

SERVICE VENDOR PROFILES

TELECOMMUNICATIONS

INPUT

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SERVICE VENDOR PROFILES
TELECOMMUNICATIONS

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SERVICE VENDOR PROFILES TELECOMMUNICATIONS

ABSTRACT

Service of telecommunications equipment has, for many years, been taken for granted as a result of regulation. With continued deregulation and the divestiture of the Bell Operating Companies by AT&T, however, competition in the market has increased substantially. INPUT estimates that the current U.S. service market for telecommunications products is currently over \$900 million and is growing more rapidly than any data processing service market.

This report studies the service organizations of the top 20 U.S. telecommunications vendors. Each service vendor is analyzed individually in a profile that includes:

- Corporate address and offices.
- Company background.
- Service demographics.
- Detailed analysis of hardware and software support systems.
- Future trends in service.

In addition, the report analyzes a number of service issues of concern to the vendors interviewed. These issues include:

- The effect of product distribution trends on service.
- Increased user involvement in telecom service.
- Third-party telecom service.
- The expanded role of professional services in telecom maintenance.

This report contains 91 pages, including 19 exhibits.



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SERVICE VENDOR PROFILES

- TELECOMMUNICATIONS

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**SERVICE VENDOR PROFILES
TELECOMMUNICATIONS**

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I. INTRODUCTION

I INTRODUCTION

- This report was produced as part of INPUT's 1985 Customer Service Program. It is one in a series of reports in the CSP telecommunications module. Other telecommunications reports include an analysis of user requirements for service and a forecast and trend analysis of the telecommunications service market.
- Telecommunications service is much more diverse than data processing (DP), partially as a result of the vast number of different products in the marketplace and also because of the long-standing dominance of AT&T in the regulated marketplace. Telecommunications equipment service tended to be priced by the number of ports or channels served rather than by specific components within the system as is the case in DP markets.
- As regulatory restrictions began to diminish, new competitors entered the U.S. telecommunications market.
 - By AT&T's standard, these were small companies, but their infusion in the market began to have an impact on service.
 - AT&T continued to maintain a very large, on-site, labor intensive service force, but the new entrants tended to search for less expensive service delivery modes.

- Service through distributors, retail outlets, and return to factory was and is offered by many telecommunications vendors.
- The purpose of this report is to profile the service activities of 20 major telecommunications vendors in the U.S. and to highlight the major differences and similarities that lead to a successful telecommunications service effort.
- The vendors included in this report are listed in Exhibit I-1. Each telecommunications service vendor is described in a standard profile format, including:
 - Company name, address, phone number, principal officers, and 1984 revenue.
 - Corporate and product background information with an emphasis on 1984/1985.
 - Service demographics, such as number of engineers, service officers, and centralized support centers.
 - Service and support, including a description of the company's service plans, participation in specific markets, TPM activities, etc.
- In addition to service vendor profiles, the report addresses service issues of concern to the vendors interviewed. These issues include:
 - The impact of product distribution on service delivery.
 - The expanding role of professional services in telecommunication support.
 - User involvement in telecom maintenance.
 - Third-party maintenance activity in telecommunications.

EXHIBIT I-1

VENDORS INTERVIEWED

VENDOR	LAN	MODEM	MULTIPLEXER	CONVERTER	BRANCH EXCHANGE
Andersen Jacobson		•	•		
AT&T	•	•	•	•	•
Case Communications		•	•		
Dexelcon	•	•	•		
DCA		•	•	•	
Ericsson					•
Executone					•
Fujitsu Business Communications					•
Gandolf Data	•	•	•	•	•
General Datacomm		•	•		

Continued

EXHIBIT I-1 (Cont.)

VENDORS INTERVIEWED

VENDOR	LAN	MODEM	MULTIPLEXER	CONVERTER	BRANCH EXCHANGE
InteCom	•				•
MICOM	•	•	•	•	
Mitel					•
Northern Telecom					•
Pacific Telesis	*	*	*	*	*
Paradyne	•	•	•	•	
Racal-Vadic		•	•		
Rolm					•
Tellabs		•	•		
U.S. West	*	*	*	*	*
Total	8	13	13	7	11

*RBOCs cannot manufacturer equipment, but act as distributors.

A. METHODOLOGY

- Primary research for this study was conducted between October and December, 1985. It included both on-site and telephone interviews. The interviews ranged from 30 minutes to over one hour and frequently resulted in extended callbacks for additional information.
- The questionnaire used for the telecommunications service vendor interview is included in Appendix A.
- Over 165 telecommunications user interviews conducted by INPUT in 1985 were analyzed to identify service performance for each of the 20 vendors in this report.
- In addition to vendor and user interviews, the report is also based on extensive secondary research including analysis of annual reports, 10K reports, and trade press information.

B. DEMOGRAPHICS

- The 20 telecommunications vendors included in this report were selected for inclusion based on a number of factors.
 - Major vendors, such as AT&T, Northern Telecom, and Rolm, were included because of their overwhelming influence in the market.
 - Other vendors were added because of their importance to a particular segment of the market. This category includes companies like DCA and Gandolf.
 - Finally, some vendors are included because of their unique or emerging service operations, such as Pacific Telesis and U.S. West.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- The Executive Summary is designed in presentation format to provide key research findings and observations in a quick and orderly arrangement. The exhibits have been placed on right-hand pages with the corresponding text on the facing page. The format is designed to facilitate use of the Executive Summary as an in-house overhead presentation.

- The telecommunications service market has been in a state of transition for the last 10-15 years. As deregulation moved closer, more unregulated firms entered the market.
 - For these companies, service was often secondary to product sales, and the manufacturers often delegated service to third parties, chiefly distributors.

 - During this same period, the overwhelming industry leader, AT&T, was solidifying its position as the premiere service company in the market.

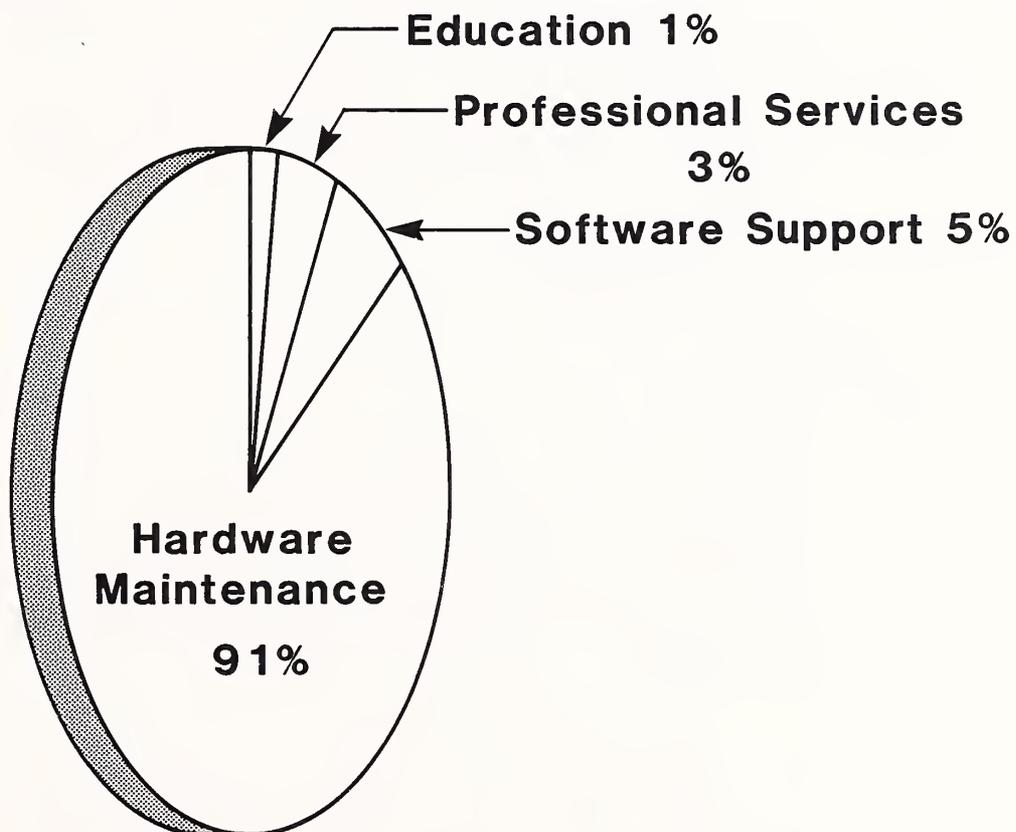
- Since the early to mid 1980s, change in the telecommunications service market has come even more quickly. A number of the "smaller" vendors have begun to recognize the necessity of controlling service delivery channels and are expanding their service networks as a result. AT&T, on the other hand, has been forced to cut back on service as a result of the divestiture of its operating companies.

- The purpose of this Executive Summary is to identify the major factors which are impacting telecommunications vendor service decisions.

A. THE TELECOMMUNICATIONS SERVICE MARKET

- U.S. telecommunications service is a \$920 million market which is almost totally dominated by hardware maintenance. Despite this domination, telecom vendors believe that the most market growth will come in professional services, software support, and education and training services.
- Telecommunications hardware service will continue to produce most of the revenue in this market, but growth will be limited, vendors believe, by three factors:
 - Increased competition will keep hardware service prices down.
 - Growth in remote support will help keep costs down, leading to lower prices.
 - Users will expect lower prices as telecommunications equipment becomes more reliable.
- Major telecom service growth will come in the area of professional services. Vendors feel that system integration, telecom planning, consulting, and facilities management will not only be major revenue producers, but will also be essential to the initial hardware sale. Users, confused by the expanding yet deregulated telecom market, clearly need vendors who can integrate office systems and telecom.
- Software support shows promise, particularly in PBX- and LAN-related services. PBX manufacturers currently have between 75 and 250 software "products" available on their equipment, but as yet have not focused on a distinct strategy to optimize revenues in this area. Vendors also recognize that software support is fundamental to LANs. In both PBX and LAN areas, users have indicated a willingness to pay additional premiums for improved service.

TELECOMMUNICATIONS SERVICE MARKET

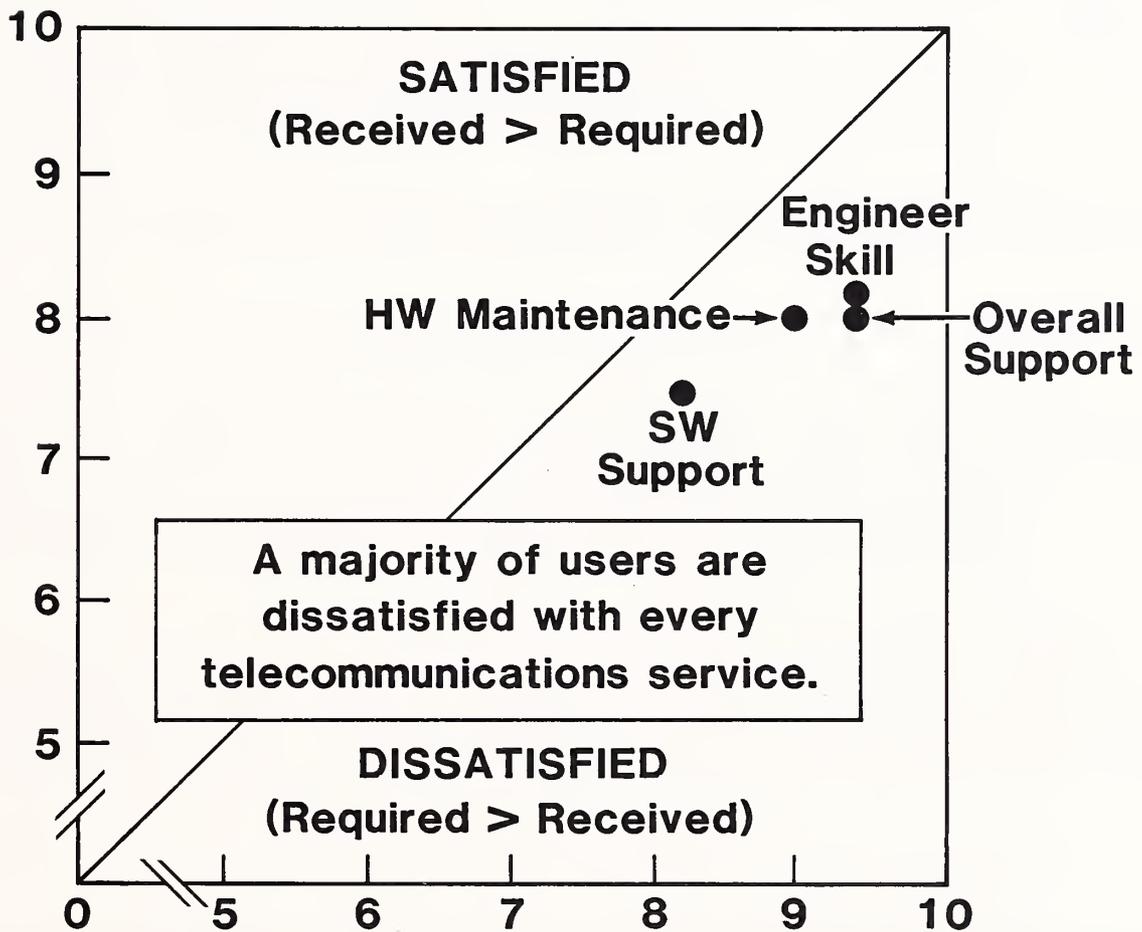


1985 Total: \$920 Million

B. USER SATISFACTION WITH TELECOMMUNICATIONS SUPPORT

- Most users are dissatisfied with the level of telecommunications support they are receiving. Not only are users dissatisfied, but their expectations for service are increasing, which is likely to lead to even higher levels of dissatisfaction in the future.
- Most of the vendors interviewed by INPUT realized the importance of this trend. Increasing levels of user dissatisfaction are likely to have an impact on equipment sales, and vendors will find it difficult to unbundle service contracts and market individual services separately. Perhaps most alarming to telecommunications vendors is the prospect of service competition from third-party maintenance vendors and/or computer hardware manufacturers.
- Although competition in the telecom service market is clearly increasing, telecom vendors insist they have the capabilities not only to keep other vendors out of their market, but, perhaps more importantly, to satisfy user demands for service. Some of the vendors' most potent weapons include control over logistic operations and increasing emphasis on remote diagnostics and support.
 - By developing an efficient logistics operation, telecom vendors believe they can ensure account control by providing the most rapid repair time.
 - Remote diagnostics, which will be proprietary to each vendor, will be essential to improve response time (a major problem area) and at the same time reduce the costs resulting from on-site service.

USER SATISFACTION WITH TELECOMMUNICATIONS SUPPORT



C. TELECOMMUNICATIONS DISTRIBUTION CHANNELS

- The telecommunications industry has developed in a fundamentally different way than the data processing industry. Many telecom vendors relied primarily on distributors to sell their products. The average vendor did not maintain a large sales or service force, but rather depended upon the distributor to perform these functions.
- A number of the telecom vendors interviewed by INPUT are now having second thoughts about depending too much on distributors. Vendors cite three reasons for this re-evaluation: reduced account control, loss of service revenue, and inability of distributors to handle large national accounts.
- Reduced account control is the most pressing problem vendors face in dealing with independent distributors. All of the vendors interviewed sell more than one major product type and would like to expand their accounts as much as possible. When selling through a distributor, the vendor has little or no control over this process since most distributors sell products from a wide variety of manufacturers.
- Loss of service revenue is becoming a second crucial issue to most telecom vendors. Users require a very high level of system availability and consequently value "insurance" on even generally reliable products, such as modems. Vendors recognize that when the distributor does not offer a full complement of services, money is being "left on the table."
- INPUT does not suggest that telecom vendors are about to abandon their distributors. Developing a complete sales and service organization would be far too expensive for most vendors. However, vendors are strengthening their sales and service groups in order to serve large, influential national accounts directly. INPUT believes that service organization development is going to continue as vendors recognize the value of direct delivery of service and support.

TELECOMMUNICATIONS DISTRIBUTION CHANNELS

- **Independent Distributors Used by Almost All Telecommunications Vendors**
 - **Vendors Are Concerned about Loss of Account Control**
 - **For Low-End Products (Modems, Converters), Distributors Dominate Service Revenues**
 - **Manufacturers Are Strengthening Sales and Service Forces, Particularly with Large Accounts**
-

D. TRENDS IN TELECOMMUNICATIONS SERVICE

- The major trend cited by well over one-half of the telecom vendors interviewed is the need to expand service offerings and at the same time reduce the cost of service delivery.
 - Vendors recognize that users are dissatisfied with service, but feel they cannot expand their service networks without the necessary financial backing. Unfortunately, vendors cannot raise their service prices for fear of an adverse reaction from both the user base and the competition.
- This quandary is being relieved by two factors: an increased use of remote support and the growth of user involvement in maintenance. Both of these developments address the crucial problem in telecom service delivery--the high cost of on-site support.
- In many cases, on-site support is not financially feasible. For example, an average \$150 service call to swap a \$300 modem does not make sense. Vendors are learning that by developing an efficient remote support organization, users can be their "hands on-site" for service. There has been minimal resistance by users to an increased role in service, primarily because users appreciate any service improvement and because vendors are enhancing user training.
- A long-term trend in telecom service is the emergence of professional services, including planning, consulting, and systems integration, in telecom maintenance. This trend is being fueled by the current drive to integrate voice and data communications, particularly in the office automation market. Users have clearly identified voice/data integration as a priority area; however, most vendors have not yet addressed the problem by offering the necessary consulting and planning services.

TRENDS IN TELECOMMUNICATIONS SERVICE

- **Increased Remote Support**
- **More User Involvement in Maintenance**
- **Growth in User Requirement for Planning and Integration Services**
- **Service Becomes an Important Selection Criteria as Competition Increases between Telecommunications Vendors**

III COMPANY PROFILES

COMPANY PROFILE

ANDERSON JACOBSON
521 Charcot Avenue
San Jose, CA 95131
(408) 263-8520

Raymond Jacobson, President
1984 Revenue: \$51 Million

COMPANY/PRODUCT BACKGROUND

- Anderson Jacobson (AJ) was one of the early "high fliers" in the telecommunications market, but lately growth has been restricted. AJ introduced one of the first practical acoustic computers in 1967. Today, the company is well known for its modems, multiplexers, and line drivers.
- 1985 has not been a good year for AJ. For the second year in a row, company revenues declined (by 9%), resulting in a net loss of \$2.7 million. The company cites two factors affecting AJ revenues: a rapid decline in lease agreements and the growing popularity of micros replacing the company's terminal products.
- The company's strategy to overcome these losses is to emphasize data communications products, particularly modems and multiplexers. Service has been identified as a key component of AJ's new sales strategy.

SERVICE DEMOGRAPHICS

- AJ has 28 service centers worldwide, with 23 in the U.S.
- There are 106 service personnel in the U.S.
- There are nine districts within two U.S. service regions.
- Parts depots are at both the district and regional level.
- Central repair facilities are in San Jose, CA.

SERVICE AND SUPPORT

- Anderson Jacobson offers a variety of service plans to their users:
 - On-site service (non-contract time and materials (T&M) rates are \$80/hour).
 - On-site exchange (i.e., an AJ service technician will install a "loaner" while the customer's equipment is being repaired).

- Customer carry-in service (available at any of the 23 U.S. service centers).
- Ship-in service to the repair and refurbishment center in San Jose (CA).
- Warranty assistance.
- Parts inventories are centered at San Jose; however, all service centers stock parts according to local contracts and product densities. If the local service center does not have a necessary part, the national center is contacted and parts can be air-expressed as necessary.
- A number of special services are offered by AJ, including:
 - Off-hour emergency service.
 - Extended maintenance coverage periods.
 - System installation.
 - Installation of system upgrades and modifications.
- Anderson Jacobson has been involved in third-party maintenance for over one year for micros, modems, multiplexers, and LANs.
- AJ reports that they believe TPM will be essential in large corporate telecommunications and LAN service accounts. The company currently services products from almost 50 different vendors.

COMPANY PROFILE

AT&T INFORMATION SYSTEMS
15 Speedwell Avenue
Morristown, NJ 07960
(201) 898-3278

Robert Allen, Chairman

COMPANY BACKGROUND

- On January 1, 1984, AT&T divested itself of its operating companies and restructured into two major sectors: AT&T Communications (AT&T-COM) and AT&T Technologies (AT&T-TECH).
 - AT&T-COM provides regulated interstate and interLATA (Local Access and Transport Area) telecommunications service.
 - AT&T-TECH provides primarily unregulated products and services including research and development through Bell Labs, manufacturing through AT&T Technologies, and service via AT&T Information Systems (ATTIS).
 - In addition, ATTIS may provide customer premises equipment.
- As AT&T's service arm, ATTIS is responsible for a very large group of products. On the computer side, ATTIS services everything from AT&T desktop microcomputers up to some of the most powerful redundant super-minicomputers on the market (3B20 line). In the communications area, ATTIS services one of the largest product groupings in the business.

SERVICE DEMOGRAPHICS

- AT&T's Information Systems Service Division installs and maintains communications, computer products, systems, and custom networks for the company. Before divestiture, AT&T had 22 separate operating company service organizations and 350 service districts. Currently, the company has 3 regions and 70 districts.
- To date, telecommunications continues to dominate Service Division activities. The company currently employs 20,000 system technicians (who respond to 35 maintenance and service calls per day). In August 1985, the company announced its intention to eliminate over 24,000 positions in the next 18 months, 8,500 of which are service positions, but even with the cuts, the Service Division's workforce will total 40,000 in more than 1,000 locations--one of the largest in the U.S. The company maintains six regional diagnostic and repair centers, called "Customer Service Support Operations."

SERVICE AND SUPPORT

- Considering AT&T's vast array of telecommunications and computer products, it is not possible to detail all service options here. General service products under the "Service-Plus" offering include:
 - Business Day Service--Monday through Friday, 8:00 a.m. to 5:00 p.m. coverage with a response time of 4 hours for major system failures and 24 hours for minor failures.
 - Around-the-Clock Service--Extends business day service to 24 hours per day, 7 days per week.
 - Dedicated Services--Full-time, on-site service for moves, changes, and emergency maintenance.
 - Time and materials coverage.
- Pricing, of course, will vary by product; however, Service-Plus costs \$3.75 per month per line for larger PBXs and \$1.50 per month per line for the Centrix System.
- In June 1985, AT&T announced Integrated Service Management (ISM), a new service which will include selected TPM services. As described by the company, ISM will offer customers a single point of contact for merging disparate technologies, accommodating multiple vendor systems, designing customer's networks, and administering and managing total service support operations.
- The company has not identified, at least publicly, a list of third-party products which will be serviced under ISM. However, it seems likely that AT&T will select products which result in increased account control rather than products which simply increase service revenues. INPUT believes that AT&T will not service competitive products in either data processing or telecommunications, but will focus on complimentary products leading to single-source control of the user's service contracts.

COMPANY PROFILE

CASE COMMUNICATIONS (formerly Case Lee Schank, General Manager
Rixor Communications) 1984 Revenue: \$200 Million
2120 Industrial Parkway
Silver Spring, MD 20904
(301) 381-2300

COMPANY/PRODUCT BACKGROUND

- Case Communications operates in the United States through its own Rixor operations and in coordination with about 120 distributors in the U.S. and Canada.
 - The company offers a wide range of modem and multiplexer products.
 - Up until the late 1970s, the company had been successful in marketing to independent telephone companies. Since 1979, however, the company has been actively pursuing the end-user market.
- Case offers a variety of modems capable of asynchronous or synchronous transmissions of up to 19.2 kbps. Prices range from under \$300 to over \$10,000. The company also offers a series of statistical multiplexers which can handle from 4 to 240 channels.
- The company is very active in both Europe and Central America, but the United States remains a major market.

SERVICE DEMOGRAPHICS

- Case offers services through 30 offices in the United States and through a number of distributors. INPUT estimates that the company has less than 100 engineers/technicians.
- Spare parts are maintained at all 30 service locations, although most offices are dependent on the central parts depot in Silver Springs. The company spokesman said it was unusual for the end user to maintain a spare parts supply.

SERVICE AND SUPPORT

- As is the case with many modem/multiplexer vendors, Case maintains a relatively small field services group and focuses instead on supporting their distribution network and maintaining a central refurbishment operation.

- Authorized distributors of Case equipment have the option to provide service themselves or through Case.
 - Large network customers frequently require a very high level of expertise and choose to contract for service directly with Case.
 - Distributors frequently handle service at smaller accounts.
- Customers who choose Case services are offered a number of options from which to select. All customers receive access to a toll-free hotline and a problem data base. Diagnostics can be performed at the user's site, remotely from the local service office, or from the central repair depot. Other options include:
 - Factory mail-in, repair/return.
 - On-site repair of equipment (rarely used, according to Case).
 - Customized service offerings (e.g., express parts swapping) which are negotiated on an individual basis.
 - Time and materials coverage is not available from Case, although it is frequently offered by distributors.
- In terms of future trends, Case believes that end users, particularly large organizations, will be forced to maintain in-house service staffs to a much greater extent than now. Telecom manufacturers will not be able to afford on-site service and will fall back on remote support, particularly in the form of advanced diagnostics.
- INPUT believes that Case's strategy of remote support for large customers and local distributor support for small sites is a viable plan in that it protects the installed base from TPM encroachment. However, as users demand higher levels of system integration, they may feel that Case's after-sales support offerings are too limited.

COMPANY PROFILE

DEXELCON ELECTRONICS, INC.
744 Hina Way
Warminster, PA 18974
(215) 443-5450

Peter Cregut, President
Jeff Martin, Field Service Manager
1984 Revenue: \$16 Million

PRODUCT BACKGROUND

- LANs: Dexelnet.
- Modems: DS 5XX series, DS 202D, Model 9XXX series, Model 200-9000 voiceband modems, Model 700 acoustic coupler, DS 541 line driver.
- Multiplexers: DS series (Statistical Time Division).

SERVICE DEMOGRAPHICS

- Dexelcon has seven service locations in the U.S. with a central repair depot at the company's facility in Phoenix.
- INPUT estimates the company has between 20-30 service personnel.

SERVICE AND SUPPORT

- As a relatively small telecommunications vendor, Dexelcon depends a great deal on user self-support; when a problem develops, users call Dexelcon's toll-free hotline (in Phoenix) and generally participate in the diagnostics.
- On-site service is available, according to Dexelcon, on a T&M basis. Most users, however, are willing to swap out modules and mail the failed parts to Dexelcon's repair/return facility. The company charges a flat rate for depot repair which is set according to the product.
- On-site service contracts are available from Dexelcon, but are rarely selected, according to the company's respondent.
- Although Dexelcon sells through a direct sales force, distributors are also used. Not all distributors provide service; those that do typically maintain their own parts supply. The company's technical support center will provide technical assistance to distributors, although remote support is not available at this time.
- Dexelcon has no immediate plans to enter the third-party maintenance market.

- One of the major service-related problems Dexelcon and all small telecommunications vendors must face is how to maintain timely service with regard to response and repair times and at the same time remain profitable. Dexelcon is clearly moving toward increased user involvement in service as a way to reduce on-site service expenditures.
- Improved user service training is key to Dexelcon's attempt to get more users involved in maintenance. The company has indicated that approximately 30% of its users are willing to perform maintenance. To support these users, the company has developed three- and five-day training seminars.
- Centralized support will be essential for Dexelcon if it is to be successful in maintaining low service prices while maintaining high user satisfaction levels.
- INPUT expects Dexelcon to institute remote (part to part) diagnostics in order to improve response time and overall system uptime.

COMPANY PROFILE

DIGITAL COMMUNICATIONS
ASSOCIATES
303 Technology Park
Norcross, GA 30092
(404) 448-1400

Bertil Nordin, President
Richard Dillenback, Director, Customer
Support Division
1984 Revenue: \$51 Million

COMPANY/PRODUCT BACKGROUND

- 1984 was an excellent year for Digital Communications Associates (DCA); revenue increased 137% and net income increased from \$2.5 million in 1983 to \$6.7 million in 1984. Revenues substantially increased as a result of a merger with Technical Analysis Corporation.
- DCA is well known for a variety of microcomputer expansion boards, but the company has been producing telecommunications products for a number of years. These products include:
 - Voicebank modems.
 - Time division, statistical time division, and interface multiplexers.
 - Converters.
 - Communication processors.

SERVICE DEMOGRAPHICS

- DCA currently has 4 field service centers and plans to open 21 centers in the United States.
- The company currently has 85 service employees; however, INPUT believes that this number will increase dramatically as the company expands to provide national support.
- Parts are maintained at all service centers as well as at the national parts depot in Georgia.

SERVICE AND SUPPORT

- Four levels of service contracts are available from DCA:
 - Standard--The emphasis is on remote telephone support via a toll-free hotline. Customers are encouraged to participate in maintenance; however, DCA will provide on-site support at no extra labor charge, but the customer must pay travel charges.

- On Call--Same as Standard coverage, but there is no charge for on-site labor or travel expenses.
 - Special Contracts--Include extended coverage, discounts for user participation in maintenance, planning, consulting, etc.
 - T&M Coverage.
- Training is important to DCA, primarily because of the extensive user self-maintenance programs. Training is usually coordinated by the sales department, but service often participates in seminars.
 - DCA reported that they do not intend to enter the TPM market; however, they do sell and service selected non-DCA equipment that supplements their products--usually in the microcomputer environment.
 - As with many other vendors, DCA believes they must overcome user needs for on-site reponse since rapidly increasing response time and system availability requirements necessitate remote support. The company is moving to increase its centralized remote support capabilities greatly while expanding service locations to ensure adequate parts availability.

COMPANY PROFILE

ERICSSON INC.
7465 Lampson
Garden Grove, CA 92641
(714) 895-3962

Hakan Ledin, President
1984 Revenue: \$3.1 Billion

COMPANY/PRODUCT BACKGROUND

- Ericsson has been a major telecommunications supplier in Europe for over 100 years and opened its first U.S. office in 1902. Currently, the company has switching equipment in over 80 countries and is expanding into the office systems market.
- A number of policy changes were made at Ericsson in late 1985, including the cessation of a joint venture with Atlantic Richfield and the abandonment of the company's microcomputer retail channel. In both cases, the industry slump was cited as a partial cause.
- Ericsson produces two major PBX models:
 - MD 110--A voice/data digital switch, expandable to 12,000 stations. The system is fully redundant, with an average cost per line of \$800.
 - Prodigy--A voice only system with a maximum of 400 stations.

SERVICE DEMOGRAPHICS

- The Ericsson service organization in the United States is pooled for a variety of products including computers, printers, terminals, disk equipment, and PBXs. Because of this pooling of resources, it is difficult to estimate the amount of service resources dedicated exclusively to telecommunications (i.e., PBX) products.
- Overall, Ericsson maintains nine to ten service centers in the U.S., plus six sales offices which provide installation service. In addition, Ericsson's products are sold through a variety of dealers and distributors who also provide service.

SERVICE AND SUPPORT

- Service on Ericsson PBXs, multiplexers, and other telecommunications products is dependent upon the distribution channel used for the product. Service on the MD 110 PBX, for example, is provided through Ericsson because this is a direct sales product. Prodigy service, however, is provided by the independent dealers and distributors selling the equipment.

- Services offered directly by Ericsson include a toll-free hotline, remote diagnostics for both hardware and software, on-site service, and extensive parts supply. User involvement in service is available (via the toll-free hotline), but is not encouraged.
- The company has indicated that while "standard" service packages are available, it is very common for an end user to contract individually for specific services coverage.
- Products that are sold through independent distribution and retail outlets (e.g., Prodigy and several multiplexers) are usually serviced by the distributors. Ericsson will support the distributor with spares and technological advice, but it is the responsibility of the distributor to deal with the end user.
- Ericsson currently does not plan to enter the third-party market and did not report any substantial encroachment by TPM capabilities.

COMPANY PROFILE

EXECUTONE
2 Jericho Plaza
Jericho, NY 11753
(516) 681-4000

John R. Jester, President
1984 Revenue: \$192 Million

COMPANY/PRODUCT BACKGROUND

- Executone is part of Continental Telecom, the \$2.1 billion telecommunications company headquartered in Atlanta, GA. Executone (actually part of the ConTel Business Product Sector) is an independent manufacturer and marketer of telephone equipment, primarily branch exchange and key equipment.
- As one of the nation's largest independent marketers of telephone equipment, Executone sells and services a wide variety of PBXs.
 - Echelon series: voice/data with up to 111 stations and 30 nonblocking channels.
 - Eclipse series: up to 992 maximum stations, totally nonblocking channels.
 - Enterprise: 250 nonblocking channels, 960 stations.
 - E1200 series: introduced in 1974, 145 nonblocking channels.
 - E400: its most current machine, the 400, can have 440 stations on 290 nonblocking channels.
 - UTX series: over 5,000 stations, totally nonblocking.
 - Vista: voice-only switch with 238 maximum stations.

SERVICE DEMOGRAPHICS

- Executone has 260 service locations in the U.S. All service locations stock parts and dispatch locally.
- INPUT estimates that the company has 25,000 service personnel overall (this figure includes ConTel service personnel).

SERVICE AND SUPPORT

- Because of Executone's commitment to large end users, the company offers a variety of contract and unbundled service offerings. Users are encouraged to participate in service via the company's toll-free hotline and to maintain a limited on-site parts supply.
- User involvement in maintenance is facilitated by a passive alert system installed in most Executone PBX systems.
 - The "black box," as described by Executone, is installed with the system to monitor both hardware and software problems.
 - The system can be supported and tested from remote locations, and, for software problems, fixes can be downloaded.
- For users preferring on-site support, Executone offers a number of different contracts and is very flexible in mixing services to meet individual user needs.
 - Users frequently mix mail-in, T&M, and on-site services, according to Executone.
 - T&M service is charged at \$56/hour for both hardware and software.
- Service for Executone equipment is provided at virtually every point in the distribution channel, including Executone service locations, the parent company (Continental Telecom), and "associated" manufacturers, such as Northern Telecom. Executone reported that they will service products manufactured by "associated" companies, but this is designed to meet the needs of present customers rather than the desire to enter the third-party maintenance market.
- Remote diagnostics and a full service product offering are key to its future success, according to Executone. The company believes users will become much more demanding of service and that manufacturers who cannot deliver the necessary service performance and options will be at a distinct competitive disadvantage.

COMPANY PROFILE

FUJITSU BUSINESS COMMUNICATIONS
3190 Mira Loma Avenue
Anaheim, CA 92806
(714) 630-7721

Jose Reines, President
1984 Revenue: \$31 Million



COMPANY/PRODUCT BACKGROUND

- Fujitsu Business Communications (FBC, formerly American Telcom) was formed in 1976 and is known for its Focus PBX system. These products include:
 - Focus, a voice/data digital switch with up to 164 trunks and 1,960 maximum stations (totally nonblocking).
 - Focus 100, a voice-only analog switch with 110 maximum stations.
 - Focus 50, a voice-only analog switch with up to 62 stations.
- The company is headquartered in Anaheim (CA), which is the central location for engineering, manufacturing, logistics, and service.

SERVICE DEMOGRAPHICS

- FBC has approximately 200 series locations including both corporate and distributor service sites.
- All dealers and sales/service offices are required by FBC to stock parts. The company's central parts depot is in California.
- INPUT estimates that FBC has 50 service employees in the U.S.

SERVICE AND SUPPORT

- Organizationally, Fujitsu Business Communications is divided into three geographic "areas." Each area has a number of regions, which in turn have a series of dealers. FBC has 80 independent dealers.
- Independent dealers are frequently the first level of contact for the end user requiring service. Accordingly, FBC has gone to considerable lengths to ensure a high quality of service delivered at this level.
 - All potential dealers are screened for financial stability.
 - Dealers are required to stock a certain level of parts.
 - Factory-trained service personnel are required at the dealer's site.

- If the local dealer cannot solve a service problem, they can call FBC's central support group in California and, if the problem persists, FBC will send technicians on-site. FBC reports that over 90% of all software modifications and fixes are done remotely, although software can also be supported by mail.
- The company is in the process of strengthening its national service organization by setting up Regional Sales Service Offices (RSSOs). These offices, which are owned and operated by Fujitsu, are designed to support both end users and local dealers. INPUT believes that FBC's goal is to exert more control over the service delivery through RSSO expansion.
- Because Fujitsu is dependent on independent dealers to provide service, the company acknowledges there is a potential for TPM encroachment.
 - FBC has attempted to prevent nonauthorized dealers from servicing their equipment by withholding parts.
 - The company has indicated that a number of large end users are already authorized service-only dealers, which has prevented any substantial TPM encroachment.
- FBC indicates it believes increased user self-maintenance and centralization of support, particularly remote support, are key trends in the industry. The company reports it intends to emphasize these areas in order to ensure a higher quality of delivered service and to maintain user satisfaction levels.

COMPANY PROFILE

GANDOLF DATA
1019 S. Noll Avenue
Wheeling, IL 60090
(312) 541-6060

Alan Melkerson, President
1984 Revenue: \$60 Million

COMPANY/PRODUCT BACKGROUND

- Gandolf Data is a subsidiary of Canada's Gandolf Technologies. Both companies were established in 1971. The company's principal product lines include modems, multiplexers, private automatic computer exchanges (PACX), and data PBXs.
- The company has identified its PACX as one of its major products. Over 2,500 units have been installed worldwide, with the U.S. being the largest market (54%). The latest version of the PACX, the 2000, is totally software-based and can handle up to 896 subscriber modes. Other Gandolf products include:
 - Modems: Gandolf offers over 40 different models of modems, including limited distance from under \$300 to voiceband modems costing over \$1,000.
 - Multiplexers: The company manufactures time division, statistical time division, and interface multiplexers.

SERVICE DEMOGRAPHICS

- Gandolf has 12 service offices in the U.S. and expects to add two additional offices in 1986. The company has approximately 50 service employees in the U.S.
- Parts are stocked in all remote offices. End users occasionally negotiate for on-site spare storage.

SERVICE AND SUPPORT

- Unlike many other telecommunications vendors, Gandolf has not committed itself to outside distributors either for sales or service. While the company does use manufacturer representatives, this practice is declining as products become more complicated and markets more interrelated.
- Because Gandolf has accepted most of the service responsibility, support options are well defined. After the normal year warranty, users can select from a variety of on-site contracts, including 5 day/8 hour, 7 day/24 hours,

and time and materials. On a special quote, users can also contract for a full-time, on-site service technician.

- If, as is usually the case, the user does not require on-site service, Gandolf offers a variety of remote services.
 - The company maintains a 24-hour hotline (not toll free).
 - Remote diagnostics is currently used, except where security is a problem.
 - When the problem is diagnosed, the company offers an "Express Loaner" service to get spares to the user by the next day.
- Software support, particularly in Gandolf's proprietary operating systems software, is a major service focus. The company can simulate most problems remotely. Although downloading is possible, the company said that patches, fixes, and upgrades are normally sent in a diskette.
- Third-party maintenance encroachment has not been a problem for Gandolf. In fact, the company is currently servicing OEM equipment, although this appears to be primarily designed to maintain customer satisfaction.
- In terms of long-term trends, Gandolf sees no consistent pattern between products, although the user's increased reliance on service seems to be growing rapidly. INPUT expects Gandolf to continue to develop their own service and logistics network, particularly in the U.S. where demand is highest.

COMPANY PROFILE

GENERAL DATACOMM INDUSTRIES
Route 63
Middleburg, CT 06762
(203) 574-1118

Dr. John C.W. Taylor, President
1984 Revenue: \$146 Million

COMPANY/PRODUCT BACKGROUND

- General Datacomm was formed in the late 1960s and is currently experiencing one of its most profitable years.
 - Sales in 1984 (\$146 million) increased 70% over 1983, and net income increased 222%.
 - Growth has resulted not only from market expansion, but also from deregulation of the telecommunications industry.
 - In 1984 alone, General Datacomm signed agreements with 4 Regional Bell Operating Companies and 15 Local Bell Operating Companies.
- General Datacomm makes and services:
 - Communication processors: Netcon-6.
 - Modems: Datacomm and the LocoModem series.
 - Multiplexers: MUX/Verter, 1150, MegaMux series.
 - Test equipment: Bert 901.

SERVICE DEMOGRAPHICS

- The company has:
 - Fifty-two service locations, each stocking parts.
 - One repair depot (in Connecticut).
 - Nine service districts in the U.S.
 - An estimated 100 field engineers in the U.S.

SERVICE AND SUPPORT

- General Datacomm (GD) offers service through 52 service centers (which are technically staffed) and inventory return depots. On-site repair calls are dispatched from these 52 centers with an average four-hour response time.
- Initial problem calls are made via GD's 24-hour, toll-free hotline. This centralized support (located in Connecticut) offers technical advice and remote diagnostics. Software downloading can be done from this central support facility.
- Service offerings range from 8x5 basic coverage (8 hours per day, 5 days per week) to an extended 24-hour coverage. The end user "bundles" as much support as is required.
- GD believes that remote support, user participation in service, and depot repairs will be essential to maintaining reasonably-priced service.
- Service on all General Datacomm equipment is the company's responsibility, even when GD authorizes an independent distributor to sell the equipment.
 - The physical repair function is centralized in the Connecticut technical center, while the 52 service centers offer primarily parts replacement and on-site technician dispatching.
 - On-site technical support is becoming less significant with the advent of sophisticated remote diagnostics. Support for systems is shifting from intermediate repair depots/service centers to either end of the distribution channel; i.e., the centralized technical support center and the customer's system site.
- General Datacomm reported it is not involved in repairing other vendor's equipment and has experienced little or no encroachment from competitive TPM vendors.

COMPANY PROFILE

INTECOM INC.
601 Intecom Drive
Allen, TX 75002
(214) 727-9141

Erik Ringkjob, President
1984 Revenue: \$79 Million

COMPANY/PRODUCT BACKGROUND

- InteCom was incorporated in Texas in 1978 and shipped their first "Integrated Business Exchange" (IBX) in 1981. Although the company has a relatively small market share (estimated at under 2%), it has substantial financial backing and its products have been well received in the marketplace.
- As with many other PBX manufacturers, InteCom has been active in integrating their equipment into the traditional data processing environment.
 - HP and Wang, for example, have designed DP products to be compatible with the company's IBX. Wang, in particular, has initiated a joint development and technology exchange program.
 - An integrated voice/data terminal called Keystone is the first result of the InteCom/Wang cooperation agreement. Wang owns approximately 20% of InteCom.
- The company makes and services:
 - Private branch exchanges: IBX S/10, S/80.
 - LANs: LANmark.

SERVICE DEMOGRAPHICS

- INPUT estimates that InteCom has 130 employees in field operations.
- The central repair and support facility is in Allen (TX).
- The company has three depots (on the east and west coasts and in Texas).

SERVICE AND SUPPORT

- InteCom distributes its PBX products through two channels: direct sales and outside distributorships (e.g., RBOCs). InteCom products sold through distributors must be supported by the distributor, although InteCom will provide limited support (chiefly in parts and technical specs) to distributors.

- A number of service plans are available to InteCom customers:
 - On-site support by an InteCom technician.
 - InteCom will train a customer's technician and then provide support via remote diagnostics and accessibility of technical staff. The technical support center is available on a 7x24 basis and can access all InteCom systems.
 - The customer may agree to maintain an InteCom system during designated shifts while InteCom's technical support center will monitor the system at all other times.
 - The customer can take the major responsibility for system maintenance, yet access the technical support center by phone.
- As with many telecommunications vendors, InteCom has emphasized its central repair depot.
 - Customers are required to maintain replacement parts on-site in order to avoid extended downtime.
 - The company's three regional service centers maintain large inventories and support users directly.
 - The central parts source is at the company's manufacturing facilities in Texas.
- Both sales and service competition are a major concern to InteCom. The company believes that customers are becoming more sophisticated in identifying major service issues, particularly response time and reliability. This concern has obviously motivated the company to stress higher levels of user interaction in service than are normally seen in other sectors of the telecommunications market.

COMPANY PROFILE

MICOM SYSTEMS
4100 Los Angeles Avenue
Simi Valley, CA 93062
(805) 583-8600

William Norred, President
1884 Revenue: \$133 Million

COMPANY/PRODUCT BACKGROUND

- MICOM was organized in 1973 and is currently a leading producer of modems, multiplexers, connectors, and LANs. The company is well known for producing user friendly products such as the Micro 800 Data Concentrator, which was recently upgraded to 32 channels to allow for greater end-user savings.
- MICOM products include:
 - Modems: The company has a number of products ranging from under \$100 up to the 16.8K bps Micro 4000 selling for over \$6,000.
 - Multiplexers: Micro 200, 800, and 900 statistical time division products are most popular.
 - Concentrators: Micro 800 and 8000 range from \$1,000 to \$7,000.

SERVICE DEMOGRAPHICS

- MICOM has 11 service locations in the United States and 1 central repair depot (in California).
- All service locations stock parts, with a central depot in California.
- INPUT estimates the company has just over 130 total service staff, with one-third in the field.

SERVICE AND SUPPORT

- MICOM offers four delivery modes for service.
 - On-site service may be contracted for Monday through Saturday, 10 hours per day. This contract includes installation and field upgrades. Users may negotiate for dedicated field engineers.
 - Users may opt for MICOM's centralized repair depot. Failed components are shipped to the company's California headquarters for refurbishment. For a premium, the user can select an express replacement service for 24-hour turnaround.

- More sophisticated users frequently use time and materials coverage in conjunction with a toll-free hotline.
- User maintenance involvement is relatively common, according to company officials. MICOM will sell the user spares and provide telephone support via the service hotline.
- Since MICOM products are sold through distributors, service is frequently delivered by non-MICOM agents. This is particularly true for unbundled services such as training and consulting. MICOM supports the distributors in much the same way as it does end users; i.e., telephone support, on-site service, parts supply, and the repair/refurbishment depot.
- MICOM expressed only a limited interest in third-party maintenance and then only as it relates to "strategic partnerships." The company currently has an agreement with DEC whereby the minicomputer manufacturer will service MICOM products at DEC sites. MICOM has expressed interest in developing other third-party relationships.
- Although strategic partnering may be effective at large sites dominated by one vendor, INPUT believes that MICOM will be forced to continue to develop their own service organization. Although a leader, the company is involved in a number of very competitive markets (e.g., modems) and will need service to differentiate itself from its competitors.

COMPANY PROFILE

MITEL CORPORATION
350 Legget Drive
P.O. Box 13089
Kanata, Ontario K2K1X3
(613) 592-2122

Terence Matthews, President
1884 Revenue: \$343 Million

COMPANY/PRODUCT BACKGROUND

- Mitel, the Canadian-based company with U.S. headquarters in Boca Raton (FL), is the world leader in private automatic branch exchanges (PABX) that carry fewer than 100 lines.
 - In 1984, however, the company registered its first major loss (\$32 million) since its founding in 1973,
 - In May 1985, British Telecom proposed to buy 51% of Mitel but, as of this printing, the deal has not been closed.
- The company's problems center around the development of the SX2000 PBX.
 - Mitel had traditionally concentrated on small hotel and office PBX installations sold and serviced through supply houses and interconnect companies. The SX2000, however, is capable of handling up to 10,000 lines and uses a new technology (bubble memory).
 - Problems bringing the SX2000 to market have resulted at least partly in the cancellation of a lucrative deal with IBM, layoffs of manufacturing personnel in Canada, closure of manufacturing facilities in both the U.S. and Canada, and the \$32 million loss.

SERVICE DEMOGRAPHICS

- Service on Mitel equipment is provided primarily by distributors; however, the company does maintain ten service locations in the U.S. The service groups (located in Florida, California, Colorado, Texas, Illinois, Virginia, Georgia, and New York) all stock parts.
- INPUT estimates that Mitel has approximately 80 service employees in the U.S., with 5 to 6 in each service location and 20 at the company headquarters in Boca Raton.

SERVICE AND SUPPORT

- As mentioned above, most direct service for Mitel equipment is provided by distributors, but Mitel will provide telephone support from any of its ten service locations to both end users and distributors. The company has a sophisticated dispatching and remote support operation which will automatically switch a call from a busy office to the central support center in Boca Raton.
- Mitel offers on-site service, but according to company officials, this is not extensively used.
- Users are expected to become involved in service and maintenance. Mitel will train customers to become qualified service technicians, after which the customer is capable of performing maintenance such as swapping modules, running diagnostics, etc.
- Because Mitel had sold primarily to small sites (under 100 lines), user parts storage was not feasible.
 - In most cases, distributors maintained the necessary parts supply with added support from Mitel service locations.
 - Larger systems, such as the SX2000, will no doubt require on-site spares, and therefore INPUT expects much more logistics cooperation between Mitel and end users in the future.
- Although Mitel has contracted for RCA Service to distribute and service the top-of-the-line SX2000 PBX, INPUT believes that Mitel will be forced to develop a much more elaborate service network if it is to compete successfully against companies like Rolm and Northern Telecom.

COMPANY PROFILE

NORTHERN TELECOM
33 City Centre Drive
Mississauga, Ontario L5B3A2
(416) 275-0960

Edmund Fitzgerald, President
1984 Revenue: \$4.4 Billion

COMPANY/PRODUCT BACKGROUND

- Northern Telecom is one of the largest manufacturers of telecommunications equipment in North America and is the largest supplier of fully digital telecommunications systems.
 - The company operates 27 manufacturing plants in Canada, 14 in the United States, and 1 each in Ireland, Brazil, and the U.K.
 - NT has 47,000 employees worldwide and 15 research facilities in the U.S. alone.
- U.S. operations accounted for \$2.8 billion in 1984, equalling almost 64% of NT worldwide revenue. In addition, U.S. revenue increased 51% between 1983 and 1984. Growth in the U.S. market resulted from a number of factors.
 - Sales to Bell Operating Companies more than doubled.
 - DMS central office switching system sales increased 77%.
 - SL PBX revenue grew 43%.
- Major product lines include:
 - DMS switching equipment, introduced in 1977 as one of the first fully digital central office switching systems, which has generated over \$3 billion in revenue.
 - SL 1/100 series of voice/data PBXs which can be configured with up to 30,000 stations.
 - SL 10 packet switching processors.

SERVICE DEMOGRAPHICS

- Northern Telecom offers both direct service and service through a wide variety of distributors including independent carriers, Bell Operating Companies, and, for smaller systems, independent interconnect organizations.

- The company has service locations in 25 major U.S. cities in addition to a number of "sub-branches." Spare parts are stocked at every service office.
- A national service support center is available to provide initial support to dealers and distributors. In addition, two emergency technical assistance centers can provide more detailed technical support.

SERVICE AND SUPPORT

- Five levels of service coverage are available from NT.
 - Basic Coverage/Labor Only provides for on-site support, but users must pay extra for parts. A contract specifies 48-hour response times for routine problems and 3-hour responses for emergency problems.
 - Basic Coverage includes all of the above plus the cost of any repair materials.
 - Standard Maintenance includes all of the above plus improved response times (24 hours for routine, 2 hours for emergencies).
 - Premium Service includes all of the above plus extended services; e.g., management reports, remote changes, etc.
 - Time and Materials are charged on a per-call basis.
- Most large system users opt for NT service. According to the company, there are an estimated 100 end-user sites with resident NT service personnel on-site during the principal period of maintenance. Smaller accounts typically depend on distributor or dealer service.
- Remote support is available from local service offices and through the emergency technical assistance centers. This includes "Permanent Remote Diagnostics" in major cities. Remote downloading is available for software support, but the company prefers to mail tapes of fixes and upgrades to customers.
- User involvement in maintenance has been limited primarily to small systems.

COMPANY PROFILE

PACIFIC TELESIS
140 New Montgomery Street
San Francisco, CA 94105
(415) 542-9000

H.T. Jones, President, PACTEL
Communications
1984 Corporate Revenue: \$7.8 Billion

COMPANY BACKGROUND

- Pacific Telesis, like all Regional Bell Operating Companies (RBOCs) is trying to establish its own presence as a service vendor for telecommunications and data processing equipment. In order to do this, the company has set up two "sister" organizations.
 - PACTEL Communications (Walnut Creek, CA) is charged with selling and servicing larger PBX switches and high-end computer systems.
 - PACTEL Infosystems, introduced in early 1985, concentrates on selling microcomputers and key telephone systems to small business.
- Because Pacific Telesis established two service organizations, one would expect a high level of cooperation, but INPUT believes that does not yet exist. Infosystems and Communications have remained independent and, in some situations, competitive organizations.

PACTEL INFOSYSTEMS SERVICE

- Infosystems has generated a great deal of interest as a result of their growing retail chain and as a result of the company's purchase of the Byte Northwest Computer shop chain. These retail outlets sell and service a number of products including:
 - PCs: Apple (MacIntosh), IBM PC, Compaq.
 - LANs 3 Com.
 - Telcom: Hayes modems.
 - Key: TIE.
- Service is prominently displayed in each retail outlet. Infosystems services include:
 - Technical Support Plan--a toll-free hotline available six days per week, electronic mail access to the Technical Support Group with a guaranteed four-hour response, and INFOLETTER documentation.

- . Users can opt for a limited number of hotline calls (25) for \$395 per year or 50 hotline calls for \$695 per year.
- On-site service contracts.
- Customized training and consulting.

PACTEL COMMUNICATIONS SERVICE

- Communications, as noted above, sells and services larger PBXs and computer systems including the Northern Telecom SL-1 PBX (supporting up to 31,000 stations). Also supported are Data General minicomputers, terminals, and printers as well as General Datacomm multiplexers and PBXs from GTE and InteCom.
- The service organization at PACTEL Communications is geographically distributed throughout California and Nevada and can be accessed via a toll-free hotline. Local engineers are dispatched from the company's central support facility in California.
- INPUT estimates that Communications has approximately 300 technicians in the California/Nevada service area.
- Future trends for the unregulated end of Pacific Telesis service depend largely on the success of the Infosystems retail outlet and the level of cooperation between the Infosystems and Communications groups. Large end-user acceptance will be dependent on the company's ability to provide service for both large and small systems as a single commodity.

COMPANY PROFILE

PARADYNE CORPORATION
8550 Ulmerton Road
P.O. Box 1347
Largo, FL
(813) 530-2000

Robert Wiggins, President
1984 Revenue: \$290 Million

COMPANY/PRODUCT BACKGROUND

- Paradyne produces a variety of telecommunications and data processing products including terminals, communication processors, modems, multiplexers, and converters.
- 1984 was an extremely good year for Paradyne.
 - Revenues were up 39% over 1983, and net income was up 203%.
 - Installation, maintenance, and operating lease revenues increased \$12.3 million or 25% in 1984.
- 1985 has not been as good a year as 1984. Declining equipment shipments resulted in a \$9.2 million loss in the second quarter. In August, Paradyne announced that most employees would be required to take six unpaid vacation days during the balance of 1985. The company laid off approximately 200 employees in June.
- Specific products include:
 - LDM series of modems ranging from 1,200 to 19,200 baud.
 - DCX series of multiplexers offering up to 240 channels.
 - 790 and 990 series of connectors.
 - Analysis front-end processors.

SERVICE DEMOGRAPHICS

- The Paradyne service organization is broken out into 5 regions, 20 districts, and 134 field offices. The company maintains seven parts and repair depots, with the national depot in Largo (FL).
- Overall, INPUT estimates that Paradyne has just under 800 service employees, about 60% of whom are field engineers/technicians.

SERVICE AND SUPPORT

- Paradyne offers four levels of service:
 - On-site Contract includes prime shift but may be extended up to 24x7. This contract also offers guaranteed response and repair time.
 - Depot Contract guarantees a three-day turnaround. The customer ships the subassembly or the whole unit to one of seven local depots.
 - On-Site Time and Materials.
 - Factory Service where the user performs most of the maintenance. Paradyne charges a flat fee for repairs on modules.
- The company maintains an extensive training program for in-house staff and end users. In addition to general instruction in how to use Paradyne products, actual repair training is offered.
- While many consulting functions remain bundled, Paradyne has unbundled a new service called Network Management Service. Paradyne will place a person at the user's site to manage large networks. Users of smaller networks depend on the remote support available on most Paradyne products.
- Unlike many other telecommunications vendors, Paradyne is investigating third-party maintenance.
 - The company has indicated that it will support a Paradyne customer with "coexisting" foreign peripherals.
 - End users are generally required to arrange for spares, but Paradyne will perform module swaps on products such as teletype machines, laser printers, and tape drives.
- The company reported that they want to be thought of as a Total Support provider rather than a TPM vendor.

COMPANY PROFILE

RACAL-VADIC
1525 McCarthy Blvd.
Milpitas, CA 95035
(408) 946-2227

Kim Maxwell, President
1984 Revenue: \$90 Million

COMPANY/PRODUCT BACKGROUND

- Since the early 1970s, Racal Vadic has been a leader in the data communications market, introducing one of the first full duplex 1,200 bps modems in 1973. In addition to multiplexers, the company also produces data compressors, error controllers, and retail transaction telephones.
- Racal-Vadic produces a number of statistical time division multiplexers and modems. The "Scotsman" series of multiplexers, for example, can be configured with up to eight channels with a transfer rate of up to 9,600 bps.
- The company produces a wide variety of modems ranging from the Model 300V (300 baud, automatic answer, priced at under \$300) to the VA4000 series (up to 4,800 baud, self-testing, alternated voice/data, priced at \$1,500).

SERVICE DEMOGRAPHICS

- Racal-Vadic has:
 - Seven service locations (two in California, one each in Texas, Illinois, Maryland, New Jersey, and Massachusetts).
 - Two repair depots (California and Maryland).
 - Parts stocked at each service location.
- Racal-Vadic has an estimated 45-50 technicians/engineers.

SERVICE AND SUPPORT

- Racal-Vadic believes that the industry is leaning toward remote diagnostics coupled with mail exchange/repair of parts in order to reduce on-site service expenditures. The company believes that increasing user technical sophistication as well as advances in remote support will be instrumental in providing more cost-effective service options.
- Service calls are initiated via a toll-free hotline. The caller is directed immediately to a technical service person.

- On-line diagnostics, testing, and analysis are available with users typically mailing in the failed part for repair.
 - An emergency exchange option is available for users who require a 24-hour turnaround (versus a 7- to 10-day turnaround for normal exchange).
 - R-V has indicated that while it has no specific policy for users stocking parts, this is common among large end users.
- The company attempts to offer a wide variety of services ranging from on-site (when required) to mail-in to T&M on a per-call basis. Non-contract time and material rates are \$75/hour with a two-hour minimum.
 - As with many other telecommunications manufacturers, Racal-Vadic sells primarily through their own sales force, but also uses distributors on a limited basis. R-V offers their distributors an "out-of-box" guarantee policy for 30 days after the system has been installed. During this time, the distributor may replace any defective product from stock. Beyond this 30-day period, service is provided by R-V's technical support staff exclusively.

COMPANY PROFILE

ROLM CORPORATION
4900 Old Ironsides Drive
Santa Clara, CA 95054
(408) 986-1000

Kenneth Oshman, President
Robert Finocchio, Director,
Customer Support
1984 Revenue: \$700 Million

COMPANY/PRODUCT BACKGROUND

- Rolm has been a major telecommunications switch manufacturer since the mid-1970s when the Computerized Branch Exchange (CBX) was first introduced. In November 1983, the company introduced the CBX II, a voice/data digital switch with up to 12,000 stations maximum.
- Probably the most significant long-term change at Rolm is its acquisition by IBM in late 1984. The \$1.26 billion deal (which necessitated the sale of Rolm's Mil-Spec computer division) overshadowed the introduction of a number of new products, including the Cedar personal communications computer and the Juniper communications card for the IBM PC.
- Rolm's commitment to support is based in part on the complexity of their products. Robert Finocchio, Director of Customer Support, estimates that Rolm has over 250 software products and that almost 40% of all Rolm employees are engaged in customer support.

SERVICE DEMOGRAPHICS

- Estimated number of Customer Support employees: 3,500.
- Estimated number of Service Centers: 66 (not including 12 independent distributors).
- Parts available at all Service Centers.
- Remote support: Each system is polled daily from a central location.

SERVICE AND SUPPORT

- Rolm offers six basic maintenance plans:
 - Standard service includes Monday through Friday, 6:00 a.m. to 6:00 p.m. service, access to the Rolm Operation Center (ROPS) dispatching, remote diagnostics, and work to completion.
 - Extended 127 service includes all of the above options extended to seven days per week.

- Extended 247 includes all of the above options in addition to 7 days per week, 24-hour coverage.
- Dedicated on-site engineer.
- Time and Materials/Per Visit charged at \$95 the first hour and \$65 the second hour during normal coverage hours.
- In addition, a number of options are available including VIP Response (1.5-hour response time for a 20% premium), Rapid Response (\$250 for a three-hour response to all calls), and Customer Participation (25% discount).
- Remote support at Rolm is centered in California and includes a central data base containing a detailed service history of each client machine. As noted, each system is polled daily to check errors that are recorded during continuous self tests run internally. Rolm reports that remote diagnostics are a major reason for a 99% problem resolution rate at the local level.

COMPANY PROFILE

TELLABS, INC.
4951 Indiana Avenue
Lisle, IL 60532
(312) 969-8800

Michael Birck, President
1984 Revenue: \$95 Million

COMPANY/PRODUCT BACKGROUND

- Although net sales at Tellabs increased over 12% between 1983 and 1984, earnings before taxes actually declined by 3% to \$22 million; 1984 cannot be considered a banner year for the company. However, growth for this modem and multiplexer manufacturer has been substantial over its 11-year history.
- Although the company has been somewhat slow in bringing out new products, new systems based on the T-1 standard are now being released. Some of the company's current products include:
 - Dataplexer series of multiplexers ranging from \$2,000-8,000 and up to 9,600 bps transfer rate.
 - T-Plexer, a 128-channel multiplexer.
 - 310 Datavoice modem with up to 9,600 bps transmission rate.
 - 30/0 line driver.
 - 450 T-Coder, a voice multiplexer for transmission on T-1 carriers.

SERVICE DEMOGRAPHICS

- Tellabs is dependent upon its distribution system to perform most service. The company maintains six regional service offices in the U.S. INPUT estimates that each region has five to six personnel.
- Regional locations and independent dealers stock parts. No repairs are done at the regional offices, rather parts are shipped to headquarters for repairs.

SERVICE AND SUPPORT

- Tellabs is primarily interested in selling networks rather than service as a specific product. The company indicates that any service it provides is generally through default, because the distributors or dealers could not meet customer expectations.

- Tellabs' distributors offer their own service plans and users frequently participate in maintenance as well. Tellabs' field application engineers and technical marketing services group offer "backup support" when necessary.
 - This support is primarily through telephone assistance in conjunction with "Replace/Repair/Return" service done by FE staff in the field.
 - All repairs are done in Illinois, and all service locations must stock parts.
- Tellabs offers a service contract to their end users through 3M. A Tellabs respondent noted, however, that very few customers "slip through" to an external contract; most users either care for their own service needs or are covered by the distributor.
- When Tellabs is called for service, FEs are typically dispatched from one of six offices in the U.S. The technician does not perform any repairs on-site, but will replace the product temporarily and return the defective part for repairs. The main plant in Illinois provides a 24-hour turnaround time.
- When the part is repaired, it is returned to the distributor who reinstalls it at the user's site.

COMPANY PROFILE

U.S. WEST
7800 E. Orchard Road
Englewood, CO 80111
(303) 793-6630

John Jester, President
1984 Revenue: \$7.3 Billion

COMPANY/PRODUCT BACKGROUND

- U.S. West is the \$7 billion conglomeration of three Bell Operating Companies (Mountain Bell, Northwestern Bell, and Pacific Northwest Bell) that provides telephone service from Iowa to Washington, Arizona to Minnesota. Overall, the company's primary coverage includes, but is not limited to, 14 western states.
- Although U.S. West has the smallest revenue of the seven RBOCs, it has been among the most active.
 - The company has restructured its unregulated sales effort to emphasize markets over specific products.
 - The reorganization combined Interline, the company's service group, with Firstel, the regional marketing organization, to form U.S. West Information Systems. The subsidiary sells and services a number of DP and Telecom products:
 - IBM and Grid computers.
 - General Datacomm modems and multiplexers.
 - TIE, NEC, InteCom, Siemens, and MICOM PBXs.

INTERLINE SERVICE AND SUPPORT

- Interline is viewed as U.S. West's primary service unit which, when coupled with Business Sales and Service, provides systems integration capability. Interline has 45 branch offices in 36 states with over 900 employees (56% of whom are technicians). A few of the 45 locations are strictly service offices, but most serve as both sales and service sites.
- Interline sees itself as a multivendor telecommunications services company.
 - Although they do sell some equipment (usually changes, additions, and upgrades), this is not their business.

- They offer installations, maintenance support, cabling (a substantial component of their business), and some consulting on a variety of PBX and key systems.
- As U.S. West begins to sell data processing equipment and local area networks, Interline will support these products as well.
- U.S. West Information Systems' strategy is for the telecommunications sales and service business to grow first rather than concentrating on retail sales of data processing products.
 - While microcomputers, such as the Grid, are available from U.S. West, they are sold primarily as terminals rather than independent standalone units.
 - The company will continue to stress its role as a systems integrator rather than a retail outlet for DP hardware.
- This sales and service strategy is in sharp contrast to other RBOCs, such as NYNEX, PACTEL, and Bell Atlantic. These vendors have been very aggressive in developing a retail network and as a result have often ended up with two service organizations. PACTEL's Infosystems and Communications and Bell Atlantic's Sorbus and Information Products and Services group are two examples of the divergence of service organizations which has taken place at other RBOCs.
- INPUT believes that U.S. West's and Interline's strategy is a good one in that it emphasizes the company's strengths during this period of confusion resulting from divestiture. In the long run, however, the goal of systems integration will force the Denver-based company to radically expand services related to data processing, particularly in the key areas of planning and consulting.

IV SERVICE ISSUES

IV SERVICE ISSUES

A. PRODUCT DISTRIBUTION AND ITS EFFECT ON SERVICE

- Telecommunications maintenance vendors, as a group, have been more concerned with shipping a product than establishing an efficient and profitable service organization.
 - Many of the smaller telecom vendors willingly transfer the service function to their distributors or independent retail sales organization in order to concentrate on the business of manufacturing equipment.
 - Typically, the manufacturers support the distributor with technical assistance, spare parts, and a factory repair/return plan.
- This relationship between manufacturer and distributor was more than adequate as long as competition was not too intense. Users were happy just to have access to the new technology these companies were introducing; service was definitely a secondary issue.
 - Currently, however, competition has increased and users are looking not only for innovative products, but also reliable products that can be serviced quickly with little or no impact to the system.

- Vendors are beginning to appreciate that service and support are becoming points of product differentiation between vendors.
- Exhibit IV-1 demonstrates the type of problem faced by many telecommunications vendors.
 - Telecom users are reporting on average six interruptions per month, 130% more interruptions than the average large system (computer) user.
 - Average repair time is 22 hours, twice what users expect and over 400% worse than computer users report. Although telecom users say that the average system is available 95% of the time, user requirements and expectations are so high (99+%) that even this performance fails to satisfy users.
- Essentially, users are telling manufacturers that the current method of delivering service is inadequate. This point is not lost on any of the vendors interviewed by INPUT. Telecom vendors are looking for new ways to improve service without changing the fundamental structure of the distribution network which has worked well until recently.
- Exhibit IV-2 describes the two tiered distribution channels used by most telecommunications manufacturers.
 - Smaller vendors depend primarily on the independent distributor for sales and service.
 - Distributors will stock parts, support retail sales and service, or supply end user support directly.
- The distributor for the smaller manufacturers provides an invaluable service because most of the manufacturers would not be able to afford a direct sales

EXHIBIT IV-1

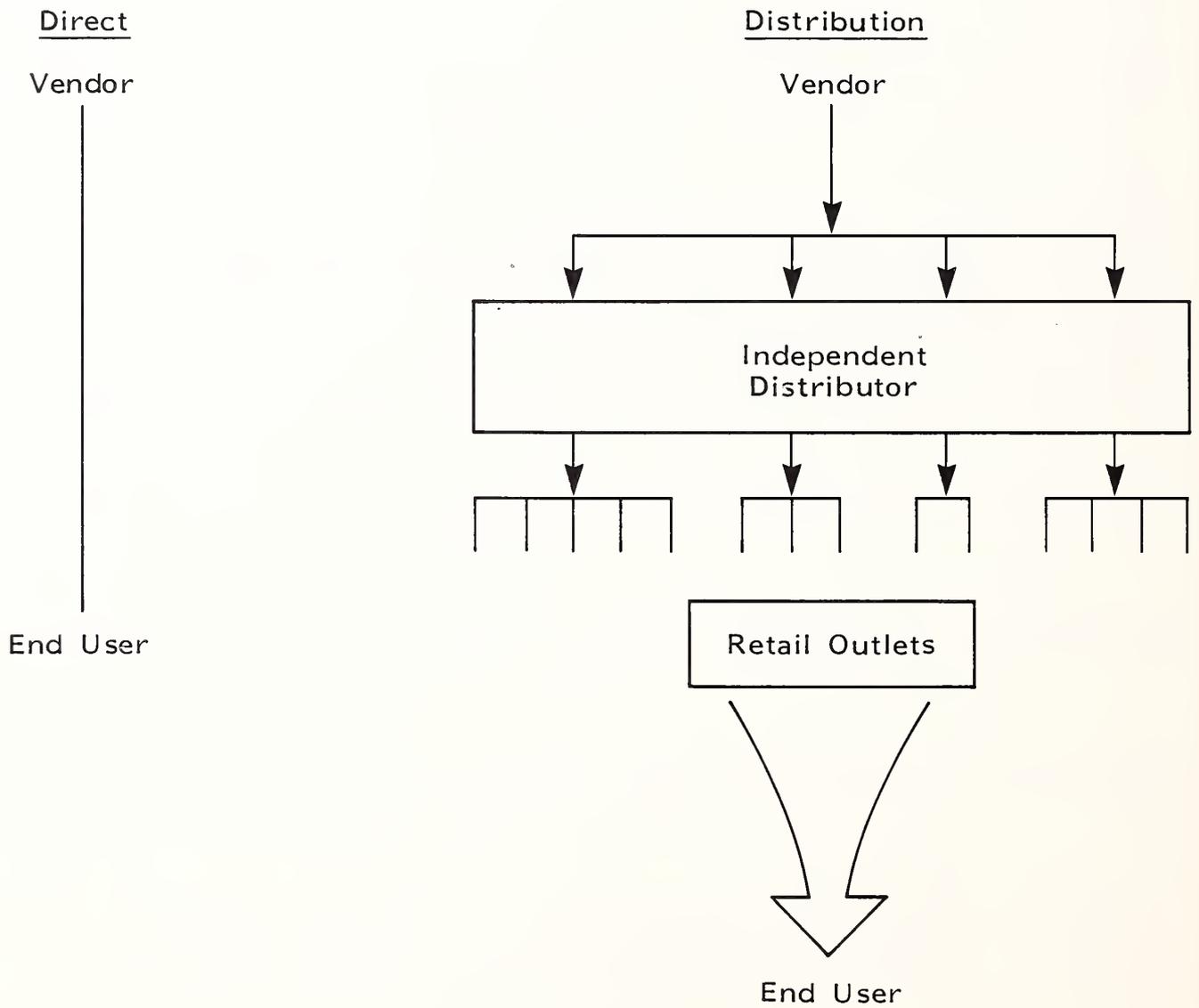
TELECOMMUNICATIONS VENDOR PERFORMANCE BELOW USER EXPECTATIONS

- Telecommunications users report almost six interruptions per month.
- Average repair time is 22 hours, twice what users expect.
- Average system availability is high (95%), but below user expectations (99%).

EXHIBIT IV-2

TELECOMMUNICATIONS DISTRIBUTION CHANNELS

Most vendors use two distribution channels, direct to large end users and through distribution for small end users.



and service organization. Even the larger telecom vendors use distributors in order to access specialized markets. AT&T, for example, will sell through the Regional Bell Operating Companies to reach the (now independent) local telephone companies.

- Over 80% of the vendors interviewed by INPUT have at least a limited direct sales and service force in addition to their distributors.
 - Typically, this direct sales/service group will support large or very sophisticated users who require services beyond the capabilities of the distributor.
 - This may include a national organization that could not be served adequately by a regional distributor or an end user whose technical requirements in areas such as system integration or new product development exceed the distributor's abilities.
- As noted above, telecom vendors cannot afford to do away with independent distributors, nor do they want to. In most cases, the vendor would like to improve support levels in the most cost-efficient manner, and usually this means working with the distributor. However, vendors are looking for new ways to compliment and enhance this service as well.
- Telecom vendors realize that in many cases they must address user complaints for service directly rather than working through the normal service distribution channels.
 - Manufacturers are much more inclined to deal directly with users to identify problems and develop solutions. In some cases, this strains the relationship between the manufacturer and the distributor.
 - One vendor reported that it was their company's policy to eliminate independent representatives over the next five to seven years because the distributors refused to carry the necessary supply of spare parts.

- Other companies are establishing their own sales and service groups as sales districts become available.
- A number of telecom vendors report they are becoming much more demanding of distributor accountability, as shown in Exhibit IV-3. This includes not only an adequate parts supply as determined by the manufacturer, but also adequate training to support the vendor's product line. Training, as discussed below, is a crucial growth area in telecom service.
- Not all relations between distributor and manufacturer are adversarial, however.
 - Almost all vendors said they intend to develop improved remote diagnostics and support in order to help the distributor (and, of course, the vendor) supply improved response and repair time.
 - Also, manufacturers are utilizing modular system design in order to promote rapid parts swap rather than repair.
- In the long run, INPUT believes that modular design and remote support will assist the manufacturer in bypassing the distributor in service delivered directly to the end user.

B. USER INVOLVEMENT IN TELECOMMUNICATIONS SERVICES

- Although user expectations for telecom services are increasing at an alarming rate, their willingness to pay higher service prices has been practically nonexistent.

EXHIBIT IV-3

ENHANCING TELECOMMUNICATIONS SERVICE

- Users are dissatisfied with service not because vendor performance has declined, but because the user's expectations are increasing rapidly.

- Vendors are addressing user complaints directly:
 - Distributors are required to be more accountable
 - Stocking parts
 - Technician training
 - Exclusive product agreement
 - Increased remote support
 - Modular system design encourages direct user / manufacturer interaction

- To a certain extent, this is understandable; products are more reliable and equipment costs for comparable performance have fallen dramatically.
- Users feel they are being generous in not expecting service prices to fall at a similar rate.
- As might be expected, telecom vendors feel a high level of frustration with this attitude since their costs for service are, in fact, increasing substantially. On-site service in general and labor costs specifically are ruinous to most vendor plans to expand services.
- While vendors have made some strides in reducing on-site expenditures with remote diagnostics and support capabilities, as well as with modular systems, they recognize that without a person on-site to perform basic tasks, the effectiveness of modular design and remote support would be highly limited.
- The vast majority of vendors interviewed by INPUT feel that the end user may play an important role in on-site telecommunications support. As Exhibit IV-4 demonstrates, almost all vendors interviewed indicated that they had a program to assist the user in providing service on their equipment.
 - All but one vendor provided a support hotline to the end user (this vendor does provide a hotline for distributors).
 - In addition to diagnostics initiation, a significant number of users install their own equipment and are willing to swap modules themselves.
- Telecom users appear to be much more willing to participate in maintenance operations than their counterparts in data processing. INPUT believes this is because of two factors:

EXHIBIT IV-4

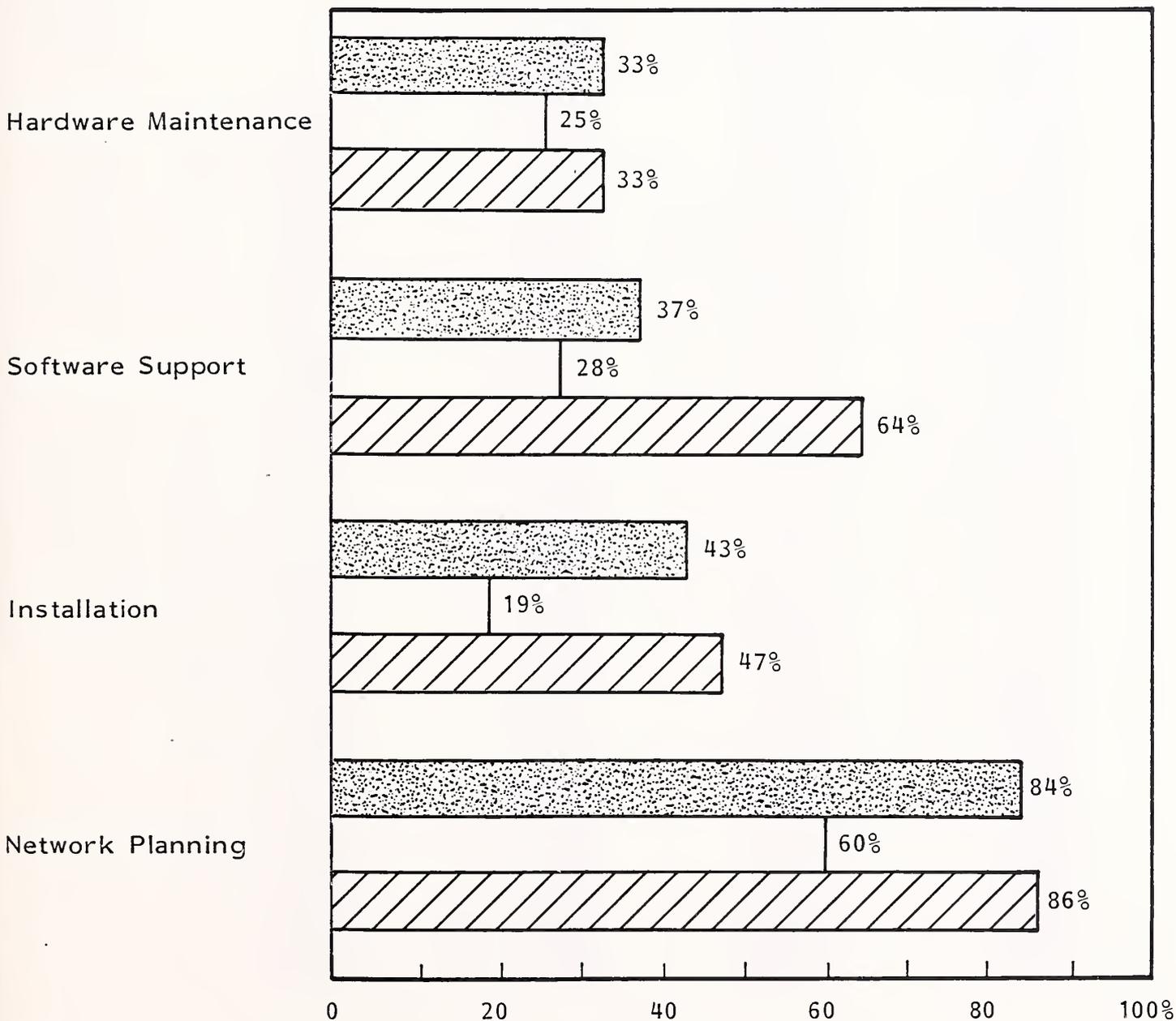
USER INVOLVEMENT IN TELECOMMUNICATIONS SERVICE

<ul style="list-style-type: none">● 100% of the vendors interviewed said that users did (or could) become involved in telecommunications maintenance.	
MOST COMMON USER ACTIVITIES	VENDORS REPORTING (Percent)
Phone Support Hotline	95%
Initiating InterCal Diagnostics	80
Equipment Installation	45
Mail-in Modules	30

- Many telecom users, particularly large organizations, were forced to develop in-house service capabilities because these services were not externally available.
- Telecom products are generally less expensive than DP equipment and users are less wary of damaging their entire system.
- A majority of users are currently involved in some type of telecom support, as shown in Exhibit IV-5. As the exhibit demonstrates, PBX users are the least likely to be involved in maintenance while network users exhibit the most amount of in-house support.
- INPUT expects continued user involvement in telecom support, particularly for less expensive products such as modems, multiplexers, and converters.
 - Vendors have been very active in designing alternative maintenance plans such as mail-in/exchange programs, delivering service module swaps, and subsidized spare parts plans for these products.
 - Users have accepted these plans as the most cost effective service delivery method for noncritical products.
- Service on products which are critical to system availability, such as PBXs and LANs, is typically much more important to the end user.
 - The user is much less willing to become involved in actual maintenance and/or support.
 - Vendors recognize user resistance to servicing these types of equipment and have developed more extensive (and expensive) on-site support options.

EXHIBIT IV-5

IN-HOUSE SUPPORT BY PRODUCT AREA



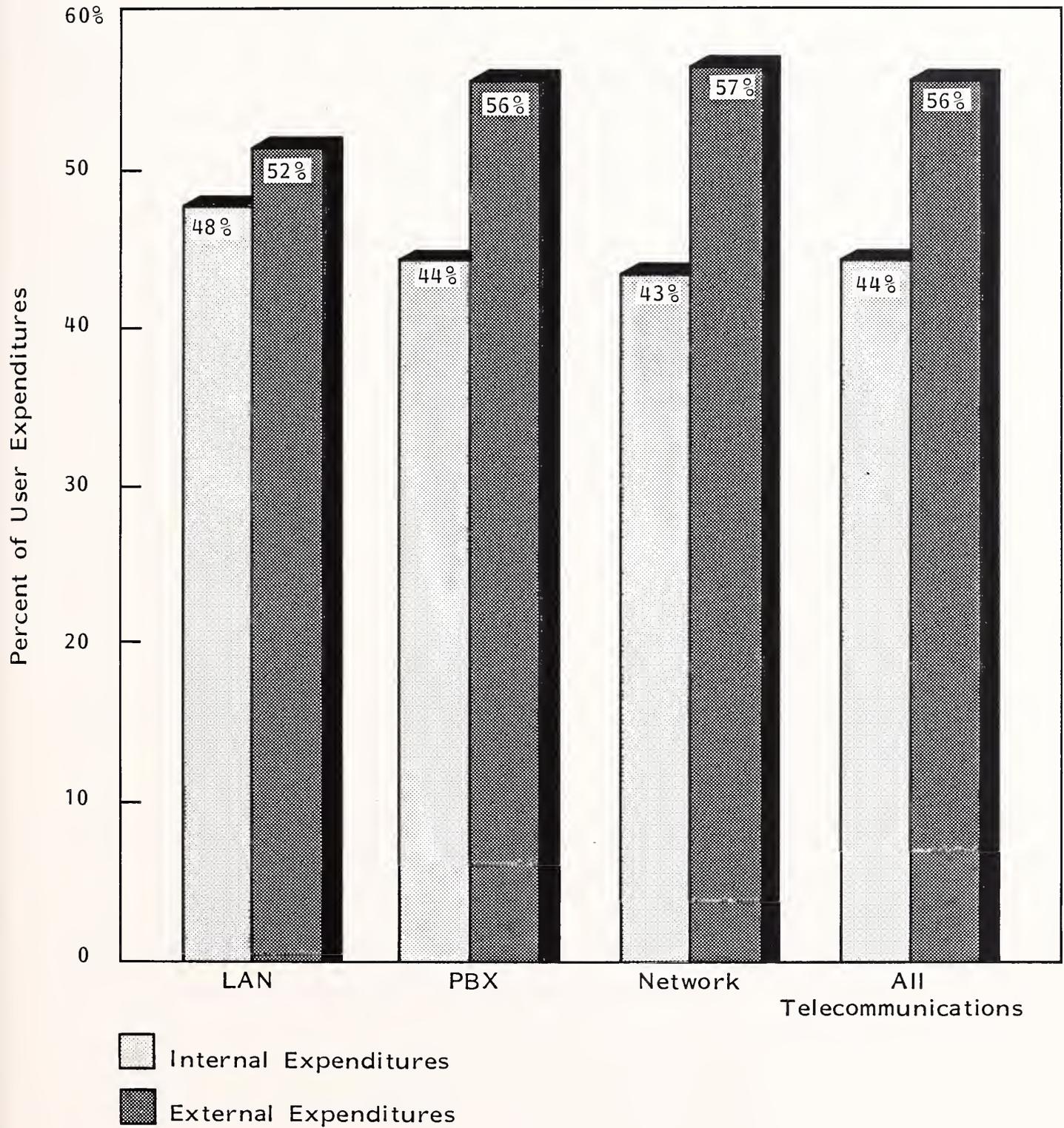
-  LAN
-  PBX
-  NET

Percent of Support

- The two-tiered support policy developed by telecom vendors has been somewhat successful in meeting most customer needs for service. All vendors interviewed have segmented their market to ensure that the proper service marketing strategy is available for each type of user.
- INPUT believes, however, that vendors are not taking full advantage of the service market opportunities that currently exist. As Exhibit IV-5 demonstrates, a very high percentage of users are involved in some level of service. INPUT feels that vendors are "leaving money on the table" when they lose revenue as a result of user self maintenance.
- Exhibit IV-6 shows the percentage of internal versus external service expenditures as reported by telecom users. The exhibit demonstrates that, in terms of service revenue, the telecom vendor's chief competition is the end user. LAN users, for example, spend almost an equal amount on internal and external service.
- When the telecom market was relatively small and underdeveloped, internal service expenditures were a minor concern to most vendors. However, as the market approaches \$1 billion and is growing at almost 30% a year, vendors have become concerned that the user's practice of supporting telecom products internally is having a dramatic effect on the vendor's bottom line.
- LAN vendors are most concerned about the trend in user self-maintenance.
 - Frequently, these vendors are forced to address support in a multi-vendor hardware environment.
 - In addition, the user expects extensive planning and installation support, cabling, and education/training.
 - As users develop an expertise in these support areas, their expectations for vendor-delivered service increase accordingly.

EXHIBIT IV-6

TELECOMMUNICATIONS USER INTERNAL VERSUS
EXTERNAL SERVICE EXPENDITURES



- User self-maintenance most seriously threatens telecom vendors in the area of planning, as shown in Exhibit IV-7.
 - Seventy-seven percent of telecom planning is performed in-house, essentially out of the vendor's control.
 - Of course, a certain level of in-house planning is to be expected; however, in areas such as needs and capacity analysis and project implementation, the telecom manufacturer is at a definite disadvantage if they have no impact until the end of the planning cycle.

- Software support is an area in which telecom users have been forced to develop their own internal support mechanism or do without support. This is particularly hard on many telecom vendors because the type of software support developed internally is the most profitable for software vendors. Users tend to concentrate internal software service in three general areas:
 - Support mechanism to correct user-related errors.
 - Internal programming staff to develop custom applications.
 - Education and training.

- These three software areas are among the most common and profitable for vendors to support.
 - Approximately 65% of the vendors interviewed who provide software support maintain "problem" data bases for software support.
 - Although none of these vendors offered end users access to this data base, it is commonly consulted by technicians for solutions to user problems.

EXHIBIT IV-7

IN-HOUSE SUPPORT OF TELECOMMUNICATIONS EQUIPMENT

SERVICE COMPONENT	SERVICE DELIVERED BY:	
	IN-HOUSE*	MANUFACTURER / TPM*
Hardware Maintenance	31%	81%
Software Support	44	64
Installation	36	78
Network Planning	77	31

*Answers will exceed 100% due to multiple responses.

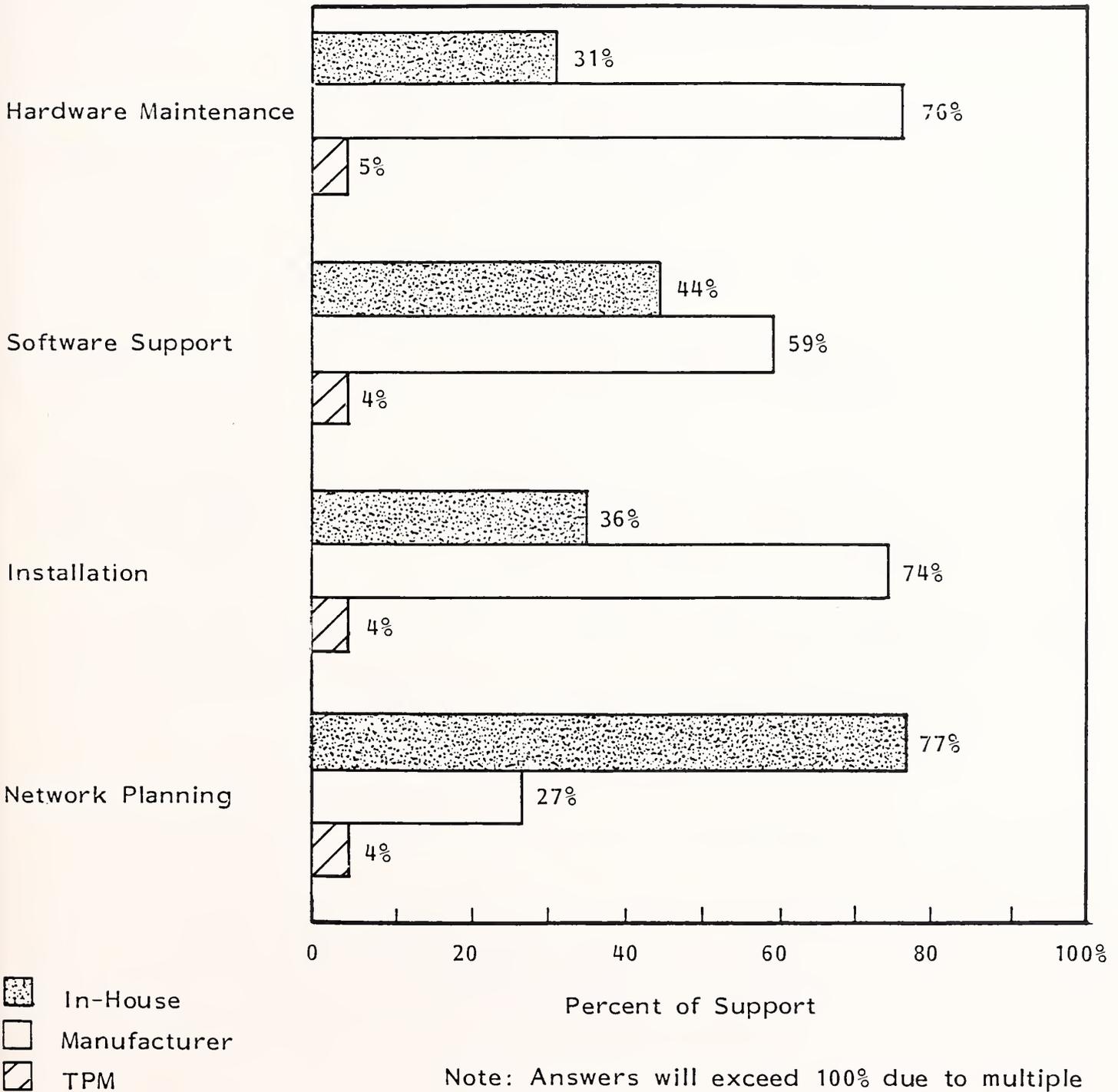
- Education and training is a second potentially profitable support area in which many users have become involved. Vendors are particularly concerned about loss of control in this area because it effects the end-user population over which capitalization and initial expenditures for education "products" can be distributed.
- Eight in ten telecom users depend on the manufacturer or distributor for hardware services. Vendors indicate they expect between 15-20% of all users will opt for self-maintenance. These are primarily large user sites that have a factory-trained service staff.

C. THIRD-PARTY MAINTENANCE IN THE TELECOMMUNICATIONS MARKET

- There was very little concern with third-party maintenance (TPM) by the telecom vendors interviewed by INPUT.
 - The vast majority of vendors (75%) said they did not perform maintenance on other vendors' products, and an even higher percentage (80%) said they had no third-party maintenance competition.
 - Forty percent of the vendors, however, said they were considering third-party maintenance in order to satisfy their customers or to increase service revenue.
- The vendor attitude is born out by user responses regarding TPM. As Exhibit IV-8 demonstrates, only 4% of all end users receive telecom support from a TPM vendor. Users said that the vast majority of telecom service was provided by the manufacturer or developed internally.

EXHIBIT IV-8

TELECOMMUNICATIONS SUPPORT SERVICE DISTRIBUTION



Note: Answers will exceed 100% due to multiple responses by individual users.

- One of the main reasons that telecom vendors feel so secure in their ability to exclude TPM competition is their high level of account control.
 - The telecom vendor typically controls parts supply, software source code, technician training, etc.
 - In addition, although the installed base is increasing rapidly for many vendors, the number of available accounts has not yet reached the breaking point for many TPM vendors.

- Although it is clear that TPM has not yet made any substantial progress in the telecom market, INPUT believes that opportunities exist for TPM to take hold and expand. The conditions which favor TPM growth include:
 - High levels of user dissatisfaction with vendor-supplied services.
 - A rapidly expanding service market (both in terms of installed base and revenue).
 - An emerging philosophy among data processing TPM vendors that they must support telecom equipment in order to offer single-source service.

- The high levels of user dissatisfaction are discussed in previous sections, but it is worth noting again that a majority of telecom users are dissatisfied with virtually every service area.
 - Critical areas include response and repair time, problem escalation, and field engineer skill level.
 - Repair time, for example, is twice what users expect. Telecom vendors who generally have limited geographic resources simply cannot meet user expectations.

- Although TPM vendors may not have the necessary telecom technical expertise, they generally can offer excellent geographic coverage. Vendors like TRW, Sorbus, and CDC maintain large staffs (TRW has 3,000; Sorbus, 1,800) and address response and repair time issues very effectively.
- Telecom service market expansion is another reason TPM vendors may be entering the market. Exhibit IV-9 demonstrates that although the TPM market for telecom products is currently rather small, it is growing rapidly.
 - The market for telecom service from TPM vendors is expected to grow at 31% annually through 1990.
 - Overall, the telecom service market is growing at 28% annually, the fastest of all product categories in the U.S.
 - This growth rate will certainly attract TPM vendors from other service product areas, such as mainframes, which is growing at 4% annually, or minicomputers, growing at 15% a year.
- TPM vendors have begun to enter the telecom market, as shown in Exhibit IV-10. Although the overall products covered are limited, INPUT believes that as TPM vendors expand their service coverage to include true single-source coverage, the growth in telecom services will be substantial. Growth will come primarily in:
 - PBXs.
 - LANs.
- PBX service will be essential to TPM vendors or hardware manufacturers who participate in the office systems market. This market subset will be particularly important as integration of voice/data communications continues.

EXHIBIT IV-9

TPM TELECOMMUNICATIONS SERVICE
1986-1990

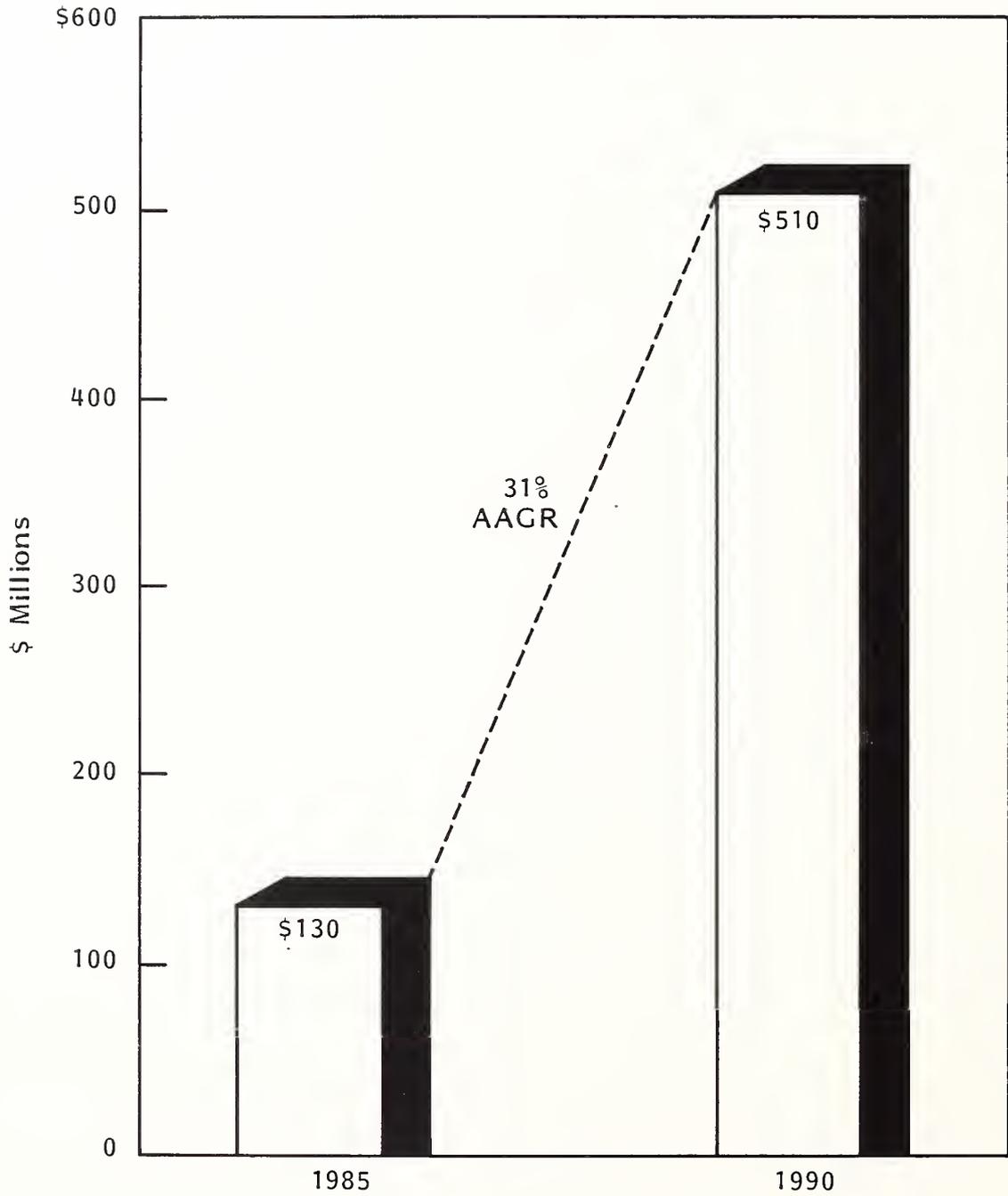


EXHIBIT IV-10

TPM VENDORS PROVIDING TELECOMMUNICATIONS SERVICE

65% of the top 100 TPM vendors provide service to at least one telecommunications product.	
TELECOMMUNICATIONS PRODUCT	PERCENT OF TOP 100 TPM VENDORS' SERVICES*
Modems	47%
LANs	24
Front End/Network Processors	18
Satellite Earth Stations	6
PBX/Key Systems	6
Multiplexers	3

*Answers will exceed 100% due to multiple responses.

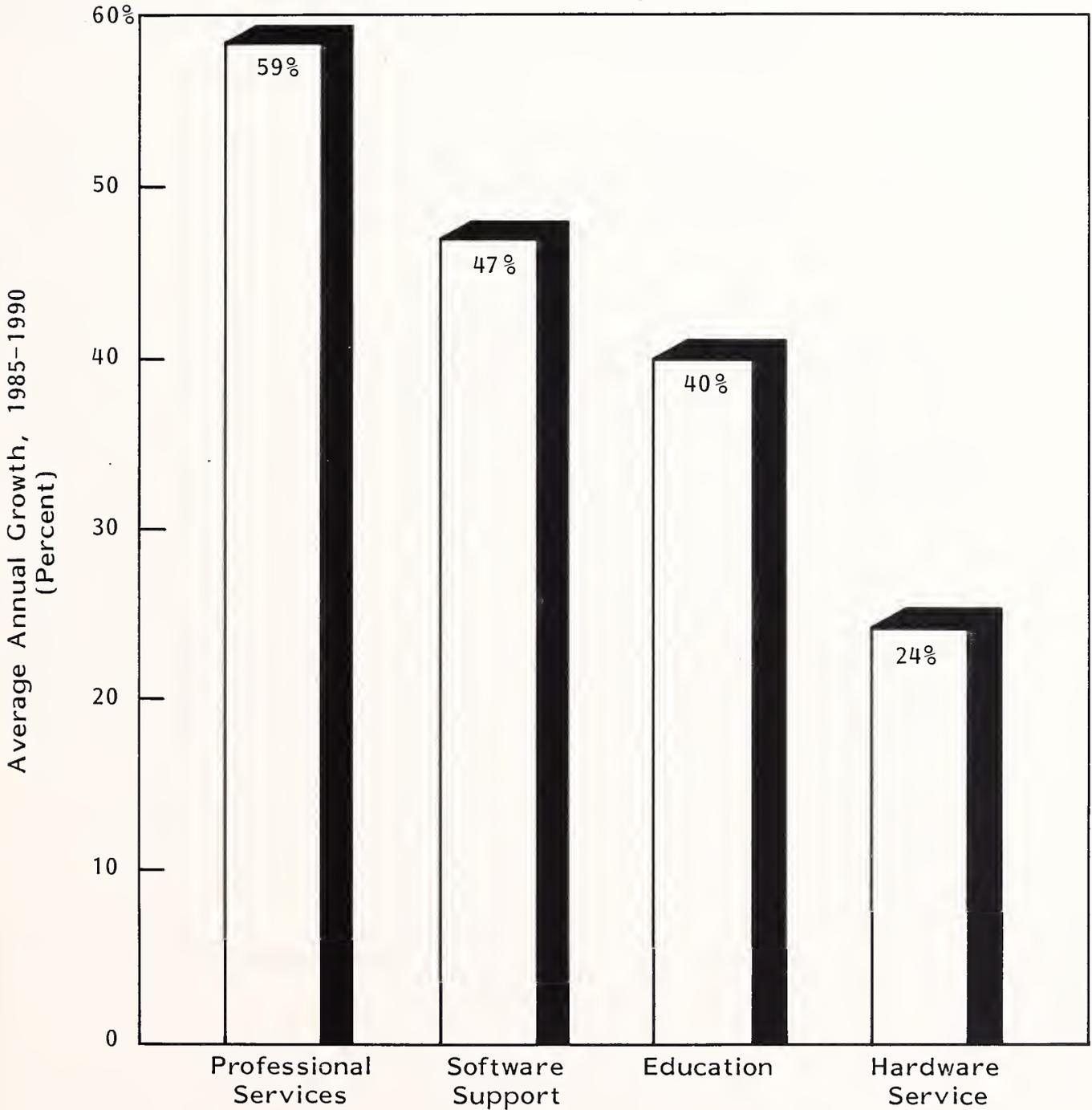
- LANs are currently supported by 24% of TPM vendors, but INPUT expects this number to increase as more data processing hardware manufacturers begin to service multivendor user sites.
 - LAN users have been very demanding of improved service, particularly with regard to hardware maintenance.
 - Service in a multivendor environment is a strength of TPM vendors--a strength which INPUT believes the TPM vendors will exploit in order to enter this submarket.

D. EVOLUTION OF TELECOMMUNICATIONS SERVICE

- Telecommunications service is growing faster than any data processing service category in the U.S.
 - At an average annual growth rate of 28%, INPUT projects that telecom service will generate over \$3 billion in revenues by 1990.
 - In addition, service of telecommunications equipment will play a pivotal role for vendors who stress account control and single-source service.
- Although telecom service will grow rapidly, INPUT expects a substantial variation in the types of services offered.
 - As Exhibit IV-11 demonstrates, INPUT believes that telecommunications hardware service will experience the slowest growth rate of all telecom services.

EXHIBIT IV-11

TELECOMMUNICATIONS SERVICE GROWTH, 1985-1990



- This growth will be limited for several reasons:
 - Vendors are unbundling many hardware services (e.g., planning and consulting).
 - With regard to the drive to reduce on-site expenditures, many vendors are relying on increased remote support and user self maintenance--both of which limit traditional hardware expenditures.
 - User demand for non-hardware services, such as system integration, project implementation, and training, has increased to a much greater extent than for hardware services.
- Exhibit IV-12 demonstrates that although all surveyed vendors still offer on-site service, a growing number are depending on service alternatives. These include remote support offered by 100% of the vendors interviewed, mail-in service by 50% of the vendors, and increased user self-maintenance (100% of the vendors).
- It is significant that 40% of the vendors interviewed said that they were investigating third-party maintenance. INPUT believes that at least several of these vendors will enter TPM in order to better utilize their field service staffs, which were underutilized as a result of slow growth in telecommunications hardware maintenance.
- Hardware service growth will also be limited by user expectations for lower hardware service prices.
- As noted, users believe that service prices should fall as a result of lower hardware prices.

EXHIBIT IV-12

SERVICE DELIVERY

- 100% have Remote Support Hotlines (80% are toll free).
- Remote diagnostics available on 65% of products (this is rapidly growing).
- On-site service available from 95%. All vendors offer on-site service through dealers or distributors.
- End-user factory mail-in repair/refurbishment available from 50%.
- 40% say they now perform or are considering third-party maintenance on other vendors' telecommunications/ data processing equipment.

- Users resist higher service prices by increasing use of T&M, mail-in, and end-user self-maintenance service options.
- Although telecom users are price sensitive when it comes to hardware service, INPUT believes that they demand much higher levels of non-hardware support and are willing to pay substantial premiums for those services. Premiums are restricted to a few high-demand services including:

<u>Service</u>	<u>Average Premium Over BMMC*</u>
Software Support	9-13%
Installations	3-5%
Standby Coverage	15-18%
Project Implementation/Integration	20-23%

*Basic monthly maintenance charge

- The vendors interviewed by INPUT recognize the need to segment their user population and to increase service flexibility in order to meet the specific needs of each user segment.
 - Exhibit IV-13 lists some of the services which have been unbundled and are now sold as individual service products.
 - As the exhibit demonstrates, most vendors have unbundled at least some services, the most common being installation, planning, consulting, and integration services.
- Vendors cited a number of benefits in developing greater service flexibility, the most substantial being the ability to sell planning and consulting services independent of the company's hardware products. Vendors say that with increasing voice/data integration, user demands for planning and system implementation services have been very strong.

EXHIBIT IV-13

VENDORS PROMOTE SERVICE FLEXIBILITY

- Over 80% of interviewed vendors have unbundled at least some non-hardware services.

- Major after-sales support areas include:
 - Software support for PBXs and LANs

 - Design and implementation services, particularly for PBX, but also for modem/multiplexer and LAN

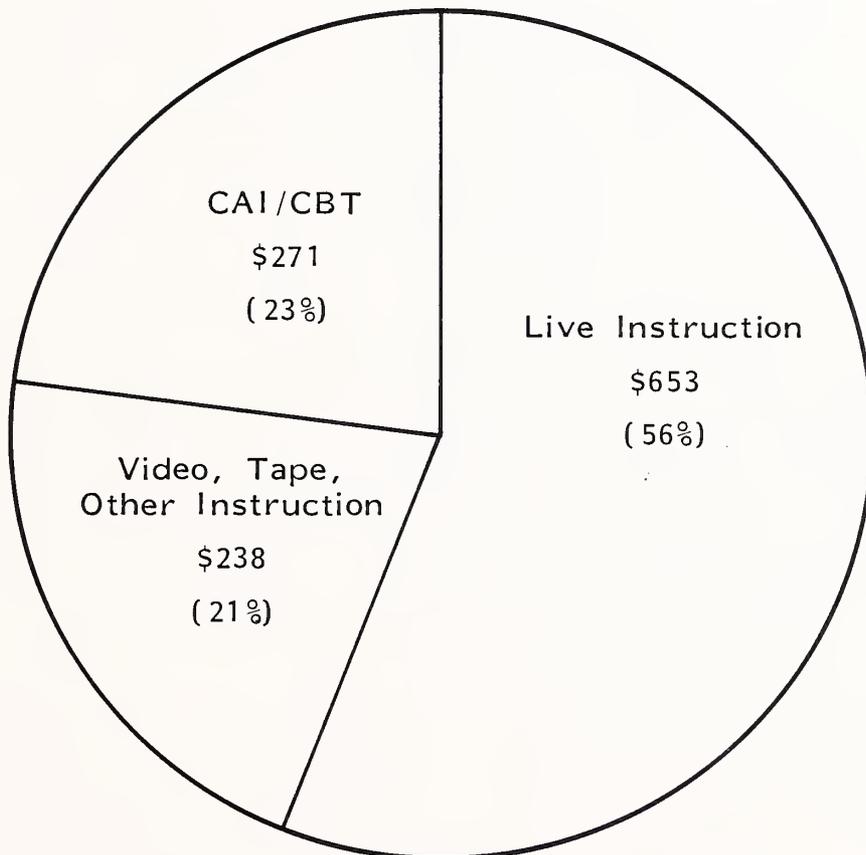
 - Education and training

 - Ongoing consulting and project management

- INPUT believes that planning and implementation services should be sold in conjunction with actual hardware and software products rather than independently. However, vendors must acknowledge that user demand for independent professional services is substantial and should not be ignored.
- One example of a service which can be sold independently from hardware is training and education. INPUT believes there is a tremendous demand for education services, not just on specific products but also for more general applications.
- Exhibit IV-14 demonstrates the market size for education and training in the data processing/telecommunications market. Currently, this \$1 billion market is dominated by live instruction; however, INPUT projects that computer-aided instruction (CAI) and computer-based training (CBT) will grow at a much faster rate than video or live instruction and will become the major training media by 1990.
- As with other professional services, vendors have had to develop training programs in order to meet the initial needs of their customer base. Now, manufacturers want to leverage their efforts in this area and appeal to a wider audience.
- The real advantage of selling education and training services separately (or any professional service for that matter) is that it allows the vendor to maintain contact with a variety of users and to exert influence on the customer's purchasing decision.
 - Data processing vendors have been very active in promoting services for this very reason.
 - IBM, for example, provides free executive-level training classes in order to ensure a high degree of visibility among corporate decision makers.

EXHIBIT IV-14

EDUCATION AND TRAINING MARKET
DATA PROCESSING/TELECOMMUNICATIONS



\$ Millions

1985 Total Vendor Revenue: \$1,162

- INPUT believes that although telecom hardware will continue to generate significant service revenue gains, the long-term impact will be felt much more in revenues derived from professional services, software support, and education and training. Vendors that are currently stressing these services report a faster growth rate in service revenue, higher levels of customer satisfaction, and a more optimistic view of their role in the future integration of telecommunications and DP equipment.

APPENDIX A: QUESTIONNAIRE

APPENDIX A
QUESTIONNAIRE

TELECOMMUNICATIONS VENDOR PROFILE

Company Name _____ President _____
Address _____ 1984 Revenues _____

Respondent Name _____
Title _____
Telephone Number _____

COMPANY PRODUCTS

- PBX
- Carrier
- Communication Processor
- LAN
- Modem
- Multiplexer
- Converter

SERVICE AND SUPPORT - HARDWARE

1. Hardware service delivery mode
 - A. Remote
 1. Hotline (toll-free)
 2. Diagnostics
 - B. On-site
 - C. Mail (documentation, parts, etc.)
 - D. User self-support
 1. Diagnostics
 2. Module swapping
 3. Depot delivery
 4. Other
 - E. Factory mail-in, repair/return
2. Parts availability, at user's site or at depots
3. Pricing
 - A. How established
 1. Competition
 2. Set by port
 3. Individual components priced separately
4. Unbundling of hardware services
 - A. Installation
 - B. Planning
 - C. Consulting
 - D. System implementation
 - E. Other

SERVICE AND SUPPORT - SOFTWARE

5. Software support delivery mode
 - A. Remote
 1. Hotline (toll-free)
 2. Diagnostics
 3. Remote fix
 4. Problems data base
 - B. On-Site
 - C. Mail (documentation, magnetic media, etc.)
 - D. User self-support

6. Description of software service products
 - A. Extended coverage
 - B. Unbundling (planning/consulting)
 - C. Pricing
 - D. Names of different programs

THIRD-PARTY MAINTENANCE

7. Products serviced but not manufactured

- | | |
|---|---|
| <input type="checkbox"/> Mainframe | <input type="checkbox"/> Local networks |
| <input type="checkbox"/> Minicomputer | <input type="checkbox"/> Branch Exchange |
| <input type="checkbox"/> Personal computers | <input type="checkbox"/> Modems |
| <input type="checkbox"/> Disk drive | <input type="checkbox"/> Multiplexer |
| <input type="checkbox"/> Tape drive | <input type="checkbox"/> Communications processor |
| <input type="checkbox"/> Word processor | <input type="checkbox"/> Terminal/workstation |

8. TPM Services provided

- | | |
|---|--|
| <input type="checkbox"/> Preventive maintenance | <input type="checkbox"/> Engineering changes |
| <input type="checkbox"/> Software support | <input type="checkbox"/> Software installation |
| <input type="checkbox"/> Hardware installation | <input type="checkbox"/> Remedial maintenance |
| <input type="checkbox"/> Conversion/upgrades | <input type="checkbox"/> Consulting |
| <input type="checkbox"/> Relocation | <input type="checkbox"/> Refurbishment |
| <input type="checkbox"/> Training | |

PRICING

9. Prime hours time and material pricing

10. Non-prime T & M pricing

FUTURE TRENDS IN SERVICE

11. Trends

- A. Remote support
- B. Redundant systems/modules
- C. Telecommunications/DP interaction
- D. Third-party maintenance
- E. Pricing

12. Other trends in telecommunications service

- F.
- G.
- H.
- I.

THE COMPANY

13. Number of service locations

14. Number and location of repair depots

15. Number and location of parts depots

16. Total number of service employees

17. Number of engineers

- A. In field
- B. At depot/headquarters

18. Services provided by the distribution network

