1982 ANNUAL REPORT FIELD SERVICES IN EUROPE



About INPUT

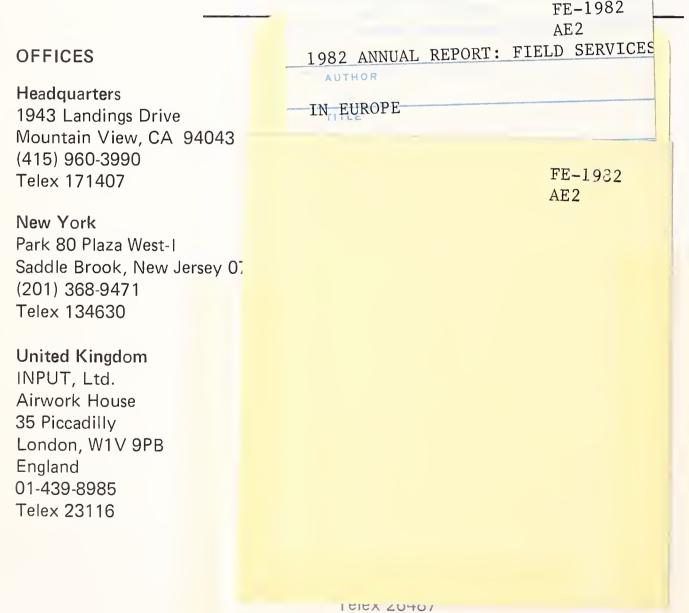
INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided 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 issues, INPUT's staff members analyze and interpret the research data, then develop recommendations and innovative ideas to meet clients'

needs. Clients receive reports, presentations, access to data on which analyses are based, and continuous consulting.

Many of INPUT's professional staff members have nearly 20 years' experience in their areas of specialization. Most have held senior management positions in operations, marketing, or planning. This expertise enables INPUT to supply practical solutions to complex business problems.

Formed in 1974, INPUT has become a leading international planning services firm. Clients include over 100 of the world's largest and most technically advanced companies.



Sweden

Athena Konsult P.O. Persson & Co AB Box 22114 S-104 22 Stockholm Sweden 08-52 07 20 Telex 17041

Planning Services for Management

1982 ANNUAL REPORT FIELD SERVICES IN EUROPE



https://archive.org/details/1982annualreport02unse

1982 ANNUAL REPORT FIELD SERVICES IN EUROPE

CONTENTS

		Page
1	INTRODUCTION	1
11	A. Conclusions I. The Information Technology Marketplace, 1982 2. Field Service Revenue Growth, 1982-1987 3. Field Service Expenses 4. Maintenance Pricing 5. Growth Of Software Maintenance 6. Personnel Policies B. Recommendations I. Long-Range Plan 2. Field Quality Assurance (FQA) 3. Third-Party Maintenance (TPM) 4. Software Maintenance 5. Change In Maintenance Strategies	9 9 11 13 16 16 19 20 20 21 22 23 23
111	USER AND VENDOR ANALYSIS OF IMPORTANT SERVICE CONSIDERATIONS A. General B. Users' Ranking Of Service Vendors	25 26 26 30 35 37 40 43
IV	VENDOR ANALYSIS	47 47 47 51 54 56 58

		Page
B. Org 1. 2. 3. 4.	Field Service Reporting Field Service Personnel Distribution Typical Field Service Salaries Field Engineering Performance Indicators/	61 61 63
C. Fie 1. 2. 3.	Measurement Techniques Id Service Pricing Pricing Methodology Maintenance Pricing By Equipment Category Price Reductions By Delivery Mode	65 65 69 71
4. D. Equ	Marketing Of Field Service Contracts Jipment Distribution By Type Of Environment Id Service Management Performance Principal Activities For Field Service Managers,	75 76 76
2. 3.	1981-1982 Success In Resolving 1981 Problems Involvement And Influence Of Field Service Management In Critical Issues, 1981-1982	78 80 82
4. 5.	Field Service Performance, 1981, And Plans For 1983 Most Significant Field Service Issues, 1981-1983	85 88
APPENDIX A	: UNITED KINGDOM USER DATA BASE A. Comparison: 1982 Versus 1981 B. Key Service Issues C. User Satisfaction With Maintenance D. Serviceability E. Other Planning Data	93 93 96 99 116
APPENDIX B	WEST GERMAN USER DATABASE	131 131 133
APPENDIX C	FRENCH USER DATABASE	159 159 163
APPENDIX D	BENELUX, SCANDINAVIAN, AND ITALIAN USER DATABASES A. Benelux Users I. Comparison: 1982 Versus 1981 2. Key Service Issues 3. Satisfaction With Maintenance And Serviceability 4. System Availability, Prices, And Maintenance Issues	195 195 195 196 198

			Page
	В.	Scandinavian Users	202
		I. Comparison: 1982 Versus 1981	202
		2. General Assessment	205
	C.	Italian Users	209
APPENDIX E:	QUE	STIONNAIRE	217

1982 ANNUAL REPORT FIELD SERVICES IN EUROPE

EXHIBITS

			Page
1	-1 -2 -3	Number Of User Respondents By Cells Vendor Respondents Methodology Used In The Field Service Programme	4 5
H	-1 -2 -3 -4	Western European Field Service Maintenance Revenue And Employment Forecast, 1982–1987 Trend Analysis Of Field Service Costs Per Call Pricing Perceived By User And Vendor Average Charge-Out Hourly Rate	12 15 17 18
III	-1 -2 -3 -4 -5 -6 -7 -8 -9	Users' Ranking Of Service Vendors By Type Of Equipment Users' Ranking Of Service Vendors By Country Users' And Vendors' Perceptions Of Current System Availability Users' Threshold Of Unacceptable Uptime As Perceived By User And Vendor Response Times Currently Provided By Vendors As Perceived By Vendors And Users Response Time Minimum Expectations Mean Time To Repair As Perceived By User And Vendor Pricing Perceived By User And Vendor Vendor And User Priorities	27 31 36 38 39 41 42 44 45
IV	-I -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13	Summary Of Respondent Vendor Financials Percent Change 1983 Versus 1982 Average Revenue Per Field Engineer Source Of Field Service Revenue, 1982 Cost Breakdown Of A Typical Fault Call Profit And Loss Or Cost Control Delegation Costs And Revenue Tracking Accounting Treatment Of Spare Parts, All Systems Field Service Personnel Distribution By Function Average Salary Ranges By Function First-Line Managers' Performance Measurement Maintenance Pricing Methodology Average Charge-Out Hourly Rate	49 50 52 53 55 57 59 60 62 64 64 67 68

			<u>Page</u>
	-14 -15 -16	Maintenance Pricing Pricing, Terms, And Expectations Price Reductions By Delivery Mode	70 72 74
	-17 -18	Equipment Distribution By Type Of Environment Principal Activities Of Field Service Managers In 1982	77
	-19	And Plans For 1983 Field Service Managers' Evaluation Of Their Success In Handling Problems	79 81
	-20	Influence Of Field Service Management On Critical Issues, 1981–1982	83
	-21 -22 -23	Vendors' Response On System Availability Vendors' View Of Response Time Vendors' Response On Repair Time And Mean Time	86 87
	-24 -25	Between Failures (MTBF) Most Significant Issues, 1981 Most Significant Issues, 1982-1983	89 90 91
Α	-1	Respondents' View Of Mainframe Maintenance Vendors In The United Kingdom	94
	-2	Users' Sensitivity Regarding Maintenance Price Increases In The United Kingdom	95
	-3	Significant Changes In Users' Opinions Of Service Quality, United Kingdom - 1982 Versus 1981	97
	-4 -5	User Consensus Regarding Key Services Issues For The United Kingdom	98
	-5 -6	User Satisfaction With Maintenance Of Large Mainframe Systems In The United Kingdom User Satisfaction With Maintenance Of Medium	100
	-7	Mainframe Systems In The United Kingdom User Satisfaction With Maintenance Of Small Business	101
	-8	Systems In The United Kingdom User Satisfaction With Maintenance Of Other	102
	-9	Minicomputers In The United Kingdom User Satisfaction With Maintenance Of Peripherals In	103
	-10	The United Kingdom User Satisfaction With Maintenance Of Terminals In	104
	-11	The United Kingdom User Satisfaction With Maintenance Of Systems Software	105
	-12	In The United Kingdom User Satisfaction With Maintenance Of Applications Software In The United Kingdom	107
	-13	Users' Rating Of Overall Quality Of Maintenance In The United Kingdom	108
	-14	Users' Rating Of Quality Of Engineers In The United Kingdom	109
	-15	Users' Rating Of Quality Of Engineers' Managers In The United Kingdom	110
	-16	Users' Rating Of Availability Of Spare Parts In The United Kinadom	111

			Page
	-17	Users' Rating Of Quality Of Information In The United Kingdom	112
	-18	Users' Rating Of Remote Diagnostics In The United Kingdom	113
	-19	Users' Rating Of Quality Of Maintenance In The United Kingdom	114
	-20	Users' Rating Of Value For Money Of Maintenance In	
	-21	The United Kingdom Users' Perception Of Serviceability For Large Systems	115
	-22	In The United Kingdom Users' Perception Of Serviceability For Medium	117
		Mainframes In The United Kingdom	118
	-2 3	Users' Perception Of Serviceability For Small Business Systems In The United Kingdom	119
	-24	Users' Perception Of Serviceability For Other Minicomputers In The United Kingdom	120
	-25	Users' Perception Of Serviceability For Peripherals In	
	-26	The United Kingdom Users' Perception Of Serviceability For Terminals	121
	-27	In The United Kingdom Users' Perception Of Serviceability For Word Processors	122
		In The United Kingdom	123
	-28	Users' Perception Of Serviceability For Systems Software In The United Kingdom	124
	-29	United Kingdom Respondents' View Of System Availability	125
	- 30	Respondents' Price Increases And Forecasts In The	
	-31	United Kingdom Users' Rating Of Importance Of Maintenance Issues In	126
	-32	The United Kingdom Respondents' Average Contracted Maintenance Period	128
	-	Versus Actual Equipment Usage, 1981 And 1982, In The United Kingdom	129
В	-1	Respondents' View Of Mainframe Maintenance Vendors	122
	-2	In West Germany Users' Sensitivity Regarding Maintenance Price	132
	- 3	Increases In West Germany Significant Changes In Users' Opinions Of Service	134
	_4	Quality, West Germany - 1982 Versus 1981 User Consensus Regarding Key Service Issues For	135
		West Germany	137
	- 5	User Satisfaction With Maintenance Of Large Mainframe Systems In West Germany	138
	-6	Úser Satisfaction With Maintenance Of Medium Mainframe Systems In West Germany	139
	- 7	User Satisfaction With Maintenance Of Small Business	
	-8	Systems in West Germany User Satisfaction With Maintenance Of Other	140
		Minicomputers In West Germany	141

		<u>Page</u>
- 9	User Satisfaction With Maintenance Of Peripherals In	142
-10	West Germany User Satisfaction With Maintenance Of Terminals In	142
-	West Germany User Satisfaction With Maintenance Of Word Processors	143
-11	In West Germany	144
-12	User Satisfaction With Maintenance Of Systems Software In West Germany	145
-13	User Satisfaction With Maintenance Of Applications	143
-14	Software In West Germany Users' Perception Of Serviceability For Large	146
-14	Mainframe Systems In West Germany	147
-15	Users' Perception Of Serviceability For Medium Mainframe Systems In West Germany	148
-16	Users' Perception Of Serviceability For Small Business	140
-17	Systems In West Germany Users' Perception Of Serviceability For Other	149
-17	Minicomputers In West Germany	150
-18	Users' Perception Of Serviceability For Peripherals In West Germany	151
-19	Users' Perception Of Serviceability For Terminals In	
-20	West Germany Users' Perception Of Serviceability For Word Processors	152
-20	In West Germany	153
-21	Users' Perception Of Serviceability For Systems Software In West Germany	154
-22	West German Respondents' Views Of System Availability	155
-23	Respondents' Price Increases And Forecasts In West Germany	156
-24	Respondents' Average Contracted Maintenance Period	130
	Versus Actual Equipment Usage, 1981 and 1982, In West Germany	157
-25	Users' Rating Of Importance Of Maintenance Issues In	
	West Germany	158
-1	Respondents' View Of Large And Medium Mainframe	
- 2	Vendors In France Users' Sensitivity Regarding Maintenance Price Increases	160
	In France	161
-3	Signficant Changes In Users' Opinions Of Service Quality, France – 1982 Versus 1981	164
_4	User Consensus Regarding Key Service Issues For	
- 5	France User Satisfaction With Maintenance Of Large Mainframe	165
	Systems In France	166
-6	User Satisfaction With Maintenance Of Medium Mainframe Systems In France	167
- 7	User Satisfaction With Maintenance Of Small Business	
	Systems In France	168

С

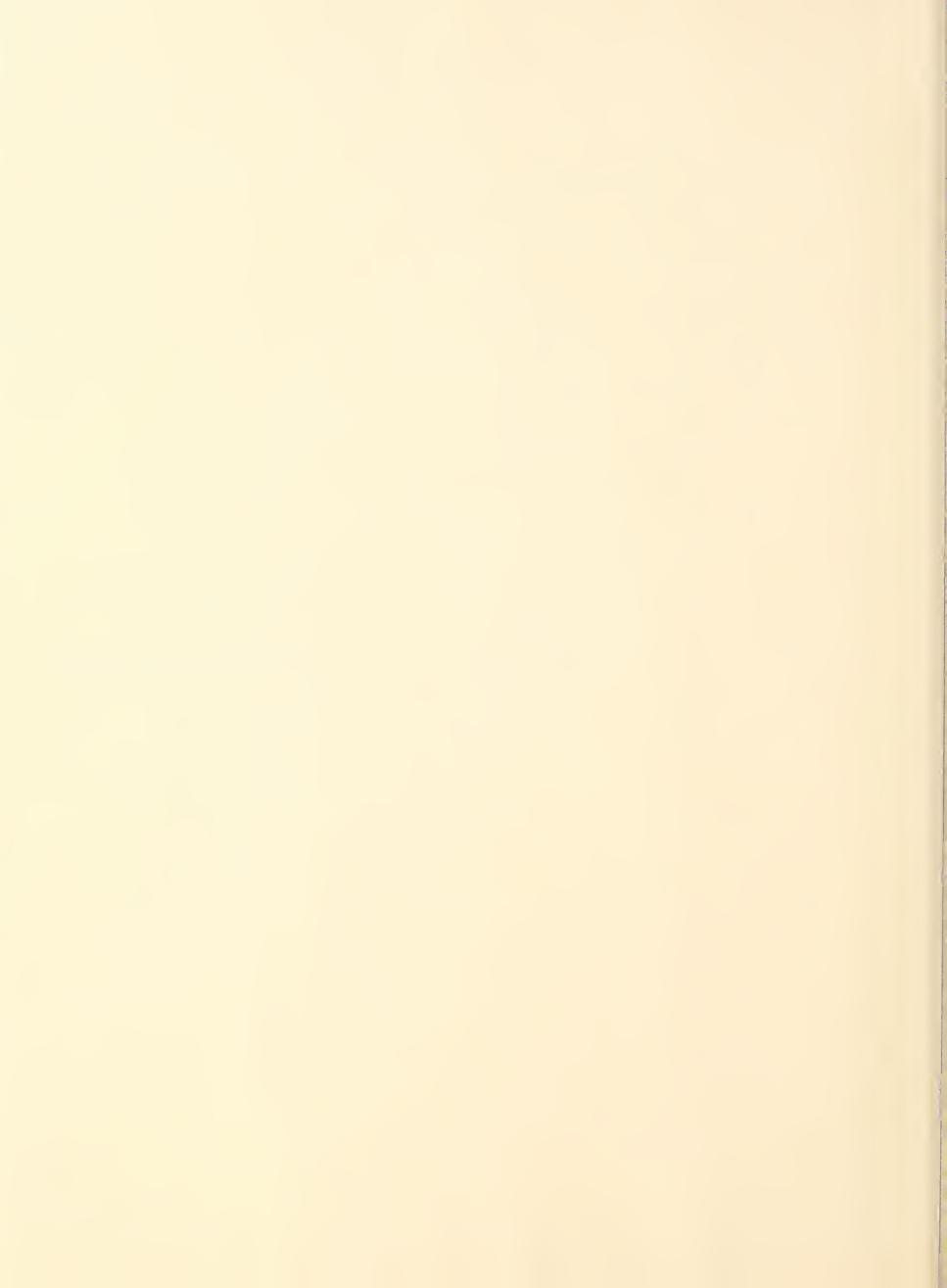
		<u>Page</u>
-8	User Satisfaction With Maintenance Of Other	
0	Minicomputers In France	169
- 9	User Satisfaction With Maintenance Of Peripherals In France	170
-10	User Satisfaction With Maintenance Of Terminals In	171
-	France User Satisfaction With Maintenance Of Word Processors	171
-11	In France	172
-12	User Satisfaction With Maintenance Of Systems Software	1,72
	In France	173
-13	User Satisfaction With Maintenance Of Applications	. 7.
17.	Software In France	174
-14	Users' Rating Of Overall Quality Of Maintenance In France	175
-15	Users' Rating Of Quality Of Engineers In France	175
-16	Users' Rating Of Quality Of Engineers' Managers In	170
. •	France	177
-17	Users' Rating Of Availability Of Spare Parts In France	178
-18	Users' Rating Of Quality Of Information In France	179
-19	Users' Rating Of Remote Diagnostics In France	180
-20	Users' Rating Of Quality Of Maintenance In France	181
-21	Users' Rating Of Value For Money Of Maintenance In	100
22	France	182
- 22	Users' Perception Of Serviceability For Large Systems In France	183
-23	Users' Perception Of Serviceability For Medium Systems	103
	In France	184
-24	Users' Perception Of Serviceability For Small Systems	
	In France	185
-25	Users' Perception Of Serviceability For Other Minicomputers	104
27	In France	186
-26	Users' Perception Of Serviceability For Peripherals In	187
-27	France Users' Perception Of Serviceability For Terminals In	107
-27	France	188
-28	Users' Perception Of Serviceability For Word Processors	, 00
	In France	189
-29	Users' Perception Of Serviceability For Software In	
	France	190
-30	French Respondents' Views Of System Availability	191
-31	Respondents' Price Increases And Forecasts In France	192
-32	Respondents' Average Contracted Maintenance Period	
	Versus Actual Equipment Usage, 1981 And 1982, In	102
-33	France Users! Pating Of Importance Of Maintenance Issues In	193
-55	Users' Rating Of Importance Of Maintenance Issues In France	194
	1 I di loc	1 / 4
-1	User Consensus Regarding Key Service Issues For Benelux	197
-2	User Satisfaction With Maintenance Of All Systems In	
	Benelux	199

D

		<u>Page</u>
-3	Users' Perception Of Serviceability For All Systems In Benelux	200
_4	Benelux Respondents' View Of System Availability	201
-5 -6	Respondents' Price Increases And Forecasts In Benelux Users' Rating Of Importance Of Maintenance Issues In	203
-0	Benelux	204
-7	User Satisfaction With Maintenance Of All Systems In	201
·	Scandinavia	206
-8	User Consensus Regarding Key Service Issues For	
	Scandinavia	207
-9	Users' Perception Of Serviceability For All Systems In	
	Scandinavia	208
-10	Scandinavian Respondents' Views Of System Availability	210
-11	User Satisfaction With Maintenance Of All Systems In	
	Italy, 1982	211
-12	User Consensus Regarding Key Service Issues For Italy	212
-13	Users' Perception Of Serviceability For All Systems In	
	Italy	213
-14	Users' Rating Of Importance Of Maintenance Issues In	
	Italy	215
-15	Italian Respondents' Views Of System Availability	216



IINTRODUCTION



INTRODUCTION

1

- This 1982 Field Service Annual Report is the third annual report in INPUT's European Field Service Programme. It is designed to provide planning data for field service executives and presents a comprehensive picture of the information processing maintenance industry.
- Users, as well as vendors, were canvassed to provide the information analysed herein.
 - The 1982 annual report places a greater emphasis on user opinions about service than did previous reports owing to users' increasing awareness of and control over maintenance plans and options.
 - A broad range of vendors was surveyed, including maintainers of mainframe computers, small business systems, minicomputers, microcomputers, peripherals, terminals, word processors, and data communications equipment.
 - Manufacturers' service organisations and third-party maintenance firms were interviewed.
- Telephone and mail interviews were conducted using the questionnaire included as Appendix E. Secondary research included INPUT's library of vendor and market information.



- Data have been organised and analysed by European regions and also as a single market.
 - Regional field service data bases have been established for the follow-ing markets:
 - . The United Kingdom (Appendix A).
 - . West Germany (Appendix B).
 - France (Appendix C).
 - Benelux/Scandinavia/Italy (Appendix D).
 - This information, in turn, is assessed in plenary form for an overview of the entire European market.
- The 1982 European Field Service Annual Report comprises three major sections.
 - The Executive Summary, Chapter II, provides an overview of important industry parameters including revenue, cost, customer satisfaction, issues, trends, and strategies. It also gives specific recommendations based on the researched conclusions.
 - Chapter III discusses key maintenance issues viewed by users of information processing equipment, including:
 - An evaluation of vendors' maintenance service and system availability.
 - Vendors' response and repair times and failure cycles.
 - Attitudes, grievances, and priorities concerning vendor service.

- Market segmentation.
- Chapter IV describes vendors' opinions of themselves regarding the business of service. Subsections address the following vendor parameters:
 - Maintenance pricing and revenue.
 - . Management, including personnel practices and statistics, and measurement techniques.
 - . New ideas.
 - Operations (repair and response times)•
 - Marketing field service.
- Research for the 1982 European Field Service Annual Report was based on the following user and vendor samples:
 - One hundred thirty-three (133) users replied to the field service questionnaire from a randomly selected list of users.
 - Fifteen (15) vendor interviews were conducted.
 - Exhibits I-I and I-2 show the breakdown of user and vendor respondents, respectively.
 - INPUT believes that these interviews represent an accurate account of European field service business conditions.
- The report continues INPUT's research and analysis in the area of field service, initiated in INPUT's 1978 U.S. multiclient study, <u>Maintenance Requirements</u> for the Information Processing Industry.

- 3 -

EXHIBIT I-1

NUMBER OF USER RESPONDENTS BY CELLS

NUMBER OF RESPONDENTS BY COUNTRY		
U.K.	57	
France & Italy	17	
Germany	24	
Benelux	19	
Scandinavia	16	

SIZES OF RESPON- DENT FIRMS (Number of Employees)		
0 - 50	7	
51 - 100	8	
101 - 200	16	
201 - 500	38	
Over 500	64	

NUMBER OF RESPONDENT SYSTEMS/UNITS		
IBM	92	
Honeywell	54	
Burroughs	10	
Univac	7	
NCR	9	
ICL	30	
DEC	13	
Siemens	15	
Others*	71	

RESPONDENTS BY TYPE OF SYSTEMS/ UNITS USED					
Large Systems	30				
Medium Systems	60				
Small Systems	31				
Minis & Micros	28				
Peripherals	55				
Terminals	63				
Word Processing	15 ·				

*CDC-3 Amdahl-1 Prime-3 Harris-1

Rediffusion-2 Ferranti-1 Hewlett-Packard-2 Vector-1 Data General-1

BASF-4 ITT-4 Olivetti-2 Raytheon-2 Wordplex-11 General Automation-1

Memorex-4 Datasaab-4 Racal-1 Nixdorf-3

STC-2 Lexitron-1 Wang-5 Metric-1

PET-1 TI-1 Ericsson-1 OKI-1 CPT-2

NAS-3 MOS-2 Transac-2

NEC-1 Datapoint-1 PCP-1 CMC-1

EXHIBIT 1-2

VENDOR RESPONDENTS

PRODUCTS MAINTAINED	Data Communications	Peripherals	Minicomputers	Peripherals, Terminals, Data Communications	Microcomputers	Data Communications	Large Systems, Medium Systems, Small Systems	Peripherals, Terminals, Data Communications	Medium, Small, Minicomputer Systems; Microcomputers, Peripherals, Terminals, Word Processors, Work Stations, and Data Communications	Large, Medium, Small, Microcomputer, and Minicomputer Systems, Peripherals, Terminals, Word Processors, Work Stations, and Data Communications	Small Minicomputer, Microcomputer Systems, Peripherals, Terminals, Word Processors, and Data Communications	Minicomputers	Medium Systems	Small Systems	Large Systems
AREA OF OPERATION	U.K.	U.K.	Holland	Europe	U.K.	U.K.	Europe	U.K.	U.K.	U.K.	U.K.	U.K.	ltaly	Europe	U.K.
SIZE OF COMPANY*	Small	Medium	Small	Large	Small	Medium	Large	Large	Medium	Large	Small	Medium	Small	Medium	Medium
TYPE OF VENDOR	Manufacturer	Manufacturer	Third-Party Maintenance	Manufacturer	Distributor	Manufacturer	Manufacturer	Manufacturer	Third-Party Maintenance	Manufacturer	Distributor/ Third-Party Maintenance	Manufacturer	Manufacturer	Manufacturer	Manufacturer
VENDOR	-	2	3	ħ	5	9	7	8	6	10	=	12	13	14	15

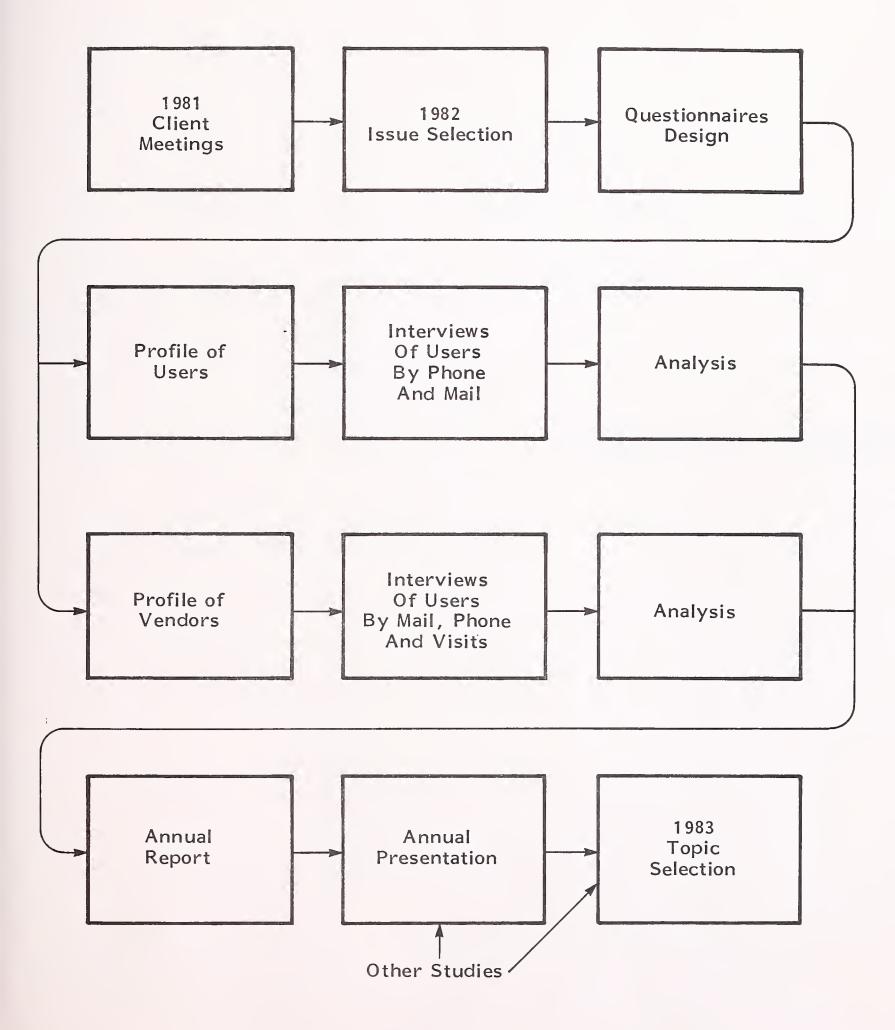
*Size based on number of field service personnel: Small = Less than 50; Medium = 51 to 200; Large = Over 200



- The overall methodology is described in Exhibit 1-3.
- Inquiries and comments from clients are invited, regarding both the context of this report and related topics of further interest.

EXHIBIT I-3

METHODOLOGY USED IN THE FIELD SERVICE PROGRAMME



-8-

A CONTRACTOR OF THE PROPERTY O

II EXECUTIVE SUMMARY



II EXECUTIVE SUMMARY

A. CONCLUSIONS

- I. THE INFORMATION TECHNOLOGY MARKETPLACE, 1982
- Despite very severe worldwide economic woes which have lingered throughout 1982, the demand for information processing equipment has been healthy in Western European markets and is expected to continue at a 20% annual growth rate.
 - The growth rate for equipment is expected to exceed that for maintenance because of the increase in microcomputers, which dilute maintenance revenues.
 - High interest rates which helped to curb inflation, but at the same time create unemployment, began to subside.
 - This stimulated capital spending at a rate to sustain demand for information processing equipment and services.
 - The West German market continues to be most successful while the French market is strained because of political pressures and devaluation of the franc.

- The markets in the United Kingdom and Italy have maintained strength established in 1980 and are expected to continue healthy expansion.
- Market metamorphosis was accelerated in 1982 because of the proliferation in microcomputer-based technology and products.
 - Office automation, and medium and small systems are beginning to replace large mainframes and systems.
 - Personal computers will overtake mainframes in terms of value shipped within the next two to three years when worldwide installations will approach 20 million systems.
 - Users are becoming more sophisticated, educating themselves in an effort to obtain the optimum end results through proper equipment and services.
 - Potential solutions to information handling have been discovered through network management and data communications.
 - Availability of protocol simulators and converters to link incompatible equipment has broadened users' choices.
 - The need for vertical market products (hardware and software) and corresponding planning, sales, marketing and support skills required to sustain growth rates are driving vendors to expand their products and services.
 - Competition in all information handling market sectors is growing keener.
- Field service has responded to these rapid and major changes in the market place with resiliency and flexibility.

- Service is finally being recognised as a business.
- Field service sponsored activities (e.g., maintenance, training, software, systems support) continue to expand in terms of new revenue opportunities.
- Productivity measures are being implemented with significant gains towards or enhancements of field service profitability.

2. FIELD SERVICE REVENUE GROWTH, 1982-1987

- Field service revenue is expected to grow at a diminishing rate, beginning at a projected rate of 15% from 1982 to 1983 and falling to a projected rate of 13% between 1986 and 1987.
 - Exhibit II-1 indicates that Western European field service revenue will be \$9.3 billion by 1987.
 - The average annual growth rate (AAGR) for the five-year period will be 14.4%.
- Diminishing growth rates for field service revenues result from both market and technical factors.
 - Competitive forces have given rise to greater elasticity in maintenance pricing.
 - Whereas previously users perceived no alternatives to the manufacturer's (or his agent's) service, this monopolistic characteristic has eased.
 - Third-party maintenance is growing as an acceptable alternative.
 - . Self-maintenance can also be achieved with more confidence.

EXHIBIT II-1

WESTERN EUROPEAN FIELD SERVICE MAINTENANCE REVENUE AND EMPLOYMENT FORECAST, 1982-1987

YEAR	FIELD SERVICE REVENUES (\$ millions)	NUMBER OF FIELD ENGINEERS (thousands)	MAINTENANCE REVENUE PER FIELD ENGINEER (\$ thousands)
1982	\$4,756	58	\$82
1983	5,488	61	90
1984	6,311	64	99
1985	7,220	67	108
1986	8,216	69	119
1987	9,301	72	129
AAGR	14.4%	4.6%	9.5%

AAGR = Average Annual Growth Rate

- Users are reducing the amount of shifts covered under maintenance.
- In at least two known and recent cases, users have rejected maintenance contracts with manufacturers and, instead, have bought insurance policies for their equipment from companies such as Lloyds of London.
- IBM has significantly reduced maintenance prices for System 370 hardware in response to greater competition.
- Degradation of maintenance revenues will also occur from technically derived stimuli.
 - Smaller, microprocessor-based systems will flourish and these do not have heavy maintenance prices.
 - . While, quantitatively, average sizes of equipment will be reduced, qualitatively, the systems will improve.
- Field service revenue per field engineer has increased, and will continue to,
 because of new maintenance and management techniques yielding greater productivity.
- The number of field engineers is expected to grow but at a slower rate than revenue.
- As the installed base migrates to newer products and lower maintenance charges, revenue deterioration will become a major challenge for field service managers.

3. FIELD SERVICE EXPENSES

 Field service has generally been the last or one of the last organisations in a vendor's firm to receive serious cost-cutting targets.

- Management has been careful to avoid constraints and restrictions regarding service.
- However, in a poor economic environment and with competitive and technical pressures evoking service revenue concerns, field service will no longer escape the budget cutting exercises that other departments suffer.
- Service managers must learn to make the necessary cost reductions without compromising the quality of service and, ultimately, customer satisfaction.
- Exhibit II-2 reflects the changing nature of field service costs as analysed on a per call basis.
 - The absolute cost of a typical call is expected to increase 16% in 1983 over 1982, and this is largely due to wage increases required to retain good technical personnel.
 - Direct labour and travel labour allocations of cost rise modestly, reflecting necessary new technicians to cover equipment in the field and support locations.
 - Spare parts and materials allocations do not change.
 - Travel expense will drop significantly, by 11%, reflecting less travel overall. More trouble-shooting will be done remotely, from a central support location.
 - Overhead and burden become excellent targets for cost cutting and this is reflected with a 6% decline.

EXHIBIT II-2

TREND ANALYSIS OF FIELD SERVICE COSTS PER CALL

COMPONENT	1983 PERCENT CHANGEOVER 1982
Average Cost	+16 %
Direct Labour	+ 3
Travel Labour	+ 6
Parts and Materials	0
Travel Expense	-11
Burden/Overhead	- 6
Number of Calls Per Engineer Per Week	+ 6

4. MAINTENANCE PRICING

- Because of competitive pressures, contract maintenance price increases will be restricted to 6.4% overall.
 - Exhibit II-3 provides a pricing analysis for 1982 and 1983 in terms of what the users and vendors separately perceive.
 - While a 7% price increase is expected by users, they are prepared to live with a 9.7% increase if pressed.
- Hourly per call rates will be increased by 9.5% from an average rate of \$63 in 1982 to \$69 in 1983.
 - Exhibit II-4 shows hourly rate analyses by country/currency.
 - Expected changes in rates range from \$31 to \$112 per hour in 1982 to \$32 to \$116 in 1983.

5. GROWTH OF SOFTWARE MAINTENANCE

- Systems software maintenance, now commonly (though not solely) the responsibility of the field service organisation, has yet to be fully exploited as a revenue base:
 - Only partial site development has been achieved for all the systems software options available on the hardware.
 - Many systems software items have service charges that are inappropriate to the ongoing development and error correction needed at the item's particular stage of development.

PRICING PERCEIVED BY USER AND VENDOR (percent)

PRICING	VENDOR THINKS	USER THINKS
The percent increase in maintenance prices over the past 12 months:		
All (Average)	5.7%	7.6%
By Country		
- U.K.	-	8.6
- W. Germany	-	6.3
- France	_	9.8
- Benelux	_	5.6
Forecasts of increase for next year:		
• All	6.4	7.0
By Country		
- U.K	-	8.2
- W. Germany	_	4.5
- France	_	9.6
- Benelux	_	5.7
Threshold of pain for next year:		
• All	11.0	9.7
By Country		
- U.K.	-	9.6
- W. Germany	-	8.1
- France	-	12.5
- Benelux	-	8.7

EXHIBIT II-4

AVERAGE CHARGE-OUT HOURLY RATE

	19	82	198	33
CURRENCY	AVERAGE	RANGE	AVERAGE	RANGE
Pound	£ 38	19-68	42	20-70
Dollar	\$ 63	31-112	69	32-116
Mark	163 DM	81-291	180	86-300
Franc	459Fr	229-822	508	242-846
Guilder	177Fls	89-317	196	93-326
Swiss Franc	140SwF	70-250	155	74-258
Krone	475	237-849	526	250-874

- Once the configuration sale has been made, salesmen do not target systems software sales, unless the user requests them or a particular hardware upgrade demands them.
- IBM alone has been successful in marketing systems software. Indeed, the complexity of options has resulted in overkill of user requirements in some cases (e.g., 4300 series where systems software library options need careful user screening if they are to be deleted from the chargeable items list).
- As vendors become more adept at focussing on this opportunity, systems software sales (and the maintenance revenue that goes with them) will rapidly increase over the 1983-1984 period.

6. PERSONNEL POLICIES

- Changes in the product mix, the move towards parts exchange/board swapout, and the establishment of software support centres and remote diagnostic centres are changing the nature and level of expertise field service organisations require. The need now is for:
 - Small numbers of highly specialised, highly experienced professionals to man support centres.
 - Many nonspecialised, low-level skilled engineers for site visits.
 - Small numbers of highly skilled engineers for on-site customer residency, where required.
 - Small numbers of highly experienced spares centres, diagnostic centres,
 and software support centre managers.
 - Small cadre of financial administrators and planners.

- Many of the administrative and managerial skills needed for these new structures will not be found in the current field service force. Promoting good engineers into managerial positions is usually a double disaster, turning a good engineer into a mediocre manager.
- Clear personnel policies that enable the current field service force to understand the changes that are carried out are vital to successful creation of the new structure. Otherwise dissatisfaction, defection, and widespread loss of morale can result in a confused field service staff.

B. RECOMMENDATIONS

I. LONG-RANGE PLAN

- Today's field service manager must develop long-range strategy plans with important considerations in mind:
 - Shorter average product life.
 - Accelerating change of product mix.
 - Increased responsibility of field service to overall company profitability.
 - Increased shortage of skilled manpower.
- IBM's new wave of aggression in all of its markets and its willingness to respond to competitive challenge with new technology products has accelerated product introduction from all vendors. This has resulted in a bewildering array of new, quasi-new, and patched-up (old) products on the market at a time of reduced sales and increased competition.

- From the field service manager's standpoint this means more small-volume specialised products with short sales lives which are added to the installed base. This is the exact contrary of the ideal service environment of a small number of very high-volume, standard products.
- This accelerating change in the product mix has its impact on the personnel skill mix, which must be planned for. Like it or not, the field service manager will also face company demands for still higher revenue and profit levels, and he should plan for these. Hardware maintenance prices can be increased without excessive user reaction if each increase is accompanied by perceived service improvements. These must be identified and planned for.
- Software maintenance revenue can also contribute heavily. Today's system
 software maintenance is vastly underpriced.
- Productivity plans must be constantly reviewed in the light of the need for improved profit levels.

2. FIELD QUALITY ASSURANCE (FQA)

- Quality commands a premium. It also improves morale of the user base and the company work force. Quality audits should be standard procedure for all field service organisations.
- While it is normal for field service managers to expect that personnel are concerned with quality, it is important to demonstrate management's preoccupation with this issue. Field staff must have the assistance and tools they need to improve their performance.
- FQA also demonstrates that vendor management believes users have a right to expect equipment to perform to specification, and to insure that all field change orders (FCOs) are implemented.

- It also provides field management with the opportunity to review contracts,
 equipment and parts inventories, branch manpower loading, reporting procedures, and communications with support centre and headquarters staff.
- Finally, the summary of FQA data guides management towards real problemsolving (as opposed to inventing new procedures that simply add to the backlog of nonfunctioning controls).

3. THIRD-PARTY MAINTENANCE (TPM)

- The concept of field service has been expanded from an overhead cost to a profit centre. Well and good, but field service can go far beyond that.
- Where an existing field service network has service skills that match products commonly found in a vendor's user base (or even another user base that is complementary in terms of market, sector, or long-term company goal), there is an opportunity to offer TPM service to that product base.
- This may be accomplished in contractual agreement with the manufacturer of the product or in competition with him. In all cases it should fulfill a <u>total</u> service and support role to the user base, compatible with the vendor company's business goals.
- Field service is accepted as a product. It should therefore be sold as such,
 aggressively and to the widest market possible.
- Arguments against such an approach that are based on 'impacting the quality
 of service to our own users' must be expected and refuted.
- Taking on an existing customer base of new products whose detailed composition and location are known in advance is far more profitable (and easier) than supporting a new sales campaign, which will produce installations at unknown intervals at unknown locations in unknown configurations.

4. SOFTWARE MAINTENANCE

- Systems software maintenance is a growing component of total service revenue, and will grow all the faster when prices are more compatible with the service rendered.
- Another aspect of software maintenance to examine is that of applications software, where the application is frozen in specification and requires substantial integration with systems software.
- In areas where this is possible, integrated maintenance support can cover hardware, systems software, and applications software.
- Some vendors are beginning to offer applications packages in vertical markets such as manufacturing, banking, and transportation (airlines mainly). In these areas, implementing integrated maintenance support is only a question of revising three separate contracts into a single contract.

5. CHANGE IN MAINTENANCE STRATEGIES

- Vendors can meet the new challenges of service in a variety of ways, including:
 - Attempts at educating the user to use central repair shops and 'return for repair' contracts.
 - Adding additional tiers of response levels/types of contracts.
 - Test marketing third-party module repair/delivery service.
 - Partial user self-maintenance.
 - Redundant hardware left on-site (e.g., extra terminal).

- User-purchased spares.
- Software support centres.
- Remote diagnostic centres.
- Facilities management service (of <u>all</u> equipment on-site from multiple vendors).
- Many vendors' cost control procedures still do not allow accurate monitoring
 of the impact of low-cost products on overall costs, and they are therefore not
 sure how big the problem is.
- Most vendors realise the need for accuracy, however. They have established
 or delegated profit centre responsibility within the field service organisation,
 and decentralised cost- and revenue-tracking.
- Organising for these changes in maintenance strategies is not easy, because it strikes at the heart of the traditional field service engineer skills profile.

III USER AND VENDOR ANALYSIS OF IMPORTANT SERVICE CONSIDERATIONS



III USER AND VENDOR ANALYSIS OF IMPORTANT SERVICE CONSIDERATIONS

A. GENERAL

- This chapter of the 1982 Field Service Annual Report for Europe concentrates
 on certain fundamental service issues.
- These important issues and considerations are analysed from two points of reference.
 - As stated earlier, the overall research for this report is based on both user and vendor data.
 - While surveys for user and vendor were different, several common points were incorporated into both survey instruments. These included basic parameters of maintenance service:
 - . System availability.
 - . Response time.
 - Repair time.
 - . Maintenance pricing.
 - Procedures.

- User ratings of important maintenance issues are compared to principal activities of field service managers.
- These issues are studied and compared, user versus vendor, to reveal priority compatibilities and anomalies.
- In addition to the analysis of these important service considerations, this chapter also provides a comprehensive user evaluation of 50 maintenance service vendors.
 - One analysis ranks vendors by type of equipment.
 - Another scores vendors' service by country.

B. USERS' RANKING OF SERVICE VENDORS

- I. EVALUATION BY TYPE OF EQUIPMENT/SERVICE
- Large systems, other mainframes, and peripherals are serviced well, according to users, as shown in Exhibit III-1.
 - IBM, often considered the standard for service towards which other service groups strive, scored well above average.
 - Their highest score was 8.1 in large systems.
 - Their lowest rating was 7.6 in the peripherals, terminals and word processor equipment categories.

USERS' RANKING OF SERVICE VENDORS BY TYPE OF EQUIPMENT

VENDOR	LARGE SYSTEMS	OTHER MAINFRAME	PERIPHERALS, TERMINALS, WORD PROCESSORS	SYSTEMS SOFTWARE	AVER- AGE
AES	-	8	_	-	8.0
Amdahl	10	_	_	-	10.0
BASF	8	-	9	-	8.5
Burroughs	7.5	6.4	6.5	7.3	7.0
CDC	-	8.0	_		8.0
CFM	8	-	8	-	8.0
CIT (AES)	-	-	7.5	-	7.5
Cii Honeywell Bull	7.5	5.5	5.8	8	6.7
Computer Maintenance (DEC)	-	9	8.7	-	8.3
СРТ	-	-	8.5	_	8.5
Datasaab	-	9	7	_	8.0
Data General	-	8	-	-	8.0
DEC	-	7.1	6.7	6.5	6.8
Electrobus (PET)	-	8	-	_	8.0
Ericsson	-	-	7.7	_	7.7
Ferranti	-	8	_	-	8.0
Gallis (CDC)	-	8	8	-	8.0
Geir (Datapoint)	-	-	4	_	4.0
General Automation	-	6	-	-	6.0
Harris	-	5	-	-	5.0
Hewlett-Packard	-	5.5	-	-	5.5

Rating: 0 = Poor, 5 = Average, 10 = Excellent

Continued



EXHIBIT III-1 (Cont.)

USERS' RANKING OF SERVICE VENDORS BY TYPE OF EQUIPMENT

VENDOR	LARGE SYSTEMS	OTHER MAINFRAME	PERIPHERALS, TERMINALS, WORD PROCESSORS	SYSTEMS SOFTWARE	AVER- AGE
Honeywell	6.5	5.8	6.4	6.7	6.4
IBM	8.1	7.7	7.6	5.9	7.3
ICL	7	6.2	5.9	7.8	6.7
ITT	-	- -	7	-	7.0
Krupp (IBM)	8	-	8	-	8.0
MDS	-	_	8	-	8.0
Memorex	_	-	8.1	-	8.1
Metric	-	10	10	-	10.0
MVS	-	-	_	7	7.0
NAS	8	7	7	_	7.3
NCR	6	7.7	6.3	6	6.5
Nixdorf	-	7	8	3	6.0
Olivetti	-	9	-	-	9.0
Paragon	4	_	-	_	4.0
Prime	_	7.3	7	5	6.4
Racal	-	8	-	-	8.0
Raytheon	-	-	8	-	8.0
Rediffusion	-	7.5	-	-	7.5
Scan Data	-	7		-	7.0
Siemens	-	9.1	8.3	2.8	6.7
Sperry Univac	-	8	7.2	6	7.1

Rating: 0 = Poor, 5 = Average, 10 = Excellent

Continued

EXHIBIT III-1 (Cont.)

USERS' RANKING OF SERVICE VENDORS BY TYPE OF EQUIPMENT

VENDOR	LARGE SYSTEMS	OTHER MAINFRAME	PERIPHERALS, TERMINALS, WORD PROCESSORS	SYSTEMS SOFTWARE	AVER- AGE
SMS (IBM)	_	7	5	-	6.0
STC	-	-	7.5	-	7.5
Systime	-	7	-	_	7.0
TEK	_	7	8	-	7.5
ті	_	-	5	-	5.0
TPM (IBM)		8	_	-	8.0
Transac	_	8	8	-	8.0
Wang	-	_	7	_	7.0
Average	7.4	7.5	7.2	6.0	7.0

Rating: 0 = Poor, 5 = Average, 10 = Excellent

- Amdahl, BASF, Siemens, Olivetti, CPT, Prime, Sperry Univac, CDC,
 Nixdorf, Data General, Ferranti, Racal, NAS were also rated successfully for hardware maintenance by users.
- Companies who were rated highly in one category of hardware but lower in others included Burroughs, Cii Honeywell Bull, Datasaab, Honeywell, ICL, NCR, and DEC.
- Third-party maintenance companies and distributers generally received acceptable ratings.
 - Gallis, CFM, Krupp, and TPM received good ratings.
 - Paragon and Geir received the lowest ratings (4).
- Systems software maintenance and support, while generally at acceptable levels, according to users, is significantly below hardware ratings.
 - Even IBM has a problem with software service, relative to their very good hardware service rating.
 - Siemens, too, was rated highly for hardware but just "fair" for software.
 - Nixdorf, like Siemens, is rated well for hardware service but not for software.
 - Cii Honeywell Bull and ICL provide good software service.

2. EVALUATION BY COUNTRY

- All countries receive good field service, based on results summarised in Exhibit III-2.
 - There is very little differentiation, according to users.

USERS' RANKING OF SERVICE VENDORS BY COUNTRY

VENDOR	UNITED KINGDOM	FRANCE	GERMANY	BENELUX	SCANDINAVIA	ITALY	AVER- AGE
AFS	8	_	_	-	-	_	8.0
Amdahl	10	_	_	_	_	_	10.0
BASF	10	-	8	9	_	_	9.0
Burroughs	6.8	-	-	-	8	_	7.4
CDC	-		_	-	8		8.0
CFM	8	-	_	-	_		8.8
CIT (AES)	7.5	-	_	-	_	_	7.5
Cii Honeywell Bull	-	6.4	6	7.4	6.5	-	6.6
Computer Maintenance (DEC)	8	_	_	-	-	_	8.5
СРТ	-	-	-	-	8.5	-	8.0
Datasaab	9	-	_	-	5	-	7.0
Data General	_	-	6	-	10	-	8.0
DEC	7.5	8	-	6.5	_	5.5	6.9
Electrobus (PET)	-	-	_	-	8	-	8.0
Ericsson	-	7	-	7	_	-	7.0
Ferranti	-	-	_	8	_	-	8.0
Gallis (CDC)	-	-	_	-	8.0	-	8.0
Geir (Datapoint)	_	-	4	-	_	-	4.0
General Automation	-	-	-	-	-	6	6.0
Harris	5	-	-	-	-	-	5.0

Rating: 0 = Poor, 5 = Average, 10 = Excellent

Continued



EXHIBIT III-2 (Cont.)

USERS' RANKING OF SERVICE VENDORS BY COUNTRY

VENDOR	UNITED KINGDOM	FRANCE	GERMANY	BENELUX	SCANDINAVIA	ITALY	AVER- AGE
Hewlett-Packard	6	_	·_	5	-	-	5.5
Honeywell	6.4	-	_	-	_	6.8	6.6
IBM	7.4	7	7.8	7.2	7.9	5.7	7.2
ICL	6.1	6.8	4	8.2	-	-	7.0
ITT	8	4	-	9	7	_	6.8
Krupp (IBM)	-	-	8	-	-	-	8.0
MDS	8	-	8	-	-	-	8.0
Memorex	6.8	9.5	8	8	-	-	8.1
Metric	_	-	-	-	10	-	10.0
MVS	_	-	-	7	-	-	7.0
NAS	-	7.3	7	8	-	-	7.4
NCR	6	-	7.3	-	7	-	6.8
Nixdorf	_	-	8	5	6	-	6.3
Olivetti	-	-	-	-	8	8	8.0
Paragon	-	-	-	-	4	-	4.0
Prime	8	7	-	-	6.3	-	7.1
Racal	8	_	-	-	-	-	8.0
Raytheon	-	-	-	8	-	-	8.0
Rediffusion	7.5	-	-	-	-	-	7.5
Scan Data	7	-	-	-	-	-	7.0
Siemens	-	-	6.4	7.5	_	-	7.0

Rating: 0 = Poor, 5 = Average, 10 = Excellent

Continued

EXHIBIT III-2 (Cont.)

USERS' RANKING OF SERVICE VENDORS BY COUNTRY

VENDOR	UNITED KINGDOM	FRANCE	GERMANY	BENELUX	SCANDINAVIA	ITALY	AVER- AGE
Sperry Univac	6.1	8	9	-	7.7	-	7.7
SMS (IBM)	-	6	-	-	-	-	6.0
STC	-	9		6	-		7.5
Systime	-		-	7		-	7.0
TEK		8	-		~~	7	7.5
TI	_	-	-	-	5	-	5.0
TPM (IBM)	-	8	-		~~	-	8.0
Transac	-	_	-	8	-	-	8.0
Wang	6	_	-		-		6.0
Average	7.4	7.3	7.0	7.3	7.2	6.7	7.2

Rating: 0 = Poor, 5 = Average, 10 = Excellent

- The variation of all country average scores is small.
 - . United Kingdom: 7.4.
 - . France and Benelux: 7.3.
 - Scandinavia: 7.2.
 - . Germany: 7.0.
- Italy is new to INPUT's 1982 analysis, and the relatively low score of 6.7 for users' satisfaction with service is still above average.
- Germany, among the group of veteran countries studied for service quality, is relatively low, but reflects the very high ideals of its expectations for maintenance.
- Among the winners, by country, are:
 - Amdahl and BASF in the U.K.
 - DEC, TEK, TPM, Sperry Univac, STC in France.
 - BASF, Cii Honeywell Bull, Siemens, Transac, and ICL do a good service job in the Benelux countries.
 - Burroughs, CDC, CPT, Data General, Gallis, IBM, Metric, and Sperry Univac are quite favourably received in Scandinavia.
 - Olivetti triumphs in the Italian market.
- Companies that should seek to improve service are as follows:
 - Cii Honeywell Bull in France and Germany.

- Data General in Germany.
- Digital Equipment in Italy.
- Geir (Datapoint) in Germany.
- General Automation and IBM in Italy.
- Honeywell in the U.K.
- ITT in France.
- NCR, Sperry Univac, and Wang in the U.K.
- Nixdorf in Benelux and Scandinavia.
- Paragon, Prime, and TI in Scandinavia.
- Home-based service companies are subject to more criticism, except for Italy.

C. SYSTEM AVAILABILITY

- Exhibit III-3 shows that in all cases vendors think they are currently providing better systems availability than users think they are.
 - The difference of opinion is not enough to alarm vendors of large systems.
 - The gap between what users and vendors believe for the remaining types of equipment is a revelation that vendors should definitely be cognizant of.

USERS' AND VENDORS' PERCEPTIONS OF CURRENT SYSTEM AVAILABILITY (percent uptime)

TYPE OF EQUIPMENT	VENDOR THINKS HE PROVIDES:	USER THINKS VENDOR PROVIDES:
Large Systems	97.7%	96.7%
Medium Systems	97.4	93.5
Small Systems	98.5	91.6
Minicomputers	98.4	91.2
Peripherals	98.1	92.7
Terminals	99.0	92.9
Word Processors	98.0	93.7

- Vendors overestimate the minimum acceptable uptime that users will accept,
 as shown in Exhibit III-4.
 - Service managers think that minimum system availability for every type of equipment should be higher than do their user counterparts.
 - All availability figures exceed 90% and users usually have alternative means by which to compensate for at least 7% to 8% downtime. This takes the form of:
 - Equipment back-up.
 - . Extra spare parts.
 - On-site field engineers•

D. RESPONSE TIME

- Users see better overall response times currently from vendors than vendors think they offer. Exhibit III-5 summarises this.
 - Users believe they are getting better response for:
 - Medium systems.
 - . Peripherals.
 - . Terminals.
 - Users perceive worse response times than vendors think they provide for:

USERS' THRESHOLD OF UNACCEPTABLE UPTIME AS PERCEIVED BY USER AND VENDOR (percent uptime)

TYPE OF EQUIPMENT	VENDOR THINKS USERS WILL ACCEPT A MINIMUM OF:	USERS SAY THEIR BOTTOM LIMIT IS:
Large Systems	97.0%	94.6%
Medium Systems	94.9	93.2
Small Systems	97.5	93.5
Minicomputers	95.0	93.7
Peripherals	95.0	92.9
Terminals	97.5	88.9
Word Processors	98.0	95.6

RESPONSE TIMES CURRENTLY PROVIDED BY VENDORS AS PERCEIVED BY VENDORS AND USERS (in hours after notification)

TYPE OF EQUIPMENT	VENDORS THINK THEY PROVIDE:	USERS THINK VENDORS PROVIDE:
Large Systems	2.0	2.0
Medium Systems	2.5	1.9
Small Systems	2.0	2.3
Minicomputers	2.8	4.0
Peripherals	12.9	. 2.0
Terminals	3.5	2.7
Word Processors	3.0	4.0
Average	4.1	2.7

- . Small systems.
- . Minicomputers.
- . Word processors.
- Users and vendors agree that a two-hour response time for large systems is what is currently provided.
- While users did not comment on microcomputers, vendors believe they currently offer a 4.5 hour response time.
- Minimum expectations of response times are perceived differently between user and vendor, as shown in Exhibit III-6.
- The overall average is misleading because of the 15-hour expected response time for peripherals as perceived by vendors.

E. REPAIR TIME

- Exhibit III-7 indicates diverse opinions about length of time to repair systems,
 as perceived by users and vendors.
- With the exceptions of word processors and peripherals, users believe that repairs are accomplished in less time than vendors think they are.
- The most significant disparity is in large systems where the perceived repair times are 0.8 hour and 2.9 hours for users and vendors respectively.
 - The 1.1 hour differential may be accounted for by 'behind the scenes' repair activity by the vendor which the user doesn't see.

RESPONSE TIME MINIMUM EXPECTATIONS (in hours after notification)

TYPE OF EQUIPMENT	USER THINKS MINIMUM IS:	VENDOR THINKS THAT USERS' MINIMUM IS:
Large Systems	1.6	1.5
Medium Systems	2.0	2.0
Small Systems	3.0	2.0
Minicomputers	4.6	1.5
Peripherals	2.0	15.0
Terminals	3.3	3.5
Word Processors	4.0	4.0
Average	2.9	4.2

MEAN TIME TO REPAIR AS PERCEIVED BY USER AND VENDOR (in hours)

TYPE OF EQUIPMENT	USERS BELIEVE IT TAKES:	VENDORS BELIEVE IT TAKES:
Large Systems	0.8	2.9
Medium Systems	1.3	2.3
Small Systems	1.7	2.5
Minicomputers	3.0	3.8
Peripherals	2.3	1.5
Terminals	2.3	3.0
Word Processors	4.3	3.5
Average	2.2	2.8

- One example of this is technical assistance provided to the site engineer from a product support centre.

F. PRICING

- When it comes to pricing of maintenance, the disparities between user and vendor are minimal.
- The user is accustomed to vendors' price increases and has caught on to the pattern of regular price increases.
- Users think they received an overall price increase of 7.6% last year while vendors think they increased prices by 5.7%, as shown in Exhibit III-8.
 - Users think they will receive a 7% increase in maintenance prices while vendors plan to increase prices by 6.4%.
 - Users previously conditioned to a monopolistic maintenance market, are now (because of more competition) prepared to pay only 9.7% while vendors continue to think maintenance prices are inelastic. Vendors think users will withstand an 11% increase.

G. SERVICE FUNCTION PRIORITIES FROM USER AND VENDOR PERSPECTIVES

- Exhibit III-9 shows a very close correlation between vendor and user priorities regarding important maintenance issues.
 - The correlation is close between:
 - Vendor and user.



EXHIBIT III-8

PRICING PERCEIVED BY USER AND VENDOR (percent)

PRICING	VENDOR THINKS	USER THINKS
The percent increase in maintenance prices over the past 12 months:		
All (Average)	5.7%	7.6%
By Country		
- U.K.	-	8.6
- W. Germany	-	6.3
- France	-	9.8
- Benelux	-	5.6
Forecasts of increase for next year:		
• All	6.4	7.0
By Country		
- U.K.		8.2
- W. Germany	-	4.5
- France	-	9.6
- Benelux	-	5.7
Threshold of pain for next year:		
• All	11.0	9. 7
By Country		
- U.K.	-	9.6
- W. Germany	_	8.1
- France	-	12.5
- Benelux	-	8.7

VENDOR AND USER PRIORITIES

	1 9	81	1982	
ACTIVITY/ISSUE	VENDOR PRIORITY	USER PRIORITY	VENDOR PRIORITY	USER PRIORITY
Equipment Reliability	1	1 *	1	2
Response Time	2	3	2	3
System Availability	4	1*	3	1
Repair Time	3	4	Ц	4
Price of Maintenance	5	5	5	5
Work Force Stability and Retention	6	6	6	7
Escalation Procedures	7	7	7	6

Rating: 1 = Important, 10 = Not Important

*Tie

- By year to year; i.e., 1981 versus 1982.
- Equipment reliability is the highest priority, overall, by users and vendors alike.
- System availability is the highest priority for users. Vendors do not view it as high but are rapidly learning its importance.
- Response time ranks next in importance for users and vendors.
- Low priority items, as viewed by vendor and user alike, are such mundane activities as escalation procedures and work force stability and retention.

IV VENDOR ANALYSIS



IV VENDOR ANALYSIS

A. ANALYSIS OF VENDOR FINANCIAL PERFORMANCE

- I. REVENUE, BUDGETS, AND PROFITS, 1982-1983
- 1982 was a successful year for Western European field service managers,
 despite slowing equipment sales caused by international economic stress.
 - Creativity and ingenuity by field service helped foster timely new service methods.
 - The continued implementation of these new service techniques and products provided valuable contributions to cost reduction and revenue enhancement.
 - The established revenue base, especially middle-aged equipment which is cheaper to maintain, also contributed to field service profits.
- The average field service manager now handles a budget in excess of \$8.5 million and expects to increase this by 10% in 1983. Revenue increases are expected to exceed cost increases by a factor of two so that gross margins will improve significantly.

- Averages such as those shown in Exhibit IV-I are useful for overall evaluations
 of vendor performance, but the individual company performances vary
 considerably.
- Field service, as an industry, is still accommodating a steady flow of new (small) suppliers but the greater part of the revenue and profit growth comes from the large established vendors.
- Gross margins averaged 18.5% of revenue in 1982 and are expected to improve more than six percentage points in 1983 to 25.3%.
- Profit before tax, nearly 13% in 1982, is also expected to improve significantly in 1983.
- Revenue and profitability comparisons are highlighted in Exhibit IV-2.
 - European field service managers expect revenue to increase by 20.5% in 1983.
 - INPUT forecasts the revenue increase more conservatively, at 15.4%, owing to the presence of more price competition and more reliable products, as well as user controlled maintenance options.
 - Budgets are expected to increase by 10.4% which basically provides for little organizational expansion.
 - The increase in budgets is largely for salary increases.
 - Gross margins and profit before tax are expected to increase by 6.8% and 3.7% respectively, according to field service managers.
 - INPUT believes these changes will be extremely challenging,
 especially in view of difficulty in meeting revenue plans.

EXHIBIT IV-1

SUMMARY OF RESPONDENT VENDOR FINANCIALS

	KRONE	1983	860,6 DKr	95,549	71,380	25.3%	16.4%
		1982	714.4 DKr	79,312	64,636	18.5%	12.7%
	SWISS FRANC	1983	253.6 Swf	28,152	21,031	25.3%	16.4%
		1982	210.5 Swf	23,368	19,044	18.5%	12.7%
	NC GUILDER	1983	321.0 Fls.	35,649	26,632	25.3%	16.4%
		1982	266.6 Fls.	29,591	24,116	18.5%	12.7%
ENCY		1983	833.0 Fr	92,489	69,094	25.3%	16.4%
CURRENCY	FRANC	1982	691.6 Fr	76,772	62,566	18.5%	12.7%
	MARK	1983	294.9 DM	32,742	24,460	25.3%	16.4%
	MA	1982	244.8 DM	27,178	22,149	18.5%	12.7%
	LAR	1983	\$113.5	12,623	9,430	25.3%	16.4%
	DOLLAR	1982	\$94.3	10,478	8,539	18.5%	12.7%
:	POUND	1983	£68.0	7,650	5,715	25.3%	16.4%
	POL	1982	£57.2	6,350	5,175	18.5%	12.7%
		COMPONENT	TOTAL SAMPLE REVENUE (millions)	AVERAGE FIELD SERVICE REVENUE (thousands)	AVERAGE FIELD SERVICE BUDGET (thousands)	AVERAGE FIELD SERVICE GROSS MARGIN (percent)	AVERAGE FIELD SERVICE PROFIT BEFORE TAX (percent)

Note: Currency based on pound sterling rates 11/11/82

Guilder = 4.66 Swiss Franc = 3.68 Krone = 12.49 Dollar = 1.65 Mark = 4.28 Franc = 12.09



EXHIBIT IV-2

PERCENT CHANGE 1983 VERSUS 1982

Average Field Service Revenue	+20.5
Average Field Service Budget	+10.4
Average Field Service Gross Margin	+ 6.8
Average Field Service Profit Before Tax	+ 3.7

SOURCE: Vendor Interviews

- Average revenue generation per field engineer is shown in Exhibit IV-3.
 - Average field service revenue per field engineer is expected to increase 35% between 1982 and 1983, according to European field service managers.
 - This seems too ambitious in view of other estimates provided by European service managers.
 - If revenues increase 20.4%, as predicted by field service managers, and field service engineers grow at 3%, a 35% increase in revenue per field engineer is not possible.
 - INPUT believes a more realistic growth rate for revenue per field engineer is 13%.

2. FIELD SERVICE REVENUE SOURCES

- An analysis of the activities that contribute to field service revenue focuses upon the areas of opportunity open to field service managers, as shown in Exhibit IV-4.
 - Currently, the placement of hardware at a customer site, whether for initial installation, upgrade, or relocation, gathers more revenue for field service than systems software; this is because either field service organisations do not maintain systems software, or software maintenance is bundled into hardware, license, or other categories.
 - Only 13% of the field service organisations polled receive credits from the sales organisations for service concessions provided to the user by sales.
 - A slightly larger percentage (20%) allows field service to handle supplies sales. Customers find it more convenient to purchase supplies

AVERAGE REVENUE PER FIELD ENGINEER (thousands)

CURRENCY	1982	1983
Pound	£ 50.2	67.7
Dollar	\$ 82.8	111.7
Mark	214.9DM	289.8
Franc	606.9Fr	818.5
Guilder	233.9Fls	315.5
Swiss Franc	184.7SwF	249.1
Krone	627.0Dkr	845.1

SOURCE: Vendor Interviews

SOURCE OF FIELD SERVICE REVENUE, 1982

·	PERCENT		
COMPONENT	Respondents	Average Contribution	Range
Hardware and Spares	100%	46%	40-100%
 Installation, Relocation, and Upgrades 	60	5	3-15
Credits from Sales	13	2	4
 Training and Documentation 	33	3	5
• Supplies	20	4	5-7
• Systems Software	13	23	40
Applications Software	20	17	30

SOURCE: Vendor Interviews

from field service personnel than from a salesman since service engineers are at the site more often than salesmen.

- Systems software maintenance has the potential to be the fastest growing single source of field service revenue over the next five years, as more and more vendors transfer this responsibility to field service. This requires organisational planning.
- Applications software is unlikely to follow the same course, remaining with either the user, third-party software house, or vendor support divisions outside field service.

3. TYPICAL FAULT CALL COSTS, 1982-1983

- The analysis of the average cost of a fault call is of value to field service managers since it pinpoints areas of potential savings and tells them how well they are performing in relation to their competitors.
- Maintenance charges are becoming an important part of the user's decision process at sales time and, in conjuction with equipment performance, are already significant to his ongoing satisfaction as a customer.
- The pressure on the field service manager to maintain or improve profitability levels translates into cost control, since revenue is not under his control.
- Exhibit IV-5 analyses the per call costs for all equipment categories, giving the average dollar cost of a fault call and the proportion of this cost that is spent on labour (direct and travel), parts and materials, travel expense, and overhead. Finally the average number of these calls per FE is shown for the vendor sample.

COST BREAKDOWN OF A TYPICAL FAULT CALL

COMPONENT	1982	1983	PERCENT CHANGE
Average Cost (dollars) *	\$262	\$305	+16%
Direct Labour (percent)	32%	33%	+ 3%
Travel Labour	18%	19%	+ 6
Parts and Materials	23%	23%	0
Travel Expense	9%	8%	-11
Burden/Overhead	18%	17%	- 6
Number of Calls per Engineer per Week	9.7	10.3	+ 6%

^{*} Other currencies: (based on rate of exchange 11/11/82)

AVERAGE COST	1982	1983
Pound	£159	£185
Mark	681 DM	792 DM
Franc	1,922 Fr	2,237 Fr
Guilder	741 Fls.	862 Fls.
Swiss Franc	585 Swf	681 Swf
Krone	1,986 DKr	2,311 DKr

- 4. PROFIT AND LOSS (P/L) VERSUS COST CENTER
- In 1982, P/L center operation began for a large number of field service organisations, raising the overall proportion of vendors operating this way to 80%, as shown in Exhibit IV-6.
- This proportion has constantly risen since INPUT's first European field service study in 1980.
- Attention is now centred on how much P/L control is delegated down the line.
 This can be a partial delegation only.
- The significance of this delegation is fourfold:
 - It pinpoints problem operations.
 - It sensitizes local management to the P/L issue, and creates new goals for them to target.
 - It upgrades the image and status of local managers in their own eyes and broadens their skills.
 - It increases company-wide P/L control through finer analysis.
- A rising proportion of mature vendors have pushed the P/L delegation all the way to branch level. Summary P/L control is retained by the next superior level in all cases.

PROFIT AND LOSS OR COST CONTROL DELEGATION

Profit and Loss	80%
Cost Control	20

Profit/Loss Delegation		
Headquarters	58%	
Regional	33	
District 17		
Branch 25		
Note: Categories are multiple choice and are not mutually exclusive,		

Source: Vendor Interviews

COSTS AND REVENUE TRACKING

- Tracking costs and revenue, long the cornerstone of field service controls, has been taken all the way down to site within customer for 20% of the vendors interviewed, as shown in Exhibit IV-7.
- The next superior level does not always exercise control; i.e., control at product level does not imply control at product line level (in fact, it very often implies no product line control).
- The installations controlled at the customer level are generally large or very large customers. Nevertheless, INPUT expects this practice to extend down the installed base over the next five years.
- A minority of vendors continue to withhold control at the field service regional or country level avoiding heavy administrative/reporting load at these points.

6. ACCOUNTING TREATMENT OF SPARE PARTS

- There is a broad range of methods for handling spare parts from an accounting standpoint, both within each category of vendor and from category to category.
- Only 13% of vendors inventory all parts; most expense them below certain values (e.g., \$50, \$100). The average values are shown in Exhibit IV-8.

COSTS AND REVENUE TRACKING

PERCENT ACTIVE
13%
27
13
20
7
7

Source: Vendor Interviews

Note: Categories are multiple choice and are not mutually exclusive.

ACCOUNTING TREATMENT OF SPARE PARTS, ALL SYSTEMS

Parts are expensed when they are less than the values shown.

CURRENCY	VALUE AVERAGE	VALUE RANGE
Pound	£ 82	5-170
Dollar	\$ 135	8-280
Mark	351DM	21-728
Franc	991Fr	60-2,055
Guilder	382FIs	23-792
Swiss Franc	302SwF	18-626
Krone	1,024DKr	62-2,123

B. ORGANISATION AND STAFFING

1. FIELD SERVICE REPORTING

- The growth of field service revenue in relation to overall company revenue and the proportion of margin contributed by field service continues to promote the reporting level of field service organisations.
- More and more field service operations now have the ear of corporate planning and top management. This is likely to have far-reaching effects on product quality and the marketing of field services in the near future.

2. FIELD SERVICE PERSONNEL DISTRIBUTION

- The total sample of 15 vendors interviewed included a large proportion of small- and medium-sized field service organisations (average 1982 field service revenue \$10 million).
- As a result, the average distribution by function is weighted towards smaller organisations where overhead functions are a higher percentage of total field service personnel.
- Exhibit IV-9 shows the average distribution of responsibilities of the 1982 sample.
 - The overall growth trends are significant: faster growth in the number of technical support engineers than in engineers.
 - This reflects the trend towards more central and sophisticated technical talent to support board swapping engineers.

FIELD SERVICE PERSONNEL DISTRIBUTION BY FUNCTION

	1982	1983	CHANGE (percent)
Average Number Field Service Employees	335	345	3.0%
- Average FS Engineers	236	242	3.0
- Average Technical Support Engineers	22	26	18.2
- Average FS Administrators	28	28	0
- Average FS Supervisors	29	29	0
- Average Field Line Managers	20	20	0

Total Sample: 15 Vendors

- The sample also showed no change in the increase in the average percentage of total field service staff that at any one time is on a training course: in both 1982 and 1981 this was 17%.
- The number of customer sites with resident engineers is also not expected to increase, and sites serviced by remote diagnostics will grow by eight times according to respondents.
- Meanwhile the number of branch offices is expected to increase by 12.5% in 1983.

3. TYPICAL FIELD SERVICE SALARIES

- The 1982 survey established salary ranges for two new categories of field engineering staff who operate out of support centres:
 - Hardware technical support engineers.
 - Software technical support engineers.
- Salary increases in 1982 were dropped to an average of 11.8% from 14% in 1981. Reduced inflation and employment in field service and other industries have meant stagnant salaries.
- In 1982, software specialists in technical support were the most favourably treated category as added emphasis on the integration of systems software maintenance with hardware maintenance gathered pace, as shown in Exhibit IV-10.
- Qualified and senior engineers also received good increases, while more mature supervisors and line managers' increases fell, reflecting the poor economy and "golden handcuff" syndrome. "Golden handcuffs" describe employees who are locked into company policies and benefits, including pay, because of their age; i.e., they are too old to change jobs even if dissatisfied.

AVERAGE SALARY RANGES BY FUNCTION

	AVERAGE YEARLY SALARY 1982	RANGE OF SALARY	PERCENT INCREASE	
FUNCTION	(\$ thousands)	(\$ thousands)	1981	1982
Trainee Engineer	\$12.5	\$10.5-14.5	12.5%	9.9%
Qualified Engineer	13.5	12.5-17.1	14.1	12.5
Senior Engineer	16.6	11.6-13.2	14.3	12.4
Technical Support Hardware	21.6	18.3-23.4	14.1	11.9
Technical Support Software	18.8	14.4-20.5	15.0	13.5
Supervisor	20.9	17.5-23.1	14.7	12.0
Line Manager	24.0	22.3-29.5	13.6	10.9

Source: Vendor Interviews

- 4. FIELD ENGINEERING PERFORMANCE INDICATORS/MEASUREMENT TECHNIQUES
- Real improvements have been implemented by field service management in responding to users' concerns: 48% of respondents' companies said that performance of first-line managers was based on customer satisfaction, as expressed in user surveys commonly carried out on a semiannual or quarterly basis, as shown in Exhibit IV-II.
- Financial criteria are also important, accounting for 35% of all criteria mentioned.
- While customer satisfaction is an important measure, employee satisfaction is also taking on an increased importance.

C. FIELD SERVICE PRICING

- PRICING METHODOLOGY
- The pricing nethodology used by vendors is easily classified into three major areas:
 - Cost-based pricing (bottom up).
 - Sales value-based pricing (top down).
 - Market-based pricing (either IBM price umbrella, competition, or "what the market will bear").
- Exhibit IV-12 shows the relative importance of each of the above three areas.
- Exhibit IV-13 provides hourly rate ranges and averages for 1982 and 1983.

FIRST-LINE MANAGERS' PERFORMANCE MEASUREMENT

RANK	CRITERION	INCLUDES	PERCENT OF ALL MENTIONS
1	Customer Satisfaction	System performance, customer satisfaction, repeat calls, MTTR/ MTBF,* response time	48%
2	Financial	Revenue, costs, P & L, direct versus indirect, receivables, overtime to base, asset to revenue ratio	35
3	No Measure		. 10
4	Employee Satisfaction	Attrition rate, employee satisfaction	7
			100%

^{*}Mean Time to Respond/Mean Time Between Failures

MAINTENANCE PRICING METHODOLOGY

RANK	CRITERION	PERCENT OF ALL MENTIONS
1	Percent of Hardware Sales Price*	32%
2 (tie)	Cost of Service	27
2 (tie)	Competition	27
4	Other (corporate guidelines, nature and value of support required)	14
	TOTAL	100%

* Maintenance as a percent of hardware sales price

Range: 7.6% to 16.0%

Median: 9.0%
Mean: 10.6%

AVERAGE CHARGE-OUT HOURLY RATE

	19	82	1983		
CURRENCY	AVERAGE	RANGE	AVERAGE	RANGE	
Pound	£ 38	19-68	42	20-70	
Dollar	\$ 63	31-112	69	32-116	
Mark	163 DM	81-291	180	86-300	
Franc	459Fr	229-822	508	242-846	
Guilder	177Fls	89-317	196	93-326	
Swiss Franc	140SwF	70-250	155	74-258	
Krone	475DKr	237-849	526	250-874	

- Margin adjustment of costs varies from vendor to vendor: some add a gross margin between 25% and 40% to fully burdened costs; some multiply direct costs by 300%; others start from basic costs, work up to standard maintenance hours per device or system, and then multiply by hourly charge-out rates per engineer.
- Sales value percentages (varying from 7.6% to 16%) are often used at the initial stage of a product's launch when actual field repair costs are not known.
 Thereafter adjustments are made on a cost-plus basis.
- A significant proportion of vendors simplify the whole process to 'a percentage
 of sales value per month' and hope that revenue more than offsets costs.
- The percentage of sales price can be finely tuned by high-frequency breakdown items, vintage of products maintained, complexity of equipment, density of installed base, or service delivery method.
- Some service managers can control geographic dispersion of products based on service costs: 'if we can't break even at competitive maintenance rates, we won't sell the product.'
- Others have adopted a more subtle approach taking into account not only costs, competition, and percent of sales value, but also level of support (value customer receives), cost of delivering that level of service, and the impact of maintenance charges on the customer's cost of ownership.

2. MAINTENANCE PRICING BY EQUIPMENT CATEGORY

- Exhibit IV-14 depicts respondents' assessments of current maintenance pricing,
 by equipment category and expressed as a percentage of hardware purchase price.
 - Large and medium systems' maintenance costs to the user, per year, are 5% of the hardware equipment price.

MAINTENANCE PRICING

EQUIPMENT CATEGORY	AVERAGE PURCHASE PRICE (\$ thousands)	AVERAGE MONTHLY MAINTENANCE CHARGE (\$ hundreds)	AVERAGE ANNUAL MAINTENANCE AS PERCENT OF PURCHASE
Large Systems	\$1,400.0	\$6,000	5.0%
Medium Systems	800.0	3,300	5.0
Small Systems and Minicomputers	58.5	521	10.7
Microcomputers	2.0	20	12.0
Peripherals	6.0	45	9.0
Terminals	1.0	10	12.0
Word Processors	5.0	50	12.0
Data Communications	5.9	39	7.9

SOURCE: Vendor Interviews

- Data communications, peripherals, small systems, and minicomputer maintenance costs to the user are 7.9%, 9%, and 10.7% respectively.
 - A spokesman for a very large international minicomputer manufacturer predicts minicomputer maintenance will become 3% of hardware equipment price within the next two years.
 - This is due to increasing pricing competition and new products which will have 'five times current reliability.'
- Microcomputers', word processors', and terminals' maintenance cost users 12% of the product cost.
- Contractual price change notification periods, price increases, and expectations are summarised in Exhibit IV-15.
 - Depending on equipment type, prices are expected to increase in 1983 by about 4% on average, ranging from 0 to 12%.
 - Users are thought by vendors to be willing to accept an average next price increase of about 8%.

3. PRICE REDUCTIONS BY DELIVERY MODE

- One important aspect of maintenance costs to vendors is the mode of delivery of the service; e.g.:
 - Carry-in/mail-in (by user).
 - Device swapout (by user).
 - Pickup and delivery (by third party).
- Another aspect is special conditions that help reduce vendor costs; e.g.:

EXHIBIT IV-15

PRICING, TERMS, AND EXPECTATIONS

PERCENT INCREASE THAT WOULD BE UNACCEPTABLE	RANGE	0	× 13%	No Data	5-10	1	12-16	16	I	15-20
PERCENT THAT WO	AVERAGE	0	× 13%	No Data	9	l	14	16	ì	18
T INCREASE NEXT ONTHS	RANGE	-25% to +7%	12	No Data	4-5	0	8-10	0-10	0	0-15
FORECAST INCREASE FOR NEXT 12 MONTHS	AVERAGE	4%	12	No Data	4.5	0	6	Ŋ	0	4
INCREASE LAST ONTHS	RANGE	0-7%	13-15	No Data	5-13	0	0-10	0	0	0-15
PERCENT INCRE IN LAST 12 MONTHS	AVERAGE	™ 0/0	14	No Data	7	0	Ω	0	0	.
NOTIFICATION PERIOD TO INCREASE PRICES	RANGE	30 Days- 12 Months	90 Days.	30-90 Days	30-90 Days	30 Days	30-120 Days	30-90 Days	30 Days	30-90 Days
NOTIFICATION TO INCREASE	AVERAGE	90 Days	90 Days	60 Days	70 Days	30 Days	90 Days	60 Days	30 Days	90 Days
	CATEGORY	Large Systems	Medium System	Small Systems	Minicomputers	Microcomputers	Peripherals	Terminals	Word Processors	Data Communications

- Cluster maintenance (multiple systems at one site).
- User self-maintenance.
- Self-installation for terminals.
- Vendors were asked what level of reductions they apply to each of these, and the results are summarised in Exhibit IV-16.
- Carry-in/mail-in by users obviates the need for an on-site visit by the vendor.
 It also implies that the user accepts reduced response time due to transportation delays and does not expect immediate repair.
- Compensation offered to users for these vendor cost reductions is high,
 averaging 40% of normal service rates.
- Device swapout allies to self-diagnosing equipment (or remotely diagnosed equipment), where user staff replaces the failed part with an equivalent from a kit of spares left for this purpose by the vendor. A further refinement of this situation is for the customer to purchase the kit of spares.
- Cluster maintenance reductions recognise the benefit to the vendor of single visits for multiple systems. This is partially returned to the customer as a rebate.
- User self-maintenance covers a wide range of self-service, and the range of
 discounts is correspondingly wide. At one end of the scale it is another name
 for device swapout, and at the other end it is full responsibility for equipment
 service with the vendor as parts wholesaler.
- Self-installation of terminals ('plug in and play') deserves a 50% reduction off the service price.

PRICE REDUCTIONS BY DELIVERY MODE

DELIVERY MODE	PERCENT OF VENDORS OFFERING	AVERAGE PERCENT REDUCTION OFFERED
Carry-In/Mail-In Device Swapout	20% 7	40% 0
SPECIAL CONDITIONS		
User Self-Maintenance	10	13
Cluster Maintenance	7	20
Self-Installation (Terminals)	7	50

^{*} While 7% of vendors surveyed offer device swapout, it is considered part of normal service and is not discountable.

4. MARKETING OF FIELD SERVICE CONTRACTS

- Today's market shows a trend towards partial customisation of service contracts to each category of user. Single contract service is principally found in startup situations (new vendors) or in new markets (e.g., personal computers).
- The packaging of service, as a product, and the attendant analysis of competitive offerings are traditional marketing functions. For this reason many vendors, after deciding to market field services, place the responsibility in the hands of marketing/sales.
- This is not a good solution to the problem. Marketing/sales perceive field service as a necessary evil - the concept of marketing such a service does not come easily.
- Marketing/sales' understanding of field service is limited; how can they meaningfully package a product that they do not understand? The motivation for field service product marketing campaigns (and for sales to sell clean service contracts) is not yet established.
- On the other hand, it is not advisable to give field service the entire responsibility for marketing its products: the workings of marketing are as strange to field service as field service is to marketing.
- It appears that most vendors have come to the same conclusions:
 - Fifty percent of responding vendors make field service <u>and</u> marketing jointly responsible for marketing field service products.
 - Twenty-eight percent place the responsibility solely in the hands of field service.
 - Twenty-two percent make marketing responsible.

D. EQUIPMENT DISTRIBUTION BY TYPE OF ENVIRONMENT

- A key aspect of designing reliability into any product is the definition of the quality of the environment in which the product is expected to perform. Environmental factors such as heat, humidity, and power source can change within the limits defined for the environment.
- Increased use of information processing equipment outside the controlled environment of the DP room presents equipment designers and maintainers with new challenges to sustain or improve reliability.
- A summary of equipment distribution by type of environment is shown in Exhibit IV-17.

E. FIELD SERVICE MANAGEMENT PERFORMANCE

- In order to assess the performance of field service management over the 1981–1982 period, the principal problem areas that field service managers spent their time on in 1981–1982 were identified.
- Their own evaluation of their success in solving problems found in the 1981 survey was then obtained along with qualitative assessment of improvements in equipment system availability response/repair times and mean time between failures.
- Finally the field service manager's view of the most significant field service industry developments in 1981 was tabulated against anticipated developments in the year in progress.

EQUIPMENT DISTRIBUTION BY TYPE OF ENVIRONMENT (percent)

EQUIPMENT CATEGORY	DP ROOM	OFFICE	PLANT/FACTORY
Mainframes	88%	12%	0%
Small Business Systems	25	64	11
Minicomputers	29	51	20
Microcomputers	2	91	7
Word Processors	5	92	3
Executive Workstations	2	78	13
Peripherals	60	25	15
Terminals	1	79	20
Data Communications	45.	40	15

Source: Vendor Interviews

- I. PRINCIPAL ACTIVITIES FOR FIELD SERVICE MANAGERS, 1981-1982
- The rating of 15 key activity areas of field service managers was assessed on a scale of 1 = 10w, 10 = high.
- Fourteen of these activity options were fixed by the questionnaire, but a consistent mention in the 'other' category was promoting new maintenance business.
- The top vendor priority in 1982, as shown in Exhibit IV-18, has shifted from reliability, which is still a major concern, to efforts to gain new business.
- Reliability is a design issue directly affecting field service profitability and, in the users' eyes, company image and product competitiveness.
- This has always been the case, but in earlier years the pressures of market share expansion in a buoyant computer market no doubt relegated it to a position of lesser importance.
- In today's tight market, competitiveness, responsiveness, and profit have combined to bring reliability to the fore.
- Response time also continues to be an important issue. Whether this takes the form of on-site visit, remote diagnostic, or concerned telephone call, the important thing to the user is that he feels his problem is known to the vendor and is being processed.
- In both 1981 and 1982 the next problem in terms of time spent by field service management was system availability, a user-driven issue.
- The other issues selected by field service management have not changed significantly in 1982 from the positions held in 1981.
- They are a combination of vendor-sensitive and user-sensitive issues:

PRINCIPAL ACTIVITIES OF FIELD SERVICE MANAGERS IN 1982 AND PLANS FOR 1983

	CLASSIFICATION BY AMOUNT OF TIME SPENT IN YEAR		
ACTIVITY	1982	1983	
Promoting New Maintenance Business	4.67	8.00	
Equipment Reliability	7.00	7.71	
Response Time	6.85	7.40	
System Availability	6.58	7.23	
Repair Time	6.77	6.93	
Price of Maintenance Services	5.92	6.79	
Retaining Engineers	5.69	6.40	
Escalation Procedures	4.23	6.00	

Source: Vendor Interviews

Rating: 1 = Low, 10 = High



- Repair time: user-driven.
- Retaining engineers: vendor-driven.
- Price of maintenance services: user- and vendor-driven.
- Escalation procedures: user-driven.

2. SUCCESS IN RESOLVING 1981 PROBLEMS

- In this analysis, field engineering managers were asked to rate themselves on their own efficiency in dealing with (and resolving) key 1981 issues.
- This has to be a somewhat subjective analysis. No single problem was rated at less than five (average success), which clearly suggests that field service managers have a high opinion of their success at handling problems.
- Exhibit IV-19 suggests the following in conjunction with Exhibit IV-18.
 - A lot of time was spent over the 1981-1982 period concentrating on new business opportunities. The keen interest in data communications suggests that network management and control is a potential new business opportunity for service vendors.
 - Customer satisfaction and meeting his demands was successfully addressed using response time, availability, and repair time criteria.
 - Likewise, living within budget limitations was a high priority, encompassing, indirectly, most of the principal activities concerning the field service manager.
 - The field service work force was stabilised, engineers were trained in new products and techniques, overall technical competence was im-

EXHIBIT IV-19

FIELD SERVICE MANAGERS' EVALUATION OF THEIR SUCCESS IN HANDLING PROBLEMS

RELATIVE SUCCESS	PROBLEM	AVERAGE ACTUAL RATING*	IMPLE- MENTED (percent)	PLANNED (percent)
1	Maintaining Data Communications Products	8.80	79%	0
2	Living within Budget Limitations	8.42	86	14%
3	Recruiting Field Service Engineers	7.58	86	7
4(tie)	Meeting Customer Demands	7.54	100	0
4(tie)	Providing Competitive Salary/ Compensation	7.54	93	0
6	Reducing Turnover of Staff	7.30	71	0
7	Training Field Service Engineers	7.15	93	7
8	Improving FE Technical Competence	6.23	93	0
9	Making Adequate Diagnostic Equipment Available	6.10	71	0
10	Reducing Spare Parts Shortages	5.92	100	0
11	Improving Product Quality	5.90	71	0
12	Providing Adequate Remote Diagnostics	5.57	57	14
13	Marketing Field Service	5.30	71	7
14	Maintenance Products through Distributors	5.25	21	0

*Rating: 1 = Low, 10 = High

SOURCE: Vendor Interviews

proved, and staff were retained to a satisfactory degree by concentrating more on their needs.

- Some difficulties were experienced in improving product quality; this has now become a hot topic within corporate planning.
- Spare parts shortages continue to be of concern.
- A significant number of vendors (71%) now have a dedicated field service marketing staff, which enhances their objectives to seek new business opportunities.
- Only a small number (21%) of the vendors employ distributors for product maintenance, and those that do are not satisfied with the results.
- Having examined the current problems of field service managers and analysed their success in handling 1981 issues, the next section analyses their influence and involvement as managers in critical issues within their respective organisations.
- 3. INVOLVEMENT AND INFLUENCE OF FIELD SERVICE MANAGEMENT IN CRITICAL ISSUES, 1981-1982
- The influence wielded by field service managers can be evaluated by looking at the crucial issues that they were involved in during 1981 and 1982, and the importance they themselves attached to those issues.
- This evaluation covers several issues that coincide with problem areas and others that are more policy/decision-oriented. This section answers the question of where field service managers have influence.
- Exhibit IV-20 summarises field service managers' evaluations of their influence in various issues.

INFLUENCE OF FIELD SERVICE MANAGEMENT ON CRITICAL ISSUES, 1981-1982

ISSUE	1981 RATING*	1982 RATING
Selection of Test Equipment	4.15	5.23
Spare Requirements Levels	6.00	6.64
Pricing of Field Service	6.14	6.21
Contractual Terms/Acceptability	4.71	5.43
Sale of Field Services	4.43	5.00
Serviceability Design	1.64	2.36
Site Environment Acceptability	3.79	4.43
User Education	2.77	3.67
Equipment Specification	2.30	3.25
Nonbuilt-in Diagnostics	2.00	2.45
Built-in Diagnostics	2.09	2.73
Order Acceptance	3.64	4.43
Equipment Design	1.18	1.73
Geographical Marketing	2.83	3.33

*Rating: 1 = Low, 10 = H

Source: Vendor Interviews

- Pricing of field service and spare requirements levels remain top areas of influence in 1982 as they were in 1981. Although the key issue governing response time, geographical marketing (or where the sales force is allowed to sell products), is still not heavily influenced by field service management, this is improving.
- Added emphasis was applied to contracts and sales in 1982, positioning field service to become more influential in defining and exploiting new business opportunities.
- A rating of below five underscores issues where field service management has minor influence, and a number of key field service issues are included:
 - Equipment specification.
 - . Equipment design.
 - · Order acceptance.
 - . Serviceability design.
 - Site environment.
 - User education.
 - Diagnostics.
 - Geographical marketing.
- However, all of these issues improved their rating in 1982 over 1981, showing that the necessity of involving field service management in the issues has become apparent.

- 4. FIELD SERVICE PERFORMANCE, 1981, AND PLANS FOR 1983
- The service provided to customers was measured for 10 categories of equipment by system availability, response time, repair time, and MTBF.
- Current values and expectations for 1983 were obtained for each of these and (with the exception of MTBF) the vendor's own judgement of what users would accept as a minimum.
- Exhibit IV-21 summarises the findings for system availability:
 - Users' minimum requirements, as perceived by vendors, are exceeded in all categories of equipment except word processors, which currently have minimum acceptable availability.
 - Vendors do not intend to improve 1983 availability for small systems, minicomputers, microcomputers, word processors, and executive workstations.
 - Modest improvements are expected in large and medium systems, peripherals, and terminals.
 - Data communications is the only category where system availability is expected to decrease in 1983.
- Next, average response times were examined. Exhibit IV-22 analyses the findings. In each case the data refer to the vendor's view, not the user's:
 - Only service vendors for microcomputers, peripherals, word processors, and executive workstations are within the user requirements.
 - A user tolerance of 15-hour response time for peripherals reflects builtin system redundancies utilising peripheral switches.

VENDORS' RESPONSE ON SYSTEM AVAILABILITY

	SYSTEM AVAILABILITY (percent)				
EQUIPMENT CATEGORY	CURRENT	ESTIMATE 1983	MINIMUM USER WOULD ACCEPT		
Large Mainframes	97.7%	98.8%	97.0%		
Medium Mainframe	97.4	97.8	94.9		
Small Business Systems	98.5	98.5	97.3		
Minicomputers	98.4	98.4	95.0		
Microcomputers	97.0	97.0	96.0		
Peripherals	98.1	98.5	95.0		
Terminals	99.0	99.6	97.5		
Word Processors	98.0	98.0	98.0		
Executive Workstations	99.0	99.0	99.0		
Data Communications	98.5	99.3	97.1		

EXHIBIT IV-22

VENDORS' VIEW OF RESPONSE TIME

	AVERAGE RESPONSE TIME (HOURS)				
EQUIPMENT CATEGORY	CURRENT	ESTIMATE 1983	USER EXPECTATION		
Large Mainframes	2.0	2.0	1.5		
Medium Mainframes	2.5	2.5	2.0		
Small Business Systems	2.0	2.0	2.0		
Minicomputers	2.8	2.5	1.5		
Microcomputers	4.5	8.0	8.0		
Peripherals	12.9	10.0	15.0		
Terminals	3.5	4.0	3.5		
Word Processors	3.0	4.0	4.0		
Executive Workstations	3.0	4.0	4.0		
Data Communications	7.3	3.8	8.0		

- The remainder of equipment response times are at or below minimum expectations with little improvement, and some degradation, expected in 1983.
- Lastly, vendor repair times and MTBF were examined, and Exhibit IV-23
 summarises the findings:
 - Vendors of all equipment categories expect to equal or improve their repair times in 1983.
 - Average MTBF values show no significant improvement over 1981.
- 5. MOST SIGNIFICANT FIELD SERVICE ISSUES, 1981-1983
- The most significant issues and accomplishments reported by vendors for 1981 are quoted in Exhibit IV-24.
 - The main themes reflect successful identification and implementation of plans to address new technology, and customer as well as productivity pressures.
 - These statements also demonstrate the increasing stature and sophistication within business environments.
- The pressing problems of the future, as described in Exhibit IV-25, show that field service managers are perceptive in identifying and managing their own organisational and operating weaknesses.
 - The lack of remote diagnostic resources, previously noted, will be addressed by 42% of the respondents.
 - Pricing problems, including erosion, will be critical. Field service managers have focused on these and are, as usual, expected to derive suitable options and alternatives.

EXHIBIT IV-23

VENDORS' RESPONSE ON REPAIR TIME AND MEAN TIME BETWEEN FAILURES (MTBF)

	REPAIR TIME (hours)		
EQUIPMENT CATEGORY	CURRENT	ESTIMATE 1983	AVERAGE MTBF (hours)
Large Mainframes	2.9	2.4	600
Medium Mainframes	2.3	2.0	450
Small Business Systems	2.5	2.5	650
Minicomputers	3.8	3.0	450
Microcomputers	1.0	1.0	1,500
Peripherals	1.5	1.4	2,250
Terminals	3.0	1.5	2,825
Word Processors	3.5	2.0	650
Executive Workstations	1.0	1.0	2,000
Data Communications	1.2	1.1	3,375

EXHIBIT IV-24

MOST SIGNIFICANT ISSUES, 1981

- 'For field service to become profitable.'
- Opening repair centre service points that include walk-in/mail-in.
- 'Seventy percent of repairs are now board exchange.'
- 'The awareness that field service can be a significant business opportunity.'
- 'The integration of micros into computing plans of major organisations.'
- 'Moving into more diverse fields of maintenance taking on maintenance of other manufacturers' equipment.'
- 'Explosive growth and hiring high-level skills.'
- 'Setting up of regional support centres allowing quicker response to customers' software queries, thus giving a form of remote diagnostics.'
- 'Holding down maintenance costs to the user.'
- Training of engineers, spare parts how they are controlled for low inventory, price pressures from customers, third-party maintenance, and remote diagnostics.
- 'Escalating running costs car hire, petrol costs, subsistence,
 etc. requiring a certain amount of curtailment in expansion plans
 and substantial increase in engineer and department productivity.'



EXHIBIT IV-25

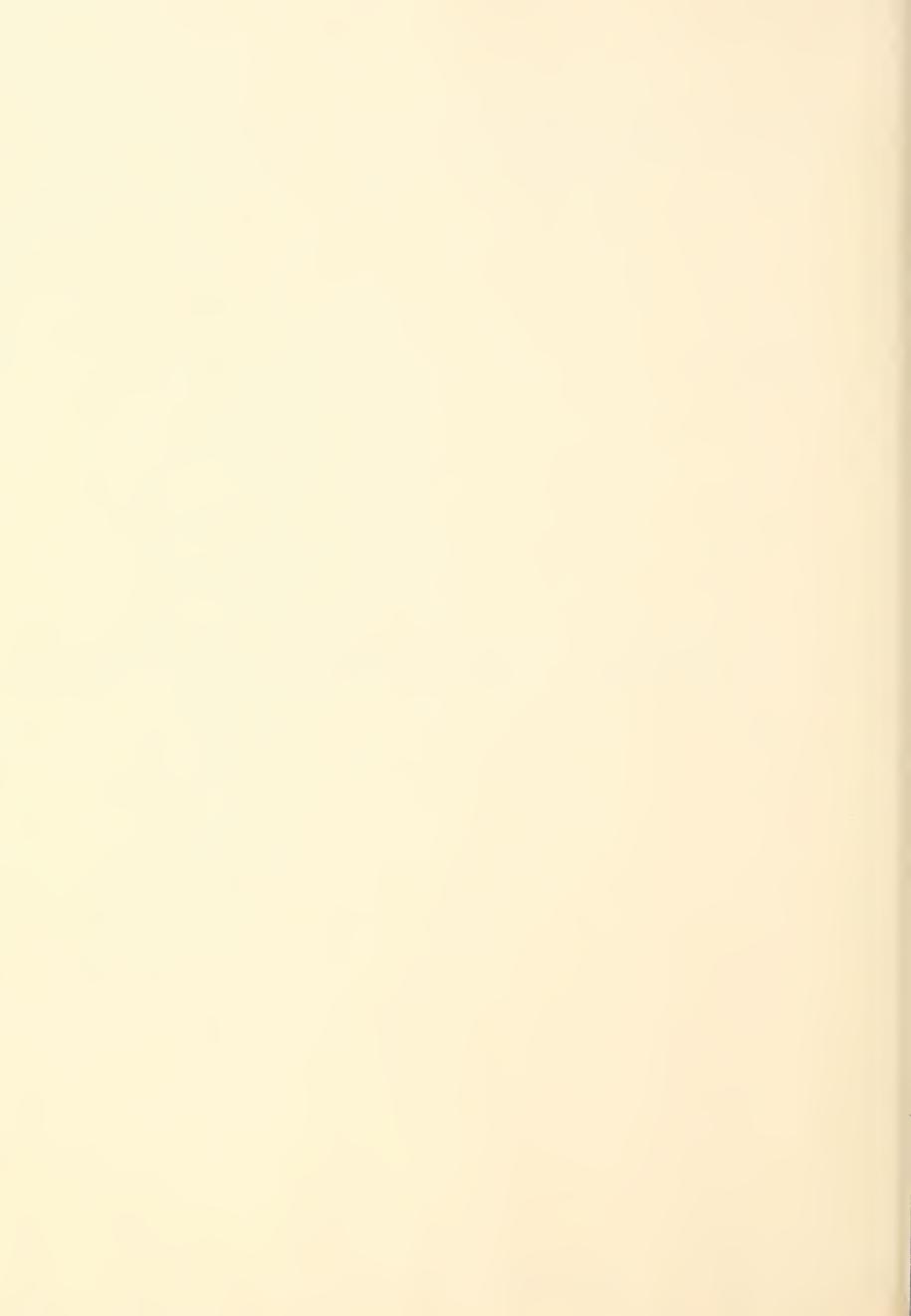
MOST SIGNIFICANT ISSUES, 1982-1983

- 'Remote diagnostics.' (42% of respondents)
- 'Maintenance price erosion.' (17% of respondents)
- 'Involvement in mini/micro products, incident management.'
- 'User first-level maintenance.'
- 'Aggressive marketing of maintenance.'
- 'Awareness that maintenance price increases will not substitute for bad business planning by maintenance organisations.'
- 'Costs and quality.'
- 'Improved reliability of products due to customer engineering getting involved at design stage.'
- 'To increase engineer productivity by moving engineers closer to customers and increasing repair staff productivity.'
- 'Increased use of mixed hardware.'
- 'Nothing that hasn't already happened.'



- New business areas have been highlighted previously, and field service groups are ready to identify and exploit these.

APPENDIX	A: UNITED	KINGDOM	USER DA	A T A B A S E

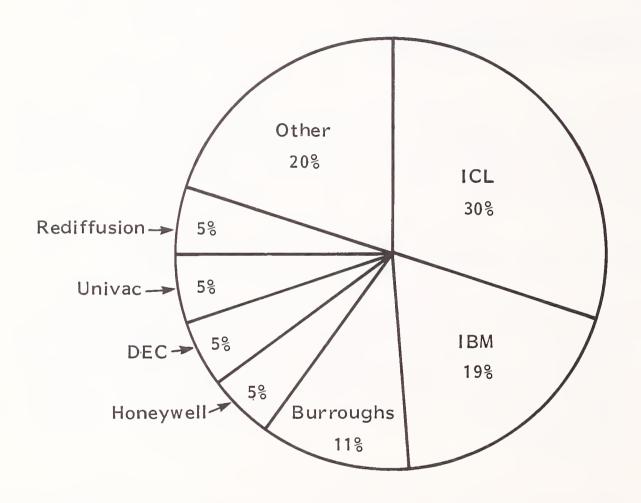


APPENDIX A: UNITED KINGDOM USER DATABASE

A. COMPARISON: 1982 VERSUS 1981

- The 1982 U.K. user database incorporates data from 1981 as well as 1982 and thereby provides valuable planning information regarding trends and major changes in users' opinions.
- Significant variations between 1981 and 1982 are noted as follows:
 - While ICL and IBM continue to dominate the U.K. market, this dominance is gradually eroding as a result of newer and smaller mainframe vendors making inroads in the marketplace. Exhibit A-I shows the market, as perceived by respondents to the survey, for maintenance.
 - Users are becoming more sensitive and more conservative about maintenance price increases. Exhibit A-2 shows this and the fact that they expect lesser price increases in the future.
 - Comparing serviceability (response and repair times), the actual median response and repair times decreased in nearly 70% of the cases, reflecting better methods of service and increased customer demand.

RESPONDENTS' VIEW OF MAINFRAME MAINTENANCE VENDORS IN THE UNITED KINGDOM



USERS' SENSITIVITY REGARDING MAINTENANCE PRICE INCREASES IN THE UNITED KINGDOM (percent)

LEVEL OF INCREASE	1 981	1982
Actual Increases As Perceived By Users (Last 12 Months)	11.5%	8.6%
Expected Increases (Next 12 Months)	10.5	8.2
Unacceptable Level Of Increase	15.3	9.6

- Users expect to decrease their contracted shift coverage by 10% in 1982.
- Over half of the key maintenance issues were downgraded in importance to users. These were as follows:
 - . Remote diagnostics.
 - . User self-maintenance.
 - . Preventive maintenance.
 - Stable engineer population.
 - Escalation procedures and price of maintenance.
- Remote diagnostics decreased in importance while increasing in quality, reflecting effective vendor development and implementation.
 - The reduced interest in the other issues means that users are less anxious about service than they were and are more concerned about their own internal problems.
- Software maintenance, systems and applications, had the most significant changes, all positive, in terms of perceived quality.
- Exhibit A-3 summarises key changes in the user database.

B. KEY SERVICE ISSUES

• Exhibit A-4 provides a candid opinion from users regarding key maintenance issues.

SIGNIFICANT CHANGES IN USERS' OPINIONS OF SERVICE QUALITY, UNITED KINGDOM - 1982 VERSUS 1981

	SERVICE CATEGORY	PRODUCT CATEGORY	CHANGE*	CONCLUSIONS
	Remote Diagnostics	Systems Software Maintenance	+2.5	Vendors are
	Quality of Engineers' Management	Applications Software Maintenance	+2.4	doing a better
	Forecast of Quality of Maintenance in 1983	Applications Software Maintenance	+2.3	job with software
	Quality of Engineer	Applications Software Maintenance	+2.1	maintenance.
Ξ	Overall Quality of Maintenance	Applications Software Maintenance	+1.9	
IVE	Forecast of Quality of Maintenance in 1983	Systems Software	+1.5	
TIS	Remote Diagnostics	Medium System	+1.4	
PO:	Remote Diagnostics	Peripherals	+1.3	
	Value for the Money (Maintenance)	Small Systems	+1.3	
	Value for the Money (Maintenance)	Applications Software	+1.2	
	Quality of Information	Applications Software	+0.8	
	Quality of Maintenance	Medium Systems	+0.7	
	Value for the Money (Maintenance)	Large Systems	+0.7	
	Remote Diagnostics	Large Systems	1.	Lack of trained
3/	Quality Engineers' Management	Small Systems	-1.2	field engineers
/IT	Value for the Money (Maintenance)	Minicomputers	•	may be the
C.A	Quality of Engineer	Minicomputers	-0.9	problem for these
NE	Quality of Information	Minicomputers	-0.8	negatives.
	Quality of Engineer	Small Systems	9 0-	

*On a Scale of 1 to 10

USER CONSENSUS REGARDING KEY SERVICES ISSUES FOR THE UNITED KINGDOM

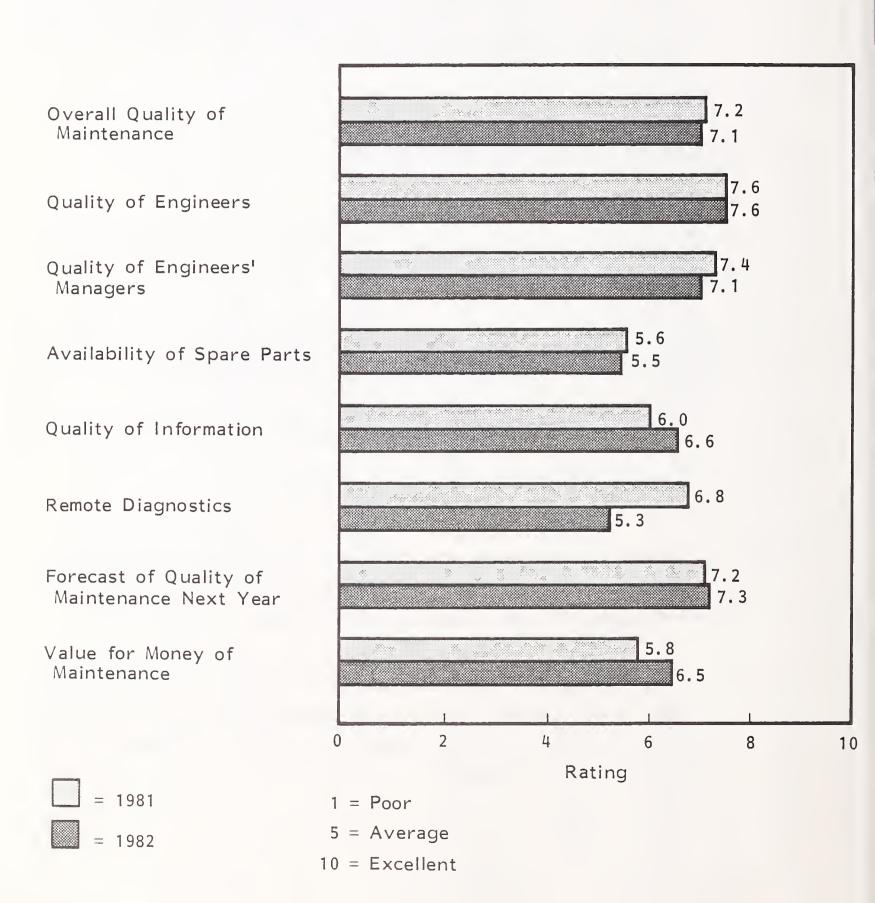
USER REPLY	'Performance', 'competitiveness', 'cost of moving to another supplier', 'percent of capital price', 'none', 'pay asking price', 'inflation rate'.	Two-thirds of users feel PM is necessary (evil). The remainder feel neutral or negative about PM.	11% do receive discounts. 89% do not receive discounts.	61% of users feel positive about remote diagnostics. 23% are negative. 16% remaining are neutral.	Two-thirds of users are not considering third-party maintenance service because of a variety of reasons: vendor loyalty, fear, lack of spares,. The others are considering third-party from a cost basis.	'Lack of spares', 'recurring problems', 'downtime', 'it fails again right after they (field service) leave', 'blaming others', 'cost too hight', 'failure right after PM', 'lack of trained FE's', 'lack of follow-up on premises', 'lack of engineer understanding', 'repeat failures'.
CONCERN	Guidelines for Evaluating Cost of Maintenance	Attitude Towards Preventive Maintenance (PM)	Users Receiving Maintenance Price Discount	Attitude Towards Remote Diagnostics	Considering Third-Party Maintenance	Annoyances Regarding Maintenance

- Relatively few users (11%) receive maintenance discounts. Vendors in the U.K. should anticipate more pressures to discount service.
- One-third of U.K. users are contemplating third-party maintenance.
- Vendors should also beware that third-party maintenance may become more desirable and feasible as user firms grow restless with some manufacturers' service and pricing.

C. USER SATISFACTION WITH MAINTENANCE

- Exhibits A-5 through A-12 provide specific details of user satisfaction with maintenance.
- Exhibits A-13 through A-20 indicate users' perception of service using a different comparison from, but the same data as, the previous analysis.
 - Users are generally satisfied with the overall quality of service.
 - All ratings are between average and excellent.
 - The lowest 1982 rating was 5.8 (5 = average) for other minicomputers. This results from the lack of trained technical resources where the demand for service engineers exceeds the supply.
 - The biggest improvement between 1982 and 1981 was in the overall quality of applications software maintenance. The rating went from 4.2 to 6.1, indicating vendors' responsiveness to users' requests for improved application support.

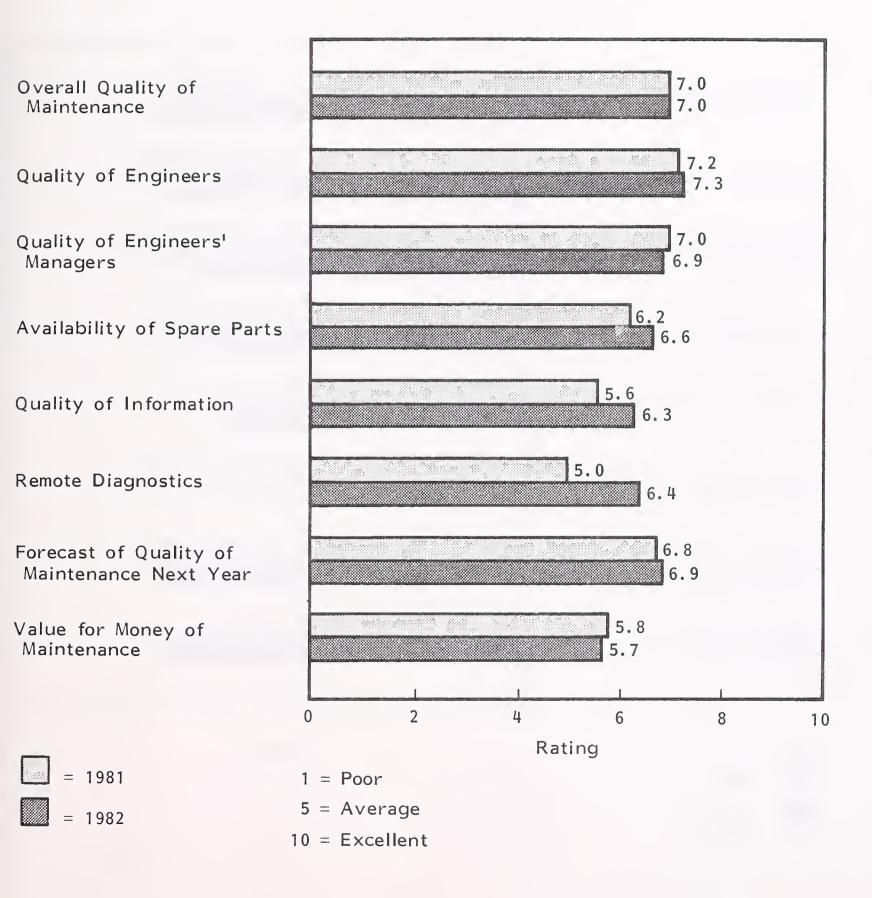
USER SATISFACTION WITH MAINTENANCE OF LARGE MAINFRAME SYSTEMS IN THE UNITED KINGDOM





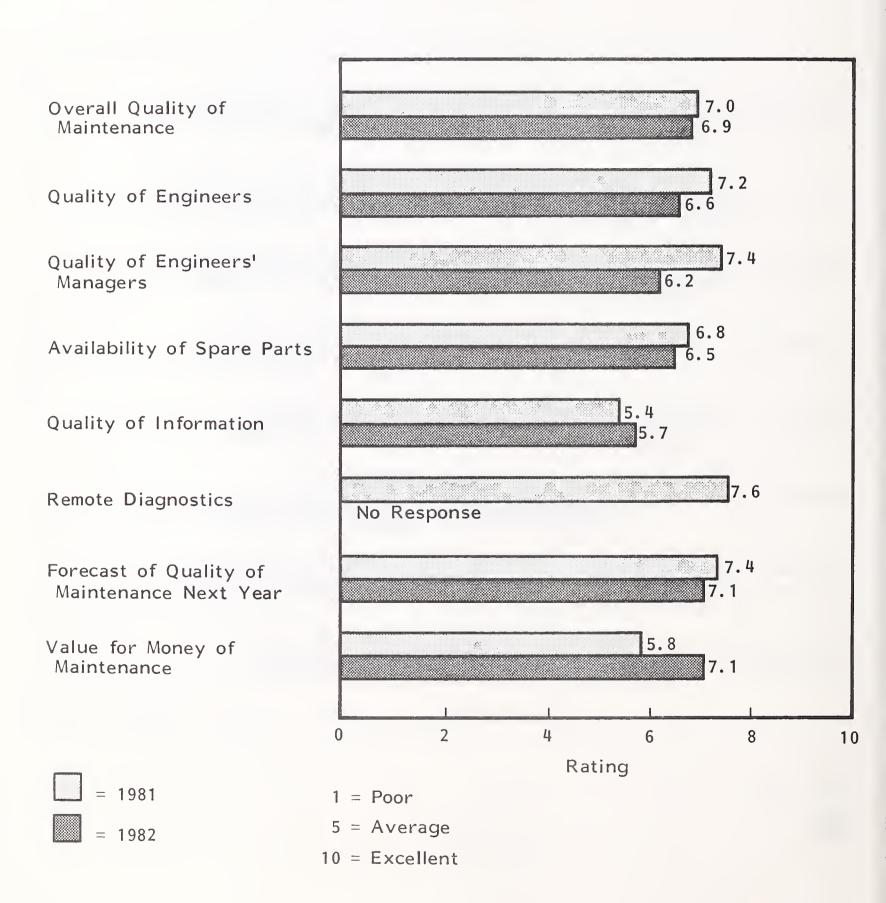
FAE2

USER SATISFACTION WITH MAINTENANCE OF MEDIUM MAINFRAME SYSTEMS IN THE UNITED KINGDOM



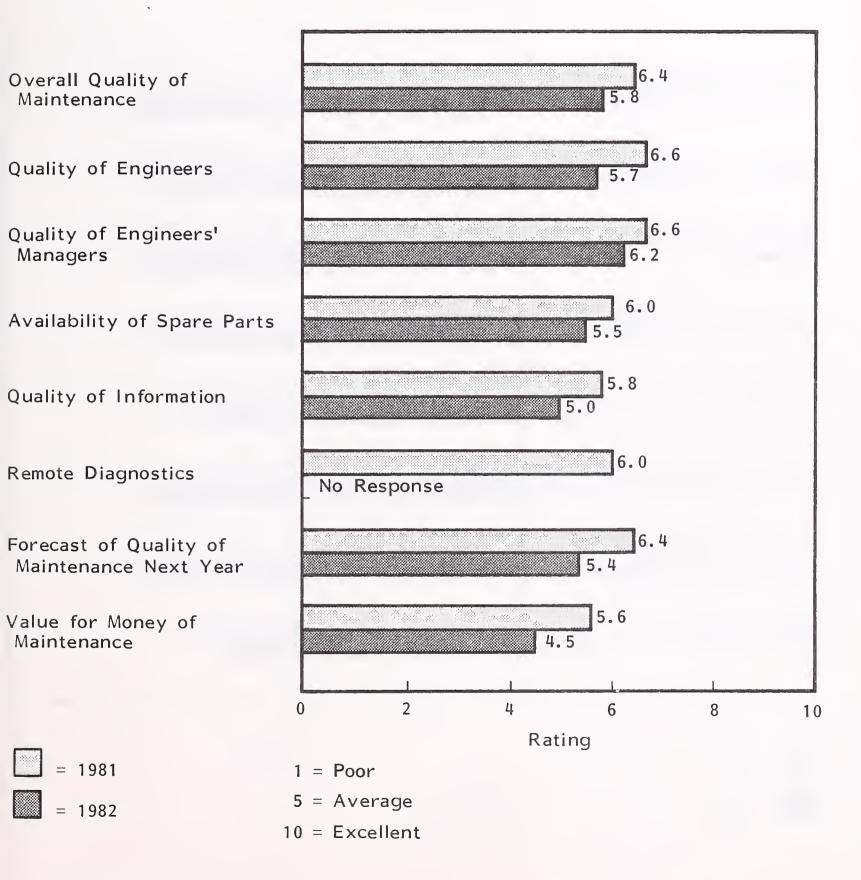


USER SATISFACTION WITH MAINTENANCE OF SMALL BUSINESS SYSTEMS IN THE UNITED KINGDOM



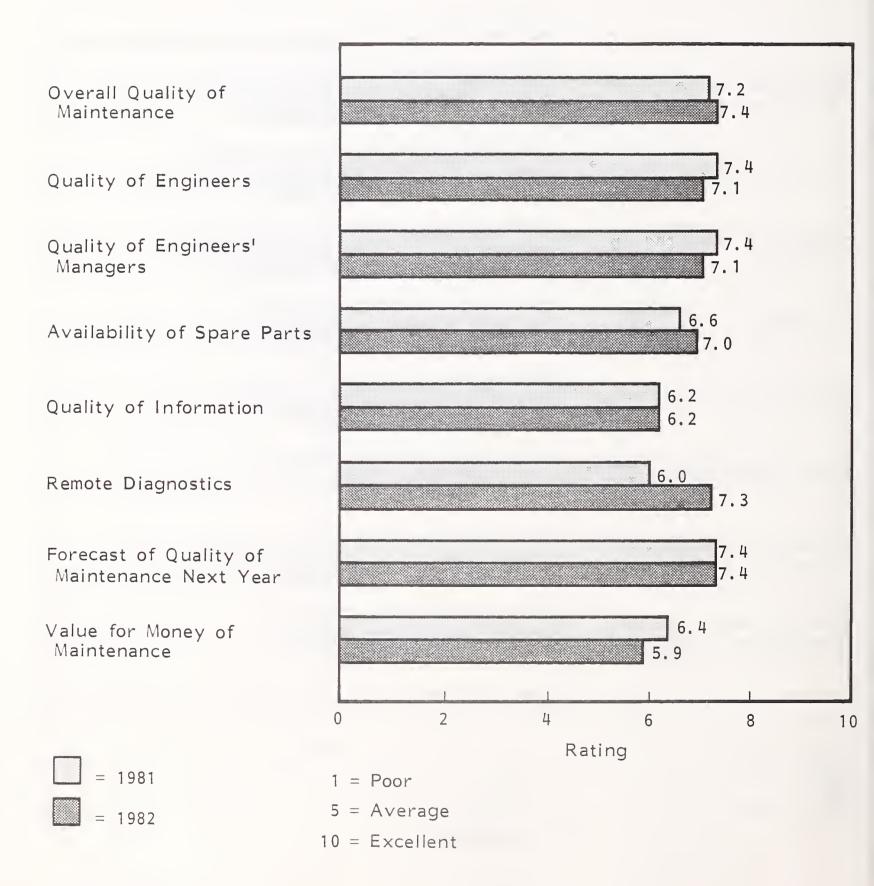


USER SATISFACTION WITH MAINTENANCE OF OTHER MINICOMPUTERS IN THE UNITED KINGDOM

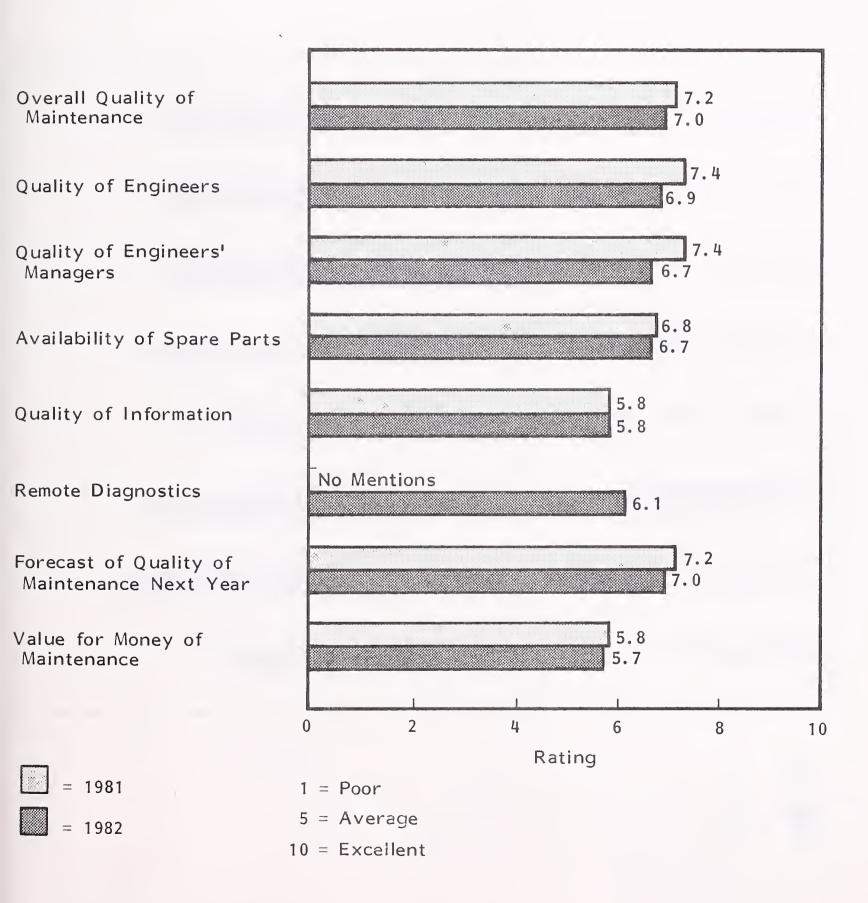


INPUT FAE2

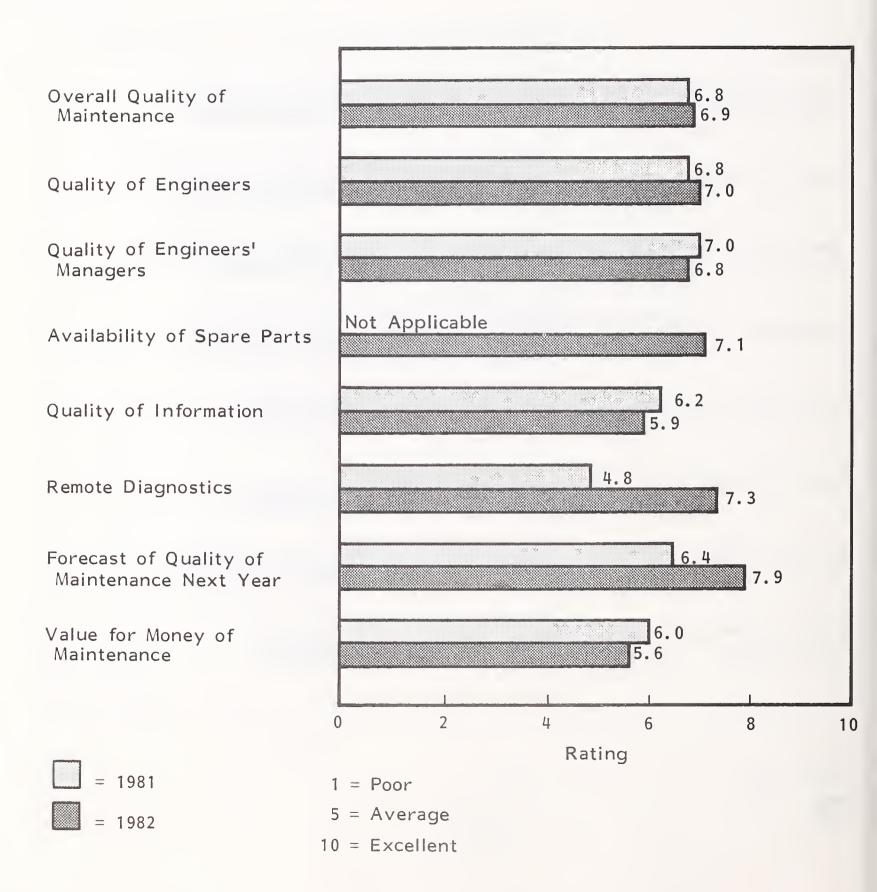
USER SATISFACTION WITH MAINTENANCE OF PERIPHERALS IN THE UNITED KINGDOM



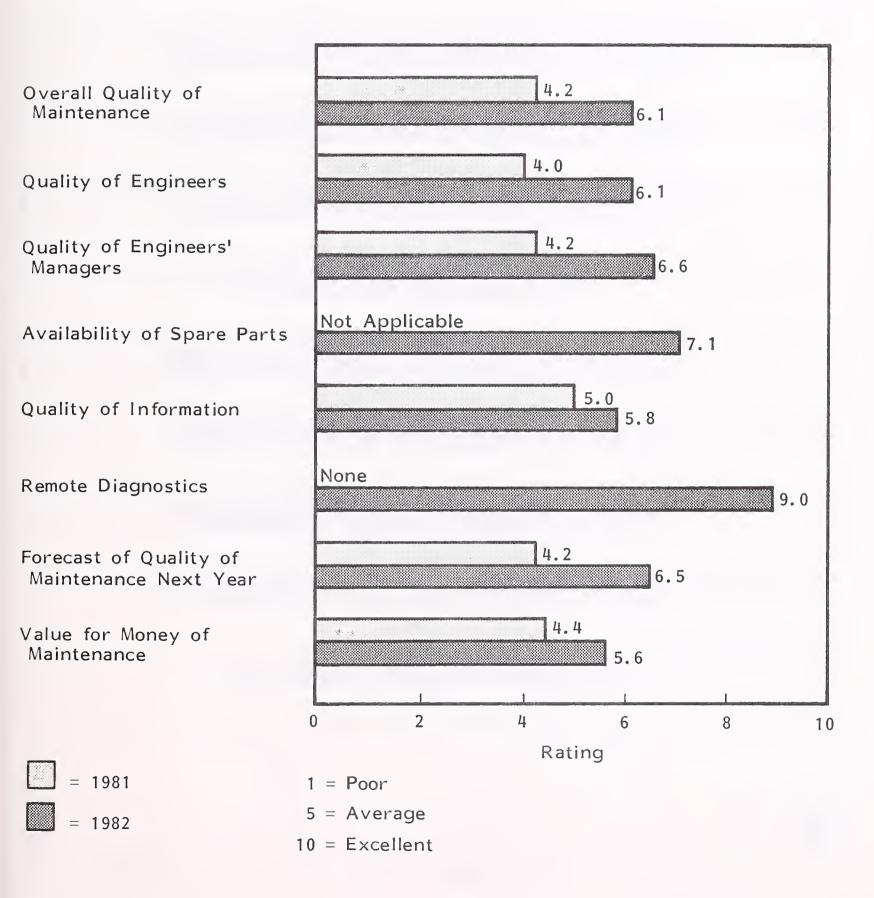
USER SATISFACTION WITH MAINTENANCE OF TERMINALS IN THE UNITED KINGDOM



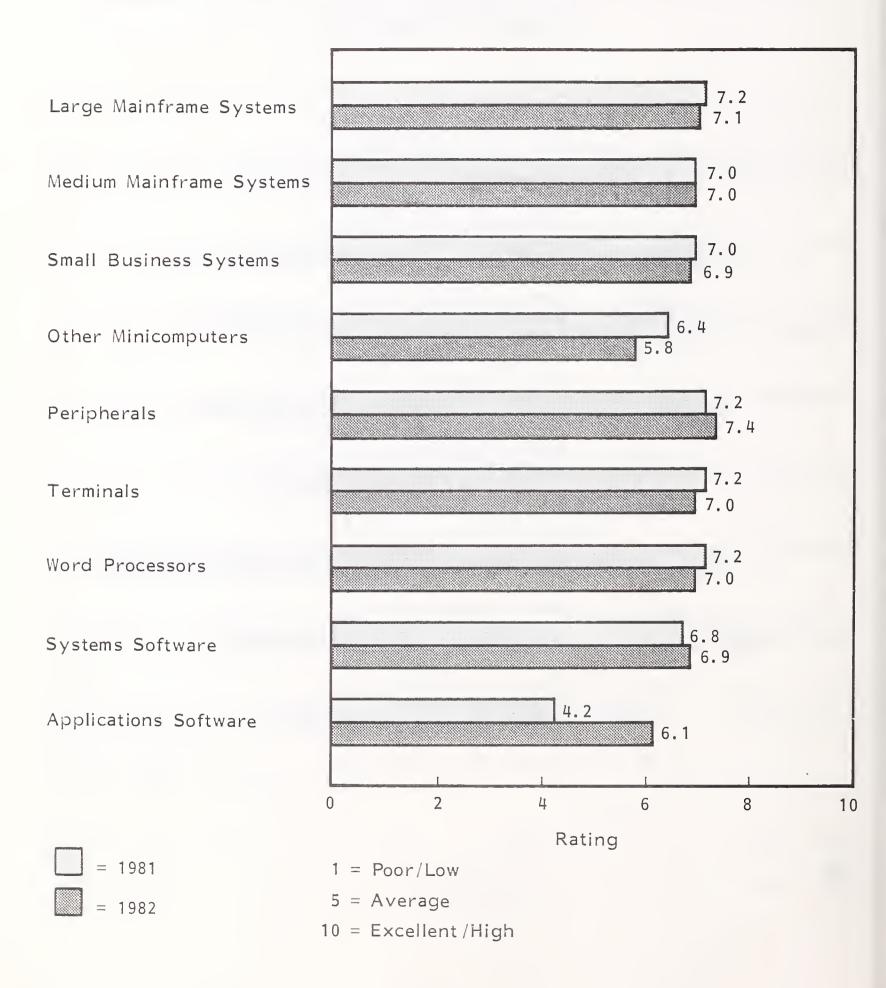
USER SATISFACTION WITH MAINTENANCE OF SYSTEMS SOFTWARE IN THE UNITED KINGDOM



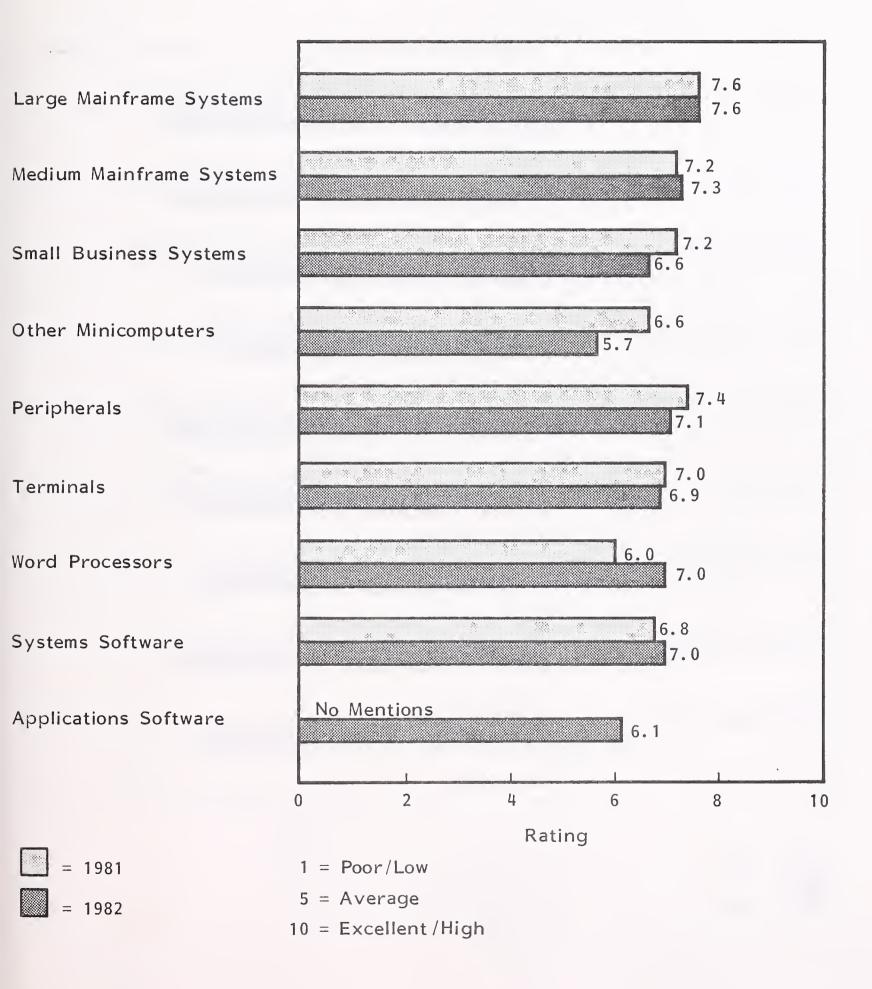
USER SATISFACTION WITH MAINTENANCE OF APPLICATIONS SOFTWARE IN THE UNITED KINGDOM



USERS' RATING OF OVERALL QUALITY OF MAINTENANCE IN THE UNITED KINGDOM



USERS' RATING OF QUALITY OF ENGINEERS IN THE UNITED KINGDOM





USERS' RATING OF QUALITY OF ENGINEERS' MANAGERS IN THE UNITED KINGDOM

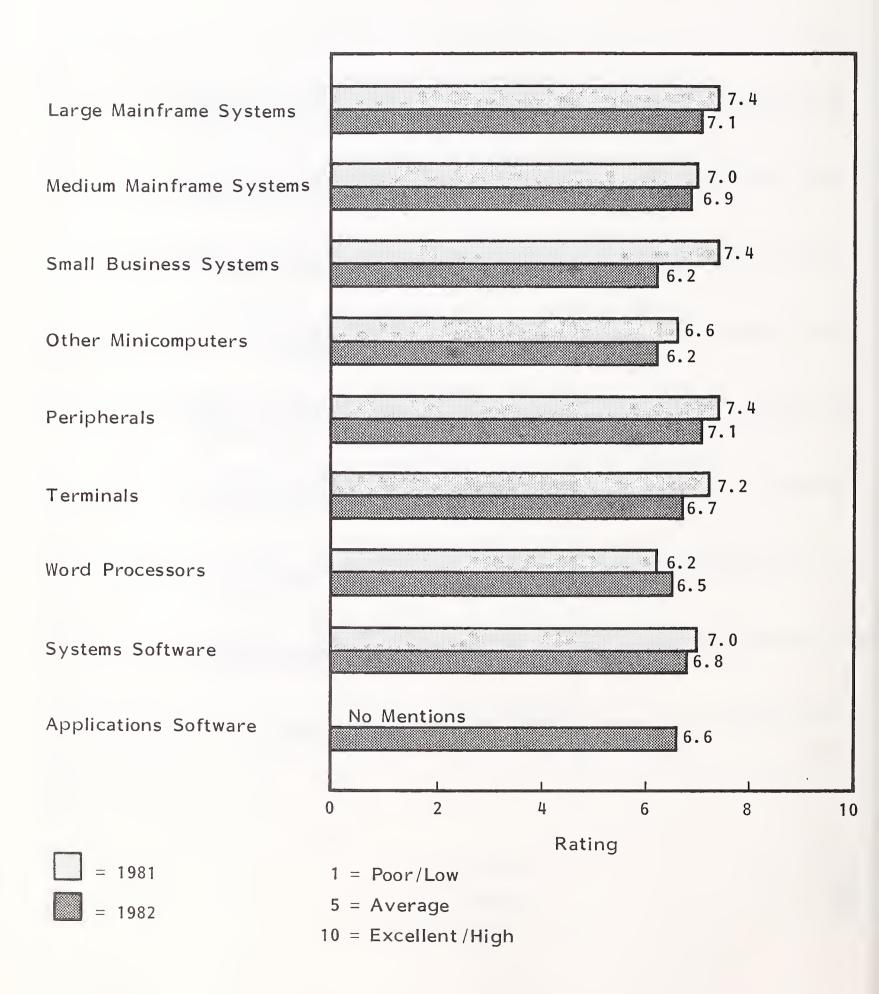
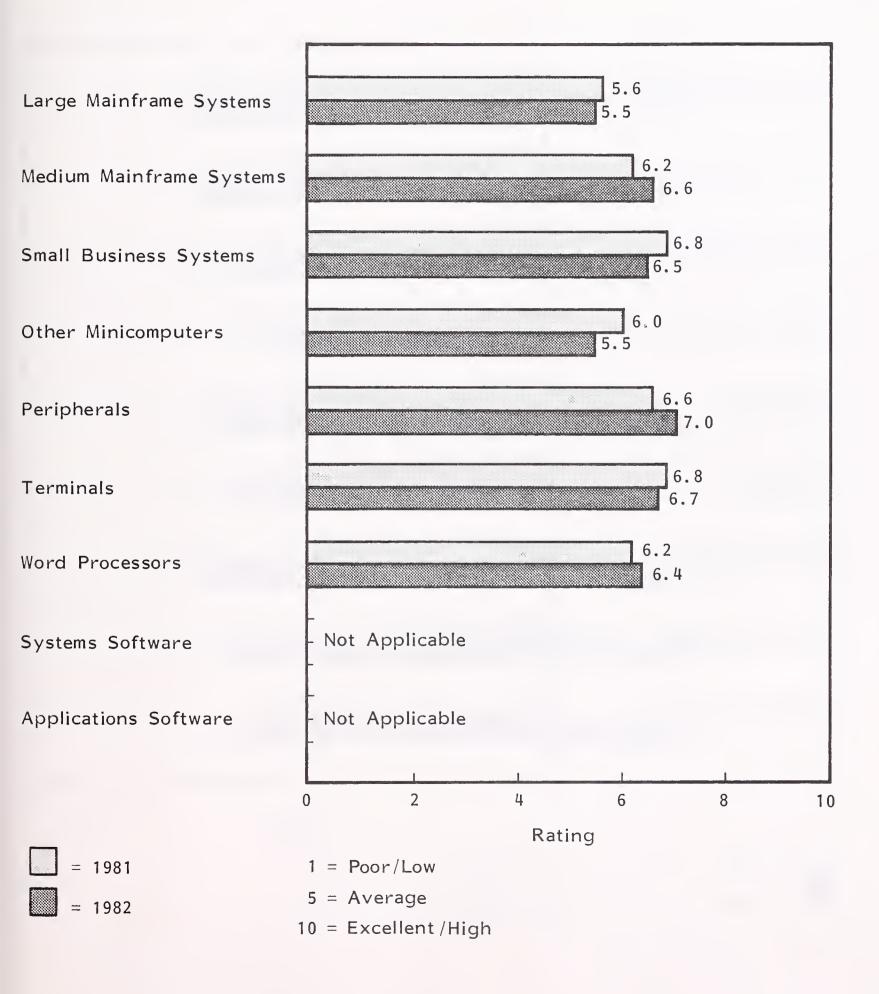
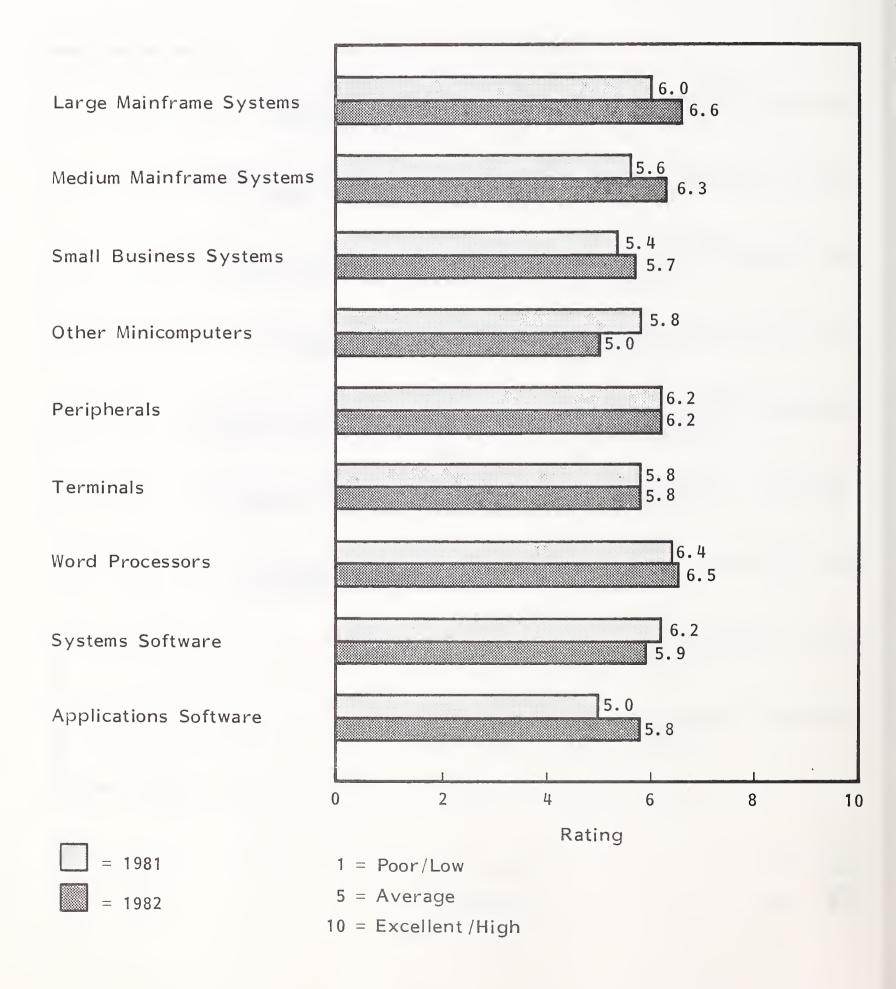


EXHIBIT A-16

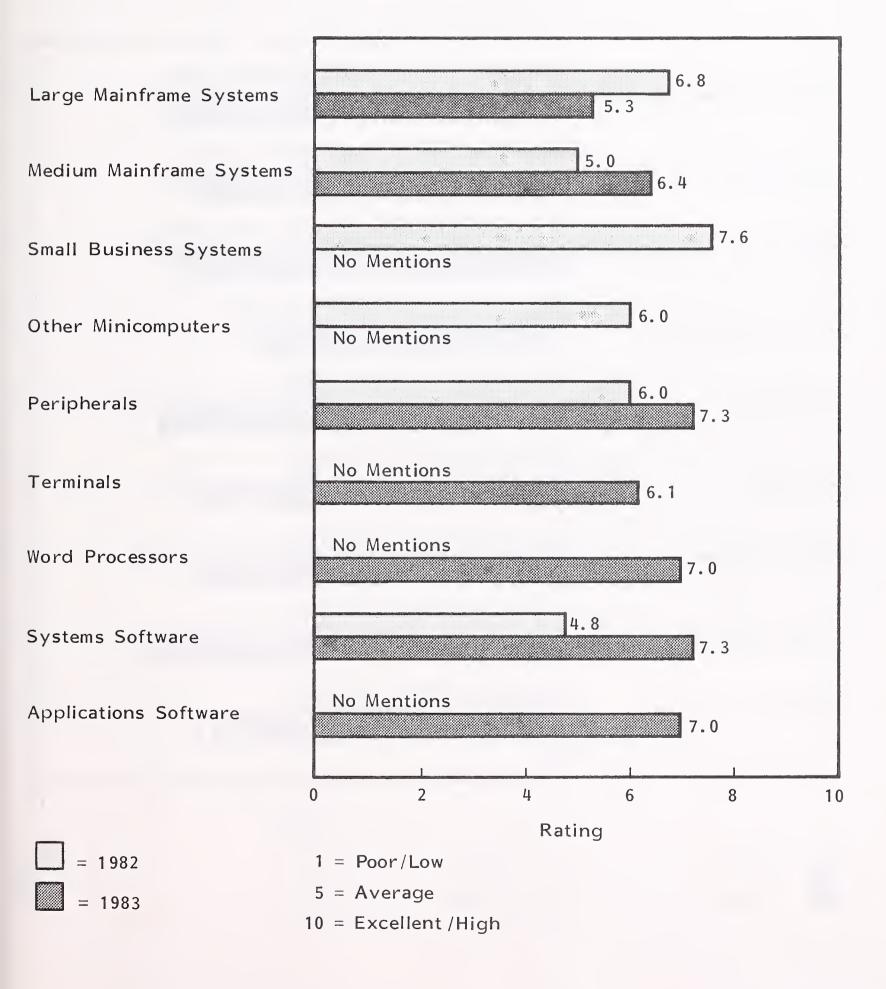
USERS' RATING OF AVAILABILITY OF SPARE PARTS IN THE UNITED KINGDOM



USERS' RATING OF QUALITY OF INFORMATION IN THE UNITED KINGDOM

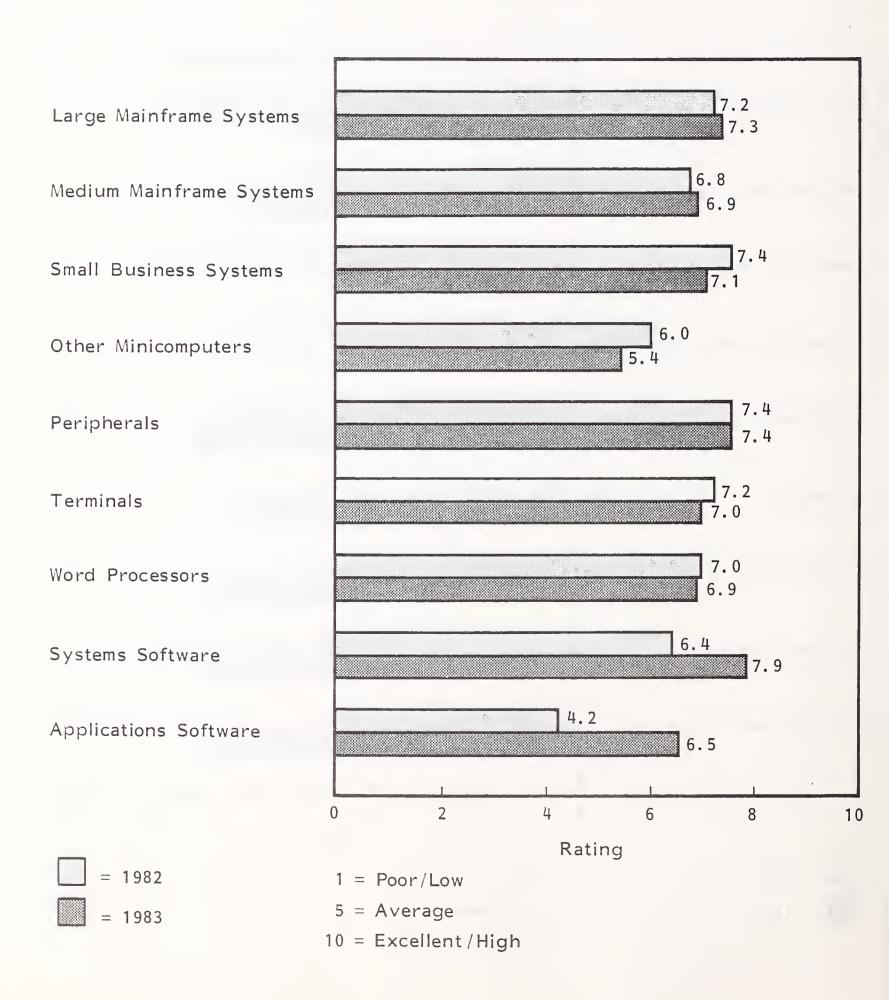


USERS' RATING OF REMOTE DIAGNOSTICS IN THE UNITED KINGDOM

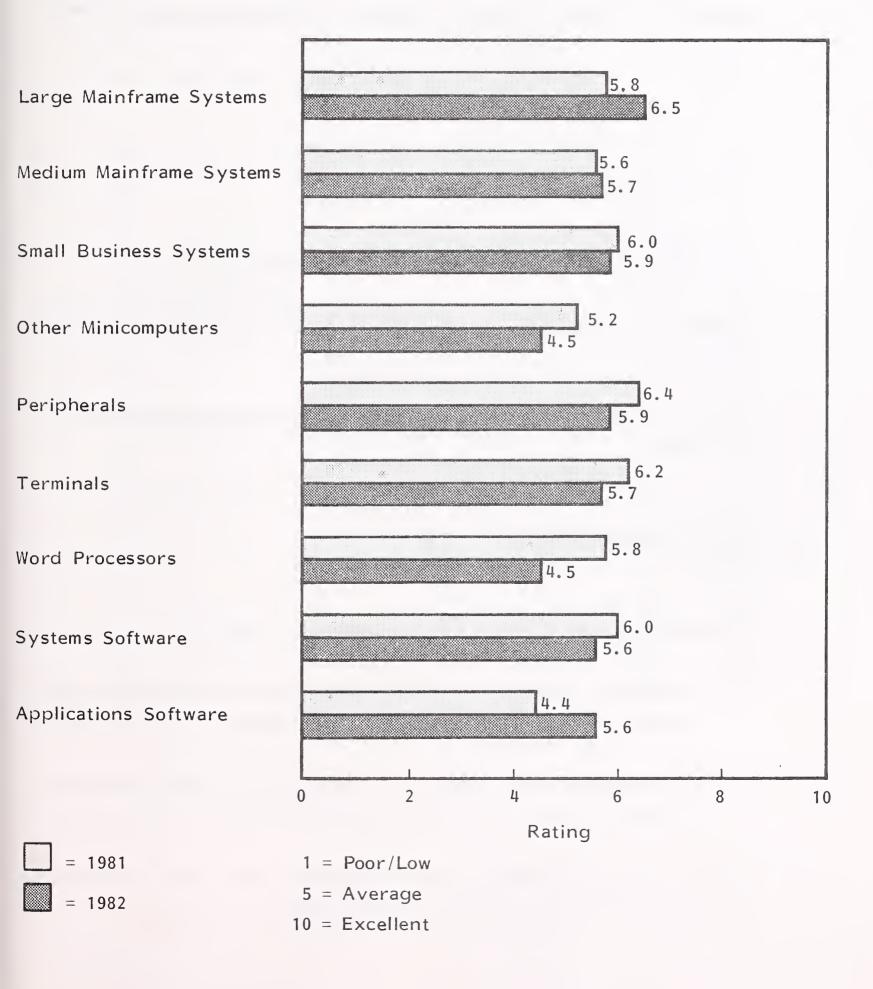




USERS' RATING OF QUALITY OF MAINTENANCE IN THE UNITED KINGDOM



USERS' RATING OF VALUE FOR MONEY OF MAINTENANCE IN THE UNITED KINGDOM





D. SERVICEABILITY

- Serviceability, as viewed by the user, is the time it takes the maintainer to respond to a problem and the time it takes to repair the fault once he arrives.
- Exhibits A-21 through A-28 show comparative response and repair times:
 - By year, 1982 versus 1981.
 - By range and median.
 - By preferred, actual, and minimum/maximum times.
- Response times generally are within two hours, even for peripheral and smaller equipment.
- Repair times have improved, reflecting more on-site board swapping and offsite repair.

E. OTHER PLANNING DATA

- Exhibit A-29 illustrates users' perceptions of systems availability.
 - In three product areas, small systems, other minicomputers, and peripherals, system availability is less than the user is willing to accept.
 - For large and medium systems, terminals, word processors, and systems software, systems availability exceeds minimum expectations of users.
- Exhibit A-30 shows a sharp change in thinking by users about maintenance pricing. Vendors should note this increased sensitivity to pricing.

USERS' PERCEPTION OF SERVICEABILITY FOR LARGE SYSTEMS IN THE UNITED KINGDOM

	TIME IN HOURS				
	1981		1982		
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN	
Response Time					
Preferred	0.50-2.50	0.50	0.25-2.0	1.0	
Actual	0.50-4.0	1.0	0.25-2.0	2.0	
Minimum Acceptable	0.50-5.0	2.0	2.0-4.0	2.0	
Repair Time					
Preferred	0.50-4.0	0.50	0.25-2.0	1.0	
Actual	0.50-5.0	1.50	0.25-1.0	0.25	
Maximum Acceptable	0.50-5.0	2.0	1.0-4.0	1.0	

USERS' PERCEPTION OF SERVICEABILITY FOR MEDIUM MAINFRAMES IN THE UNITED KINGDOM

		TIME IN HOURS			
	1981		1982		
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN	
Response Time					
Preferred	0.50-4.0	1.0	0.25-4.0	1.0	
Actual	0.50-5.0	2.0	0.50-24.0	2.0	
Minimum Acceptable	0.50-5.0	3.0	1.75-24.0	3.0	
Repair Time					
Preferred	0.50-3.50	0.75	0.25-2.0	2.0	
Actual	0.50-6.0	1.75	0.25-4.0	1.0	
Maximum Acceptable	0.50-6.0	3.25	1.0-4.0	2.0	



USERS' PERCEPTION OF SERVICEABILITY FOR SMALL BUSINESS SYSTEMS IN THE UNITED KINGDOM

	TIME IN HOURS				
	1981		1982		
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN	
Response Time					
Preferred	0.25-9.0	2.0	1.0-4.0	1.0	
Actual	0.25-10.0	3.0	1.0-6.0	2.0	
Minimum Acceptable	2.0-10.0	5.0	2.0-24.0	4.0	
Repair Time					
Preferred	0.50-6.0	1.25	0.50-24.0	2.0	
Actual	1.0-6.0	1.50	0.50-11.0	2.0	
Maximum Acceptable	1.50-6.0	3.50	0.50-24.0	4.0	

USERS' PERCEPTION OF SERVICEABILITY FOR OTHER MINICOMPUTERS IN THE UNITED KINGDOM

		TIME IN HOURS			
	1981		1982		
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN	
Response Time					
Preferred	0.33-6.0	2.0	1.0-4.0	1.0	
Actual	0.75-10.0	3.0	2.0-6.0	3.0	
Minimum Acceptable	2.0-10.0	4.0	3.0-24.0	10.0	
Repair Time					
Preferred	0.50-4.0	1.0	0.50-48.0	4.0	
Actual	0.50-6.0	2.0	0.50-4.0	1.0	
Maximum Acceptable	1.0-6.0	4.0	2.0-24.0	2.0	

- 120 -

USERS' PERCEPTION OF SERVICEABILITY FOR PERIPHERALS IN THE UNITED KINGDOM

	TIME IN HOURS						
	19	81	198	32			
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN			
Response Time							
Preferred	0.50-6.0	1.50	0.50-2.0	2.0			
Actual	0.50-6.0	2.50	0.50-2.0	2.0			
Minimum Acceptable	0.50-6.0	4.0	1.0-2.50	2.0			
Repair Time							
Preferred	0.50-4.0	1.0	0.25-3.0	. 1.0			
Actual	0.50-6.0	2.0	0.25-1.0	1.0			
Maximum Acceptable	0.50-6.0	4.0	1.0-4.0	1.50			

USERS' PERCEPTION OF SERVICEABILITY FOR TERMINALS IN THE UNITED KINGDOM

		TIME IN	HOURS					
	198	81	198	32				
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN				
Response Time								
Preferred	0.33-9.0	2.0	0.50-4.0	2.0				
Actual	0.50-12.0	4.0	0.50-12.0	2.0				
Minimum Acceptable	0.75-12.0	8.0	1.0-4.0	4.0				
Repair Time								
Preferred	0.50-6.0	0.75	0.50-3.0	1.0				
Actual	0.50-6.0	1.50	0.25-1.0	1.0				
Maximum Acceptable	0.50-6.0	4.0	1.0-8.0	2.0				

USERS' PERCEPTION OF SERVICEABILITY FOR WORD PROCESSORS IN THE UNITED KINGDOM

	TIME IN HOURS						
	198	31	198	32			
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN			
Response Time							
Preferred	0.25-9.0	2.0	0.25-4.0	1.0			
Actual	0.50-12.0	4.0	0.25-1.0	1.0			
Minimum Acceptable	2.0-12.0	4.0	2.0-4.0	3.0			
Repair Time							
Preferred	0.50-4.0	1.0	1.0-2.0	1.0			
Actual	1.0-6.0	2.0	0.50-1.0	1.0			
Maximum Acceptable	1.0-6.0	3.0	1.50-4.0	2.0			

USERS' PERCEPTION OF SERVICEABILITY FOR SYSTEMS SOFTWARE IN THE UNITED KINGDOM

	198	81	198	32
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-12.0	4.0	2.0-8.0	1.0
Actual	0.50-12.0	4.50	1.0-2.0	2.0
Minimum Acceptable	2.0-12.0	9.0	1.0-8.0	9.0
Repair Time				
Preferred	1.0-12.0	5.0	1.0-2.0	1.0
Actual	1.0-12.0	7.0	1.0-4.0	2.0
Maximum Acceptable	1.0-12.0	10.0	1.0-4.0	2.0

UNITED KINGDOM RESPONDENTS' VIEW OF SYSTEM AVAILABILITY

(percent)

	CURRENTLY	NTLY ING	IDEALLY WOULD LIKE	LLY LD (E	MINIMUM WOULD ACCEPT	AUM LD EPT	PERCENT INCREASE WOULD PAY FOR IDE	ERCENT ICREASE WOULD FOR IDEAL
CLASSIFICATION	1981	1982	1981	1982	1981	1982	1981	1982
Large Mainframe Systems	96.8%	96.78	98.88	99.18	92.78	93.48	10.8%	15%
Medium Mainframe Systems	96.5	8.46	8*86	6.96	94.5	8*16	20	17
Small Business Systems	06	91.5	7.86	99.3	92.5	9.46	15	22
Other Minicomputers	93.8	92.4	9.86	8.86	91	8 * 116	31	20
Peripherals	96.2	93.3	66	94.5	94.9	95.2	21	15
Terminals	97.2	92.9	6*86	97.5	93.9	Z*88	28	17
Word Processors	94.5	97.4	66	н*66	95.7	7.96	32	N/A
Systems Software	97	98.3	66	95.2	97	9.46	30	22
Applications Software	92	97.0	988	100	96	26	75	0

RESPONDENTS' PRICE INCREASES AND FORECASTS IN THE UNITED KINGDOM

SYSTEM AVAILABILITY (percent)	PERCENT INCREASE IN LAST 12 MONTHS		FORECAST INCREASE EXPECTED IN NEXT 12 MONTHS		PERCENT INCREASE THAT WOULD BE UNACCEPTABLE	
CLASSIFICATION	1981	1982	1981	1982	1981	1982
Large Mainframe Systems	11.3%	8.7%	11 %	7.8%	15.8%	8.8%
Medium Mainframe Systems	13.4	12.2	10.4	9.1	16.4	12.0
Small Business Systems	10.5	8.7	10.1	8.4	14.4	12.6
Other Minicomputers	11	5.0	11.5	10.0	16.2	10.0
Peripherals	11.3	8.0	10.9	8.0	16.5	11.2
Terminals	10.3	8.9	9.8	8.7	13.6	10.2
Word Processors	9.9	7.0	9.3	12.0	14.5	10.0
Systems Software	10.9	10.0	9.7	7.0	14.7	6.3
Applications Software	N/A	N/A	11.6	3.0	15.6	5.0

- Exhibit A-31 records vendors' responses to maintenance issues and their importance.
 - Over half the issues decreased in importance from 1981 to 1982.
 - This reflects users' concerns about their own internal problems and is a vote of confidence to vendors to manage their own issues.
- Exhibit A-32 provides shifts of maintenance compared to shifts of usage. A
 10% reduction in contracted maintenance is expected.

USERS' RATING OF IMPORTANCE OF MAINTENANCE ISSUES IN THE UNITED KINGDOM

	ASKED	IN 1981	ASKED	IN 1982
MAINTENANCE ISSUES	1981	1983	1982	1984
System Availability	9.9	9.9	9.5	9.6
Response Time	8.9	9.2	8.9	9.2
Repair Time	8.9	8.9	8.6	8.7
Preventive Maintenance	7.6	7.3	6.1	5.8
Remote Maintenance	8.6	8.6	4.5	5.0
Escalation Procedures	7.9	8.3	6.8	6.9
Price of Maintenance	8.6	8.9	7.5	7.9
Stable Engineer Population	8.3	.7.6	7.0	7.0
Uptime Guarantees	6.9	7.3	7.0	7.2
Equipment Reliability	9.6	9.9	9.3	9.5
Support Centres	5.9	7.3	6.3	6.5
Software Maintenance	7.9	8.9	7.1	7.6
Flexible Contract	5.9	7.3 ·	5.2	5.4
User Self-Maintenance	5.3	6.3	3.7	4.1

^{1 =} Unimportant

^{5 =} Average

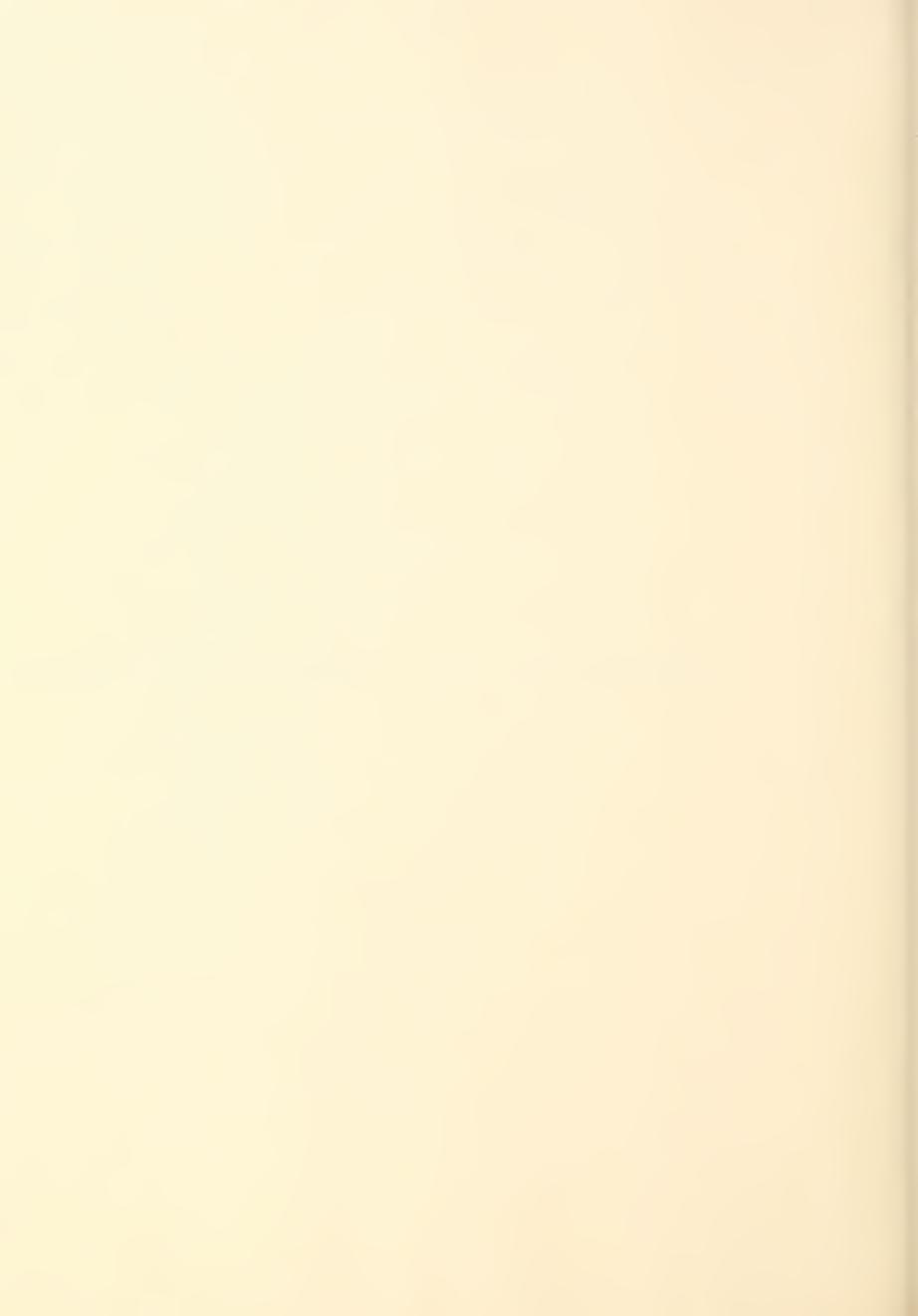
^{10 =} Important

EXHIBIT A-32

RESPONDENTS' AVERAGE CONTRACTED MAINTENANCE PERIOD VERSUS ACTUAL EQUIPMENT USAGE, 1981 AND 1982, IN THE UNITED KINGDOM

S	2	0	m	0	0	0	0	0	0
WORD	1982	•	1.	1.0	1.0	5.0	5.	5.0	5.0
WORD	1981		1.3	-	1.3	5.0	5.0	5.0	5.0
NALS	1982	1:2	1.6	1.2	1.7	5.0	4.6	5.0	5.3
TERMINALS	1981	1.2	1.5	1.2	1.6	5.1	5.4	5.1	5.4
ERALS	1982	1.6	1.9	1.6	œ .:	5.0	5.2	5.0	5.1
PERIPHERALS	1981	6.1	2.1	6.1	2.1	5.5	5.5	5.5	5.5
ER PUTERS	1982	1.2	1.6	1.2	1.6	5.0	5.2	5.0	5.4
OTHER MINICOMPUTERS	1981	1.2	1.7	1.2	1.7	5.2	5.5	5.2	5.5
VESS VESS EMS	1982	1.2	1.6	1.2	1.6	5.0	5.2	5.0	5.6
SMALL BUSINESS SYSTEMS	1981	£.	1.4	*	7.5	5.1	5.1	5.2	5.2
MEDIUM MAINFRAME SYSTEMS	1982	£.	2.2	<u>.</u>	2.3	5.0	5.0	5.0	5.2
MED MAINF SYST	1981	7.5	2.0	5.	2.0	5.0	5.0	5.0	6.0
LARGE AINFRAME SYSTEMS	1982	2.0	2.6	2.2	2.8	5.5	5.0	5.0	5.5
LARGE MAINFRAME SYSTEMS	1981	2.3	2.8	2.3	2.7	5.4	5.7	5.4	5.7
MAINTENANCE PERIOD AND EQUIPMENT	USAGE	Contracted Maintenance (Number of Shifts)	Equipment Usage (Number of Shifts)	Contracted Maintenance Forecast Next Year (Number of Shifts)	Forecast Equipment Usage Next Year (Number of Shifts)	Contracted Number of Days Per Week	Actual Usage, (Days per Week)	Contracted Number of Days per Week Next Year	Forecast Usage (Days per Week) Next Year

APPENDIX B: WEST GERMAN USER DATABASE

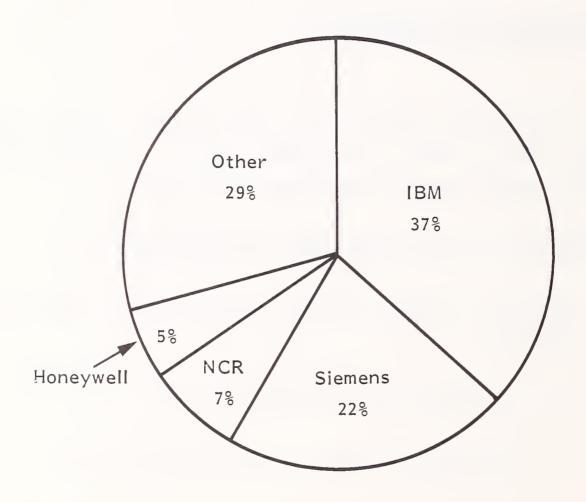


APPENDIX B: WEST GERMAN USER DATABASE

A. COMPARISON: 1982 VERSUS 1981

- INPUT's assessment of West German users indicates a healthy, competitive market place, in terms of maintenance services. According to research, vendors have been generally responsive to users' needs.
- Market share, as represented by users, is shown in Exhibit B-1.
 - Significant changes occurring between 1981 and 1982 include the following:
 - IBM's share has shrunk from 67% to 37%.
 - Siemens has increased its share from 14% to 22%.
 - NCR and Honeywell have increased market shares by 6% and 4% respectively.
 - The purpose of this report is to discuss and analyse maintenance issues, trends, and data. Market share information is not intended to provide accurate analysis but a general view from users.

RESPONDENTS' VIEW OF MAINFRAME MAINTENANCE VENDORS IN WEST GERMANY



- West German users, like many of their European neighbours, are becoming more sensitive to maintenance costs. Exhibit B-2 indicates that users are anticipating a reduced rate (4.5%) of maintenance price increase in 1982 compared to 1981 (5.2%).
- Contracted maintenance shift coverage, according to users, is expected to drop by 13%, from 1.5 shifts to 1.3 shifts.
- Notwithstanding the perceived improvement of the quality of service, in cases where 89% of user satisfaction parameters improved, serviceability (response and repair times) fell in 1982 from 1981 levels.
 - Sixty-three percent of equipment/software categories showed a slower response than in 1981.
 - Fifty percent of these categories experienced an increase in repair time.
- This explains why 57% of the maintenance issues evaluated by users increased in importance. These included:
 - Software maintenance, up 51% in importance.
 - Price of maintenance, up 38% in importance.
 - Up-time guarantees, up 9% in importance.
 - System availability, up 7% in importance.

B. GENERAL APPRAISAL OF THE WEST GERMAN MAINTENANCE MARKET

• The quality of service in West Germany has improved markedly, as shown in Exhibit B-3.

USERS' SENSITIVITY REGARDING MAINTENANCE PRICE INCREASES IN WEST GERMANY

LEVEL OF INCREASE	1 981	1982
Actual Increases As Perceived By Users (Last 12 Months)	6.0%	6.3%
Expected Increases (Next 12 Months)	5.2	4.5
Unacceptable Level Of Increase	8.2	8.1

SIGNIFICANT CHANGES IN USERS' OPINIONS OF SERVICE QUALITY, WEST GERMANY - 1982 VERSUS 1981

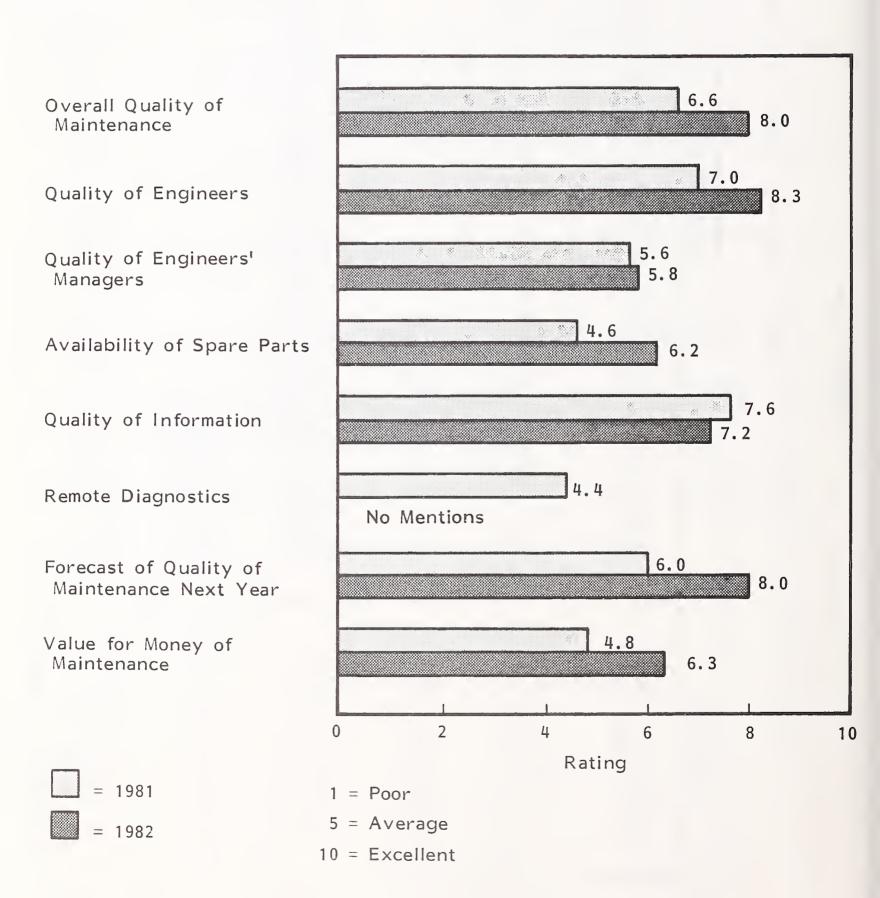
CONCLUSIONS	There was obviously a spare parts problem in Germany in 1981 which has been appro-	priately recognised and addressed by field service managers in Germany (as	have the other items here).				
CHANGE	+0.8 to +4.8	+1.3 to +2.2	+1.3 to +2.2	h°h+	+1.0 to +2.9	+0.8 to +2.4	+1.2 to +1.9
PRODUCT CATEGORY	AII	Large, Medium Systems, Peripherals, Word Processors	Large, Medium Systems, Peripherals, Word Processors	Medium Systems	Large, Medium Systems, and Word Processors	Large, Medium, Other Mini- computer Systems, and Word Processors	Other Minicomputers and Terminals
SERVICE CATEGORY	Availability of Spare Parts	Quality of Maintenance Overall	Quality of Engineers	Remote Diagnostics	Forecast Quality of Maintenance Next Year	Value of Maintenance	Quality of Information
			3	VITIS	Od		

- Responses to key service issues are routine except for two areas, as shown in Exhibit B-4:
 - INPUT changed the normal query regarding preventive maintenance into: 'Is there anything you would like to be changed?' (about service); 62% said 'no.'
 - Forty-eight percent of the West German market might be interested in third-party maintenance.
- Exhibit B-5 through B-13 provide details of West German users' satisfaction with maintenance.
- Exhibit B-14 through B-21 indicate trends in serviceability, and response and repair times.
- System availability experience and tolerances are included in Exhibit B-22.
- Sensivity to pricing and contract maintenance/equipment usage data are described in Exhibits B-23 and B-24 respectively.
- Finally, users' ratings of maintenance issues are tabulated in Exhibit B-25.

USER CONSENSUS REGARDING KEY SERVICE ISSUES FOR WEST GERMANY

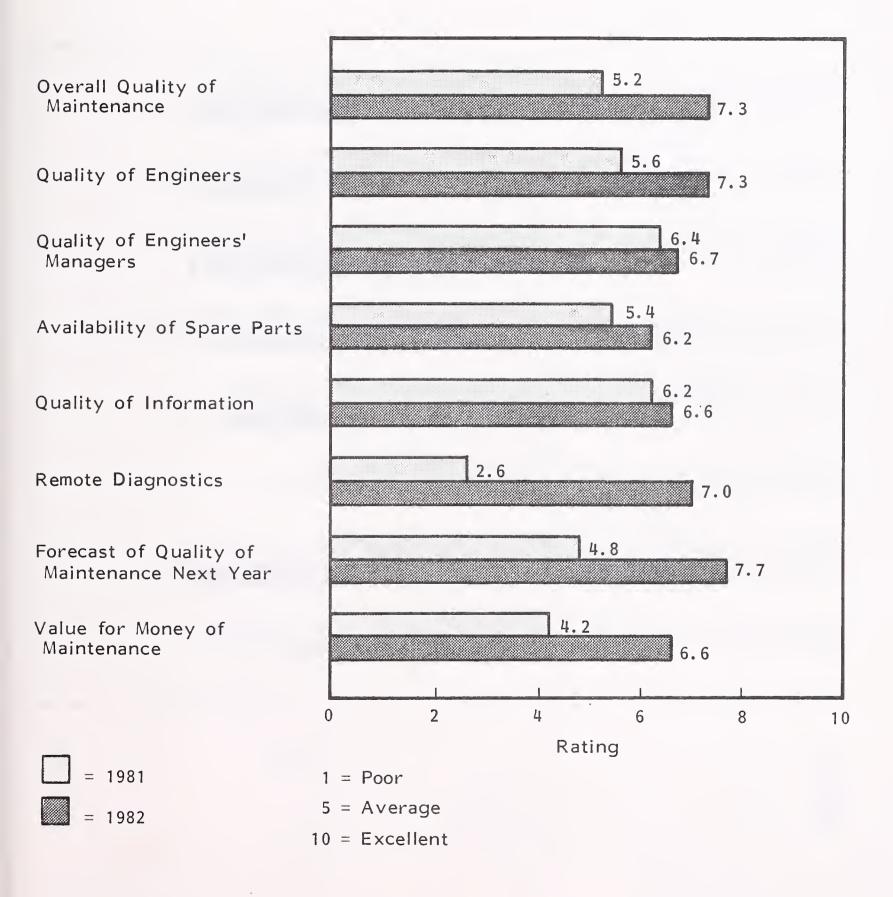
CONCERN Guidelines for Evaluating Cost of Maintenance Is There Anything You Would Like Changed? Users Receiving Maintenance Price Discount Attitude Towards Remote Diagnostics Remote Diagnostics Maintenance Maintenance

USER SATISFACTION WITH MAINTENANCE OF LARGE MAINFRAME SYSTEMS IN WEST GERMANY



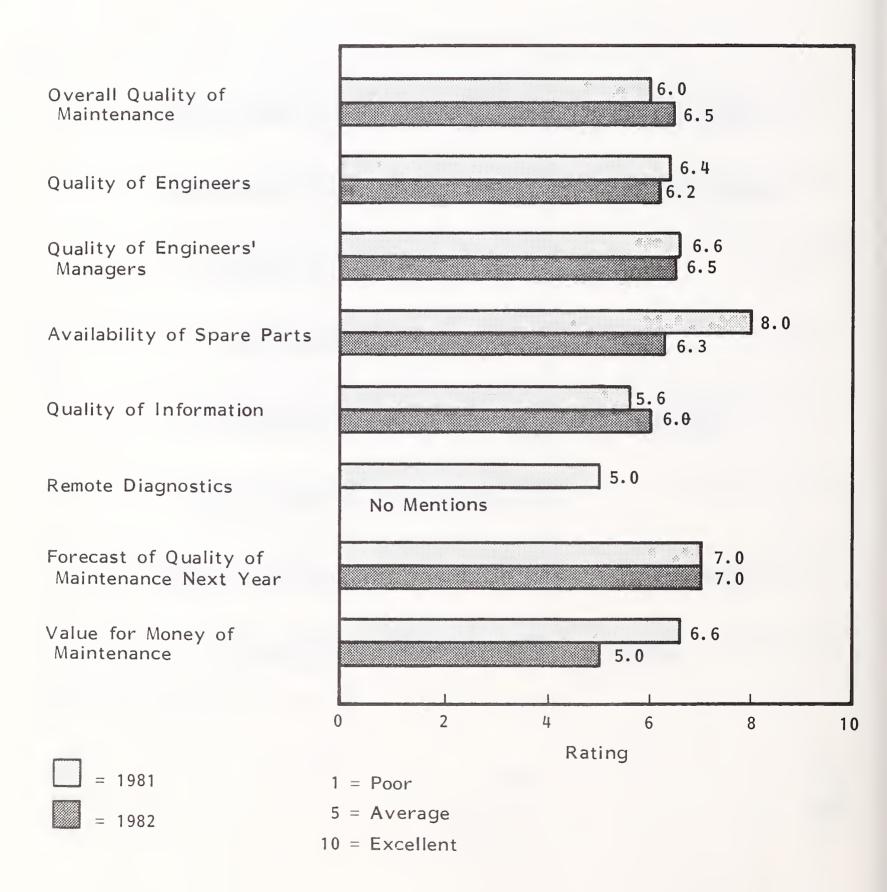


USER SATISFACTION WITH MAINTENANCE OF MEDIUM MAINFRAME SYSTEMS IN WEST GERMANY

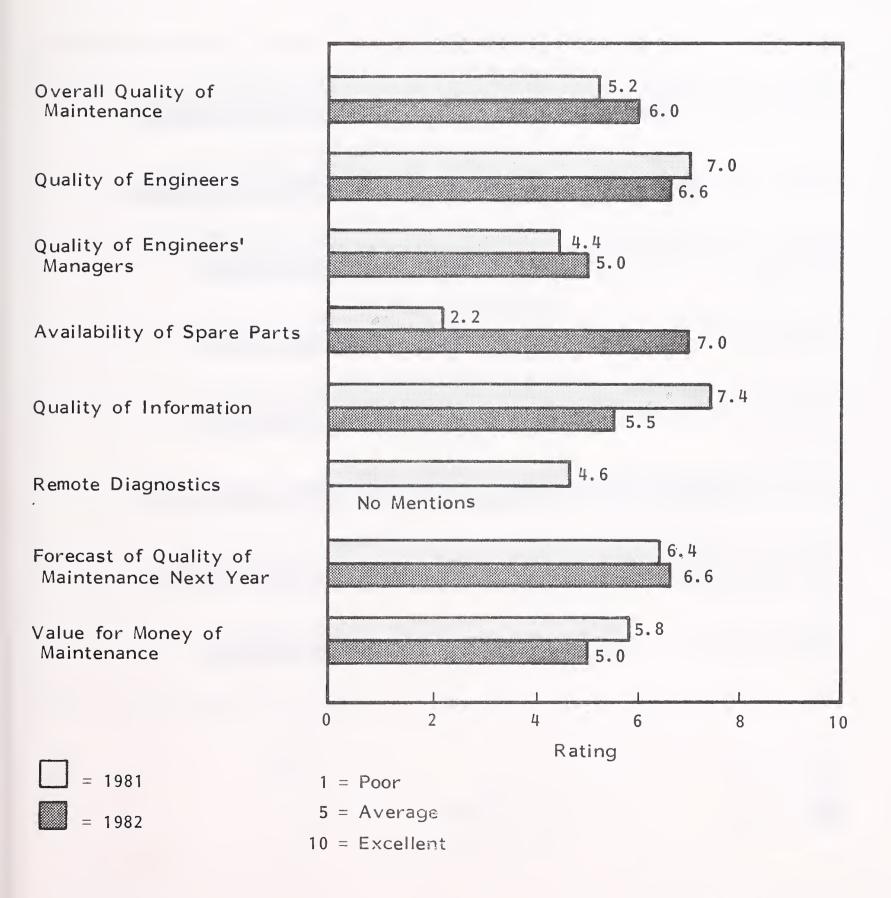




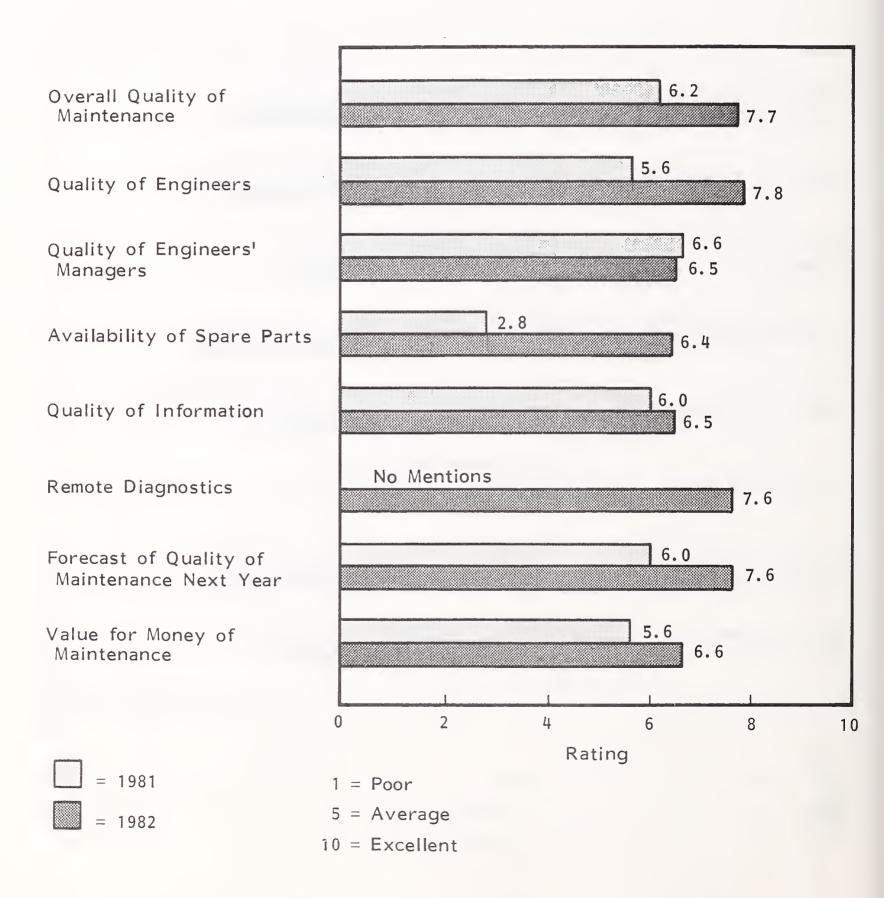
USER SATISFACTION WITH MAINTENANCE OF SMALL BUSINESS SYSTEMS IN WEST GERMANY



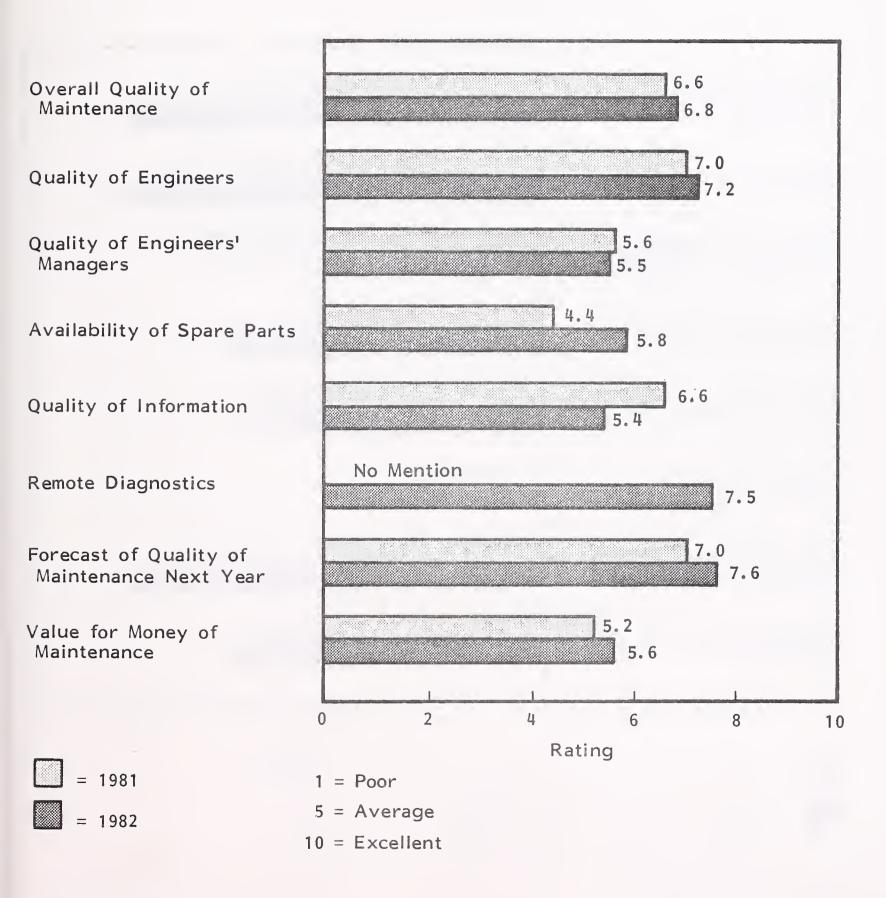
USER SATISFACTION WITH MAINTENANCE OF OTHER MINICOMPUTERS IN WEST GERMANY



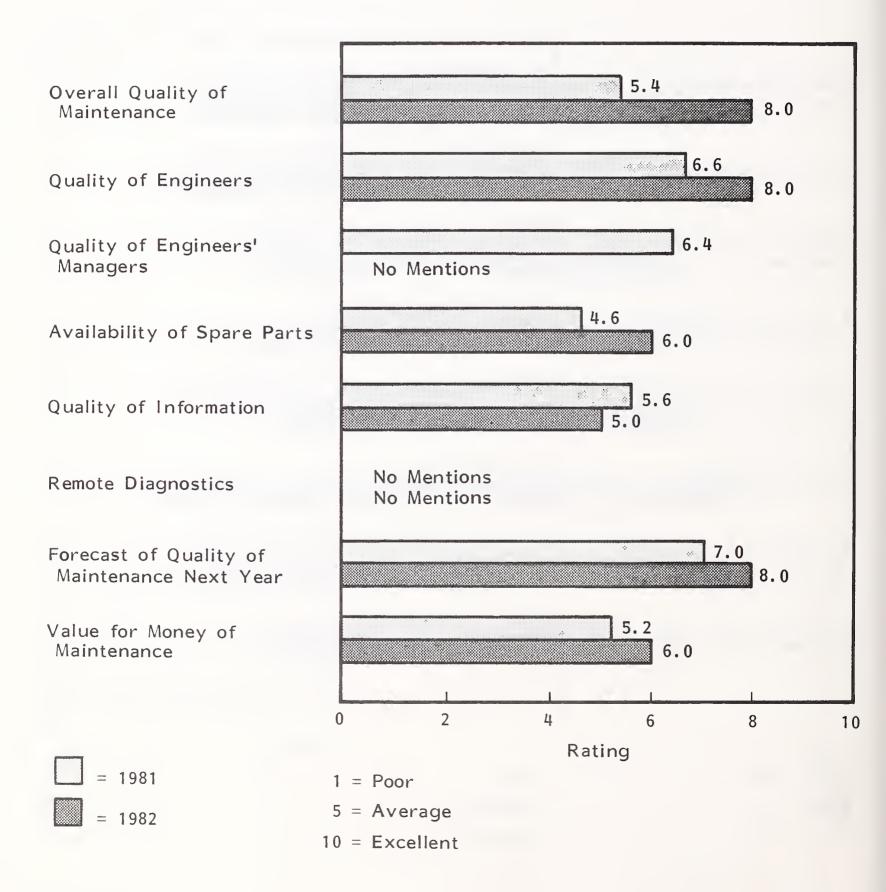
USER SATISFACTION WITH MAINTENANCE OF PERIPHERALS IN WEST GERMANY



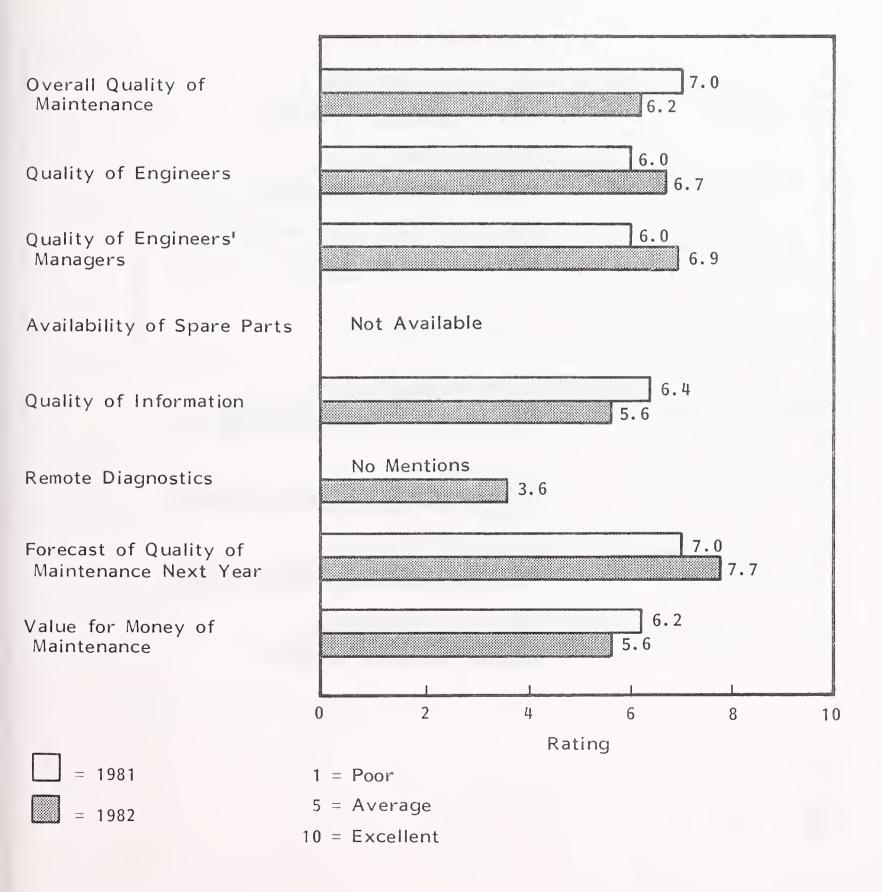
USER SATISFACTION WITH MAINTENANCE OF TERMINALS IN WEST GERMANY



USER SATISFACTION WITH MAINTENANCE OF WORD PROCESSORS IN WEST GERMANY

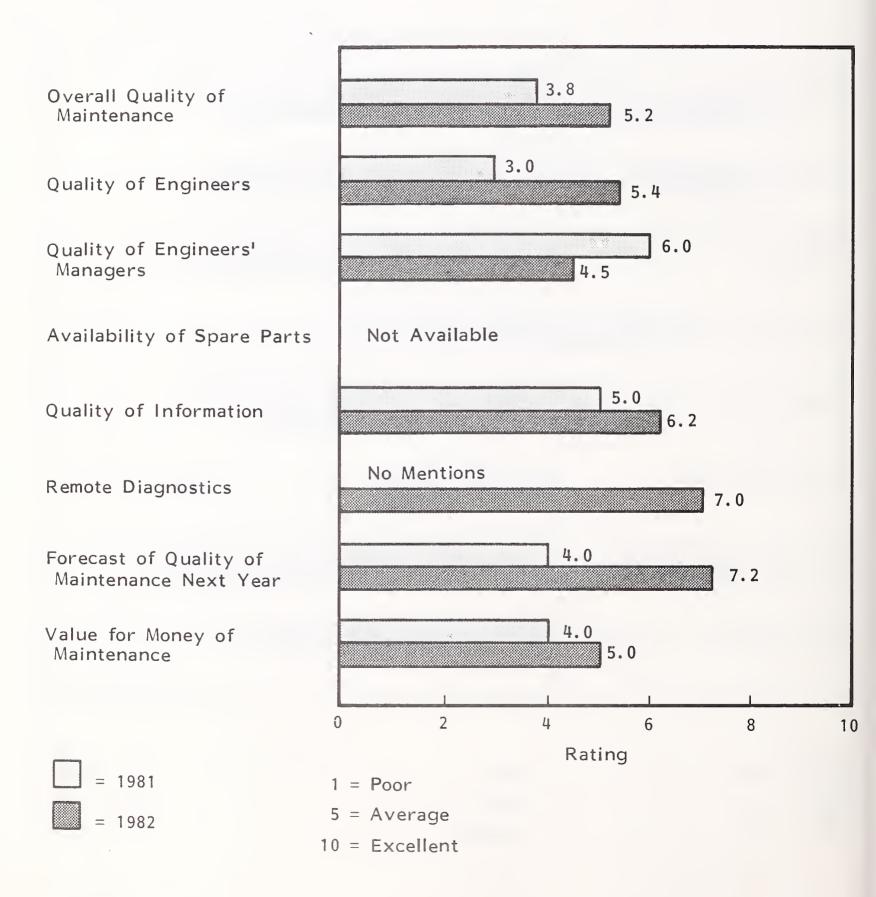


USER SATISFACTION WITH MAINTENANCE OF SYSTEMS SOFTWARE IN WEST GERMANY



- 145 -

USER SATISFACTION WITH MAINTENANCE OF APPLICATIONS SOFTWARE IN WEST GERMANY



USERS' PERCEPTION OF SERVICEABILITY FOR LARGE MAINFRAME SYSTEMS IN WEST GERMANY

	TIME IN HOURS						
	19	81	198	32			
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN			
Response Time							
Preferred	0.50	2.50	0.50-1.0	1.0			
Actual	0.50	4.75	1.0-1.0	1.0			
Minimum Acceptable	0.50	3.50	1.0-2.0	1.0			
Repair Time							
Preferred	0.50	2.50	1.0-2.0	1.50			
Actual	0.50	5.0	1.0-1.0	1.0			
Maximum Acceptable	0.50	4.50	1.0-1.0	1.0			

USERS' PERCEPTION OF SERVICEABILITY FOR MEDIUM MAINFRAME SYSTEMS IN WEST GERMANY

	TIME IN HOURS			
	1981		1982	
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-4.0	0.50	0-2.0	0.50
Actual	0.50-5.0	1.50	0-6.0	2.0
Minimum Acceptable	0.75-4.50	1.75	1.0-8.0	1.0
Repair Time				
Preferred	0.50-4.50	1.0	0.50-5.0	1.0
Actual	0.50-5.0	2.50	1.0-4.0	1.0
Maximum Acceptable	0.50-5.0	3.25	1.0-8.0	2.0

USERS' PERCEPTION OF SERVICEABILITY FOR SMALL BUSINESS SYSTEMS IN WEST GERMANY

	TIME IN HOURS			
	1981		1982	
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-3.0	1.0	0.50-3.0	1.0
Actual	0.50-5.0	1.50	1.75-6.0	2.0
Minimum Acceptable	0.50-4.75	1.75	1.0-8.0	2.0
Repair Time				
Preferred	0.50-3.0	1.0	1.0-3.0	1.0
Actual	1.0-5.0	1.75	0-1.0	1.0
Maximum Acceptable	1.0-4.50	2.0	1.50-8.0	2.0

USERS' PERCEPTION OF SERVICEABILITY FOR OTHER MINICOMPUTERS IN WEST GERMANY

	TIME IN HOURS			
	1981		1982	
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-3.50	1.0	0-1.0	0.50
Actual	0.50-5.0	2.0	2.0-5.0	3.0
Minimum Acceptable	1.0-5.0	2.50	4.0	4.0
Repair Time				
Preferred	0.50-4.0	1.0	0	0
Actual	0.50-5.0	1.75	2.0-4.0	3.0
Maximum Acceptable	1.0-5.0	2.25	3.0	3.0

USERS' PERCEPTION OF SERVICEABILITY FOR PERIPHERALS IN WEST GERMANY

	TIME IN HOURS			
	1981		1982	
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-4.50	1.0	0-2.0	1.0
Actual	1.0-5.0	1.50	0-24.0	2.0
Minimum Acceptable	1.5	2.50	1.0-5.0	2.0
Repair Time				
Preferred	0.50-5.0	0.50	0-1.0	1.0
Actual	0.50-5.0	1.0	0.50-6.0	2.0
Maximum Acceptable	0.50-5.0	1.0	1.0-4.0	2.0

USERS' PERCEPTION OF SERVICEABILITY FOR TERMINALS IN WEST GERMANY

	TIME IN HOURS			
	1981		1982	
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-5.0	0.50	0-4.0	1.0
Actual	0.50-5.0	1.0	0-24.0	2.0
Minimum Acceptable	0.50-5.0	1.0	1.0-48.0	2.0
Repair Time				
Preferred	0.50-5.0	1.0	0-4.0	1.0
Actual	0.50-5.0	1.50	0.50-48.0	2.0
Maximum Acceptable	0.50-5.0	2.0	1.0-5.0	1.0

USERS' PERCEPTION OF SERVICEABILITY FOR WORD PROCESSORS IN WEST GERMANY

	TIME IN HOURS			
	1981		1982	
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-5.0	1.50	1.0	1.0
Actual	0.50-5.0	3.0	3.0	3.0
Minimum Acceptable	1.0-4.50	2.75	1.0	1.0
Repair Time				
Preferred	0.50-4.0	0.50	1.0	1.0
Actual	0.50-5.0	2.25	4.0	4.0
Maximum Acceptable	1.0-4.0	3.0	1.0	1.0

USERS' PERCEPTION OF SERVICEABILITY FOR SYSTEMS SOFTWARE IN WEST GERMANY

	TIME IN HOURS			
	1981		1982	
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-5.0	6.0	0-8.0	1.0
Actual	0.75-5.0	8.0	1.0-12.0	4.0
Minimum Acceptable	1.0-5.0	9.0	1.0-24.0	4.0
Repair Time				
Preferred	0.50-5.0	2.0	0-24.0	2.0
Actual	0.50-5.0	6.0	1.0-10.0	2.0
Maximum Acceptable	0.50-5.0	7.0	1.0-24.0	2.0

WEST GERMAN RESPONDENTS' VIEWS OF SYSTEM AVAILABILITY

SYSTEM AVAILABILITY (percent)	CURRENT LY GETTING		IDEALLY WOULD LIKE		MINIMUM WOULD ACCEPT	
CLASSIFICATION	1981	1982	1981	1982	1981	1982
Large Mainframe Systems	96.2%	96.7%	99.2%	96.8%	95.4%	96.1%
Medium Mainframe Systems	98.1	92.2	99.6	98.1	96.2	91.6
Small Business Systems	95.6	91.7	98.2	95.9	95.0	92.5
Other Minicomputers	94.1	90.0	99.1	99.0	95.1	92.5
Peripherals	97.8	92.0	99:2	97.4	96.1	90.6
Terminals	96.4	92.9	98.8	97.9	94.5	89.1
Word Processors	93.8	90.0	98.1	95.0	96.3	95.0
Systems Software	96.8	97.0	99.2	99.5	97.2	97.1
Applications Software	94.4	94.5	98.8	96.0	96.3	93.9

RESPONDENTS' PRICE INCREASES AND FORECASTS IN WEST GERMANY

	PERCENT INCREASE IN LAST 12 MONTHS		FORECAST INCREASE EXPECTED IN NEXT 12 MONTHS		PERCENT INCREASE THAT WOULD BE UNACCEPTABL	
CLASSIFICATION	1981	1982	1981	1982	1981	1982
Large Mainframe Systems	5.4%	3.4%	4.2%	4.4%	6.4%	9 .3 %
Medium Mainframe Systems	5.1	6.0	5.2	5.0	7.8	7.6
Small Business Systems	6.9	7.3	4.8	4.7	10.2	9 .0
Other Minicomputers	7.2	No Mention	7.0	No Mention	11.3	No Mention
Peripherals	5.2	6.5	5.2	4.6	7.0	9.1
Terminals	6.8	5. 9	5.1	3.4	9.8	7.8
Word Processors	4.8	No Mention	5.0	No Mention	6.5	No Mention
Systems Software	5.3	8.5	4.8	6.0	8.1	6.0
Applications Software	7.1	No Mention	5.4	No Mention	7.0	No Mention

RESPONDENTS' AVERAGE CONTRACTED MAINTENANCE PERIOD VERSUS ACTUAL EQUIPMENT USAGE, 1981 AND 1982, IN WEST GERMANY

S	2	0	0	0	0	0	0	0	0
WORD	1982	•	-	,	_	5.	υ,	က်	5
WORD	1981			from 0 from	r.	5.0	5.0	5.6	5.6
INALS	1982	-	7.	6	1.7	5.0	5.5	5.0	5.5
TERMINALS	1981	1.3	1.6	1.3	1.8	5.3	5.6	5.3	5.8
PERIPHERALS	1982	1.5	2.1	. ت	2.1	5.1	5.4	7.1	5.4
PERIPH	1981	1.4	2.2	1.6	2.2	r.	5.7	5.2	5.8
OTHER	1982		Z	o ∑	шΖЬ) Z	S	
OTHER	1981	1.2	1.8	1.3	8.	5.2	5.4	5.3	5.8
VESS VESS VEMS	1982		•	1.4	1.3	5.1	5.1	5.1	5.1
SMALL BUSINESS SYSTEMS	1981		1.4	£.	1.6	5.0	5.7	5.2	6.1
MEDIUM MAINFRAME SYSTEMS	1982	1.4	1.7	 	1.7	4.7	5.1	4.6	5.1
MED MAINF SYST	1981	1.4	2.1	1.7	2.7	5.1	6.2	5.1	6.6
LARGE MAINFRAME SYSTEMS	1982	1.5	2.5	1.5	2.5	5.3	5.8	5.3	5.8
LAI MAINF SYST	1981	2.3	2.7	2.3	2.9	5.2	6.1	5.2	6.2
MAINTENANCE PERIOD AND EQUIPMENT	USAGE	Contracted Maintenance (Number of Shifts)	Equipment Usage (Number of Shifts)	Contracted Maintenance Forecast Next Year (Number of Shifts)	Forecast Equipment Usage Next Year (Number of Shifts)	Contracted Number of Days per Week	Actual Usage, (Days per Week)	Contracted Number of Days per Week Next Year	Forecast Usage (Days per Week) Next Year

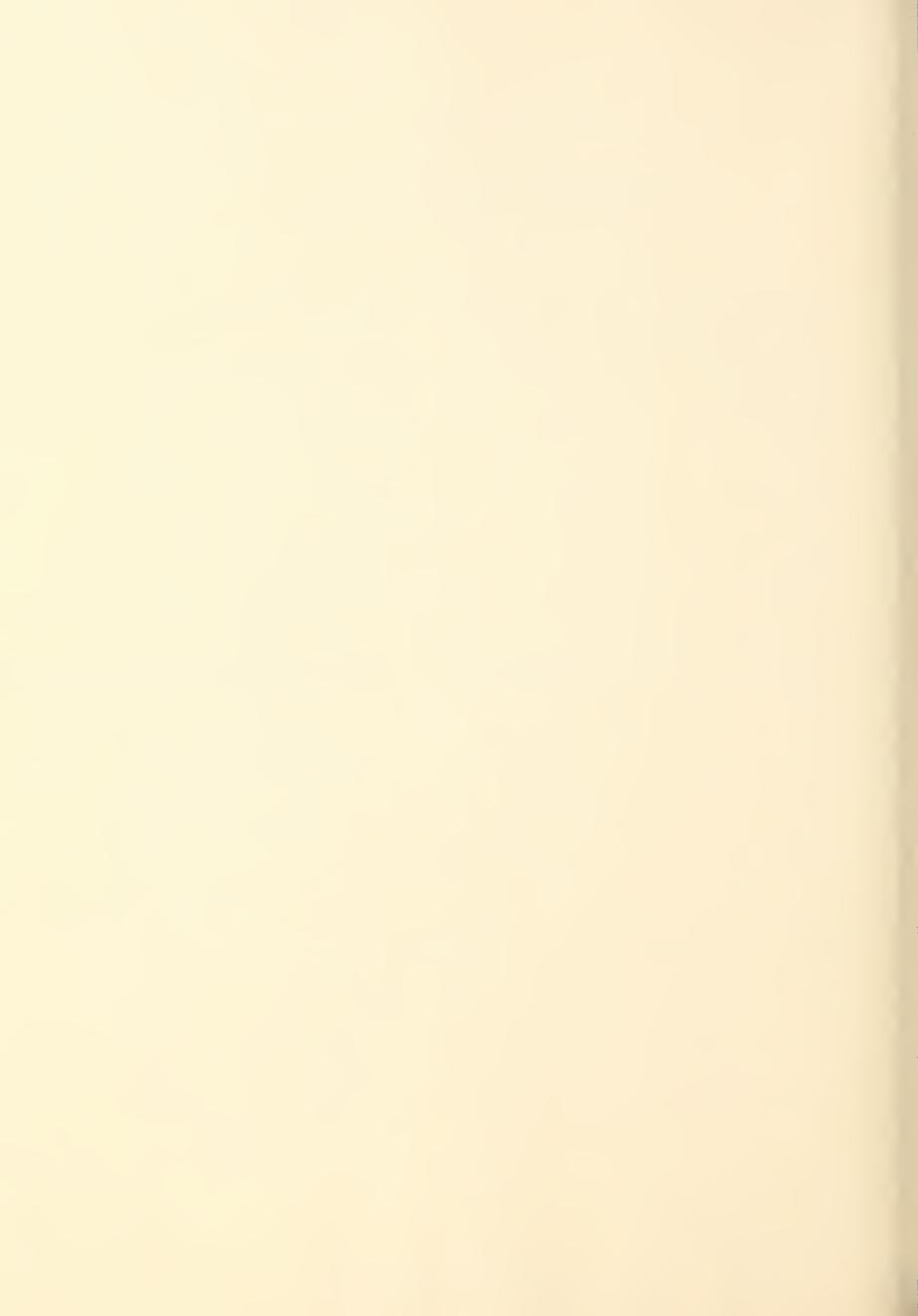
USERS' RATING OF IMPORTANCE OF MAINTENANCE ISSUES IN WEST GERMANY

	ASKED	IN 1981	ASKED	IN 1982
MAINTENANCE ISSUES	1981	1983	1982	1984
System Availability	9.2	9.9	9.8	9.9
Response Time	9.6	9.6	8.7	8.9
Repair Time	9.2	8.9	8.3	8.4
Preventive Maintenance	6.6	6.6	6.7	6.8
Remote Maintenance	5.9	7.6	4.6	5.5
Escalation Procedures	6.6	5.9	5.6	5.8
Price of Maintenance	5.6	7.3	7.7	8.1
Stable Engineer Population	6.6	6.9	6.4	6.4
Uptime Guarantees	6.6	8.9	7.2	7.4
Equipment Reliability	9.2	9.6	9.7	9.7
Support Centres	6.6	7.6	7.6	8.0
Software Maintenance	5.9	6.6	8.9	9.2
Flexible Contract	5.6	5 . 9	5.7	5.7
User Self-Maintenance	3.6	4.3	2.4	2.7

^{1 =} Unimportant
5 = Average

^{10 =} Important

APPENDIX C: FRENCH USER DATABASE

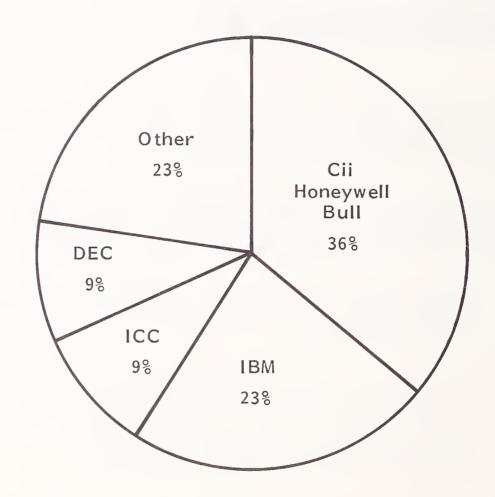


APPENDIX C: FRENCH USER DATABASE

A. COMPARISON: 1982 VERSUS 1981

- INPUT's assessment of French users indicates a dynamic marketplace for maintenance issues now and in the future.
- Cii Honeywell Bull and IBM continued to dominate the market for maintenance in large and medium systems, as shown in Exhibit C-1.
 - Market shares are as seen by respondent users and provide a general view of the market.
 - The purpose of this report is to discuss and analyse maintenance issues, trends, and data. Market share information is not intended to provide accurate analyses but a general users' view.
- Significant changes occurring between 1981 and 1982 include the following:
 - While French users are expecting a modest price increase, from 8.3% in 1982 to 9.6% in 1983, the acceptable/unacceptable threshold has barely changed up 0.5% as shown by Exhibit C-2.
 - Contracted maintenance shift coverage is expected to shrink significantly by 32% next year, from 1.6 shifts to 1.1 shifts, on average.

RESPONDENTS' VIEW OF LARGE AND MEDIUM MAINFRAME VENDORS IN FRANCE



USERS' SENSITIVITY REGARDING MAINTENANCE PRICE INCREASES IN FRANCE

LEVEL OF INCREASE	1981	1 982
Actual Increases As Perceived By Users (Last 12 Months)	9.6%	9.8%
Expected Increases (Next 12 Months)	8.3	9.6
Unacceptable Level Of Increase	12.0	12.5

- Fifty-nine percent of user satisfaction parameters improved across all product categories.
 - Eighty-eight percent of the user satisfaction parameters improved in the small systems segment.
 - Three quarters of the user satisfaction parameters improved in the large systems and terminal categories.
 - Seventy-one percent of user satisfaction parameters improved for systems and applications software segments.
 - Peripherals had only one parameter improvement out of eight for a 12.5% gain.
- Serviceability and response and repair times showed an improvement in actual response times for 50% of the product/software classifications, offset by a degradation in repair times (medians) for three quarters of product/software classes.
- Fifty-four percent of maintenance issues decreased in value of importance.
 Among these were:
 - Preventive maintenance, down 33% in value.
 - Maintenance pricing, down 19% in value of importance.
 - Repair time degraded in 17% of the cases.
- On the positive side:
 - Repair time increased in importance by 17%.

- Escalation procedures were expressed by users as being 14% more important this year than last.
- Support centres increased in importance by 10%.

B. GENERAL APPRAISAL OF THE FRENCH MAINTENANCE MARKET

- The general quality of service in France is improving, as shown in Exhibit C-3.
- Feedback from users to direct questioning about key issues is summarised in Exhibit C-4.
 - One particular quotation from a user is noteworthy: 'Monopoly of the manufacturer lends itself to abusive costs'.
- Exhibits C-5 through C-21 graphically indicate users' satisfaction with parameters of service.
- Serviceability and response and repair times, are illustrated in Exhibits C-22 through C-29.
- System availability, pricing, contract/usage, and maintenance issues are summarised in Exhibits C-30, C-31, C-32, and C-33, respectively.

EXHIBIT C-3

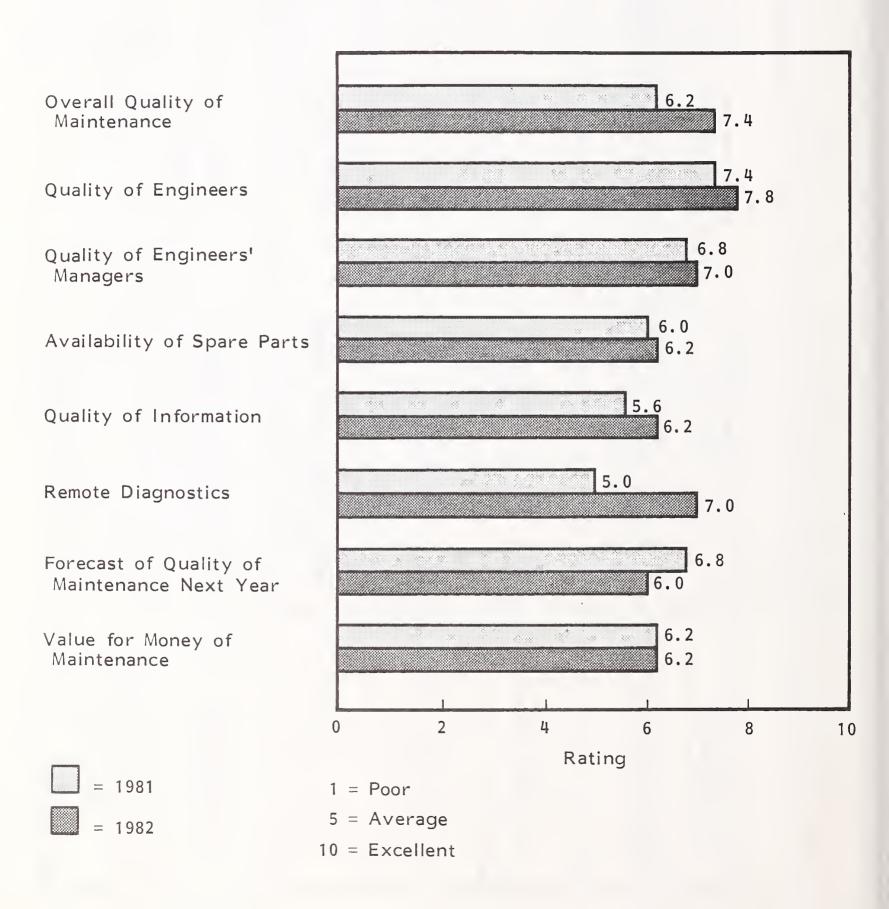
SIGNIFICANT CHANGES IN USERS' OPINIONS OF SERVICE QUALITY, FRANCE - 1982 VERSUS 1981

SERVICE CATEGORY	PRODUCT CATEGORY	CHANGE	CONCLUSIONS
Overall Quality of Maintenance	Large and Small Systems, Terminals, and Applications Software	+1.2 to +2.4	Strong indications of genuine improvement in service.
Quality of Engineer	Small Systems, Terminals, Word Processors, Applications Software	+1.0 to +2.8	Image of the field engineer has been greatly improved and probably is the main reason for increase in overall quality.
Quality of Engineers' Management	Small Systems Terminals, Word Processors (positive), Other Minis, and Applicable Software (negative)	-0.8 to +1.9	More favorable improvements than not.
Availability of Spares	Small Systems, Other Minis, Terminals (positive), Medium Systems, and Word Processors (negative)	-0.8 to +2.3	Half the job of getting spares to the site is done.
Quality of Information	Small Systems and Systems Software	+1.0 to +2.3	Reflects better management in service.
Remote Diagnostics	Large Systems (positive) Other Minis (negative)	-2.7 to +2.0	There is still some apprehension, but growing acceptance.
Forecast of the Quality of Maintenance	Large Systems (negative), Small Systems, Other Minis, Terminals, and Applications Software	-0.8 to +2.6	Optimism is the key.
Value of Maintenance	Peripherals (negative) and Small Systems and Applications Software (positive)	-0.7 to +1.7	Values are to increase in specialized areas.

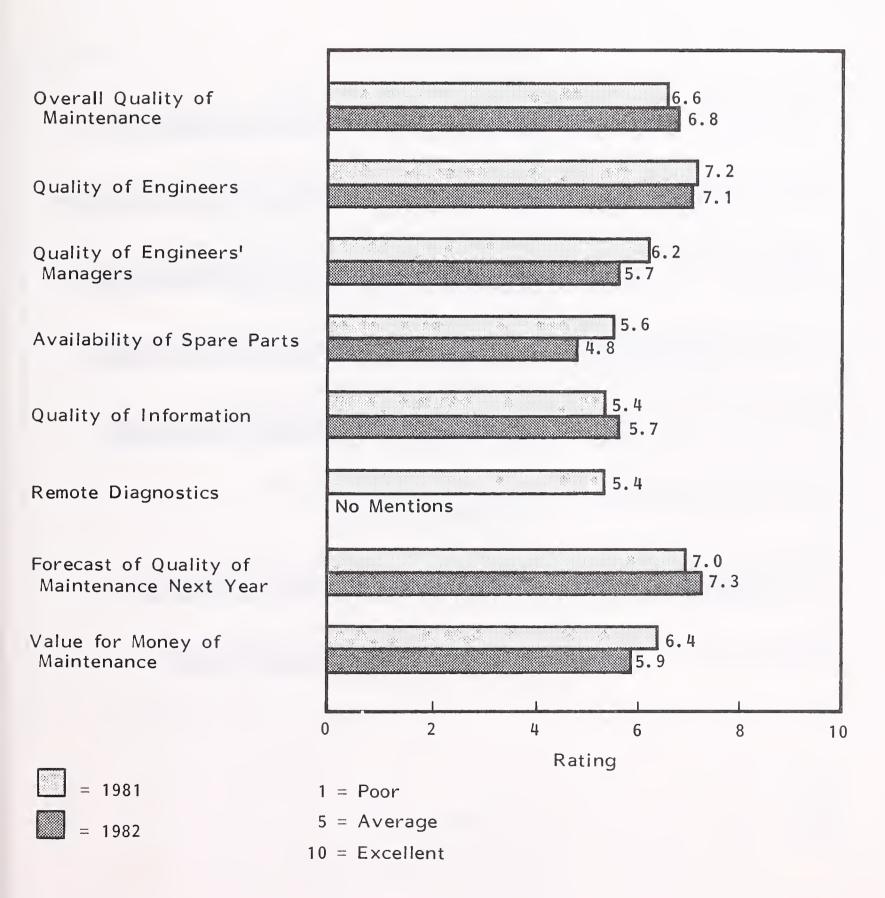
USER CONSENSUS REGARDING KEY SERVICE ISSUES FOR FRANCE

USER REPLY	'Number of repairs', 'equipment reliability', 'price related to uptime', 'varies according to MTBF', 'as provided by IBM', 'percent of purchase price', 'probability of breakdown'.	73% accept PM. 27% find it a burden.	25% of French users get some sort of maintenance discount.	65% of French users favor remote diagnostics. 29% are negatively inclined. 6% don't know.	31% are either considering third-party maintenance or using it. 63% are not interested. 6% don't know about third-party maintenance.	'Delays and incompetence of newly trained staff', 'high cost', 'response time too long', 'poor standard of work by average technician', 'cost of contract', 'response time', 'waiting for parts that are not in good condition', 'reduction of technician quality', 'monopoly of the manufacturer lends itself to abusive costs'.
CONCERN	Guidelines for Evaluating	Attitude Towards	Users Receiving	Attitude Towards	Considering Third-Party	Annoyances Regarding
	Cost of Maintenance	Preventive Maintenance	Maintenance Price Discount	Remote Diagnostics	Maintenance	Maintenance

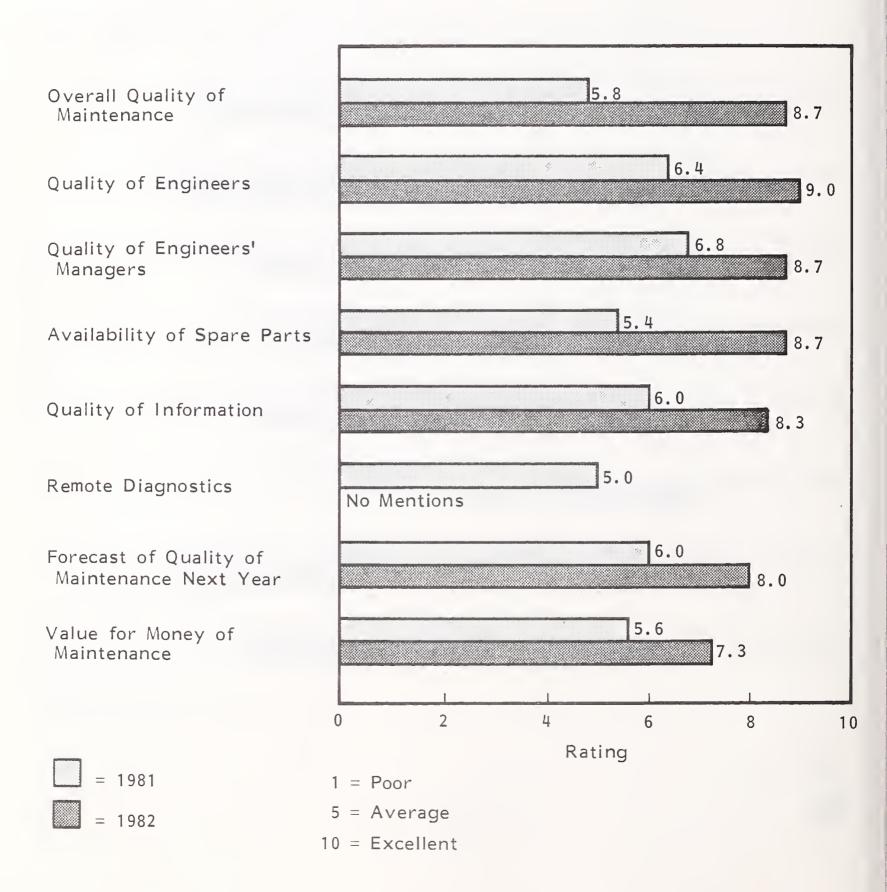
USER SATISFACTION WITH MAINTENANCE OF LARGE MAINFRAME SYSTEMS IN FRANCE



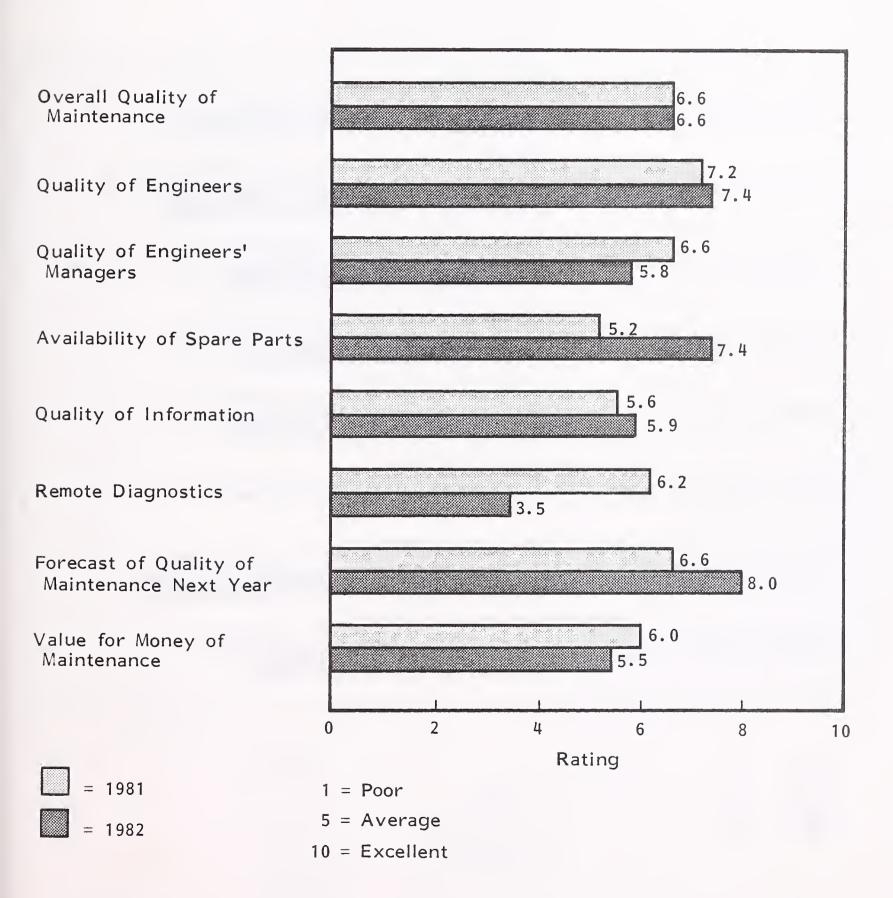
USER SATISFACTION WITH MAINTENANCE OF MEDIUM MAINFRAME SYSTEMS IN FRANCE



USER SATISFACTION WITH MAINTENANCE OF SMALL BUSINESS SYSTEMS IN FRANCE

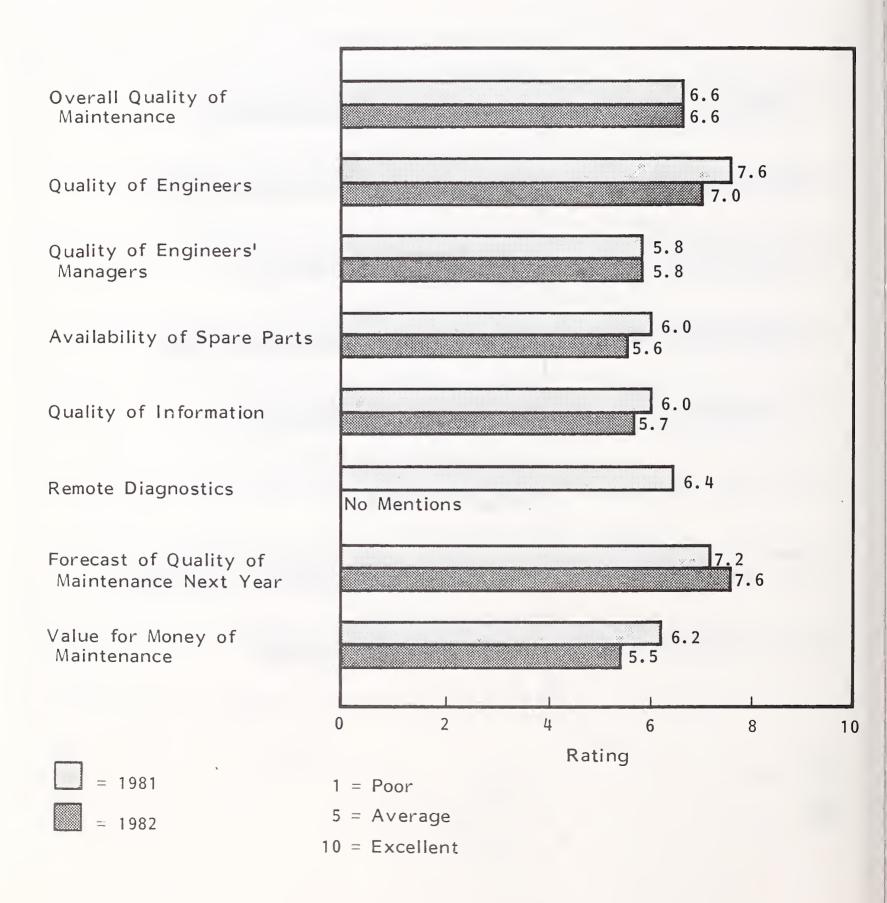


USER SATISFACTION WITH MAINTENANCE OF OTHER MINICOMPUTERS IN FRANCE



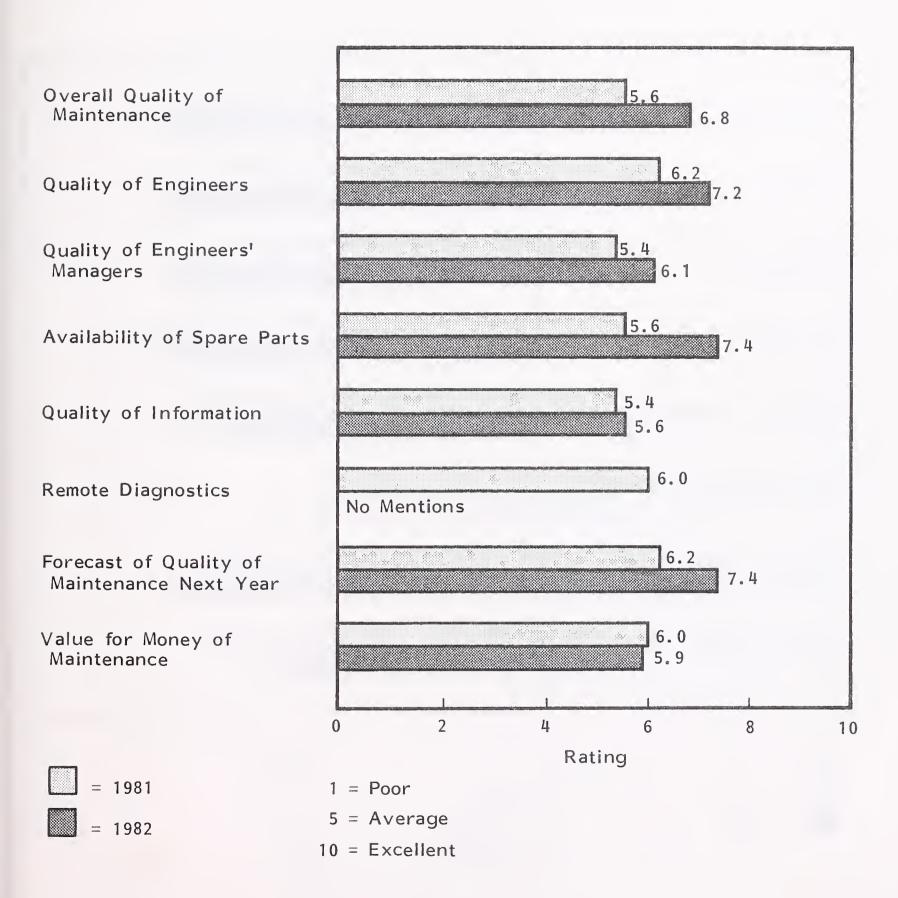


USER SATISFACTION WITH MAINTENANCE OF PERIPHERALS IN FRANCE

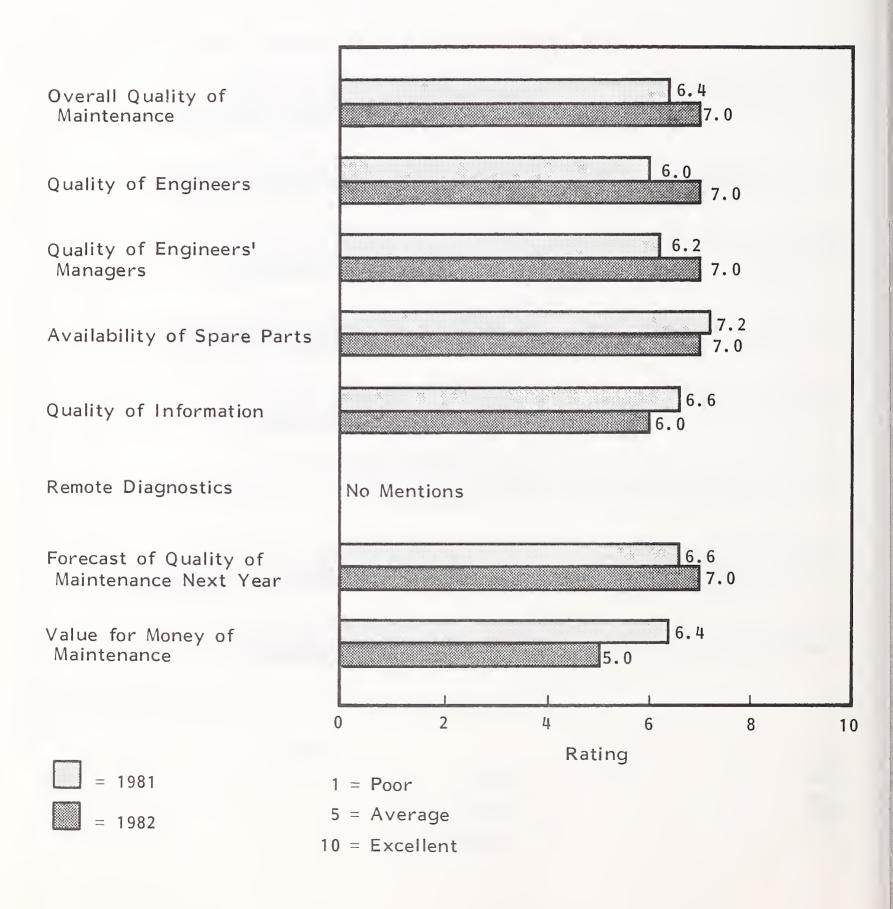


- 170 -

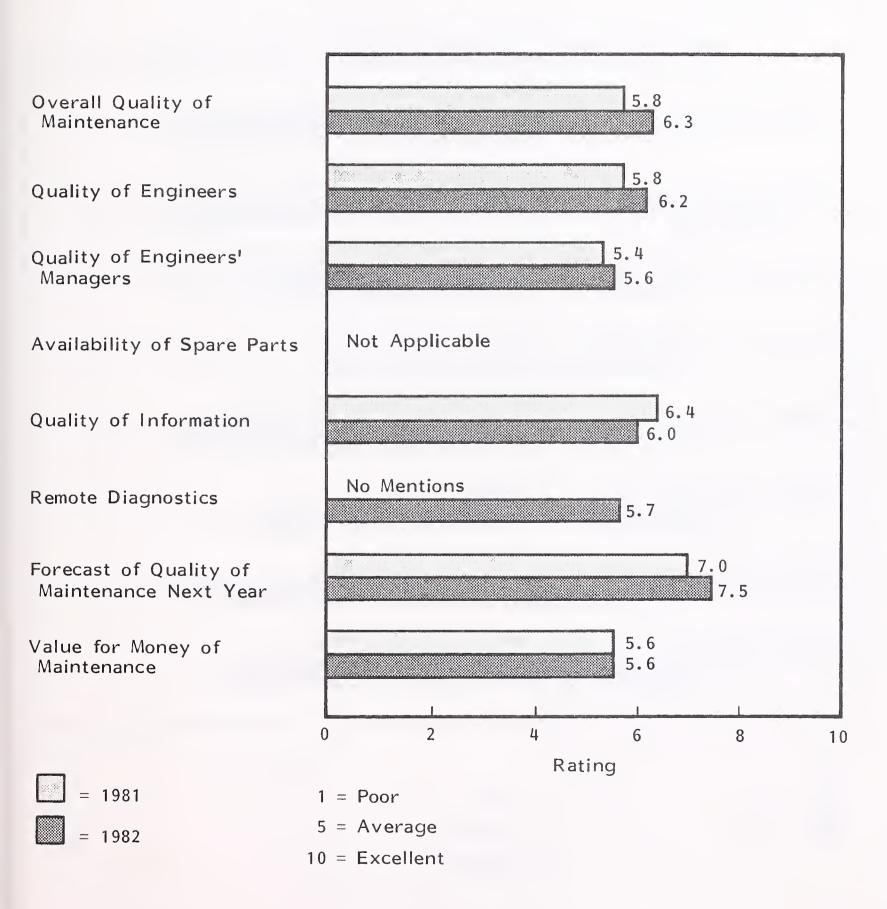
USER SATISFACTION WITH MAINTENANCE OF TERMINALS IN FRANCE



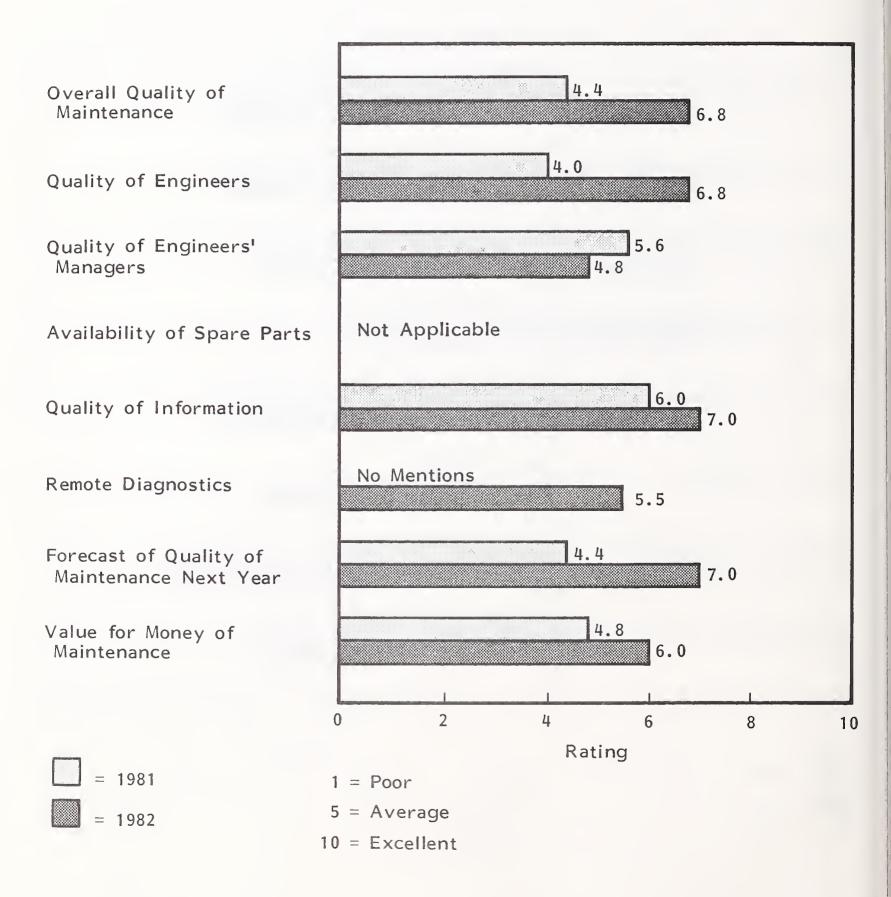
USER SATISFACTION WITH MAINTENANCE OF WORD PROCESSORS IN FRANCE



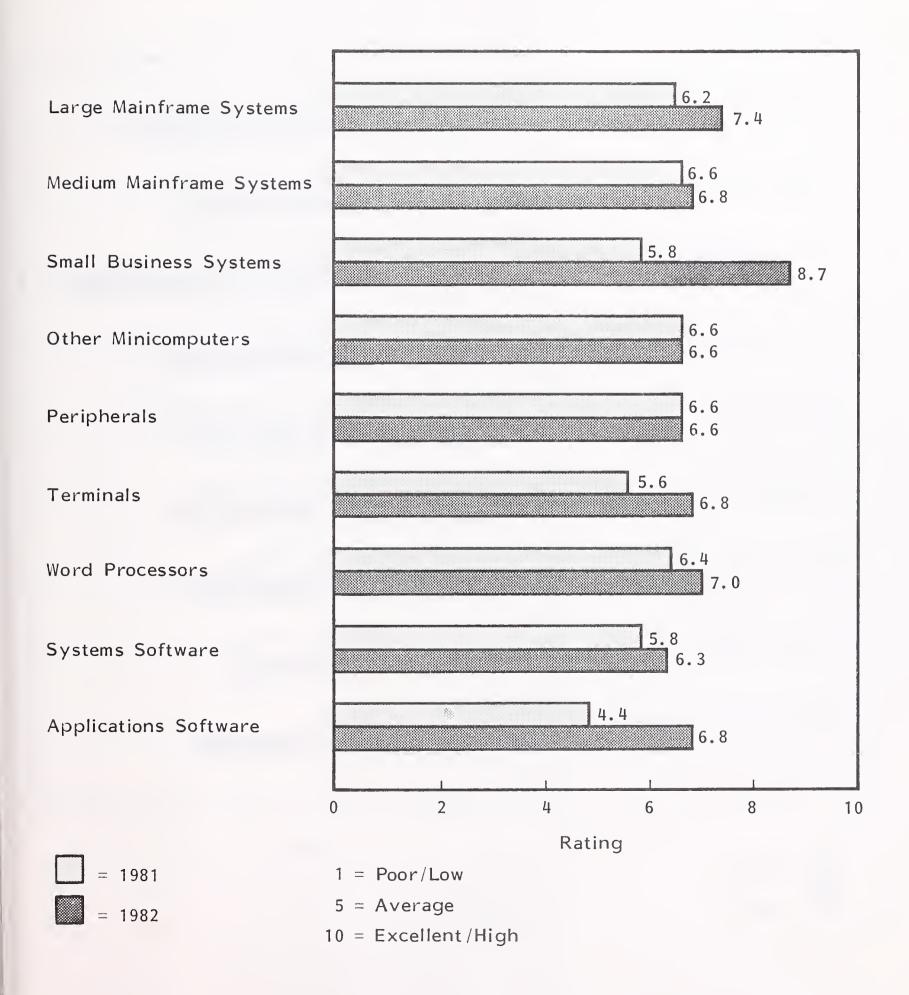
USER SATISFACTION WITH MAINTENANCE OF SYSTEMS SOFTWARE IN FRANCE



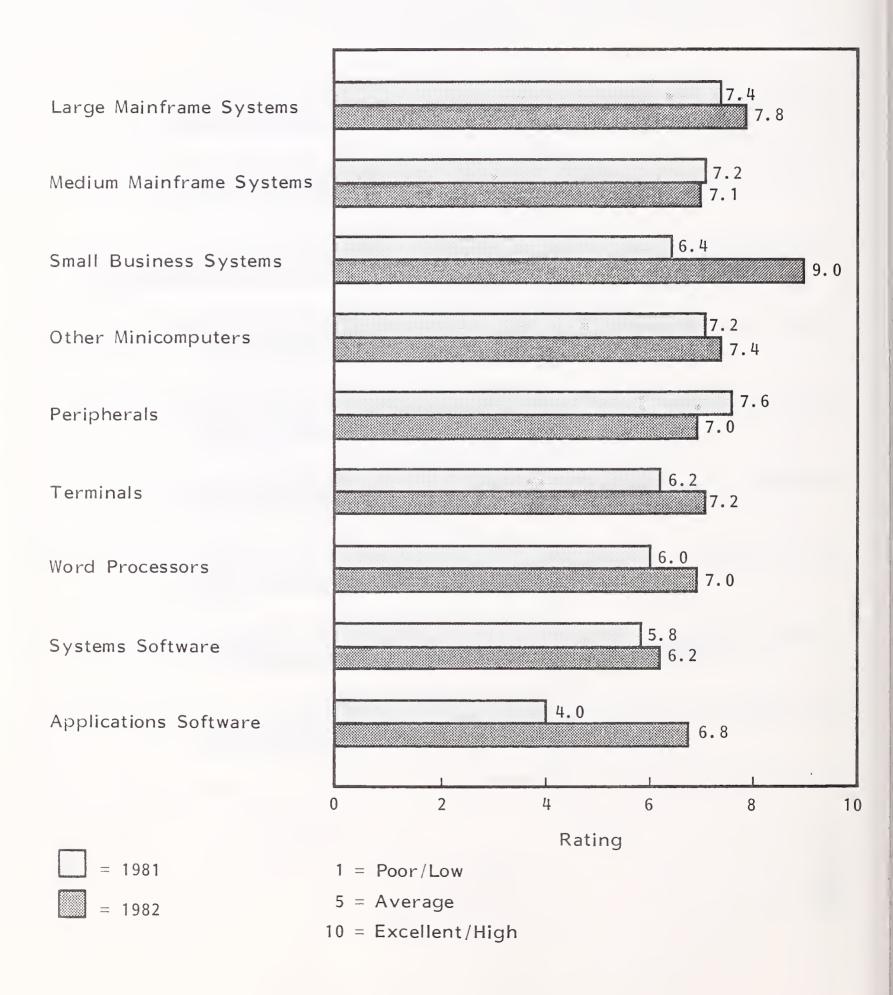
USER SATISFACTION WITH MAINTENANCE OF APPLICATIONS SOFTWARE IN FRANCE



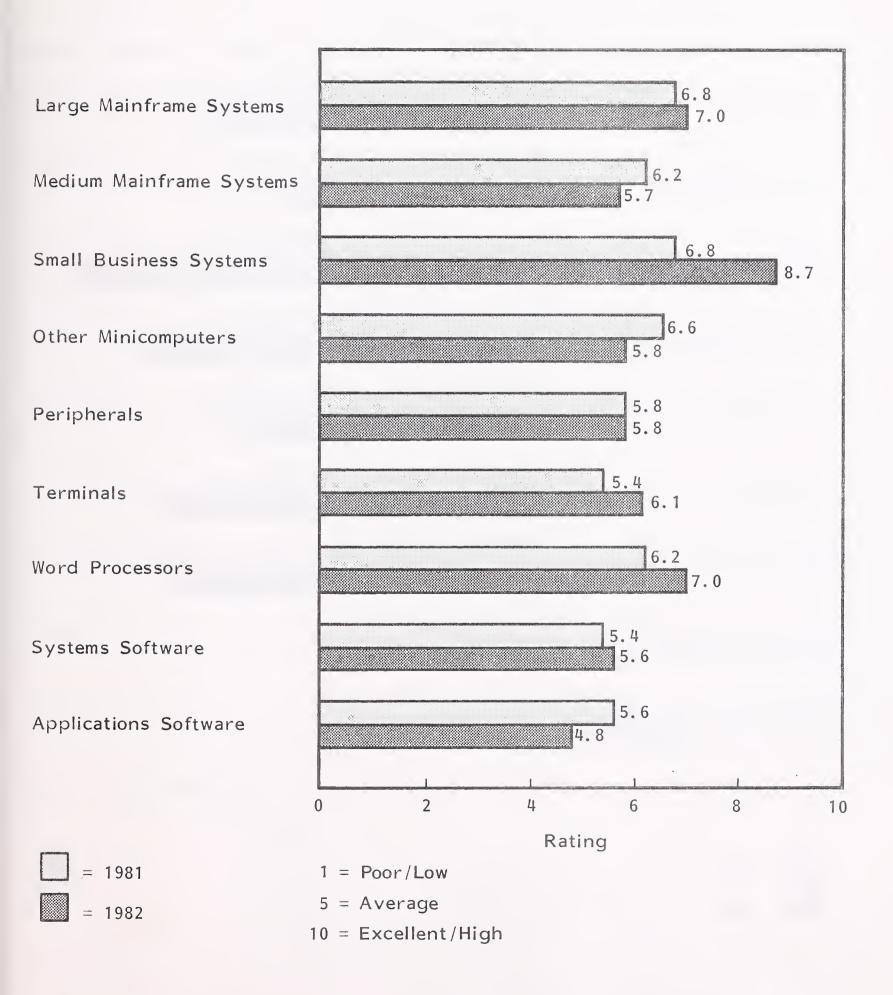
USERS' RATING OF OVERALL QUALITY OF MAINTENANCE IN FRANCE



USERS' RATING OF QUALITY OF ENGINEERS IN FRANCE

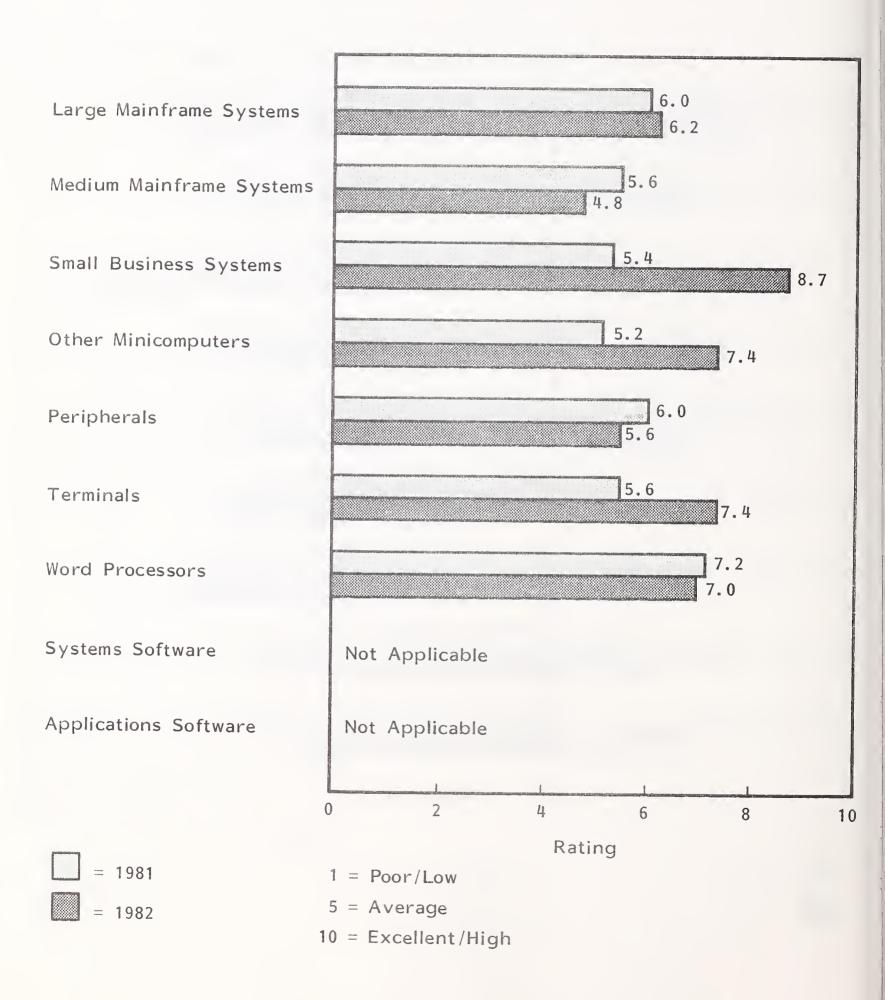


USERS' RATING OF QUALITY OF ENGINEERS' MANAGERS IN FRANCE

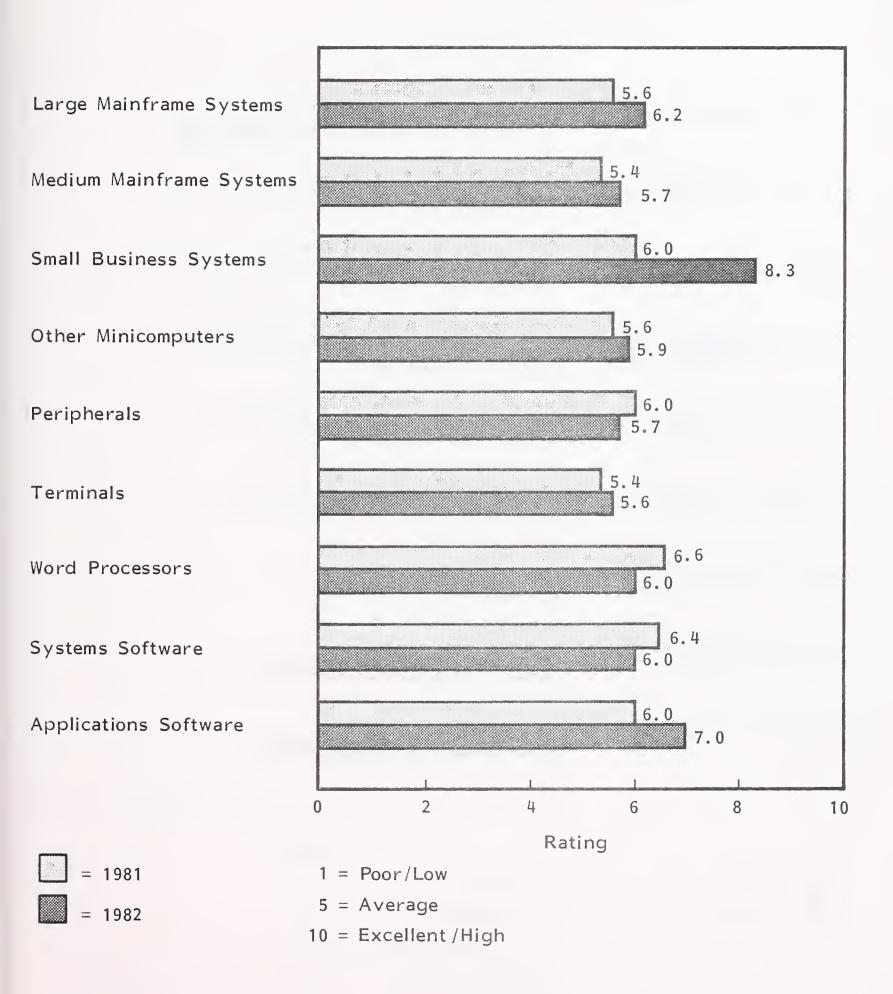




USERS' RATING OF AVAILABILITY OF SPARE PARTS IN FRANCE

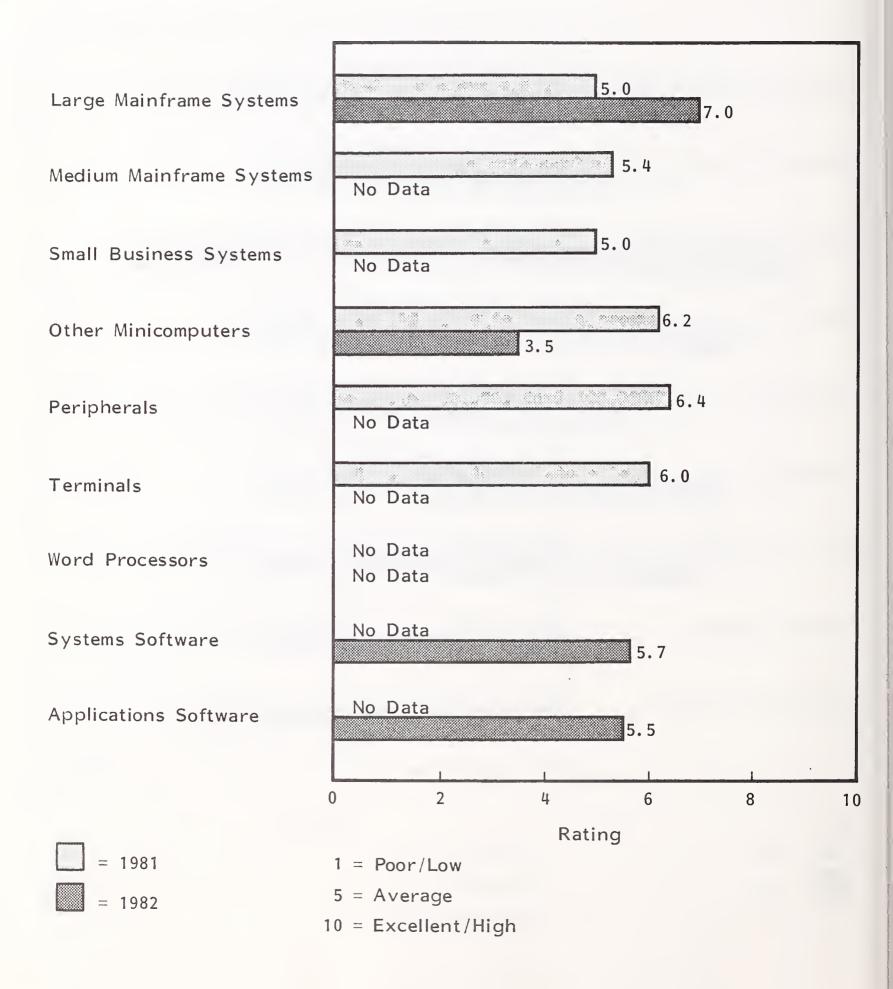


USERS' RATING OF QUALITY OF INFORMATION IN FRANCE

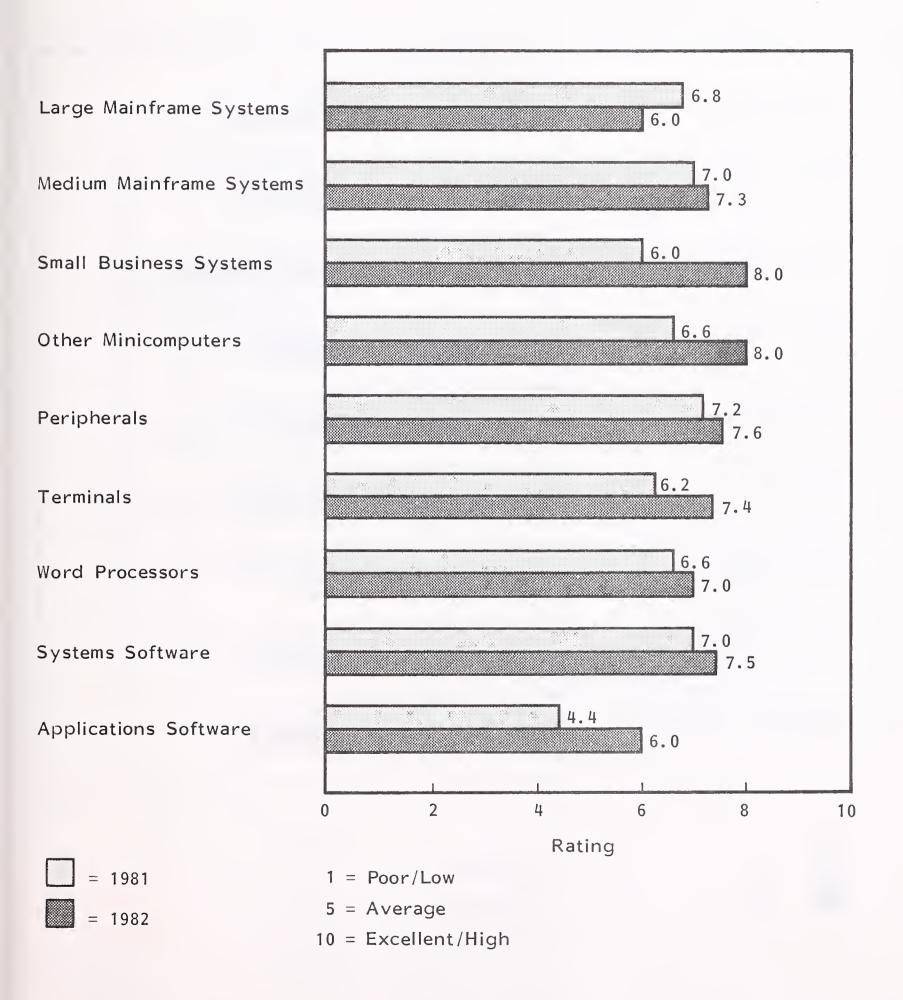




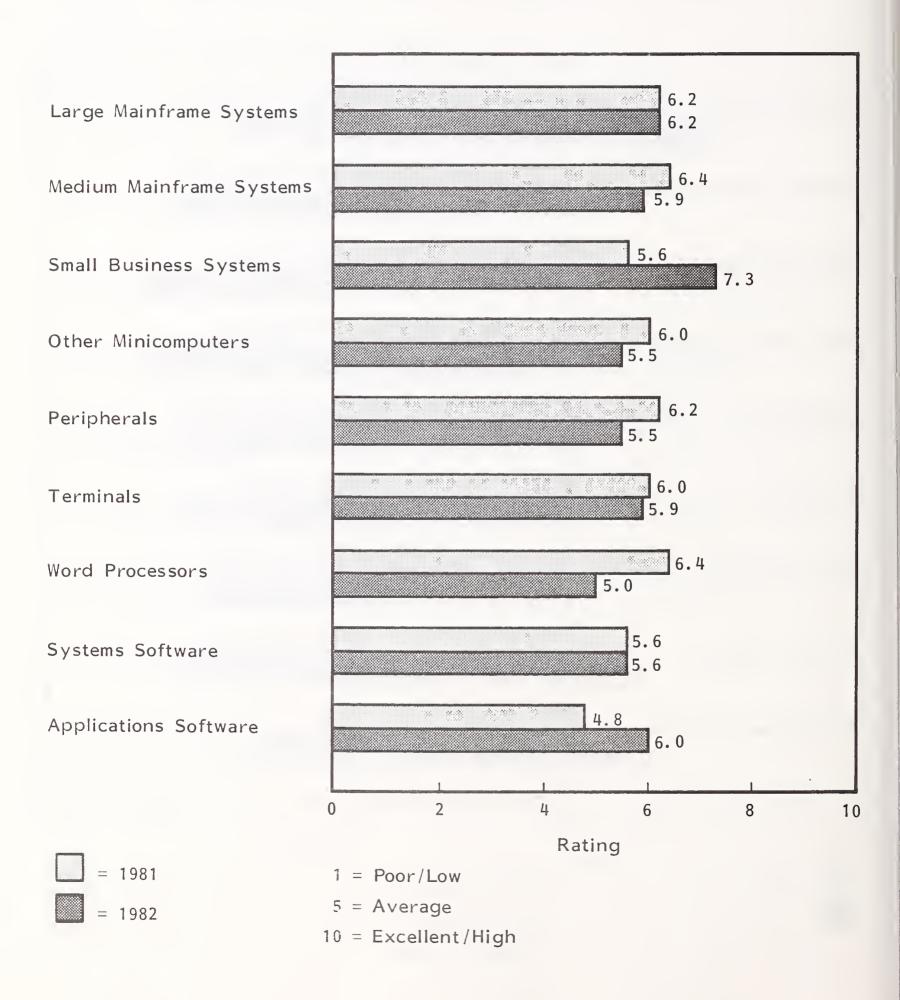
USERS' RATING OF REMOTE DIAGNOSTICS IN FRANCE



USERS' RATING OF QUALITY OF MAINTENANCE IN FRANCE



USERS' RATING OF VALUE FOR MONEY OF MAINTENANCE IN FRANCE



USERS' PERCEPTION OF SERVICEABILITY FOR LARGE SYSTEMS IN FRANCE

	TIME IN HOURS					
	198	81	1982			
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN		
Response Time						
Preferred	0.50-4.0	0.75	1.0-2.0	1.0		
Actual	0.25-5.0	2.0	1.0-6.0	3.0		
Minimum Acceptable	0.50-5.0	1.50	2.0-3.0	2.0		
Repair Time						
Preferred	0.50-4.50	0.75	0.5-2.0	1.0		
Actual	0.50-5.0	1.0	1.0-24.0	2.0		
Maximum Acceptable	1.0-5.0	2.0	2.0	2.0		

USERS' PERCEPTION OF SERVICEABILITY FOR MEDIUM SYSTEMS IN FRANCE

·	TIME IN HOURS				
	1981		1982		
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN	
Response Time					
Preferred	0.50-4.0	1.0	0.50-4.0	1.0	
Actual	0.50-5.0	2.50	1.0-24.0	1.0	
Minimum Acceptable	0.50-5.0	2.50	2.0-24.0	2.0	
Repair Time					
Preferred	0.50-5.0	1.0	0.50-2.0	1.0	
Actual	0.50-5.0	1.50	1.0-24.0	2.0	
Maximum Acceptable	0.50-5.0	3.0	2.0	2.0	

USERS' PERCEPTION OF SERVICEABILITY FOR SMALL SYSTEMS IN FRANCE

	TIME IN HOURS						
	198	81	1982				
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN			
Response Time							
Preferred	0.50-5.0	2.0	1.0-2.0	2.0			
Actual	0.50-5.0	3.0	3.0-4.0	3.0			
Minimum Acceptable	0.50-5.0	3.50	4.0-8.0	4.0			
Repair Time							
Preferred	0.50-5.0	1.0	2.0-2.0	2.0			
Actual	0.50-5.0	2.50	2.0-4.0	2.0			
Maximum Acceptable	0.50-5.0	2.75	4.0-8.0	4.0			

USERS' PERCEPTION OF SERVICEABILITY FOR OTHER MINICOMPUTERS IN FRANCE

	TIME IN HOURS				
	198	81	1982		
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN	
Response Time					
Preferred	0.25-4.50	1.50	1.0-8.0	2.0	
Actual	0.50-5.0	2.0	1.0-29.0	7.0	
Minimum Acceptable	0.25-5.0	3.50	2.0-9.0	3.0	
Repair Time					
Preferred	0.50-4.50	1.0	1.0-8.0	2.0	
Actual	0.50-4.75	2.0	1.0-28.0	5.0	
Maximum Acceptable	0.50-5.0	2.50	2.0-8.0	2.0	

USERS' PERCEPTION OF SERVICEABILITY FOR PERIPHERALS IN FRANCE

	TIME IN HOURS						
	198	81	1982				
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN			
Response Time							
Preferred	0.50-3.50	1.0	1.0-48.0	2.0			
Actual	0.50-5.0	2.50	0.50-24.0	2.0			
Minimum Acceptable	0.50-5.0	3.0	2.0-48.0	2.0			
Repair Time							
Preferred	0.50-4.0	1.0	0.50-15.0	4.0			
Actual	0.50-5.0	2.50	0.50-24.0	4.0			
Maximum Acceptable	0.50-5.0	3.50	2.0-24.0	2.0			

USERS' PERCEPTION OF SERVICEABILITY FOR TERMINALS IN FRANCE

·	TIME IN HOURS			
	1981		1982	
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-5.0	1.75	2.0-24.0	4.0
Actual	0.50-5.0	2.50	2.0-48.0	4.0
Minimum Acceptable	0.50-5.0	3.0	2.0-36.0	3.0
Repair Time				
Preferred	0.50-4.0	0.75	0.50-2.0	1.0
Actual	0.50-5.0	1.50	0.50-120.0	4.0
Maximum Acceptable	0.50-5.0	3.0	2.0-24.0	2.0

USERS' PERCEPTION OF SERVICEABILITY FOR WORD PROCESSORS IN FRANCE

		TIME IN	HOURS	
	198	31	198	32
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0.50-10.0	2.0	4.0-24.0	4.0
Actual	0.50-10.0	5.0	4.0-24.0	8.0
Minimum Acceptable	2.0-10.0	5.0	4.0-12.0	8.0
Repair Time				
Preferred	0.50-5.0	1.0	0.50-2.0	4.0
Actual	0.50-5.0	2.0	0.50-120.0	8.0
Maximum Acceptable	0.50-5.0	2.50	2.0-24.0	4.0

USERS' PERCEPTION OF SERVICEABILITY FOR SOFTWARE IN FRANCE

		TIME IN	HOURS	
	198	31	198	32
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	1.0-10.0	6.0	1.0-24.0	2.0
Actual	1.50-10.0	10.0	1.0-24.0	4.0
Minimum Acceptable	2.0-10.0	9.0	1.0-24.0	2.0
Repair Time				
Preferred	1.0-10.0	2.0	1.0-4.0	1.0
Actual	1.50-10.0	5.0	1.0-48.0	3.0
Maximum Acceptable	1.50-10.0	5.50	2.0-20.0	2.0

FRENCH RESPONDENTS' VIEWS OF SYSTEM AVAILABILITY

SYSTEM AVAILABILITY (percent)	CURRE GET 1	· · · • — ·	IDEA WOU LII	JLD	MINII WOU ACC	ILD
CLASSIFICATION	1981	1982	1981	1982	1981	1982
Large Mainframe Systems	95.1%	97.0%	98.8%	99.4%	94.2%	96.6%
Medium Mainframe Systems	97.2	96.1	99.1	98.3	95.7	85.2
Small Business Systems	93.0	96.2	97.5	98.7	95.0	95.3
Other Minicomputers	94.1	94.6	99.1	98.8	94.5	88.8
Peripherals	93.4	83.8	98.4	88.0	95.0	83.4
Terminals	98.7	92.4	99.5	88.3	97.0	85.6
Word Processors	95.6	91.3	99.0	96.3	96.0	95.3
Systems Software	90.8	95.5	98.8	98.7	95.0	95.6
Applications Software	93.8	96.0	99.0	98.7	96.0	97.7

RESPONDENTS' PRICE INCREASES AND FORECASTS IN FRANCE

SYSTEM AVAILABILITY (percent)	PERC INCRE IN L/ 12 MOI	ASE AST	FOREC INCRE EXPEC IN NI 12 MOI	EASE CTED EXT	PERC INCRI TH/ WOUL UNACCE	EASE AT D BE
CLASSIFICATION	1981	1982	1981	1982	1981	1982
Large Mainframe Systems	10.5%	11.0%	8.4%	10.2%	12.6%	12.0%
Medium Mainframe Systems	11.8	8.6	10.2	9. 2	13.4	13.9
Small Business Systems	8.8	16.0	8.9	13.5	12.1	18.3
Other Minicomputers	8.1	11.5	7.6	10.7	11.4	10.0
Peripherals	10.6	9.5	6.8	10.0	9.4	13.0
Terminals	8.6	8.5	8.4	7.8	12.8	11.8
Word Processors	7.4	6.7	6.3	10.7	10.3	9.0
Systems Software	9.3	8.0	7.1	6.5	11.7	14.5
Applications Software	11.3	8.0	11.2	8.0	14.1	10.0

EXHIBIT C-32

RESPONDENTS' AVERAGE CONTRACTED MAINTENANCE PERIOD VERSUS ACTUAL EQUIPMENT USAGE, 1981 AND 1982, IN FRANCE

LARGE MAINFRAME SYSTEMS		MEDIUM MAINFRAME SYSTEMS	SMALL BUSINESS SYSTEMS	ALL INESS TEMS	OTHER	OTHER MINICOMPUTERS	PERIPHERALS	ERALS	TERMINALS	INALS	WC	WORD
1982 1981 1982	1982		1981	1982	1981	1982	1981	1982	1981	1982	1981	1982
1.3 1.7 1.3	<u>.</u>		1.2	1.0	1.2	1.0	1.8	1.3	1.1	1.0	•	1.0
2.3 2.1 2.3	2.3		1.5	1.5	1.6	1.5	1.7	2.3	2.2	1.3	1.3	1.0
1.3 1.8 1.3			1.6	1.0	1.2	1.0	1.9	1.3	1.2	1.0	•	1.0
2.5 2.3 2.3	2.3		6.1	1.5	1.8	1.5	2.2	2.7	1.5	2.3	1.6	1.0
4.0 5.3 3.4	3.4		5.1	5.0	5.2	5.0	5.2	3.6	5.4	3.8	5.0	5.0
5.4 5.4 5.2	Ŋ. ,	~	5.2	5.0	5.3	4.2	5.5	4.9	5.5	4.6	5.1	5.3
4.0 5.5 3.4	3,	St.	5.0	5.0	5.0	5.0	5.5	3.6	5.5	3.8	5.4	5.0
5.4 6.4 5.2	5.2	~	5.9	5.0	5.1	4.2	5.7	5.1	5.6	5.1	5.5	5.3

USERS' RATING OF IMPORTANCE OF MAINTENANCE ISSUES IN FRANCE

	ASKED	IN 1981	ASKED	IN 1982
MAINTENANCE ISSUES	1981	1983	1982	1984
System Availability	9.2	9.6	8.8	9.5
Response Time	8.3	9.2	7.8	8.9
Repair Time	6.9	7.3	8.1	8.5
Preventive Maintenance	6.6	5.9	4.4	4.8
Remote Maintenance	5.0	5.0	4.8	6.9
Escalation Procedures	5.9	5.9	6.7	7.8
Price of Maintenance	8.9	9.2	7.2	7.7
Stable Engineer Population	6.6	. 6.6	6.1	5.9
Uptime Guarantees	6.9	7.6	7.5	8.2
Equipment Reliability	9.2	9.6	9.1	8.9
Support Centres	6.3	6.9	5.7	6.9
Software Maintenance	6.9	8.9	7.4	8.2
Flexible Contract	5.9	6.3	5.6	6.5
User Self-Maintenance	6.6	6.6	5.1	7.1

^{1 =} Unimportant
5 = Average

^{10 =} Important

APPENDIX D: BENELUX, SCANDINAVIAN, AND ITALIAN USER DATABASES



APPENDIX D: BENELUX, SCANDINAVIAN, AND ITALIAN USER DATABASES

A. BENELUX USERS

- I. COMPARISON: 1982 VERSUS 1981
- INPUT's assessment of the Benelux users in 1981 and 1982 indicates stability in opinions and attitudes regarding maintenance and maintenance vendors. Few significant variations were detected, comparing 1982 data to 1981 data.
 - A notable change is Benelux users' tolerance to maintenance price increases.
 - They are willing to accept a slightly higher increase this year compared to last, when other users are hoping to see the amount of increase shrink.
 - The absence of competitive maintenance alternatives supports this attitude.
 - Benelux users are also willing to accept longer average response times,
 mainly because actual response and repair times have improved.
 - Subjective ratings of significant maintenance issues showed a trend of less concern over service in 1982 than in 1981.

- Among the issues of lesser importance to the user were: escalation procedures, stable engineering work force, response time, and pricing.
- Issues gaining in the Benelux users' opinion included: system centres, system availability, support centres, and user self-maintenance.

2. KEY SERVICE ISSUES

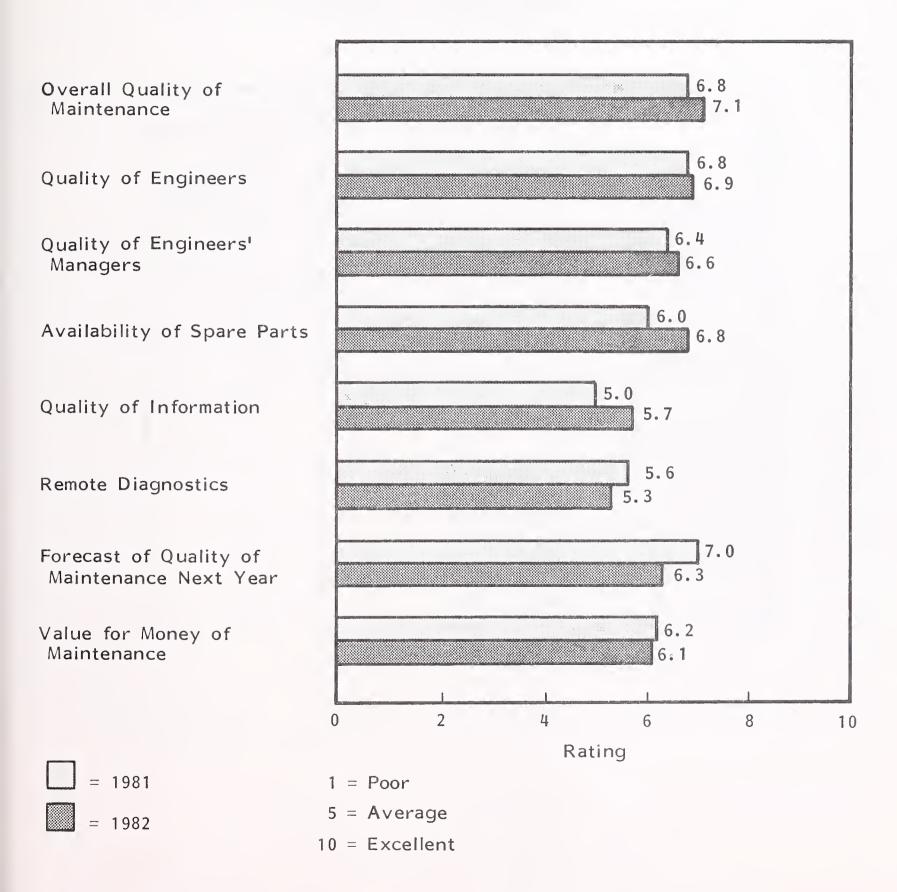
- Users' candid reactions or comments to key service issues are summarised in Exhibit D-1.
 - Vendor maintenance dominates this area and, without competition, the absence of any maintenance price discounts is not unusual.
 - The potential for third-party maintenance is good, as most users perceive it as being unavailable rather than objectionable.
 - Maintenance cost evaluation is primarily determined from hardware cost relationships and performance.
 - Views are positive regarding preventive maintenance and remote diagnostics.
 - Annoyances concerning maintenance are not unusual, including the fact that there is any necessity for service.
- Vendors should be sensitive to the vulnerability of the Benelux market for alternative or competitive maintenance resources.

USER CONSENSUS REGARDING KEY SERVICE ISSUES FOR BENELUX

ma abo
Annoyances Regarding 'Delays', 'bound to supplier', 'trial and error diagnostics', 'it's a necessity' disagreements between hardware and software engineers', 'ongoing faults' (repetitive).

- 3. SATISFACTION WITH MAINTENANCE AND SERVICEABILITY
- Benelux users are satisfied with the service they receive and feel that there
 has been a slight overall improvement in quality of maintenance, as shown in
 Exhibit D-2.
 - Ratings by users in 1982 do not vary appreciably with those of 1981.
 - Perceived enhancements are seen in five out of the eight topics.
 - Spare parts availability and quality of information are the most notable improvements.
- Exhibit D-3 compares trends in response times and mean time to repair as perceived by users.
 - Actual response times have improved slightly, as have repair times.
 - These improvements are responsible for users relaxing the range of minimum acceptable responsiveness.
- 4. SYSTEM AVAILABILITY, PRICES, AND MAINTENANCE ISSUES
- System availability is important to Benelux users, as shown in Exhibit D-4.
 - Users are receiving availability from their systems which falls between minimum and maximum expectations.
 - The actual system availability, as perceived by users, ranges from 90.4% to 98.8% depending on equipment classification.
 - . Ideal expectations vary from 97% to 100%.

USER SATISFACTION WITH MAINTENANCE OF ALL SYSTEMS IN BENELUX



USERS' PERCEPTION OF SERVICEABILITY FOR ALL SYSTEMS IN BENELUX

		TIME IN	HOURS	
	19	81	198	32
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0-8.0	1.0	0.25-4.0	1.0
Actual	0-36.0	2.0	0.25-8.0	2.0
Minimum Acceptable	0-24.0	2.2	0.25-120.0	4.0
Repair Time				
Preferred	0-2.8	0.8	0.50-36.0	1.0
Actual	0-3.5	1.8	0.25-4.0	1.0
Maximum Acceptable	0.3-4.0	2.0	0.50-120.0	2.0

BENELUX RESPONDENTS' VIEW OF SYSTEM AVAILABILITY

SYSTEM AVAILABILITY (percent)	CURRE GET 1		WOU	ALLY J L D KE	MINI WOU ACC	JLD
CLASSIFICATION	1981	1982	1981	1982	1981	1982
Large Mainframe Systems	97.7%	96.6%	99.18	99.7%	95.1%	95.4%
Medium Mainframe Systems	96.8	90.4	98.7	97.7	94.7	91.4
Small Business Systems	92.0	96.7	97.1	99.4	93.4	93.4
Other Minicomputers	95.4	97.2	98.8	100.0	95.2	95.4
Peripherals	97.4	96.8	99.0	99.3	95.3	94.8
Terminals	97.1	96.0	98.7	99.7	94.6	94.5
Word Processors	93.2	98.8	98.1	100.0	95.1	93.0
Systems Software	98.1	96.4	99.2	98.7	98.0	94.5
Applications Software	94.0	96.3	98.4	97.0	94.9	86.3

- Minimum standards range from 86.3% to 95.4%.
- Overall average system availability improved slightly from 95.7% in 1981 to 96.1% in 1982.
- Exhibit D-5 provides user-perceived pricing data.
 - Users believe they had an average maintenance price increase of 5.6% in 1982 compared to a 6.3% increase in 1981.
 - They expected a 6.2% increase in 1982 and believe that 1982-1983 increases will be about 5.7%.
 - The threshold of unacceptable price increases was at 8.5% in 1981 and is 8.7% in 1982.
- o Maintenance issues, as rated by users, appear in Exhibit D-6.

B. SCANDINAVIAN USERS

- I. COMPARISON: 1982 VERSUS 1981
- Scandinavian users express an appreciable improvement in their satisfaction with service in 1982 compared to 1981.
 - Use of remote diagnostics improved 84%.
 - Spare parts availability increased by 34%.
 - Quality of engineers' managers and engineers rose 28% and 15% respectively.

RESPONDENTS' PRICE INCREASES AND FORECASTS IN BENELUX

	PERC INCRE IN LA 12 MON	ASE AST	FOREC INCRE EXPEC IN NI 12 MOI	EASE CTED EXT	PERC INCRI TH WOUL UNACCE	EASE AT D BE
CLASSIFICATION	1981	1982	1981	1982	1981	1982
Large Mainframe Systems	4.8%	6.6%	4.5%	7.4%	7.5%	9.2%
Medium Mainframe Systems	6.2	6.0	5.0	3.8	7.5	7.5
Small Business Systems	7.1	6.9	10.5	7.4	12.0	10.0
Other Minicomputers	6.9	4.3	6.5	6.0	8.0	9.0
Peripherals	5.4	5.4	5.4	5.2	7.5	8.0
Terminals	7.2	4.6	6.0	4.4	9.0	9.2
Word Processors	No Mentions	3.4	6.0	4.5	7.5	10.0
Systems Software	4.8	6.2	5.0	6.3	8.4	10.0
Applications Software	8.2	7.0	6.5	6.0	9.2	5.5

USERS' RATING OF IMPORTANCE OF MAINTENANCE ISSUES IN BENELUX

	ASKED	IN 1981	ASKED	IN 1982
MAINTENANCE ISSUES	1981	1983	1982	1984
System Availability	8.3	8.9	9.5	9.6
Response Time	9.2	9.2	8.1	8.6
Repair Time	8.6	8.9	7.9	8.1
Preventive Maintenance	6.9	5.9	6.8	6.6
Remote Maintenance	5.6	6.9	4.8	5.3
Escalation Procedures	7.3	7.3	6.3	6.5
Price of Maintenance	8.9	8.9	5.9	6.5
Stable Engineer Population	8.3	6.9	5.4	5.4
Uptime Guarantees	5.9	7.6	7.0	7.5
Equipment Reliability	8.6	8.6	9.2	9.2
Support Centres	5.0	5.0	6.7	7.0
Software Maintenance	7.6	8.3	7.9	8.0
Flexible Contract	6.3	6.3°	5.8	6.4
User Self-Maintenance	3.6	5.0	5.1	5.8

^{1 =} Unimportant

^{5 =} Average

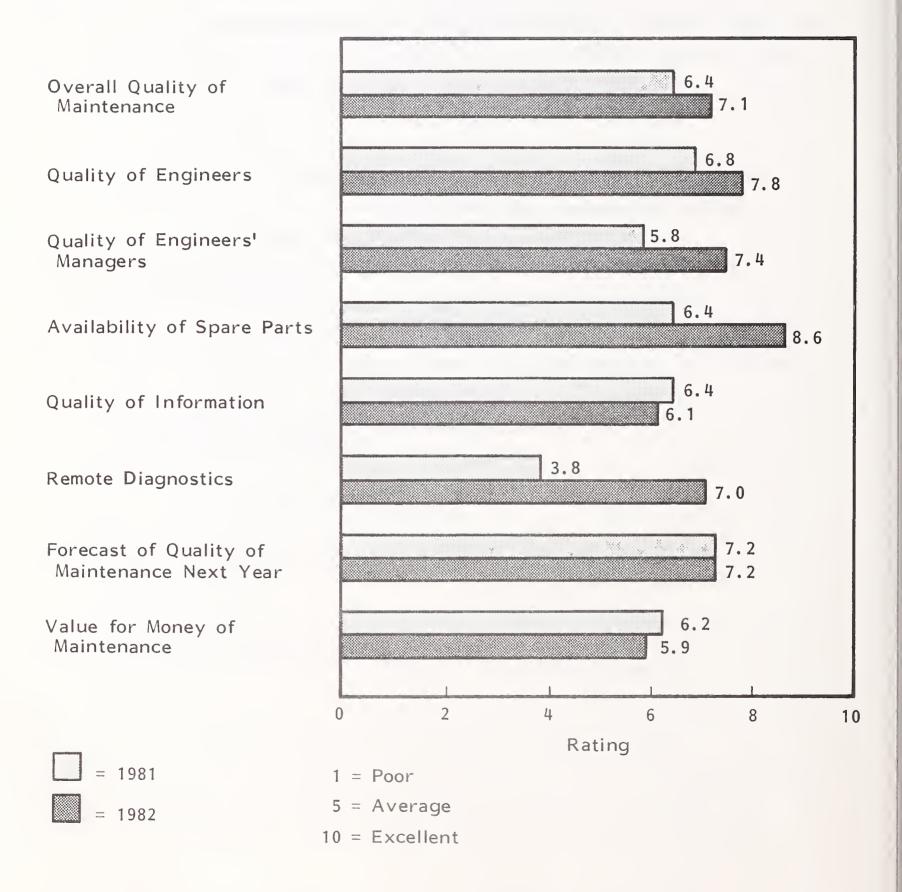
^{10 =} Important

- Overall quality of maintenance improved 10%.
- Minimum acceptable response times relaxed slightly due to a small improvement in repair time.

GENERAL ASSESSMENT

- Scandinavian users are receiving satisfactory service, as noted in Exhibit D-7.
 - Significant improvements as noted above, are creating a positive vendor image.
- Feedback relating to key service issues, as shown in Exhibit D-8, signals the need for vendor focus on service strategies.
 - One enterprising user has cancelled his maintenance contract and has taken out an insurance policy.
 - . He believes he will save money.
 - . This idea has also been recently implemented in the U.K.
 - Very little maintenance discounting is perceived.
 - Over half the users don't consider third-party maintenance because they don't think it is available.
 - Positive attitudes exist for use of remote diagnostics and preventive maintenance.
 - Grievances towards service are normal.
- Serviceability and response and repair times are shown in Exhibit D-9, and indicate normal response and repair intervals are at two hours.

USER SATISFACTION WITH MAINTENANCE OF ALL SYSTEMS IN SCANDINAVIA



USER CONSENSUS REGARDING KEY SERVICE ISSUES FOR SCANDINAVIA

'High costs', 'lack or needs', 'can't get th	Attitude Toward and takes too long'. Positive respondents like remote diagnostics because it is a cost saver and provides more system availability.	Jsers Receiving enance Price Discount	Attitude Toward 100% are very favorable toward PM and believe PM is important for system uptime.	elines for Evaluating 'We have equipment without contracts and use insurance to prevent costs', 'compare pricing with other users', 'must pay - no competition', 'competition'.	CONCERN USER REPLY	"We have equipment without contracts and use insurance to prevent costs', 'compare pricing with other users', 'must pay - no competition', 'intuition', 'competition', 'com	Suidelines for Evaluating Cost of Maintenance Preventive Maintenance Users Receiving laintenance Price Discount Remote Diagnostics Maintenance Maintenance Maintenance Maintenance
JOS HIGHER IL WAS HOL AVAIIADIE.		Attitude Toward and takes too long!. Positive respondents like remote diagnostics because it is a cost saver and provides more system availability.	Only 6% of Scandin 20% are negatively and takes too long it is a cost saver a	100% are very favo uptime. Only 6% of Scandin and takes too longit is a cost saver a	ting "We have equipment costs", 'compare printuition', 'competinintuition', 'competinintuptime. 100% are very favouptime. Only 6% of Scandinand takes too longinit is a cost saver and takes too longinit is a cost saver	44% replied negatively toward TPM. 'Tried it - not satisfied', 'no - \satisfied with vendor'. 56% indicated it was not available.	Considering Third-Party Maintenance

USERS' PERCEPTION OF SERVICEABILITY FOR ALL SYSTEMS IN SCANDINAVIA

	TIME IN HOURS			
	19	81	19	82
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN
Response Time				
Preferred	0-4.5	1.0	0.5-8	2.1
Actual	0-24.0	2.0	0.5-24	2.0
Minimum Acceptable	0-24.0	2.0	1.0-40	4.0
Repair Time				
Preferred	0-48.0	1.0	0.5-4	1.7
Actual	0-48.0	2.5	0.3-24	2.0
Maximum Acceptable	0-48.0	2.5	1-80	3.7

- System availability is important, as shown in Exhibit D-10.
 - The average availability degraded slightly from 96.5% in 1981 to 95% in 1982.
 - System availability for all classes of equipment except small business systems and peripherals is acceptable, falling between users' minimum and maximum tolerances.
 - Systems software, however, falls below minimum expected levels.

C. ITALIAN USERS

- The Italian market for maintenance was added in 1982, and since it is new there are no comparisons to 1981 research.
- Italian users rate their satisfaction with service above average, overall, as shown in Exhibit D-11.
- Reactions to key service issues, Exhibit D-12, reveal that users' perceptions of remote diagnostics are disproportionately negative.
 - Vendors should work on improving this through regular contacts with users and sharpened skills in diagnostics.
 - Twenty-five percent of Italian users receive a discount, and since only half are negatively inclined towards third-party maintenance, a competitive market for service is suggested.
- Exhibit D-13 describes users' views of serviceability in terms of:

SCANDINAVIAN RESPONDENTS' VIEWS OF SYSTEM AVAILABILITY

SYSTEM AVAILABILITY (percent)	CURRENTLY GETTING		IDEALLY WOULD LIKE		MINIMUM WOULD ACCEPT	
CLASSIFICATION	1981	1982	1981	1982	1981	19 82
Large Mainframe Systems	98.1%	93.5%	99.2%	97.8%	96.0%	92.3%
Medium Mainframe Systems	97.4	98.8	99.1	99.6	95.5	96.6
Small Business Systems	96.0	88.2	98.7	96.0	95.0	95.0
Other Minicomputers	97.0	97.3	99.0	99.0	96.4	94.0
Peripherals	98.1	90.8	99.1	97.7	95.8	93.8
Terminals	96.8	97.9	97.8	97.9	94.2	95.0
Word Processors	94.4	97.7	96.0	99.0	94.6	96.7
Systems Software	97.8	96.4	99.2	99.5	97.0	97.2
Applications Software	92.9	94.3	98.9	99.5	96.1	98.7

USER SATISFACTION WITH MAINTENANCE OF ALL SYSTEMS IN ITALY, 1982



Quality of Engineers

Quality of Engineers' Managers

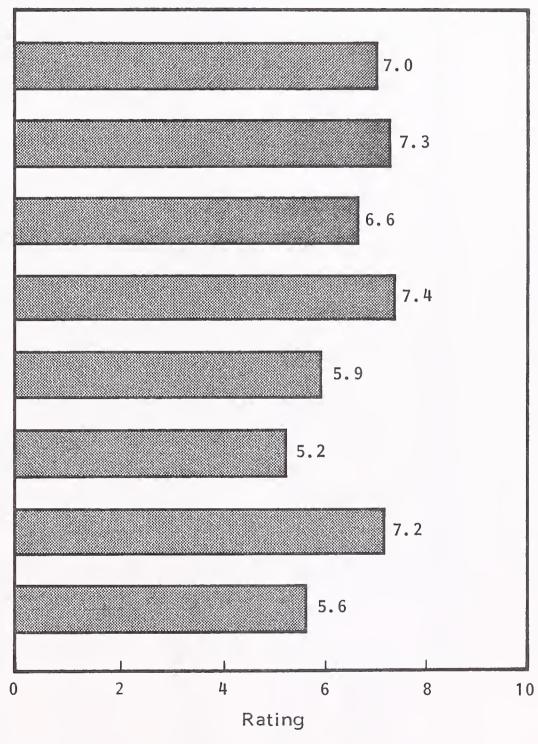
Availability of Spare Parts

Quality of Information

Remote Diagnostics

Forecast of Quality of Maintenance Next Year

Value for Money of Maintenance



1 = Poor

5 = Average

10 = Excellent

USER CONSENSUS REGARDING KEY SERVICE ISSUES FOR ITALY

USER REPLY	'Repair time', 'equipment reliability', 'relationship to uptime', 'hardware performance'.	'Not interesting'. 'We do it'. 'We need it'.	25% receive a discount.	Half of Italian user respondents are negatively inclined toward remote diagnostics.	Half do not want third-party maintenance. Half do not know about it.	'Delays and incompetence of newly trained staff', 'high cost', 'very' satisfied'.
CONCERN	Guidelines for Evaluating Cost of Maintenance	Attitude Toward Preventive Maintenance	Users Receiving Maintenance Price Discount	Attitude Towards Remote Diagnostics	Considering Third-Party Maintenance	Annoyances Regarding Maintenance

USERS' PERCEPTION OF SERVICEABILITY FOR ALL SYSTEMS IN ITALY

	TIME IN HOURS					
	198	81	1982			
SERVICE	RANGE	MEDIAN	RANGE	MEDIAN		
Response Time				_		
Preferred	N	. N	0.30-24.0	3.7		
Actual	0	0	0.50-110.0	4.2		
Minimum Acceptable	M e n	M e n	1.0-150.0	4.0		
Repair Time	t i o	t i o				
Preferred	n	n	0.30-6.0	1.30		
Actual	S	S	0.50-24.0	3.30		
Maximum Acceptable			1.0-36.0	3.30		

- Response time.
- Repair time.
- System availability ranks high, 10, on the Italian users' assessment of maintenance in 1984, as shown in Exhibit D-14.
 - This is corroborated by the high expectations for systems availability shown in Exhibit D-15.
 - Perceived availability, overall at 89.9%, falls short of mimimum user standards, 90.6%, indicating another chore for vendors to concentrate on.

USERS' RATING OF IMPORTANCE OF MAINTENANCE ISSUES IN ITALY

	ASKED	IN 1982
MAINTENANCE ISSUES	1982	1984
System Availability	7.6	10
Response Time	8.3	7.5
Repair Time	8.7	7.8
Preventive Maintenance	4.9	5.2
Remote Maintenance	4.0	8.2
Escalation Procedures	4.6	9.8
Price of Maintenance	7.3	8.0
Stable Engineer Population	6.8	6.8
Uptime Guarantees	7.0	8.3
Equipment Guarantees	8.7	9.8
Support Centres	7.0	8.7
Software Maintenance	7.6	9.3
Flexible Contract	6.1	8.0
User Self-Maintenance	4.3	5.3

ITALIAN RESPONDENTS' VIEWS OF SYSTEM AVAILABILITY

CLASSIFICATION	CURRENTLY GETTING 1982	IDEALLY WOULD LIKE 1982	MINIMUM WOULD ACCEPT 1982
Large Mainframe Systems	99.3%	99.0%	98.0%
Medium Mainframe Systems	86.5	98.5	95.5
Small Business Systems	80.0	100.0	60.0
Other Minicomputers	96.9	99.0	94.5
Peripherals	90.0	99.0	95.0
Terminals	91.7	99.2	87.2
Word Processors	N o	Mentio	n s
Systems Software	85.0	99.5	97.3
Applications Software	90.0	99.5	97.3

APPENDIX E: QUESTIONNAIRE



FIELD SERVICE VENDOR SURVEY 1982

1. STAFFING LEVELS	1982	1983
Employees in company		
Number in field service		
Number of field engineers		
Number of technical support engineers		
Number of field service administrators		
Number of field service supervisors		
Number of field service		·
line managers		

2. ORGANIZATION	1982	1983
Number of branch offices		
Number of sites with resident engineer		
Number of sites using remote diagnostics		
Number of spares holding centers		
Percent of staff at headquarters		·
Percent of staff on training courses		
Percent of engineers working from home		

3. FINANCIAL	1982	1983
Field service revenue		
Field service budget		
Profit percentage before tax	olo	olo
Revenue per engineer		
Fully burdened cost of engineer		
Charge out hourly rate for engineer		
Percent field service revenue of total company revenue		

4. SALARY	DOLI RAN		AVERAGE	PERC INCR		TRAINING INVESTMENT
INFORMATION	FROM	ТО	SALARY	1981	1982	VALUE
Trainee						
Qualified Field Engineer						
Senior Field Engineer				-		-
Hardware Support Engineer					,	
Software Support Engineer						
Supervisor						
Line Manager			·			

5. DISTRIBU	TION BY	ENVIRONA	MENT
EQUIPMENT CATEGORY	PERCENT DP ROOM		PERCENT PLANT/ FACTORY
Mainframe Systems			
Small Business Systems			
Minicomputers			
Microcomputers			
Word Processors			
Executive Workstation			
Peripherals	-		
Terminals		-	
Data Communications			

6. COST BREAKDOWN OF A TYPICAL FAULT CALL						
COMPONENT	1982	1983				
Average Cost (\$)						
Direct Labor (Percent)						
Travel Labor (Percent)						
Parts and Material (Percent)						
Travel Expense (Percent)						
Burden and Over- head (Percent)						
Average Number of Calls Per Week/ Per Engineer						

7. How do you set your maintenance charges (e.g., percent of sales value, based on costs, etc.)?

8. LABOR TURNOVER	1981	1982
Number of Field Engineers Lost		
Number of Field Engineers Gained		

9.	What are the major losing engineers?	reasons	for

10. Please rate the following in terms of the amount of field service management attention paid to them in 1981, and your plans for 1982 in this regard (1 = Low, 10 = High)

·	AREA	1981 RATING	1982 RATING
•	System Availability		
•	Response Time		
•	Repair Time		
•	Preventive Maintenance		
•	Remote Maintenance		
•	Escalation Procedure		
•	Price of Maintenance		·
•	Stability of Engineer Population		
	Uptime Guarantees		
•	Equipment Reliability		
•	Support Centers		
•	Software Maintenance		
•	Flexible Contracts		
•.	User Self-Maintenance		
•	Other		
•	Other		

11. Please rate your success at implementing the following during 1981:

1 = Low, 10 = High

P = Planned, I = Implemented/no data

N = Not implemented

12	Please rate	the	field	servi	ce	
	involvemen	t and	d influ	uence	in	the
	following i	ssues	· .			•

1 = Low

10 = High

N = Not implemented		10 - Iligii		
	RATING		1981	1982
Recruiting of Field Service Engineers		Equipment Specification		
Training of Field Service Engineers		Equipment Design		
Reducing Labor Turnover		Equipment Serviceability Design		
Improving Product Quality		Built-in Diagnostics		
Making Adequate Diagnostic Equipment Available		Other Diagnostics		
Providing Adequate Remote Diagnostic Assistance		Selection of Test Equipment		
Meeting Customer Demands		Spares Requirements and Levels		
Living with Budget Limitations	5	Geographic Marketing Control		
Providing Competitive Salary/Compensation		Order Acceptance Sign-Off		
Reducing Spare Parts Shortages		Contractual Terms and Conditions		
Improving FE Technical Competence		Acceptability of Site Environment		
Marketing Field Service		User Education		
Maintenance Through Distributors		Selling of Field Service		
Maintenance of Data Communications Equipment		Pricing of Field Service		

13. MAINTENANCE PRICING						FORECAST	PERCENT	W3 L
EQUIPMENT	PURCHASE VALUE OF YOUR EQUIPMENT	MONTHLY MAIN- TENANCE CHARGE	CONTRACT RESPONSE TIME	CONTRACT PERIOD OF NOTICE OF INCREASE	PERCENT INCREASE IN LAST 12 MONTHS	INCREASE EXPECTED IN NEXT	THAT WOULD BE UNAC- CEPTABLE	HOURLY CHARGE FOR AN ENGINEER
Large Mainframe Systems								
Medium Mainframe Systems).					
Small Business Systems								
Minicomputers								
Microcomputers								·
Peripherals								
Terminals	-							
Word Processors						-		
Executive Workstation								
Data Communications								
Systems, Software								
Applications Software								
		Action to the second se						

CATALOG NO. FAIE 2

					,								
	NUMBER OF REPEAT CALLS (PERCENT)			•									
	NUMBER NUMBER OF NO OF FAULT REPEAT FOUND CALLS (PERCENT)												
	AVERAGE MEAN TIME BETWEEN FAILURES												
/ERAGE HOURS	AFTER WHAT TIME DOES ENGINEER CALL FOR							_					
MAINTENANCE AVERAGE REPAIR TIME IN HOURS	YOUR ESTIMATE FOR 1983				÷								
MAINT	CURRENT												
/ERAGE I HOURS	WHAT DO YOU HOPE TO ACHIEVE IN 1983												
MAINTENANCE AVERAGE RESPONSE TIME IN HOURS	WHAT DOES YOUR USER EXPECT												
MAINTE	CURRENT												
BILITY	MINIMUM YOUR USER WOULD												
SYSTEM AVAILABILITY (PERCENT	ESTIMATE IN 1983												
SYSTE	CURRENT												
14. FIELD SERVICE	PEKFORMANCE EQUIPMENT CATEGORY	Large Mainframe Systems	Medium Mainframe Systems	Small Business Systems	Minicomputers	Microcomputers	Peripherals	Terminals	Word Processors	Executive Workstation	Data Communications	Systems Software	Applications Software

15.	Do your field service revenues include revenues from the following? (or percent if possible)
	Hardware maintenance Systems software maintenance
	Applications software Training/documentation
	Installation fees Equipment relocation
	Spares Supplies (e.g., ribbons, disk packs, etc.)
	Credits from sales for special maintenance conditions.
	Other (please specify)
16.	Do you operate field service P & L control atbranch,district, regional,headquarters level, orcost/budget control?
17.	Can you quantify the benefits versus costs of the principal new field service programs? (e.g., Remote Diagnostics, Support Centers, Automated Dispatch, etc.)
18.	What key indicators or measurement techniques are used to control CE/
	first line managers?
19.	Do you offer reductions in standard maintenance contract prices for
	different delivery modes? YES NO PERCENT
	Carry in/mail in:
	Device swap-out:
	Other ():
	Other ():

20.	To what level do you track costs and revenues? Site Customer Product Product line Other
21.	With regard to spare parts, do you: Expense low-cost parts (less than \$)? Inventory parts over \$?
22.	What life expectancy do you apply to spares?
23.	Who is responsible for marketing and sales of field service products and contracts? Sales organization Both involved Other (
24.	In your view what was the most significant field service issue or development in 1981 (i.e., in your organization and/or in other field service companies)?
25.	What will be the most significant issue in the next 24 months? (as for 24)
ı	THANK YOU The time you have spent with us is appreciated. If you would like to know more about INPUT's research programs and are not already a client, please check here







