OPPORTUNITIES IN MARKETING

SYSTEMS SOFTWARE PRODUCTS

INPUT

THE COMPANY

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

The company carries out continuous and in-depth research. Working closely with
clients on important
members analyze and
data, then develop
innovative ideas to
Clients receive re
access to data on whi
and continuous consul

Many of INPUT's prof
have nearly 20 year
areas of specializati
senior management p
marketing, or planr
enables INPUT to su|
to complex business p

Formed in 1974, II
leading internation
Clients include ove
largest and most
companies.

UNITED STATES, West Coast
2471 East Bayshore Road
Suite 600
Palo Alto, California 94303
(415) 493-1600
Telex 171407

UNITED STATES, East Coast
Park 80 Plaza West-1
Saddle Brook, New Jersey 07662
(201) 368-9471

UNITED KINGDOM
INPUT Europe
Empire House
High Road

MAS

HOR

Opportunities in Marketing
Systems Software Products

M
1979
SFW

M
1979
SFW

ce Company, Ltd.
lo. 12-7 Kita Aoyama

Merriwa Street
N.S.W. 2072

OPPORTUNITIES IN MARKETING
SYSTEMS SOFTWARE PRODUCTS

IMPACT REPORT #14

AUGUST 1979

INPUT

OPPORTUNITIES IN MARKETING
SYSTEMS SOFTWARE PRODUCTS

- i -

TABLE OF CONTENTS

INPUT

INPUT

OPPORTUNITIES IN MARKETING
SYSTEMS SOFTWARE PRODUCTS

LIST OF EXHIBITS

INPUT

INPUT

INPUT

I INTRODUCTION

I   INTRODUCTION

- This INPUT report on marketing systems software is part of the Market Analysis Service (MAS).

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

- Research for this report included a series of in-person and telephone interviews, conducted in June 1979, with top officers of systems software companies and with EDP managers.

- The report evolved from an analysis of the specific interviews conducted for the study combined with computer census data from Computer Intelligence Corporation and the experience and analyses of the INPUT staff.

- The study considers only the United States market for systems software. 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.

INPUT

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

- Related INPUT studies are listed in Appendix C.

INPUT

II EXECUTIVE SUMMARY

II   EXECUTIVE SUMMARY

A.   MARKET SIZE, SEGMENTATION AND GROWTH RATES

- Systems software is one of the fastest growing segments of the computer services industry.

    - The market for systems software is over $750 million dollars and is growing at 33% a year.

    - By 1983 the market will exceed $3.1 billion.

    - These figures include revenues from services companies and hardware vendors.

- The largest single vendor in the market is IBM, with a 33% market share. The market share data by vendor type is shown in Exhibit II-1.

- The largest independent systems software company has less than 3% of the market, but as a group, the 500 independents control 45% of the systems software market.

- The average systems software firm generates slightly less than $700,000 in revenues annually. However, the 450 smallest companies each average $300,000 in annual revenue production.

- 3 -

INPUT

EXHIBIT II-1

UNITED STATES SYSTEMS SOFTWARE MARKET SIZE,
MARKET SHARE AND GROWTH RATES

VENDOR TYPE	1978 REVENUES ($000,000)	1978 MARKET SHARE	1983 REVENUES ($000,000)	AAGR*	1978 MARKET SHARE
● HARDWARE MANU-FACTURERS	$360	47%	$1,692	36%	54%
BM	250	33	1,345	40	43
OTHER LARGE AND MEDIUM COMPUTER MANUFACTURERS	50	6	124	20	4
NiCOMPUTER MANUFACTURERS	60	8	223	30	7
● REMOTE COMPUTING SERVICES COMPANIES	58	8	177	25	6
● INDEPENDENT SYSTEMS SOFTWARE VENDORS	345	45	1,281	30	40
TOTAL	$763	100%	$3,150	33%	100%

VERAGE ANNUAL GROWTH RATE

INPUT

- Vendors selling systems software that operates on IBM hardware have the biggest market segment to target, nearly $600M dollars or 76% of the total market.

- There are nearly 20,000 IBM System/360 Model 20's or larger computers installed throughout the U.S. The average IBM installation pays $29,250 for systems software per year, of which $22,500 is for one new package.

- Non-IBM installations pay an average of $15,750 annually for systems software.

- The systems software market segments are all growing at 30% or more per year.

  - The systems operations market segment, those products which manage the computer resource during applications program execution, is growing at 33% a year. This segment will grow from $389 million in 1978 to $1,637 million by 1983.

  - The systems utilization product segment of the market, those products which aid in utilizing the computer system more effectively, is growing at 30% a year. The market segment will grow to $312 million in 1983 from a base of $84 million in 1978.

  - The implementation systems market segment, those products which prepare applications for execution, is growing at 33% a year. This segment will grow from $290 million in 1978 to $1,201 million by 1983.

INPUT

B. SYSTEMS SOFTWARE VENDOR SALES AND MARKETING STRATEGIES: PRESENT AND FUTURE

- Exhibit II-2 shows some of the key personnel statistics for responding systems software vendors.

  - Development and maintenance organizations are the largest group in systems software firms. Most firms have one development and mainte-nance organization rather than separate groups for each technical function.

  - Sales and sales support staffs are approximately the same size.

  - The average annual compensation of all systems software professionals is $34,000. Sales and development/maintenance personnel compen-sation averages $37,000, while sales support staff personnel average $26,000 annually.

  - Systems software vendors average 10% to 15% of revenue as a pre-tax profit margin. The profit margin is inversely related to revenue, i.e., the higher the revenue, the lower the profit margin.

  - Training programs are brief and highly reliant on on-the-job-training (OJT).

  - Turnover is highest in the sales staff, but is still at a manageable level.

- Many systems software companies have not needed to refine their lead-generating or lead follow-up methods because it has been easier to add new products to generate incremental sales rather than to prospect, qualify, and close sales of existing products to new customers. The market obviously cannot sustain this "cream skimming" policy forever. However, many companies have successfully employed this approach for five or more years.

INPUT

EXHIBIT II-2

RESPONDING SYSTEMS SOFTWARE VENDOR
KEY STATISTICS BY PERSONNEL CATEGORY

FACTOR	PERSONNEL CATEGORY					TOTAL
	SALES	SALES SUPPORT	MARKET-ING	DEVELOP-MENT	MAINTEN-ANCE	
PERCENT OF EMPLOYEES	21%	21%	5%	14%	39%	100%
PERCENT FEMALE	11%	22%	22%	16%	13%	14%
COMPENSATION COST AS A PERCENT OF REVENUE	10.7%	8.0%	2.1%	9.0%	15.4%	45.2%
AVERAGE SALARY ($000)	$37	$26	$34	N/A	$37	$34
TOTAL COST AS A PERCENT OF REVENUE	20.3%	15.1%	5.0%	7.2%	25.5%	73.1%
AVERAGE TOTAL TRAINING PROGRAM LENGTH (WEEKS)	11	8	N/A	10	10	10
AVERAGE FORMAL TRAINING PROGRAM LENGTH (WEEKS)	2	2	N/A	2	2	2
TURNOVER PERCENTAGE	22%	13%	10%	15%	17%	17%

N/A= NOT AVAILABLE

INPUT

- Trade press advertising is the most commonly used lead-generation technique for s s s su e endors.

  - s e this advertising as being less successful for generating eaus co npared to direct mail campaigns, telephone survey work, and sem ars.

  - Some ven ors now use trade press advertising only for company and/or product recognition rather than lead generation.

  - Successful lead-generating programs were generally measured in either sales closed or titles of lead respondents.

- Buyers of systems software indicated that trade press advertising was the most commonly used source for obtaining information on the availability of products.

- Nearly one half of the average number of leads generated per systems software company come from direct mail and marketing survey techniques. Buyers also rated direct mail as a major (31%) source of information on product availability.

- There is a clear trend for systems software vendors to sell their products outside of the U.S. The vendors are moving in the direction of direct representation in foreign markets, except in Japan.

  - Agents have not always generated a level of revenue commensurate with their sales territory when compared to U.S. results.

  - Vendors would prefer receiving 100% of the product revenue rather than a royalty for each sale (which may be 5% to 50% of the product sales price).

INPU

- Slightly less than one half of the systems software vendor respondents indicated that in-person sales calls were regularly made on the top DP executive of a prospect during the sales cycle. Another 25% of the vendors indicated that they planned to do this in the future. Systems software companies that called on top executives in the organization generally indicated that the sales cycle was smoother.

- In cases where the DP manager was not called on, the highest management level aware of the sales effort was the systems and/or programming manager.

- Over 80% of the systems software buyers indicated that the buying decision was made at the vice presidential level or higher if the package costs more than $5,000.

- Systems software vendors are primarily development rather than marketing oriented for new product additions. Marketing research is generally not used. Development drives product creation rather than the market.

- Systems software is priced according to what the market will bear. This includes software maintenance, which most respondents believed should be priced at 10% of the product purchase price.

- There appears to be a direct relationship between revenue production and the type of product sold. The more user-oriented the product (productivity aids, data base management systems, etc.), the greater the revenue generated per sales person. The more systems-oriented the product (spoolers, utilities, etc.) the less revenue generated per sales person.

- The majority of systems software buyers would prefer to buy software from vendors rather than develop equivalent packages in-house.

INPUT

C. TECHNOLOGICAL IMPACTS AND DEVELOPMENTS

- The current trend is for hardware manufacturers to price hardware and software separately. This is particularly apparent with IBM's new 4300 series computer line.

- Other hardware vendors interviewed expect that IBM will continue to move operating system functions into microcode. They also perceive that systems software vendors have exposure in that current operating system hooks used by the software vendors may be eliminated as the operating systems move into micocode.

- Buyers appear to be very optimistic about technology changes and believe that their jobs will be made easier as these changes occur.

- Distributed data processing (DDP) is being implemented. DDP may not always need a linked computer network, but simply require local processing of most data plus communication with other computers for as little as 20% of all processing requirements.

- Buyers are not yet receptive to, or understanding of, the benefits of a user site hardware service available from computer services firms (for example, ADP and NCSS). Only 15% of the responding buyers indicated that they would consider such a service.

- All respondents believe that turnkey systems present a very attractive offering for small computer systems. Respondents indicated that the need for and use of turnkey systems will continue to grow in the forseeable future.

INPU

D.   TECHNICAL RECOMMENDATIONS

- Product user groups should be used to the fullest possible extent in deter-mining existing product enhancements. Several vendors reported that their user groups vote on and then rank all product enhancements desired. Vendors, therefore, have a clear picture of where future technical product development should occur.

- A longer, more formal and more highly structured training program should be developed by systems software vendors. A prime reason for lengthening the training program is to raise the productivity of the personnel. Remote computing services vendors, for example, generate over 50% more revenue per sales person than do systems software vendors.

- Packages should be designed for demonstratability. The buyer wants to see the product output (even if only test data is used) on his own machine.

- Products must be technically sound and well documented. One of the most important assets of a vendor is the customer who can recommend a product to other prospects.

- Software vendors must carefully evaluate the impact of the movement of operating system functions into microcode by hardware vendors.

E.   MARKETING RECOMMENDATIONS

- Systems software vendors must refine their lead-generating and follow-up methods in order to acquire new accounts with existing products. This strategy will generate more customers in the long run than the "cream skimming" approach of looking only for the quick sales.

INPUT

- Systems software vendors must reconcile the difference between their image of trade press advertising and the buyers' image. Buyers expect to see vendor advertisements and actually claim to respond to ads when in need of a product. Vendors, however, are not satisfied with the number and quality of leads generated from the advertising.

- All systems software vendors should create strategies to exploit the use of direct mail and marketing survey techniques to generate more leads. These techniques have been extremely beneficial to the companies that have used them.

- Systems software sales in Europe are growing at a 61% annual rate. This is based on the survey for the 1979 ADAPSO Annual Report recently conducted by INPUT. Vendors should examine the economics of establishing direct sales organizations in Germany, France, England and the Benelux countries to exploit the growing popularity and acceptance of systems software in those markets.

- Systems software vendors must call higher in the prospect's organization to close sales faster. The buying decision point is at the vice president level for all major systems products, and for most other systems software products as well.

- Systems software vendors must become more marketing oriented and less product development driven when determining what new product should be added to their line.

- Vendors should seriously consider raising selected software maintenance rates to 15% of the product purchase price. This is especially true for complex software that is in a continual process of enhancement.

- Buyers of systems software indicated that vendors should have a greater degree of participation during the product evaluation process. Vendors should clearly heed this advice.

INPUT

- Systems software vendors should perform careful market research before deciding to add any major products to their product line to ensure that the new product meets a real user need.

INPUT

III STRUCTURE OF THE SYSTEMS SOFTWARE MARKET

III STRUCTURE OF THE SYSTEMS SOFTWARE MARKET

A. THE TOTAL INDUSTRY

1. PRODUCT DEFINITIONS

- Systems software products are software that enable the computer communications system to perform basic functions. System products are to be contrasted to application products as described in the definitions in Appendix A.

    - Systems operations products manage the computer system resource during applications program execution. Examples of such products are operating systems, DBMS, and communication monitors.

    - System utilization products utilize the computer system more effectively. Examples of such products are performance measurement systems, job accounting systems, and utilities.

    - Implementation system products prepare applications for execution by assisting in design, programming, testing and related functions. Examples of such products are languages, productivity aids, report writers, and program library systems.

- The terms product and package are used interchangeably in this report.

INPUT

- Systems software is the generic term used to describe all packages of this class.

2.   VENDOR TYPES

- Hardware manufacturers sell systems software and create the market for other vendors to sell systems packages.

  - Hardware manufacturers have historically given systems software to customers for a nominal fee or without charge.

  - Hardware manufacturers have concentrated on selling hardware so that software package development has been of secondary concern. This is reflected in sub-optimum package design, dependability, execution speed and maintenance support.

- Non-hardware manufacturers perceived that the market needed quality systems software that worked dependably and quickly, could be modified easily, and was well supported if problems arose in program execution.

  - Systems software vendors, therefore, designed products to fill the gap left by hardware manufacturers.

  - Some remote computing services (RCS) companies also sell systems software. RCS vendors have historically followed the lead of systems software firms in selling systems products. This may change as the RCS vendors search for ways to increase revenues. The potential of systems software makes it an attractive area for RCS vendors to consider.

3.   MARKET DESCRIPTION

- The computer industry market forecasts are shown in Exhibit III-I. Systems software accounts for 9% of the total 1978 U.S. available market.

- 16 -

INPU

EXHIBIT III-1

- 17 -

COMPUTER SERVICES MARKET FORECASTS-
U.S. AVAILABLE REVENUES (1978-1983)

MODE OF SERVICE	$ MILLION		AVERAGE ANNUAL GROWTH RATE 1978-1983
	1978	1983	
PROCESSING			
REMOTE COMPUTING	$2,707	$6,885	21%
FACILITIES MANAGEMENT	1,082	2,410	17
BATCH	1,976	2,364	5
TOTAL PROCESSING	$5,765	$11,659	15%
SOFTWARE PRODUCTS			
SYSTEMS	$ 763	$3,150	33%
APPLICATIONS	473	1,235	21
TOTAL SOFTWARE PRODUCTS	$1,236	$4,385	29%
PROFESSIONAL SERVICES			
PROFESSIONAL SERVICES	$1,362	$2,515	21%
TOTAL	$8,363	$18,559	17%

INPUT

- The data in Exhibit III-1 has been updated since the 1978 MAS Annual Report and is based on a new analysis of the systems software marketplace.

- The systems software segment of the market will grow at 33% per year through 1983. This forecast is derived from:

    - Interview data gathered for this study.

    - The 1979 ADAPSO survey carried out by INPUT.

    - A review of the revenue growth of major vendors.

B.   HARDWARE VENDORS OFFERING SYSTEMS SOFTWARE

- Virtually all hardware vendors sell some systems software.

- Exhibit III-2 shows estimates of the systems software revenue generated by the major hardware manufacturers. Revenue includes package license sales, rentals and software maintenance charges for all systems software sold in the U.S.

- Hardware vendors, particularly those selling small computers, are unbundling their software from the total system price concept to individually priced packages. This trend is expected to continue over the next three to five years to the point where virtually all software sold will be unit priced.

C.   SYSTEMS SOFTWARE VENDORS

- Independent systems software vendors account for 45% of the systems software market, or a total of $345 million dollars in 1978.

- 18 -

INF

EXHIBIT III-2

- 19 -

ESTIMATED 1978 HARDWARE MANUFACTURERS' REVENUES FROM
THE SALE OF SYSTEMS SOFTWARE IN THE U.S.

HARDWARE MANUFACTURER	1978 SYSTEMS SOFTWARE REVENUE ($ MILLION)	MARKET SHARE*
IBM	$ 250	33%
BURROUGHS	17	2
CDC	3	1
DEC (LARGE COMPUTERS)	3	1
H-P (LARGE COMPUTERS)	2	1
HONEYWELL (LARGE COMPUTERS)	8	1
NCR	6	1
UNIVAC	11	1
MINICOMPUTER MANUFACTURERS**	60	8
TOTAL	$ 360	47%

*SHARE OF TOTAL MARKET OF $763 MILLION DOLLARS
**INCLUDES DEC, HP, HONEYWELL AND OTHER VENDORS' REVENUE FROM MINICOMPUTER
SYSTEMS SOFTWARE SALES, RENTALS AND MAINTENANCE

INPUT

- There are approximately 500 independent vendors of systems software.

    - Se en vendors have revenue of $10 million or greater.

    - Twe ty vendors each have annual revenue of between two and ten
      ii,lion dollars.

    - Less than two million dollars in annual revenue is generated by each of
      465 vendors.

- The average systems software vendor generates slightly less than $700,000 of
  revenue annually. However, the 450 smallest companies each average
  $300,000 in annual revenue production.

D.   ROLE OF THE RCS VENDORS

- RCS vendors followed independent systems software vendors into the systems
  package business. The 1979 ADAPSO Annual Report found that RCS vendors
  generate about 1% of their revenue from the sale of systems software.

- The RCS vendors presently account for about 8% of the total systems software
  market, but this share is expected to grow as these vendors acquire products
  or companies in this market segment. (For example, National CSS recently
  acquired Turnkey Systems).

- RCS vendors could potentially be a source of systems software packages in the
  future, whether they decide to sell their own internally developed packages to
  end users directly or to vendors who sell systems software.

    - Distributed processing and distributed data base software developed by
      RCS vendors could become a saleable product.

INPL

- Network and communications software that ties in minicomputers with large mainframes is another area where RCS vendors might develop saleable products.

- Operating system efficiency aids, utilities, and accounting systems could also be considered as potential systems packages of the future.

E. MARKET SIZE, SEGMENTATION AND GROWTH RATE

- Exhibit III-3 shows the forecast of the 1978 systems software market size. These figures indicate that 76% of the U.S. market for systems software is concentrated on IBM computers.

- Exhibits III-4 through III-9 provide detailed data on IBM and plug-compatible hardware computer installation counts by operating system configuration.

  - Exhibit III-4 presents a summary of IBM and plug compatible computer installation counts by operating system configuration. There are over 19,000 IBM 360, 370 and 303X computers. Amdahl and Itel have nearly 500 plug compatible computers installed.

  - Exhibits III-5, III-6 and III-7 show the installation counts for IBM 360s, 370s and 303Xs respectively. Exhibit III-8 shows the Itel installation counts and Exhibit III-9 shows the Amdahl installation counts.

- The average IBM installation has at least four systems software packages, as shown in Exhibit III-10.

- The average IBM installation pays $22,500 for a new systems software package. The total spent on systems software annually per installation is $29,250.

INPUT

EXHIBIT III-3

SYSTEMS SOFTWARE MARKET SIZE
FORECAST FOR 1978

HARDWARE MANUFACTURER	NUMBER OF INSTALLATIONS *	REVENUE PER INSTALLATION	ESTIMATED REVENUE ($ MILLION)	PERCENT
IBM	19,800	$ 29,250	$ 579M	76%
BURROUGHS	2,335	15,750	37	5
CDC	422	15,750	7	1
DEC (LARGE COMPUTERS)	863	15,750	14	2
HP (LARGE COMPUTERS)	908	15,750	14	2
HONEYWELL (LARGE COMPUTERS)	850	15,750	13	2
NCR	1,200	15,750	19	2
UNIVAC	1,295	15,750	20	2
MINICOMPUTERS**	N/A	N/A	60	8
TOTAL	N/A	N/A	$ 763M	100%

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**INCLUDES DEC, HP, HONEYWELL AND ALL SMALL COMPUTER MANUFACTURERS

INPU

EXHIBIT III-4

IBM AND PLUG COMPATIBLE COMPUTER INSTALLATION COUNTS
BY OPERATING SYSTEM CONFIGURATION*

COMPUTER HARDWARE	OPERATING SYSTEM CONFIGURATION										
	DOS	DOS/VS	TOTAL DOS	PER-CENT OF TOTAL	OS	OS/VS	OS/MVS	TOTAL OS	PER-CENT OF TOTAL	GRAND TOTAL	PER-CENT OF GRAND TOTAL
IBM 360	6,587	0	6,587	33%	583	0	0	583	3%	7,170	36%
IBM 370	402	6,948	7,350	37	547	2,163	1,135	3,845	19	11,195	57
IBM 303X	1	133	134	1	21	202	638	861	4	995	5
IBM TOTAL	6,990	7,081	14,071	71	1,151	2,365	1,773	5,289	26	19,801	97
PERCENT OF IBM TOTAL	36%	37%	73%	–	6%	12%	9%	27%	–	100%	–
AMDAHL	0	3	3	**	18	36	98	152	1	155	1
ITEL	14	92	106	1	59	94	27	180	1	286	2
GRAND TOTAL	7,004	7,176	14,180	72%	1,228	2,495	1,898	5,621	28%	19,801	100%
PERCENT OF GRAND TOTAL	35%	36	72%	–	6%	13%	10%	28%	–	100%	–

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION, APRIL 1, 1979.
**LESS THAN 1%

INPUT

EXHIBIT III-5

IBM 360 COMPUTER INSTALLATION COUNTS
BY OPERATING SYSTEM CONFIGURATION*

IBM 360 MODEL	OPERATING SYSTEM CONFIGURATION										
	DOS	DOS/ VS	DOS TOTAL	PER-CENT OF TOTAL	OS	OS/VS	OS/ MVS	OS TOTAL	PER-CENT OF TOTAL	GRAND TOTAL	PER-CENT OF GRAND TOTAL
20	1,870	0	1,870	26%	0	0	0	0	0%	1,870	26%
22	225	0	225	3	0	0	0	0	0	225	3
25	185	0	185	3	0	0	0	0	0	185	3
30	2,257	0	2,257	31	0	0	0	0	0	2,257	31
40	1,357	0	1,357	19	71	0	0	71	1	1,428	20
44	32	0	32	**	13	0	0	13	**	45	1
50	463	0	463	6	146	0	0	146	2	609	8
65	183	0	183	3	299	0	0	299	4	482	7
67	11	0	11	**	17	0	0	17	**	28	**
75	3	0	3	**	23	0	0	23	**	26	**
85	0	0	0	0	3	0	0	3	**	3	**
95	1	0	1	**	11	0	0	11	**	12	**
TOTAL	6,587	0	6,587	92%	583	0	0	583	8%	7,170	100%
PERCENT OF TOTAL	92%	0	92%	–	8%	0	0	8%	–	100%	–

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**LESS THAN 1%

INP

EXHIBIT III-6

IBM 370 COMPUTER INSTALLATION COUNTS
BY OPERATING SYSTEM CONFIGURATION*

IBM 370 MODEL	OPERATING SYSTEMS CONFIGURATION										
	DOS	DOS/VS	DOS TOTAL	PER-CENT OF TOTAL	OS	OS/VS	OS/MVS	OS TOTAL	PER-CENT OF TOTAL	GRAND TOTAL	PER-CENT OF GRAND TOTAL
115	84	1316	1400	13%	0	0	0	0	0	1400	13%
125	66	1248	1314	12	3	3	0	6	**	1320	12
135	119	840	959	9	0	30	0	30	**	989	9
138	15	1363	1378	12	4	104	0	108	1	1486	13
145	73	1155	1228	11	55	528	9	592	5	1820	16
148	10	800	810	7	13	450	13	476	4	1286	11
155	33	99	132	1	258	138	22	418	4	550	5
158	2	125	127	1	93	746	592	1431	13	1558	14
165	0	1	1	**	59	24	31	114	1	115	1
168	0	1	1	**	52	130	468	650	6	651	6
195	0	0	0	0	10	10	0	20	**	20	**
TOTAL	402	6948	7350	66%	547	2163	1135	3845	34%	11195	100%
PERCENT OF TOTAL	4%	62%	66%	–	5%	19%	10%	34%	–	100%	–

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**LESS THAN 1%

INPUT

EXHIBIT III-7

IBM 303X COMPUTER INSTALLATION COUNTS
BY OPERATING SYSTEM CONFIGURATION*

IBM 303X MODEL	OPERATING SYSTEMS CONFIGURATION										
	DOS	DOS/ VS	DOS TOTAL	PER- CENT OF TOTAL	OS	OS/VS	OS/ MVS	OS TOTAL	PER- CENT OF TOTAL	GRAND TOTAL	PER- CENT OF GRAND TOTAL
3031	1	128	129	13%	15	148	83	246	25%	375	38%
3032	0	5	5	**	2	40	113	155	16	160	16
3033	0	0	0	0	4	14	442	460	46	460	46
TOTAL	1	133	134	13%	21	202	638	861	87%	995	100%
PERCENT OF TOTAL	**	13%	13%	–	2%	20%	64%	87%	–	100%	–

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**LESS THAN 1%

INPU

EXHIBIT III-8

- 27 -

ITEL AS/X COMPUTER INSTALLATION COUNTS
BY OPERATING SYSTEM CONFIGURATION*

ITEL AS/X MODEL	OPERATING SYSTEM CONFIGURATION										
	DOS	DOS/VS	DOS TOTAL	PER-CENT OF TOTAL	OS	OS/VS	OS/ MVS	OS TOTAL	PER-CENT OF TOTAL	GRAND TOTAL	PER-CENT OF GRAND TOTAL
4	6	66	72	25%	3	22	0	25	9%	97	34%
5	8	26	34	12	47	53	18	118	41	152	53
6	0	0	0	0	9	19	9	37	13	37	13
TOTAL	14	92	106	37%	59	94	27	180	63%	286	100%
PERCENT OF TOTAL	5%	32%	37%	–	21%	33%	9%	63%	–	100%	–

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION

INPUT

EXHIBIT III-9

AMDAHL 470/VX COMPUTER INSTALLATION COUNTS BY
OPERATING SYSTEM CONFIGURATION*

AMDAHL 470/VX MODEL	OPERATING SYSTEM CONFIGURATION										
	DOS	DOS/VS	DOS TOTAL	PER-CENT OF TOTAL	OS	OS/VS	OS/ MVS	OS TOTAL	PER-CENT OF TOTAL	GRAND TOTAL	PER-CENT OF GRAND TOTAL
V5	0	3	3	2%	3	5	14	22	14%	25	16%
V6	0	0	0	0	15	31	75	121	78	121	78
V7	0	0	0	0	0	0	9	9	6	9	6
TOTAL	0	3	3	2%	18	36	98	152	98%	155	100%
PERCENT OF TOTAL	0	2%	2%	–	12%	23%	63%	98%	–	100%	–

INPU

EXHIBIT III-10

SYSTEMS SOFTWARE PRODUCT INSTALLATIONS*

PACKAGE CATEGORY	CIC DATABASE COUNT	PROJECTED ACTUAL COUNT RANGE	AVERAGE PER INSTAL- LATION**
SYSTEMS OPERATIONS PRODUCTS	7,162	2,400-3,600	2
SYSTEM UTILIZATION PRODUCTS	4,043	13,000-20,000	1
IMPLEMENTATION SYSTEM PRODUCTS	4,872	16,000-24,000	1
TOTAL SYSTEMS PRODUCTS	16,077	53,000-80,000	4

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**ALL IBM 360/20 THROUGH 30 MODELS HAVE BEEN EXCLUDED FROM THE TOTAL
 IN DETERMINING AVERAGE NUMBER OF PRODUCTS PER INSTALLATION.

INPUT

- An average of one new systems software package is acquired each year.

- Maintenance charges of 10% of the purchase price are paid on three additional systems packages, accounting for the total spent.

- Non-IBM installations buy a new systems package once every two years and pay maintenance charges for two additional packages each year for a total cost of $15,750 annually.

- The systems software market size and growth forecast are shown in Exhibit III-11. The overall market segment will grow at an average annual rate of 33%.

- Exhibit III-12 shows a forecast of market size and growth by systems software product type.

- The independent systems software vendors that participated in the study accounted for over 15% of the total systems software revenue and for over 33% of the total independent systems software companies revenue. Exhibit III-13 shows the respondents' 1978 revenue by system product type.

  - The respondents sell a total of 70 products and have over 27,000 installations of those products.

  - The 70 products of the respondents generated $116 million dollars of revenue in 1978.

INP

EXHIBIT III-11

UNITED STATES SYSTEMS SOFTWARE MARKET SIZE
AND GROWTH FORECAST (1978 AND 1983)

VENDOR TYPE	MARKET SIZE		
	1978 REVENUE ($M)	1983 REVENUE ($M)	AAGR* 1978-1983
HARDWARE MANUFACTURERS			
IBM	$250M	$1,345M	40%
OTHER LARGE AND MEDIUM			
COMPUTER MANUFACTURERS	50	124	20
MINICOMPUTER MANUFACTURERS	60	223	30
TOTAL HARDWARE MANUFACTURERS	$360M	$1,692M	36%
REMOTE COMPUTING SERVICES COMPANIES	$ 58M	$ 177M	25
INDEPENDENT SYSTEMS SOFTWARE COMPANIES	$345M	$1,281M	30
TOTAL	$763M	$3,150	33%

*AVERAGE ANNUAL GROWTH RATE

INPUT

EXHIBIT III-12

MARKET SIZE AND GROWTH FORECAST BY TYPE
OF SYSTEMS SOFTWARE PRODUCT

PRODUCT TYPE	MARKET SIZE		AVERAGE ANNUAL GROWTH RATE 1978-1983
	1978 REVENUE ($ MILLION)	1983 REVENUE ($ MILLION)	
SYSTEMS OPERATIONS	$ 389M	$ 1,637M	33%
SYSTEMS UTILIZATION	84	312	30
IMPLEMENTATION SYSTEMS	290	1;201	33
TOTAL	$ 763M	$ 3,150M	33%

INP

EXHIBIT III-13

RESPONDENT PRODUCT REVENUE STATISTICS
FOR 1978

PRODUCT TYPE	PRICE RANGE ($000)	NUMBER OF PRODUCTS	NUMBER OF INSTAL- LATIONS	1978 REVENUE ($000,000)	PERCENT OF REVENUE
SYSTEMS OPERATIONS	$ 4-132	22	8,200	$ 58.9	51%
SYSTEMS UTILIZATION	1.5-40	16	4,700	13.2	11
IMPLEMENTATION SYSTEMS	1-60	32	14,300	43.9	38
TOTAL	–	70	27,200	$116.0	100%

F.   MARKET SHARE BY COMPETITOR

- Systems software companies were reluctant to provide detailed product revenue and installation count data. Therefore, INPUT agreed with respondents that the data gathered would not be used to determine market share position by product and vendor.

- INPUT utilized the data base of Computer Intelligence Corporation (CIC) to determine market share data.

    - CIC does not have a complete list of all systems software products used at every installation. Therefore, the CIC product data must be factored up to reflect actual product counts. The factored product counts are listed under "projected actual count range."

    - The list of competitive products is not exhaustive. However, the competitive products listed are the only ones on the CIC data base.

    - Market share information is shown as the number of installations of a product within a particular product class. INPUT has selected five such product classes. Market share estimates are shown on the following exhibits:

    - Teleprocessing monitors - Exhibit III-14.

    - Report writers - Exhibit III-15.

    - Operating system performance measurement tools - Exhibit III-16.

    - Tape management systems - Exhibit III-17.

    - Data base management systems -Exhibit III-18.

INP

EXHIBIT III-14

TELEPROCESSING MONITOR SYSTEMS FOR IBM AND PLUG COMPATIBLE COMPUTERS*

PACKAGE NAME	CIC DATA BASE COUNT	PROJECTED ACTUAL COUNT RANGE	SHARE OF MARKET	PENE- TRATION PERCENT**
CICS	3,122	10,000- 15,000	86.6%	81.9%
ENVIRON/1	151	500-750	4.3	4.1
TASK/MASTER	153	500-750	4.3	4.1
WESTI	167	550-850	4.8	4.6
TOTAL	3,593	11,000-17,350	100.0%	94.7%

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**ALL IBM 360/20 THROUGH 30 MODELS HAVE BEEN EXCLUDED FROM THE TOTAL
 IN DETERMINING PENETRATION PERCENTAGES.

INPUT

EXHIBIT III-15

REPORT WRITER SYSTEMS FOR IBM AND
PLUG COMPATIBLE COMPUTERS*

PACKAGE NAME	CIC DATA BASE COUNT	PROJECTED ACTUAL COUNT RANGE	SHARE OF MARKET	PENE- TRATION PERCENT**
CULPRIT	47	170-250	4.3%	1.4%
DYL 250 & DYL 260	295	1,000-1,500	25.4	8.2
EASYTRIEVE	303	1,000-1,500	25.4	8.2
INQUIRE	15	50-75	1.3	.4
MARK IV	501	1,700-2,500	42.6	13.8
SOCRATES	11	40-60	1.0	.3
TOTAL	1,172	3,960-5,885	100.0%	32.3%

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**ALL IBM 360/20 THROUGH 30 MODELS HAVE BEEN EXCLUDED FROM THE TOTAL
 IN DETERMINING PENETRATION PERCENTAGES.

INP

EXHIBIT III-16

OPERATING SYSTEM PERFORMANCE MEASUREMENT PACKAGES
FOR IBM OS AND PLUG COMPATIBLE COMPUTERS*

PACKAGE NAME	CIC DATA BASE COUNT	PROJECTED ACTUAL COUNT RANGE	SHARE OF MARKET	PENE- TRATION PERCENT
CUE	231	500-800	53.1%	11.6%
CAS/CPA	9	50-100	6.1	1.3
PPE	64	250-350	24.5	5.3
BOOLE & BABBAGE				
TOTAL	304	800-1,250	83.7%	18.2%
LOOK	34	150-250	16.3	3.6
GRAND TOTAL	338	950-1,500	100.0%	21.8%

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION

INPUT

EXHIBIT III-17

TAPE MANAGEMENT SYSTEMS FOR IBM AND
PLUG COMPATIBLE COMPUTERS*

PACKAGE NAME	CIC DATA BASE COUNT	PROJECTED ACTUAL COUNT RANGE	SHARE OF MARKET	PENE- TRATION PERCENT
IBM DOS PACKAGES				
EPAT	370	1,200-1,800	85.7%	15.6%
TFAST	63	200-300	14.3	2.6
TOTAL	433	1,400-2,100	100.0%	18.2%
IBM OS PACKAGES				
TLMS	84	250-400	20.6%	5.8%
UCC ONE	322	1,000-1,500	79.4	22.2
TOTAL	406	1,250-1,900	100.0%	28.0%
GRAND TOTAL	839	2,650-4,000	100.0%	21.8%

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**ALL IBM 260/20 THROUGH 30 MODELS HAVE BEEN EXCLUDED FROM THE TOTAL
IN DETERMINING PENETRATION PERCENTAGES.

INPU

EXHIBIT III-18

DATA BASE MANAGEMENT SYSTEMS SOFTWARE
LEADING VENDORS*

PACKAGE NAME	CIC DATA BASE COUNT	PROJECTED ACTUAL COUNT RANGE	SHARE OF MARKET	PENE-TRATION PERCENT**
ADABAS	92	300-450	3.7%	2.5%
DL/1	471	1,600-2,400	19.9	13.1
IDMS	104	350-500	4.2	2.8
IMS	1,439	3,500-5,000	42.2	27.8
RAMIS	21	100-250	1.7	1.1
SYSTEM/2000	85	300-400	3.5	2.3
TOTAL	598	2,000-3,000	24.8	16.4
GRAND TOTAL	2,810	8,150-12,000	100.0%	66.0%

*BASED PRIMARILY ON COMPUTER INTELLIGENCE CORPORATION INFORMATION
**ALL IBM 360/20 THROUGH 30 MODELS HAVE BEEN EXCLUDED FROM THE TOTAL
IN DETERMINING PENETRATION PERCENTAGES.

INPUT

- These exhibits also indicate the degree of coverage that the product has in the marketplace. Degree of coverage is measured by penetration of total IBM and plug-compatible systems in the U.S.

    - All small IBM 360 computers (models 20, 22, 25 and 30) were eliminated from the computer total to reflect the fact that very few of these machines are operated as a separate installation.

    - Since some systems vendors license software by CPU rather than installation, all penetration estimates are based on CPU counts. Penetration figures and market share figures may actually be higher in those cases where a product runs on multiple CPUs at the same installation.

- Teleprocessing monitors and data base management systems are systems operations products.

- Operating system performance measurement tools and tape management systems are systems utilization products.

- Report writers are implementation system products.

- 40 -

INPU

IV HARDWARE MANUFACTURER
VENDOR PROFILE

IV   HARDWARE MANUFACTURER VENDOR PROFILE

A.   MARKETING STRATEGIES FOR SYSTEMS SOFTWARE

- Hardware manufacturers have historically bundled most systems software with the hardware as a single product offering.

- The current trend is for hardware manufacturers to price hardware and software separately.

  - Respondents indicated that they plan to separately price more and more systems software.

  - Systems software for small computers is currently priced separately more frequently than for large computers.

- As hardware prices continue to fall, vendors are looking for ways to design the lowest possible cost system for the user. This is particularly important as most hardware looks the same from the end user standpoint.

  - Cycle and seek times are rarely considered in the small system buying cycle.

  - Users buy system capabilities, i.e., software solutions.

INPUT

- The main points of difference between hardware manufacturers, from an end user perspective, is the software that solves the user's problems.

  - If a software package from one vendor is priced higher than a similar package from another vendor, the prospective user wants to compare the capabilities of the two packages to determine if the higher price of one can be justified by additional and useful features.

  - Most systems software can be offered on a modular basis like the hardware. The user is asked if a specific function needs to be performed. If the answer is yes, the appropriate piece of software is included in the offer (and the cost of that software is added to the total system cost).

- Most hardware manufacturers offer multiple software solutions for particular user problems. Multiple compilers are offered, for example, so that the user can choose between FORTRAN, BASIC, or COBOL. Data base management systems generally can be delivered in multiple versions, each version being priced separately depending on its features. Packages available from vendors in different versions are priced high, medium, or low for a full, partial, or basic system, respectively. This offers both flexibility and a low-cost solution to the system buyer. Every system element purchased will also be evaluated and justified for use.

B.   IBM SYSTEMS SOFTWARE PLANS

- IBM is in the process of unbundling systems software from the hardware. This is particularly apparent in the Series I line, 8100, and the 4300 Series.

- IBM is expected to continue to unbundle its software.

INPL

- IBM will continue to move operating system software to microcode. This process will be evolutionary rather than revolutionary.

    - A clear migration path must exist for users to move up the line (360 to 370 to 303X, etc.).

    - System performance can be increased as repetitive operating system functions are moved into hardware.

    - Software maintenance costs can be reduced by standardizing system functions and by moving these functions to microcode. Hardware problem diagnostics can be done remotely from the user site through the use of another computer.

    - A completely modularized operating system for ease of maintenance (of both hardware and software) would be a distinct advantage to IBM.

    - IBM can keep plug-compatible manufacturers on the defensive by continually moving functions to microcode.

    - IBM is currently in the business of selling hardware. Moving software into microcode means that more hardware and less software will be included in each sale of a computer.

- IBM's 8100 and 4300 are partial answers to the distributed data processing market.

    - The 8100 will be sold to large users, each of whom will order multiple systems. This machine will perform communications controlling and word processing functions in a closely coupled CPU environment such as that shown in Exhibit IV-1.

    - Whereas the 8100s are intended as satellite processors (to 370s, 303Xs, and now to 4300s) for distributing processing power in a close-coupled

- 43 -

INPUT

EXHIBIT IV-1

A FUTURE DISTRIBUTED PROCESSING MODEL

VOICE AND DATA
COMMUNICATION CONTROLLER

```
3750
```

FOR DISTRIBUTED
APPLICATONS

```
4300        8100        8100        8100    3644
```

ENERGY AND
OTHER SENSOR CONTROL

COMMUNI-
CATION
FRONT END

WORD
PROCES-
SING LOOP

```
8100
```

TO OTHER
COMPARABLE
NODES

TO HOST
H-SERIES

INFORMA-
TION ENTRY
&
RETRIEVAL
LOOP

INPU
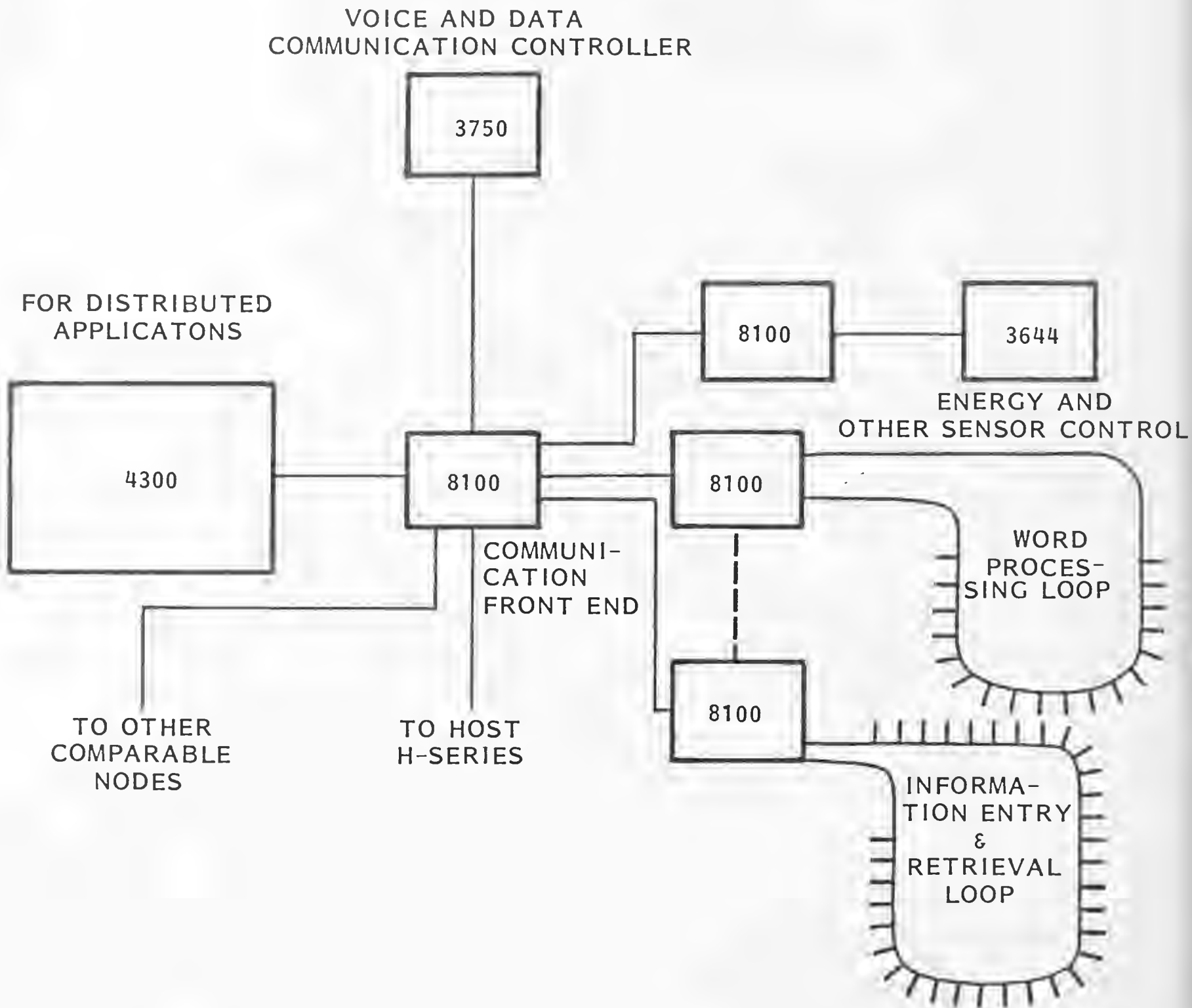
mode, the 4300s have been designed principally as host processors. This is not to deny that 4300s will be distributed around organizations. It is certainly IBM's primary objective to replicate 4300 mainframes in an organization, ensuring systems compatibility and using SNA for communication. The differences between the host and the satellite approaches are ones of:

- Size and processing power.

- Mainline operating systems as opposed to specialized and limited program products.

- Centralized systems development (on the 8100s) versus distributed systems development (on the 4300s).

- Minicomputer and small business computer vendors have for some years now accepted the challenge of selling large volumes of small-scale systems. IBM formally joined them in this game when General Systems Division was advanced, and, with Series I now being sold by GSD, the momentum is increasing. However, what is new is to find the high volume, low cost strategy applied within DPD.

- This change of direction is another move in IBM's grand strategy for the 1980s and 1990s of being able to provide computing and data processing facilities to all sizes of organizations and all levels within organizations:

  - To the home or to the executive at his desk, (personal computing).

  - To small businesses and the local shops.

  - To industrial companies of all sizes, including the multinationals.

- The 4300 range is cast as the general purpose workhorse replacing the 370s, and to extend data processing throughout the sort of organizations that have

INPUT

previously concentrated on a single mainframe serviced by a centralized DP department.

- IBM recognizes that DDP poses a potential threat to the DP department. Until now, loss of control has seemed to threaten the large 370 sites with fragmentation. By wielding its present array of products, IBM can now put its energy behind DDP.

- The 4300 can be offered flexibly:

    - At one or more user sites.

    - As a standalone or in a network.

    - As a host, satellite, or node.

- Taken with the 8100, it offers the salesman a gamut of configuration possibilities for rationalizing an organization's hardware requirements. It fairly and squarely occupies the middle ground (or the compromise area) between replicated standalone processors and the large over-centralized mainframes, without preventing either of those extreme options for selected cases or selected areas.

- The most conspicuous absentee in the group of recent IBM announcements is Data Base Management Systems Software (DBMS). The reason for this are various:

    - IMS users are the main sufferers from the present DBMS offering, but they are already predominantly large-scale systems users (System/370 Models 158, 168 and 303X Series).

    - IBM's "H" Series (the Virtual Processor systems which will replace 303X and lie on the same price/performance curve as 4300) must arrive with a revamped DBMS.

- 46 -

INPU

- IBM needs time to evaluate the new data base on System/38 (relational techniques have so far been easier to implement in small scale data bases); meanwhile DL/I should continue as the mid-range standard and as a yardstick for evaluation.

- Until IBM sees how many users opt for the new FBM disks (as opposed to staying with emulation of earlier disks), DBMS dvelopments cannot be finalized.

- "System R," IBM's relational data base, has been in use internally for some time, but has been plagued with performance problems. It is currently in beta test at two installations. IBM cannot afford to force out another software "kluge" like IMS. This time there will not be enough SE's to go around and hold hands, and so the software must be reasonably clean the first time out. Extensive use of microcode, combined with off-loading of intelligence directly to the storage device, has been the implementation strategy and appears to provide a working solution for medium sized (50-500 megabyte) data bases on the System/38. Now the objective is to make it work in the 1-10 billion byte range, a larger problem.

- When a new relational data base is announced, it is likely to be implemented in firmware on the "H" Series, but also in software (in a degraded mode) on the 370/303X to provide a migration path. The difference in performance will provide a strong motivation for users to upgrade to the "H" Series.

- Combined with concurrent improvements in data communications, the "H" Series announcements will relieve users of the necessity to consider non-IBM equipment at remote nodes in a DDP environment. The seeds of this evolution are already present in the 4300/3880/3370, in much the same way as VS was present in the first System/370s, although not revealed until later.

- By 1980 IBM must have resolved the question of data base standards for each of its ranges. It is significant that the 3370 disk unit with FBM has even more recently (February '79) been announced for the System/38. This will afford a

INPUT

file migration path from Series 30 to 4300 and will enhance interconnections between 30s and 4300s in an SNA network.

- The new range of large-scale systems incorporating multi-processors with virtual processor environment ("H" Series) will be announced not later than third quarter 1980.

- IBM expects 4300s to be installed in one of three ways:

    - IBM provides SCP and utility software, and something called "application enabling" software.

    - IBM provides normal systems software plus application "code" modules, which are fully coded and documented but require customer implementation and integration if destined to run alongside other applications.

    - IBM provides dedicated "application machines" comprising systems software and off-the-shelf application products.

- "Application enabling" software remains a nebulous concept. It appears to be a refurbished phrase for": "Let's by-pass the DP department and allow users to implement their own systems," a sentiment which, though laudable in itself, has been severely and consistently eroded by the increasing complexity of hardware and software. IBM has not given any examples of the concept. At its minimum, it could be taken to include languages, interactive development aids, and data management facilities.

- "Code" modules mean fully developed application systems to run in a shared environment. Today's systems are being developed using the best techniques for the parameterizing of module options and for progressive user growth in sophistication and complexity of facilities. IBM has not announced any new products of this category as part of the 4300 launch, but individual IBM offices are being encouraged to develop products with wide user applicability.

INPU

- Whereas the two methods already described both require some support from the DP department, the third and last does not. The "application machine" is the complete "black box" installed and commissioned by IBM and available to the end user at once without any intermediaries. IBM dreams of the possibility of an organization having ten such 4300 systems, each servicing a dedicated end user application. No software has yet been packaged in this way, but STAIRS and PLANCODE are two contenders for this treatment.

- IBM's mind, the new market stance represents a major software opportunity for all types of service companies. There is no intention to offer turnkey solutions on the 4300. IBM's in-house systems house effort is currently fully occupied servicing requirements in the 303X range.

- IBM is prepared to sell, under license, application systems developed by other organizations. An example is the computer aided design system CADAM from Lockheed. In this case all support is handled by the original supplier.

- Once 4300 hardware has been installed and commissioned, all on-site support becomes chargeable. The charges can be incurred:

  -     On an ad hoc basis.

  -     Or a monthly software maintenance fee.

  -     Or both, depending on the program product.

- With the price/performance of the 4300, this means that software charges will become an increasing proportion of IBM revenues. This is a new policy. Its announcement accompanied the 4300 launch. It is to come into operation on January 1, 1980, and is to apply to all DPD products.

- One or more national support centers will support all licensed program products, whether system control programs, utility, or application software. The national center will:

INPUT

- Accept telephone calls for software/support queries.

- Route the query to the relevant specialists who will solve the problems if possible and call back the user with a verbal fix, or notify the user of the need to call out local PSR support from the nearest branch and arrange to do so.

No charge accrues to the user until the local PSR starts to leave his branch to travel from where he is located to the user in trouble.

- IBM has tested this system for a year and reports that 60% of calls result in fixes without on-site visits. Standard written fixes will continue to be issued when genuine bugs have been diagnosed and cleared through the formal channels.

- The financial advantage to the user is that he can be selective in his choice of modules to be put on a maintenance agreement, while leaving others to be supported on demand. He can thus accept risks where he wants and get blanket coverage otherwise.

- Acceptance of the 4300 by the user community will provide an opportunity for systems software vendors to develop new products.

    - Some products will enhance DOS/VSE so that it runs faster and more efficiently than the version released by IBM.

    - Productivity aids, report writers, tape management systems, and the like, should be converted from DOS and DOS/VS to run under VSE if at all possible.

    - The 4300 market will be very large, ultimately several times larger than the 360, 370 and 303X market combined. System/3 and low end 370 users will migrate to the 4300 because of the:

INP

- Low cost.

- High price/performance.

- Standard operating system (DOS).

- The expectation for a clear migration path upward to larger IBM mainframes.

- The compatibility of the 8100 and 4300 which can crate a distributed data processing capability.

- IBM currently offers 417 system software products.

  - 90 systems operations products.

  - 103 systems utilization products.

  - 224 implementation systems products.

- IBM has between 21% and 28% of the available systems software products but generates 33% of the revenue from those products.

  - There are between 1,500 and 2,000 systems software products available from approximately 1,000 vendors.

- IBM generates $600,000 annual revenues per product compared to the industry average (adjusted) of $150,000 to $200,000.

- 51 -

INPUT

- Systems software vendors responding to this study generated $1,660,000 per product. However, this figure must be translated into a number comparable to IBM's to allow for the difference between rental only (IBM) and purchase/lease/rental/maintenance (of systems software vendors). When the translation is made, the responding systems software vendor also generates $600,000 annual revenue per product.

- The industry average annual revenue generated per product is $400,000 to $500,000. When an adjustment is made to these numbers to account for the rental/purchase difference, the industry adjusted average becomes $150,000 to $200,000 of revenue generated annually.

- IBM appears intent on increasingly raising the percent of the software component in the total system sale. Exhibit IV-2 shows software costs as a percent of hardware systems cost for several current computer systems.

  - Minicomputer manufacturers are obtaining a greater percent of the system purchase from software than does IBM on its 4300.

  - IBM has increased the percent of the software component in a system sale from the System/3 to System/34 to System/38. A trend appears to have developed and is expected to continue on the same track.

  - This will contribute to the growth of the market, as discussed earlier, and means that systems software vendors must maintain a more informed position relative to IBM product paths.

INF

EXHIBIT IV-2

SOFTWARE COST AS A PERCENT OF HARDWARE PRICE

HARDWARE MODEL	TYPICAL SYSTEM HARDWARE PRICE ($000)	SYSTEMS SOFTWARE COST AS A PERCENT OF HARDWARE PRICE
IBM S/34	$ 91	6%
IBM S/3-15	333	2
IBM SERIES/1	27	20
IBM S/38	155	14
IBM 8100 (SMALL)	180	27
IBM 8100 (LARGE)	310	15
IBM 4331	230	10
IBM 4341	709	8
DEC PDP-11/70	242	17
HP 3000-III	196	11
HONEYWELL L64	498	6

- 53 -

INPUT

V SYSTEMS SOFTWARE VENDOR PROFILE

V   SYSTEMS SOFTWARE VENDOR PROFILE

A.   SYSTEMS SOFTWARE VENDOR DESCRIPTION

- Systems software vendors sell software products that enable the computer/communications system to perform basic functions. The product areas are:

    - Systems operation which functions during application program execution to manage the computer system resource.

    - System utilization which is used by operations personnel to utilize the computer system more effectively.

    - Implementation systems which are used to prepare applications for execution by assisting in design, programming, testing, and related functions.

- Successful systems software firms have been categorized historically as entreprenuerial start-up operations that found a small market niche where a systems product could be used advantageously. Many of these companies had only one product to sell, and it was sold on the basis of low price and high quality.

- 55 -

INPUT

- However, the profile of the successful systems software vendor has changed in the last five years.

  - There are still many entrepreneurial companies, but the start-up rate appears to be decreasing. Many of these companies now develop products for sale to other systems software vendors. Most software developers receive an ongoing royalty and occassionally an initial cash payment for their product.

  - The industry is also moving toward consolidation as some of the more established companies develop new product offshoots and acquire other products at a high rate. Most successful large systems software vendors have added an average of one new product a year to their product line for the last five years.

  - Sales forces of systems software vendors are increasing in size. In addition, as potential market penetration increases, the sales force needs new products to sell to maintain their present personal income level. Several vendors that had one sales person five years ago have a sales force of five or more today.

  - Systems software vendors of all sizes are acquiring products to sell. Since software packages can be acquired for little or no cash down payment, nearly anyone can find a product to market. Larger companies, like ADR, have acquired other companies with the sole purpose of adding software packages to their existing product line. One and two million dollar systems software vendors have acquired products on a royalty basis to bolster their product line. There have also been other cases where smaller, $100,000 companies have acquired additional products to supplement their existing line.

  - New program development is being stiffled in large companies because of the uncertain return of the investment. A new generation of large scale IBM computers has been expected for some years (System H), and

- 56 -

INPU

EXHIBIT V-2

RESPONDENTS' LEAD-GENERATING TECHNIQUES

VEHICLE/TECHNIQUE	NUMBER OF RESPONDING COMPANIES USING THIS APPROACH	LEVEL OF SATISFACTION WITH APPROACH*
TRADE PRESS ADVERTISING	10	2.3
MARKETING SURVEYS	2	4.5
SEMINARS	4	4.0
DIRECT MAIL	3	4.2
COLD CALLING	3	3.0

* MEASURED ON A 1 TO 5 SCALE WHERE 1 = LOWEST LEVEL OF
SATISFACTION AND 5 = HIGHEST LEVEL OF SATISFACTION

- 59 -

INPUT

- One company advertises only seminars on the general product area in the trade press. Several other vendors also advertise seminars but generally include the announcement as only one small element of the ad copy.

- Interestingly, although trade press advertising is used extensively, it is considered to be the least effective of the lead-generating techniques.

- Two companies are using marketing survey techniques to identify product prospects. The approach used is to call computer users to determine the user's reaction to the need for particular product(s). When users with specific product type needs are determined, their names are turned over to the sales force as leads to be qualified.

  - The people making the telephone calls to computer users may or may not be company employees (both techniques have been employed).

  - The products sold by the company are not identified in the market survey call, but the overall product type is identified. For example, a survey might be conducted on data base management systems, but IMS or DL/I would not be identified.

  - The list of computer users comes from the available lists in the industry (such as those from Computer Intelligence Corporation).

  - This lead-generating technique is considered to be very effective in creating new leads for the sales force and received the highest level of satisfaction rating from respondents.

- Respondents have found seminars describing problem areas and their product solutions to be very effective in generating qualified prospects (i.e., a prospect that has a need for a product).

INPU

the threat of this new computer system has thwarted systems software development for new products. Product developers are unsure that new products would operate with the new IBM computer line.

- A list of leading systems software vendors and INPUT estimates of their 1978 systems software annual revenue is shown in Exhibit V-I. INPUT interviewed 12 of the companies on this list.

B.   SALES STRATEGIES

I.   LEAD GENERATION

- The sales cycle begins with the generation of a lead: someone that might be a candidate to buy a product.

- It is instructive to examine the ways that systems software companies generate leads because several companies have developed techniques that appear to be very effective. Lead generation approaches are listed in Exhibit V-2.

- The most commonly used approach for lead generation is trade press advertising. Virtually all respondents indicated that they used this technique.

    - About one-half of the respondents used the trade press to enhance company image or to foster company name recognition among potential buyers.

    - Nearly all respondents have used the trade press to announce or to stimulate interest in one product but have listed other products that are also available from the vendor in the ad copy.

- 57 -

INPUT

EXHIBIT V-1

ESTIMATES OF VENDORS' SYSTEMS
SOFTWARE REVENUES IN 1978

REVENUE	VENDOR
OVER $ 10 MILLION	APPLIED DATA RESEARCH, INC. CINCOM SYSTEMS, INC. INFORMATICS, INC. MRI SYSTEMS CORPORATION PANSOPHIC SYSTEMS, INC. SDI ASSOCIATES, LTD. SOFTWARE AG OF NORTH AMERICA, INC.
$2-10 MILLION	ALTERGO SOFTWARE, INC. BOOLE & BABBAGE, INC. CAPEX CORPORATION COMPUTER ASSOCIATES, INC. CULLINANE CORPORATION INNOVATION DATA PROCESSING JOHNSON SYSTEMS, INC. MATHEMATICA PRODUCTS GROUP THE COMPUTER SOFTWARE COMPANY TURNKEY SYSTEMS, INC. UNIVERSITY COMPUTING COMPANY VALUE COMPUTING, INC. WESTINGHOUSE ELECTRIC COMPANY WHITLOW COMPUTER SYSTEMS, INC.
LESS THAN $2 MILLION	DUQUESNE SYSTEMS, INC. DYLAKOR SOFTWARE SYSTEMS, INC. M. BRYCE & ASSOCIATES, INC. MANAGEMENT AND COMPUTER SERVICES, INC. SOFTWARE MODULE MARKETING, INC. SYNERGETICS UNIVERSAL SOFTWARE, INC.

INP

- Participants typically responded to a direct mail flyer or an advertisement prior to signing up for the seminar.

- Seminars were rated very effective in generating product leads.

- Direct mail solicitations are used to generate product prospect leads. The effectiveness of this technique is very high because the direct mail piece can be designed to screen out prospects more easily than an advertisement because more room is available to say more in the direct mail piece.

- Few companies use the techniques of having the sales force cold call the computer community (only three respondents indicated that this was done). In other areas of business, most sales efforts require that new prospects be culled from every possible source just to be able to meet sales quota goals. It appears that few systems software companies have reached product penetration levels sufficient to require this amount of effort. Several respondents indicated that cold calling was not required because leads were generated from other sources in sufficient volume to keep the sales force occupied.

- Many systems software companies have not needed to refine their lead-generating or lead follow-up methods because it has been easier to add new products to generate incremental sales rather than to prospect, qualify, and close sales of existing products to new customers. The market obviously cannot sustain this "cream skimming" policy forever. However, many companies have successfully employed this approach for five or more years.

- The most commonly used advertising media for lead generation are shown in Exhibit V-3. It is interesting to see that all trade press advertising is considered less than moderately successful. While all respondents indicated that press advertising was necessary for company name recognition and/or product identification, the quality of advertisement response they received was poor.

- 61 -

INPUT

EXHIBIT V-3

RESPONDENTS' LEAD GENERATION PRODUCTION

MEDIUM/SOURCE	AVERAGE NUMBER OF LEADS GENERATED PER YEAR PER COMPANY	QUALITY OF LEADS GENERATED*	AD SIZE RANGE
COMPUTER DECISIONS	800	2.3	1/8 TO 2 PAGES
COMPUTERWORLD	900	2.7	7" X 10" TO 2 PAGES
DATAMATION	1,650	2.6	1/8 TO 2 PAGES
ICP	150	2.0	N/A
INFOSYSTEMS	1,200	2.2	1/8 TO 2 PAGES
TRADE PRESS TOTAL	4,700	2.3	N/A
DIRECT MAIL	1,600	4.2	N/A
MARKETING SURVEY	2,300	4.5	N/A
OVERALL TOTAL	8,600	3.7	N/A

N/A = NOT APPLICABLE
*MEASURED ON A 1 TO 5 SCALE WHERE 1= LOWEST QUALITY AND 5= HIGHEST QUALITY

INPU

- The quality of leads generated was as high as it is because most companies felt that this method was necessary, even if closed sales could not be attributed to advertising. One respondent indicated that a $1 million annual advertising campaign generated 100 qualified leads, all of which came from INFOSYSTEMS or DATAMATION.

- Most respondents indicated that COMPUTERWORLD advertising was effective for company name identification only. Slightly less than one-half of the respondents expressed plans to drop all trade press advertising because of its lack of effectiveness.

- Nearly one-half of the average number of leads generated per company per year came from direct mail and marketing survey techniques. When you take lead generation effectiveness into account, direct mail and market survey are six to four favorites over trade press advetising.

- Respondents were asked to describe their measure of lead "quality."

  - One-half of the respondents indicated that closed sales were the main measure of lead quality.

  - One-third of the respondents indicated that lead quality was measured by job title and company of respondents.

  - One-fifth of the respondents indicated that lead quality was measured by the prospect having the right hardware and operating system for the vendor's product.

2. PROSPECT QUALIFICATION

- All respondents indicated that phone contact with the lead contact (prospect) is an important element of the sales cycle.

- One-half of the respondents try to close the prospect on a product trial or demonstration during the first phone conversation.

- One respondent uses the mail to solicit product trials on very simple products, but uses the phone to solicit trials on more complex products.

- One-half of the respondents indicated that the first phone call to the prospect is used to determine prospects product needs (need assessment). Based on the results of this conversation, the sales person will either drop the prospect, send more descriptive product literature, or push for a product presentation.

- Several respondents indicated that sales literature is designed to be self-qualifying for the prospect. This means that the prospect initiates the second series of discussions if he wishes to consider the product further.

3. SALES APPROACH

- One-half of the respondents indicated that sales strategy did not vary from product to product. The other half of the respondents expressed the following strategies by product type:

- The major product offered by the vendor is sold by a direct sales force. Subsequent products are sold by the sales support staff.

- Two companies use demonstrations for products that have easily visible effects, e.g., data base system is not easily demonstrable, but a system performance measurement tool is.

- A sales support staff is used by two responding companies to sell the technical products in the product line.

- One company sells a product to an end user group while the majority of its products are sold to the data processing group.

INF

- There is a trend for systems software vendors to sell products to end users rather than the DP department. Users are involved with decisions to purchase software in the areas of data base management systems, report writers, and other end user oriented products.

- Vendors that offer demonstratable products push heavily for a free trial by the prospect. Most vendors have found that 50% to 80% of all free trials close.

- Systems software vendors generally either sell directly or use agents to sell for them. Only five joint venture arrangements are employed by systems software vendors and these are used by the largest vendors in the industry. The respondents' sales approaches used in various geographic markets are shown in Exhibit V-4.

- Almost three-fourths of the respondents have at least some direct sales activity in Europe. Many vendors report significant revenue from their foreign operations.

- The trend is for more systems software companies to offer their products outside of the U.S. Several respondents also expressed an interest in changing many of the present agent relationships to direct sales organizations in response to increasing sales abroad. This trend does not yet apply to Japan, however, as the low level of activity there still warrants the use of agents rather than direct sales.

- One-fourth of the respondents use only the phone and mail as their direct sales approach in the U.S. Although these vendors are relatively small, they are considered to have excellent products, offer excellent service, and are very profitable.

- Slightly less than one-half of the respondents indicated that in-person sales calls were regularly made on the top DP executive of a prospect during the sales cycle. Another 25% indicated that they planned to do this in the future. Systems software companies that called on executives in the organization

- 65 -

INPUT

EXHIBIT V-4

SALES APPROACH USED BY RESPONDENTS
IN GEOGRAPHIC MARKETS

COUNTRY/ AREA	NUMBER OF COMPANIES USING THIS APPROACH			RESPONDENT AVERAGE OWNERSHIP	NUMBER OF RESPONDENTS USING MAIL AND PHONE ONLY TO SELL
	DIRECT SALES	AGENT	JOINT VENTURE		
U.S.A.	12	0	0	100%	3
CANADA	10	2	0	80	2
EUROPE	8	10	2	50	0
MIDDLE EAST	4	5	0	40	1
FAR EAST	2	8	0	20	1
MEXICO	4	2	2	50	1
CENTRAL AND SOUTH AMERICA	5	7	1	30	2

INP

generally indicated that the sales cycle was smoother, but data gathered on the number of sales calls made prior to close of sale were inconclusive to support this statement.

- Those companies that call on the top DP executive do so an average of twice during the sales cycle.

    - One call is to introduce the company when necessary and to overview the product under consideration.

    - The other call is to finalize contract terms and have the order signed.

- The systems and programming manager or programming manager are generally called on an average of three times by the sales person. The project manager of the product evaluation, if different from the systems and/or programming manager, is also called on three or four times during the sales cycle.

- The technical evaluation group is generally called on once during the sales cycle. This group receives:

    - A product overview.

    - A technical product presentation (generally given by a sales support staff member).

    - A product demonstration where applicable.

- The majority of the respondents indicated that the sales cycle is changing. The most commonly voiced changes were:

    - The sales cycle must be oriented to the top DP executive.

INPUT

- More users of DP services are participating in the decision process to acquire systems software. This is particularly true for data base management systems, report writers, and similar general use products.

- Respondents were asked to estimate the number of sales calls made prior to a prospect being dropped or until the sale closed.

  - The average number of on-site sales calls made on a prospect before dropping that prospect was seven calls, with a range of one to almost never.

  - The average number of on-site sales calls made on a prospect prior to closing a sale was five calls, with a range of one to twelve.

- Respondents should closely examine the utility of working prospects that will not close easily. With few systems software vendors approaching saturation with their products in the market, they would be better off calling on new prospects rather than spending time talking to users who do not buy.

C. EFFECTIVE MARKETING

1. NEW PRODUCT DEVELOPMENT

- New products provide the life blood for systems software vendors. Many vendors have been adding an average of one new product per year for the last five years.

- Respondents were asked to determine the critical factors that created an impetus for the additions of new products to the product line. The responses are tabulated in Exhibit V-5.

INPU

EXHIBIT V-5

RESPONDENTS' PERCEPTION OF WHY NEW PRODUCTS
ARE CREATED*

FACTOR	COMPANY												TO-TAL	AVER-AGE
	1	2	3	4	5	6	7	8	9	10	11	12		
REQUIREMENT PERCEIVED BY SALES FORCE AND NOT OFFERED BY COMPETITOR	1	2	3	1	1	5	5	3	4	1	5	3	34	2.8
LOSS TO COMPETITION	1	1	3	1	5	3	2	1	3	3	1	1	25	2.1
RESULT OF IN-HOUSE DEVELOPMENT	1	4	3	1	3	2-3	3	2	1	5	2-3	2	30	2.5
MARKET RESEARCH PERFORMED IN-HOUSE	1	1	5	1	5	1	4	5	2	1	1	4	31	2.6
MARKET RESEARCH PERFORMED BY CONSULTANT	1	1	2	1	1	1	1	4	1	1	1	2	17	1.4
NEW HARDWARE INTRODUCED BY HARDWARE MANUFACTURER	1	1	3	1	2	3-4	1	1	1	3	3	3	23.5	2.0
TREND TO ON-LINE PROCESSING	1	3	4	1	4	3-4	1	3	4	2	5	3	34.5	2.9
DECISION TO SPECIALIZE BY INDUSTRY	1	1	5	1	1	1	1	1	1	1	1	4	19	1.6

*FACTORS ARE RATED ON A ONE TO FIVE SCALE WHERE 5= MOST IMPORTANT AND 1= LEAST IMPORTANT

INPUT

- Respondents appear to be primarily development oriented on new product additions. Three out of four of the top rated factors indicate more concern with development than with marketing.

- The most important factor in new product additions is the trend to on-line processing. Respondents believed that this trend is having an impact on their product decisions when evaluating new product opportunities.

- The second most important factor in new product additions is a requirement perceived by the sales force and not offered by a competitor. Given the technical background of many of the systems software sales personnel, this factor also indicates more of a reliance on the technical staff than on marketing-oriented people.

- Respondents rated market research performed in-house as the third most important factor in new product additions. Only one respondent indicated that market research performed by a consultant would be acceptable to top management. This fact reinforces the conclusion that most systems software organizations are driven by the technical group rather than by the marketing group.

- The factor rated fourth was that new products were the result of in-house development. Respondents indicated that this type of development activity typically was done without formal market research input. Furthermore, this activity was often stimulated by the entrepreneurial owner who had started the original business by developing a product that the owner felt was needed in the marketplace. This decision was nearly always made without the benefit of market research to verify the product need in the marketplace. History has shown these few entrepreneurs to be correct in their market assessments to date, but the risk of failure from product development based on "gut" feeling can be very high.

INP

2. PRODUCT EXTENSIONS

● Respondents were asked to rate the importance of a series of factors on why a decision is made to modify and/or extend an existing product. The results of that analysis are shown in Exhibit V-6.

● Respondents were inclined to listen to market forces when determining what should be modified or extended on an existing product. The most important factors are listed below in decending order of importance:

- Loss to competition.

- Requirement perceived by the sales force and not offered by competitor.

- Result of in-house development.

● Other factors that received a relatively high ranking included:

- Trend to on-line processing.

- New hardware introduced by hardware manufacturer.

- Market research performed in-house.

● Another very important factor was that existing products are affected by user groups. Many systems software companies have a meeting of product users at least yearly. The user group evaluates product extensions and generally prioritizes the "wish" list for the vendor. The vendor then uses that input as the major determining factor for product change.

- One-fourth of the respondents indicated that user groups were important and gave this factor a rating of 4.7.

INPUT

EXHIBIT V-6

RESPONDENTS' PERCEPTION OF WHY EXISTING PRODUCTS
ARE MODIFIED OR EXTENDED*

FACTOR	COMPANY												TO-TAL	AVER-AGE
	1	2	3	4	5	6	7	8	9	10	11	12		
REQUIREMENT PERCEIVED BY SALES FORCE AND NOT OFFERED BY COMPETITOR	5	2-3	4	1	2	4	3	5	5	1	5	3	40.5	3.4
LOSS TO COMPETITION	5	4	4	1	5	3	1	5	5	5	1	4	43.0	3.6
RESULT OF IN-HOUSE DEVELOPMENT	5	4	3	1	4	1	4	2	3	3	4	3	37.0	3.1
MARKET RESULT PERFORMED IN-HOUSE	1	1	5	1	5	1	2	4	1	1	1	4	27.0	2.3
MARKET RESEARCH PERFORMED BY CONSULTANT	1	1	1	1	1	1	1	1	1	1	1	3	14.0	1.2
NEW HARDWARE INTRODUCED BY HARDWARE MANUFACTURER	1	1	4	1	4	3	1	1	1	4	3	5	29.0	2.4
TREND TO ON-LINE PROCESSING	1	3	3	1	5	3	1	1	3	3	3	4	31.0	2.6
DECISION TO SPECIALIZE BY INDUSTRY	1	1	2	1	1	1	1	3	1	1	1	4	18.0	1.5

*FACTORS ARE RATED ON A ONE TO FIVE SCALE WHERE 5= MOST IMPORTANT AND 1= LEAST IMPORTANT

INPU

- Had this factor been listed separately on the questionnaire it would probably rank as the most important factor.

3. PRICING

- Seventy-five percent of the respondents indicated that systems software products were priced according to what the market will bear. To determine this, vendors examine comparable product prices, the cost of performing the same function without the product, and IBM's position.

    - Historically, systems software has been priced very conservatively.

    - Systems software vendors generally set a price for a new product until it has been sold for a year, or until the product has achieved a good base of customers that can be used as references for additional sales. The price of the product then is generally increased 25% to 100%.

- Maintenance of the software is almost always priced according to what the market will bear.

    - One-half of the respondents indicated that the market will bear a 10% annual maintenance charge (10% of the current purchase price of the software).

    - One-half of the respondents believed that the market will bear a 10% to 15% annual maintenance charge.

- The trend is for maintenance charges to continue increasing to the 15% level. When considered on a service basis, a 15% maintenance charge is generally extremely reasonable for the service provided.

- Maintenance, as described by the respondents, includes program fixes, telephone support, most program extensions, and the majority of product enhancements. Few vendors charge separately for enhancements unless the

- 73 -

INPUT

enhancements are a separate module with unique capabilities distinct from the basic product.

- Nearly 75% of the respondents acknowledged that some form of professional service (programming, training, consulting) was available on a time and materials basis. Only one-third of the respondents indicated that the professional services were actively sold with systems software. Two-thirds of the respondents either do not offer or do not actively seek out professional service opportunities with their systems software product sales.

4. TERMS AND CONDITIONS OF SALE

- An area of interest to some systems software vendors that was identified after the interviewing process began is the terms and conditions of sale for a software product.

- INPUT did not perform specific research on terms and conditions for software sales, but could do so if sufficient interest warranted such a study. Areas of interest would include:

  - Relationship of lease price to purchase price.

  - Lease term (month-to-month, year, or longer).

  - Software maintenance.

    - Pricing.

    - On-site or off-site.

    - Central site or individual site for multiple copies per customer.

    - On contract or per call basis.

- 74 -

- Term length (month-to-month, year, or longer).

- Program fixes included.

- Enhancements, modifications or extensions included.

- Installations of program updates.

- Product warranty (coverage and length).

- Product training.

    - Cost for installation support.

    - Ongoing support.

    - Program testing.

- License rights of buyer.

    - Multiple sites (support, use and discounts).

    - Multiple systems (support, use and discounts).

    - Modification.

- International issues.

    - Pricing.

    - Maintenance and support.

    - Protection of sellers rights.

INPUT

. License rights of buyer.

. Training.

. Warranty.

. Subsidiary of U.S. company.

D.   PERSONNEL ISSUES

1.   VENDOR PERSONNEL STATISTICS

● The personnel distribution by job function of responding companies is shown in Exhibit V-7. From this exhibit it would appear that about half of the non-administrative staff is involved in program development and maintenance activities and the other half is involved in sales and marketing.

- At first glance, it appears that sales and support people are in a one to one ratio in systems software companies. If company ten data is removed, however, the ratio becomes six to four of sales to sales support.

- The reason for removing company ten is that this organization relies on sales support personnel to penetrate existing accounts with sales of additional products. This company was the only respondent that indicated such a heavy reliance on sales support for a selling function.

● Respondent personnel distribution by sex is shown in Exhibit V-8. Fourteen percent of the non-administrative staff is female.

- The area with the greatest concentration of women is sales support.

- 76 -

INF

EXHIBIT V-7

RESPONDENTS' PERSONNEL DISTRIBUTION
BY JOB FUNCTION

COMPANY	NUMBER OF EMPLOYEES					
	SALES	SALES SUPPORT	MARKETING	DEVEL- OPMENT	MAINT- ENANCE	TOTAL
1	48	17	22	N/A	126	213
2	50	30	0	N/A	100	180
3	8	0	0	4	4	16
4	15	5	5	10	10	45
5	70	55	12	40	12	189
6	10	17	3	40	20	90
7	17	11	9	12	4	53
8	6	0	0	N/A	4	10
9	1	2	1	4	2	10
10	40	150	8	N/A	200	398
11	30	30	0	N/A	N/A	N/A
12	23	10	9	N/A	50	92
TOTAL	318	327	69	110*	532*	1,296*
AVERAGE	27	27	6	18*	48*	118*
PERCENT	21%	21%	5%	14%	39%	100%

N/A = NOT AVAILABLE (MANY COMPANIES DO NOT SEPARATE DEVELOPMENT AND MAINTENANCE PERSONNEL)
*EXCLUDING COMPANY NUMBER 11

INPUT

EXHIBIT V-8

RESPONDENTS' PERSONNEL DISTRIBUTION BY SEX

COMPANY	PERCENT FEMALE					
	SALES	SALES SUPPORT	MARKETING	DEVEL-OPMENT	MAINT-ENANCE	OVERALL
1	6%	18%	32%	N/A	4%	8%
2	5	20	0	N/A	20	16
3	0	0	0	0	25	6
4	20	10	40	40	10	24
5	10	25-30	0	15-20	15-20	16
6	20	20	20	10	10	12
7	20	60	33	20	25	32
8	50	0	0	N/A	25	40
9	0	0	0	0	0	0
10	10	10	10	15	15	13
11	20	70	N/A	N/A	N/A	N/A
12	5	0	22	N/A	12	10
AVERAGE	11%	22%	22%	16%	13%	14%
OVERALL PERCENT	17%	34%	7%	9%	33%	100%

N/A = NOT AVAILABLE

INPL

- The area with the lowest concentration of women is sales.

• Respondents felt generally satisfied with the number of women in their organizations. Most felt more female sales personnel would be an asset, but none expressed plans for a concerted program to recruit such candidates.

2. PERSONNEL COSTS

• Respondents compensation cost structure is shown in Exhibit V-9.

• Viewed differently, the average annual compensation of various functional department personnel is as follows:

- For sales personnel - $37,000.

- For sales support personnel - $26,000.

- For marketing personnel - $34,000.

- For development and maintenance personnel - $37,000.

• It is surprising to see that compensation for those in development and maintenance is as high as that for the sales staff.

- This is a reflection of the value of the systems programmers that work on the complex system packages.

- Many systems software company founders and key employees are programmers. Top management does not want to lose its technical staff to other companies, so a wage higher than average is paid to these employees.

• The total cost structure of the responding systems software vendors is shown in Exhibit V-10.

INPUT

EXHIBIT V-9

RESPONDENTS' COMPENSATION COST AS A
PERCENT OF REVENUE

COMPANY	REVENUE ($M)	COMPENSATION COST AS A PERCENT OF REVENUE					
		SALES	SALES SUPPORT	MARKET-ING	DEVELOP-MENT	MAINT-ENANCE	TOTAL
1	$ 22.0	3.6%	14.1%	.9%	N/A	18.6%	37.2%
2	.5	40.0	0	0	N/A	20.0	60.0
3	5.0	14.0	4.0	4.0	N/A	8.0	30.0
4	18.5	5.9	9.7	1.6	40.0	20.0	77.2
5	21.0	12.9	5.2	1.9	5.2	1.0	26.2
6	8.0	11.3	2.5	3.8	N/A	17.5	35.1
7	8.4	15.5	3.6	4.8	N/A	20.2	44.1
8	8.9	21.3	11.2	0	N/A	32.6	65.1
9	2.0	15.0	0	0	N/A	10.0	25.0
10	3.2	15.6	3.1	6.3	9.4	9.4	43.8
AVERAGE	$ 9.8	10.7%	8.0%	2.1%	9.0%	15.4%	45.2%

N/A= NOT AVAILABLE

INP

EXHIBIT V-10

RESPONDENTS' TOTAL COST AS A PERCENT
OF REVENUE*

COMPANY	REVENUE ($M)	TOTAL COST AS A PERCENT OF REVENUE*						
		SALES	SALES SUPPORT	MARKET-ING	SUB TOTAL	DEVELOP-MENT	MAINTEN-ANCE	TOTAL
1	$22.0	6.4%	23.2%	1.4%	31.0%	N/A	30.9%	61.9%
2	1.0	10.0	10.0	10.0	30.0	20.0	10.0	60.0
3	5.0	22.0	10.0	10.0	42.0	N/A	2.0	62.0
4	18.5	11.4	20.0	3.8	35.2	35.1	15.1	85.4
5	21.0	37.1	13.8	6.2	57.1	N/A	20.0	77.1
6	8.0	22.5	5.0	7.5	35.0	N/A	32.5	67.5
7	8.4	23.8	6.0	13.1	42.9	N/A	38.1	81.0
8	8.9	27.0	14.6	0	41.6	N/A	38.2	79.8
9	2.0	25.0	0	0	25.0	0	25.0	50.0
10	3.2	21.9	9.4	9.4	40.7	12.5	12.5	65.7
AVERAGE	$ 9.8	20.3%	15.1%	5.0%	40.4%	7.2%	25.5%	73.1%

N/A = NOT AVAILABLE
*TOTAL COST DOES NOT INCLUDE ADMINISTRATIVE, OVERHEAD, INTEREST COSTS, ETC.

INPUT

- These figures would indicate a pretax profit margin for the respondents of 10-15%. This compares favorably to the 1979 Annual ADAPSO Report average of 11% pretax profit margin for all software companies.

- Over 40% of all expenditures is for sales, sales support, and marketing staff. Another 33% of expenditures is for development, maintenance, and related expenses.

- Most large organizations in the survey have higher costs relative to revenues than small companies. The results of the 1979 Annual ADAPSO Report also indicate that profit is inversely related to revenues; i.e., the higher the revenue, the lower the profit margin.

3.   TRAINING PROGRAMS

- Just over 50% of the respondents indicated that a formal training program was used to train new company employees. Only one-third of the respondents provided any form of ongoing training to their professional staff.

- Summaries of the sales, sales support, and development/maintenance training programs are shown in Exhibits V-11, V-12, and V-13, respectively. Conclusions drawn from these exhibits are:

    - The training programs are very unsophisticated. New hires receive an average of two weeks of formal training and then six to nine weeks of OJT prior to being placed in their positions.

    - Very little ongoing formal training is used. This seems particularly strange in the technical area where it would be expected that people would need to take courses on a periodic basis.

    - Less than one-half of the respondents used any form of outside training by education vendors. It is surprising that hardware vendors were not used more frequently for technical personnel development.

- 82 -

INPU

EXHIBIT V-11
RESPONDENTS' SALES TRAINING PROGRAM SUMMARY

TRAINING PROGRAM ELEMENT	COMPANY												TO-TAL*	AVER-AGE
	1	2	3	4	5	6	7	8	9	10	11	12		
TRAINING PROGRAM TOTAL LENGTH (IN WEEKS)	6	6	20	24	2-3	30	5	6-8	16	3-7	2-4	8	133	11
LENGTH OF FORMAL TRAINING CLASSES (IN WEEKS)	2	3	8	0	0	4	1	3	0	0	0	4	25	2
OJT (IN WEEKS)	4	3	12	24	2-3	26	4	3-5	16	3-7	2-4	4	108	9
MANAGEMENT TRAINING PROGRAM LENGTH (IN WEEKS)	0	0	4	0	0	0	0	1	0	0	0	0	5	<1
FORMAL PRE-CLASS TESTING**	N	N/A	Y	N	N	N	N	N	N	N	N	N	1	8%
FORMAL IN-CLASS TESTING**	Y	N/A	Y	N	N	N	N	Y	N	N	N	Y	4	33%
TESTING BY ROLE PLAYING AND PRESENTATIONS**	Y	Y	Y	N	N	N	Y	Y	N	N	N	Y	6	50%
TESTING BY PROBLEM SOLVING**	N	N	Y	N	N	N	Y	N	N	N	N	N	2	17%
CLASS SIZE	3	1-20	10	10-20	1	4-8	10	10-15	0	0	20	10-20	102	10
NUMBER OF CONSULTANTS USED	0	0	3	0	0	0	2	0	0	0	0	2	7	1
FORMAL ON-GOING TRAINING PROGRAM USED**	N	Y	Y	N	N	Y	Y	N	N	N	N	N	4	33%
TRAINING BY EDUCATION VENDOR**	Y	Y	N	N	N	N	N	N	N	N	Y	Y	4	33%
TRAINING PROGRAM USES EDUCATION VENDOR MATERIALS**	N	Y	Y	N	N	Y	N	Y	Y	N	N	Y	6	50%

N/A = NOT AVAILABLE

*TOTAL AND AVERAGE ON YES/NO QUESTIONS INDICATE YES/NO QUESTIONS INDICATE YES RESPONSES

**Y= YES N= NO

INPUT

EXHIBIT V-12
RESPONDENTS' SALES SUPPORT TRAINING PROGRAM SUMMARY

TRAINING PROGRAM ELEMENT	COMPANY												TO-TAL*	AVERAGE
	1	2	3	4	5	6	7	8	9	10	11	12		
TRAINING PROGRAM TOTAL LENGTH (IN WEEKS)	4-5	10	20	24	0	4	6	9-10	4-8	0	2-4	5	92	8
LENGTH OF FORMAL TRAINING CLASSES (IN WEEKS)	2	3	8	0	0	4	2	3	0	0	0	1	23	2
OJT (IN WEEKS)	2-3	7	12	24	0	0	4	6-7	4-8	0	2-4	4	69	6
MANAGEMENT TRAINING PROGRAM LENGTH (IN WEEKS)	0	0	4	0	0	0	0	1	0	0	0	0	5	<1
FORMAL PRE-CLASS TESTING**	N	N	Y	N	N	N	N	N	N	N	N	N	1	8%
FORMAL IN-CLASS TESTING**	Y	N	Y	N	N	N	N	Y	N	N	N	N	3	25%
TESTING BY ROLE PLAYING AND PRESENTATIONS**	N	N	Y	N	N	N	N	Y	N	N	N	Y	3	25%
TESTING BY PROBLEM SOLVING**	N	N	Y	N	N	N	Y	N	N	N	N	N	2	17%
CLASS SIZE	3	0	10	10-15	0	4-8	5	10-15	0	0	20	5-10	77	6
NUMBER OF CONSULTANTS USED	0	0	3	0	0	0	0	0	0	0	0	1	4	<1
FORMAL ON-GOING TRAINING PROGRAM USED**	N	Y	Y	N	N	Y	N	N	N	N	N	N	3	25%
TRAINING BY EDUCATION VENDOR**	Y	Y	N	N	N	N	N	N	N	N	N	Y	3	25%
TRAINING PROGRAM USES EDUCATION VENDOR MATERIALS**	N	Y	Y	N	N	Y	N	Y	N	N	N	Y	5	42%

*TOTAL AND AVERAGE ON YES/NO QUESTIONS INDICATE "YES" RESPONSES
**Y= YES N= NO

INPUT

TRAINING PROGRAM ELEMENT	COMPANY												TO-TAL*	AVER-AGE
	1	2	3	4	5	6	7	8	9	10	11	12		
TRAINING PROGRAM TOTAL LENGTH (IN WEEKS)	0	0	16	24	0	2	6	36–38	20–24	0	1	16	124	10
LENGTH OF FORMAL TRAINING CLASSES (IN WEEKS)	0	0	4	0	0	2	2	8	0	0	0	2	18	2
OJT (IN WEEKS)	0	0	12	24	0	0	6	28–30	20–24	0	1	14	108	9
MANAGEMENT TRAINING PROGRAM LENGTH (IN WEEKS)	0	0	4	0	0	0	0	1	0	0	0	2	7	1
FORMAL PRE-CLASS TESTING**	N	N	Y	N	N	N	N	N	N	N	N	N	1	8%
FORMAL IN-CLASS TESTING**	N	N	Y	N	N	N	N	Y	N	N	N	Y	3	25%
TESTING BY ROLE PLAYING AND PRESENTATIONS**	N	N	N	N	N	N	N	N	N	N	N	N	0	0%
TESTING BY PROBLEM SOLVING**	N	N	Y	N	N	N	Y	Y	N	N	N	Y	4	33%
CLASS SIZE	0	0	10	5–10	0	1	1–3	5–10	0	0	20	1–5	52	4
NUMBER OF CONSULTANTS USED	3	0	0	0	0	0	0	0	0	0	0	0	3	<1
FORMAL ON-GOING TRAINING PROGRAM USED**	N	N	Y	N	N	Y	N	Y	N	N	N	Y	4	33%
TRAINING BY EDUCATION VENDOR**	Y	N	N	N	N	N	N	N	N	N	N	Y	2	17%
TRAINING PROGRAM USES EDUCATION VENDOR MATERIALS**	N	N	Y	N	N	N	N	Y	N	N	N	Y	3	25%

*TOTAL AND AVERAGE ON YES/NO QUESTIONS INDICATE YES RESPONSES
**Y= YES N= NO

- Training programs must be considered to be in their infancy with systems software vendors. The average formal classroom training is two weeks, followed by another six to nine weeks of OJT. These figures would indicate that either experienced people are being induced to join systems software vendors or newly hired people learn their jobs while performing them, or both.

4. PRODUCTIVITY

- The revenue production per salesperson is shown in Exhibit V-14. The range of production is obviously quite wide, with a range of from $80,000 to $1.85 million.

- There appears to be a direct relationship between revenue production and type of product sold. The more user oriented the product (productivity aids, data base management systems, etc.), the greater the revenue generated per sales person. The more systems oriented the product (spoolers, utilities, etc.), the less revenue generated per sales person.

- Productivity is not directly related to sales force size or overall revenue production.

    - There is no relationship between sales force size and productivity.

    - There is no relationship between company revenue level and productivity.

5. TURNOVER

- The personnel turnover statistics of respondents are shown in Exhibit V-15.

- The average annual turnover for all job categories is 17%.

    - The sales function has the highest turnover: 22%.

- 86 -

INP

EXHIBIT V-14

RESPONDENTS' REVENUE PRODUCTION
PER SALES PERSON

COMPANY	REVENUE PRODUCTION PER SALES PERSON ($M)
1	$ 1.85
2	1.00
3	0.55
4	0.55
5	0.35
6	0.31
7	0.30
8	0.29
9	0.25
10	0.21
11	0.18
12	0.08
AVERAGE	$ 0.39

INPUT

EXHIBIT V-15

RESPONDENTS' PERSONNEL TURNOVER BY JOB FUNCTION

COMPANY	TURNOVER PERCENTAGE					
	SALES	SALES SUPPORT	MARKETING	DEVEL-OPMENT	MAINTEN-ANCE	OVERALL
1	15%	3%	5%	N/A	20%	16%
2	10-12	10-12	0	N/A	10-12	10-12
3	0	0	0	0	0	0
4	20	20	10	30	30	24
5	50	20-25	30	30	30	35
6	2	2	2	0	2	2
7	10	15	0	15	0	9
8	22	0	0	N/A	0	10
9	0	0	0	0	0	0
10	10	10	10	10	10	10
11	10	20	0	N/A	N/A	N/A
12	44-45	25	0	N/A	50	41
AVERAGE	22%	13%	10%	15%	17%	17%
OVERALL PERCENT	31%	19%	3%	8%	39%	100%

N/A = NOT AVAILABLE

INPUT

- The maintenance function has the second highest turnover: 17%.

- Marketing has the lowest turnover: 10%.

- The range of turnover percentages is high: 0 to 50%. Smaller companies typically have lower turnover percentages than higher companies. Private companies have lower turnover percentages than public companies. The reasons for this appear to be:

  - There is more flexibility in small companies and private companies than in large organizations or public companies.

  - This flexibility can translate into special rewards to key employees, which can boost morale and which appears to lower turnover.

6. COMPARISON OF REMOTE COMPUTING SERVICES VENDORS AND SYSTEMS SOFTWARE VENDORS

- The average annual revenues generated per salesperson for remote computing services (RCS) companies is $.61 million. This is greater than the average annual production of the systems software company sales staff: $.39 million.

- Sales and sales support compensation costs for RCS companies are 5.2% of revenue compared with 18.7% for systems software vendors.

- Sales turnover in RCS companies averages 27% with a range of 15-50% annually. This is greater than the 22% sales turnover average for systems software companies.

- Sales support turnover in RCS companies averages 20% annually, with a range of 10-31%. This is higher than the 13% sales support turnover average systems software companies.

INPUT

- Systems software companies are smaller than most RCS companies. This size factor appears to be an advantage from the point-of-view of minimizing employee turnover.

- Ten percent of the sales force and 24% of the sales support staff of RCS companies are female. Systems software companies have 11% and 12% for those same categories, respectively.

- The average RCS sales training program lasts 17 weeks. This is six weeks longer than the average systems software sales training program.

- The average RCS sales support training program is three weeks longer than the comparable systems software training program which lasts eight weeks.

- Formal classes for sales and sales support training in RCS companies average six and three weeks, respectively. Systems software companies average two weeks of formal training for both sales and sales support trainees.

E.   PRODUCT DEVELOPMENT

1.   PROGRAM DEVELOPMENT METHODS

- Just over one-half of the respondents indicated that program development techniques had changed in the last two or three years. Those respondents who experienced changes indicated that they were dramatic. The major new techniques employed were:

    - Improved estimating, scheduling, and control of programming activities.

    - On-line program development, testing, and debugging.

- 90 -

INPU

- Development of special high-level languages to perform program development more quickly and efficiently.

- Use of consultants to perform more work on a fixed-fee basis.

- Acquisition of more products and internal development of fewer products.

● Exhibit V-16 lists changes in program development techniques envisioned in the next five years.

- Several respondents spoke of changes in the next five years that other respondents had already implemented. Examples include development of higher level languages, structural/modular program development, acquisition of more products external to the company, use of outside consultants, and on-line program development.

- Virtually all respondents expressed the need for a high-level development language that would assist in program development. Current programming techniques are obviously not providing satisfying long-term solutions to vendor problems.

2. IMPORTANCE OF DATA BASE SYSTEMS TO SYSTEMS SOFTWARE

● Seventy-five percent of the respondents indicated that a data base, or data base concept, was extremely important to their current products. All respondents indicated that either the need for data base products would grow in the future or that the need could not grow any more important than it already is.

● Several respondents stated that the data base will become the most important corporate resource in the future.

INPUT

EXHIBIT V-16

COMMENTS BY RESPONDENTS ON CHANGES FORESEEN IN
PROGRAM DEVELOPMENT METHODS OVER
THE NEXT FIVE YEARS

- "USE OF PROGRAMMING TOOLS IS THE ONLY REAL WAY TO IMPROVED PRODUCTIVITY."
- "PREPACKED MODULES USED WITH VERY LITTLE CUSTOM PROGRAMMING."
- "METHODS WILL CHANGE FOR END USER, BUT NOT VENDOR."
- "ELIMINATE PROGRAMMING WITH AUTOMATED METHODS."
- "MORE SPECIAL DEVELOPMENT LANGUAGES ARE REQUIRED."
- "ELIMINATION OF COBOL-LIKE LANGUAGES BY CREATION OF MUCH HIGHER LEVEL LANGUAGES."
- "PRODUCTS ARE NEEDED THAT ALLOW MIGRATION FROM ONE DBMS TO ANOTHER."
- "MORE STRUCTURAL DESIGN NEEDED."
- "A MOVE TO ACQUIRE MORE PRODUCTS IS ANTICIPATED."
- "PROGRAMMING MUST GET EASIER."
- "ON-LINE PROGRAM DEVELOPMENT WILL TAKE PLACE."
- "WE WILL USE MORE CONSULTANTS FOR SPECIFIC PROJECTS."

INI

3.   IMPORTANCE OF SECURITY TO SYSTEMS SOFTWARE

- The security issue raises at least three problems for systems software vendors:

  - Protecting user data.

  - Protecting software code from duplication.

  - Protecting software code from modification during program execution.

- Sixty percent of the respondents indicated that security was very important to their products. Vendors were primarily concerned about protecting user data, but nearly all respondents expressed concern over the difficulty of protecting the systems software from duplication.

- Three respondents indicated that they planned to protect their software better in the future, but only one had an active strategy to implement the plan.

- One vendor discussed a plan to either build a security system product or to modify existing products to provide more security of user data.

- Although respondents discussed security at great length, the best comment that summed up the general attitude was: "Everyone talks about it and wants it, but no one is willing to pay for it." This attitude seems to pervade both vendors and users despite recent system breaches resulting in the unauthorized appropriation of millions of dollars.

INPUT

VI SYSTEMS SOFTWARE BUYER PROFILE

VI   SYSTEMS SOFTWARE BUYER PROFILE

A.   SYSTEMS SOFTWARE BUYERS AND THE BUYING CYCLE

- A total of 26 buyers of systems software were interviewed to create the buyer profile. The 26 companies have medium to very large computer installations.

    - The smallest installation had a single IBM 370/145 computer.

    - The largest installation had two IBM 370/168s and three IBM 3033s.

    - Nearly all companies were using a virtual storage operating system (DOS/VS, OS/VS1, OS/VS2 or OS/MVS).

    - The respondents had 34 different hardware and operating system configurations and a total of 47 IBM 370/145 or larger CPUs.

- The system software buyers are currently quite centralized as shown in Exhibit VI-I. The picture is dramatically changing, however, as decentralization once again appears to be on the horizon for many companies. Exhibit VI-2 contains representative comments addressing the question of why companies are decentralizing.

- The computer industry has historically experienced swings between centralization and decentralization. This is because:

- 95 -

INPUT

EXHIBIT VI-1

HOW CENTRALIZED/DECENTRALIZED IS YOUR COMPANY

INPU
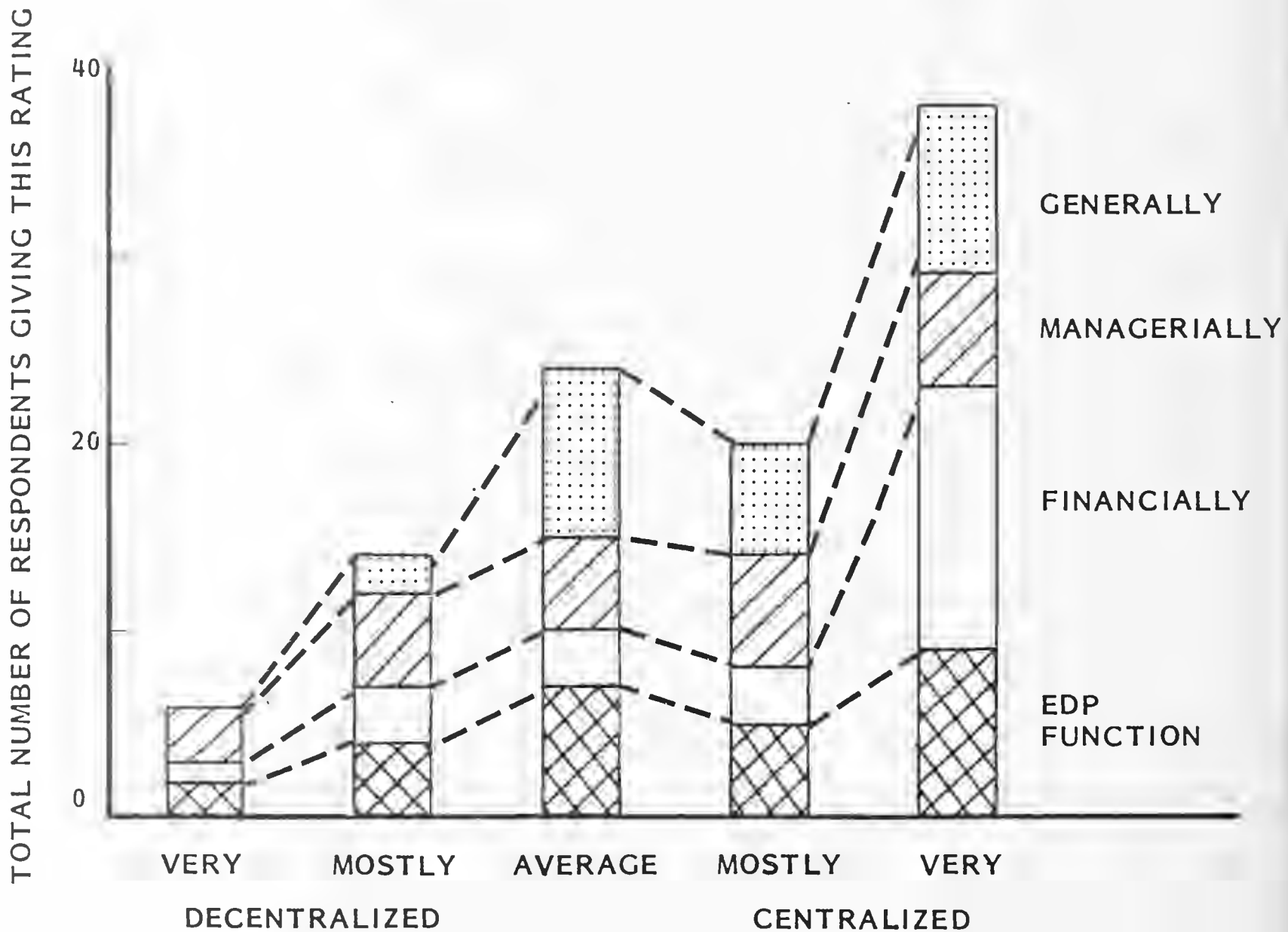
EXHIBIT VI-2

RESPONDENTS' COMMENTS ON DECENTRALIZATION

- "ECONOMICS IS FORCING THE ISSUE, AND THE TECHNOLOGY IS BECOMING AVAILABLE."
- "DP FUNCTIONS WILL BECOME MORE DECENTRALIZED AS ACADEMIC AND ADMINISTRATIVE FUNCTIONS ARE SEPARATED."
- "WE ARE EXPERIENCING A TREND TO DECENTRALIZATION IN EDP BECAUSE HARDWARE IS BECOMING AVAILABLE AT A LOWER COST."
- "EDP WILL BE MORE DECENTRALIZED BECAUSE WE WANT EACH BANK TO HAVE MORE INDIVIDUAL CAPABILITY."
- OUR CONSTITUENT HOSPITALS ARE NOW BEING DECENTRALIZED BY A MANAGEMENT POLICY DECISION."
- "WITH DISTRIBUTED DATA PROCESSING, EACH DEPARTMENT WILL CONTROL ITS OWN SPENDING."

INPUT

- There is no one good way to solve all of a company's data processing problems.

- What works for DP in one company may not work for another company.

- DP is so complex and has such a short history that management continues to experiment with it to attempt to find the best answer to the decentralization/centralization question.

- Changing technology and new hardware economics affect the financial reasons for one approach or the other.

- The majority of systems software buyers would prefer to buy or consider buying software from vendors rather than develop equivalent packages in-house.

  - The data on these preferences by package type are shown in Exhibit VI-3.

  - There is a marked preference to acquire the more technically complex products (systems operations and utilization) than less technically complex products (systems implementation and applications).

- The respondents' views on the form of software package delivery are shown in Exhibit VI-4.

  - Over 70% of the respondents believe that systems operations and systems utilization products should be standardized. However, the balance would like to see at least some customizing of these packages for users.

  - Only 35% of respondents believe that applications packages should be standardized compared to over 60% for all systems packages.

- 98 -

INP

EXHIBIT VI-3

RESPONDENTS' ATTITUDES TOWARD SOFTWARE PACKAGES

NUMBER OF RESPONDENTS

PREFER

CONSIDER

WON'T/CAN'T USE

INPUT
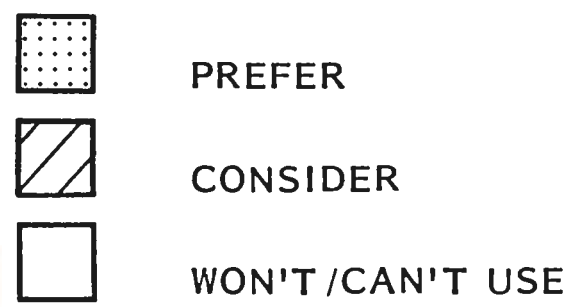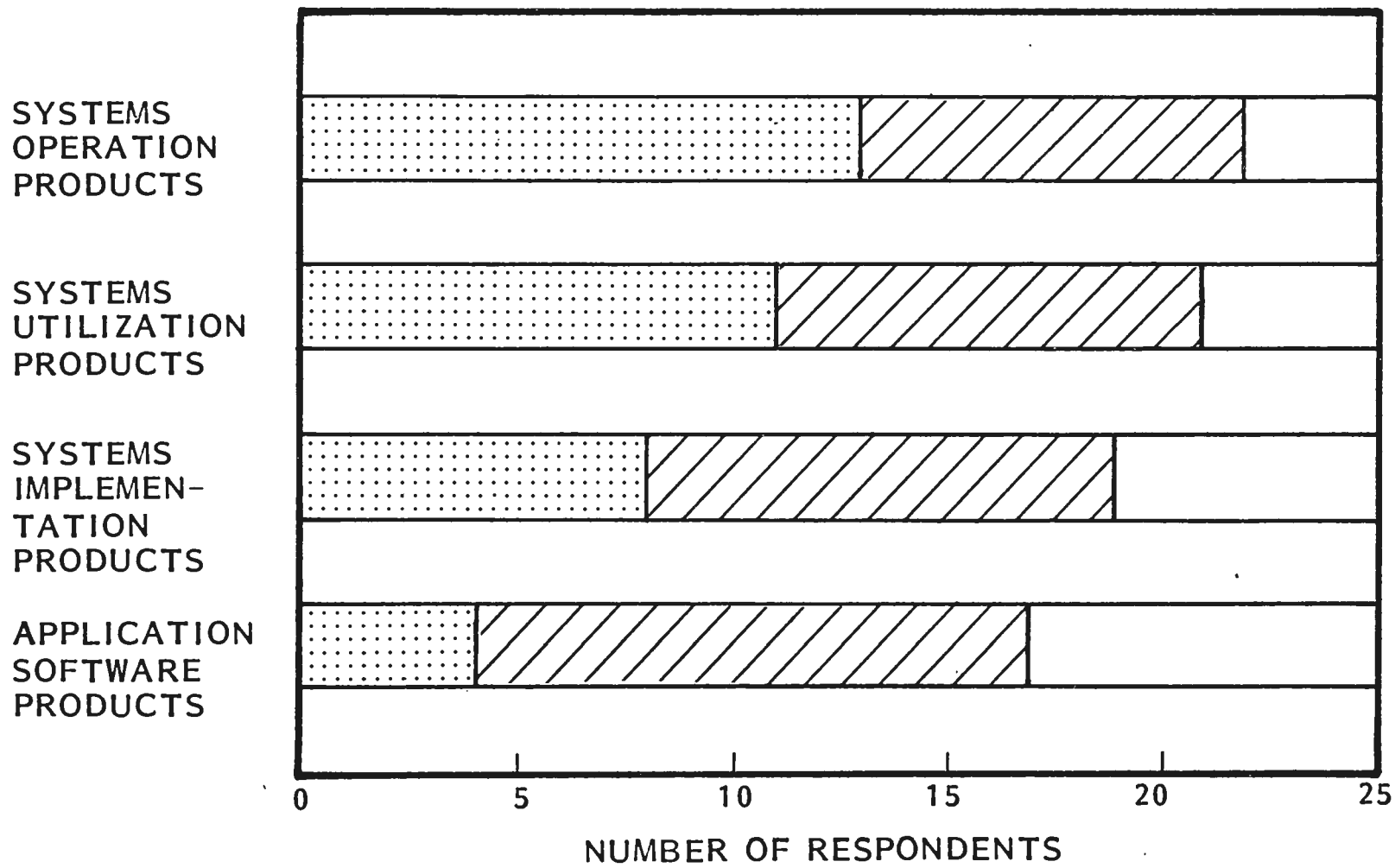
EXHIBIT VI-4

RESPONDENTS' VIEW OF FORM OF SOFTWARE PACKAGE DELIVERY

- STANDARD, NO CUSTOMIZATION
- SEMI-CUSTOMIZED
- FULLY CUSTOMIZED
- COMPUTER SERVICES
- NO PREFERENCE

- 100 -

INPU
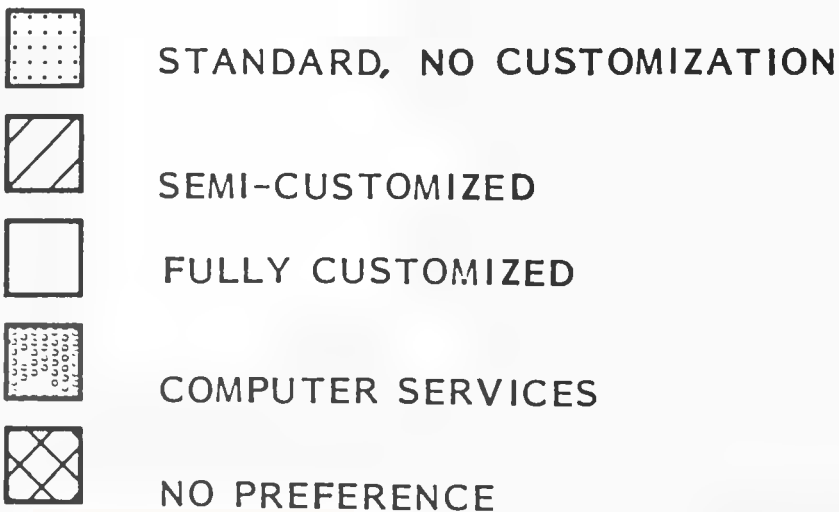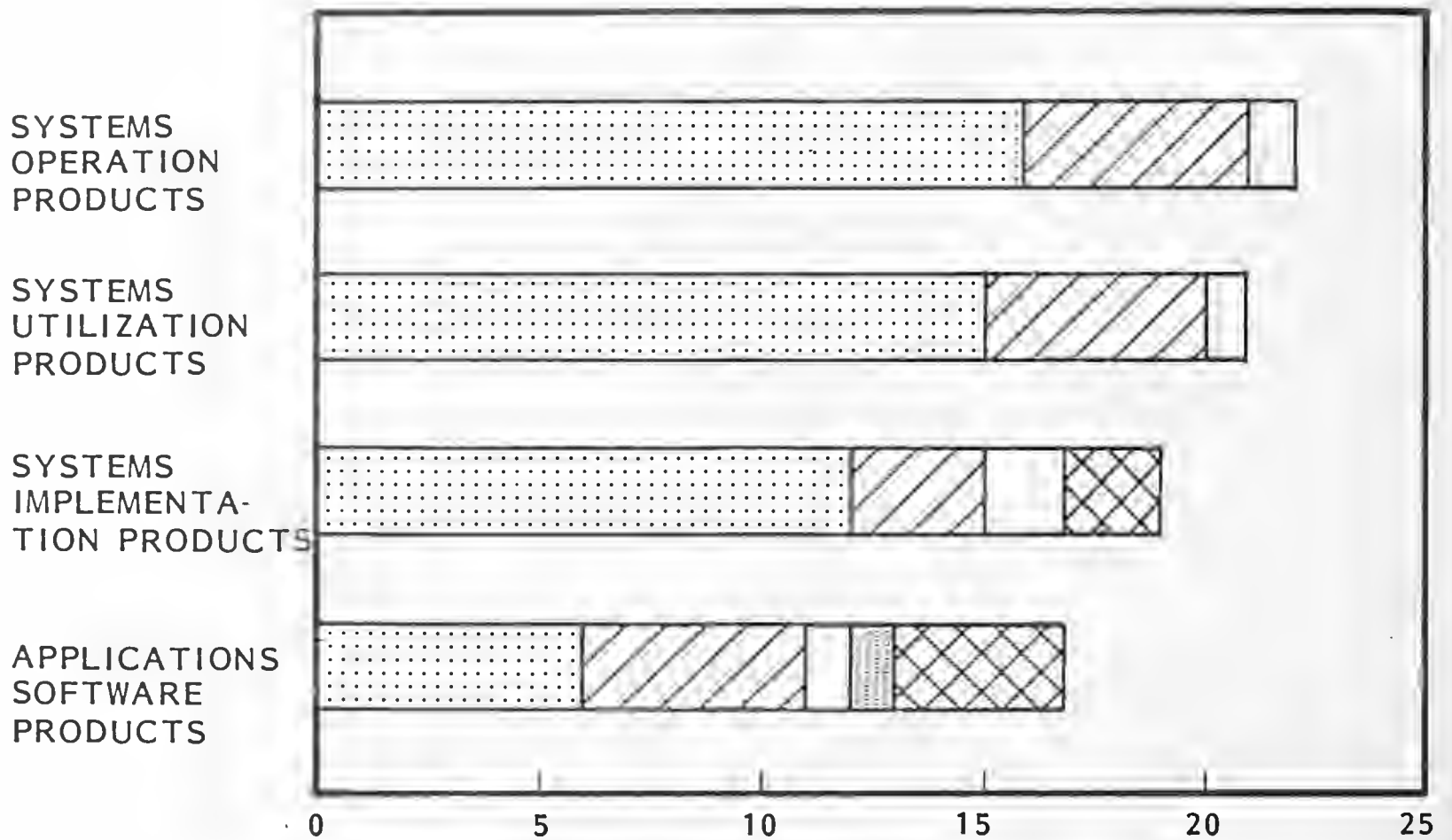
- Respondents were asked to indicate how they determined the quality of a systems software package. The responses are tabulated in Exhibit VI-5.

    - Nearly 70% of respondents wanted to benchmark, try, or have the package demonstrated whenever possible (some packages, such as DBMS, generally do not fit into this category).

    - Buyers place a great deal of emphasis on discussions with existing users of the packages as well as with the vendors themselves.

    - Vendor reputation was considered important by almost 30% of the respondents.

- Buyers of systems software had several ideas on how the sales process for systems software could be improved. These recommendations are listed in Exhibit VI-6.

    - It would appear that vendors can respond to most of the items on this list.

    - The majority (almost 75%) of these items relate to ineffective selling on the part of the vendor. This may be caused by sales force turnover, or it may be a symptom of the sales force working to close easy accounts and not bothering with more difficult sales situations.

- The buying decision is made at a vice president's level or higher in over 80% of the cases where the product costs more than $5,000. The final approval process is shown in Exhibit VI-7.

- Exhibit VI-7 seems to have at least one clear interpretation. If the package can be priced at $5,000 or less, the approval process will be relatively easy. If the package is priced over $5,000, then upper management must become involved in the decision process.

INPUT

EXHIBIT VI-5

SYSTEMS SOFTWARE PACKAGE QUALITY ASSESSMENT
TECHNIQUES USED BY RESPONDENTS

ASSESSMENT TECHNIQUE	NUMBER OF RESPONDENTS	PERCENT OF RESPONDENTS USING THIS TECHNIQUE
DEMONSTRATION, BENCHMARK, FREE TRIAL	18	69%
DISCUSSIONS WITH USERS (REFERENCES)	16	62
DISCUSSIONS WITH VENDORS	15	58
REPUTATION OF VENDOR	7	27
DATAPRO	2	8
QUALITY OF PROMOTIONAL MATERIAL	2	8

EXHIBIT VI-6

TECHNIQUES FOR IMPROVING THE SALES PROCESS

- "OFFER FREE TRIAL." (4 RESPONDENTS)
- "MORE PRODUCT COMPARISON ADS."
- "LESS EXECUTIVE OVERVIEW ADS."
- "LESS QUESTION AND ANSWER ADS."
- "ESTABLISH SOLID REFERENCE BASE FOR PRODUCT."
- "LOWER PRICE OF MAINTENANCE."
- "HAVE SALES PEOPLE STAY IN CONTACT WITH PROSPECT."
  (2 RESPONDENTS)
- "MORE KNOWLEDGEABLE SALES PEOPLE WITH LESS HARD SELL."
  (2 RESPONDENTS)
- "PROVIDE MORE DETAILED PRODUCT LITERATURE FOR
  EVALUATIONS."
- "BETTER FOLLOW-UP SUPPORT."
- "WOULD LIKE TO SEE MORE FIRMS LIKE INPUT PROVIDE
  INFORMATION ON PRODUCTS."
- "NEED BETTER VENDOR UNDERSTANDING OF BUYER APPROVAL
  CYCLE AND TIME FRAME." (3 RESPONDENTS)

INPUT

EXHIBIT VI-7

APPROVAL PROCESS FOR PURCHASE OF SYSTEMS SOFTWARE

SPENDING LIMIT	APPROVAL NEEDED (NUMBER OF RESPONSES)				
	DEPARTMENT MANAGER	EDP DIRECTOR	DP COMMITTEE	VICE PRESIDENT	BOARD OF DIRECTORS
< $5,000	3	4			
UP TO $20,000		1			
UP TO $50,000		1			
OVER $5,000				6	1
OVER $20,000				1	
OVER $50,000				1	1
ALL PURCHASES		2	1	11	

INP

- System software vendors should consider calling on the top decision maker whenever possible. This will make the final decision process work more effectively since the top decision maker will already know the vendor and at least have a general understanding of the capabilities of the product under consideration.

- The respondents indicated that technical groups, the EDP director, committees, and users were also part of the buying process. However, these groups had varying degrees of authority.

- Nearly 75% of the respondents indicated that their budget must include enough funds to cover the cost of the package being considered.

- Over 90% of the respondents indicated that a formal justification was required to purchase any software package. Exhibits VI-8 and VI-9 list the approaches used.

- Respondents were asked to determine the value they received from their expenditures on vendor software packages. Exhibit VI-10 indicates that of those respondents expressing an opinion, over 80% believed that they received reasonable value from software expenditures.

- Only 10% of the respondents believed that systems software was underpriced, and about 20% believed that it was overpriced.

B.   SOURCES FOR IDENTIFYING SYSTEMS SOFTWARE

- Exhibit VI-11 presents an analysis of where systems software buyers find out about available packages.

INPUT

EXHIBIT VI-8

RESPONDENTS' COST JUSTIFICATION TECHNIQUES
FOR EVALUATING OUTSIDE SERVICES

DISCOUNTED CASH FLOW

LIFE CYCLE COST

MISCELLANEOUS

REPLACEMENT
PERSONNEL COST

RETURN ON
INVESTMENT

IMPROVED TIME
EFFICIENCY/CAPACITY

8%

10%

15%

17%

27%

23%
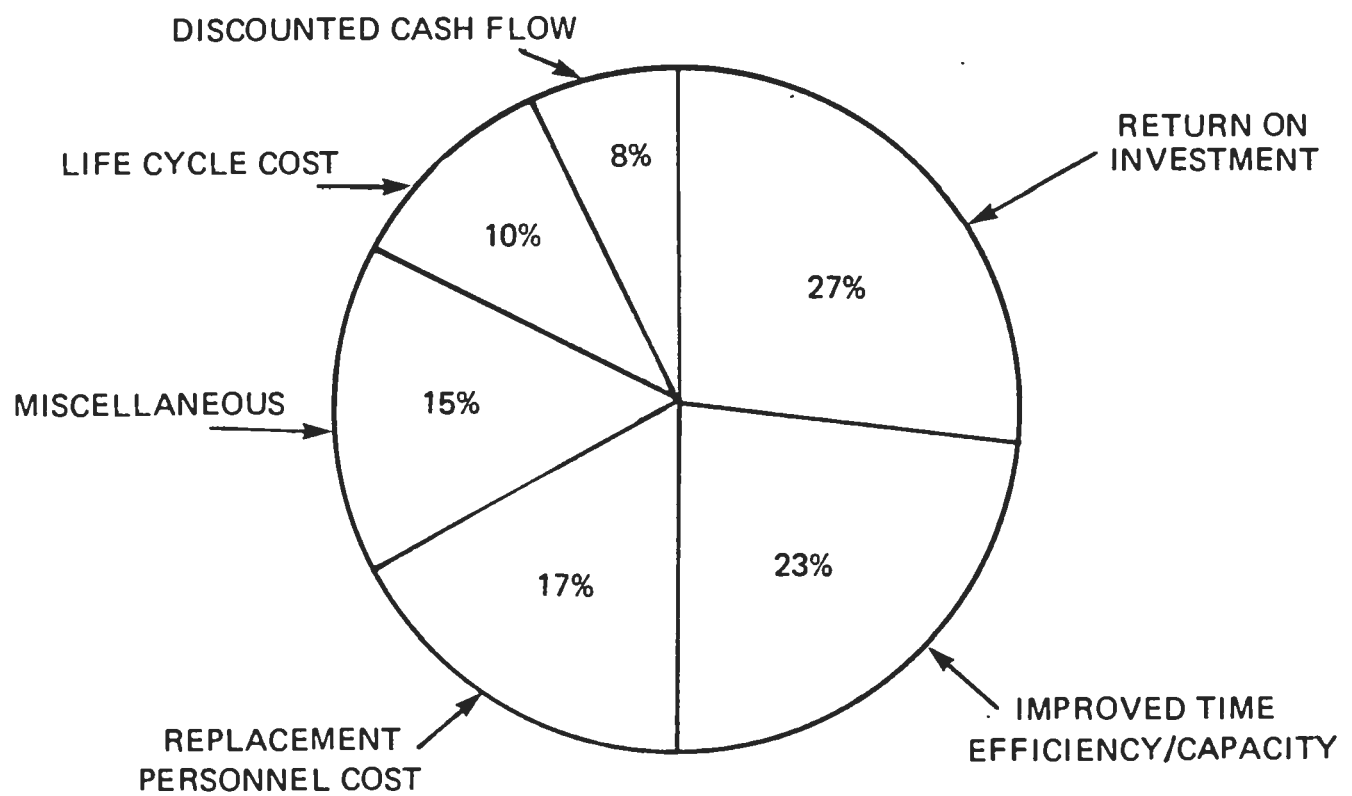
PERCENTAGE OF TOTAL MENTIONS
OF COST JUSTIFICATION TECHNIQUES

INI

EXHIBIT VI-9

MISCELLANEOUS COST JUSTIFICATION
TECHNIQUES OF RESPONDENTS

- "DEGREE OF SERVICE IMPROVEMENT."

- "UNIT QUANTITY DISCOUNT."

- "CHEAPER TO BUY THAN TO BUILD."

- "COST AVOIDANCE."

- "COST /BENEFIT ANALYSIS."

- "AMOUNT OF POTENTIAL USAGE."

- "MUST RECOVER COSTS FROM OTHER PARTS OF THE .
  BUDGET."

INPUT

EXHIBIT VI-10

RESPONDENTS' BELIEF OF VALUE FOR
PURCHASED SOFTWARE

NUMBER OF MENTIONS

▨ SYSTEMS OPERATIONS SOFTWARE

▨ SYSTEMS UTILIZATION AND IMPLEMENTATION SYSTEMS SOFTWARE

☐ APPLICATIONS SOFTWARE

INP
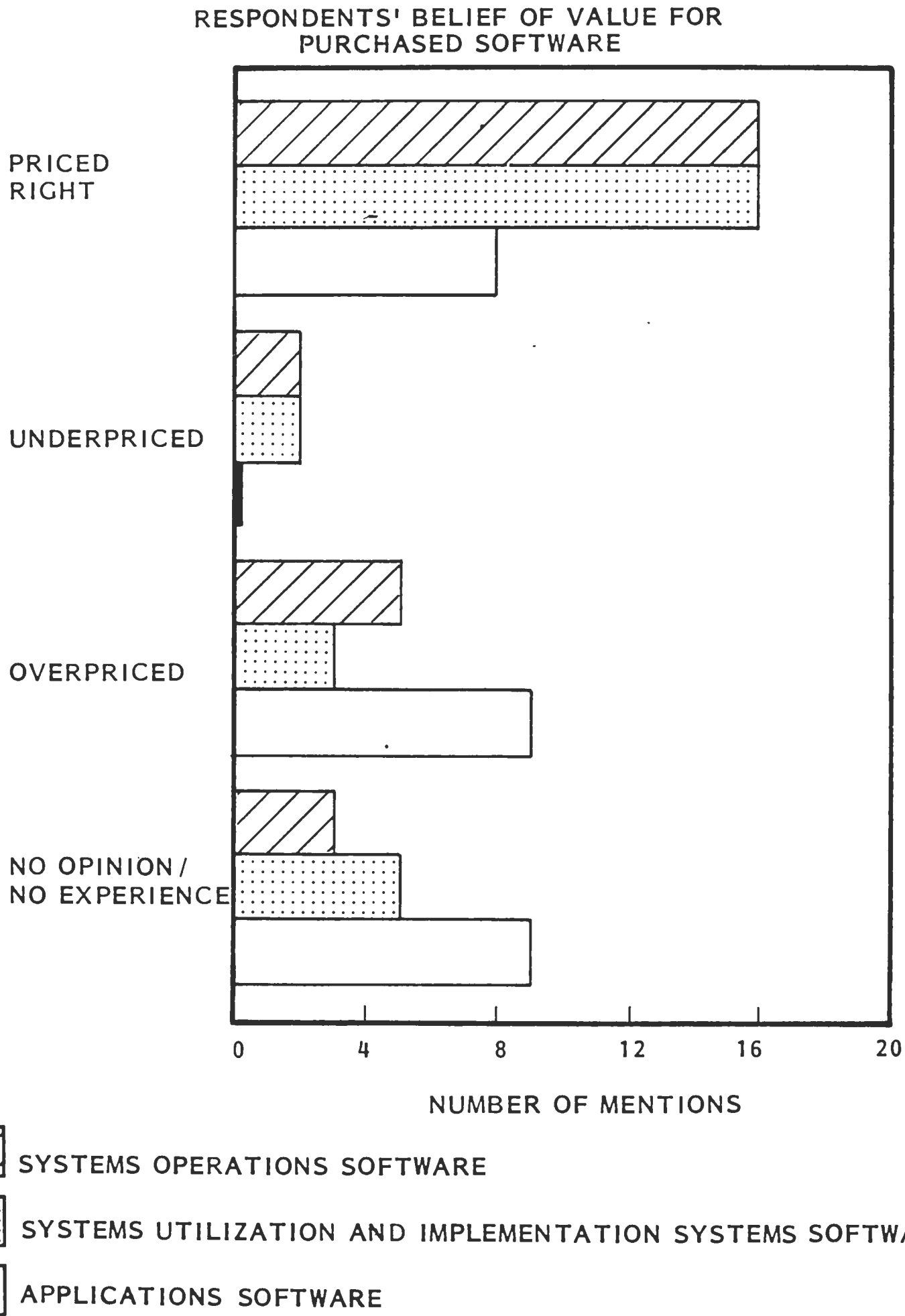
EXHIBIT VI-11

SOURCES OF SYSTEMS SOFTWARE
PACKAGE INFORMATION

SOURCE OF PRODUCT INFORMATION	NUMBER OF RESPONDENTS	PERCENT OF RESPONDENTS MENTIONING THIS SOURCE
TRADE PRESS	18	69%
VENDOR CALLS	11	42
DIRECT MAIL	8	31
DATAPRO	7	27
USER GROUPS	4	15
HEADQUARTERS	3	12
ICP	3	12
SEEK WHEN NEEDED	3	12
SEMINARS	1	4
AUERBACH	1	4

INPUT

- Surprisingly, industry sources such as Auerbach, Datapro, and ICP were mentioned by only 40% of the respondents as a source of information on packages.

- Nearly 70% of the respondents mentioned the trade press as being important, with COMPUTERWORLD and DATAMATION sharing the top spot for number of mentions.

- It was very surprising to find that only 40% of the respondents received information from vendors as a result of a sales call by the vendor. This figure should ideally be close to 100%, and it clearly shows that vendors' sales staffs have much work to do in the eyes of the buyers.

- Direct mail solicitations by vendors was mentioned as a source of information for buyers in over 30% of the cases. For those vendors that want to penetrate new companies, there appears to be a clear opportunity to design a direct mail campaign that could reach multiple points within an organization.

INP

VII COMPARISON OF BUYER AND VENDOR ATTITUDES

VII COMPARISON OF BUYER AND VENDOR ATTITUDES

A. PROMOTION

- Systems software vendors underestimate the value of trade press advertising. Although this promotion vehicle may not generate the volume of leads desired by the vendor, the buyers of systems software rated trade press advertising as the number one source for finding out about products available in the marketplace.

- Vendors expressed a concern over the effectiveness of their sales forces in qualifying prospects. Buyers indicated that vendors were used as a source of product information in less than one half of the cases. The data gathered from the buyers supports the conclusion of vendors that the effectiveness of the sales force in qualifying prospects could and should be improved.

- Buyers and vendors indicated a high level of satisfaction with direct mail promotion programs. Vendors should give serious consideration to the development of a concentrated program to develop qualified prospects using direct mail.

- Vendors rated seminars as a very effective technique for qualifying prospects. Buyers of software, however, did not share in this enthusiasm for seminars. Only one buyer mentioned seminars as a source for obtaining information on software.

INPUT

- Vendors stated that it was an advantage to demonstrate products to the buyer. Seventy percent of the buyers indicated that they wanted to benchmark, test or see a demonstration of the product prior to buying the package. Given the high close rates of trials that vendors mentioned (50% to 80%), it would be wise for vendors to closely examine their product demonstration strategy.

    - Packages could be modified to develop features that can be demonstrated. If a feature can be demonstrated, it is easier to sell (because it appears tangible). For example, a job accounting system could be demonstrated by creating many management and operations reports. These reports are probably more important in the sales cycle than the technique used to gather the data used in the reports.

    - A product trial package could be developed that allowed a prospective user to generate many reports (on accounting, computer performance, data base usage, etc.) from a "canned" data base. The reason for using this approach is that many prospects use performance analysis, loading or capacity data on a one-time basis to tune their system. Vendors reported several cases where prospects installed the package, ran the reports using live data, and then declined to buy the package because they were able to tune their system properly during the product trial period. By using a "canned" data base approach, the prospect could become familiar with the ease of use of the product, but could not substitute his own real data for the product to analyze.

B. SALES APPROACH

- Buyers of systems software indicated that systems software sales people should have a greater degree of participation during the product evaluation process.

INPUT

- Some sales people may not wish to maintain the contact because they are looking for quick and easy sales.

- Vendors have often not understood the buyer's evaluation, justification, and buying cycle. This occurs because the sales person has not called on the decision maker or because not enough time was spent by the sales person discussing product evaluations with the prospect.

- Vendors should analyze their sales programs to be sure that their sales people are actively working with prospects. Vendors should also determine that their sales or sales support staff is calling on customers to ascertain the level of customer satisfaction with the software product and to probe for new software needs that a buyer may have developed.

● The vendors must get their sales force to call higher in the organization as 80% of the buyers report that the decision to buy software (over $5,000) is made at the vice president level or higher. Only 50% of the responding vendors indicated that they called on the DP manager or a higher level.

● Vendors must establish a customer base that will recommend a software product to other prospects.

- Virtually all buyers indicated that discussions with other product users and the vendor's reputation (which is based on a referential customer base) were important factors in determining product quality.

- A customer that is pleased with one product from a vendor is more apt to buy another product from the same vendor rather than go to someone else.

INPUT

VIII IMPACT OF TECHNOLOGY ON
SYSTEMS SOFTWARE

VIII IMPACT OF TECHNOLOGY ON SYSTEMS SOFTWARE

A. TECHNOLOGICAL THREATS

1. HARDWARE VENDORS' PERCEPTIONS

- INPUT asked hardware vendors to assess the impact of technology on systems software. All hardware vendors interviewed offer some type of interface between their hardware and IBM hardware.

- All hardware vendors expect that IBM will continue to move operating system functions into microcoded firmware. This process will continue for some time. The composit view of respondents was:

    - IBM will use this process to defend itself against plug compatible vendors.

    - IBM can continue to increase operating system performance by using more microcode.

    - IBM could develop a data base computer as a logical extension to this process.

- 115 -

- IBM could eventually reduce the maintenance requirements of its operating systems if more functions were placed into microcode and thus become fixed in function.

- The risk to systems software vendors as perceived by hardware vendors is that the current operating system hooks used by systems software vendors may be eliminated as the operating systems move into microcode.

- Non-IBM hardware manufacturers expect no problems in continuing to maintain their interface with IBM hardware. This is because the interfaces were designed to communicate at a computer-to-computer level without getting wrapped up in the operating systems.

2.   SYSTEMS SOFTWARE VENDORS' PERCEPTIONS

- Nearly 40% of the respondents indicated that hardware changes would have no impact on their systems software products. These vendors feel very well positioned to withstand any technological change that IBM may present to the industry.

- Over 60% of the respondents, however, believed that changes made by IBM in its operating system could have tremendous impact on their products.

    - Thirty percent of the respondents expect that future changes made by IBM in the operating system will be in the software. These changes could have a major impact on the systems software vendor packages.

    - Thirty percent of the respondents expect that IBM will incorporate major portions of the operating system into microcode in the future (one to five years from now). These respondents believe that the microcode could have a major impact on their packages.

- 116 -

INP

3. BUYERS' PERCEPTIONS

•   Buyers of systems software typically felt that they will be influenced by one of the following three impacts that hardware could have on systems software:

    -   There will be no impact (13% of responses).

    -   The impact will be on operating systems (software only 16% of responses; microcode, 26% of responses).

    -   The end user's job and perspective will be simplified (45% of responses).

•   Thus, buyers apparently are very optimistic about changes in technology and perceive that their jobs will be made easier as these changes occur.

•   Buyers believe that technological change will have a heavier impact on systems software than on applications software. The margin of response is somewhat surprising, however, as this view is held by slightly more than 60% of the respondents.

•   Nearly 20% of the respondents believe that applications software will be affected more by technological change than will systems software.

4. COMPARISON OF PERCEPTIONS

•   Systems software vendors may understate the impact that hardware vendors (mainly IBM) could have on their products if the hardware vendors move more operating systems functions into microcode.

•   Buyers of systems software may be overly optimistic on the impact of IBM moving operating system capabilities into microcode. Buyers may even underestimate the need for IBM to continue changing its hardware as a competitive strategy to keep plug compatible hardware manufacturers on the defensive.

INPUT

B.   PRODUCT DELIVERY CHANGES

I.   HARDWARE VENDORS' PERCEPTIONS

- All hardware vendors interviewed believe that distributed data processing (DDP) is already here.

    - Companies may process as much as 80% of local data at the local site via minicomputer in the future. The remaining data will be processed centrally on larger computers.

    - EDP managers are not aware, in some cases, that functional department managers are buying their own computers. A plant manager, for example, can acquire a complete system for $20,000 to $50,000 and can often do this out of his own budget.

- Distributed processing may not always involve a linked computer network. Hardware manufacturers believe that most processing will be done locally, and a network will only be used occasionally to send data upstream to a central computer or downstream to the small computers from the central computer. Networks of 300 to 500 nodes will develop in this fashion.

- The hardware vendor respondents expressed some concern about what will happen when company mangements realize that distributed data processing is rapidly evolving sometimes without the involvement of the DP department. DP managers may be asked to explain how all of these small computers could have been acquired without DP department cooperation. If a corporate decision is made to attempt to consolidate all of the small computers, it could cause implementation and compatibility problems for the DP department would be charged with the consolidation plan.

- 118 -

INP

- Hardware vendors believe that turnkey systems will continue to be sold on small computers. However, most respondents indicated that turnkey systems would probably not be offered on medium and large computers.

2. SYSTEMS SOFTWARE VENDORS' PERCEPTIONS

- Forty percent of the respondents believed that the trend to DDP would have no impact on their products.

- Sixty percent of the respondents indicated that DDP would afford opportunities for new products that these vendors would eventually offer to their current client bases.

- Only one respondent expressed a negative impact of DDP on its business. This vendor was concerned with the increased costs necessary to develop and subsequently maintain its products in a DDP environment.

- Respondents indicated any one of four impacts were expected as a result of the increased use of minicomputers in the industry:

    - Nearly 55% of the respondents expected no impact from minicomputers on their product offerings.

    - Nearly 20% of the respondents expected to combine their systems software with a minicomputer and offer the total system to users in the future (one to five years).

    - Twenty percent of the respondents expected that they would adapt their products to operate on several different minicomputer systems.

    - One respondent indicated that minicomputers could have a positive impact on its business, providing that it did not have to sell directly to each individual minicomputer installation.

INPUT

- Exhibit VIII-I lists the opinions of respondents on the impact that turnkey systems would have on their product lines:

    - The majority of respondents expect to experience no impact from turnkey systems.

    - The balance of the respondents expect to experience a positive impact on their products from turnkey systems.

3. BUYERS' PERCEPTIONS

- Over one-third of the responding buyers expect to have a present or future need for a distributed data base, and Exhibit VIII-2 shows the expected time needed to obtain such a base.

- Approximately 50% of the responding buyers expressed some form of overall advantage to combining existing data bases. This has probably not been done in many cases because over 60% of the respondents have experienced performance problems with their data base management system.

- Nearly 50% of the respondents either have or will have DDP in the next three years, as Exhibit VIII-3 shows. Another 18% are presently considering ways to implement it.

- As shown in Exhibit VIII-4, only 15% of the respondents indicated that they would consider a user site hardware service. There also appears to be a general lack of familiarity with the subject as nearly 60% of the respondents expressed no opinion. By INPUT's definition, a User Site Hardware Service (USHS) combines a network, user programmable hardware, and significant software. Examples are ADP's On-Site, NCSS's System 3200 and GEIS's Marklink.

INP

EXHIBIT VIII-1

RESPONDENTS' PERCEPTIONS OF IMPACT ON SYSTEMS SOFTWARE
BY TURNKEY SYSTEMS OFFERINGS

- "NO EFFECT." (6 RESPONDENTS)
- "CURRENT SOFTWARE WILL BE INCORPORATED AS PART OF TURNKEY SYSTEM." (2 RESPONDENTS)
- "DEVELOP SYSTEM BUILDING BLOCKS."
- "GOOD AREA TO TARGET FOR IBM IMMUNITY, BUT HIGH LABOR COSTS ARE REQUIRED TO DEVELOP THESE SYSTEMS."
- "CURRENT PRODUCTS ENHANCED BECAUSE TURNKEY SYSTEMS WON'T FIT MOST USERS."

INPUT

EXHIBIT VIII-2

RESPONDENTS' TIMING REQUIREMENTS FOR A
DISTRIBUTED DATA BASE

NUMBER OF RESPONDENTS

INP
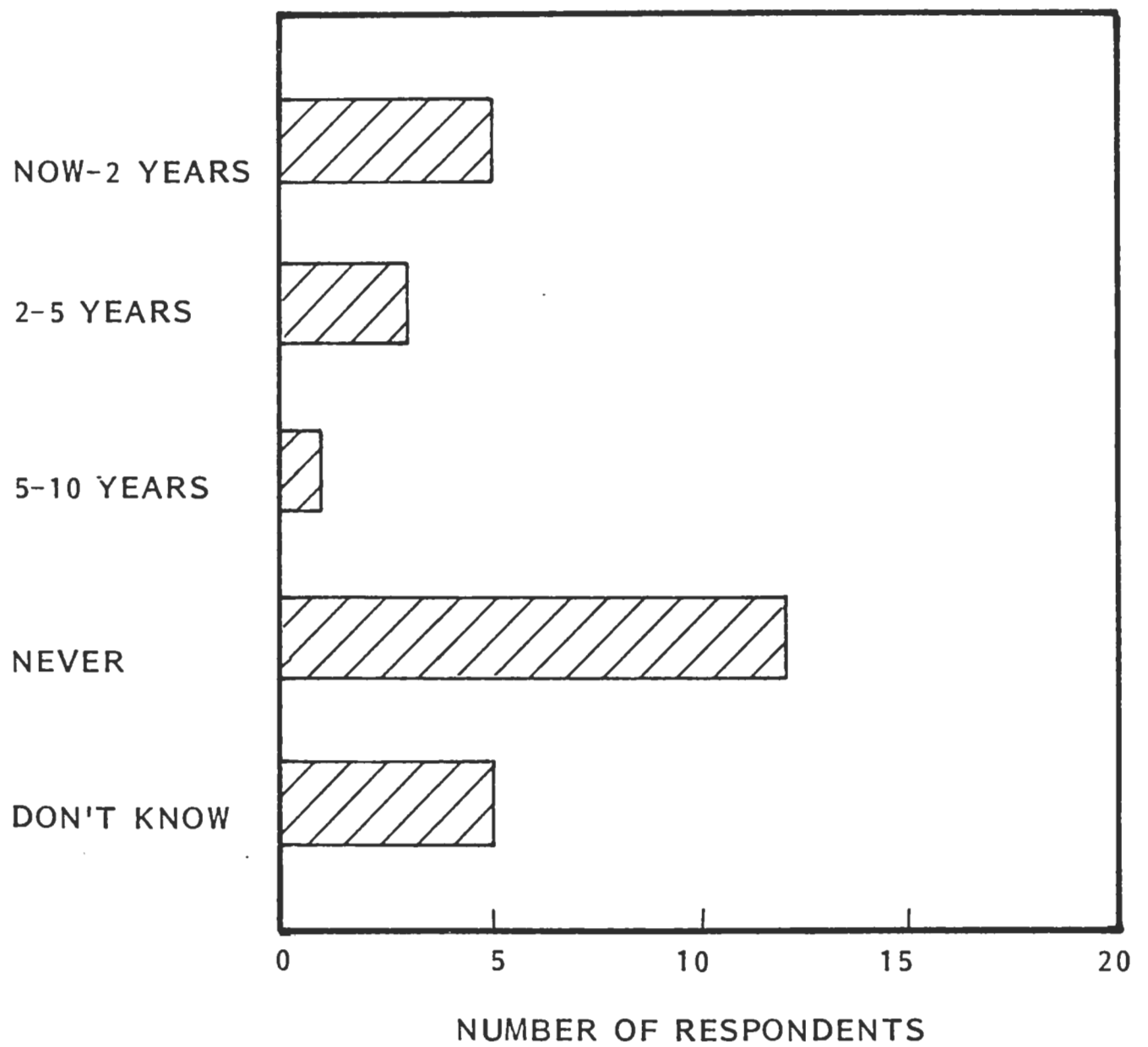
EXHIBIT VIII-3

RESPONDENTS' TIMING REQUIREMENTS FOR DISTRIBUTED DATA PROCESSING
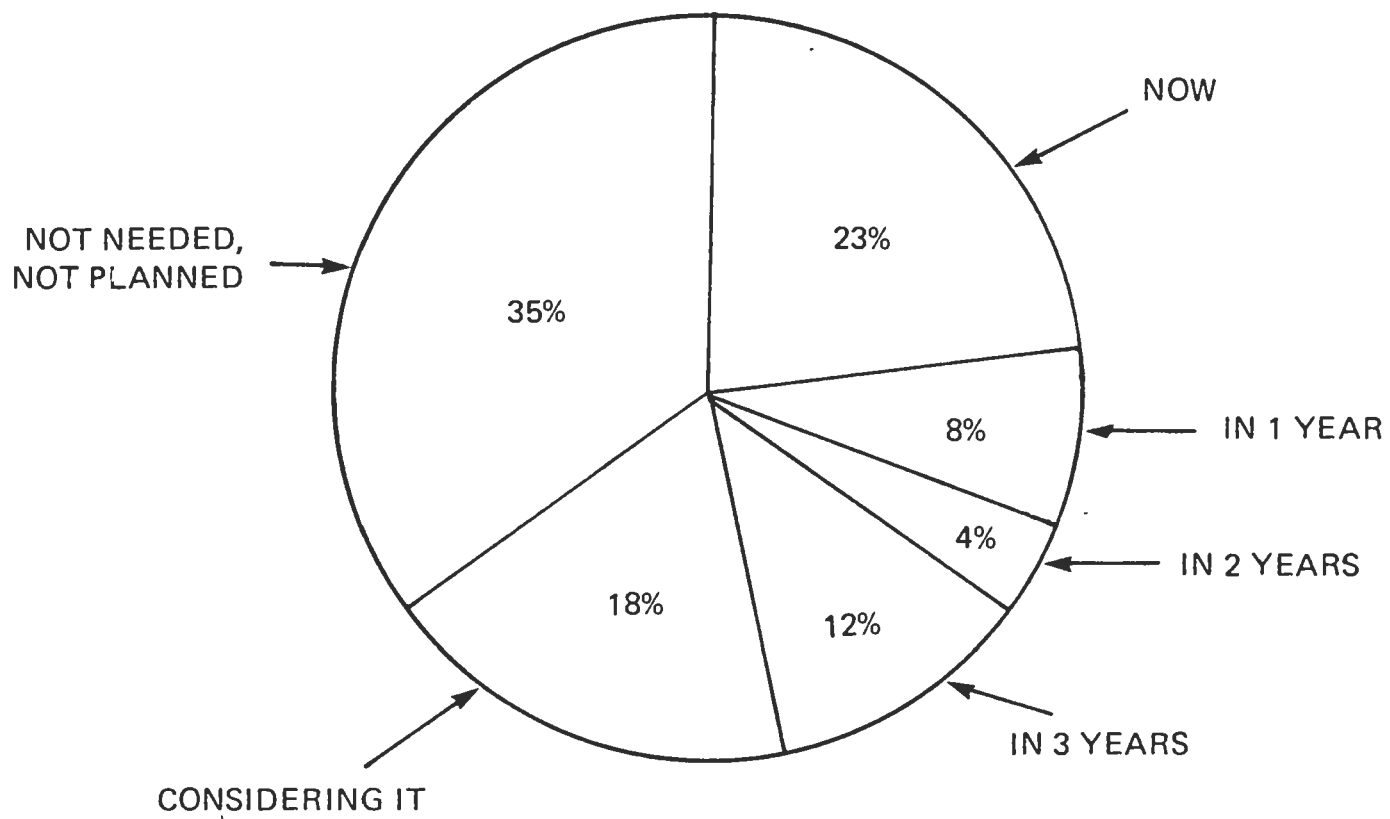
PERCENTAGE OF RESPONDENTS

EXHIBIT VIII-4

- 124 -

RESPONDENTS' PERCEPTIONS OF
USER SITE HARDWARE SERVICES

YES

15%

NO OPINION,
NOT FAMILIAR
WITH IT

58%

27%

NO
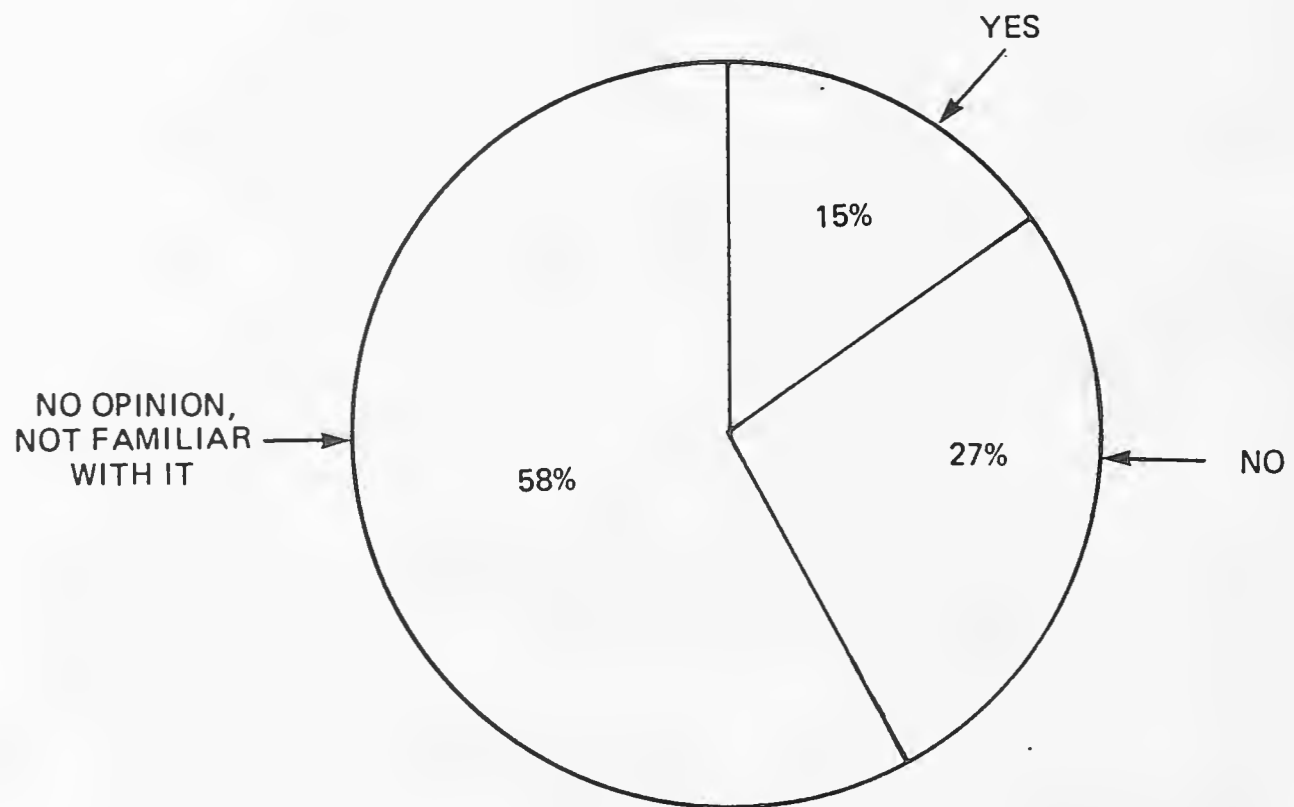
PERCENTAGE OF RESPONDENTS

- The majority of respondents perceived that turnkey systems are an advantage rather than a threat to the DP organization. Exhibit VIII-5 indicates the respondents opinions.

- Exhibit VIII-6 expresses respondents' views on why turnkey systems are an advantage to the DP organization. Nearly all responses indicate that the DP organization sees the turnkey system as a way of solving a user need quickly, cost effectively, and without creating additional maintenance or development problems for the DP group.

4.   COMPARISON OF PERCEPTIONS

- Hardware manufacturers, systems software vendors, and buyers of systems software have similar views on product delivery modes and changes in those delivery modes.

- Perhaps the most significant point is that all three groups perceive that the need for and use of turnkey systems will continue to grow in the foreseeable future.

C.   <u>NEW PRODUCT NEEDS AND OPPORTUNITIES</u>

- Hardware vendors, systems software vendors, and buyers of systems software were asked to indicate the likelihood of development of 18 different product categories. Each group was asked to assess the likelihood of the appearance of each product within a two-year timeframe and within a two to five-year timeframe. Likelihood was measured by high, medium, and low ratings.

- To convert the data gathered to an understandable form, the following procedure was used:

INPUT

EXHIBIT VIII-5

RESPONDENTS' PERCEPTIONS OF TURNKEY SYSTEMS

ADVANTAGE

THREAT

DEPENDS ON
SITUATION

OTHER

NO COMMENT

0   20   40   60   80   100

PERCENTAGE OF RESPONDENTS

INP
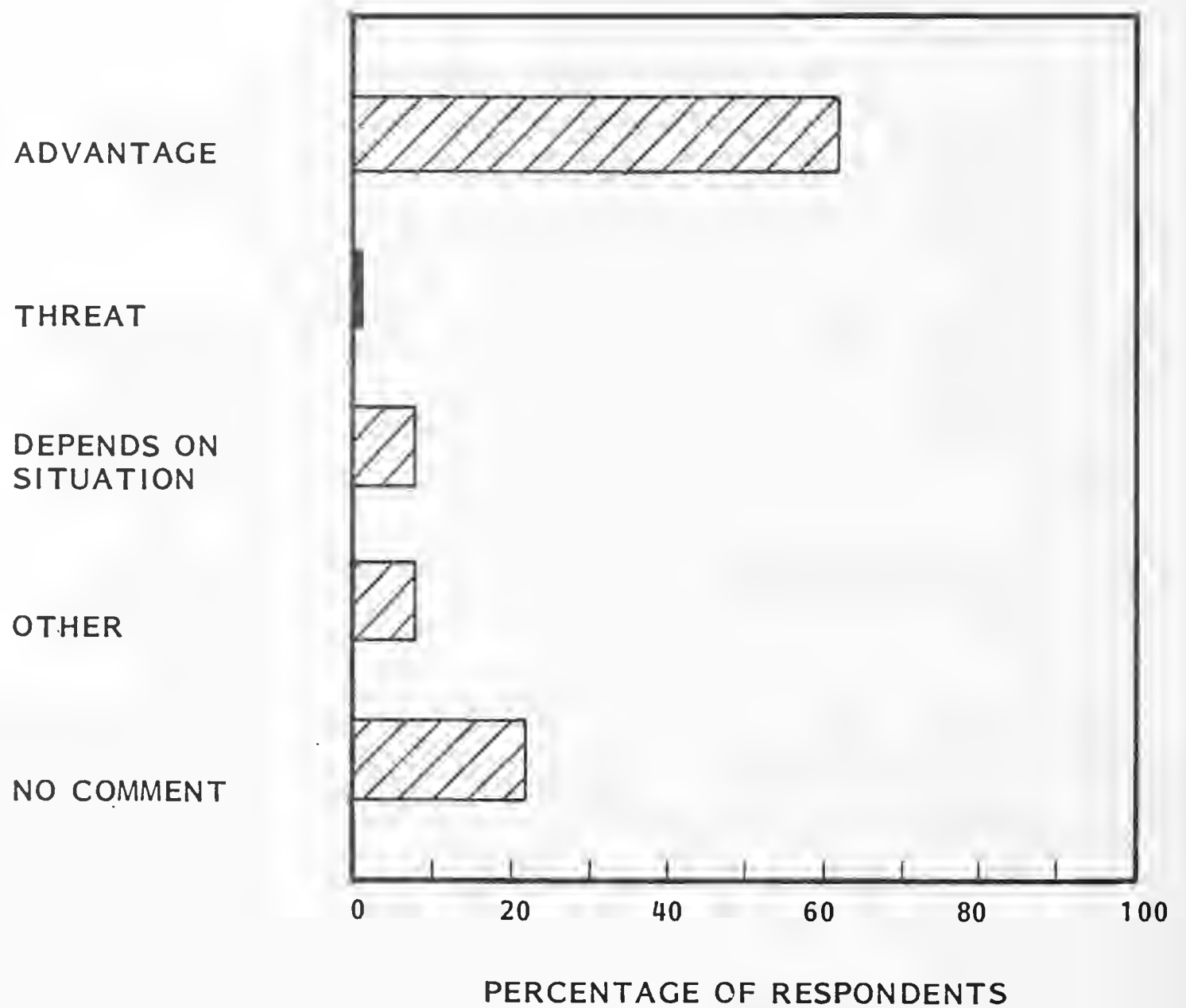
EXHIBIT VIII-6

RESPONDENTS' OPINIONS OF WHY TURNKEY
SYSTEMS ARE AN ADVANTAGE

- "COST EFFECTIVE."
- "QUICKER IMPLEMENTATION, BETTER MAINTENANCE WHEN REQUIRED."
- "SOFTWARE IS ALREADY DEVELOPED."
- "SUPPORT. ALSO THE SYSTEM IS AVAILABLE QUICKER THAN DOING IT YOURSELF."
- "WOULD REDUCE THE 'BODY COUNT' - BUT ONLY IF IT FIT THE NEEDS OF THE ORGANIZATION."
- "FASTER IMPLEMENTATION, LOWER COST."
- "MORE CAPABILITIES."
- "CAN WORK AT THE TRANSACTION, NOT APPLICATION LEVEL."
- "HAVE TESTED SYSTEMS TO USE."
- "GIVE YOU WHAT YOU WANT WITH A MINIMUM OF TIME SPENT ON DEVELOPMENT."

INPUT

- High, medium, and low ratings were assigned values of 3, 2, and 1, respectively.

- The respondents ratings for each category (hardware manufacturer, systems software vendor, and systems software software buyer) for each product were summed.

- The summations for each product were divided by the number of respondents to determine a normalized score for that product. In this way, ratings for each category and for each product may be directly compared.

I. HARDWARE VENDORS' PERCEPTIONS

- Hardware vendor perceptions of the likelihood for development of selected new products is shown in Exhibit VIII-7.

- Respondents believe that a relational data base system will probably be available within the next two years and will almost certainly be available within the next five years.

- Respondents did not believe that any other product has a high likelihood of appearing within the next two years.

- Hardware vendors indicated that there was a high likelihood of development of the following products within the next five years:

  - Non-procedural languages.

  - Linking word processing to data processing.

  - Management work stations.

  - Distributed data bases.

- 128 -

INPU

EXHIBIT VIII-7

HARDWARE VENDOR RESPONDENTS' VIEWS OF LIKELIHOOD
FOR DEVELOPMENT OF NEW PRODUCTS

PRODUCT	NORMALIZED SCORE*	
	WITHIN 2 YEARS	WITHIN 5 YEARS
NON-PROCEDURAL LANGUAGES	2.3	2.8
RELATIONAL DATA BASE	2.5	3.0
DATA BASE CONVERSION AIDS	1.8	2.0
LINKING WORD PROCESSING TO DATA PROCESSING	2.0	2.5
AUTOMATIC FILE INDEXING	1.8	2.0
GRAPHICS/COLOR CRT OUTPUT PACKAGES	1.5	1.8
USER ORIENTED/HUMAN ENGINEERED MODELING OR SIMULATION PACKAGES	1.3	2.0
AUTOMATIC PROGRAM CHECKERS/ TESTERS	2.0	2.3
SYSTEMS DESIGN AIDS (SYSTEMS WORKBENCH)	2.0	2.3
AUTOMATIC CODING/PROGRAMMING	2.0	2.3
LINKING PERSONAL COMPUTERS TO LARGE MAINFRAMES	1.3	2.0
MULTI-MEDIA SOURCE DATA CONVERSION	1.5	2.0
ELECTRONIC MAIL	1.3	2.0
MANAGEMENT WORKSTATIONS	2.0	2.5
LINKING OFFICE SYSTEMS (TELEPHONE, COPYING, FILING) TO DATA PROCESSING	1.8	2.5
TELECONFERENCING	1.3	1.5
DISTRIBUTED DATA BASES	2.0	2.8
VOICE RECOGNITION AND CONVERSION	1.5	1.8

*1= LOW, 2= MEDIUM, 3= HIGH

INPUT

2. SYSTEMS SOFTWARE VENDORS' PERCEPTIONS

- Systems software vendors' perceptions of products likely to be developed within the next five years are shown in Exhibit VIII-8.

- No products listed in Exhibit VIII-8 appear to be a likely development for system software vendors within the next two years.

- An automatic coding/programming product is very likely to be offered by systems software vendors within five years. No other products have a high likelihood of development within that five-year timeframe.

- Four products received large increases in probability of development within two to five years. This indicates a growing interest in, but perhaps a reluctance to develop, such products. These products are:

  - Linking word processing to data processing.

  - Linking personal computers to large mainframes.

  - Management work stations.

  - Linking office systems (telephone, copying, filing) to data processing.

- These figures would indicate three significant features of the systems software environment:

  - Systems software companies have never planned for the long-term, often because they felt that they had no control over a marketplace that IBM created.

  - Systems software companies have historically reacted to hardware manufacturers' software offerings by improving the packages or filling in gaps.

INP

EXHIBIT VIII-8

SYSTEMS SOFTWARE VENDOR RESPONDENTS' VIEWS OF LIKELIHOOD FOR DEVELOPMENT OF NEW PRODUCTS

PRODUCT	NORMALIZED SCORE*	
	WITHIN 2 YEARS	WITHIN 5 YEARS
NON-PROCEDURAL LANGUAGES	2.1	2.0
RELATIONAL DATA BASE	2.1	2.2
DATA BASE CONVERSION AIDS	1.9	2.1
LINKING WORD PROCESSING TO DATA PROCESSING	1.6	2.3
AUTOMATIC FILE INDEXING	1.5	1.8
GRAPHICS/COLOR CRT OUTPUT PACKAGES	1.9	2.3
USER ORIENTED/HUMAN ENGINEERED MODELING OR SIMULATION PACKAGES	1.9	2.3
AUTOMATIC PROGRAM CHECKERS/ TESTERS	2.0	2.3
SYSTEMS DESIGN AIDS (SYSTEMS WORKBENCH)	2.3	2.4
AUTOMATIC CODING/PROGRAMMING	2.2	2.5
LINKING PERSONAL COMPUTERS TO LARGE MAINFRAMES	1.6	2.2
MULTI-MEDIA SOURCE DATA CONVERSION	1.5	1.8
ELECTRONIC MAIL	1.5	1.8
MANAGEMENT WORKSTATIONS	1.4	2.2
LINKING OFFICE SYSTEMS (TELEPHONE, COPYING, FILING) TO DATA PROCESSING	1.5	2.2
TELECONFERENCING	1.5	1.8
DISTRIBUTED DATA BASES	1.9	2.3
VOICE RECOGNITION CONVERSION	1.3	1.6

*1= LOW, 2= MEDIUM, 3= HIGH

INPUT

- Systems software vendors would rather buy software from someone else than build it themselves. This course of action involves less risk than product development.

3. BUYERS' PERCEPTIONS

- Exhibit VIII-9 shows the respondents' views of the likelihood of availability of new products.

- Respondents expect a least three new product offerings within the next five years:

    - Relational data base.

    - Linking word processing to data processing.

    - Graphics/color CRT output packages.

- Although all respondents do not expect to see either non-procedural languages or the linking of office systems (telephone, copying, filing) to data processing products within the next five years, the likelihood of availability of these two products has grown more rapidly than any other potential products.

4. COMPARISON OF PERCEPTIONS

- Exhibits VIII-10 through VIII-28 show the likelihood of availability and the value to users of various software products. The standard scores in these exhibits were calculated using the following procedure:

    - Responses were weighted on a 3:2:1 ratio corresponding to a high:medium:low rating of likelihood by the respondent.

INP

EXHIBIT VIII-9

SYSTEMS SOFTWARE BUYER RESPONDENTS' VIEWS OF LIKELIHOOD OF AVAILABILITY OF NEW PRODUCTS

PRODUCT	NORMALIZED SCORE*	
	WITHIN 2 YEARS	WITHIN 5 YEARS
NON-PROCEDURAL LANGUAGES	1.8	2.3
RELATIONAL DATA BASE	2.0	2.5
DATA BASE CONVERSION AIDS	1.7	2.0
LINKING WORD PROCESSING TO DATA PROCESSING	2.4	2.8
AUTOMATIC FILE INDEXING	1.8	1.8
GRAPHICS/COLOR CRT OUTPUT PACKAGES	2.2	2.5
USER ORIENTED/HUMAN ENGINEERED MODELING OR SIMULATION PACKAGES	1.9	2.3
AUTOMATIC PROGRAM CHECKERS/ TESTERS	1.4	1.7
SYSTEMS DESIGN AIDS (SYSTEMS WORKBENCH)	1.8	2.1
AUTOMATIC CODING/PROGRAMMING	1.4	1.7
LINKING PERSONAL COMPUTERS TO LARGE MAINFRAMES	1.6	1.8
MULTI-MEDIA SOURCE DATA CONVERSION	1.3	1.6
ELECTRONIC MAIL	2.0	2.2
MANAGEMENT WORKSTATIONS	1.6	1.6
LINKING OFFICE SYSTEMS (TELEPHONE, COPYING, FILING) TO DATA PROCESSING	1.5	2.1
TELECONFERENCING	1.6	1.8

*1= LOW, 2= MEDIUM, 3= HIGH

INPUT

EXHIBIT VIII-10

LIKELY AVAILABILITY AND VALUE OF NON-PROCEDURAL
LANGUAGES IN THE OPINION OF RESPONDENTS

IN TWO YEARS

IN FIVE YEARS

USEFULNESS

0   20   40   60   80   100

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

INP
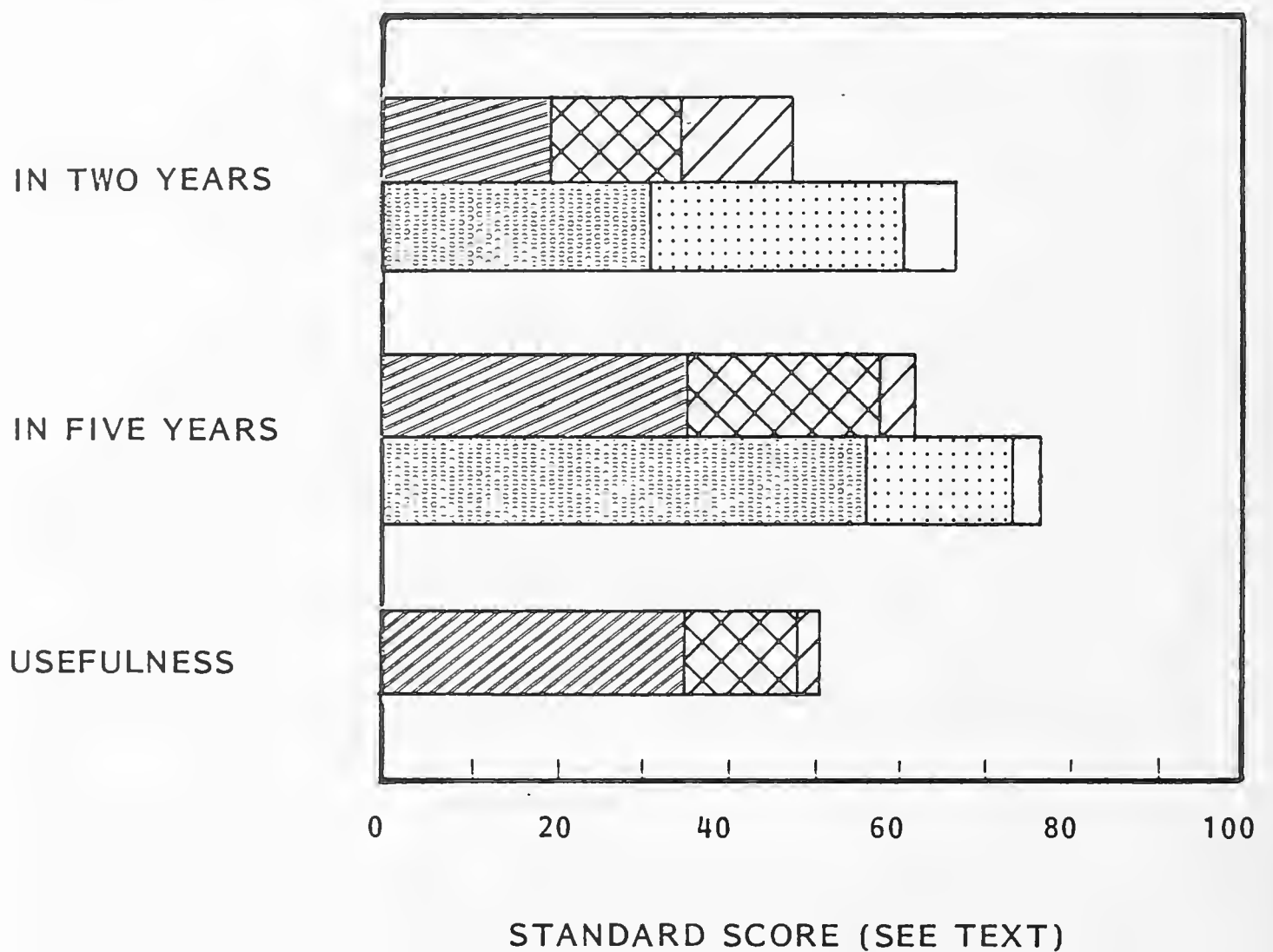
EXHIBIT VIII-11

LIKELY AVAILABILITY AND VALUE OF RELATIONAL
DATA BASE IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

INPUT
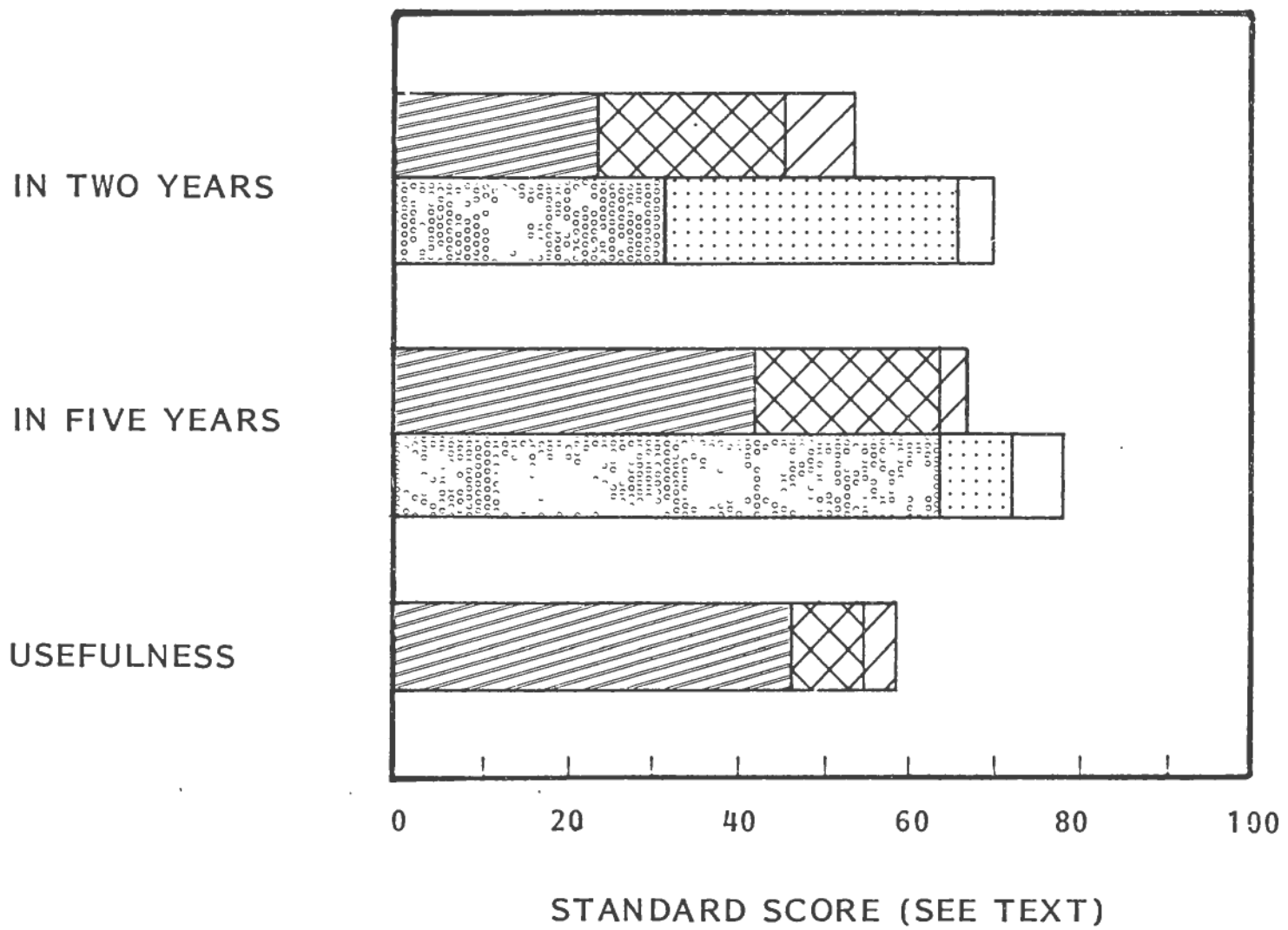
EXHIBIT VIII-12

LIKELY AVAILABILITY AND VALUE OF DATA BASE
CONVERSION AIDS IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

- 136 -

INP
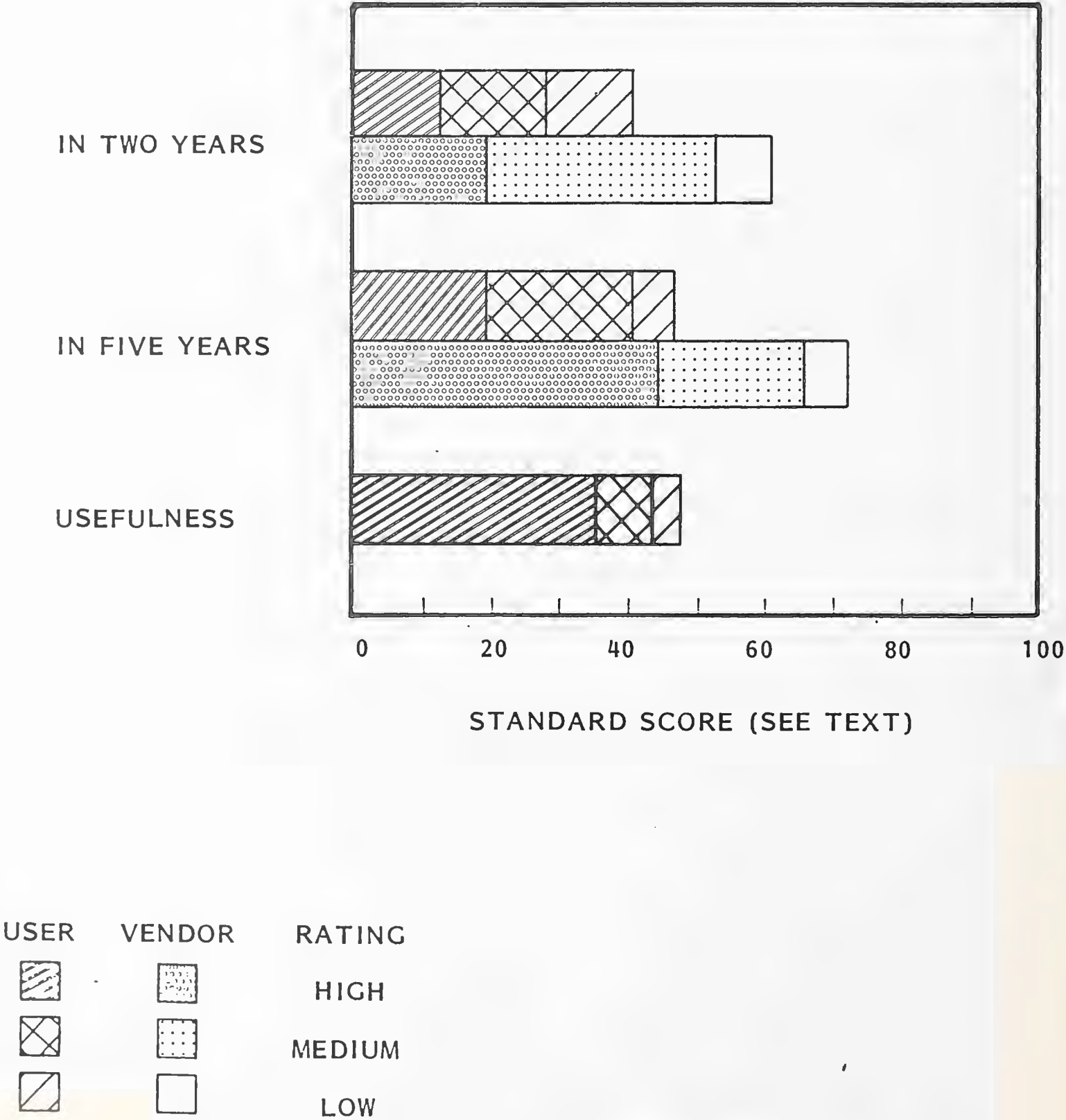
EXHIBIT VIII-13

LIKELY AVAILABILITY AND VALUE OF WORD PROCESSING
LINKED WITH DATA PROCESSING IN THE
OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

- 137 -

INPUT
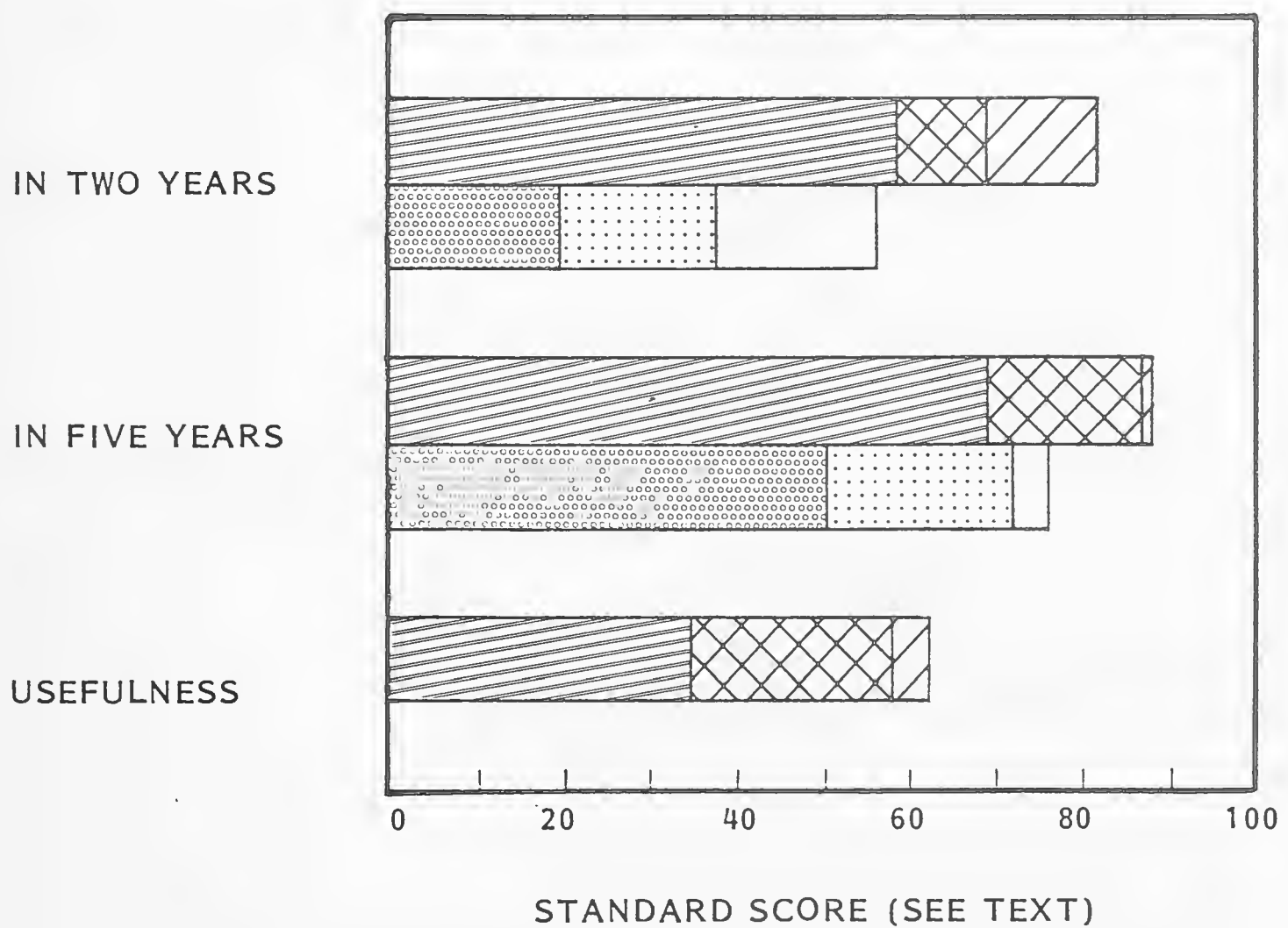
EXHIBIT VIII-14

LIKELY AVAILABILITY AND VALUE OF AUTOMATIC CONTENT INDEXING IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

- 138 -

INPU
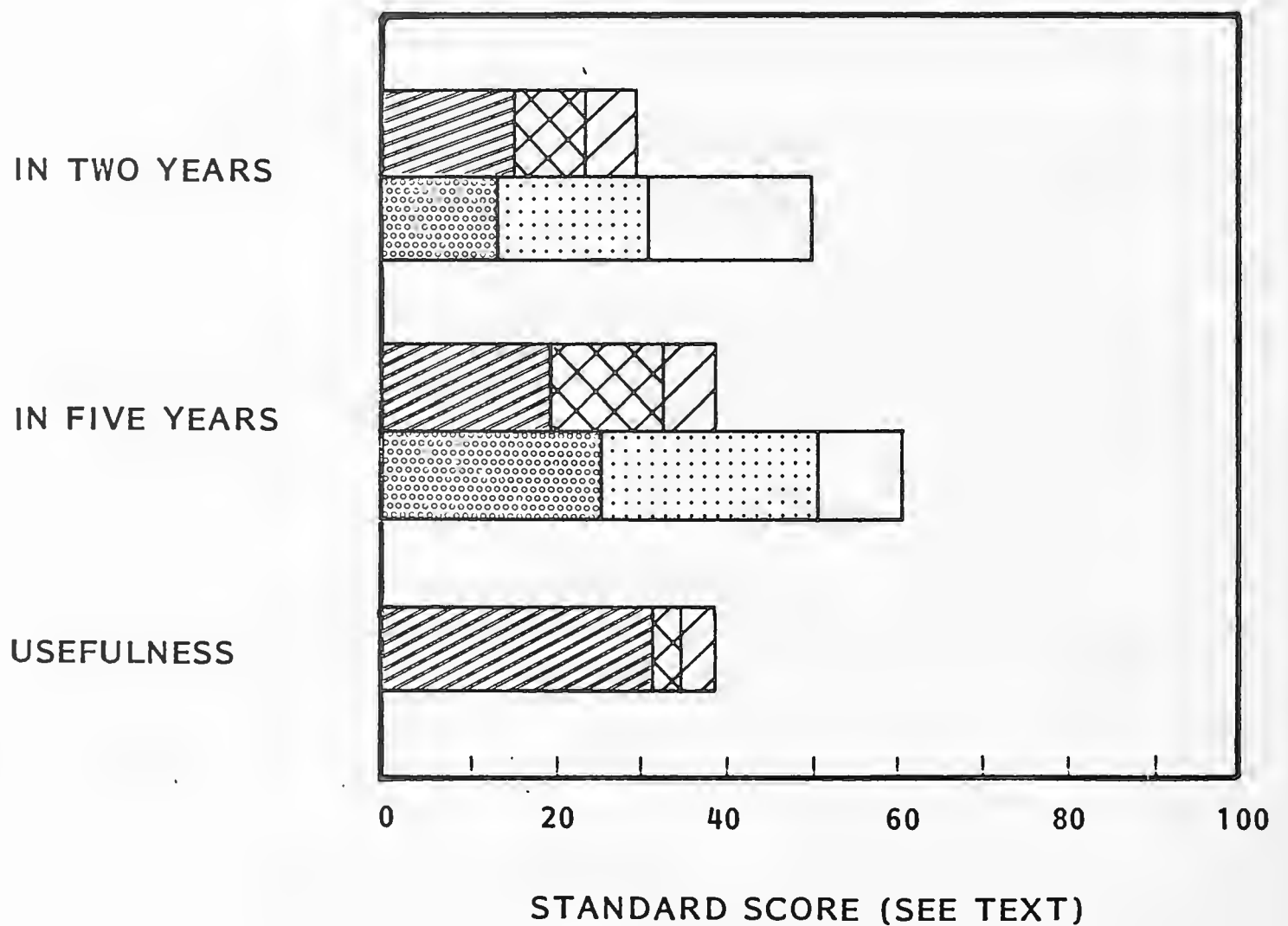
EXHIBIT VIII-15

LIKELY AVAILABILITY AND VALUE OF CRT GRAPHICS /
COLOR IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

- 139 -

INPUT
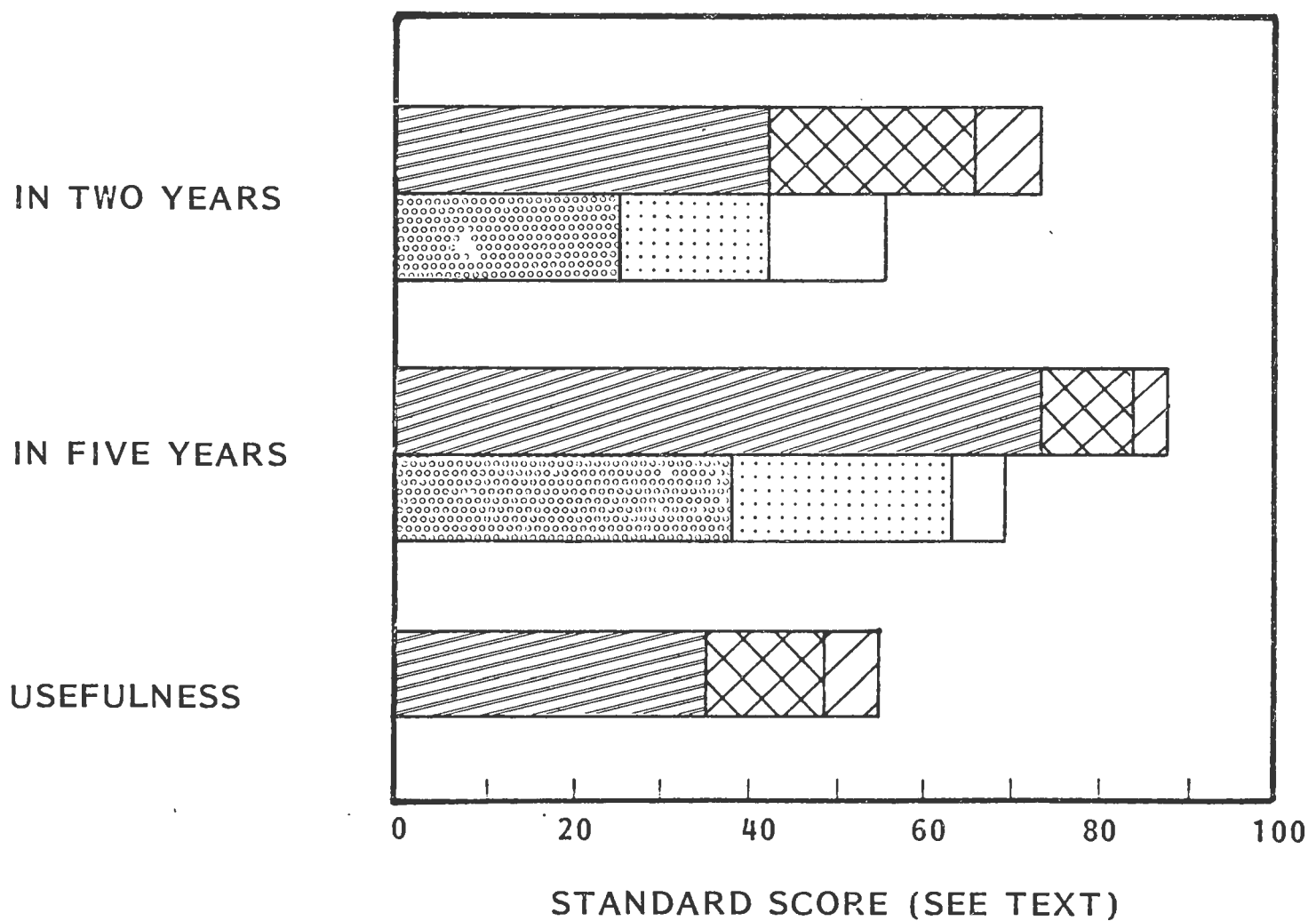
EXHIBIT VIII-16

LIKELY AVAILABILITY AND VALUE OF HUMAN- ENGINEERED
MODELING/SIMULATION TOOLS IN THE
OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

- 140 -

INP
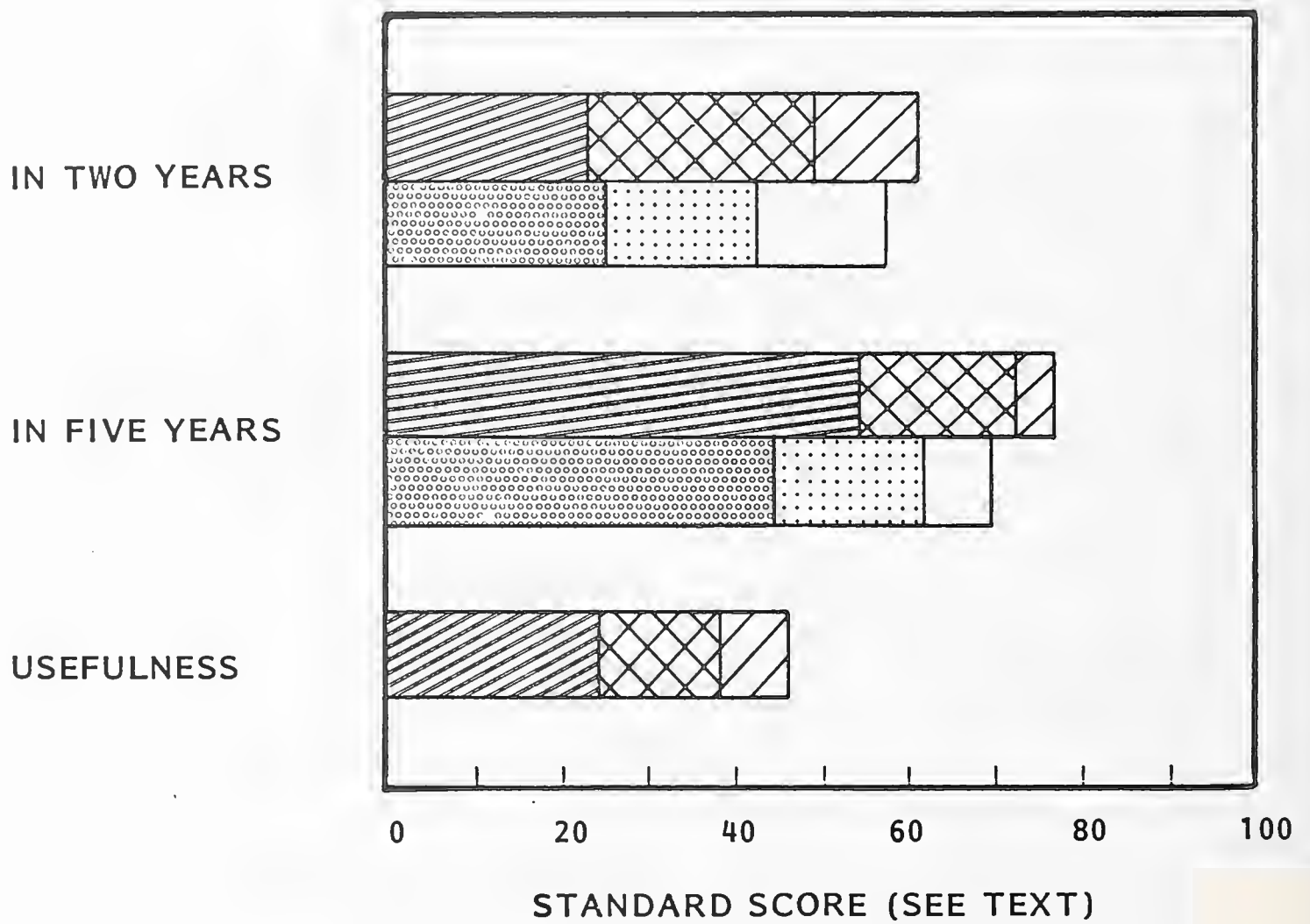
EXHIBIT VIII-17

LIKELY AVAILABILITY AND VALUE OF AUTOMATIC PROGRAM
TESTERS IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

INPUT
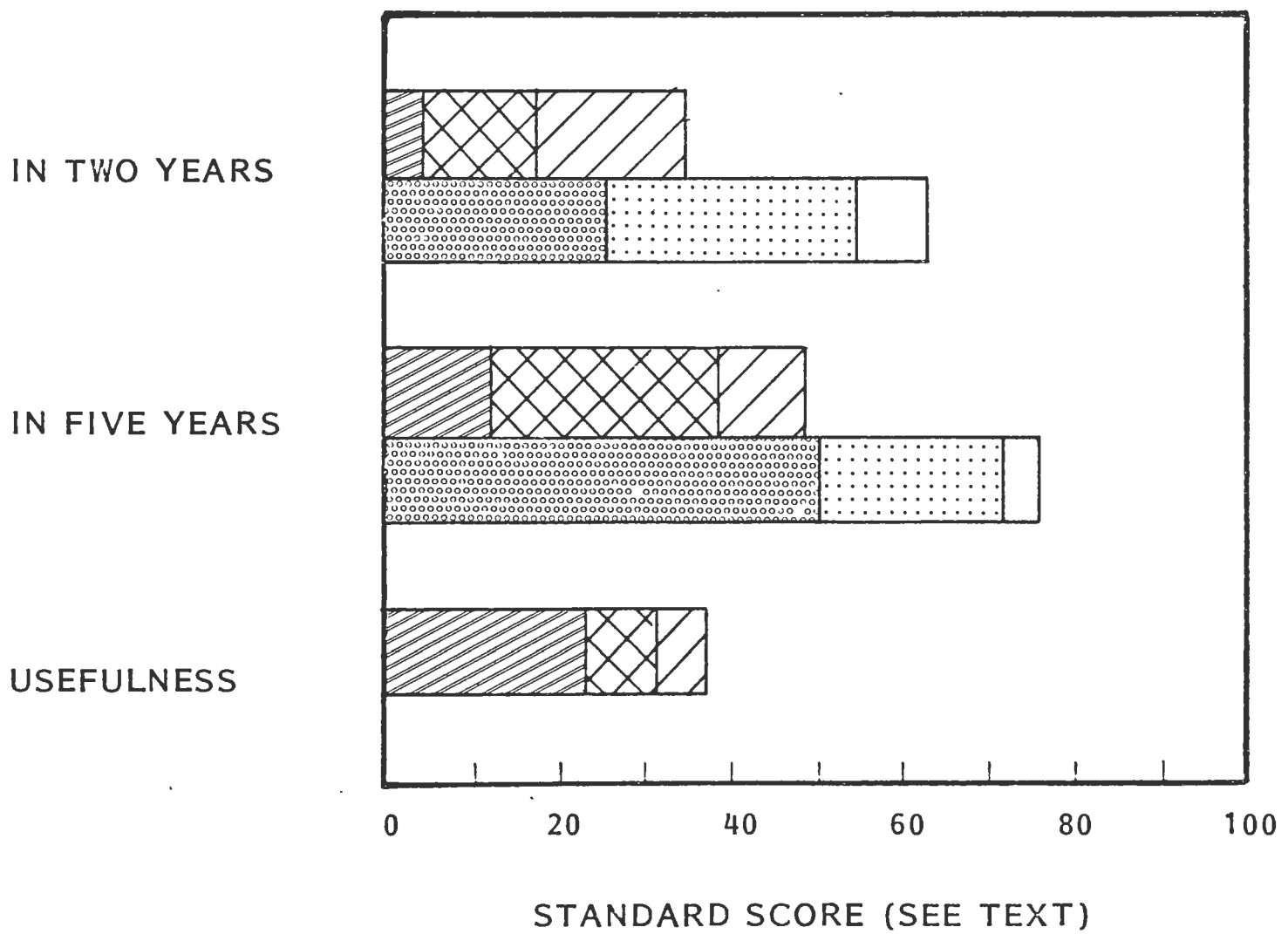
EXHIBIT VIII-18

LIKELY AVAILABILITY AND VALUE OF SYSTEMS DESIGNER'S
WORKBENCH IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

INPUT
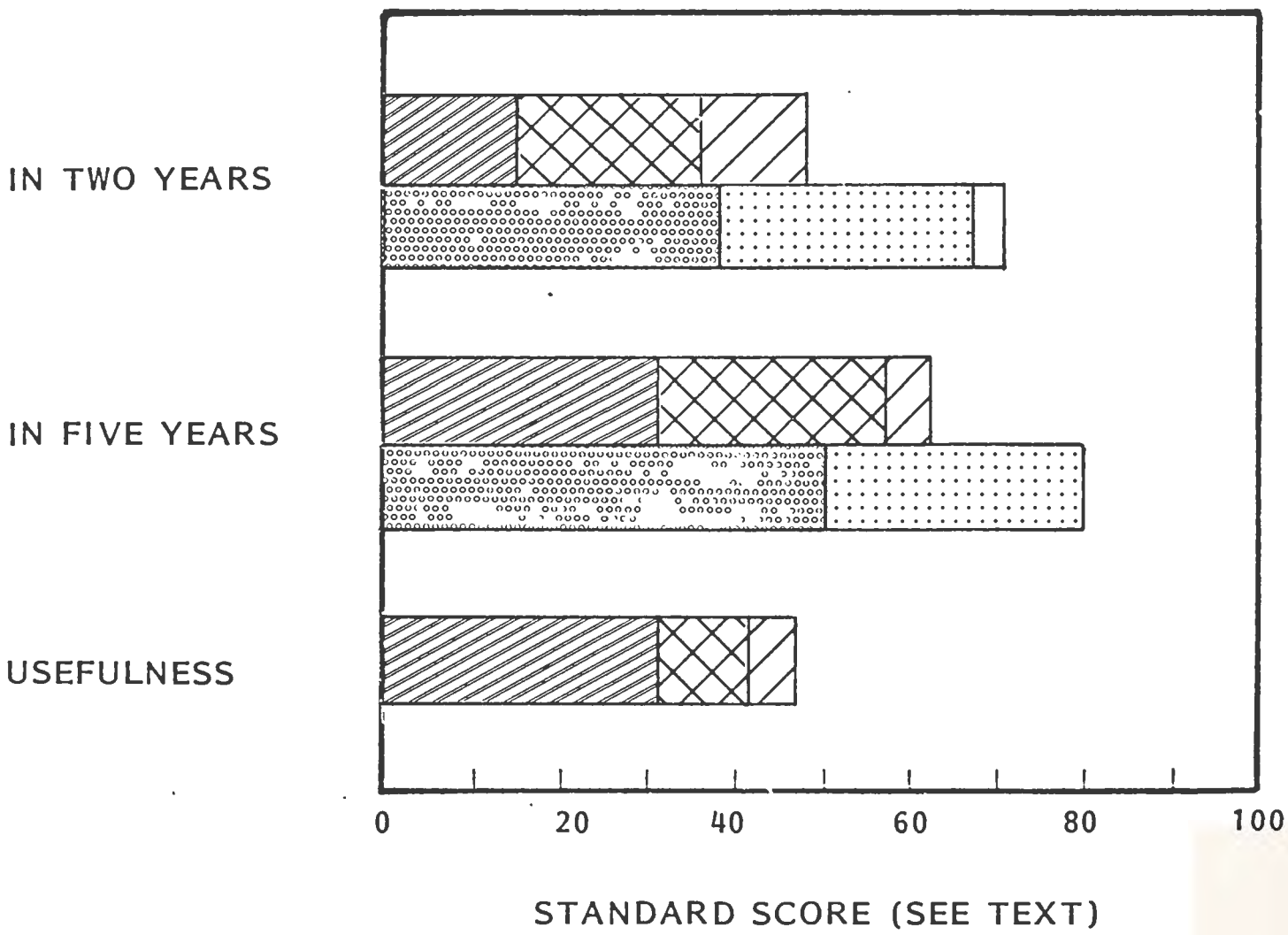
EXHIBIT VIII-19

LIKELY AVAILABILITY AND VALUE OF AUTOMATIC PROGRAMMERS IN THE OPINION OF RESPONDENTS

IN TWO YEARS

IN FIVE YEARS

USEFULNESS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

- 143 -

INPUT
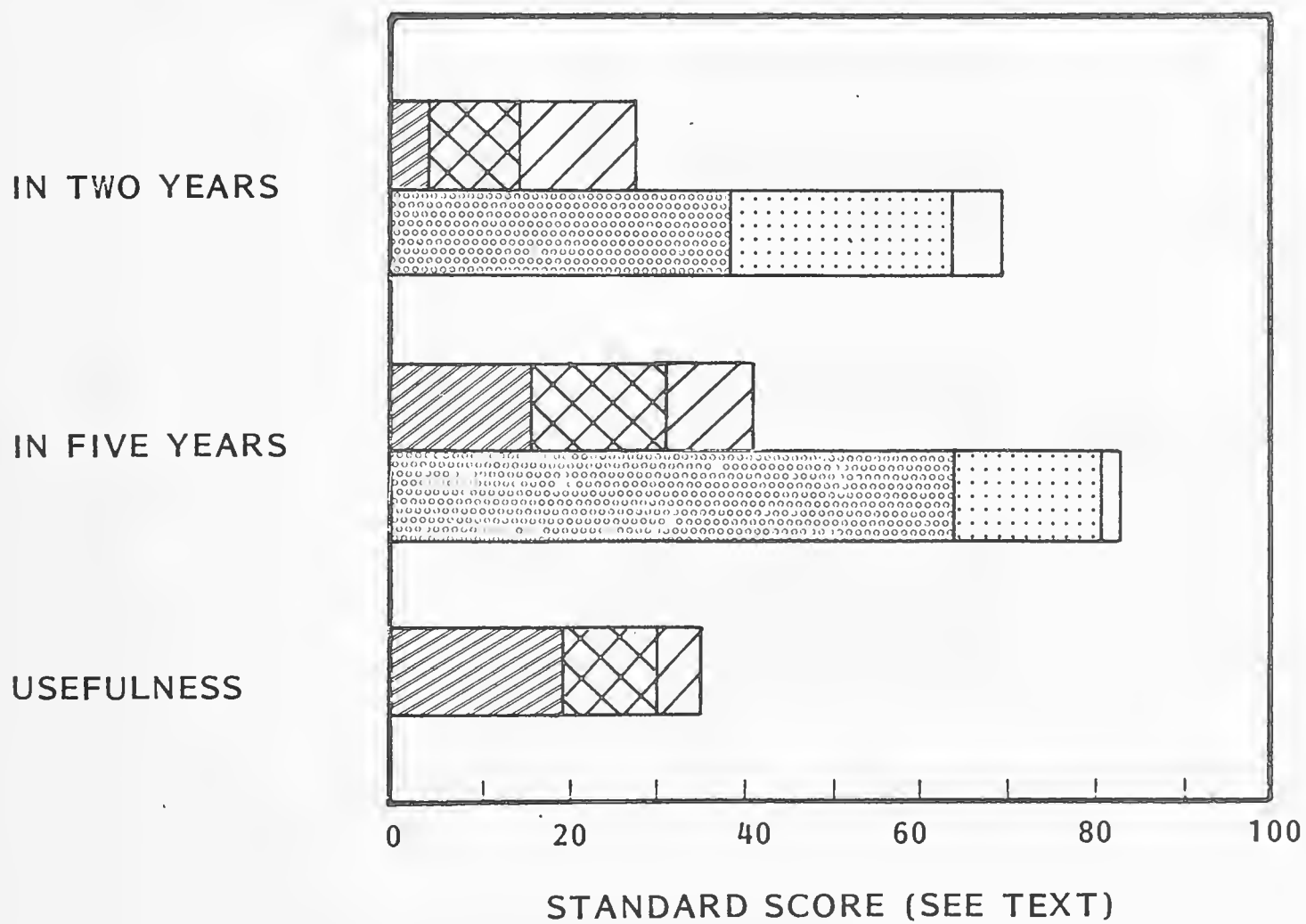
EXHIBIT VIII-20

LIKELY AVAILABILITY AND VALUE OF PERSONAL COMPUTERS LINKED TO MAINFRAMES FROM THE HOME IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)
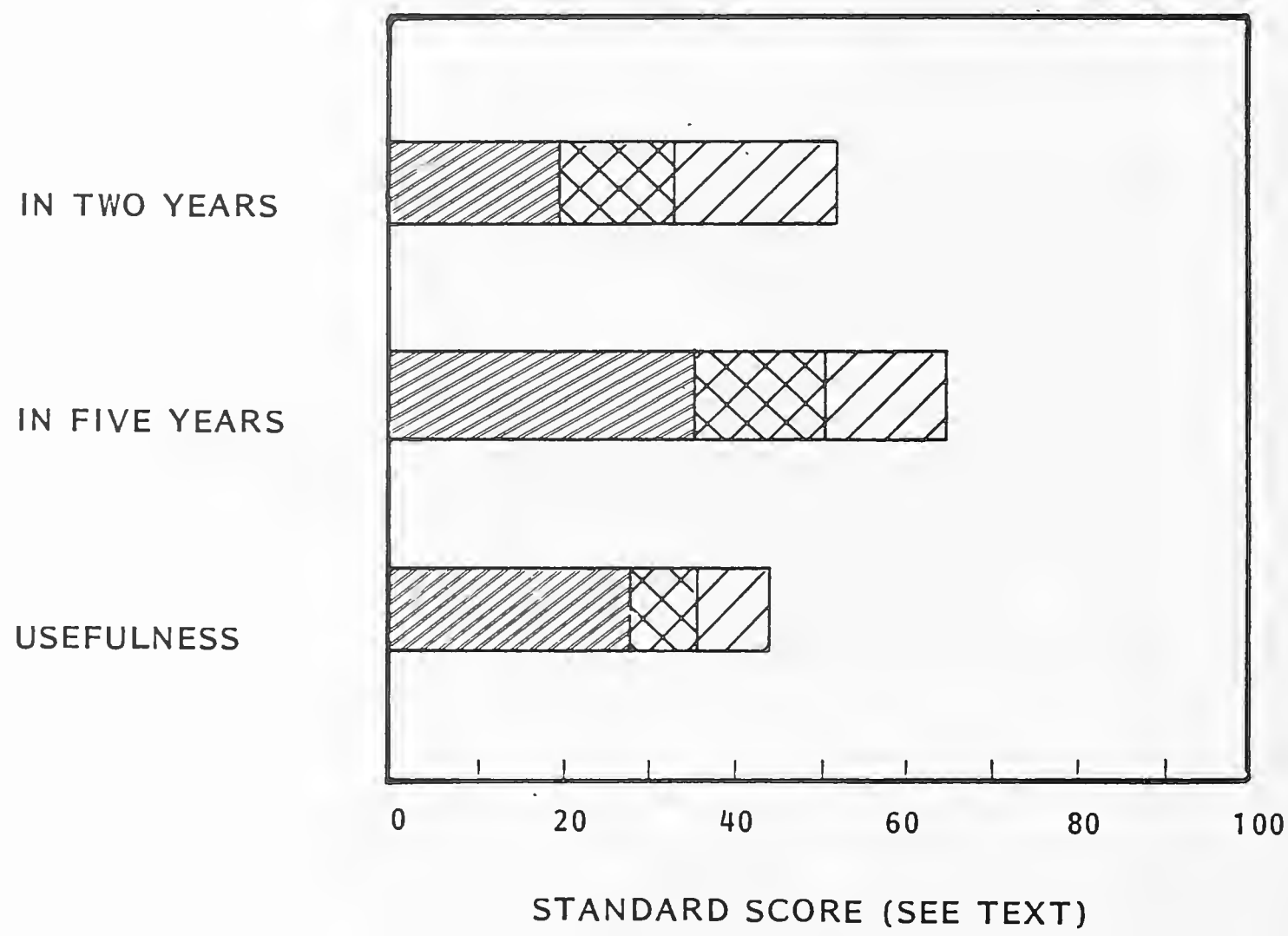
USER	RATING
▨	HIGH
⊠	MEDIUM
▧	LOW

- 144 -

INPUT

EXHIBIT VIII-21

LIKELY AVAILABILITY AND VALUE OF PERSONAL
COMPUTERS LINKED TO MAINFRAMES FROM THE
OFFICE IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER   VENDOR   RATING

HIGH

MEDIUM

LOW

- 145 -

INPUT
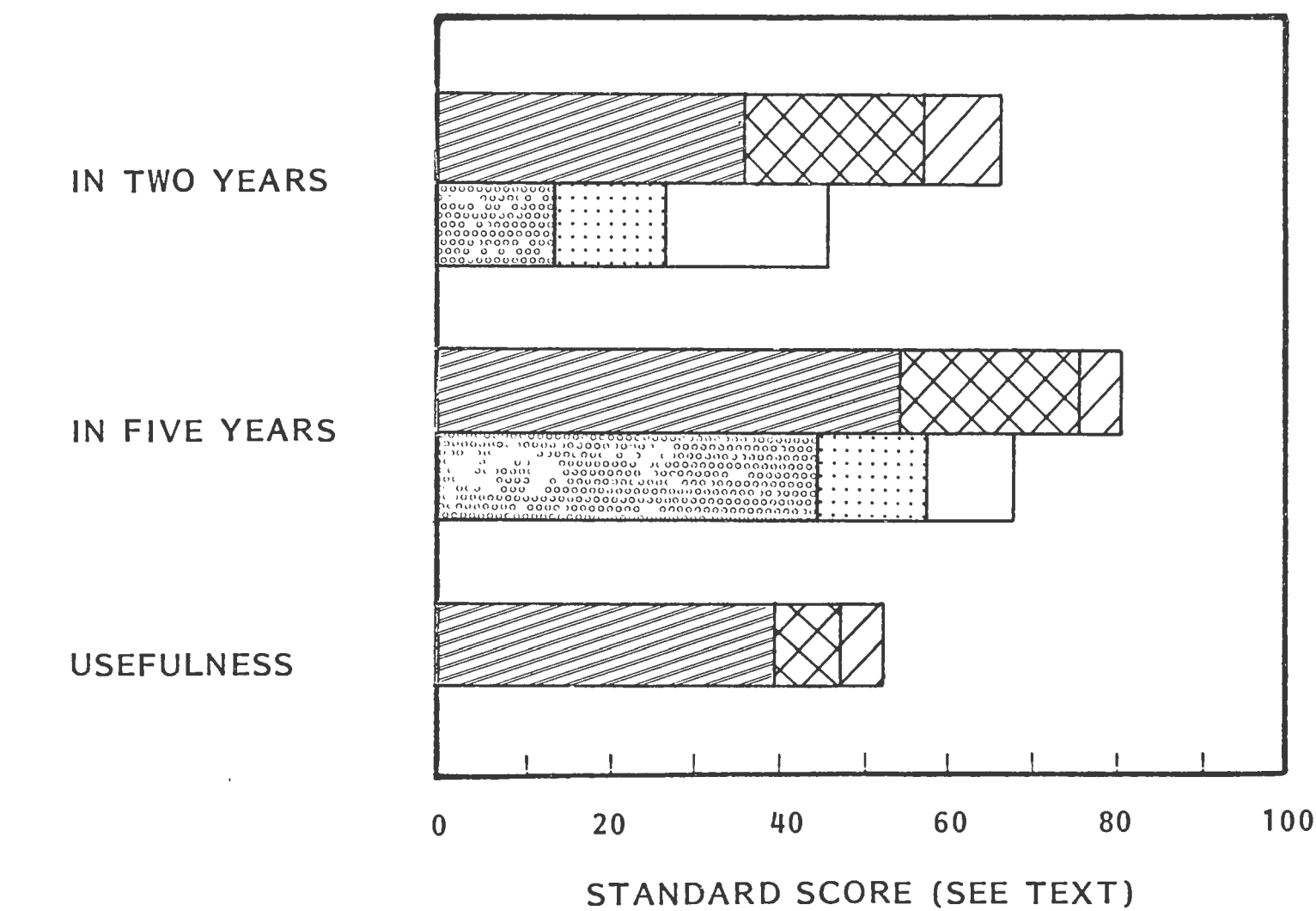
EXHIBIT VIII-22

LIKELY AVAILABILITY AND VALUE OF MULTI-MEDIA
SOURCE DATA CONVERTERS
IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

- 146 -

INPUT
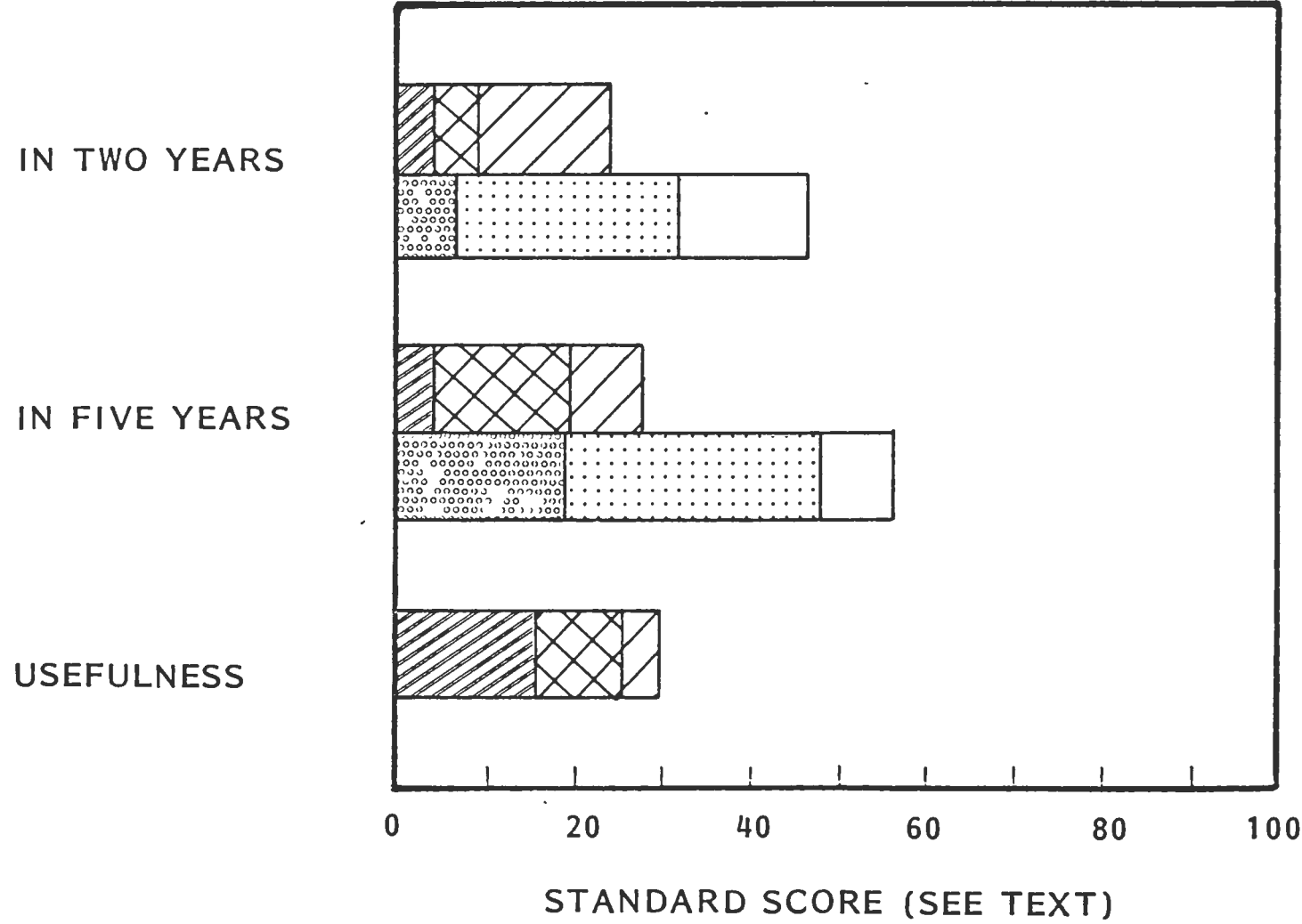
EXHIBIT VIII-23

LIKELY AVAILABILITY AND VALUE OF ELECTRONIC
MAIL IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

INPUT
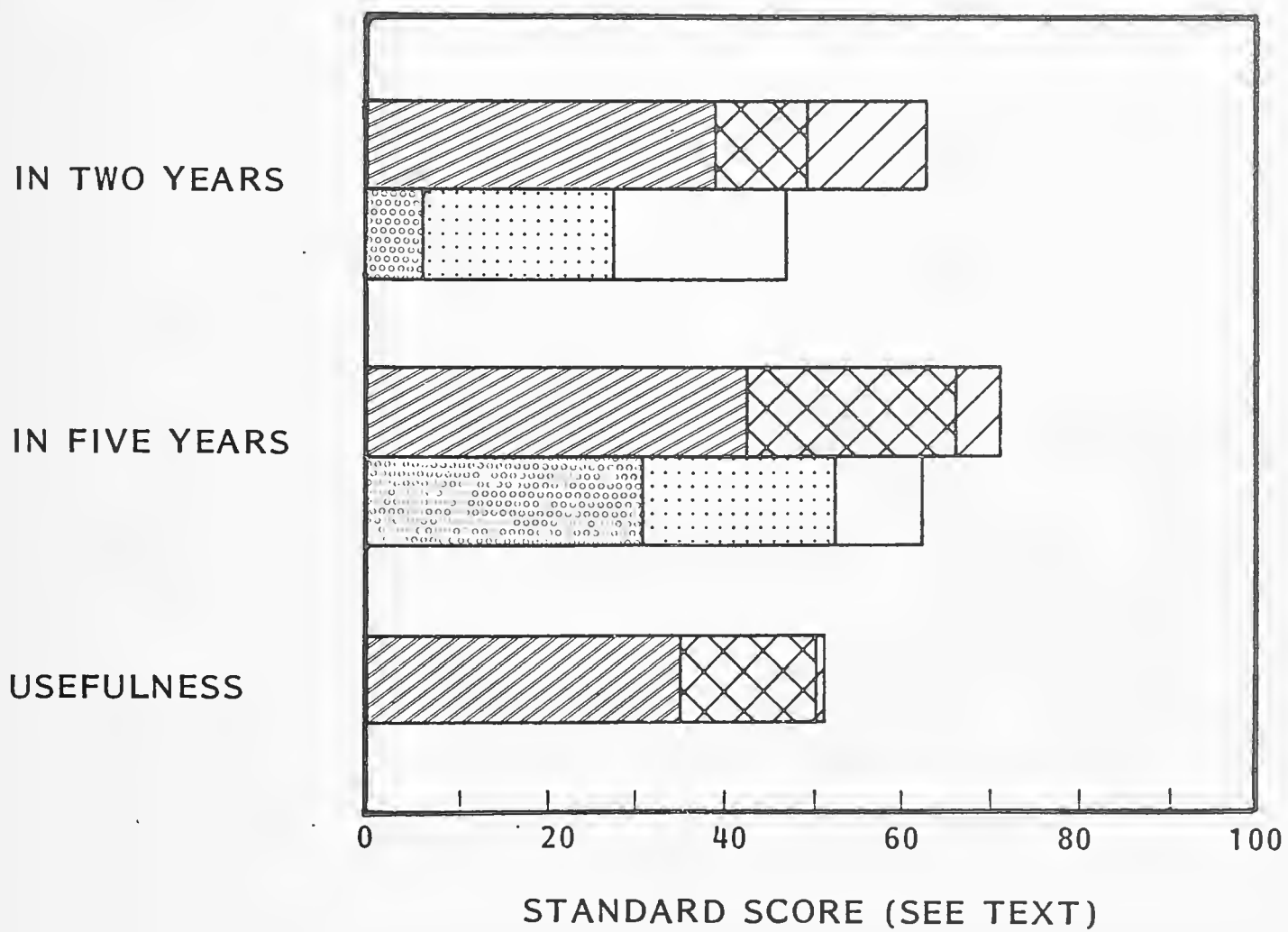
EXHIBIT VIII-24

LIKELY AVAILABILITY AND VALUE OF THE INTEGRATED OFFICE IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

INPUT
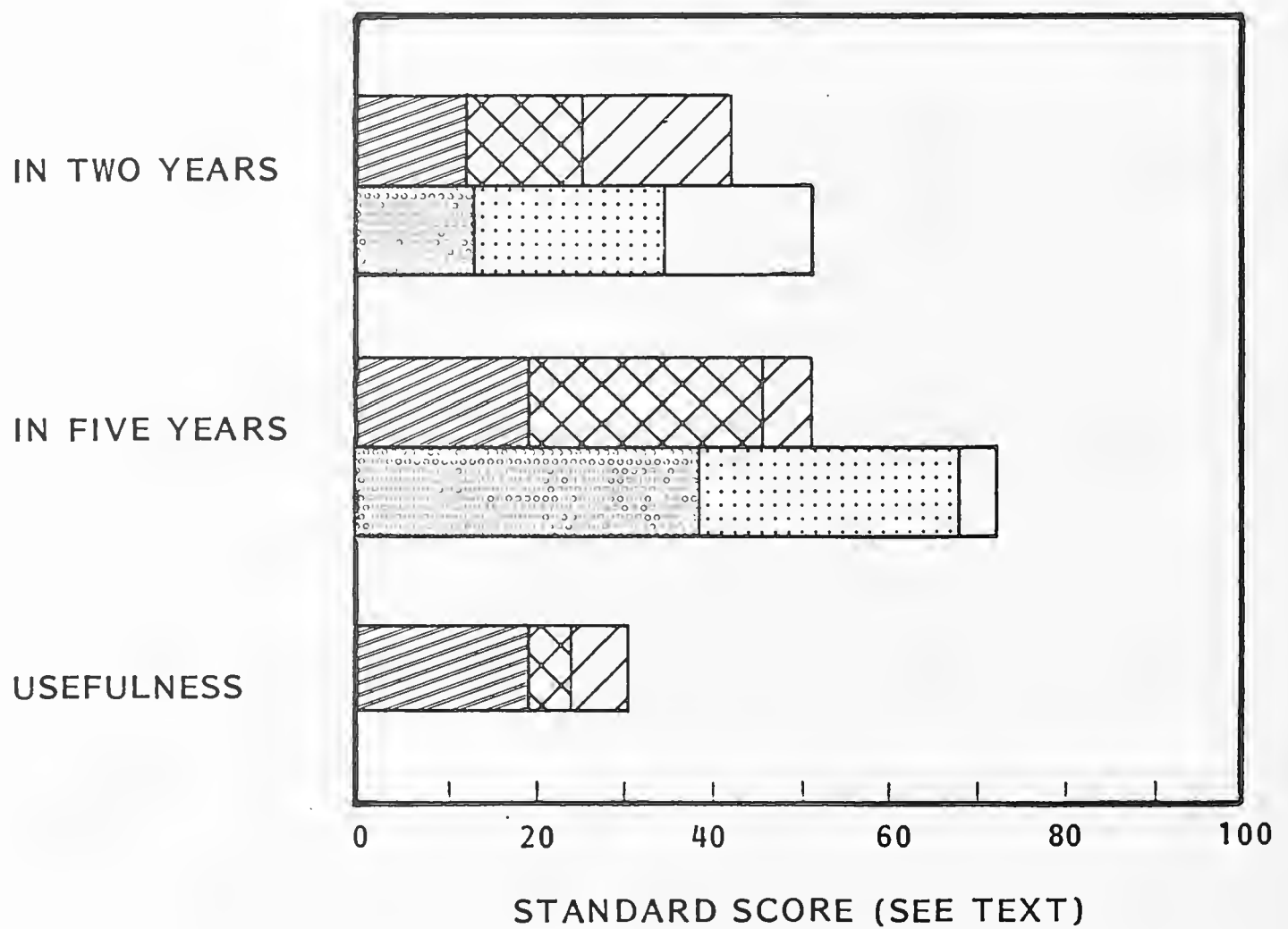
EXHIBIT VIII-25

LIKELY AVAILABILITY AND VALUE OF MANAGEMENT
WORKSTATIONS IN THE OPINION OF RESPONDENTS

USER   VENDOR   RATING

HIGH

MEDIUM

LOW

INPUT
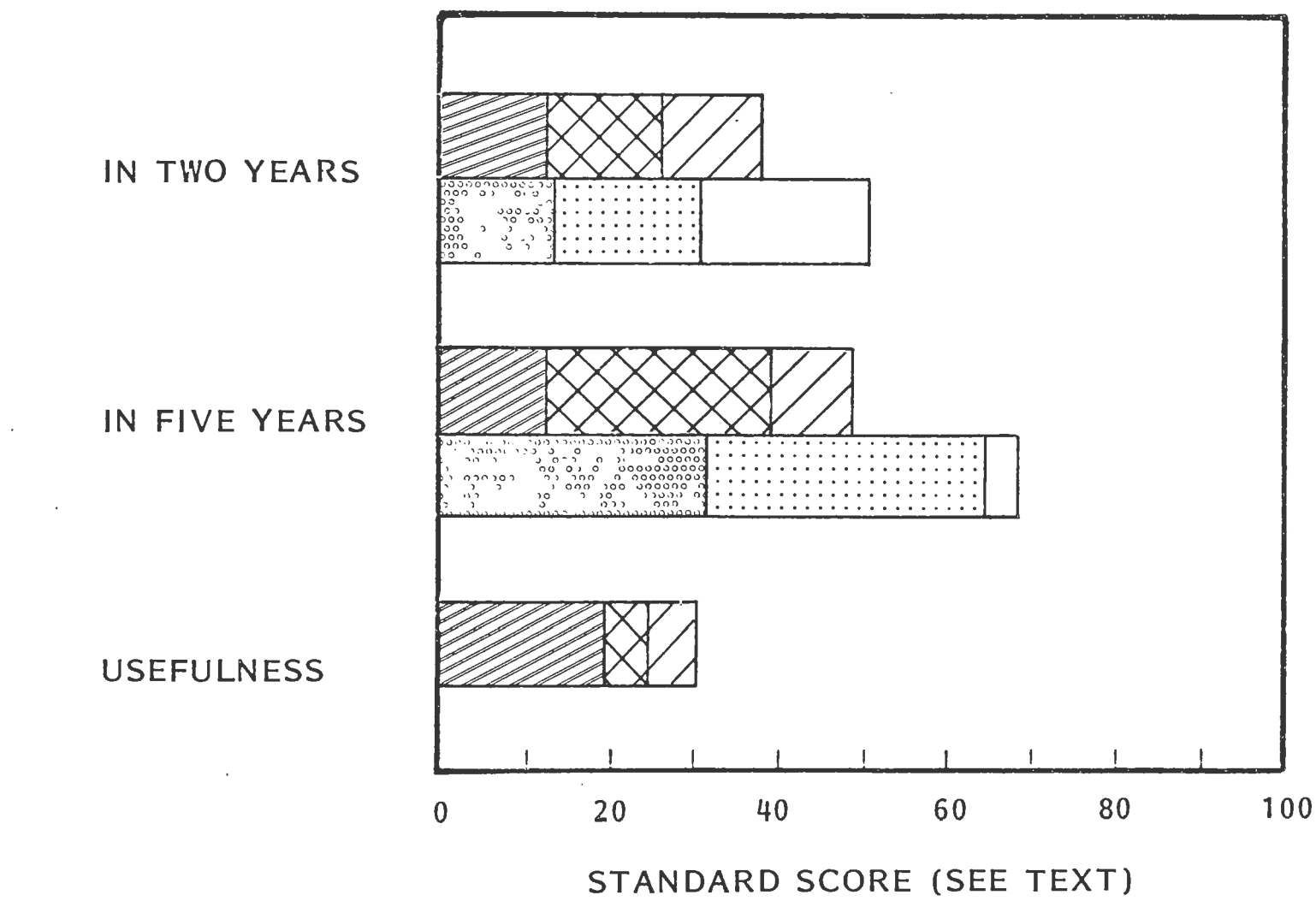
EXHIBIT VIII-26

LIKELY AVAILABILITY AND VALUE OF TELECONFERENCING
IN THE OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
▨	▦	HIGH
▨	▦	MEDIUM
▨	▢	LOW

- 150 -

INPUT
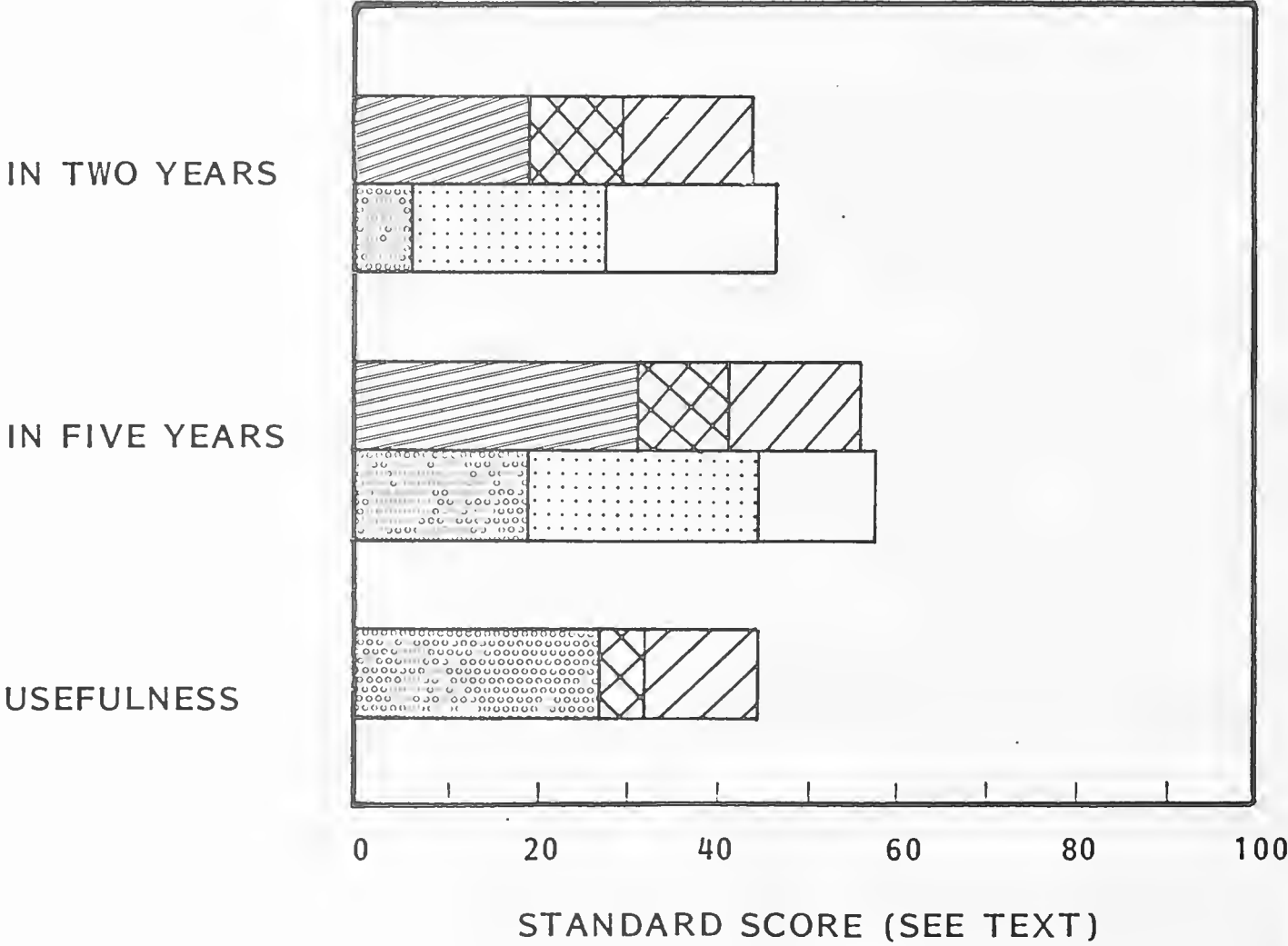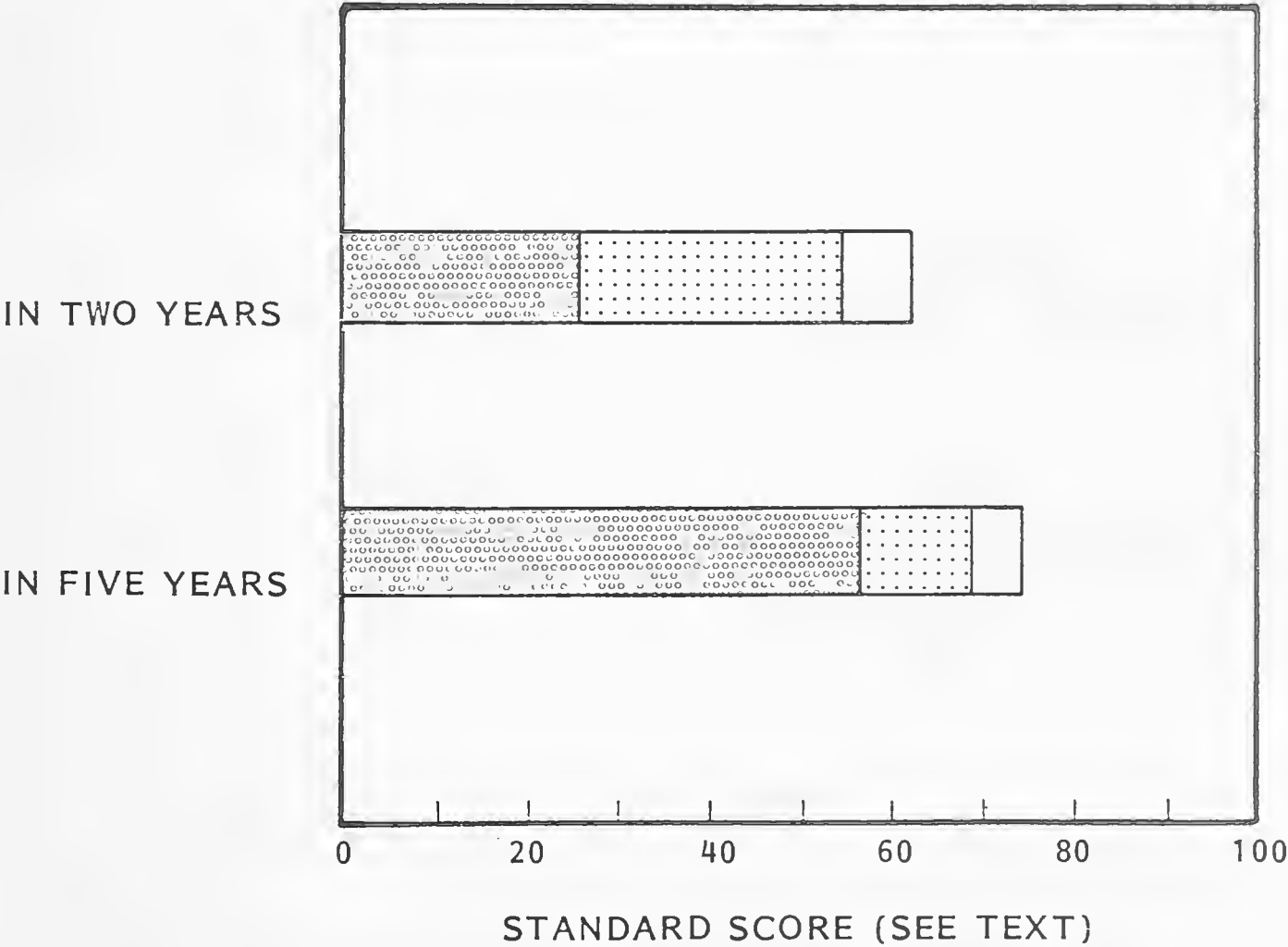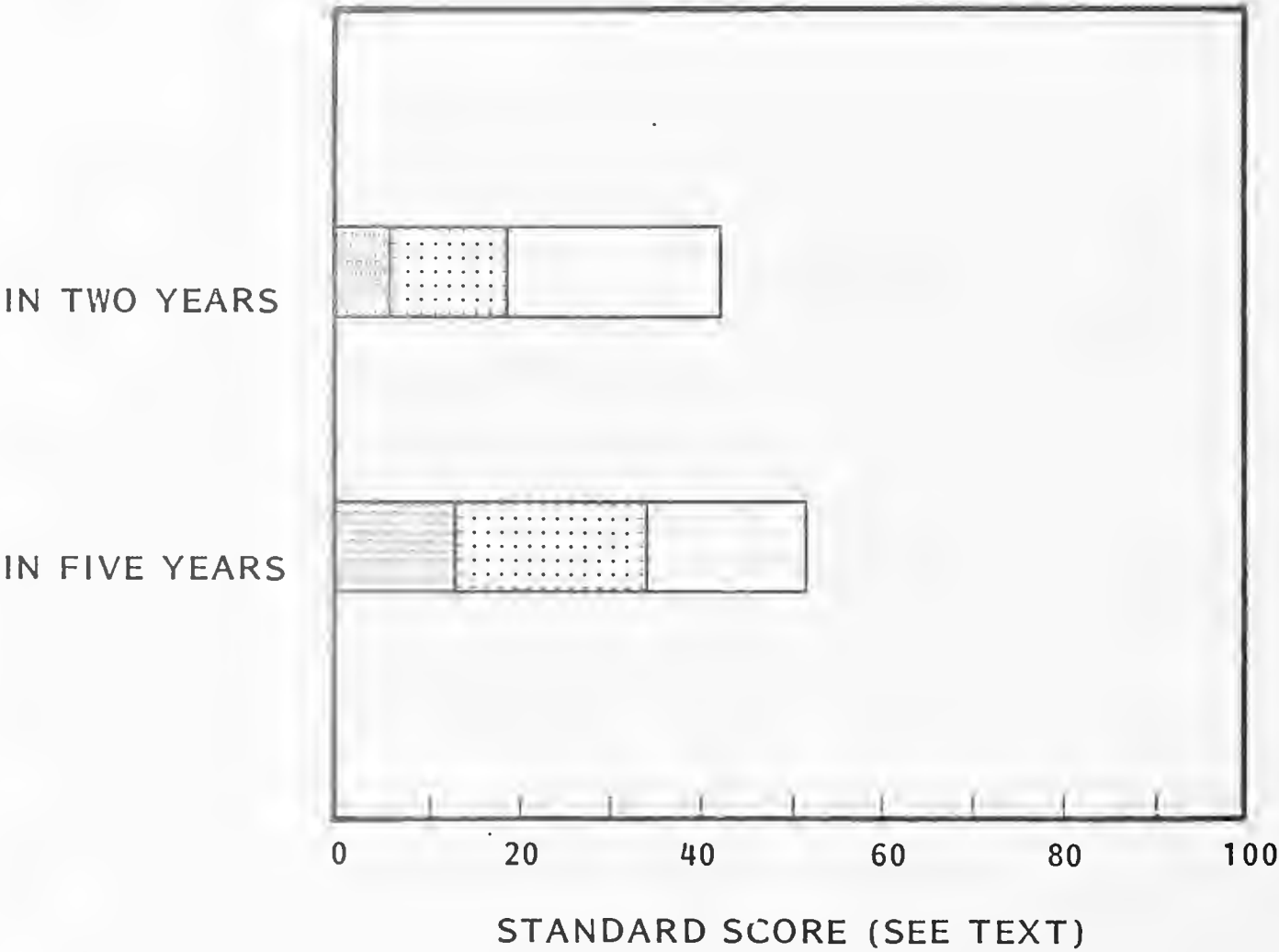
EXHIBIT VIII-27

LIKELY AVAILABILITY AND VALUE OF DISTRIBUTED
DATA BASE MANAGEMENT SYSTEMS IN THE
OPINION OF RESPONDENTS

STANDARD SCORE (SEE TEXT)

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

- 151 -

INPUT

EXHIBIT VIII-28

LIKELY AVAILABILITY AND VALUE OF VOICE
RECOGNITION SOFTWARE IN THE
OPINION OF RESPONDENTS

USER	VENDOR	RATING
		HIGH
		MEDIUM
		LOW

INPUT

- The summary of responses was then further normalized to a percentage score so that a maximum score of 100 would indicate unanimous agreement that an event is highly likely to occur.

- Vendors rated almost 70% of the product opportunities higher than buyers. In these cases, 50% or less of the buyers believed that the products would be useful. Vendors should consider implementing 'additional market research products to verify user needs in these potential product areas.

- In the 30% of cases where buyers rated product opportunities higher than vendors, the measure of usefulness to buyers was almost always 50% or less. Vendors therefore must be prepared to perform a complete need analysis of buyers before embarking on any of the new product opportunities listed in Exhibits VIII-10 through VIII-28.

- Vendors rate the following product opportunities significantly higher than buyers:

  - Relational data base, Exhibit VIII-11.

  - Automatic program checkers/testers, Exhibit VIII-17.

  - Automatic coding/programming, Exhibit VIII-19.

  - Management workstations, Exhibit VIII-25.

- It is significant to find that buyers of systems software were not more interested in obtaining products that purport to increase productivity and reduce costs (such as the four listed above).

- However, it was also significant to see that the opportunities ranked lowest by all vendors and buyers concerned office automation. The lowest ranked areas were:

INPUT

- Voice recognition and conversion, Exhibit VIII-28.

- Teleconferencing, Exhibit VIII-26.

- Multimedia source data conversion, Exhibit VIII-22.

- Automatic file indexing, Exhibit VIII-4.

- Buyers ranked the following opportunities higher than vendors:

  - Linking word processing to data processing, Exhibit VIII-13.

  - Graphics/color CRT output packages, Exhibit VIII-15.

- The most likely areas for new product development within the next five years are:

  - Non-procedural languages, Exhibit VIII-10.

  - Relational data base, Exhibit VIII-11.

  - Linking word processing to data processing, Exhibit VIII-13.

  - Automatic coding/programming, Exhibit VIII-19.

  - Management workstations, Exhibit VIII-25.

  - Linking office systems to data processing, Exhibit VIII-24.

  - Distributed data bases, Exhibit VIII-27.

INPUT

D.   CONSTRAINTS TO GROWTH FOR SYSTEMS SOFTWARE VENDORS

- Exhibit VIII-29 lists the reported constraints to growth for systems software vendors.

- Systems software vendors perceive no major potential constraints to growth.

- Lack of desired funds or a tight budget is the biggest constraint to growth, but respondents recognize this as only a marginal problem.

- Inadequate marketing by vendors is also considered to be a minor constraint to growth.

- Overall, only six responses out of 110 indicated major constraints to growth feelings by respondents (as measured by a rating of five). Only 22% of the responses indicated moderate (at ratings of four or five) or major constraints to growth.

- Systems software vendors apparently feel that they are growing as rapidly as they can or should. Consequently, they have a feeling of confidence and satisfaction with results.

INPUT

EXHIBIT VIII-29

POTENTIAL CONSTRAINTS TO GROWTH FOR SYSTEMS
SOFTWARE VENDORS AS REPORTED BY RESPONDENTS

CONSTRAINT	RATING*
USER BUDGET	2.2
USER RESISTANCE TO BUYING SOFTWARE	2.1
INADEQUATE MARKETING BY VENDOR	3.1
PRODUCT DESIGN	2.5
PRODUCT QUALITY	2.3
PRODUCT DOCUMENTATION	2.2
PRODUCT TRAINING	2.7
INDUSTRY IMAGE	2.4
TECHNOLOGICAL UNCERTAINTY	2.9
VENDOR BUDGET	3.2

*MEASURED ON A 1 TO 5 SCALE, WHERE 1 IS NOT A CONSTRAINT AND 5 IS A
MAJOR CONSTRAINT.

INPUT

APPENDIX A: DEFINITION OF TERMS

APPENDIX A: DEFINITION OF TERMS

<u>COMPUTER SERVICES</u>. These are services provided by vendors which perform data processing functions using vendor computers (processing services) or assist users to perform such functions on their own computers (software products and/or professional services).

<u>PROCESSING SERVICES</u>. Processing services encompass facilities management, remote computing services, and batch services: they are categorized by type of services bought by users as follows:

- <u>General Business</u> services are processing services for applications which are vendor; this can be a complete package, such as a payroll package, or an applications "tool," such as a budgeting model, where a user provides much of the customizing of the finished product it uses. General business processing is often repetitive and transaction oriented.

- <u>Scientific and Engineering</u> services are the processing of scientific and engineering problems for users across industries. The problems usually involve the solution of mathematical equations. Processing is generally problem solving and is non-repetitive, except in the sense that the same packages or "tools" are used to address different, but similar, problems.

- <u>Industry Specialty</u> services provide processing for particular functions or problems unique to an industry or industry group. The software is provided by the vendor either as an industry or industry group. The software is provided by

- 157 -

INPUT

the vendor either as a complete package or as an applications "tool" which the user employs to produce its unique solution. Specialty applications can be either business or scientific in orientation; data base services, where the vendor supplies the data base and controls access to it (although it may be owned by a third party), are also included under this category. Examples of industry specialty applications are: seismic data processing, numerically-controlled machine tool software development, and demand deposit accounting.

- Utility services are those where the vendor provides access to a computer and/or communications network with basic software that enables any user to develop its own problem solution or processing system. These basic tools include terminal handling software, sorts, language compilers, data base management systems, information retrieval software, scientific library routines, and other systems software.

SOFTWARE PRODUCTS. This category includes users' purchase of applications and systems packages for use on in-house computer systems. Included are lease and purchase expenditures, as well as fees for work performed by the vendor to implement and maintain the package at the users' sites. Fees for work performed by organizations other than the package vendor are counted in professional services. The sub-categories of software products are:

- Application Products are software which perform processing to serve user functions. They consist of:

  - Cross-industry products which are used in multiple user industry sectors. Examples are payroll, inventory control, and financial planning.

  - Industry specialized products which are used in a specific industry sector such as banking and finance, transportation, or discrete manu-facturing. Examples are demand deposit accounting and airline scheduling.

- 158 -

INPUT

- **System Products** are software that enable the computer/communications system to perform basic functions. They consist of:

    - **System operations products** which function during applications program execution to manage the computer system resource. Examples include operating systems, DBMS, communication monitors, emulators, and spoolers.

    - **System utilization products** which are used by operations personnel to utilize the computer system more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.

    - **Implementation system products** which are used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, data dictionaries, report writers, project control systems, program library management systems, and retrieval systems.

PROFESSIONAL SERVICES. This category is made up of services related to EDP including systems design, custom/contract programming, consulting, education and training. Services are provided on the basis of:

- **Time and Materials** - The billing rate is measured in units of time rather than actual costs.

- **Fixed Price** - A firm price is agreed upon for a defined piece of work.

- **Cost Plus Fee** - The billing rate depends on actual costs plus a fixed fee.

Remote Computing Services. Provision of data processing to a user by means of terminals at the user's site(s) connected by a data communications network to the vendor's central computer. The three sub-modes of RCS are:

INPUT

- Interactive (timesharing) is characterized by interaction of the user with the system, primarily for problem solving timesharing but also for data entry and transaction processing: the user is on-line" to the program/files.

- Remote Batch is where the user hands over control of a job to the vendor's computer which schedules job execution according to priorities and resource requirements.

- Data Base inquiry is characterized by the retrieval of information from a vendor-maintained data base. This may be owned by the vendor or a third party.

Batch Services. This includes data processing performed at vendors' sites of user programs and/or data which are physically transported (as opposed to electonically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and COM processing, are also included. Batch services include those expenditures by users which take their data to a vendor site which has a terminal connected to a remote computer used for the actual processing.

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

INPUT

APPENDIX B: INTERVIEW PROFILE
AND QUESTIONNAIRES

APPENDIX B: INTERVIEW PROFILE AND QUESTIONNAIRES

INPUT

INPUT is preparing a report on future developments in software and how users should prepare for them. We see major developments in the next five years in the use of distributed data processing (DDP), database management systems (DBMS), non-procedural languages, and integration of office systems (word processing, electronic mail).

A. GENERAL

1. The information I have shows that you have (#)_____ IBM (Model) _____ operating under _____. Is that correct?

2. On a scale of 1 to 5, how centralized/decentralized is your company?

Very centralized ◄————————► Very decentralized

a. Generally	1	2	3	4	5
b. Managerially	1	2	3	4	5
c. Financially	1	2	3	4	5
d. With respect to EDP	1	2	3	4	5

e. Will there be any changes in your company's centralization/decentralization philosophy? ☐ Yes ☐ No. How and why?

f. How long does your company usually wait before adopting new developments in data processing? ☐ Among the earliest ☐ First one-third ☐ Average ☐ Last one-third ☐ Near the end.

B. NEW DEVELOPMENTS

3. What are the three to five most important factors that cause you to make major changes or new developments in software?

4. In your opinion, how likely will new products be available in the following areas in the next 2-5 years, and how useful would they be to you?

	Likelihood of Availability						Usefulness			
	Within 2 Yrs.			Within 5 Yrs.						
	H	M	L	H	M	L	H	M	L	$(K)
a. Non-procedural Languages	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
b. Relational Data Base	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
c. Data Base Conversion Aid	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
d. Word Processing Linked to DP	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
e. Automatic Content Indexing	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
f. Graphics/Color CRT Packages	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
g. User oriented/human engineered modeling/simulation packages	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
h. Automatic program testers	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
i. Systems Analysis/Design Aids (Systems Workbench)	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
j. Automatic Programming	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
k. Personal Computers Linked to Large Mainframes from home? from office?	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐	____ ____
l. Multi-media source data converters	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
m. Electronic Mail Systems	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
n. Integrated Office Systems (Telephone, Copying, Filing, DP)	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
o. Management Workstations	☐	☐	☐	☐	☐	☐	☐	☐	☐	____
p. Teleconferencing	☐	☐	☐	☐	☐	☐	☐	☐	☐	____

5. What other software areas do you feel are, or should be, under development during the next five years?

6.　a.　How and by whom are software development priorities decided now?

　　b.　What is the user's role?

- ☐　Initiate request only
- ☐　Moderate involvement during development.
- ☐　Heavy, continuous involvement during development.
- ☐　Project leader.
- ☐　Active role in EDP priority steering committee
- ☐　_____

　　c.　Is the user's current level of involvement satisfactory?　Yes ☐
　　　　No ☐

　　　　How will it change in the next 2-5 years?

7. What is your attitude toward software packages?	For Systems Oper. Prods.	For Systems Utiliz. Prods.	For Implem. Sys. Prods.	For Applic. Sfw. Pkgs.
a. Prefer it	☐	☐	☐	☐
b. Consider it	☐	☐	☐	☐
c. Won't/Can't use it	☐	☐	☐	☐

If (a) or (b), do you prefer

	For Systems Oper. Prods.	For Systems Utiliz. Prods.	For Implem. Sys. Prods.	For Applic. Sfw. Pkgs.
d. Standard, "off-the-shelf" packages	☐	☐	☐	☐
e. Semi-custom, parametized packages	☐	☐	☐	☐
f. Use of a computing services package	☐	☐	☐	☐
g. Fully customized packages	☐	☐	☐	☐

8.   a.   How do you find out about software packages now?

      b.   How do you judge their quality?

      c.   What improvements to their selling process would make your buying decisions more efficient?

      d.   Do you feel you are getting good value for your software dollar with respect to each of the following?

	Underpriced	Priced Right	Overpriced	No Opinion
Systems software	☐	☐	☐	☐
Utility software	☐	☐	☐	☐
Applications software	☐	☐	☐	☐

9.   a.   Who has final approval to purchase outside software in your company?

	Mgr. of Oper., Prog., etc.	Dir. of EDP	Non-EDP Div. Head	VP, etc.
Under $5,000	☐	☐	☐	☐
$5,000-$20,000	☐	☐	☐	☐
$20,000-$50,000	☐	☐	☐	☐
$50,000-$100,000	☐	☐	☐	☐
Above $100,000	☐	☐	☐	☐

      b.   Who else is involved in the process?

      c.   Must these items be specifically identified in the budget if above a certain dollar level?   ☐ Yes   ☐ No. What level? $_____.

      d.   Must there be a formal cost justification?   ☐ Yes   ☐ No

           ☐   Only above $_____.

      e.   What justification is normally used?   ☐ ROI   ☐ Discounted cash flow   ☐ Replacement personnel cost   ☐ Improved time efficiency/capacity utilization   ☐ Life cycle cost   ☐ Other (describe)

C. LANGUAGES

10. a. What percentage of your total applications are written in:
     COBOL _____% FORTRAN _____% PL/1 _____%
     Assembly Language _____% (Other) _____ _____%

     b. What percentage of existing applications use structured techniques? _____%

     c. What percentage of new applications use structured techniques? ____%

     d. If you are using structured techniques now, what degree of improvement have you seen in: reliability?

         easier maintenance?

         on time/on cost development?

         better match to specifications?

     e. Which techniques are you using?

     f. Do you consider structured techniques ☐ a great improvement in systems development ☐ useful in certain circumstances ☐ only a fad ☐ not useful.

11a. What do you think will be the impact of new hardware technology on software during the next 2-5 years?

     b. Will the impact be greater on systems software ☐ or applications software ☐ or about the same ☐ ? Describe, if possible.

12a. Do you have online program development facilities?

     ☐ Yes ☐ No. If yes, for how long? _____ years.

     If no, when do you plan to install them? In _____ years.

     b. What facilities do you or will you use? ☐ TSO ☐ CMS

         ☐ Wylbur ☐ ROSCOE ☐ Maestro ☐ _____

     c. How did (will) you justify using them?

     d. Were the results as expected? ☐ better ☐ worse ☐ as expected.
         Please describe

D.   DBMS

13a.   Which DBMS are you now using?   □ IMS   □ Total   □ IDMS   □ Adabas

□ Model 204   □ System 2000   □ DMS   □ _____

    b.   How long have you used it? _____

14.   a.   How many separate data bases do you have? _____

    b.   What total size? _____ MB

15a.   Would there be any advantage to combining them?   □ Yes   □ No (to #16)

    b.   If yes, describe

    c.   If yes, what has prevented you from doing it?   □ Technical factors

        □ Financial factors   □ Other priorities

        □ _____

    d.   When will you combine them? In _____ years.

16.   Have you experienced performance or other problems using the DBMS in specific situations?   □ Yes   □ No (skip to #17)

    a.   If yes, describe

    b.   How do you think this problem could be relieved?

17a.   Will you require a distributed data base? □ Yes   □ No (to #18)

    b.   By when? _____

    c.   If yes, how will you maintain it?   □ Nightly batch update of central DB, then download subset to nodes.

        □ Periodic polling of nodes by central host.

        □ Non-redundant DB, backed up and maintained locally.

        □ Other, describe:

d. Who will furnish the software for maintaining the DB?

☐ Hardware vendor ☐ DBMS vendor ☐ Outside consultant

☐ RCS vendor ☐ Ourselves

18a. What would cause you to change to another DBMS?

b. Would you require availability of a conversion aid as part of your selection criteria? ☐ Yes ☐ No

19. a. Have you investigated relational data bases for your situation?

☐ Yes ☐ No   Not familiar with them (skip to #20)

b. What advantages/disadvantages would they have for your situation?

E.   DDP

20. Are you considering, or do you now have, distributed data processing (DDP)?
☐ Yes ☐ No. If no, go to question 25.

21. What configuration do you intend to use for DDP? ☐ Main host-driven/star network ☐ Stand-alone minis loosely coupled to central facility and each other ☐ Other (describe)

22. What hardware and operating systems will you use for DDP?

    a. At the central site: (#) _____ IBM Model _____ under
        ☐ OS/VSI ☐ MVS ☐ DOS/VS, or (#) _____ (Make, Model)
        _____ under _____ .

    b. At the nodes: (#) _____ IBM Model _____
        under _____ , or (#) _____ (Make, Model)
        _____ under _____ .

    c. Would you consider User Site Hardware Service? ☐ Yes ☐ No
        Why or why not?

23. a. What factors led you to choose your DDP hardware and configuration?
        ☐ already in place ☐ compatible with central site ☐ most cost effective
        ☐ easiest to use ☐ proven successful in a situation similar to ours
        ☐ operating software already developed

    b. What kind of justification did you use to select DDP?

24. a. What type of applications will be or could be operated remotely?

Could be	Will be	
☐	☐	General financial & administrative (A/R, A/P, G/L, Payroll, etc.)
☐	☐	Sales and marketing (O/E, Sales Analysis, etc.)
☐	☐	Industry specialties (Inventory, Scheduling, Demand Deposit Accounting, Student Records, etc.)
☐	☐	Scientific and Engineering (T/S, OR, CAD, etc.)

24.   b.   Who will furnish the software for these applications?

	Use Existing Software	Rewrite Software Centrally	Rewrite Software at Nodes	Use Turnkey Sys.,/Sfw. Pkg./RCS
General financial and administrative	☐	☐	☐	☐
Sales and marketing	☐	☐	☐	☐
Industry Specialties	☐	☐	☐	☐
Scientific & Engineering	☐	☐	☐	☐

24c.   How soon will they be in operation?

	Now	In 1 yr.	In 2 yrs.	In ___ yrs.
General financial and administrative	☐	☐	☐	___
Sales & Marketing	☐	☐	☐	___
Industry Specialties	☐	☐	☐	___
Scientific & Engineering	☐	☐	☐	___

24d.   What were the reasons for choosing these applications?

25.   What do you think is/are the greatest problem(s) with DDP right now?

☐ Too expensive for   ☐ communications   ☐ hardware
                       ☐ people   ☐ software

☐ Too much risk of losing control

☐ Too many unresolved technical problems

☐ _____

☐ _____

26a.   Do you consider turnkey systems an advantage ☐   or a threat ☐ ?
       Why?

       b.   Do you consider minis/micros/personal computers an advantage ☐
               or a threat ☐ ? Why?

F.　PERSONNEL

27.　a.　How much training did (will) your programming improvement techniques require?

　　b.　Is this　☐ more　☐ less　☐ about the same as you expected originally?

　　c.　Is the training for EDP staff　☐ voluntary　☐ required?

　　d.　Is the training　☐ in-house　☐ from IBM　☐ from a training vendor?

　　e.　Do users also receive training?　☐ voluntary　☐ required　☐ none.

28.　a.　Are you experiencing an EDP personnel shortage?　☐ none

　　　☐ mild　☐ moderate　☐ severe.

　　　What is your turnover level now? _____% per year.

　　b.　In the next 1-2 years, do you expect the shortage to:

　　　☐ increase　☐ decrease　☐ stay the same.

　　　☐ moderately　☐ severely

　　c.　In the next 5 years, do you expect the shortage to:

　　　☐ increase　☐ decrease　☐ stay the same.

　　　☐ moderately　☐ severely

　　d.　What strategies are you/will you use to cope?

　　　☐ more productivity through training and/or incentives

　　　☐ more productivity through technology

　　　☐ offload development to users

　　　☐ more use of packaged software for　☐ systems　☐ applications

　　　☐ stretch out development time

　　e.　What productivity aids would you like to see?

THANK YOU VERY MUCH. WE WILL SEND YOU A SUMMARY OF THE RESULTS IN ABOUT 60 DAYS.

1. Sales Approach

   a. What is the typical sales strategy used (eg. send brochure, qualify via phone, make product presentation, work with groups affected by product, close)?

   _____

   _____

   _____

   _____

   _____

   b. Does the sales strategy vary by product? ( ) Yes   ( ) No

   If so, how?_____

   _____

   _____

   _____

   _____

   c. What is your sales approach for different countries?

Country/Area	Direct Sales %		Agent %		Joint Venture %		Telephone & Mail Sales %	
U.S.A.								
Canada								
Europe								
Middle East								
Far East								
Mexico								
Central and South America								
Others								

INPUT

d. Who do you call on to sell?

Call	Title/ Position	Number of Calls	Vendor Presentation	Overview Presentation	Technical Presentation
1					
2					
3					
4					
5					
6					
7					

e. Is this shifting? ( ) Yes ( ) No If yes, how?_____

_____

_____

f. Does the product have an influence on who your sales force call on?

( ) Yes ( ) No If yes, how?_____

_____

_____

_____

g. How many calls are made before a prospect is dropped?_____
   Before a sale is closed?_____

2.   Marketing

a. How do you know if and when to develop a new product, or to modify
    and/or extend existing products? Please rate the following factors
    in degree of importance in these decision processes (5 is most
    important, 1 is not important).

Factor	Develop a New Product	Modify and/or Extend Existing ·Products
Requirement perceived by sales force and not offered by competitor		
Loss to competition		
Result of In-house Development		
Market Research performed In-house		
Market Research performed by Consultant		
New hardware introduced by hardware manufacturer		
Trend to on-line processing		
Decision to specialize by industry		
Other (describe)		

INPUT

2. b. How are your prices determined for your package, maintenance
        and professional services?

Method	Package	Maintenance	Professional Services
Cost plus profit percent			
Competition			
What the market will bear			
Cost plus fixed fee			
Time and materials			
Other (describe)			

INPUT

3. Product Statistics

Software Product	Price	Number of Installations	Hardware	Application or System Software *	1978 Revenue	Where Advertised	Competitors	Competitors Revenue Estimate

* Application Products

  - Cross Industry Products

  - Industry Specialized Products

Systems Products

  - Systems Operations Products

  - System Utilization Products

  - Implementation Systems Products

4.   Personnel and Cost Statistics

	Number of People	Percent Female	Turnover Percentage	Compensation Cost as a % of Revenue	Total Cost as a % of Revenue
Sales					
Sales Support					
Marketing					
Total Sales & Marketing					
Development					
Maintenance					

5.   Advertising

Medium/ Source	Number of Leads Generated	Quality of Leads Generated*	Typical Ad Size	Type of Ad Used**	Products Advertised

 * Measures on a 1 to 5 scale where 5 is the highest quality.
 ** Serious advertisement or comical advertisement.

a.   How do you measure the quality of leads generated?_____

_____

INPUT

6. Describe your training programs.

Training Program Element	Sales Personnel	Sales Support Personnel	Development and Maintenance Personnel	Comments
Training program total length (in weeks)				
Length of formal training classes (in weeks)				
OJT (in weeks)				
Management training program length (in weeks)				
Formal pre-class testing *				
Formal In-class testing *				
Testing by role playing and presentations *				
Testing by problem solving*				
Class Size				
Number of consultants used				
Formal on-going training program used *				
Training by education vendor*				
Training program uses education vendor materials*				

* Yes or No

CATALOG NO.

M S F M

7. What technological threats do you see for your products (such as micro
    computers, communications, mass memory, inexpensive memory, structured
    programming)?

    _____

    _____

    _____

    _____

8. What impact will DDP have on your products?_____

    _____

    _____

    _____

    _____

9. What impact will minicomputers have on your business?_____

    _____

    _____

    _____

    _____

10. What impact will turnkey systems have on your business?_____

    _____

    _____

    _____

    _____

INPUT

11. Please specify plans and likelihood of development for the following:

Likelihood of Development

		Within 2 Years			Within 5 Years		
a.	Non-procedural languages_____	H	M	L	H	M	L
b.	Relational Data Base _____	H	M	L	H	M	L
c.	Data Base Conversion Aids _____	H	M	L	H	M	L
d.	Linking Word Processing to Data Processing _____	H	M	L	H	M	L
e.	Automatic File Indexing _____	H	M	L	H	M	L
f.	Graphics/color CRT output packages _____	H	M	L	H	M	L
g.	User oriented/human engineered modeling or simulation packages	H	M	L	H	M	L
h.	Automatic Program Checkers/Testers	H	M	L	H	M	L
i.	Systems Design Aids (systems workbench)	H	M	L	H	M	L
j.	Automatic Coding/programming	H	M	L	H	M	L
k.	Linking personal computers to large mainframes	H	M	L	H	M	L
l.	Multi-media source data conversion	H	M	L	H	M	L

INPUT

		Within 2 Years			Within 5 Years		
m.	Electronic Mail	H	M	L	H	M	L
	_____						
n.	Management Workstations						
	_____	H	M	L	H	M	L
o.	Linking office systems (telephone, copying, filing) to data processing	H	M	L	H	M	L
	_____						
p.	Teleconferencing_____	H	M	L	H	M	L
	_____						
q.	Distributed Data Bases	H	M	L	H	M	L
	_____						
r.	Voice recognition and conversion_____	H	M	L	H	M	L
s.	Other_____	H	M	L	H	M	L

12. What other software (not suitable for development by your company) do you feel should be under development?

_____

13. Technical Considerations

   a. Have your program development methods changed in the last two or three years? ( ) Yes ( ) No

      If so, how?_____

      _____

      _____

   b. What changes do you foresee in program development methods in the next five years?

      _____

      _____

      _____

INPUT

c. How important is the concept of a data base to your products?

_____

Will this importance change in the next two or three years?

( ) Yes   ( ) No If so, how?_____

_____

_____

d. How important is security in your products?_____

_____

_____

Do you expect this to change in the next two or three years?

( ) Yes ( ) No If so, how?_____

_____

_____

INPUT

14. What are current major constraints to growth for systems software vendors? Rate each constraint in degree of importance where 5 is a major constraint and 1 is not a constraint.

Constraint	Rating
User budget	
User resistance to buying software	
Inadequate marekting by vendor	
Product Design	
Product Quality	
Product documentation	
Product Training	
Industry Image	
Technological uncertainty	
Vendor budget	
Other	

15. What are the major unmet user needs?_____

_____

_____

_____

_____

16. Send product literature.

INPUT

- 184 -

APPENDIX C: RELATED INPUT REPORTS

APPENDIX C: RELATED INPUT REPORTS

TITLE	PUBLICATION DATE	PRICE
Computer Services Industry 1978 Annual Report	Nov 1978	$4,000
1979 ADAPSO Annual Report	July 1979	
Impact Of Marketing Compensation Plans In The Computer Services Industry - Impact Report #7	Dec 1977	$2,500
Sales And Sales Support Training - Impact Report #13	June 1979	$2,000
Data Base Systems Software Markets - Impact Report #8	May 1978	$1,500
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	$1,500

INPUT