TURNKEY SYSTEM OPPORTUNITIES, 1979--1984

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TURNKEY SYSTEM OPPORTUNITIES, 1979-1984

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TABLE OF CONTENTS

TURNKEY SYSTEM OPPORTUNITIES, 1979-1984

LIST OF EXHIBITS

1 INTRODUCTION

I INTRODUCTION

- This INPUT report on turnkey systems markets is produced as part of the Market Analysis Service (MAS).

- The topic was selected because of high client interest and the growing importance of turnkey systems to the computer services industry.

- Research for this report included a series of in-person and telephone interviews, conducted in September 1979, with top officers of turnkey systems companies, remote computing services firms, and hardware manufacturers.

- The report evolved from an analysis of the specific interviews conducted for the study combined with the experience and judgement of the INPUT staff.

- The study considers only the United States market for turnkey systems. However, where appropriate, international issues are discussed. All forecasts are for the U.S. market only.

- Inquiries and comments from clients on the information presented are requested.

- A definition of terms is included in Appendix A.

- The interview profile and questionnaires are included in Appendix B.

- Related INPUT studies are listed in Appendix C.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

A. CHARACTERISTICS OF THE MARKET

- A turnkey system has been defined as a "package" of software and hardware that is intended to fulfill a user's specific application requirements.

- The turnkey system vendor, therefore, markets directly to a specific area where there is a specific need. That is, he sells a "solution" to the end user.

- Turnkey systems are a tremendously important area for computer industry growth in the 1980s.

  - This is the first turnkey systems study done as a part of INPUT's Market Analysis Service.

  - Computer processing services companies have a major role to play in this evolving market and must prepare for it today.

  - A key trend of the future is to sell solutions in the computer industry, not just hardware or software. Turnkey systems are a major part of this trend.

  - INPUT estimates that there are over 4,500 vendors of turnkey systems in the U.S. today. This is twice the number of computer services

companies that sell processing services, software products, and professional services.

- The turnkey system market is changing. In addition to systems houses or turnkey vendors, hardware manufacturers and processing services companies are selling or plan to sell turnkey systems.

- The increased competition has had a positive market impact since more prospects are being developed and are buying based on high perceived benefit/cost ratios.

- Hardware manufacturers may be facing another retrenching and consolidation phase such as that seen in the early 1970s.

  - DEC and Data General are the leading suppliers of hardware for turnkey systems.

  - Texas Instruments and IBM have achieved excellent growth rates in shipments recently, and will be major competitors in the turnkey system market in the 1980s.

- Software has become the most critical part of the system and now provides most of the "value added" portion of a sale. Hardware manufacturers and other turnkey vendors rate software as the most significant profit generator.

- In fact, software development will be the key to future prosperity in the turnkey system industry.

- The increased need for software products, combined with the economics of producing and maintaining those products, will cause the creation of many new software manufacturers who will specialize in systems design, programming, and systems maintenance.

- Software manufacturers will rely on dealers, distributors, agents, and today's turnkey vendors to sell their software products to end users. The software products will initially be sold to the end user as part of a turnkey system. However, the availability of a wide variety of software products will provide end user distribution channels with add-on products to sell to existing customers.

- The software manufacturer, therefore, is filling an increasingly critical niche. As competition intensifies, many of these firms will be absorbed into large companies.

- While turnkey vendors have a major share of today's market, the major hardware manufacturers and processing services companies will be taking a much more aggressive stance toward this market.

- Distributed data processing is gaining in importance due to economies of scale shifting towards smaller, interconnected, distributed computers. This trend will be boosted by offerings of automated office services.

B. MARKET SEGMENTATION BY VENDOR

- The turnkey system market is served by:

  - Hardware manufacturers.

  - Processing services companies, who have entered the turnkey system market and, in a limited fashion, are also manufacturing hardware.

  - Turnkey system vendors, who package OEM hardware and software to produce a complete system.

- Two markets are developing:

  - Small systems for small establishments and first time users.

  - Larger systems for more sophisticated users.

- The turnkey market character will thus be determined by the interplay between the three types of vendors and the development of the two basic markets.

- Cost curves have an impact on these two markets.

  - Technology is driving the costs of hardware down, but a practical limit to the decreases will soon be reached.

  - Printers and other mechanical devices are not experiencing dramatic price decreases and barring major technological innovation, this will not happen. INPUT is not forecasting any major innovations in this area through 1984.

  - Users are buying more hardware for their interactive systems today than they purchased several years ago. Even with reduced hardware prices, the average turnkey systems sale price has remained relatively constant for the last two or three years. This trend will continue throughout the forecast period.

  - The overall effect of the cost curves and user buying trends will be a system cost in 1984 that is within 5% of the total systems cost today.

C. MARKET SIZE AND GROWTH

- There are three distinct parts to the turnkey systems market: hardware, software, and services.

- The hardware component includes the processor, storage, printers, and other peripherals included in the turnkey system contract.

- The software component includes systems software, application packages, and software customization included in the turnkey contract.

- Services are installation, training, and other costs included in the turnkey system contract.

- Together this market represents $4 billion in revenues in 1979 and shipments of 61,000 turnkey units, as shown in Exhibit II-1.

- The hardware portion of the turnkey system industry represents 23% of the dollar value of all minicomputers and small business computers sold in 1979.

- Turnkey systems markets will grow significantly over the next five years. Overall growth is expected to be 35% per year through 1984, representing a $18.8 billion market by that date.

- Growth for the three types of vendors is shown in Exhibit II-2.

  - Processing services firms will have a 125% per year increase in turnkey system sales. Proper planning will be required to profitably reach this growth potential.

  - Turnkey system vendors will grow 20% per year through 1984.

  - Hardware manufacturers will grow 51% per year through 1984.

- Respondents expect increased pre-tax profit margins in 1979 over 1978.

  - It is significant to note that many turnkey systems vendors have experienced low profit margins. This is expected to continue for the vendor that does not sell industry and function specialized systems.

EXHIBIT II-1

MARKET FORECAST FOR TURNKEY
SYSTEMS BY SYSTEM COMPONENT,
1979-1984

SYSTEM COMPONENT	1979 ($ BILLION)	1984 ($ BILLION)	AVERAGE ANNUAL GROWTH RATE 1979-1984 (PERCENT)
HARDWARE	$2.4	$ 8.9	30%
SOFTWARE	1.1	7.1	45
SERVICE	0.6	2.8	35
TOTAL	$4.1	$18.8	35%
SYSTEMS SHIPPED	61,000	279,000	35%

EXHIBIT II-2

MARKET FORECAST FOR TURNKEY SYSTEMS
BY VENDOR TYPE, 1979-1984

VENDOR TYPE	1979 ($ BILLION)	1984 ($ BILLION)	AVERAGE ANNUAL GROWTH RATE 1979-1984 (PERCENT)
HARDWARE MANUFACTURER	$ 0.5	$ 3.8	51%
PROCESSING SERVICES COMPANY	0.1	6.1	125
TURNKEY VENDOR	3.5	8.9	20
TOTAL	$ 4.1	$ 18.8	35%

- Vendors that sell highly specialized turnkey systems have higher profit margins than those that do not sell specialized systems.

D. TURNKEY SYSTEM MAINTENANCE

- Maintenance is a key issue for turnkey system users.
  - Users expect to call one location for support.
  - It should be the responsibility of the vendor that sold the turnkey system to coordinate all hardware and software maintenance.
  - Hardware manufacturers have an advantage over other vendors in this area. They will be supplying the vast majority of the hardware in turnkey systems. Manufacturers have the experience in maintaining hardware.
  - Processing services companies are gaining experience in this area through the support of user site hardware services.
- The most effective way to deal with the maintenance issue is to utilize remote diagnostics to detect user problems.
- Remote diagnostic capability using computer to computer communications has become a distinct trend as vendors seek ways to solve hardware and software maintenance problems. The majority of respondents have the capability for remote diagnostics.
  - Some vendors have the ability to change systems and applications software at the user site through the use of this remote facility.

- Hardware and systems software maintenance usually is the responsibility of the manufacturer. Application software maintenance is the responsibility of either the processing services firm or the turnkey system vendor.

  - For hardware maintenance, the OEM manufacturer assumed responsibility in 62% of the cases.

- Maintenance and follow-on hardware and software sales are not included in the forecast for turnkey systems, but are clearly important factors in the market.

  - The follow-on sales of hardware, software, and professional services sold separately, after installation of the turnkey system, represent a major market opportunity.

  - Respondents indicated that an average of 20% of their revenue came from follow-on sales. In one case 80% of the revenue was generated from within the existing customer base. By 1984 the market for follow-on sales will approach $5 billion. This is incremental to the $18.8 billion forecast in Exhibit II-2.

  - Maintenance, although not separately forecast in this study, will be at least $2 billion in 1984 and may approach $5 billion. This is also incremental to the $18.8 billion forecast in Exhibit II-2.

E. MARKETING STRATEGY

- Three types of selling are in general use by the industry: direct sales force, independent distributors, and - a new development - the retail store.

- The retail store seems to offer substantial benefits in isolating qualified buyers and demonstrating systems. NCR and DEC have had good results with this method of distribution.

- Turnkey vendors and processing services companies are well positioned to sell directly to the end user, as this has been their sales contact.

- Hardware manufacturers do not have as much experience selling outside of the DP organization and will find the end user to be a much different buyer from the EDP manager.

- Hardware manufacturers also lack the software products needed for selling turnkey systems.

  - These firms historically have had to invest heavily in hardware research and development, as well as plant and equipment, to keep up with the demand for their products.

  - These vendors are currently investing heavily in applications software so that they can sell directly to the end user in the next three to five years.

- The average turnkey system sold by a hardware manufacturer or turnkey vendor is priced between $60,000 and $70,000. This is one-fourth the cost of a turnkey system from a processing services company.

  - Processing services companies have moved their software from their networks to large minicomputers without making dramatic changes to the applications. The quality and flexibility of these systems commands a premium price on the market.

- Over 50% of all vendors in the turnkey systems market offer data base management systems and distributed data processing as a part of their product line.

  - Over 75% of professional services companies and turnkey vendors offer professional services to their clients as a part of the turnkey system customization process.

- Nearly one-half of the turnkey vendors sell their software products separately, as well as a part of a turnkey system.

- Processing services companies have several advantages over other vendors of turnkey systems.

  - Processing companies have networks in place that can facilitate development of DDP.

  - These companies have developed excellent applications targeted to specific functions and industries.

  - The processing company that sells turnkey systems can offer its clients and prospects a complete range of services:

    . Processing services.

    . Turnkey systems.

    . User site hardware services.

    . Software products.

    . Network management.

- Respondents found that referrals from existing users were the best source of qualified leads for new turnkey system prospects. Direct mail and seminars were typically used as well and with very good results. These findings coincide with other INPUT studies that found these three techniques to be the most effective in generating leads.

- The average sales cycle reported by respondents for selling turnkey systems was four months. The range in the cycle was 2 weeks to 18 months.

F. RECOMMENDATIONS

- Functional groups will account for most hardware purchases in the future and all vendors must recognize this important market shift.

- Processing services companies must begin planning for the explosive growth in turnkey systems.

  - These firms must develop a strategy to deal with the pending intense competition from hardware manufacturers and turnkey vendors for the first time computer user.

  - Processing companies should develop a customer migration strategy. Each customer should understand the growth options available, such as:

    . Migrating from a processing service to a turnkey system or user site hardware service.

    . Migrating from a processing service or a user site hardware service to a software product that can be run on the user's in-house computers.

  - Economies of selling favor large metropolitan areas and large companies. Processing companies must plan for this, as well as determine how they will service the small non-metropolitan customer (if at all).

    . Retail stores are one option open to the processing companies, and at least one major vendor will announce such a trial program in 1980.

- Processing services companies must examine the economics of hardware assembly if they expect to sell large numbers of turnkey systems and user site hardware systems.

- Software manufacturers should be considered acquisition targets as these firms will provide an expanded base of applications products for the processing firms.

- Turnkey vendors are also excellent acquisition targets for processing services companies. Turnkey vendors that have developed industry and function specific application software could be an excellent complement for the processing services company. Furthermore, acquisition of the turnkey vendor would provide a client base from which maintenance and system add-on revenue could be generated.

- Processing services companies should look for turnkey system applications where networks are needed. Two examples are:

  . A real estate data base could be maintained centrally and be accessed by individual real estate companies' computers. The real estate companies could also use their computers for accounting. The accounting system and real estate data base application could be sold as a turnkey system.

  . Restaurants could perform routine inventory procedures on their own on-site computer. Data on accounts payable from the restaurant could be sent over a network to the restaurant headquarters where it could be consolidated with other restaurant data for central payment. In addition, credit card consolidation and EFTS integration could be offered. These are potential turnkey systems that a computer processing company could develop using its network.

  - . Networks clearly provide value added services that most turnkey system customers would not attempt to create on their own.

- Turnkey vendors are well positioned for the next three to five years, but will face serious competition after that time from hardware and processing services firms.

  - Turnkey vendors should look to software manufacturers for application software.

    . This will eliminate the need for each turnkey vendor to maintain its own software development and maintenance staff. Software will be provided by the software manufacturer.

    . Turnkey vendors should be able to raise their profit margins by eliminating the personnel in the software area.

  - Turnkey vendors must develop industry and function specific software to better meet increased competition.

  - Turnkey vendors should examine the profitability of concentrating their efforts in non-metropolitan areas. This strategy would avoid head-on competition from processing services firms and hardware manufacturers who will concentrate their selling efforts in the major business centers.

- Hardware manufacturers must sell directly to end users in order to control the channel of distribution.

- All three types of vendors should concentrate on the software component of the turnkey system as this is what the user is really buying. Furthermore, software will continue to be the source of most of the profit potential in turnkey systems.

III THE TURNKEY SYSTEMS MARKET

III THE TURNKEY SYSTEMS MARKET

A. MARKET DEFINITIONS

- A turnkey system is composed of hardware and software integrated into a total system that is designed to completely fulfill the processing requirements of a single application or set of applications for a user.

- Turnkey systems may include hardware from a single manufacturer or multiple manufacturers. However, a turnkey systems supplier must package the hardware and software for the user.

- Turnkey systems may be interactive or batch oriented.

  - Early turnkey systems were batch oriented because of minicomputer operating system limitations, lack of vendor experience with interactive systems design, and because users didn't want interactive systems.

  - Most turnkey systems available today are interactive. Operating system limitations have been removed, vendors have obtained experience with interactive systems, and users now expect interactive applications.

- Turnkey systems may be designed to support one or more simultaneous users. Accounting systems generally support single users. Office automation systems support many simultaneous users.

- Turnkey systems are becoming highly specialized as applications are designed for specific vertical markets. Most turnkey vendors attribute a major part of their success to these highly specific products.

- Hardware manufacturers are concerned with turnkey systems because they supply hardware to companies that add software and sell the system to end users. For this study, INPUT interviewed 16 hardware manufacturers - all major vendors in the marketplace. Exhibit III-1 contains a list of the major hardware manufacturers supplying OEM or turnkey systems from which INPUT selected the companies to interview.

- Processing services companies have historically provided processing services to companies needing computer power. They are now beginning to sell turnkey systems and, to a limited extent, to manufacture hardware. INPUT interviewed ten processing services companies which were selected from the list given in Exhibit III-2.

  - Some processing service companies such as Automatic Data Processing and National CSS are offering a special type of turnkey system and/or service. INPUT has called these offerings user site hardware services, but they are also turnkey systems.

  - INPUT has included user site hardware turnkey systems in the market forecast to the extent that the hardware and software are actually sold to the user. If the hardware and software are not sold to the user, as is the case with ADP, then the system is not counted as turnkey.

- Turnkey vendors integrate hardware and software into a total system to satisfy the data processing requirements of the end user. INPUT interviewed 45 turnkey vendors. The size of these firms ranged from $200,000 in annual

EXHIBIT III-1

HARDWARE MANUFACTURERS

- BURROUGHS
- COMPUTER AUTOMATION
- DATA GENERAL
- DATAPOINT
- DIGITAL EQUIPMENT CORPORATION
- FOUR-PHASE
- GENERAL AUTOMATION
- HEWLETT-PACKARD
- HONEYWELL
- IBM
- INTERDATA P-E
- MICRODATA
- MODCOMP
- NCR
- PRIME
- SEL
- SYCOR X
- TANDEM
- TEXAS INSTRUMENTS
- UNIVAC/VARIAN X
- WANG

EXHIBIT III-2

PROCESSING SERVICES COMPANIES

- AUTOMATIC DATA PROCESSING
- BOEING COMPUTER SERVICES
- COMPUSERVE
- COMPUTERIZED AUTOMOTIVE REPORTING SERVICE
- COMPUTER SCIENCES CORPORATION
- COMSHARE
- CONTROL DATA CORPORATION
- DATA RESOURCES, INC.
- GENERAL ELECTRIC INFORMATION SERVICES
- INFORMATICS
- INTERACTIVE DATA CORPORATION
- ITEL
- KEYDATA
- MCAUTO
- NATIONAL CSS
- ON-LINE SYSTEMS
- OPTIMUM SYSTEMS
- RAPIDATA
- TYMSHARE
- UNITED COMPUTING SYSTEMS
- UNIVERSITY COMPUTING COMPANY
- XEROX COMPUTER SERVICES

revenues to over $15 million. All vendors interviewed derived virtually all of their revenue from the sale of turnkey systems.

- Definitions are listed in Appendix A.

B. END USERS

- There are two classes of end users that buy turnkey systems:
  - Data processing departments.
  - Functional area organizations.
- The data processing manager is usually not receptive to turnkey systems because he views himself as in competition with the turnkey system vendor and because he frequently considers the turnkey system to be a relatively unsophisticated product.
- The turnkey vendor sells primarily to the functional area; e.g., accounting, manufacturing, engineering, research - anywhere there is a need for a complete system that will do a specific job for the user. In other words, the vendor sells a system that will provide a total solution for the non-DP end user.

C. VENDORS

- There are three types of turnkey system vendors: hardware manufacturers, processing services companies, and the turnkey vendor - also called a systems house.

- Hardware manufacturers mainly sell to the EDP professional. So far, they do a limited amount of selling to functional areas.

- Processing services companies sell mainly to functional areas and, in a limited sense, to the EDP manager. Again, the EDP manager tends to think of the processing services company as a competitor.

- Turnkey vendors sell almost exclusively to functional areas.

D. TYPES OF SELLING APPROACHES

- The industry generally uses three sales distribution channels: a direct sales force, independent distributors, and (currently being tested) retail stores.

- It would appear that using a direct sales force is the optimum method for any supplier. However, the heavy expense of maintaining a nationwide sales force is a limiting factor which is forcing companies to experiment with other sales channels.

- The distributor is presently the most widely used means of selling systems on a turnkey basis. The hardware manufacturer uses this approach because it costs very little to establish a dealer or distributor network.

- The retail store is the newest means of selling hardware. Thus far, DEC and NCR have adopted this approach with, apparently, some degree of success. Both firms, however, still maintain direct sales forces.

- The hardware manufacturer is searching for the most cost effective way to generate sales. As hardware prices continue to decline, the sales approach must change because the cost of selling has to keep in line with the lowered system price. Retail stores currently offer the best potential for lowering selling costs.

- The retail store distribution channel appears to offer substantial benefits over conventional selling approaches.

  - Qualified buyers are identifiable because they have made the effort to go to the store.

  - Prospects can be dropped quickly if they are not qualified without spending any significant amount of time with them.

  - System capabilities can be demonstrated to qualified prospects (and simultaneously to more than one prospect).

- Most hardware manufacturers use a combination of direct sales and distributors. The different approaches of several companies merit discussion.

  - IBM sells the vast majority of its hardware directly with its own sales forces. IBM is also experimenting with sales centers to demonstrate 5100 equipment. IBM owns and operates all of these centers which are similar in concept to the retail stores of NCR and DEC.

  - Data General sells virtually all of its hardware OEM through an extensive dealer/distributor network. Discounts and incentives are offered to the dealers/distributors to encourage sales activity.

  - Wang sells all of its hardware with its own sales force. Wang uses software/systems companies to provide software solutions to buyers. In this way, Wang gets all revenue from hardware sales and provides a market for system houses to generate sales from software used on Wang computers.

IV MARKET SEGMENTATION, SIZE, AND GROWTH FORECAST

IV MARKET SEGMENTATION, SIZE, AND GROWTH FORECAST

A. MARKET SEGMENTATION

- Three types of vendors serve the turnkey market:
  - Hardware manufacturers.
  - Processing services companies.
  - Turnkey vendors.
- Product offerings are becoming highly specialized by industry and by function. More and more, success or failure in the market is being predicated on how industry specific a product offering is.
  - Customization is typically performed by turnkey vendors for individual customers.
  - Hardware manufacturers and processing services companies generally do not offer as much customization on systems as do turnkey vendors.
  - Successful vendors of all types prefer to specialize by industry so that customization for individual users can be minimized.

  - Industry experienced data processing professionals can design systems for specific industries that will appeal to the majority of prospective users.

  - Systems changes desired by customers are easier to implement on industry specific software than on generalized software.

- There are nearly 50 manufacturers that supply the hardware to the turnkey systems vendors and processing services companies.

- There are at least 15 large processing services companies that currently sell turnkey systems, and that number will grow dramatically in the next five years.

- There are approximately 4,500 turnkey system vendors in the U.S.

- The turnkey system market is presently highly fragmented, with no single turnkey vendor having a significant market share.

- Nearly all turnkey vendors (except hardware manufacturers and processing services firms) cover regional markets. This is changing, however, as some of the larger vendors construct their own nationwide distributor network.

- Several companies will emerge as national software manufacturers.

  - These vendors will design, develop, and maintain software packages.

  - The software manufacturers will sell their software to turnkey vendors who will sell directly to end users.

- Market share data of turnkey vendors is difficult to measure because of the large number of companies serving the market and because no turnkey vendors stand out as being major national suppliers. Historically, market share data has been reported by hardware manufacturer rather than turnkey vendor.

- Hardware manufacturers are generally reluctant to provide computer shipment data, so surveys must be made to estimate their market share. Exhibit IV-1 is representative of the variety of market share data available today. The estimates are for 1978.

  - The data shows market share of installed minicomputers based on units and market share based on dollars and units shipped in 1978.

- Digital Equipment Corporation and Data General are clearly the dominant vendors in the market; however, the trends show that IBM is increasing its market share rapidly.

- The market share data indicates a consolidation trend in the industry.

  - The 22 vendors identified have sold over 75% of the installed base and sold over 90% of the minicomputers in 1978.

  - This data indicates a move to the same type of consolidation that occurred in the large mainframe computer market in the 1970s.

B. MARKET SIZE

- The market for turnkey systems includes three distinct elements:

  - Hardware. This category includes the processor, storage, printers, and other peripherals included in the turnkey system contract.

  - Software. Packages and customization of both systems and applications software included in the turnkey systems contract are in this category.

  - Service. Installation, training, and other costs covered in the turnkey system contract are included in this category.

EXHIBIT IV-1

MARKET SHARE FOR MINICOMPUTER
HARDWARE MANUFACTURERS, 1978

VENDOR	MARKET SHARE OF INSTALLED BASE	MARKET SHARE OF CURRENT SHIPMENTS	
	BY UNITS (PERCENT)	BY UNITS (PERCENT)	BY DOLLARS (PERCENT)
BURROUGHS	1%	2%	2%
COMPUTER AUTOMATION	1	2	1
DATA GENERAL	12	15	10
DATAPOINT	5	6	3
DIGITAL EQUIPMENT CORP.	24	29	32
FOUR-PHASE	2	2	4
GENERAL AUTOMATION	1	1	1
HEWLETT-PACKARD	6	7	8
HONEYWELL	1	2	2
IBM	5	6	7
INTERDATA	3	4	3
MICRODATA	1	1	1
MODCOMP	2	2	4
NCR	1	1	1
PRIME	*	1	2
RAYTHEON	1	NA	NA
SEL	*	1	2
SYCOR	2	2	1
TANDEM	*	*	1
TEXAS INSTRUMENTS	3	4	2
UNIVAC/VARIAN	3	3	3
WANG	1	1	1
OTHERS	25	8	9
TOTAL	100 %	100 %	100 %

* LESS THAN 1%
NA = NOT AVAILABLE

- Customization of software is included in the software category. Most turnkey systems are currently sold with some degree of customization for the end user. This is more apt to be characteristic for first time users than for practiced buyers.

  - Experienced computer users see the advantages of buying software packages because of the lower cost of a package over a customized system. A package has fewer maintenance problems.

  - First time users have been reluctant to change their procedures when they install a computer.

- Add-on hardware sales, software products, hardware maintenance, software maintenance, and additional services are not included in the forecast.

- The total 1978 market size for turnkey systems was slightly under $3 billion, as shown in Exhibit IV-2.

  - Hardware sales represented $1.7 billion, or nearly 60% of the turnkey market size.

  - Software sales represented $0.7 billion, or 26% of the turnkey market.

  - Services amounted to $0.4 billion, or 15% of the turnkey market.

- Nearly 43,000 units were installed on a turnkey basis in 1978, representing approximately 37% of the total minicomputer/small business computer shipments.

- Hardware sales in turnkey systems represent approximately 23% of the dollar value of all minicomputer/small business computer shipments in 1978.

- Turnkey system firms accounted for 84% of the value of systems shipped in 1978. Processing services companies accounted for only 2% of 1978 systems

EXHIBIT IV-2

TOTAL 1978 MARKET FOR TURNKEY SYSTEMS

REVENUE COMPONENT	HARDWARE VENDORS ($ MILLION)	PROCESSING SERVICES COMPANIES ($ MILLION)	TURNKEY SYSTEM FIRMS ($ MILLION)	TOTAL ($ MILLION)	PERCENT
HARDWARE	$ 230	$ 28	$ 1,470	$ 1,728	59%
SOFTWARE*	100	31	610	741	26
INSTALLATION		4	200	204	7
TRAINING		5	120	125	4
OTHER	50	3	50	103	4
TOTAL	$ 380	$ 71	$ 2,450	$ 2,901	100%
UNITS SHIPPED	6,000	300	36,600	42,900	NA

* INCLUDING CUSTOMIZATION
NA = NOT APPLICABLE

shipped value. Most processing services firms are new to the turnkey market, (there are only 15 active vendors in the marketplace).

- Hardware manufacturers generated the greatest level of turnkey systems revenue per company in 1978; nearly $8 million. Turnkey system firms generated slightly more than $0.5 million in revenue in 1978. Processing services companies generated an average of $5 million in turnkey systems revenues per company in 1978.

  - Hardware manufacturers and processing services vendors appear to have developed a "critical mass" for selling turnkey systems.

  - Turnkey firms have not generated a substantial revenue base, only $500,000 average annual revenue per company in 1978. This lack of size reduces the firm's ability to develop applications and to weather adverse economic events (such as a recession or interest rate increases).

- Processing services companies have the highest average price for a turnkey system. It is not uncommon for processing companies to move software from large computers to minicomputers with a minimum of software changes. The result is a powerful and flexible system that commands a high price.

- The typical turnkey system available from a hardware manufacturer or turnkey vendor today is priced between $60,000 and $70,000. This is about one-fourth the price of a turnkey system from a processing company, as Exhibit IV-3 shows.

- Hardware accounts for 60% of the selling price of most turnkey systems today (except processing services companies' turnkey systems).

- There are forces that are driving the cost of hardware down.

EXHIBIT IV-3

HARDWARE, SOFTWARE, AND SERVICE COMPONENTS OF
TURNKEY SYSTEMS AS REPORTED BY RESPONDENTS

COMPONENT	VENDOR TYPE		
	HARDWARE MANUFACTURER	PROCESSING SERVICES COMPANY	TURNKEY VENDOR
PRICE FOR AVERAGE SYSTEM ($000)			
HARDWARE	$36	$ 94	$44
SOFTWARE	16	106	18
SERVICE	8	36	11
TOTAL	$60	$236	$73
PERCENT OF PRICE OF AVERAGE SYSTEM			
HARDWARE	60%	40%	60%
SOFTWARE	26	44	25
SERVICE	14	16	15
TOTAL	100%	100%	100%

- Processor cost has decreased by up to 50% a year in the last five years, but the percentage rate reductions will become smaller as the cost of the processor approaches the cost of the materials used in the chip itself.

- Storage costs are decreasing and will continue to decrease by 10% or more per year for the next five years.

- Peripherals have dropped in price over the last five years, but the rate of price reduction is slowing. Further price reductions of any magnitude are unlikely without major technological innovation. That innovation has not appeared on the horizon.

- There are forces that are driving costs of hardware up.

  - Energy costs are rising over 10% a year (faster than the rate of inflation). This raises the cost of hardware because of the energy use in manufacturing, assembly, and testing.

  - Printers and other mechanical devices generally have a higher cost base because of materials cost increases. Since the technology has basically remained unchanged in these devices for a number of years, there are very little additional efficiency improvements that can be made. Only non-impact printers have affected cost savings. An unforeseen technological breakthrough would be required to lower costs.

- It is expected that by 1984 the cost of hardware for a typical system will be within 5% of where it is today.

  - Hardware costs could decrease by as much as 5% a year for the next five years. This is optimistic and probably the best case.

  - Buyers of turnkey systems are purchasing more hardware today than several years ago, mainly more terminals and storage. This fact plays

an important role in keeping the hardware component of the turnkey system at 50-60% of the total system price.

- Microcomputer turnkey systems have a much lower hardware dollar component than minicomputer turnkey systems. However, on a percentage basis, the hardware component of microcomputer turnkey systems is now nearly 90%, but it will fall to 60-70% within the next five years.

C. GROWTH FORECAST

- Respondents were asked to evaluate a set of factors according to their importance in either fueling the growth or in limiting the growth of turnkey system sales. The results of that analysis are shown in Exhibit IV-4.

- Hardware manufacturer respondents indicated that four major factors were responsible for fueling the growth in turnkey systems:

  - Low cost.

  - Many applications are now available to buyers.

  - The software is of high quality.

  - Prospects are now knowledgeable in how to evaluate and select a system.

- It is interesting to see that hardware manufacturer respondents do not see processing services companies or turnkey vendors as fueling the growth in turnkey systems.

- Hardware manufacturer respondents see two major limiting factors to the growth in turnkey systems:

EXHIBIT IV-4
A COMPARISON OF FACTORS FUELING AND LIMITING THE GROWTH OF TURNKEY SYSTEMS SALES AS REPORTED BY RESPONDENT VENDORS*

GROWTH FACTOR	FUELING GROWTH				LIMITING GROWTH			
	HARDWARE VENDORS	PROCESSING SERVICES COMPANIES	TURNKEY VENDORS	OVERALL	HARDWARE VENDORS	PROCESSING SERVICES COMPANIES	TURNKEY VENDORS	OVERALL
COST	4.1	2.9	3.5	3.7	3.3	2.1	3.1	3.0
SALES PERSONNEL	3.3	3.6	3.1	3.3	3.4	4.3	3.0	3.4
TECHNICAL PERSONNEL	2.9	3.0	3.5	3.2	3.0	3.6	2.7	3.1
USER TRAINING	3.3	2.9	3.3	3.2	2.8	3.2	2.4	2.6
COMPETITION FROM HARDWARE VENDORS	2.6	3.3	3.1	3.0	2.3	2.4	2.6	2.5
COMPETITION FROM PROCESSING SERVICES COMPANIES	1.9	2.8	2.0	2.1	2.5	2.8	1.9	2.2
COMPETITION FROM TURNKEY VENDORS	3.0	3.5	3.2	3.2	2.4	2.9	2.4	2.5
TURNKEY SYSTEM QUALITY	3.9	3.6	4.3	4.1	3.1	4.4	3.5	3.6
HARDWARE SYSTEM QUALITY	3.1	2.5	3.6	3.2	2.0	2.3	3.0	2.6
VARIETY OF APPLICATIONS	4.1	3.5	4.0	3.9	3.5	2.6	3.4	3.2
PROSPECT SOPHISTICATION	3.5	3.6	3.6	3.6	4.5	2.6	3.1	3.0

*RATED ON SCALE OF 1 TO 5, WHERE 5 IS HIGHLY IMPORTANT AND 1 IS NOT IMPORTANT

- The prospect is not as sophisticated as desired to evaluate and select new systems.

- More applications would sell more systems.

- It should be pointed out that factors can be a limit on, as well as fuel, growth.

  - Hardware manufacturers indicated that prospects are much more sophisticated today than they were several years ago, but that more sophisticated buyers are desired. Hardware manufacturers would like to see more sophisticated prospects in the future.

  - Prospects limit the growth in the sale of turnkey systems in the eyes of the hardware manufacturer, because of a lack of knowledge in hardware, software, and systems. Since prospect knowledge is greater today compared to several years ago, prospect sophistication fuels growth in turnkey systems.

- The variety of applications provided are another factor that both fuels and limits growth:

  - A large number of turnkey systems covering many applications are available to buyers. This fuels growth because prospects can find a system for their needs.

  - Hardware manufacturers believe that if more applications were available that more turnkey systems could be sold. Since demand for applications exceeds supply, this limits the growth of turnkey systems.

- Processing services respondents indicated that five factors were largely responsible for fueling the growth in turnkey systems:

  - Prospects' increased ability to evaluate and select systems.

- High quality of systems.

- Ability of sales personnel to effectively sell systems.

- A wide variety of applications available to the user.

- Competition from turnkey vendors.

- It is not surprising to see that processing services companies did not rate lower system cost as one of the major factors fueling turnkey systems growth.

  - Processing services companies' turnkey systems have a substantially higher average price than other vendors' systems.

- Processing services firm respondents indicated that three major factors are limiting the growth in turnkey systems:

  - System quality; i.e., systems would sell more easily if they were of higher quality.

  - Shortage of effective sales personnel.

  - Lack of adequately trained and experienced technical personnel.

- Processing services vendors sales personnel are both fueling and limiting the growth of turnkey systems.

  - The sales personnel selling turnkey systems are doing an excellent job in the eyes of their respective companies.

  - The problem is that there are not enough effective sales personnel available.

- Note that processing services company respondents do not presently view other processing services companies as fueling or limiting factors in the growth of turnkey systems. This will undoubtedly change in the future as processing services firms begin to compete for customers.

- Turnkey vendor respondents had the most reasons responsible for fueling the growth in turnkey systems:

  - Quality of systems.

  - Availability of many software systems.

  - Prospects can evaluate and select systems effectively.

  - Hardware quality.

  - Low cost.

  - Technical personnel create systems that solve user problems.

- Turnkey vendor respondents see only one major factor limiting turnkey system growth:

  - The quality of the systems should be improved to generate more sales.

- Turnkey vendors see turnkey system quality as a help and a hindrance.

  - There are many systems available that have an excellent design and are easy to implement for the user.

  - However, there are systems available that are poorly designed and are extremely difficult for the user to implement.

- Turnkey vendors do not view processing services firms as being a help or hindrance to the growth of turnkey system sales.

- Overall, processing services vendors are not currently viewed as a major factor in turnkey systems. This will likely change in the future.

- Hardware quality, as an issue, is becoming less important in the overall picture of turnkey systems. Hardware quality has a basically indifferent rating from all vendor types.

- It is surprising that vendors do not rate user training as a limit on turnkey system growth.

  - Other INPUT surveys found user training to be critical to the success or failure of a turnkey system installation.

  - Users are concerned with the quality of vendor supplied education. Some of the education classes and instructors are excellent, but some are not.

  - In order to accommodate a substantial rate of growth in turnkey systems, vendors are going to be forced to use some form of computer assisted instruction (CAI) to train users.

    . Interactive documentation could be supplied as an element of the turnkey system or as a separately sold, microprocessor based, training system.

    . Instructions that need to be computerized are not only for user training, but also computer startup, operating, and shutdown procedures.

- INPUT believes that user training will be a limiting factor on the sale of turnkey systems, unless vendors take some positive action in the direction of adding CAI to their product offerings.

- The factors fueling the growth of turnkey systems far outweigh the limiting factors. All respondents viewed the market as challenging; one where substantial growth opportunities would allow many different vendors to co-exist for the next five years.

- Turnkey systems are receiving much more attention today than in the past. The growth prospects for turnkey systems are excellent for the next five years as shown in the forecast in Exhibit IV-5.

- There are ongoing costs that are usually not included in the turnkey system contract and are, therefore, excluded from the forecast.

  - Hardware maintenance.

  - Software maintenance.

- Software maintenance is tracked as a computer services expenditure in INPUT reports.

- Follow-on sales to turnkey system customers are not included in the forecast unless the sale is for another turnkey system.

  - Hardware additions are not included in the forecast.

  - Software packages and professional services purchased subsequent to a turnkey sale are not included in the forecast. Expenditures of this type are included in the INPUT computer services forecast. (Market Analysis Service 1979 Annual Report, INPUT. December 1979.)

EXHIBIT IV-5

MARKET GROWTH IN TURNKEY SYSTEMS, 1978-1984

VENDOR TYPE	1978 ($ MILLION)	1979 ($ MILLION)	1980 ($ MILLION)	1981 ($ MILLION)	1982 ($ MILLION)	1983 ($ MILLION)	1984 ($ MILLION)	AAGR 1979-1984 PERCENT
HARDWARE MANUFACTURERS	$ 380	$ 490	$ 640	$ 1,240	$ 1,990	$ 2,410	$ 3,830	51%
PROCESSING SERVICES COMPANIES	71	110	555	1,110	1,990	4,290	6,130	125
TURNKEY VENDORS	2,450	3,550	4,570	5,660	6,790	7,770	8,880	20
TOTAL	$ 2,901	$ 4,150	$ 5,770	$ 8,010	$ 10,770	$ 14,470	$ 18,840	35%
SYSTEMS SHIPPED	43,000	61,000	85,000	119,000	159,000	214,000	279,000	35%

- By 1984 the turnkey system market will be nearly as large as the entire computer services market. The growth rate for turnkey systems is almost double the growth rate for all computer services.

- The large market potential and excellent growth prospects will attract many parties to turnkey systems.

  - Hardware manufacturers will continue to be the major force in providing hardware and, ultimately, as a provider of software as well.

  - Processing services companies will become more involved in turnkey systems; first using existing software, but eventually acquiring products and companies already in the marketplace.

  - Large turnkey vendors may make a few acquisitions, but most often will obtain license rights for software from others and will market the software on a turnkey basis to their own customers and prospects.

  - Large diversified multinational firms will make acquisitions of turnkey vendors. Companies like Dun & Bradstreet, McGraw-Hill, and Prentice-Hall will be active participants.

- The forecast in Exhibit IV-5 assumes that there will be a high level of acquisitions in the marketplace.

  - Nearly $6 billion of the market size for processing services vendors in 1984 will be the direct result of product or company acquisition mode.

  - Two billion dollars of the 1984 market size for hardware companies will be derived mainly from product acquisitions, as well as some company acquisitions.

- If company and product acquisitions are not made, the distribution of market share between vendor types will be substantially different than shown, but the overall size of the market in 1984 will be unchanged.

- The forecast shows turnkey system revenue by vendor type, but does not truly reflect the total revenue that the hardware manufacturers will generate.

  - Hardware manufacturers will generate revenue from the sale of turnkey systems. By 1984 this will represent nearly $4 billion.

  - Hardware manufacturers will also generate revenue from the sale of hardware to processing services companies and turnkey vendors. This revenue will amount to another $7 billion.

  - Hardware manufacturers can, therefore, expect to generate at least $10 billion in revenue in 1984 from their involvement in turnkey systems. This is over 50% of the total dollars generated from turnkey system sales.

- Hardware manufacturers will see a 51% per year increase in turnkey system sales. They will achieve over one-half of that growth by acquiring turnkey systems vendor software and, in some cases, turnkey vendors.

  - As mentioned above, in addition to turnkey system sales, hardware manufacturers will generate revenue from hardware sales to other turnkey vendors, including processing services companies. This will be a $7 billion market in 1984 and will have grown at 35% a year from a $1 billion base in 1978.

  - Hardware manufacturers' overall involvement in turnkey systems will generate a 38% average annual growth rate through 1984.

- Processing services firms will experience a 125% per year increase in turnkey systems sales. Over two-thirds of this growth will be derived from turnkey vendors that processing services firms will acquire in this period.

  - Of the over $6 billion generated from turnkey system sales in 1984, between $2.1 and $2.6 billion will be hardware revenue.

  - At least $3.5 billion in revenue will be generated by processing services companies exclusive of hardware in 1984.

- Turnkey systems vendors will grow at 20% a year through 1984.

  - If no product or company acquisitions were made by hardware manufacturers or processing services companies, turnkey vendors would grow at nearly 40% per year through 1984.

  - Top selling products and rapidly growing companies will be the prime acquisition targets.

  - The effect of acquisitions on the turnkey vendors is a lowering of the potential growth rate from 40% to 20%.

- The forecast by vendor types shown in Exhibit IV-5 can be separated into the three different turnkey system components of hardware, software, and service, as shown in Exhibit IV-6.

  - Hardware will account for 47% of the total system price by 1984, down from 58% today.

  - Software will account for 38% of the total system price 1984, up from 27% today.

  - Services will retain a constant 15% share of the total system price.

EXHIBIT IV-6

MARKET FORECAST BY COMPONENT, 1978-1984

SYSTEM COMPONENT	1978 ($ MILLION)	1979 ($ MILLION)	1980 ($ MILLION)	1981 ($ MILLION)	1982 ($ MILLION)	1983 ($ MILLION)	1984 ($ MILLION)	AAGR 1979-1984 PERCENT
HARDWARE	$ 1,731	$ 2,410	$ 3,210	$ 4,320	$ 5,570	$ 7,160	$ 8,880	30%
SOFTWARE	740	1,120	1,700	2,490	3,590	5,140	7,140	45
SERVICE	430	620	860	1,200	1,610	2,170	2,820	35
TOTAL	$ 2,901	$ 4,150	$ 5,770	$ 8,010	$ 10,770	$ 14,470	$ 18,840	35%
SYSTEMS SHIPPED	43,000	61,000	85,000	119,000	159,000	214,000	279,000	35%

- The substantial growth rate in software will not be possible using today's development tools.

  - Applications building systems will be needed to generate the 45% level of growth. Products such as MAESTRO and UNIX are examples of system building tools, but much more powerful products are needed.

  - Hardware manufacturers will be the first to announce application building tools. Hardware manufacturers have already identified that software will be the limiting factor in selling turnkey systems in the future.

- Installation and training is another limiting factor in the sale of turnkey systems.

  - In order to reach the 35% growth rate in the service component of turnkey systems, new service delivery vehicles must be created.

  - Computer assisted instruction holds the greatest potential as a delivery vehicle for providing the necessary installation, training, and operating guidance. This point was addressed earlier in this chapter.

V COMPARISON OF HARDWARE MANUFACTURERS, COMPUTER PROCESSING SERVICES COMPANIES, AND TURNKEY VENDORS

V COMPARISON OF HARDWARE MANUFACTURERS, COMPUTER PROCESSING SERVICES COMPANIES, AND TURNKEY VENDORS

A. HARDWARE MANUFACTURERS' PRODUCTS AND SERVICES

- Traditionally, the primary business activity of the hardware manufacturer has centered on the design and manufacture of computers and computer systems.

  - Capital and expertise have been channeled into the development and sale of computer products.

  - Products have been distributed worldwide, either directly by the vendor or through arrangements with original equipment manufacturers or distributors.

- Hardware manufacturers, historically, have been oriented to providing tangible commodities - measurable pieces of "iron," rather than solution oriented, value added services. Software development has lagged compared to the growth in hardware.

  - Respondents in this group displayed a wide range of products that utilize the latest technology.

  - Virtually all respondents expressed their concerns over software.

. The return on investment on software is uncertain, particularly for applications products where market acceptance is difficult to gauge prior to product testing.

. Financing for software is difficult to obtain because of the intangible nature of software.

. Software development projects have a way of requiring more people, time, and money than is initially budgeted.

- Typically, hardware vendors concentrated on production rather than on computer services, as is displayed in Exhibit V-1. The exceptions are a few of the larger manufacturers who have established data processing networks.

  - Only 23% of the respondent manufacturers currently unbundle their software and hardware, although the trend is toward unbundling. However, almost all applications packages sold by hardware manufacturers are priced separately from the hardware.

  - Nearly three-fourths of the hardware manufacturers surveyed did not offer applications software supported by the manufacturer.

  - The software was generally developed by users and turnkey vendors, then sold by the hardware manufacturer.

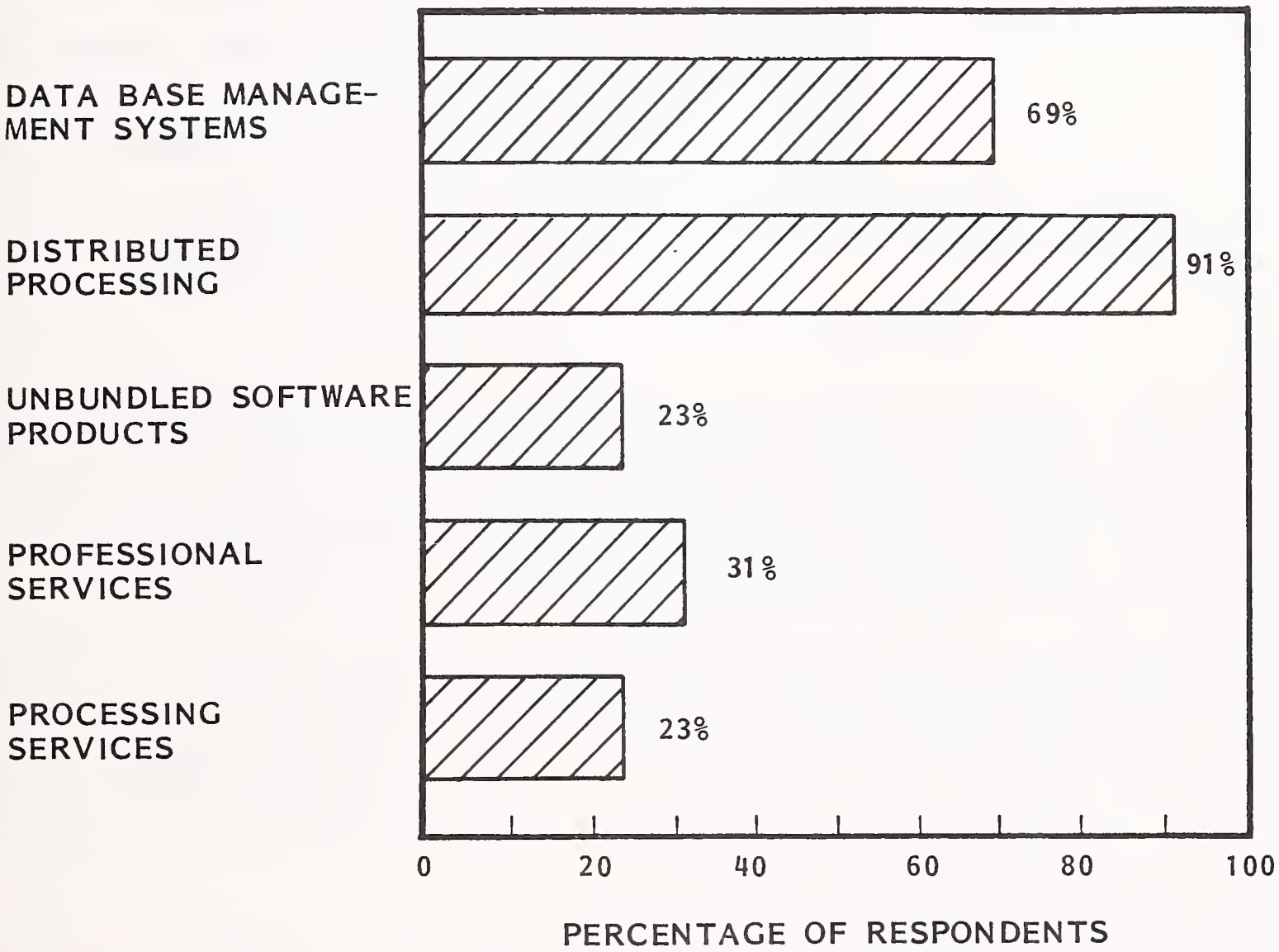
    . The hardware manufacturer provides no support or assistance to the users of the software. That task is performed by the software developer.

    . Hardware manufacturers only provide a distribution function for applications software products.

  - Computer processing services are currently provided by less than one-fourth of the hardware manufacturing respondents.

EXHIBIT V-1

RESPONDENT HARDWARE MANUFACTURERS' RELATED PRODUCTS AND SERVICES



. Many hardware manufacturers are examining the feasibility of providing processing services in the next three years.

. The rationale used is that software developed for processing services could also be used for turnkey systems and software products.

. Hardware manufacturers using this reasoning may be underestimating the task of developing quality industry specific software. If the task was this easy, every processing services vendor would have been selling turnkey systems and software products many years ago.

- Professional services are offered infrequently.

- Hardware vendors stated that distributed data processing (DDP) is a primary marketing threat. The trend clearly points to economies of scale shifting in favor of smaller distributed computers interconnected by networks. Most systems sold by respondents are compatible with IBM systems.

- Some vendors are directed at an evolving market which merges data processing with word processing. These vendors believe that word processing holds the key to the automated office. The vendors working on automated office products are also heavily involved in DDP; these two areas are very closely related.

- The majority of respondents provide a data base management system for their applications. Variations include a structured data base system utilizing query language to systems that are CODASYL based.

- Vendors are well aware that the cost of writing programs has spiralled over the past few years and that costs are likely to double again by 1985. Two respondents, therefore, have turned to a new language, PASCAL, which they feel can cut programming costs by 75%. They have added a PASCAL compiler to some of their existing machines.

  - PASCAL has had little impact on the larger mainframe systems which use the older COBOL language. Respondents' compiler offerings are shown in Exhibit V-2.

B. COMPUTER PROCESSING SERVICES COMPANIES' PRODUCTS AND SERVICES

- Historically, processing services companies have provided either cross-industry or industry specific applications processing. Their business has rested on the provision of a value added service rather than with the production of a commodity. As a result, they are well positioned to impact the turnkey systems business, which is user and solution directed. In fact, as the study shows, many processing services companies are already engaged in developing specific minicomputer based applications, have installed standalone systems, and are actively involved in establishing user site hardware services using distributed data processing.

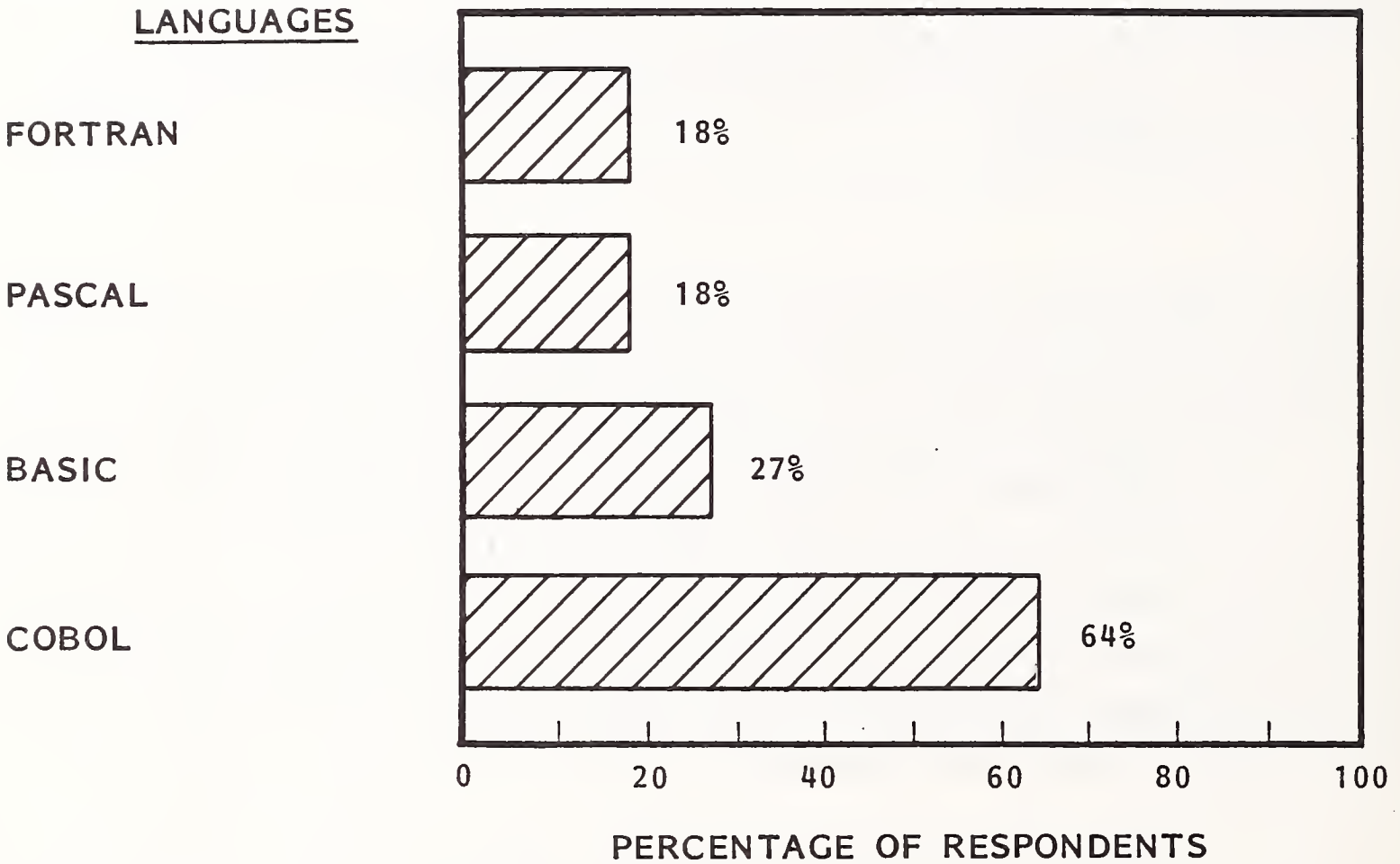
- Seventy-five percent of processing services respondents, indicated in Exhibit V-3, are engaged in professional services. They support clients with consulting and custom programming. Typically, price is bundled with the system cost.

- Software products are offered separately by 38% of those vendors surveyed.

- System packages are more often offered than applications software. This trend may be reversed as the processing services companies' investment in applications software grows.

EXHIBIT V-2

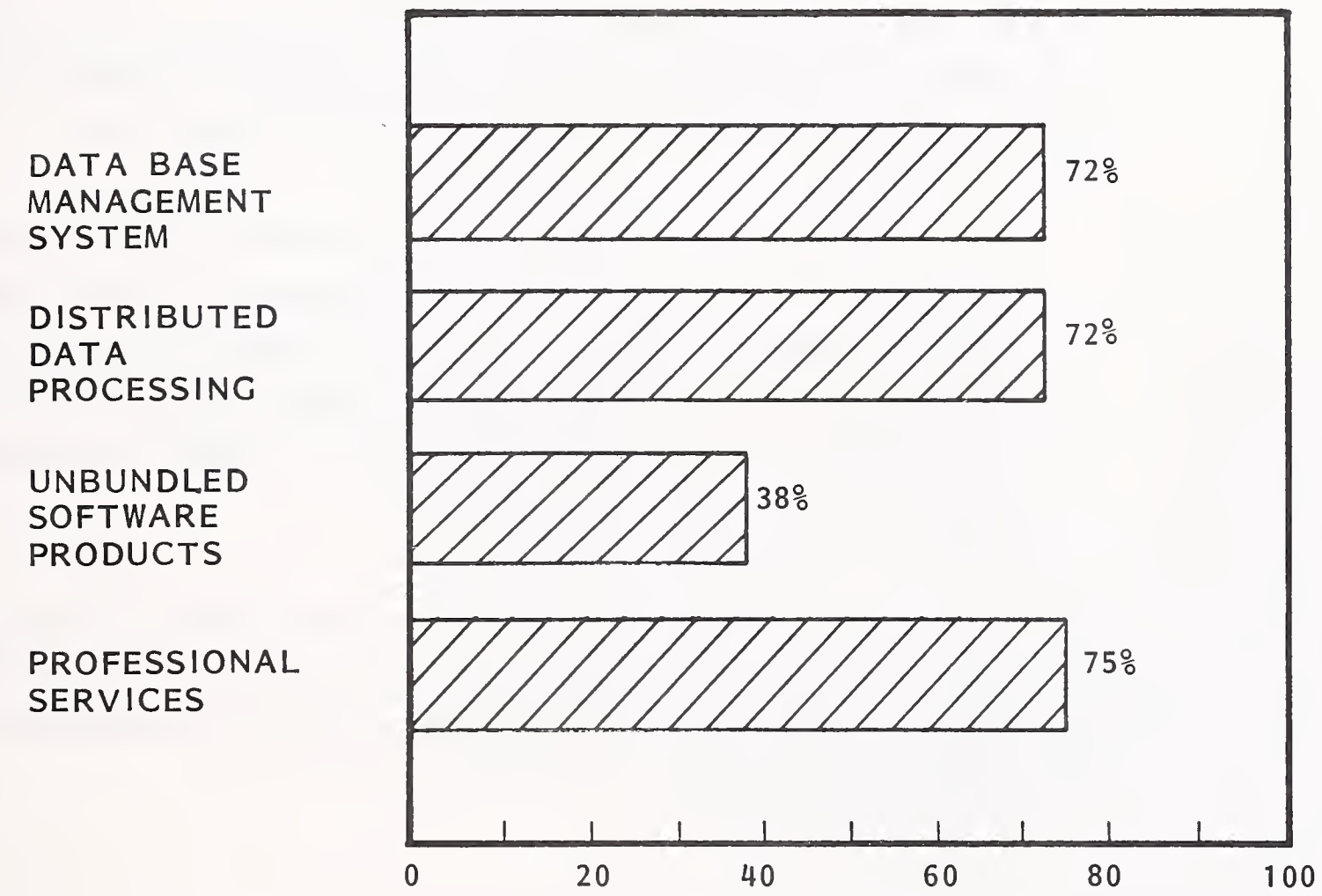
RESPONDENT HARDWARE MANUFACTURERS' COMPILER OFFERINGS FOR MINICOMPUTERS, MICROCOMPUTERS AND SMALL BUSINESS COMPUTERS



NOTE: PERCENTAGES WILL TOTAL GREATER THAN 100% DUE TO MULTIPLE RESPONSES

EXHIBIT V-3

RESPONDENT PROCESSING SERVICES COMPANIES'
RELATED PRODUCTS AND SERVICES



- Processing services companies tend to target the medical, manufacturing, distribution, and professional services sectors with their turnkey systems.

- Seventy-two percent of the respondents indicated that they offered distributed data processing capability. Distributed data processing will grow in importance as vendors become more involved in offering automated office services.

- The vast majority of respondents indicated that they are using a data base management system (DBMS) for their applications. The respondents who replied negatively, stated that one would be used in the near future.

  - A proprietary DBMS offered by a processing services vendor, and integrated into the applications, is an excellent way to tie users to a specific vendor. The user becomes reluctant to change suppliers because of the user investment in applications software and the conversion effort required to change from one DBMS to another or from one application system to another.

- The most preferred language for applications was COBOL, as can be seen in Exhibit V-4. Interestingly, no respondent in this group has yet used PASCAL, which seems to be gaining favor because of its greater portability, readability, and maintenance properties.

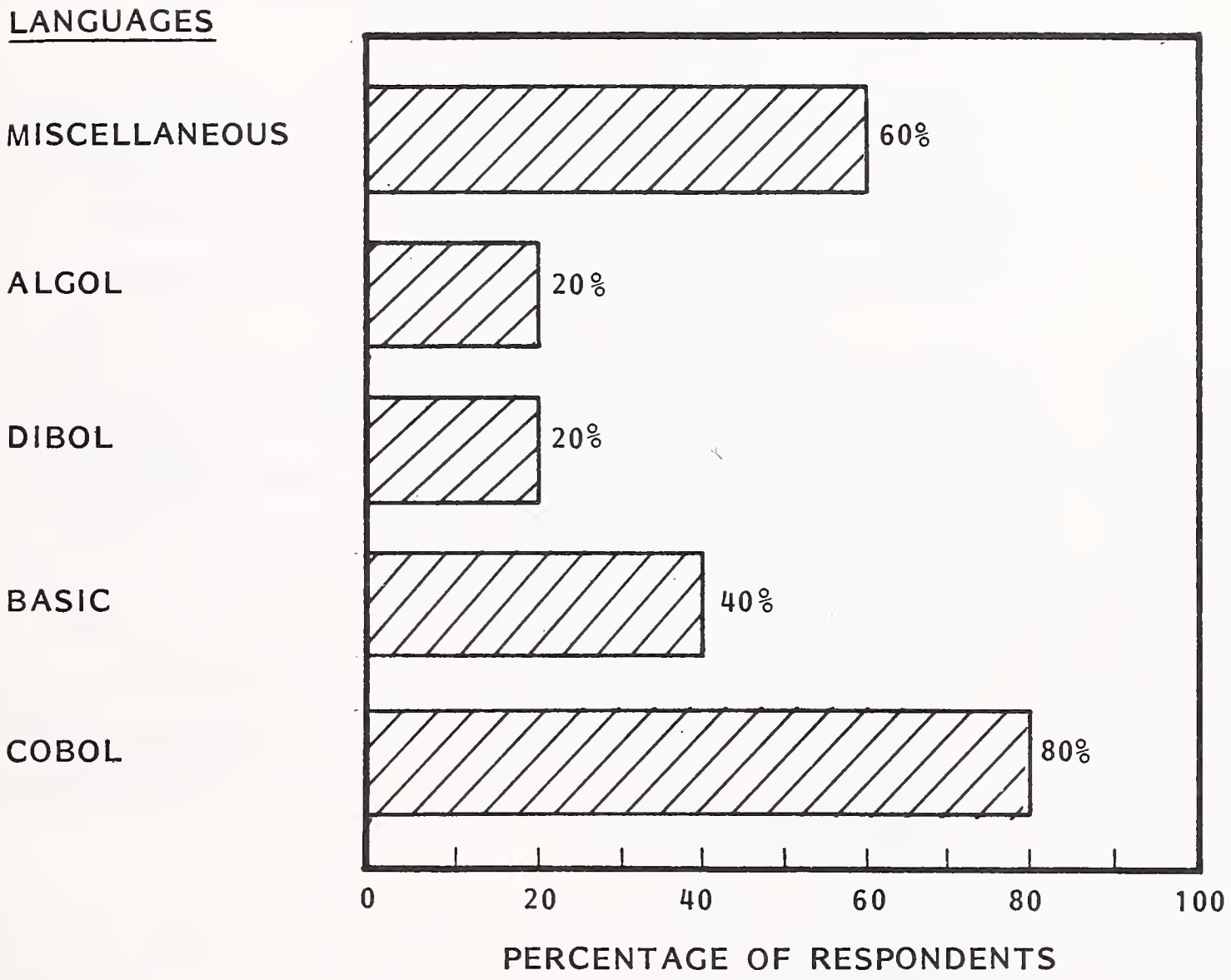
C. TURNKEY VENDORS' PRODUCTS AND SERVICES

- Because they have developed in response to particular user needs, turnkey vendors have become solution oriented.

  - They have assumed the role of integrators, in the sense that they match hardware and software to solve a problem.

EXHIBIT V-4

RESPONDENT PROCESSING SERVICES COMPANIES'
USE OF COMPILERS FOR
TURNKEY SYSTEM APPLICATIONS SOFTWARE



- Whereas the hardware manufacturer is commodity oriented, the turnkey vendor is concerned with the value added services.

- Less than one-third of the respondent turnkey vendors offered computer processing services, as Exhibit V-5 demonstrates.

  - Processing services offered were generally industry specific and delivered in a remote computing mode.

- Professional services were offered by over 75% of the respondents. Service and support are key aspects of this business, and the turnkey vendors were heavily engaged in consulting and custom software development which were assessed either on a fixed fee or on a time and materials basis.

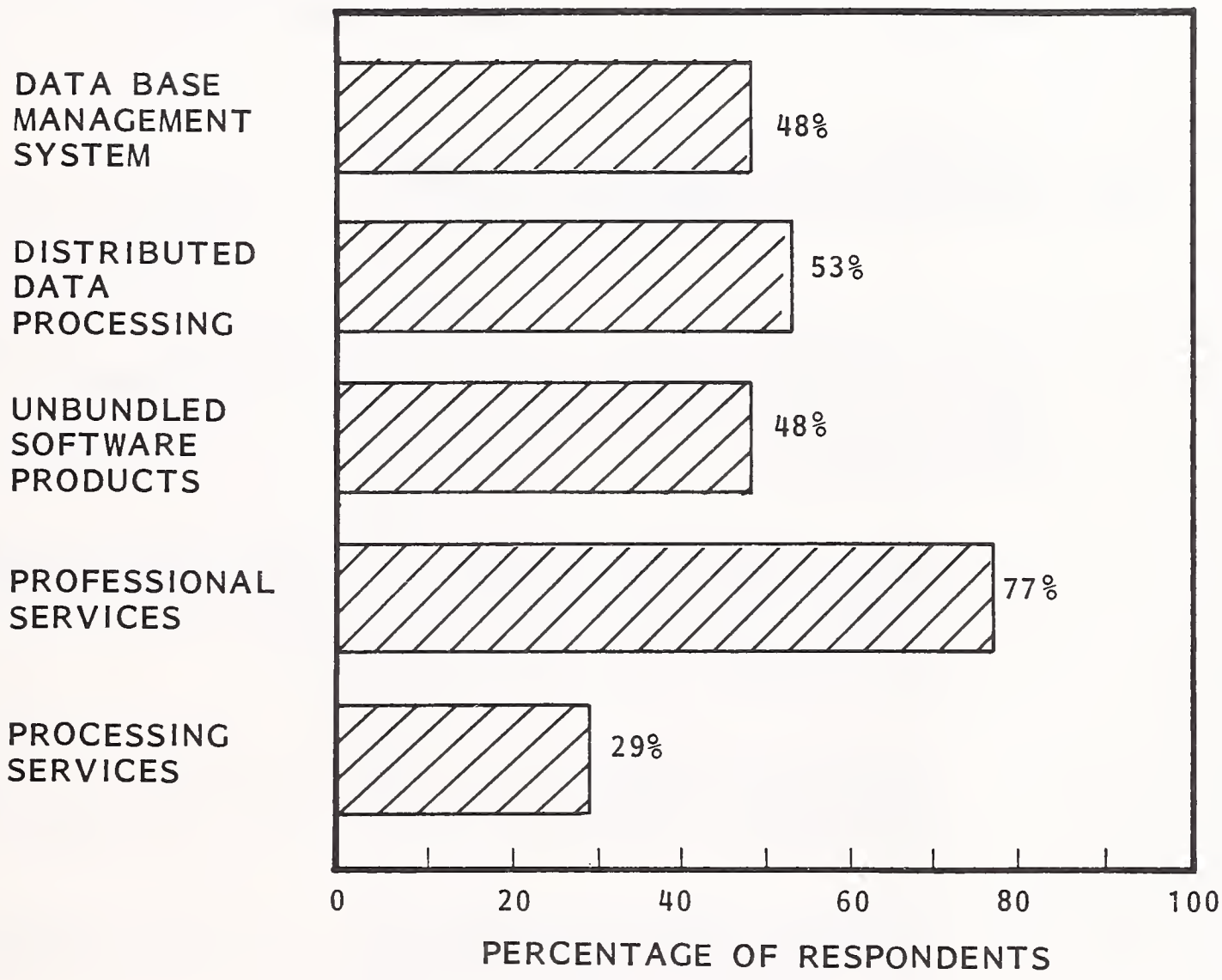
- Of those respondents interviewed, 53% indicated that distributed data processing can be implemented with their systems. Within the group who responded negatively, 14% suggested that networking was part of their strategy and that interconnection via communications would be achieved by 1980.

  - Vendors, particularly those engaged in word processing, are aware that distributed data processing provides the springboard for the office of the future. They are positioning themselves to gain leverage in this developing marketplace.

- Half the vendors surveyed offered their software products independently or packaged on a turnkey basis. Packages ran the gamut from general business applications with cross industry applicability to highly specialized products targeting a vertical market in the manufacturing, distribution, medical, local government, and professional service sectors.

EXHIBIT V-5

RESPONDENT TURNKEY VENDORS'
RELATED PRODUCTS AND SERVICES



- One-half of the respondents use a data base management system (DBMS) and, of these, four are used for specialized applications. Of the 50% who don't currently use a DBMS, four declared an intent to install a data base management system in the near future.

- Sixty-four percent of the respondents favored either BASIC or COBOL as the preferred language for their applications. The remainder, as shown in Exhibit V-6, used a wide variety of languages, including FORTRAN and PASCAL.

D. MARKETING STRATEGY AND PRICING

- There is a growing emphasis on solution oriented systems. The end user who may be a sales manager, personnel manager, or secretary is the turnkey system prospect.

  - Sales and technical personnel are the key factor in delivering this message. They have to speak the language of the user and be able to deliver products that fulfill end user needs.

  - Hardware manufacturers will have to learn to sell to the non-DP professional - a market that is relatively new to this class of vendors.

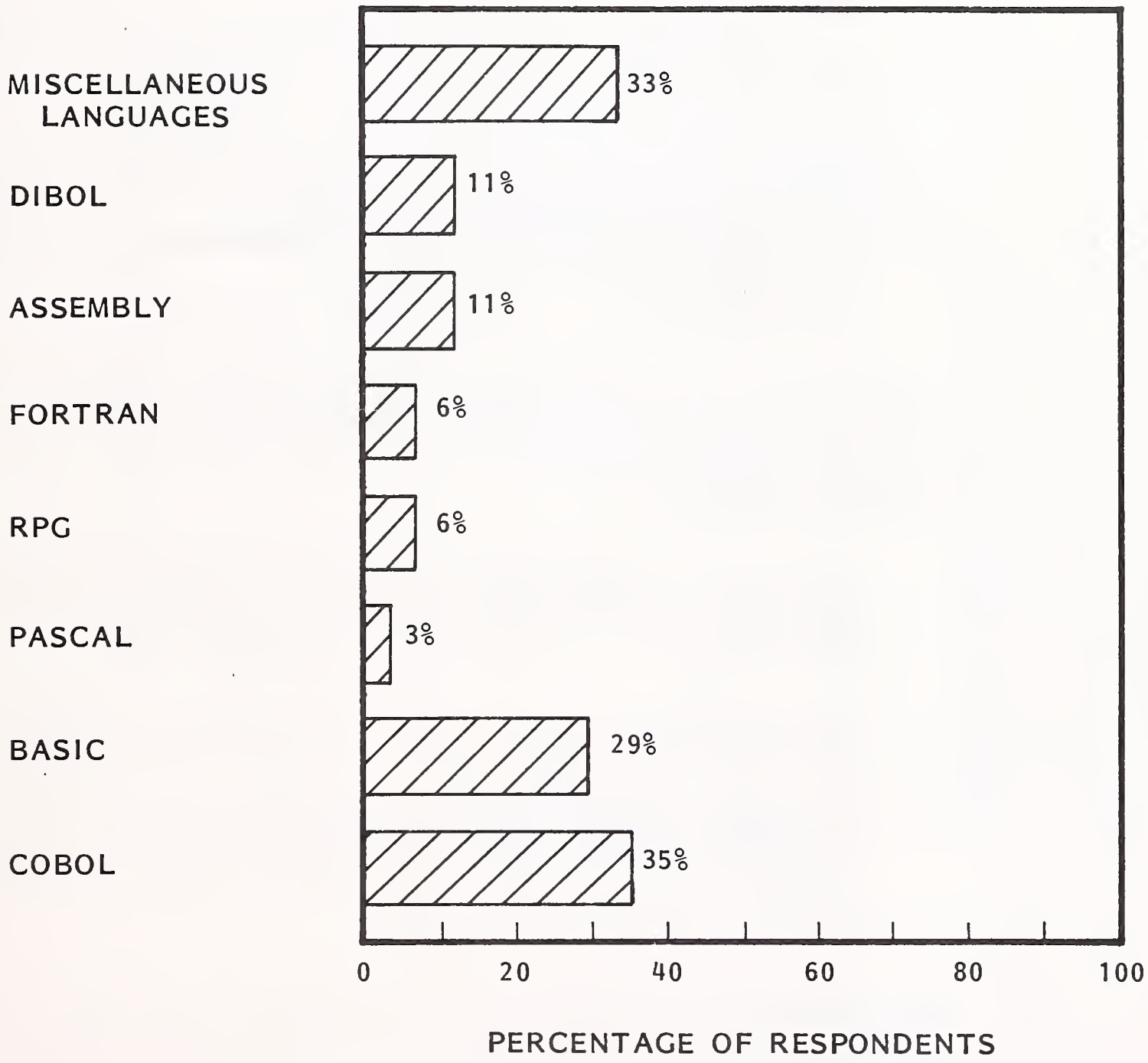
  - Processing services companies have a marketing advantage because their established client base might well provide the main source of turnkey systems prospects.

    . Customers or prospects can be offered the choice of processing services, software, turnkey systems, and user site hardware services, all delivered by the same vendor.

    . A clear migration path exists for the user, regardless of the point of entry into the processing company's product line. The

EXHIBIT V-6

RESPONDENT TURNKEY VENDORS'
USE OF LANGUAGES
FOR TURNKEY SYSTEM APPLICATIONS



user can migrate from processing services to turnkey or user site hardware services. The next step could be a move to an in-house computer where the user would buy the software from the processing vendor to avoid any conversion activity.

- Unlike hardware manufacturers or processing services companies, turnkey vendors don't have the resources or the ability to depend on either production or processing for survival.

- Difficulties are often experienced because turnkey vendors are often too small to engage in extensive market analysis and sales campaigns.

- Turnkey vendors have tended, therefore, to concentrate their efforts on regional markets where they can best control the chain of events. Many systems offered reflect this approach which is geared exclusively to local industries.

- Turnkey vendor respondents were asked to rate the importance of industry expertise and data processing expertise in their sales staff. The results are tabulated in Exhibit V-7.

  - Respondents indicated that an equal mix of industry expertise and data processing expertise were desirable in their sales staff.

  - The respondents expressed concern over the actual success in achieving this mix in their sales staff. The sales staff industry and data processing levels of expertise do not currently measure up to management's expectations. No plans were stated by management on how they plan to solve this problem.

- Generating leads for turnkey systems is obviously a key task, but most lead generating techniques yield less than satisfactory results, as shown in Exhibit V-8.

EXHIBIT V-7

TURNKEY VENDOR RESPONDENTS'
RATINGS OF SALES COMPETENCE

STATE OF COMPETENCE	LEVEL OF IMPORTANCE
INDUSTRY EXPERTISE	
ACTUAL	2.7
DESIRED	4.2
DATA PROCESSING EXPERTISE	
ACTUAL	2.6
DESIRED	4.1

NOTE: RATED ON A SCALE OF 1 TO 5, WHERE 5 = MOST IMPORTANT AND 1 = LEAST IMPORTANT

EXHIBIT V-8

RESPONDENTS' RATINGS OF LEAD GENERATING TECHNIQUES

FACTOR	HARDWARE MANU-FACTURER	PROCESSING SERVICES COMPANY	TURNKEY VENDOR	OVERALL
TRADE PRESS ADVERTISING	3.1	2.9	2.7	2.9
OTHER ADVERTISING	3.3	1.5	2.0	2.2
DIRECT MAIL	3.6	3.0	2.7	3.0
SEMINARS	3.5	3.6	2.8	3.2
COLD CALLING	2.6	2.3	2.4	2.4
HARDWARE VENDOR REFERRALS	NA	3.0	2.4	2.6
USER REFERRALS	4.0	4.4	4.2	4.2
DAPAPRO, AUERBACH, ETC	1.9	1.1	1.7	1.6

NOTE: RATED ON A SCALE OF 1 TO 5, WHERE 5 = MOST IMPORTANT AND 1 = LEAST IMPORTANT
NA = NOT APPLICABLE

- Referrals are the best source for generating qualified prospects. However, other lead generation techniques, while not rated as high in respondent level of satisfaction, are needed to generate a sufficient volume of leads to keep a sales force selling efficiently.

- Direct mail and seminars were rated slightly higher than average by respondents. This finding is supported by other INPUT studies that have shown that direct mail and seminars are good vehicles for generating a large number of qualified prospects.

- Other lead generating techniques, while not yielding satisfactory results, must still be used until more effective prospecting techniques are developed.

- All vendor classes reported an average selling cycle of four months.

  - Turnkey vendor respondents had the widest range, from two weeks to 18 months.

  - Hardware manufacturer respondents indicated a cycle of between one and eighteen months.

  - Processing services companies expressed a one to nine month sales cycle range.

- The sales approach used internationally by turnkey vendors of all types is shown in Exhibit V-9.

  - The tendency is clear to sell directly in the U.S., Canada, U.K., and Europe and to use agents/distributors in other countries.

  - This follows the same pattern of hardware and computer services selling strategies of U.S. based companies.

EXHIBIT V-9

SALES APPROACH USED BY RESPONDENTS
IN GEOGRAPHIC MARKETS

COUNTRY	NUMBER OF COMPANIES USING THIS APPROACH BY VENDOR TYPE					
	HARDWARE MANUFACTURER		PROCESSING SERVICES COMPANY		TURNKEY VENDOR	
	DIRECT SALES	AGENT/ DISTRIB-UTOR	DIRECT SALES	AGENT/ DISTRIB-UTOR	DIRECT SALES	AGENT/ DISTRIB-UTOR
U.S.A.	11	3	6	–	30	11
U.K.	10	3	–	1	5	7
EUROPE	9	6	–	1	3	7
CANADA	7	4	–	–	8	5
MEXICO	4	7	–	–	2	4
CENTRAL AMERICA	5	6	–	–	–	3
SOUTH AMERICA	5	9	–	–	1	4
FAR EAST	4	9	–	–	1	8
NEAR EAST	2	7	–	–	1	3

- Vendors were asked if they would consider sharing applications software between vendor types and whether they would consider obtaining maintenance on that applications software from another vendor.

  - Respondents overwhelmingly agreed that sharing applications would be in everyone's best interest. More systems could be sold if the applications were available to vendors.

  - No suggestions were made by respondents on how an applications software sharing system could be established. This is an interesting opportunity for a vendor to investigate further.

  - A minority of respondents have had problems with applications sharing in the past, mainly because the applications did not perform the functions as advertised. However, the majority of these firms indicated that they would consider sharing software again.

E. PROFITABILITY FACTORS

- Respondents were asked to rate a list of factors, in terms of their importance, in making money in the turnkey system business. The factors are described below:

  - Profit contribution from the sale of hardware.

  - Profit contribution from the sale of software.

  - Profit contribution from on-going hardware maintenance (usually not included as an element in a turnkey system sale).

  - Profit contribution from on-going software maintenance (usually not included as an element in a turnkey system sale).

- Profit contribution resulting from an orientation in the organization to understand prospect needs, and to translate those needs into turnkey system specifications that will ultimately lead to sales.

- Profit contribution from a company direction that feels the most important job responsibility of every employee is to sell, sell, sell.

- Profit contribution from training classes as add-ons to a turnkey system sale (these classes would only be a part of the turnkey system sale if they are included in the original turnkey system sales contract).

- Profit contribution from custom programming and consulting as a part of the turnkey system sale.

- Profit contribution resulting from controlling costs.

• The most important money making factor to all respondents was the software element of the turnkey system, as shown in Exhibit V-10.

- Respondents indicated that most of the profit contribution of the turnkey system elements came from software - particularly packaged software.

- With this orientation, it is surprising to see that respondents were not more active in software package development. It would be expected that the vendors would invest in the systems aspect that generates the greatest return - software.

- Software maintenance, although not a part of the turnkey system sale, is important as a follow-on item to vendors. Vendors do not feel that they generate as much profit from software maintenance as is generated from software package sales.

EXHIBIT V-10

RESPONDENTS' RATINGS OF MONEY-MAKING FACTORS IN TURNKEY SYSTEMS

FACTOR	VENDOR TYPE			OVERALL
	HARDWARE MANU-FACTURER	PROCESSING SERVICES COMPANY	TURNKEY SYSTEM VENDOR	
HARDWARE	3.6	3.4	3.4	3.4
SOFTWARE	4.8	5.0	4.6	4.7
HARDWARE MAINTENANCE	3.7	2.3	3.4	3.2
SOFTWARE MAINTENANCE	4.1	3.4	3.4	3.5
MARKETING	3.9	4.6	3.8	4.0
SALES	3.8	4.0	3.9	3.9
TRAINING	3.2	3.1	2.9	3.0
PROFESSIONAL SERVICES	2.6	2.3	3.0	2.8
COST CONTROL	3.4	4.6	3.6	3.8

NOTE: RATED ON A SCALE OF 1 TO 5, WHERE 5 = MOST IMPORTANT AND 1 = LEAST IMPORTANT

- The second ranked money making factor is the marketing orientation that companies develop. Respondents were in near unanimous agreement that customer and prospect needs should drive the company; however the larger vendors were generally the only firms to actually implement such a policy.

- It was initially surprising to see that hardware was not rated higher as a moneymaking factor, particularly by hardware manufacturers. Closer examination yielded a reasonable explanation for this situation.

  - Most turnkey systems are sold in highly competitive environments. When negotiations with prospects become intense, discounting becomes commonplace. The first item to be discounted is usually the hardware, although the prospect may not be aware of this. Respondents indicated that the hardware was occasionally sold near cost in intense competitive situations.

F. MAINTENANCE

- Maintenance is of paramount importance in turnkey system support.

  - If someone other than the hardware manufacturer sells the system, who performs the hardware maintenance and the systems software maintenance?

  - If hardware and systems software maintenance is performed by the hardware manufacturer, but the system is sold by a non-hardware manufacturer, who should the user call if there is a problem with the turnkey system?

- The user wants to call one number if support is needed. Users expect that the vendor providing support will solve the problem, whether it is in the hardware, systems software, or applications software. The user bought a turnkey system and expects turnkey maintenance.

- Hardware manufacturers clearly have an advantage over processing services companies and turnkey vendors in this area.

- Processing services companies are beginning to deal with the central maintenance issue when selling distributed data processing products, such as user site hardware services and intelligent terminals.

- Maintenance on turnkey systems is performed by different vendor types. The maintenance must be performed on hardware, systems software, and applications software. Exhibit V-11 shows the number of respondents involved in each type of maintenance.

  - The original hardware manufacturer performs the maintenance on nearly 70% of the hardware and 60% of the systems software, but on only 22% of the applications software. It is interesting to note the interaction between the hardware manufacturers and turnkey vendors on applications software.

    . Over one-half of the hardware manufacturing respondents look to turnkey vendors for applications software maintenance. This is an indication of the lack of applications software capability of these companies, as well as the lack of investment made in applications software by the manufacturers.

    . Nearly one out of five turnkey vendors look to hardware manufacturers for applications software support. In these cases, the turnkey vendors are acting as the sales force for the hardware manufacturer without being the manufacturing companies' employees.

EXHIBIT V-11

WHO PERFORMS MAINTENANCE,
AS REPORTED BY RESPONDENTS

WHO PERFORMS MAINTENANCE	NUMBER OF RESPONDENTS			OVERALL PERCENT OF RESPONDENTS
	HARDWARE MANU-FACTURER	PROCESSING SERVICES COMPANY	TURNKEY VENDOR	
HARDWARE				
ORIGINAL MANUFACTURER	11	6	24	69%
THIRD PARTY	2	1	5	14
TURNKEY VENDOR	-	-	10	17
SYSTEMS SOFTWARE				
ORIGINAL MANUFACTURER	13	6	15	59
THIRD PARTY	-	1	2	5
TURNKEY VENDOR	-	1	20	36
APPLICATIONS SOFTWARE				
ORIGINAL MANUFACTURER	5	-	7	22
THIRD PARTY	-	1	-	2
TURNKEY VENDOR	6	7	28	76

- Turnkey vendors and processing services companies perform nearly 20% of their own hardware maintenance, nearly 40% of their own systems software maintenance, and over three-quarters of their applications software maintenance. A high proportion of hardware maintenance is performed by processing services companies and turnkey vendors.

- Over 85% of all processing services company respondents perform their own hardware maintenance. Given the small installed base of hardware of these companies, it would appear that this support function must be a drain on profits. However, none of the respondents indicated that hardware maintenance was a money loser.

- Many of the turnkey vendors perform their own maintenance because of the mix of hardware that was included in the turnkey sale. For example, a processor from DEC is combined with a printer from Diablo and terminals from Hazeltine. In some cases, special adapters are made by the turnkey vendors to connect the hardware together. In these cases, the turnkey vendor must take responsibility for hardware maintenance.

- Third party maintenance companies perform 14% of the hardware maintenance, but less than 5% of the systems and applications software maintenance.

• A key maintenance issue, from the user perspective, is the interface point for support. Respondents were asked to identify whether the user called a central office or a local office for support. The data are summarized in Exhibit V-12.

- Roughly one-half of the respondents ask the user to call a central office for support.

- Hardware manufacturers and processing services companies lean toward the use of local offices for support while turnkey vendors tend to utilize central support. These statistics are related to company size.

EXHIBIT V-12

RESPONDENTS' METHODS OF MAINTENANCE

HOW MAINTENANCE IS PERFORMED	NUMBER OF RESPONDENTS			OVERALL PERCENT OF RESPONDENTS
	HARDWARE MANU-FACTURER	PROCESSING SERVICES COMPANY	TURNKEY VENDOR	
HARDWARE				
CENTRAL	5	2	18	44%
LOCAL	8	6	18	56
SYSTEMS SOFTWARE				
CENTRAL	5	3	24	55
LOCAL	8	5	13	45
APPLICATIONS SOFTWARE				
CENTRAL	2	3	25	53
LOCAL	9	5	13	47

. Large companies have local offices with support personnel capable of handling customer inquiries.

. Small companies have local sales offices only, with support handled from headquarters.

- Another key issue, from the user perspective, is the capability of the vendor to identify and solve turnkey system problems in a timely fashion.

  - Users in remote locations or in cities where the vendor does not maintain a presence are concerned about the ability of the vendor to provide user support.

  - Vendors are designing hardware and software that can be diagnosed remotely in order to identify problems. Some vendors provide the added ability to modify software for the user from a remote site.

  - Vendors offering remote diagnostics capabilities have a support advantage over vendors that must send personnel to the user site to identify problems. The cost savings to remote diagnostics are obvious; plus the user is able to obtain support far faster than possible with on-site maintenance people.

  - Over one-half of the respondents indicated that hardware and software could be diagnosed remotely from the user site, as shown in Exhibit V-13. Although not all of the respondents currently use the remote diagnosis feature, all intend to use it in the future.

G. FOLLOW-ON BUSINESS

- All vendors of turnkey systems interviewed stressed the importance of follow-on business to the initial turnkey system sale.

EXHIBIT V-13

REMOTE DIAGNOSTICS CAPABILITY OF RESPONDENTS

REMOTE DIAGNOSTIC USE	PERCENT OF RESPONDENTS HAVING REMOTE DIAGNOSTICS CAPABILITY			OVERALL PERCENT OF RESPONDENTS
	HARDWARE MANU-FACTURER	PROCESSING SERVICES COMPANY	TURNKEY VENDOR	
HARDWARE	50%	75%	50%	54%
SYSTEMS SOFTWARE	50	100	53	60
APPLICATIONS SOFTWARE	25	88	53	52

- Vendors have recognized that additional sales can be made to customers when new needs arise. These sales involve additional memory, disk storage, peripherals, software, professional services, and new processors.

- Vendors have also recognized that when a turnkey system becomes obsolete through technological change, a completely new turnkey system can be sold to the end user. There is little risk of displacement of hardware alone because the end user doesn't understand hardware and, initially, didn't buy the hardware separately. The end user bought a total system and will continue to buy complete systems in the future.

- Follow-on, or add-on, business can also take the form of selling a microprocessor based computer assisted instruction turnkey system. As has been mentioned, this is of critical importance to support turnkey systems in the future.

- It should be reiterated the follow-on business of hardware, software, or services sold separately are not included in the forecast.

  - Established turnkey vendors have found that the user will generally pay as much for follow-on business over a five year period as he initially paid for the entire turnkey system. This could amount to an additional five billion dollar market by 1984.

  - Turnkey vendors reported up to 80% of their annual revenue is currently being generated from follow-on business. A 20% figure, which is closer the the norm, would tie to the $5 billion follow-on market in 1984 discussed above.

H. PERSONNEL FUNCTIONS

- Exhibit V-14 shows the personnel distribution by job function for respondent vendors.

  - Sales, hardware maintenance, and software were targeted for analysis. All other personnel are included under the "other" category.

- Processing services companies stress software development and maintenance. This reflects the investment and commitment that these vendors have in software growth for the future.

- Hardware manufacturers are not making as large an investment in software as are processing services companies and turnkey vendors when examined on a percent of personnel basis. However, the dollars that are invested in software - particularly systems software - by hardware manufacturers are large.

I. FUTURE OF TURNKEY SYSTEM VENDORS

- The turnkey vendor has traditionally been in a good position to sell to the end user. Small turnkey vendors must maintain a close relationship with the end user in order to maintain their viability in the face of increased competition from large hardware manufacturers and processing services companies.

- Turnkey vendors will increasingly look to software manufacturers for software and software maintenance.

  - Software manufacturers create and sell software to hardware manufacturers, processing services companies, and turnkey vendors. They rarely sell directly to end users.

EXHIBIT V-14

RESPONDENT PERSONNEL DISTRIBUTION BY JOB FUNCTION

COMPANY TYPE	FUNCTION (PERCENT)				
	SALES	HARDWARE MAINTE-NANCE	SOFTWARE DEVELOP-MENT AND MAINTE-NANCE	OTHER	TOTAL
HARDWARE MANUFACTURER	8%	22%	9%	61%	100%
PROCESSING SERVICES COMPANY	21	4	24	51	100
TURNKEY VENDOR	25	25	14	36	100

  - Software manufacturers have existed in the processing services area for years. Tymshare, McAuto, University Computing Company, and others have obtained software for their networks from small software manufacturers.

  - Some turnkey vendors have become software manufacturers, too. However, in addition to providing software to other turnkey vendors, they generally buy hardware from the manufacturer and then resell it to their clients. This generates the greatest hardware discounts possible for all parties involved. Binary Data Systems, Integrated Software Systems of San Diego, and Minicomputer Business Applications of Los Angeles are examples of software manufacturers.

- Industry and function specific software is needed for turnkey systems. Individual turnkey vendors will not be able to fund the cost of developing all of the software that is needed.

  - Decreasing hardware prices result in smaller hardware dollar margins which will cut into profits unless some countervailing action is taken. The action could be to sell more hardware or to generate a greater profit from software. The potential for generating more profit from software will fuel the growth of software manufacturers.

- Turnkey vendors are typically small companies. In order to remain competitive, these firms will need to carefully assess their product offerings and their geographic coverage.

  - Vendors need to sell quality products in narrow markets and establish market share. This will help keep out competition from hardware and processing services companies. The competition will not be able to anticipate an adequate rate of return on investment in software if the market is already being properly served.

- Small turnkey vendors may often find their best opportunities in small towns where they are known. Major manufacturers and processing companies may not choose to maintain an office in many small cities, thereby providing a geographic advantage to the turnkey vendor. However, small towns, by their very nature, provide a limited market for growth.

- Many small turnkey vendors will probably add office products and other services to their product line to present an image to their clients as a full service supplier.

- Processing services companies will continue to add turnkey systems to their product offerings. This is particularly true for:

  - Large processing services companies looking for additional markets for their products.

  - Small processing services firms that have experienced stagnant or declining processing service revenues and have decided to sell turnkey systems to increase their sales.

  - Processing firms will continue to utilize their industry functional area and software expertise to develop systems with a hardware component (either turnkey or user site hardware service).

- Processing services firms have two main customer types:

  - First time computer users.

  - Companies with in-house computers that have a need for overload processing or unique software, communications, or data base capabilities.

- The first time computer user is a turnkey system prospect. The processing services firm is vulnerable to losing this customer unless a turnkey system is made available (or a user site hardware service).

- Processing services companies will concentrate their selling efforts in the larger metropolitan areas and in large companies where the economics of developing and maintaining a direct sales force can be justified.

- Processing services firms will acquire small hardware manufacturers in order to obtain hardware assembly capabilities. McDonnell Douglas has recently completed its tender offer for Microdata. It is reasonable to assume that the McDonnell Douglas Automation Company (McAUTO) will ultimately be combined with Microdata.

- Processing services firms will buy out software manufacturers to acquire the industry and function specific software.

- Processing services companies are evaluating hardware assembly for user site hardware services and for turnkey systems. National CSS has assembly operations for its 3200 system.

  - Processing companies believe they can assemble their own hardware less expensively than they can by buying pre-assembled hardware from manufacturers.

  - Some processing companies are assembling hardware because unique capabilities are required that are not available elsewhere in the marketplace.

  - Processing companies are offering hardware solutions to retain customers and expand their prospect base.

- Hardware manufacturers will move increasingly toward selling directly to the end user. Software will provide the needed added value required to sell

functional area end users; and hardware manufacturers will obtain this software.

- Hardware manufacturers will probably obtain software from software manufacturers, either through licensing arrangements or company acquisition.

- There will be several acquisitions of processing services firms by hardware manufacturers, although this will not be a general trend.

- Hardware manufacturers will develop a large amount of software themselves in cases where software is not available and where the acquisition price for a software manufacturer exceeds the anticipated software development costs.

- Because of internal policy constraints and potential anti-trust implications, it is unlikely that IBM will acquire software manufacturers. IBM can and will, however, buy or lease the software it needs whenever internal development does not make economic sense.

  - Because of IBM's size, the company can usually justify a higher software investment than other firms.

- Most hardware manufacturers are currently not well positioned to make substantial software investments.

  - The heavy investment in research and development to continue lowering hardware prices and to remain competitive on hardware functions is a major concern of all manufacturers.

  - Substantial investment in plant and equipment to increase and/or modify production capabilities is required as technology has changed and new products brought to market.

- The dilemma for the hardware vendors is that they must be prepared to sell directly to the end user in three to five years and must have the software ready to sell to this end user. The hardware manufacturer will begin to weigh the advantages of new production capacity with the need for software products.

- Hardware manufacturers, like processing services firms, will concentrate their direct selling efforts in larger metropolitan areas and in large companies. In addition, hardware manufacturers will open up more retail stores to attract prospects from all locations.

- The software manufacturer is well positioned to fill a major market need in the next three to five years.

  - This need is so critical to processing and hardware manufacturers, however, that acquisitions of these companies will be made.

  - Those software manufacturers not acquired will experience intense competition from processing services and hardware firms five years from today.

  - Office products companies will also move to acquire software manufacturers. Software will be the key ingredient to facilitate the linking of word processing, communications, and data processing.

- Software manufacturers may ultimately be forced from the marketplace.

  - Many will be acquired.

  - Processing services and hardware manufacturers will eventually become direct competitors.

  - Software manufacturers, like many hardware manufacturers today, don't sell directly to end users. Software manufacturers have little or

no control on the channel of distribution because their customer - the turnkey vendor - sells directly to the end user.

- Software manufacturers, turnkey vendors, and processing services firms will initially be supported and encouraged by hardware manufacturers. In the next three to five years, however, hardware manufacturers will increasingly view these types of companies as direct competitors. Their response will be to reduce discounts on hardware and perhaps modify the hardware frequently to require software changes. This, for example, has been IBM's response to aggressive plug compatible computer manufacturers.

- The market for turnkey systems is segmenting in two directions: smaller turnkey systems, generally microprocessor based; and larger turnkey systems utilizing many terminals, large amounts of storage, and the ability to perform many tasks concurrently for the user.

  - The smaller turnkey systems will be directed to the small businesses, first time users and small groups in large corporations.

- Respondents were asked to comment on the future of the turnkey system market. The comments fairly summarize everything that has been addressed in this study:

  - "Sell solutions to the end users."

  - "Product offerings should be specialized by industry and function."

  - "Merge hardware, software, and networks together to create solutions."

  - "Develop and use tools that aid application software creation."

APPENDIX A: DEFINITIONS

APPENDIX A: DEFINITIONS

- A Small Business Computer, for the purpose of this study, is a system which is built around a central processing unit (CPU), and which has the ability of utilizing at least 20M bytes of disk capacity, provides multiple CRT work stations, and offers business oriented system software support.

- A Small Business Computer Manufacturer builds its system around a proprietary CPU and provides system software. It may make or buy peripheral equipment and semiconductor devices. Distribution to the end user may be through its company field sales offices, a network of distributors, or both.

- Software Products are systems and applications packages which are sold to computer users by equipment manufacturers, independent vendors, and others. They also include fees for work performed by the vendor to implement a package at the user's site.

- A Turnkey System is composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of an application (or applications) for a user.

- A Turnkey Vendor integrates hardware and software into a total turnkey system to satisfy the data processing requirements of the end user. He may also develop software products for license to end users.

- A Distributor purchases the small business computer on an OEM basis from the manufacturer and markets it to the end user. It may or may not provide a turnkey system.

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

- An End User may buy a system from the hardware supplier(s) and do his own programming, interfacing, and installation. Alternately, he may buy a turnkey system from a systems house or hardware integrator.

- A Hardware Integrator develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. He may also develop control system software in addition to installing the entire system at the end user site.

- A Microcomputer combines all of the CPU, memory, and peripheral functions of a computer on a chip of silicon. It may be sold in an integrated circuit package or with the addition of more memory and peripheral circuits packaged on a board or in a console.

- A Minicomputer is usually a 12 or 16 bit computer which is provided with limited application software and support and represents a portion of a complete large system.

APPENDIX B: INTERVIEW PROFILE

APPENDIX B: INTERVIEW PROFILE

Hardware Manufacturers	16
Processing Services Companies	10
Turnkey System Vendors	45
Total Vendors Interviewed	71

APPENDIX C: RELATED INPUT REPORTS

APPENDIX C: RELATED INPUT REPORTS

TITLE	PUBLICATION DATE	PRICE
Computer Services Industry 1979 Annual Report	Dec 1979	$4,000
1979 ADAPSO Annual Report	July 1979	$ 595
Acquisition Strategies For Computer Services Companies - Impact Report #12	Mar 1979	$2,500
Opportunities In User Site Hardware Services - Impact Report #11	Feb 1979	$2,000
Trends In Services And Software Pricing - Impact Report #9	July 1978	$1,000

APPENDIX D: QUESTIONNAIRE

TURNKEY SYSTEMS MARKETS

Turnkey systems are a complete package of standalone hardware, systems software and applications software sold together to solve a user's problem. The key is the solution rather than the specific hardware or software. Do you agree with this definition? If not, how would you modify it? _____

_____

1. Please describe your turnkey systems.

APPLICATION AND INDUSTRY	VENDOR		MEMORY SIZE RANGE	TYPICAL MEMORY SIZE	DISK STORAGE RANGE	TYPICAL DISK SYSTEM SIZE	TYPICAL NUMBER OF CRTs OR TERMINALS	SYSTEM PRICE RANGE	TYPICAL SYSTEM PRICE	NUMBER OF CUSTOMERS	NUMBER OF INSTALLATIONS	USER PROSPECT COMPANY SIZE
	PROCESSOR	PERIPHERALS										

2. Please answer the following questions relative to the type of product and services that you offer.

a. Do you offer any processing services? ☐ Yes ☐ No

If yes, briefly describe _____

_____

b. Do you offer any professional services? ☐ Yes ☐ No

If yes, briefly describe _____

_____

c. Do you sell software products separately? ☐ Yes ☐ No

If yes, describe your offerings:

Systems Software	Applications Software
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

d. What programming language is used most commonly for your applications software? _____

e. Do you use a data base management system? ☐ Yes ☐ No

If yes, which and for what applications? _____

_____

Do you intend to use one, or an additional one? _____

f. Do you use distributed processing as a part of your offering?

☐ Yes ☐ No If yes, describe _____

_____

_____

INP

g. Could your turnkey system be connected to a larger computer system? ☐ Yes ☐ No

Describe: _____

_____

_____

h. Describe the upward migration path that your customer would typically take as a system is outgrown:

	Yes/No	Approximate Cost
Processor Change		
Add Disk Storage		
Change Disk Storage		
Add Memory		
Add CRTs or Terminals		
Other		

3. Please answer the following questions regarding marketing strategy and tactics:

   a. Please rate the following methods of generating leads on a scale of 0 to 5 where 0 indicates an effective technique and 5 represents the most effective lead generating technique:

Lead Generating Technique	Rating	Comments
Advertising - Trade Press		
Advertising - Other		where?
Direct Mail		source?
Seminars		
Cold Calling		sales function?
Hardware Vendor		
Referrals		
Datapro, Auerbach, etc.		which?
Other		

b. Where are your systems sold?

Country	Direct	Agent/Distributor*
USA		
United Kingdom		
Europe		
Canada		
Mexico		
Central America		
South America		
Far East		
Near East		
Other		

*Give revenue of agents/distributors

c. Are your prospects looking for larger or smaller turnkey systems than in 1976-1977? ☐ Larger ☐ Smaller

Is this a trend? ☐ Yes ☐ No

Why? _____

_____

d. How many days between initial contact and sales close? _____

_____

e. What will the typical system sell for in 1984? _____

Why? _____

_____

f. Please rate the following factors in importance for making money in the turnkey systems business. Please use a scale of 1 to 5 where 1 indicates no importance and 5 indicates greatest importance.

Factor	Rating
Hardware	
Software	
Hardware Maintenance	
Software Maintenance	
Marketing	
Sales	
Training	
Professional Services	
Cost Control	
Other	

g. In developing a price for your turnkey systems, what percent of the price applies to each of the following?

Component	Percent of Price
Hardware	
Software	
Installation	
Training	
Other	
Total	100%

4. Please indicate your revenue and systems shipped figures for turnkey systems only (this data will be aggregated for forecasting purposes only).

		Revenue	Number of Systems Shipped
	1977	_____	_____
	1978	_____	_____
Estimated	1979	_____	_____
Forecast	1984	_____	_____

5. Please answer the following questions with regard to turnkey system hardware and software maintenance. (Check all that apply)

a. How is maintenance performed?	Hardware	Systems Software	Applications Software
Central Office			
Local Office			
b. Who performs the maintenance?	X	X	X
Original Manufacturer			
Third Party			
Turnkey Vendor			
c. Do you use remote diagnostics?			

d. Would you consider obtaining software and/or maintenance from another vendor? ☐ Yes ☐ No

Why? _____

_____

_____

6. How many employees do you have with a primary responsibility in one of the following areas? (this data will be aggregated for forecasting purposes only)

Area	Number of Employees
Sales	
Hardware Maintenance	
Software Development	
Software Maintenance	
Management	
Other	
Total	

7. How many years has your company been in the turnkey systems business?

_____

8. What is your approximate pre-tax profit margin? (this data will be aggregated for forecasting purposes only)

1978 _____ 1979 (est.) _____

9. What impact will technology (hardware, software, communications) have on the turnkey business in the next 5 years? _____

_____

_____

10. Please rate the following factors as fueling the growth in turnkey systems. Please use a scale of 1 to 5 where 1 indicates no impact and 5 indicates a major impact on growth.

Factor	Rating
Cost	
Sales Personnel	
Technical Personnel	
User Training	
Competition from Hardware Manufacturers	
Competition from Remote Computing Services Companies	
Competition from Turnkey Vendors	
Turnkey System Quality	
Hardware Quality	
Variety of Applications	
Prospect Sophistication	
Other	

11. Please rate the following factors as limiting the growth in turnkey systems. Please use a scale of 1 to 5 where 1 indicates no limit to growth and 5 indicates a major limiting impact on growth.

Factor	Rating
Cost	
Sales Personnel	
Technical Personnel	
User Training	
Competition from Hardware Manufacturers	
Competition from Remote Computing Services Companies	
Competition from Turnkey Vendors	
Turnkey System Quality	
Hardware Quality	
Variety of Applications	
Prospect Sophistication	
Other	

12. Regarding the future of turnkey systems, what do you forecast regarding:

Applications _____

_____

_____

Office of the Future _____

_____

_____

Pricing _____

_____

_____

13. Are you considering hardware alternatives?

Describe: _____

_____

_____

_____

14. Please rate the importance of technical competence for the sales staff. Use a scale of 1 to 5 where 1 indicates minimal technical skills and 5 represents highly technical skills.

Sales Staff Technical Competence	Industry Expertise	Data Processing Expertise
Actual		
Desired		

15. What percent of your revenue comes from repeat business (second, third, etc. time buyer) as opposed to the first time user?

_____ %

14. Please rate the importance of technical competence for the sales staff. Use a scale of 1 to 5 where 1 indicates minimal technical skills and 5 represents highly technical skills.

Sales Staff Technical Competence	Industry Expertise	Data Processing Expertise
Actual		
Desired		

15. What percent of your revenue comes from repeat business (second, third, etc. time buyer) as opposed to the first time user?

_____ %