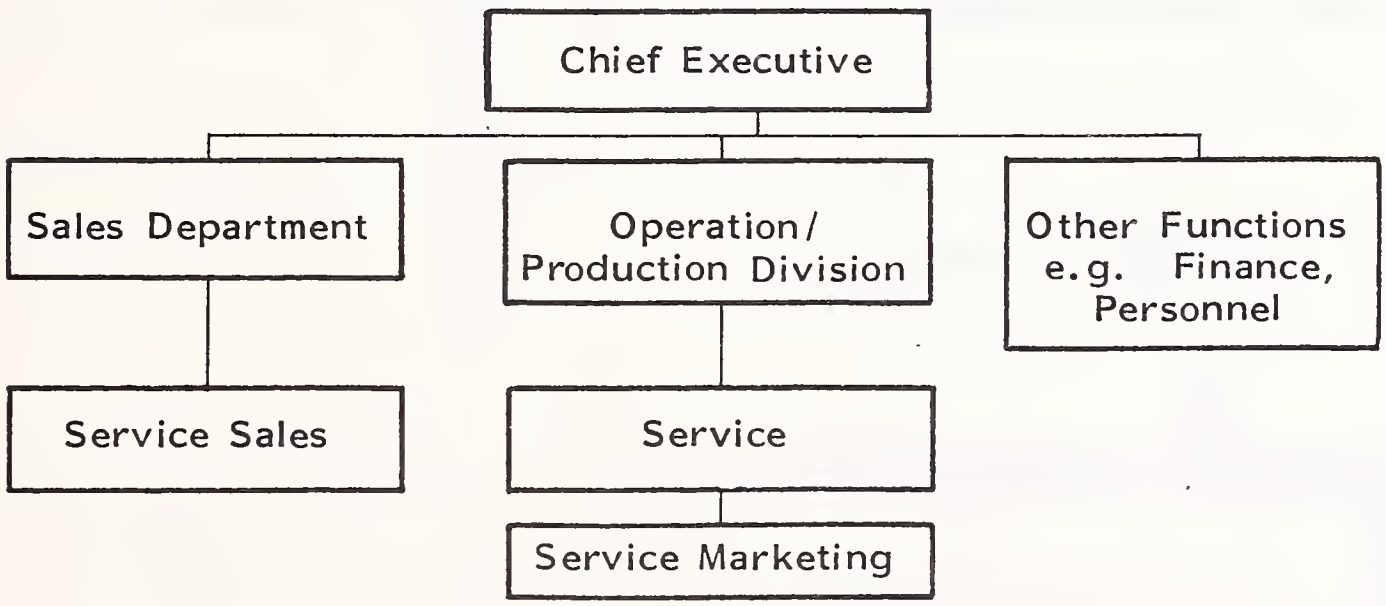
EXHIBIT V-4

SALES AND MARKETING ORGANIZATIONS

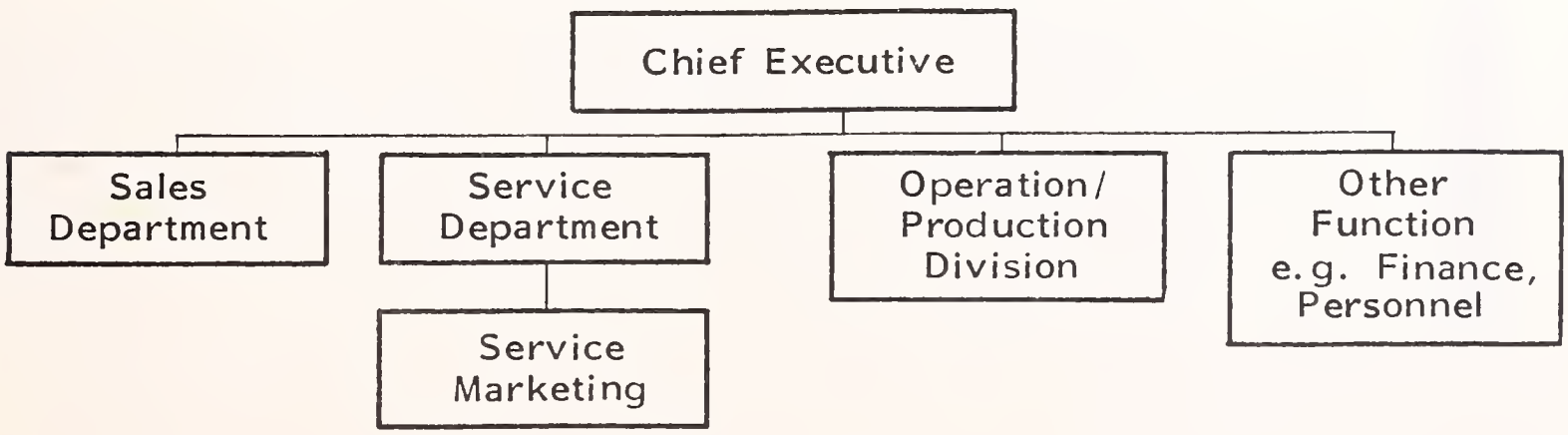
A. PRODUCT-DOMINATED VENDORS



B. SALES-DOMINATED VENDORS



C. MARKET-DOMINATED VENDORS



- Next, the "product," the service offering in this case, must be introduced to the market. This can be accomplished through a variety of avenues. First, brochures and other sales literature must be produced. Print and other media advertisements should be involved in order to attract new customers. As with other "products," service should be presented as attractively and effectively as possible in order to entice customers.

- Finally, service should be emphasized as a sales feature by the existing sales force. This can be extended to the concept of account management, in situations where the larger system users are assigned a single sales contact who handles both equipment and service sales support. In this respect, the vendor benefits by the continual support of the customer.

- Exhibit V-5 presents the necessary steps in the introduction of a service program to the public. It is important to note that at the beginning and end of the service introduction process, extensive analysis of the marketplace should be performed. This can be accomplished through independent research firms and internal market planning groups.

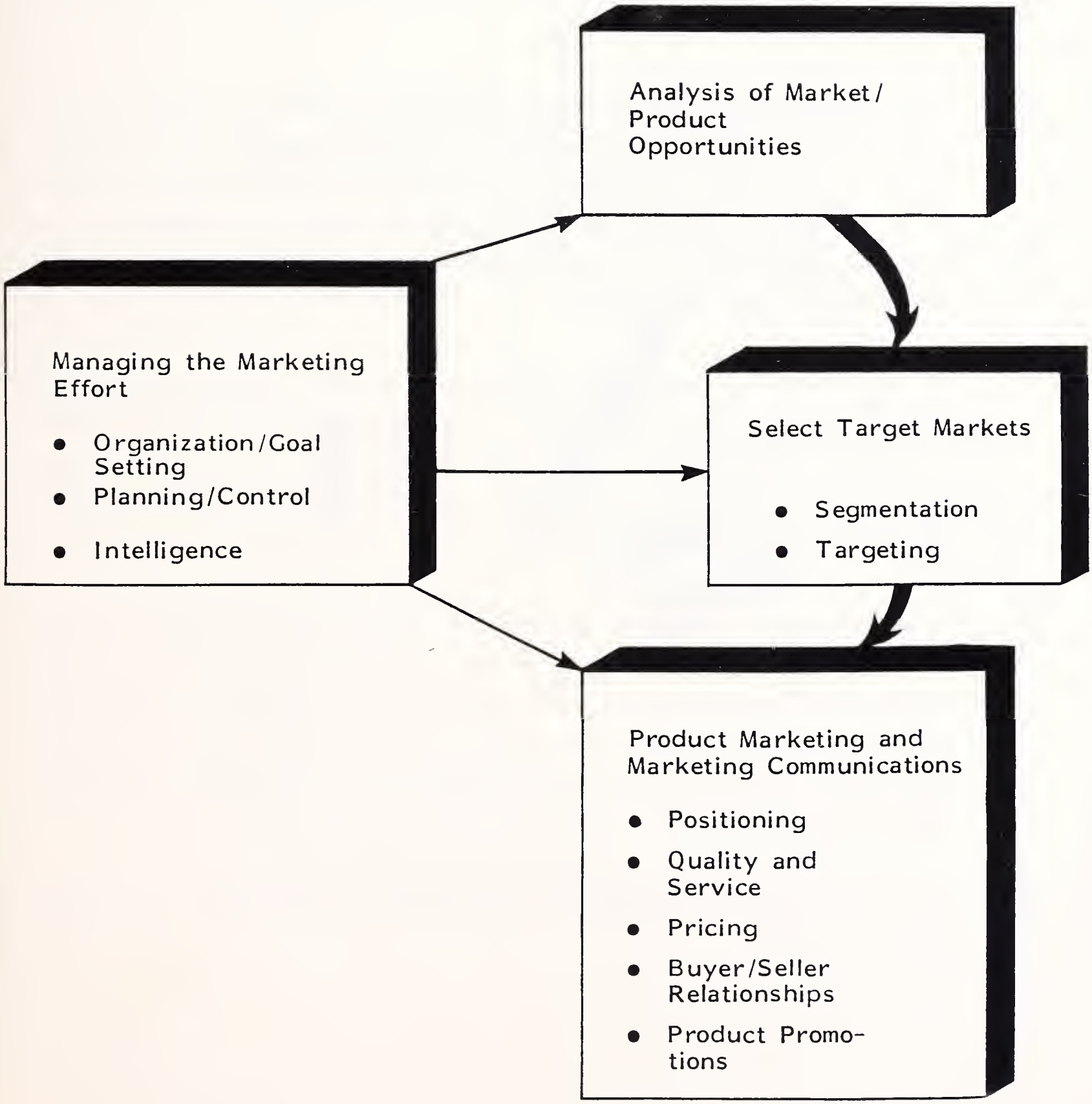
D. SUCCESSFUL SALES OF SERVICE

- In the past, office products service sales was the responsibility of the product distributor who was usually a computer retail store salesperson concerned with the sale of the product rather than service. In fact, the fear of questionning the reliability of the product caused the salesperson to purposely not bring up the issue of service to the customer.

- As more vendors recognized the importance of service in contributing both contract revenues and product sales revenues, the importance of selling service became more apparent. Since service was becoming a more distinct entity in the organizational structure of the company, the service organiza-

EXHIBIT V-5

THE MARKETING PROCESS



tion required the development of successful sales and marketing techniques in order to increase its revenue flow.

- The first requirement in selling service, as with any other product, is effective marketing communications, both written and verbal. Written communications, most often in the form of brochures, are effective in showing the benefits of a service offering. Not only do they contribute directly to sales of service contracts, but they also act as a form of public relations, keeping the issue of service in the user's mind.

- Oral communications--ranging from the salesperson-potential customer interaction to the end user-service organization interaction--have a far-reaching impact on the overall satisfaction with service. The service organization should emphasize interpersonal communication skills in its training of all personnel, especially at the field engineer level, where the customer has the most frequent after-sale contact.

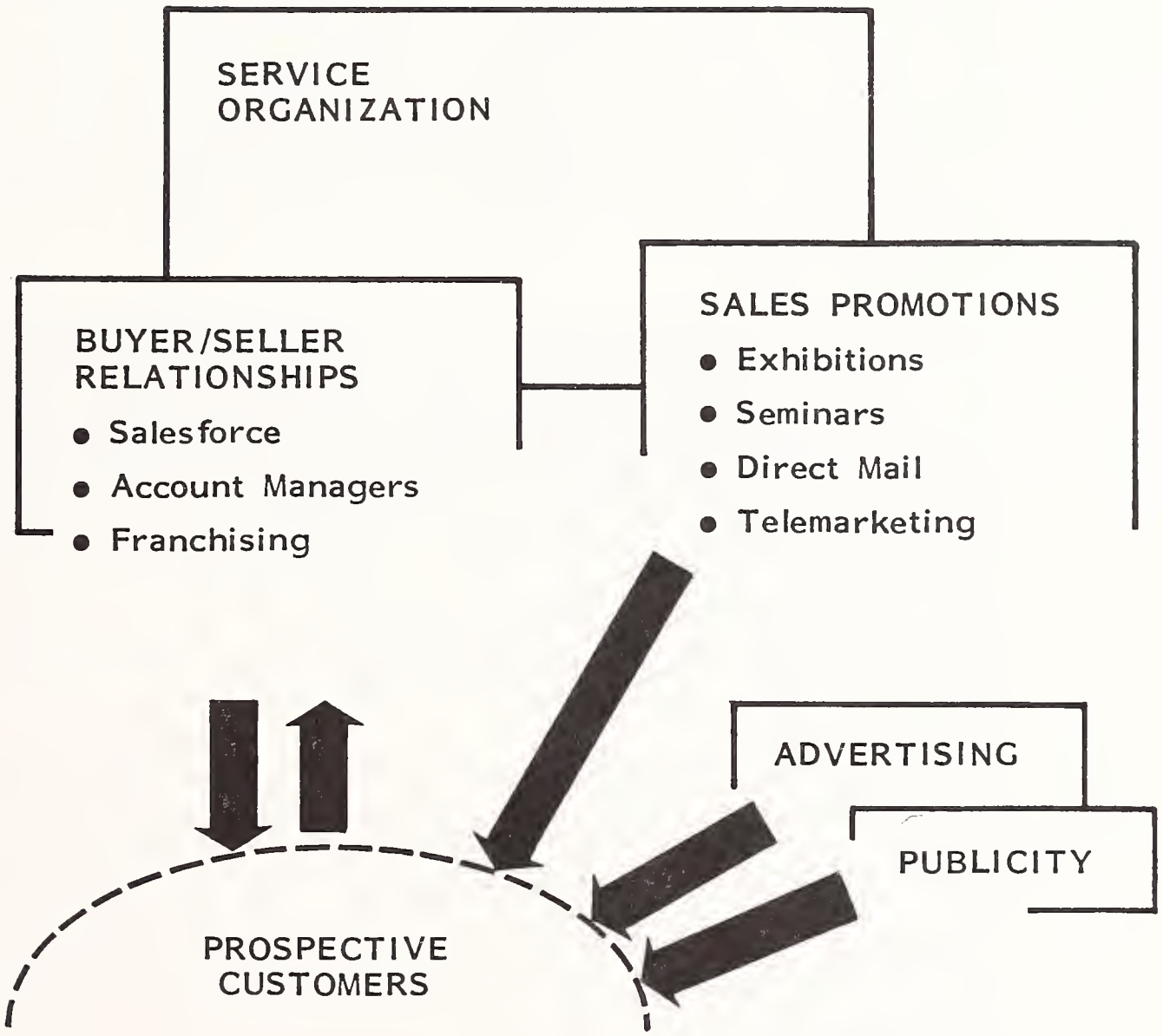
- The actual sale of service can benefit from the same marketing techniques that have boosted other product sales. The newest trend that can be utilized by service organizations is telemarketing, especially for contracts, spare parts, and supplies. Telemarketing efforts can effectively blanket a large market base that uses office products.

- An eventual goal in service marketing would be the development of persons within the service organization who would coordinate all sales and service activities for large customers. This person, known as the account manager, would then provide the user with a single point of contact within the vendor organization, and would provide the vendor with a more stable relationship with each large account.

- Exhibit V-6 summarizes the importance of effective service marketing communications.

EXHIBIT V-6

MARKETING COMMUNICATIONS



GOALS

- Control Costs of Selling
- Emphasize Promotional Methods
- Establish Objectives and Measure Performance

E. ADVANTAGES OF MARKETING SERVICE

- The final and yet most important reason to market service is the potential revenues inherent in service. Service revenues provide an annual source of income to the vendor. Taken over the eventual life cycle of a product, it is not unlikely that service revenues will exceed revenues derived from the actual sale of the product, especially when related charges for services such as installation are included. As the product base grows, so does this continual source of revenues.

- A related advantage of service is the protection and generation of future sales as a result of quality service. This is especially true as the performance characteristics and reliability of the equipment improves to the point that the difference between products becomes negligible. At this point in time, the customer's perception of the service image of the vendor becomes an important purchase decision criterion. Vendors that become active in marketing the quality of their service will especially benefit from this tendency.

- A source of service-related revenue that is growing in acceptance is the direct sales catalog of supplies and accessories. Digital Equipment Corporation, Wang, and Texas Instruments are examples of companies already offering such a service. In the first quarter since starting DECdirect, DEC brought in an estimated $100 million in sales as a result. An added benefit of this type of offering is the improved satisfaction of the user--all three vendors listed above receive higher user satisfaction marks in the area of supplies and add-on sales since instituting their programs.

- A vendor should not lose sight of the fact that even though effective marketing increases sales and profits, the most long-lasting result is improvement of the vendor's understanding of the user's service needs. As that understanding increases, vendors are more likely to be able to recognize and act on user needs when those needs are most immediate to the user (and profitable to the vendor).

- Exhibit V-7 lists the specific ways that a marketing plan can increase service sales and profitability. In essence, this exhibit indicates that office product vendors must take a long-term strategic view of service and that strategic goals must ultimately be based on the needs of the service population.

- Vendors that maintain a "reactive" approach to service will not be able to maximize service profitably because they will be too late in offering service to their users. Revenue will be lost because competitive pressures will hold down prices for service "also-rans."

- By maintaining a "proactive" marketing approach to service, the office product vendor will be assured that new trends in service or new user demands for service can be acted upon when need and profitability is the greatest.

EXHIBIT V-7

HOW MARKETING CAN INCREASE SALES AND PROFITS

- Places Emphasis on Markets, Not Services
  - Opens Up Bigger Market Potential
  - Focuses on Customer Needs and Wants
- Targets Services in Areas of Highest Sales and Profit Potential
- Emphasizes Profit Planning, Not Just Sales Revenue
- Emphasizes a Planned Approach
  - Systematic Analysis of Market
  - Planned Levels of Achievement
  - Creates Positive Strategies to Overcome Problems
- Balances Company Resources to Optimize Business Effectiveness
- Focuses Attention of All Employees on Sales and Profit Goals
- Encourages Marketing Decisions Based on Fact, Not Fantasy

VI VENDOR CASE STUDIES

VI VENDOR CASE STUDIES

A. APPLE COMPUTER, INC.

- Incorporated in 1977, Apple Computer, Inc. sparked the microcomputer revolution with the introduction of the Apple I. During those early years, Apple's growth rate was an incredible 150% compounded between 1978 and 1983.

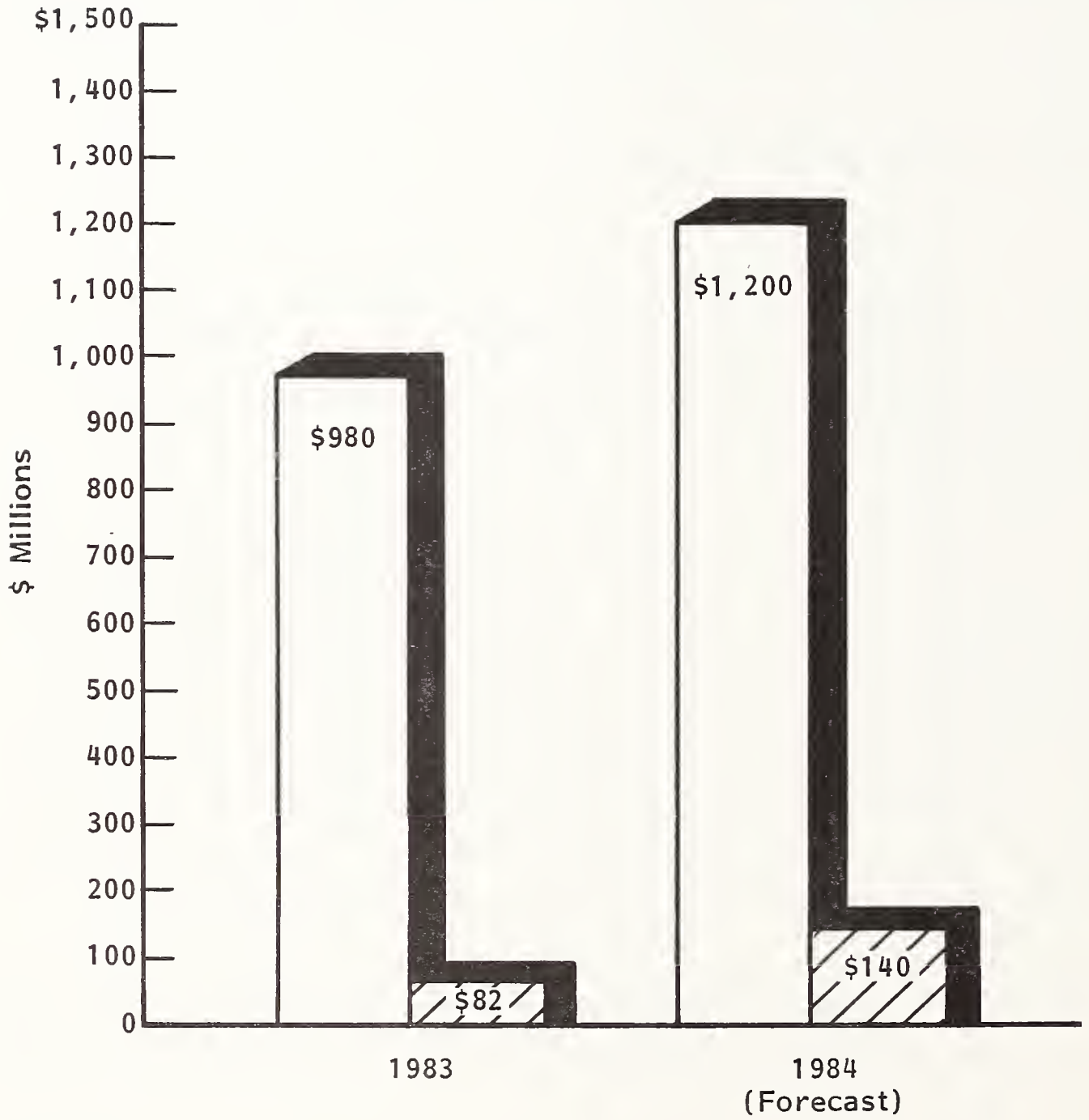
- IBM's entrance into the PC market slowed this growth noticeably; however, the tremendous demand for microcomputer products, especially in the corporate environment, has continued Apple's profitable operation. As shown in Exhibit VI-1, sales in 1983 were $980 million, a 69% increase over 1982. INPUT forecasts that Apple's 1984 revenues will be $1.2 billion. IBM's presence is expected to further eat into Apple's share of the market, yet Apple is attempting to fight back, with the introduction of new 32-bit machines and with a reorganization of their sales structure.

- Apple service revenues for 1983 were $82 million, or 8% of the company revenues. By 1984 Apple service revenues grew 11% to $140 million.

- One of the newest Apple machines is the 32-bit Macintosh, introduced at a shareholders meeting in January 1984. Incorporating LISA technology, the Macintosh is aimed at the fast-growing small- to medium-sized business market, where its relatively inexpensive ($2,495 list price), easy to use

EXHIBIT VI-1

APPLE REVENUE GROWTH



(mouse-driven), and bundled approach will be very attractive to computer neophytes.

- In addition, Apple filled in gaps in its business computer line by reintroducing scaled-down (especially price wise) versions of the disappointing LISA.

- Most recently, Apple aimed at the home and small business market with its newest machine, the Apple IIc portable. This 7-1/2 pound machine should attract many IIe users who will be attracted by the IIc's software compatibility, price ($1,295 list), and size (especially after the expected flat screen monitor is released).

- Apple is currently restructuring its distribution strategy, having recently dropped its manufacturer representative force that dealt with dealers. Instead, Apple will organize its own sales force, which should improve Apple's control over the customer base.

- Apple's basic service philosophy results from a realistic appraisal of the large costs attached to providing direct support to a dispersed customer base. Instead of establishing its own extensive product support operations, Apple organized support activity behind the dealers and distributors, known as Apple Authorized Service Dealers, which currently number over 1,500 throughout the U.S.

- Apple provides support to these dealers through their service organization, which is located in their Product Distribution and Support Group. All necessary training, documentation and repair manuals, and diagnostics are provided to service dealers. In addition, only authorized service dealers are allowed to purchase spare parts kits from Apple.

- In 1982 Apple established an exclusive third-party maintenance agreement with RCA, with the intent to attract more corporate and large installation users. RCS offers on-site service on a contractual or a time-and-materials

basis, with nationwide coverage from 450 engineers operating out of 200 service locations. Advantages to Apple users who opted for RCA include a wide variety of services available, such as installations, preventive maintenance, and parts availability (since RCA is the only Apple-authorized TPM given access to Apple spares).

B. CENTRONICS DATA COMPUTER CORPORATION

- Incorporated in 1968, Centronics is one of the largest independent printer manufacturers, with total revenues of $164.1 million for the fiscal year ending January 1, 1984. Centronics manufactures a wide range of dot matrix and line printers ranging in price from below $600 to above $20,000.

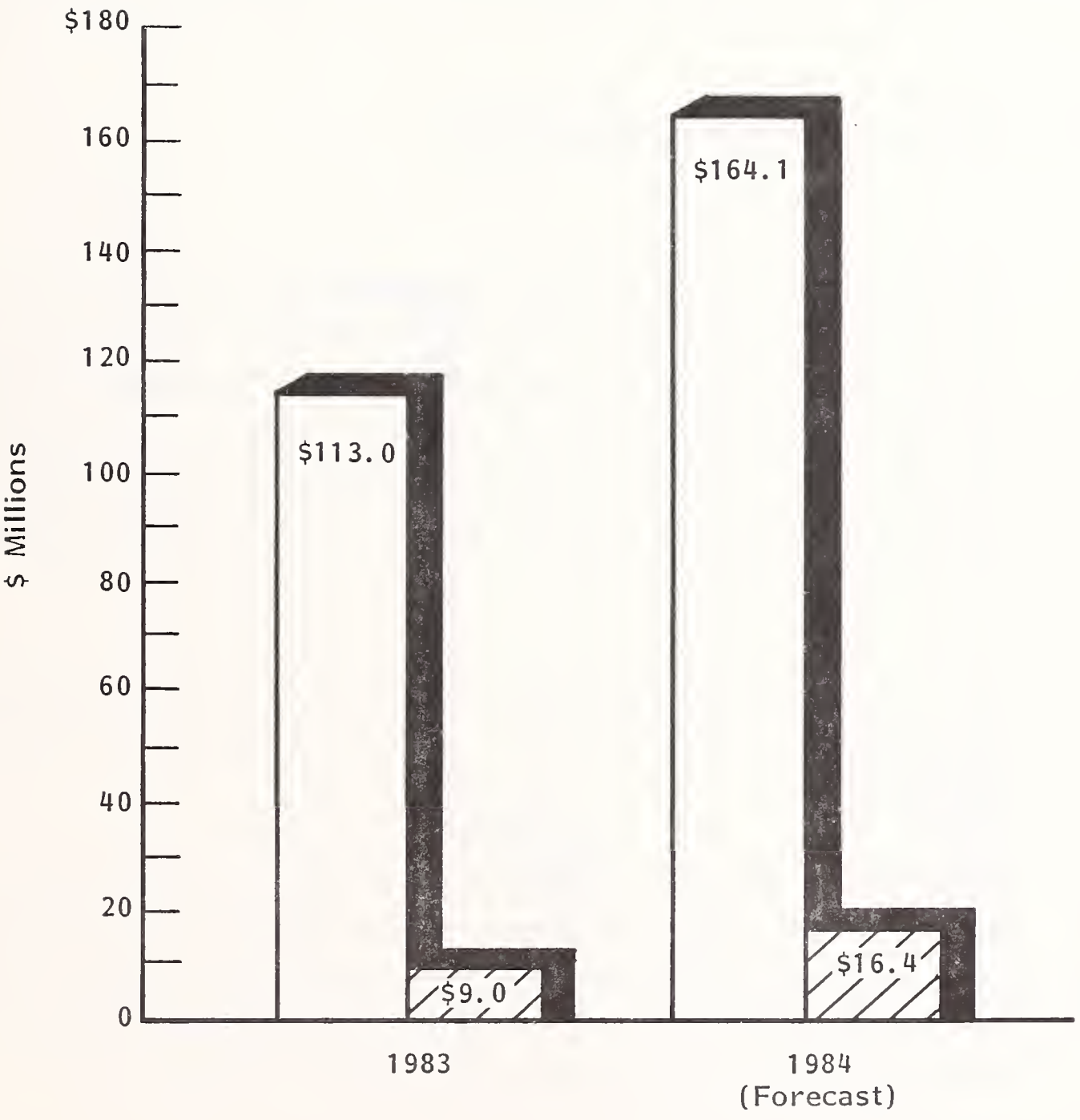
- 1983 was a tough year for Centronics, as sales basically remained flat, resulting in a net loss of $7.7 million. The primary reason was the lack of a true, low-end dot matrix printer that would compete in the 160-CPS-and-under market. To rectify the situation, Centronics introduced the economically priced Horizon 480 dot matrix printer aimed at the microcomputer market.

- Service exists at Centronics within a separate subsidiary known as Centronics Sales and Service Corporation. Although the company as a whole lost money last year, service has been profitable for the last three years. Service is responsible for approximately 10% of the company's revenues in fiscal 1984, and that percentage is expected to grow in the future. Exhibit VI-2 provides Centronics equipment sales and service forecasts.

- Currently, there are approximately 225 employees in service working out of 100 service locations. Over one-half of these are engineers, both in the field or working out of nine carry-in service centers. In addition, Centronics has a National Service Depot located at their Hudson (NH) headquarters.

EXHIBIT VI-2

CENTRONICS REVENUE GROWTH



- Dispatching is carried out on an automated, nationwide basis, where users can call a toll-free number in Hudson for telephone support or on-site service. Centronics' dispatching system, which was developed in-house, also tracks field engineer performance, equipment history, and parts inventory. Response time is currently averaging between six and eight hours, while repair time, benefitting from improved component design, is averaging around 1/2 hour.

C. DIGITAL EQUIPMENT CORPORATION

- Digital Equipment Corporation, the second largest computer company (with $4.3 billion in total company revenues), as shown in Exhibit VI-3, has made a slow but significant entrance into the microcomputer industry. With micro revenues estimated at $4 million in 1983, DEC garners a market share of less than 5%. Yet the important point about DEC's presence in the personal computer market is the variety and depth of service offerings available to DEC's personal computer users.

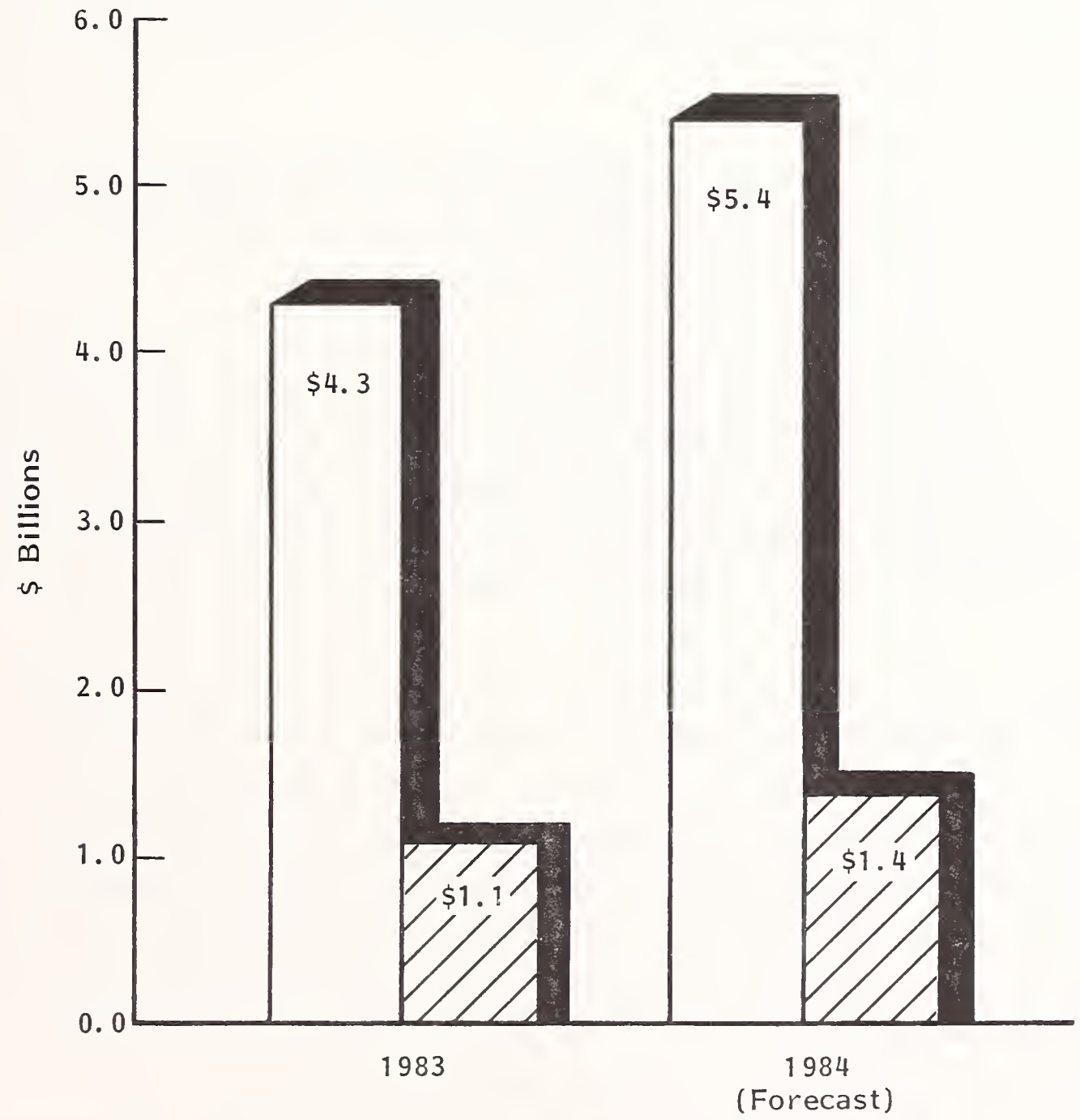
- Total service revenues, also shown in Exhibit VI-3, were just over $1 billion in 1983. INPUT forecasts that DEC's total service will grow to $1.4 billion in 1984.

- Well known for their menu of service available for large- and small-systems users, DEC also offers a complete menu of services for their line of personal computers, which includes the DEC Mate II (a 12-bit, single-user machine), and Rainbow 100 series (8- and 16-bit machines), and the Professional series (16 bit). DEC offers both on-site service and carry-in support.

- Users opting for on-site maintenance can choose basic system support, receiving on-site coverage Monday through Friday, 8 a.m. to 5 p.m., or DEC service coverages, which guarantee four-hour response, continuous repairs,

EXHIBIT VI-3

DEC REVENUE GROWTH



and up to 24-hour, seven-day coverage. Both service plans entitle users to field changes and operating system updates free of charge.

- Noncontract customers can receive their service on a per-call basis for both on-site and carry-in.

- DEC offers a popular carry-in service contract, which offers a two-day turn-around for equipment brought to any of 120 Digital service centers located nationwide.

- An additional option to DEC customers is DEC Mailer support, which provides five-day turnaround and a 90-day warranty on work performed. Customers are only responsible for paying shipping to DEC.

- Training is an area that DEC has emphasized. Courses are offered to DEC customers in a variety of areas, including self-maintenance, software usage, and general operations. Users can choose between traditional lecture format or self-paced instruction, the latter consisting of printed manuals and instruction based on computers or videos.

- DEC's attempt to improve its market share through improved service offerings is further evident in the recently announced "Investment Protection Plan." Under the program, retail buyers receive one year of free on-site service (rather than carry-in), free parts, telephone support for both hardware and software, selected operating software updates, a user newsletter, and a limited "no questions asked" return policy. This return policy allows retail customers 30 days to decide whether or not they want to keep their new DEC machine.

- Corporate buyers receive a reduced version of the "Investment Protection Plan," which has three months of free on-site coverage, rather than a year. Corporate buyers do not receive the return option either.

- Another innovative approach to service delivery was "DEC direct," started for the larger DEC products in 1983 and offered to personal computer users in 1984. Through an attractive catalog, users can place toll-free telephone orders for a variety of supplies, accessories, and add-on equipment ranging from diskettes to office furniture. An additional catalog presents personal computer software, often at discount prices. The popularity and success of DEC direct has prompted many other computer manufacturers to offer similar direct sales programs.

D. INTERNATIONAL BUSINESS MACHINES

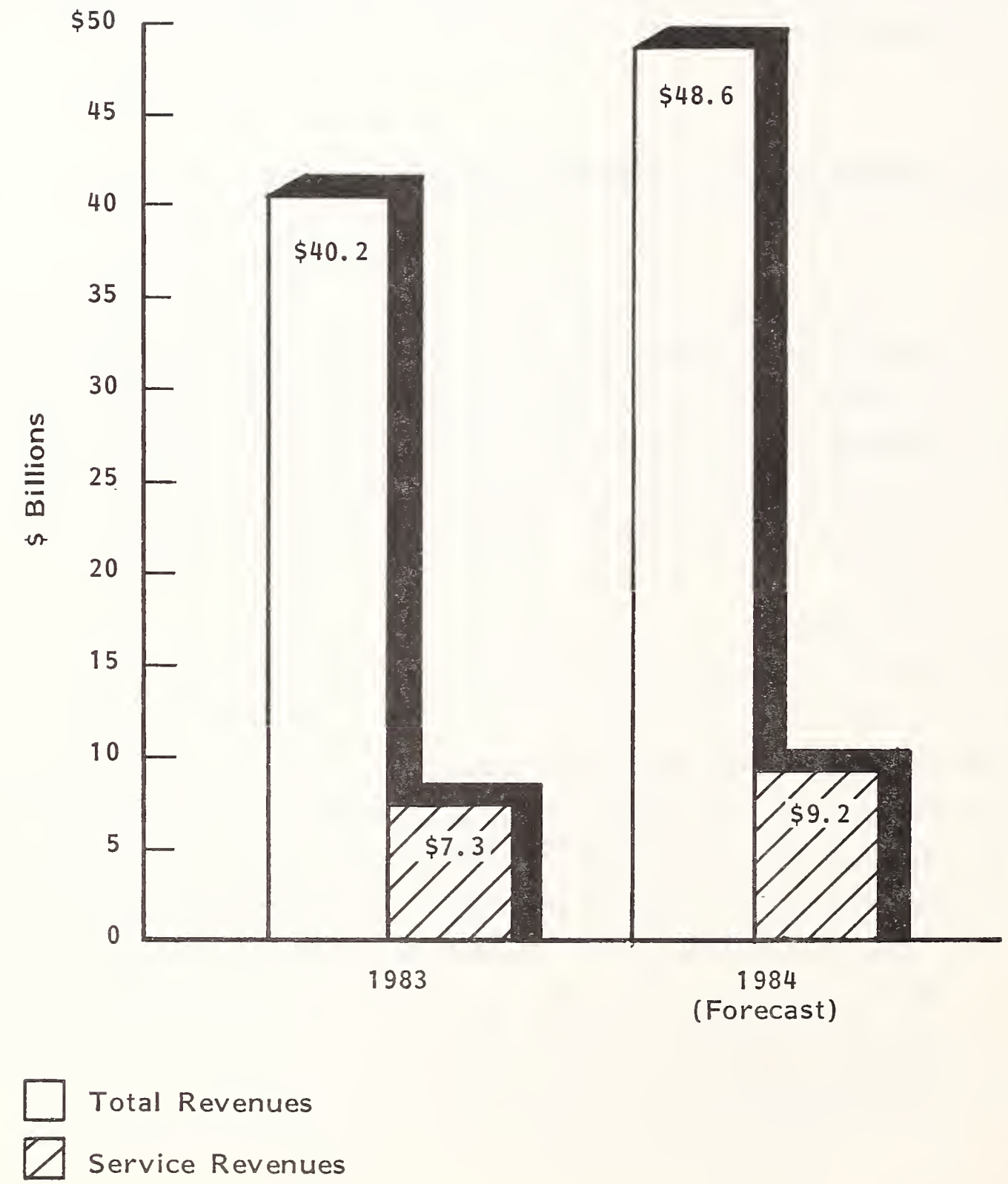
- 1983 was yet another record year for IBM. Total revenues topped $40 billion, representing a growth rate of over 20%. Service as a separate entity would itself be a Fortune 500-size company, with $7.3 billion in 1983 revenues. Through their sheer size alone, IBM's entrance into the personal computer market in 1981 shook the industry. Personal computer revenues were estimated at around $2 billion, up from a conservative estimate of $700 million in 1982.

- Exhibit VI-4 provides 1983 sales and service revenues and forecasts to 1989.

- During 1983 IBM blitzed the microcomputer market with four new product offerings. In March IBM introduced the IBM PC/XT, which added a hard disk to the already popular PC. In October IBM announced two expanded capability workstation PCs--the 3270 PC and the PC XT/370. In November IBM announced the PCjr, which was IBM's first attempt at the home market. The first three products were geared at solidifying IBM's hold on the top-end business marketplace. The last release was a much-criticized attempt at bringing the home and small company user into the fold.

EXHIBIT VI-4

IBM REVENUE GROWTH



- IBM originally emphasized an atypical service philosophy for the PC. Instead of their traditional full-service policy, IBM assumed a lower support profile, emphasizing independent (outside) support structures for the PC. In the past, support for the PC came usually from the purchase sources, such as dealers, IBM Product Centers, or the IBM National Marketing Center.

  - IBM, through its Product Centers or National Marketing Center (for large national accounts), provided strictly depot service, either carry-in, mail-in, or by courier (if within 20 miles of a Product Center).

  - Dealers were the only source of on-site service, and they were allowed a free hand in setting prices.

- In the Spring of 1983, IBM announced a more complete service offering, including on-site service. The four types of service available were:

  - Mail-in to a regional repair center.

  - Carry-in to any IBM service/exchange center.

  - Courier pick-up and delivery.

  - On-site service.

- In 1984 IBM announced two additional service offerings for their personal computer line. The first, geared to the neophyte PCjr user, is a toll-free hotline to the PCjr Information Center, which handles rudimentary service and operational questions. The second new offering is aimed at improving software operations and allows PC users to call a toll-free software support center to ask seven "single-topic" questions for a $380 charge. Both offerings are limited to certain geographical regions.

- To a certain extent, IBM is keeping with its past philosophy of independent support around the PC family in the area of training. IBM utilizes independent training firms working out of selected IBM Product Centers, where users can attend operational training classes priced at $95 per four-hour class.

E. TANDY CORPORATION

- Originally starting as a leather crafts store in 1918, Tandy, in 1977 introduced the first inexpensive personal computer available through retail outlets. That first personal computer, the TRS-80 microcomputer system, helped spark what is now a booming home and business personal computer market.

- Revenues derived from the sale of micros rose 28% for Tandy for the last fiscal year, from $466.2 million in 1982 to $598 million in 1983. Major contributors to sales growth included the updated versions in the TRS-80 line, the Models 3 and 4, and the revolutionary lap-size Model 100.

- Tandy attempted to expand its top-end computer line with the introduction of the TRS-80 Model 16B, introduced in 1983, and the IBM-compatible Model 2000, introduced in 1984. The Model 16B is a dual-processor, multiuser computer that utilizes the Motorola 68000 chip, allowing 32-bit processing. The Model 2000, based on the Intel 80186 microprocessor, is touted to be three times faster than the IBM PC--at a 25% lower price.

- Tandy's service philosophy is unusual within the microcomputer industry, largely as a result of product diversification. With products ranging from radios to computers, Tandy realized that the sheer variety would make it difficult to run a service operation as a profit center.

- Tandy, unlike all other microcomputer manufacturers, already had an extensive retail dealer network in place. In addition, Tandy's dealers were already

service oriented, having been built around the electronics marketplace. Therefore, it became possible to set up service locations at selected Radio Shack outlets, allowing both depot (in-shop) and on-site service.

- Currently, Tandy has 450 customer service representatives located at 250 service locations in the U.S. In addition, at the Ft. Worth headquarters Tandy has 75 additional technical support engineers who provide assistance to Radio Shack outlets.

- Tandy also utilizes its existing dealer network as an alternative to a centralized telephone support number. At one time, Tandy offered an "800" line to its customers; however, a large percentage of calls that were more operational in nature caused an overuse of the line, necessitating a switch-over to localized support numbers. Tandy successfully marketed the use of local Radio Shack outlets as a source of technical support to their users.

- The use of local retail outlets as a source of sales and service has been adopted by other microcomputer vendors, including IBM. According to Tandy, this recognizes the effectiveness of retail outlets as a distribution point for microcomputers under the price of $10,000, due to increased visibility of products and reduced "on-the-shelf" competition from other computer vendors' products.

- An obvious trend that Tandy is going through is an attempt to "spruce" up its image as a serious computer manufacturer. Two recent undertakings illustrate this point:

  - The opening of over 400 full-service Computer Centers, along with additional "Plus" Computer Centers located within existing Radio Shack outlets, indicating an emphasis on microcomputer products.

  - The renaming of Model 2000 (dropping the Radio Shack logo and replacing it with the Tandy name). This move recognized the business world's skepticism toward Radio Shack as a serious computer.

F. WANG LABORATORIES, INC.

- With revenues of $2.15 billion (for fiscal year 1984) and over 30 years of experience in the electronics and computer industries, Wang qualifies as one of the leaders in the data and word processing marketplaces. Primarily known for workstations and word processing equipment, Wang has entered the personal computer market with a Professional personal computer.

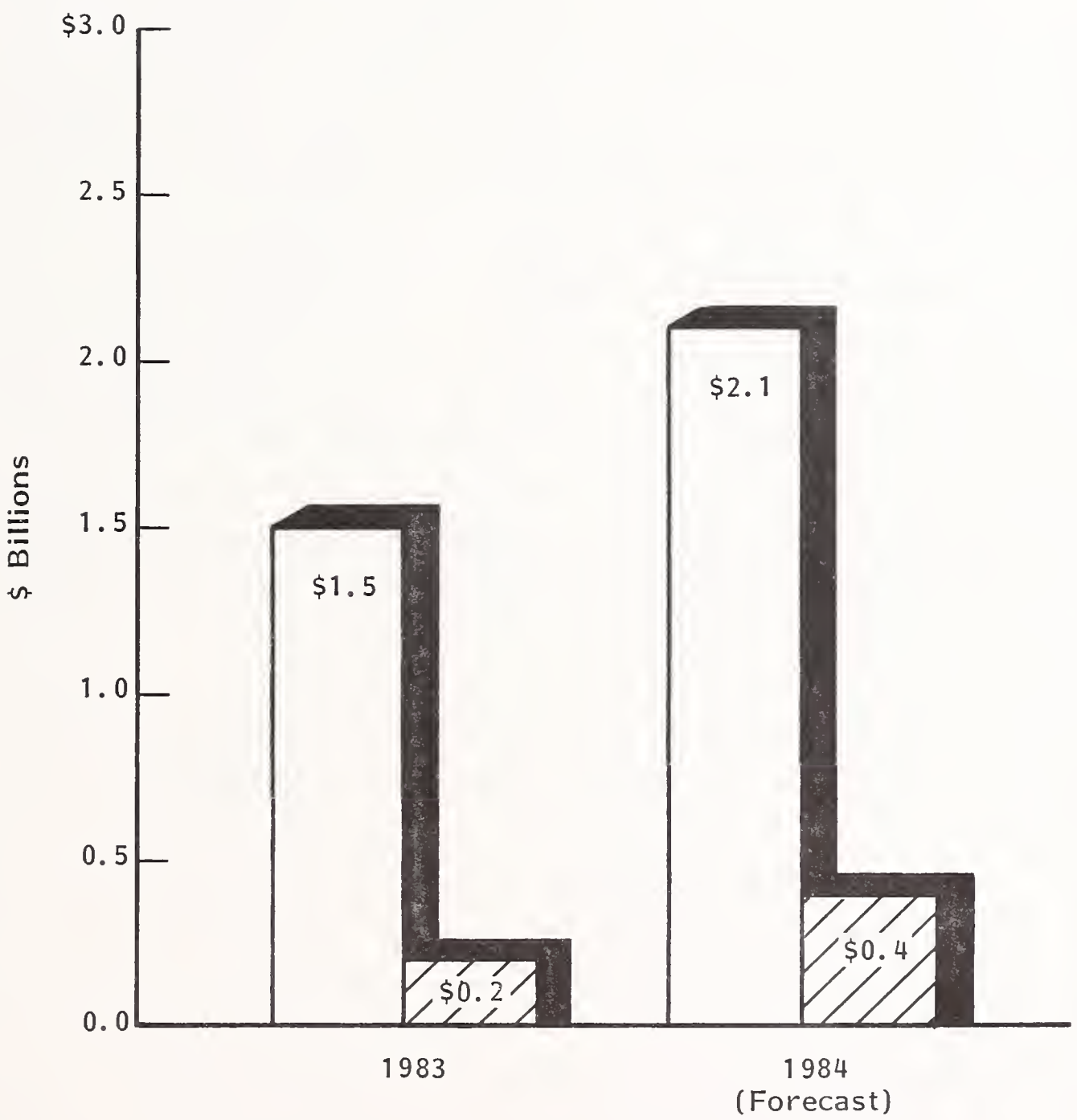
- Product distribution is a major concern for Wang. After considering the opening of five Wang Business Centers (scheduled for November 1983), Wang held off and instead reemphasized its dealer structure. The desirability of the high-visibility product centers is still evident at Wang; however, it appears that the company is still not convinced that the existing dealer network should be replaced. Instead, Wang is seeking to attract new dealers through a new dealer/host program that will encourage dealers to become more involved in direct sales of smaller systems, often on referral from a Wang direct sales-person.

- Service has been a traditional strength. While overall company revenue growth has fluctuated between 20% and 40%, as shown in Exhibit VI-5, service revenues have grown over 60% for each of the last three years, and are expected to continue to grow at a rate faster than for the overall company. Service revenues for fiscal year 1984 were $400 million, an increase of 40% from 1983 service revenues; company growth was about 35% for that time-frame. To further illustrate service growth at Wang, service went from a 43% loss in 1980 to a 18% profit in the fiscal year ending June 30, 1983.

- At the center of Wang's service philosophy is the WangCare service program. Under WangCare, users receive on-site service, guaranteed uptime of 95%, an escalation policy that will replace the problem unit if the problem persists for 60 days. For an additional premium, users can receive WangCare Plus, which entitles them to 98% guaranteed uptime, guaranteed response time of two

EXHIBIT VI-5

WANG REVENUE GROWTH



hours (if within 25 miles of a service location) or three hours (if within 50 miles). If the WangCare Plus customers opt for one additional period of coverage, they receive an uptime guarantee of 99%.

- o Wang has six regional Call Control Centers, which are responsible for the dispatching of all field engineers. Completely automated, these centers incorporate their District Management System that contains complete customer and product history, including an effective parts inventory located at each branch office. In this fashion, Wang field engineers can assure that they either have a required spare, or, if not, one can be ordered and shipped from a nearby Field Support Center within 24 hours.

- o Other examples that reflect Wang's concern include:

  - Annual customer satisfaction surveys that query Wang-contracted maintenance customers on service quality.

  - Periodic equipment performance reviews, which record the number of service calls, response times, and conformance to preventive maintenance requirements.

  - Escalation procedures that provide management notification and involvement in conjunction with customer liaison personnel.

  - Employee satisfaction surveys that recognize the importance of keeping Wang engineers and support personnel satisfied. This will directly improve service performance.

- o Following closely in other vendors' footsteps, Wang has introduced WangDirect, which provides direct, toll-free telephone sales of selected hardware, software, and supplies through a series of attractive catalogs. WangDirect has contributed to a very successful supplies sales program at Wang, which is expected to bring in between $75 to $80 million in the next year.

APPENDIX: QUESTIONNAIRE

APPENDIX :

QUESTIONNAIRE

1. Many of the large system service vendors are increasing the number of services offered to customers as a way to increase revenues and to improve user satisfaction. What type of post-sales support services does your department now offer or plan to offer in the next 3 years?

	Current	1987	Please Describe
- Planning	___	___	_____
- Consulting	___	___	_____
- Documentation	___	___	_____
- Training	___	___	_____
- Site Audits	___	___	_____
- Software Support	___	___	_____
System	___	___	_____
Application	___	___	_____
- Remote Diagnostics	___	___	_____

2. a. Dispatching technology has advanced very rapidly in the last few years. Do you see these changes in dispatching helping your field services group?

_____

_____

_____

b. Do you offer or plan to offer centralized dispatching?

_____

_____

_____

2. (Cont.)

c. Does your company have local, regional or national dispatching?

d. Please rate your dispatching performance.

e. Has new technology increased performance?

f. Describe the organization structure of your dispatching unit

g. Is parts tracking a function of dispatching?

3. a. Spare parts inventory is usually the second largest budget item for customer service organizations (coming right after personnel expenditures). Controlling these parts inventories is a major goal of most service vendors. Is your capital investment in spares growing?

b. What factors influence your parts investment?

c. Do you have parts depots on a national or regional basis?

3. (Cont.)

d. How many parts depots does your company have? _____

_____

e. Are parts depots at repair depots? _____

_____

f. What impact have parts depots had on productivity improvements in your company?

_____

_____

4. a. Please describe the remote support services that your company offers:

_____

_____

b. Does the customer receive a discount or a premium for using remote support?

_____

_____

c. What systems or products are covered by RSS? _____

_____

d. What was the impact of remote support services on customer support?

_____

_____

e. What trend do you see in remote support? _____

_____

5. a. We have noticed that in the last 2 or 3 years many of the major service vendors have been building up their depot service networks. Do you think that depot service will significantly impact on-site service?

b. Do you offer T/M or contract rates at depots?

c. What products are covered by depot service?

d. What channel of distribution do you use?

e. How do you market depot service?

f. How do you price depot service?

6. a. Users have indicated to us that the number of call-backs has been growing, particularly as the number of experienced FE's has decreased. Is your customer services group tracking the problem of call-backs and, if so, how do you plan to reduce call-backs?

b. What percent of completed fault calls are completed in the first call?

6. (Cont.)

c. What percent of call-backs have you experienced? _____

_____

d. Are you achieving goals for MTTRepair? (Y/N) _____

MTTResponse _____

MTBF _____

System Availability _____

7. a. Software support, in the minds of many users, has already become as important as hardware support. How do you see this trend toward increasing software support requirements affecting your customer services department and what is your department doing to meet these requirements?

_____

_____

b. Does your company offer:

	YES/NO	DESCRIBE
- System Software Support	____	_____
- Application Software Support	____	_____
- Training on Software	____	_____
- Support Centers	____	_____
Regional	____	_____
National	____	_____
- Hotlines	____	_____
- On-Site Support	____	_____
- User Involvement	____	_____
- Software Consulting	____	_____

8. a. Single source maintenance and third-party maintenance is becoming increasingly popular among the large service vendors. Honeywell, DEC, and NAS all have just recently announced major expansions in this area. How do you see this effecting your field service options?

_____

_____

b. Will you offer these services? _____ Describe: _____

_____

c. On what products? _____

d. Please describe TPM or Single Source as it relates to:

- Parts _____
- Pricing _____
- Training _____
- Documentation _____
- Software Support _____

9. a. Customer service is becoming more and more competitive with the growth of TPM, single source vendors, and new service vendors such as AT&T. How is this going to effect your pricing policies for field service?

_____

_____

b. When and why do you change service prices? _____

_____

9. (Cont.)

c. Do you offer discounts for any of these features?

	Yes/No	PLEASE DESCRIBE
- User involvement in Maintenance	____	_____
- User delivery of Plug-in Modules	____	_____
- Relaxed Requirements on Response Time	____	_____
- Remote Diagnostics	____	_____
- Volume Discounts	____	_____
- User purchase of Parts Kits	____	_____
- Invoice Prepayment	____	_____

10. Where do you see field service prices going in the next 2-3 years?

_____

11. Service guarantees such as guaranteed availability and guaranteed response time are an attractive option to many users. Where do you see guarantees fitting into the future role of your field service group?

_____

_____

12. a. Personnel costs are the most significant portion of field service expenditures. Improving staff productivity is one method vendors are using to improve their competitive position in service. How do you measure the field engineer's productivity and do you foresee any major changes in overall service staff productivity?

_____

_____

12. (Cont.)

b. Are FE's becoming more productive? _____

_____

c. Do you measure?

	Yes/No	PLEASE DESCRIBE
- Revenue per Engineer	____	_____
- Personnel per Equipment	____	_____
- Expense to Revenue	____	_____
- Down Time	____	_____
- Number Call-Backs	____	_____

13. Please complete the following personnel matrix:

	SOURCE OF NEW EMPLOYEES	TURNOVER 1983 (Percent)	EXPECTED GROWTH	TOTAL NUMBER
Junior FE				
Senior FE				
Software Support				
Line Manager				
Staff				

14. a. Field service revenues are always a touchy subject, but would you say that FS revenue growth has matched your expectations this year?

_____

_____

b. Was FS department profitable? _____ Please Describe: _____

_____

c. What level of growth? _____

_____

d. What are some of the factors affecting FS growth? _____

_____

e. What were FS revenues? _____

_____

f. What were FS expenses? _____

_____

15. Do you think that the field engineer should be involved in any of these sales or sales-support functions:

	Yes/No	DESCRIBE
- Making Goodwill Calls	____	_____
- Software	____	_____
- Maintenance Contracts	____	_____
- Attending Sales Meetings	____	_____

VENDOR COMPETITIVE ANALYSIS—OFFICE PRODUCTS

ABSTRACT

This report provides competitive analysis of the customer service operations of the major office product vendors in the U.S. Included in the report are three basic sections:

- An analysis of the customer service marketplace, as affected by product technological advances and strategic advances in support of the marketplace.

- Analysis of service operations that reflect the user needs presented in the user requirements reports.

- Analysis of service business trends, including marketing of service as a way of increasing the profitability of service.

The report concludes with in-depth analysis of successful service opportunities in the office product market.

This report contains 105 pages, including 36 exhibits.

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December 1984
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