U.S. User Ratings of Mainframes

Datapro's 1988 edition of its annual Computer Users Survey employed questionnaires mailed to a cross-section of mainframe computer sites listed with the International Data Corporation (IDC), and to a supplementary listing provided by a small user group.

This report summarizes screened responses from 411 mainframe users. (For results of our survey of minicomputer users, see *Datapro Reports on Minicomputers.*)

Especially because our questionnaire was so comprehensive, Datapro greatly appreciates the generous cooperation of all survey respondents.

This report presents the results of Datapro's 1988 survey of computer users. Over 400 mainframe system users, including those of most popular mainframes, detailed their system environment and usage. They also shared their assessment of the systems and of their manufacturers' support. Used with regard to our expressed caveats, this information should be of great value to prospective users who are evaluating computer systems.

THE 1988 QUESTIONNAIRE

In multiple-part questions, we asked users to describe their system and model, configuration, technological and organizational environment, budget, and plans.

Another group of questions asked the users to rate 24 specific aspects of their computer systems. The categories rated included ease of operation, reliability of system, reliability of peripherals, maintenance service (responsiveness and effectiveness), technical support (trouble-shooting, education, and documentation), manufacturer's software (operating system, compilers and assemblers, and applications programs), ease of programming, ease of conversion, and overall satisfaction. Additional ratings included timeliness of hardware installation; timeliness of software installation; ease of expansion; compatibility of terminals, peripherals, and software carried over from other systems; power/energy efficiency; productivity aids; software support delivered by the vendor; and ease of keeping up with and implementing vendor changes to hardware/software.

We also asked users if they run certain software packages in the following categories: data base management systems, data management systems, application development tools, utilities, communications software, performance monitors, security systems, and system enhancement packages. Detailed user ratings of mainframe software will ▷

CHART 1. 1988 SURVEY RESPONDENTS BY INDUSTRY TYPE AND VENDOR

Industry Type	Mainframe Respondents	Percent of Respondents in Industry Type (If at least 10% of Vendor Respondents)						
		Amdahl	Honeywell Bull	IBM	NAS	NCR	Unisys	Other
Manufacturing	**78** (19%)		✓	✓		✓	✓	
Government	**59** (14%)	✓	✓	✓	✓	✓	✓	✓
Education	**53** (13%)	✓	✓	✓	✓	✓	✓	✓
Banking/Finance/ Securities	**43** (11%)			*			✓	
Retail/Wholesale	**38** (9%)		✓				✓	
Insurance	**37** (9%)	✓	*	✓	✓			
Health Care/ Medical	**19** (6%)							✓
Public Utilities	**15** (4%)	✓				*		
Service Bureaus	**14** (3%)	✓			✓			
Transportation**	**14** (3%)							
Construction	**6** (2%)					*		

Near miss: 9% of 1988 respondents.
***But < 9% for every vendor's user respondents.*

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CHART 2. MAIN CURRENT AND PLANNED APPLICATIONS

Applications	In Use 1988		Planned For 1988-89	
	≥ 20%	≥ 10%	≥ 20%	≥ 10%
Accounting/Billing	✓			✓
Payroll/Personnel	✓			✓
Order Processing	✓			✓
Purchasing	✓			✓
Sales/Distribution	✓			✓
Manufacturing	✓			
Education		✓		
Banking		✓		
Insurance		✓		
Engineering/ Scientific		✓		
Executive Info.			✓	
Decision Support				✓
Financial Control				✓

be described by individual product reports in Volume 3 of *Datapro 70*, throughout the coming year.

Finally, we asked if the computer system did what it was expected to do and if the users would recommend their computer system to others. Some of the answers were surprising.

METHODOLOGY AND SURVEY RESPONSE RATE

Survey results customarily begin with an impressive recounting of the methodology used. Typically, these descriptions bore most readers and still fail to identify explicitly any shortcomings of the survey.

Suffice it to say that Datapro went to its usual, considerable lengths to collect responses for all current mainframes, to screen out obviously biased or otherwise unsuitable responses, and to analyze the survey data impartially and accurately. New this year was computing support from Datavision Research of Princeton, New Jersey; Datavision's proprietary statistical software tools helped us tabulate and analyze the results more efficiently.

Having spared our nonstatistician readers the customary treatise on methodology, we now forthrightly offer a few *explicit* cautionary remarks.

CAVEATS ON USE OF SURVEY RESULTS

Datapro's annual survey, well received for many years by the data processing community, generates highly useful information. But we are concerned that potential system users, vendors, and journalists not misinterpret the survey results.

Readers considering a system acquisition can use the survey most effectively in defining *their own unique needs* and in preparing evaluation *questions* for each candidate computer system's vendor. The survey may also suggest additional systems and vendors worth investigating.

Neither the objective data reported nor the subjective user ratings, however, should be used as the primary basis for choosing or rejecting a mainframe system/model—much less a vendor. Apart from the overriding importance of the reader's own special needs, these caveats are based on the realities of this type of survey, as explained below.

Similarly, Datapro urges vendors and journalists not to exaggerate the statistical import of the ratings results reported here. As indicated, Datapro offers these study results as a useful, but not definitive, tool.

Here are key reservations to keep in mind when interpreting survey results of this type.

Sample Size. First, any compelling generalization about a system/model or its vendor would require a much more extensive random sample of the installed base. Regrettably, and despite follow-up reminder mailings of over 3,500 questionnaires, this year's survey response was significantly lower than last year's. This year's survey was conducted in the summertime—not a good time for surveys, as we found out.

Whether reporting on objective factors (type of industry, disk memory used, etc.) or on user ratings, a smaller sample always runs the risk of not accurately representing the "population"—the entire installed base of a system/model, or the full list of a vendor's customers.

Not wishing to ignore important systems, however, Datapro cautiously reports even rather small batches of responses. Several charts and tables in this report remind the reader of the exact number of responses on which each average is based.

CHART 3. A NEW TREND ?

Acquisition Method (Average of Respondents)	1988	1987	1986
Purchase (%)	59	52	54
Rent/Lease from Mfr. (%)	18	15	14
Lease from 3rd-Party (%)	23	32	32

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CHART 4. MAIN MEMORY (MEGABYTES)—RANGES REPORTED BY ≥ 25% of RESPONDENTS

	4 < 8	8 < 16	16 < 32	32 < 64	64 < 128	128+
Amdahl			✓*		✓*	
Honeywell Bull		✓*	✓			
IBM			✓*			
NAS				✓*	✓	✓
NCR	✓*	✓	✓			
Unisys		✓*	✓			

** Most commonly reported range (highest percentage = mode).*

Overall consistency of the 1988 results with prior surveys tells us that this survey is quite sound. Because of this year's reduced sample base, however, individual *changes* from prior survey results should not readily be deemed significant.

For example, the industry types represented by this year's system respondents differ somewhat from last year's; but one should certainly not infer that a vendor no longer serves an industry type previously reported. The chart showing industry-type distribution remains useful—partly by showing at least some of the industries served by a vendor, and mainly because it helps readers understand the interests *of the survey respondents.*

Differential and Variable Response Rates. Some types of users may be more likely than others to *respond* to an opinion survey. If business-oriented users are more likely to respond than scientific or academic or military users, then the priorities of business users would of course be emphasized in the results.

More specifically in regard to this year's survey, we noted that Unisys customers proved distinctly more willing than most others to complete survey forms in the summertime. This changed the proportional makeup of the survey's aggregate values, as illustrated below.

Halo Effects. A more subtle aspect of survey results is that respondents for each vendor may share attitudes or concerns that make their numerical ratings not strictly comparable across vendor groups. One vendor's customers might have *esprit de corps*—and another's perhaps a collective Excedrin headache—that could raise or lower their ratings across the board.

Averaging of Extremes. At the same time, we see paradoxical instances of low-rated systems/models being recommended, on average, more enthusiastically than higher-rated models. The clarity obtained by averaging out extreme responses can occasionally lead to composite results that would not likely represent any single individual.

With all these reservations to keep in mind, is this or any survey comprehensible? Of course! So please read on.

GUIDE TO 1988 SURVEY RESULTS

Most of the numerical data presented here appears in reference tables at the end of the report:

1. Mainframe Characteristics and Ratings—
   by Vendor and Model
2. Mainframe Characteristics and Ratings—
   Recap by Vendor
3. Mainframe Plans for 1988-89—
   by Vendor and Model
4. Mainframe Plans for 1988-89—
   Recap by Vendor

Tables 1 and 2 are each formatted as pairs of facing pages: characteristics on the left and ratings of the same systems or vendors on the right.

Since the import of tabulated data is not always conspicuous, we first offer several overview and contrast-highlighting charts with accompanying comments. Graphs of other data from the survey provide background information on the respondents' system implementations and on their organizational budgets.

Industry and Applications

We asked survey respondents to specify the type of "industry" that best describes their organization, and the principal applications of their mainframe systems.

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CHART 5. LOCAL AND REMOTE WORKSTATIONS/TERMINALS

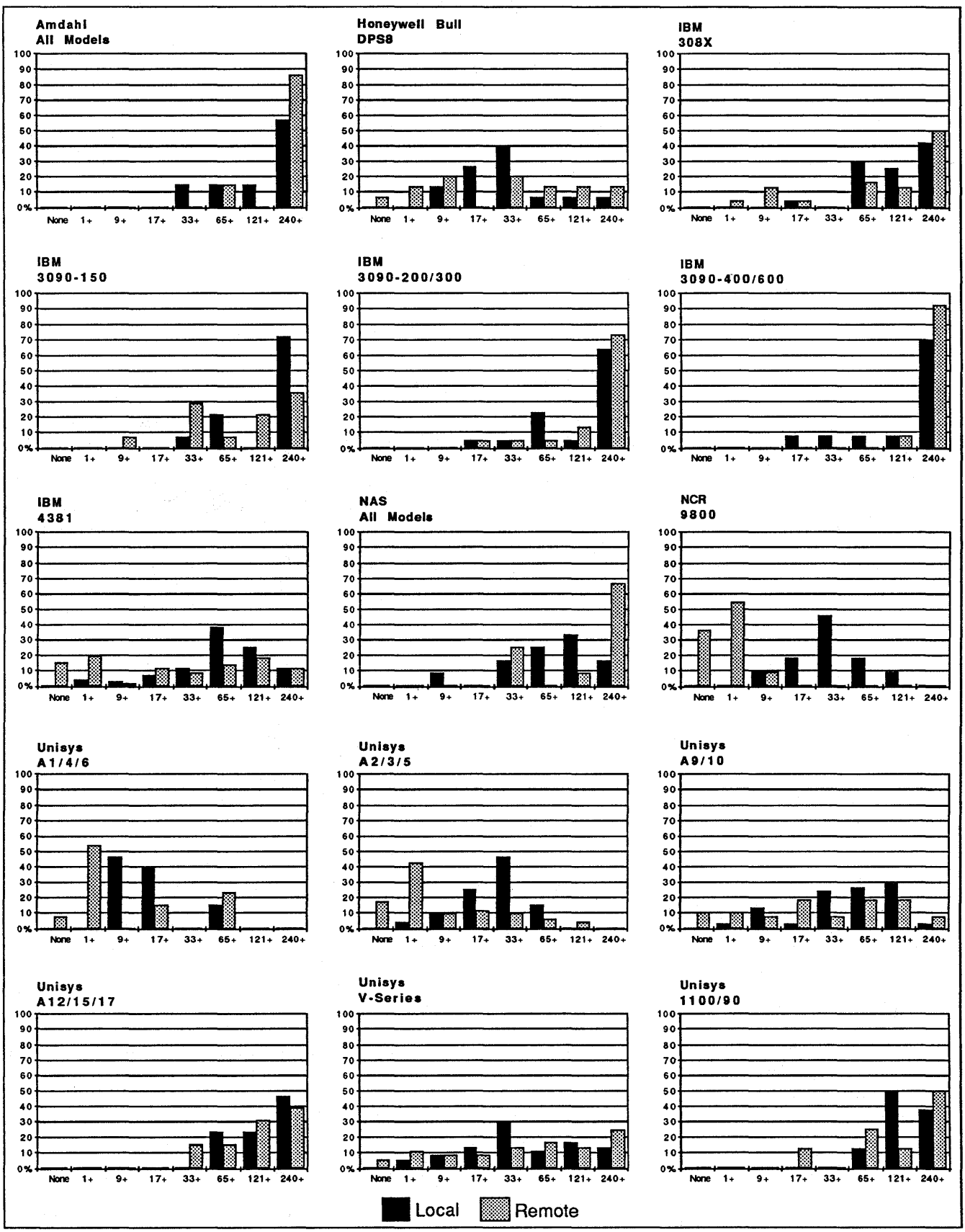

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Chart 1 shows the most common reported industry types, overall and by vendor. To emphasize the distribution pattern of this year's respondents, the chart displays only those industry types accounting for at least 10 percent of respondents for the vendor. Of course, each vendor also serves other industries, and this respondent distribution should not be mistaken for market penetration.

Chart 2 shows the main applications respondents currently use, along with their plans for new applications in 1988-89. Again to emphasize the overall pattern, the chart includes only applications reported by at least 10 percent of the respondents. Note that the current applications appear in order, starting with the most popular (accounting/billing). The first six items on the list have kept their exact rank for several years, and the next four have kept their approximate rank.

Smaller numbers of respondents categorized their applications in more specialized terms. Examples include legal case management, welfare case tracking, real estate, brokerage and trading, leasing, publishing, student data, scheduling, data acquisition, criminal justice, child information, reservations, fund-raising, and construction estimating.

Plans for 1988-89 mostly reflect the well-established, major applications; but at least 10 percent of respondents have plans for new decision support or financial control systems, and over 20 percent plan an executive information system.

System Acquisition Alternatives

We asked how users acquired their systems: outright purchase, rental/lease from the manufacturer, or third-party lease. This is a major and complex user choice, affected by system availability, predicted residual values, tax considerations, and intangibles such as confidence in the financial health of—and product line commitment by—alternative suppliers.

For several years the reported percentage of system purchases rose, apparently because major vendors used their pricing structures to encourage purchases. The percentage dropped slightly each year from 1985 through 1987. Last year, purchasing inhibitions seemed to relate to tight money and uncertainty about the overall economy.

This year's survey figures were much more intriguing (Chart 3). The purchase percentage jumped all the way back up to 59—and exclusively at the expense of third-party suppliers! Was this a new trend, seemingly with a story behind the story? How to factor in pricing strategy changes, the growing concern with residual values in the face of rapid technological advances, and the stock market crash and recovery? Or was there a cycle? Could we, unhappily, draw no conclusion, because normal sampling variation might be more pronounced due to this year's reduced number of survey responses?

CHART 6. MOST POPULAR PLANNED EXTENSIONS/ACQUISITIONS

	% of 1988 Respondents		
Planned Extensions/Acquisitions	≥ 20%	≥ 10%	< 10%
Expand Hardware	✓		
Expand Datacomm Facilities	✓		
More Software from Mfr. and Other Suppliers	✓		
Laser Printers	✓		
Application Development Tools	✓		
Query/Report System	✓		
Performance Monitors	✓		
Electronic Mail	✓		
Data Base Management System	✓		
Power Conditioning System		✓	
Data Center Control System		✓	
Image Processing		✓	
Graphics			✓
Optical Disk Device			✓

Our conclusion? There is no trend, at least not one that our survey reveals. As noted in our caveats above, Unisys customers were extremely cooperative. While response levels from several vendors' customers, including IBM's, fell sharply during our summertime survey experiment, Unisys responses held strong. In sum, while last year's results included over four times as many IBM users as Unisys users, this year's survey represents them in equal numbers!

Compared to IBM, as Table 2 reveals, a higher percentage of Unisys users purchase their systems; this has also been true historically. So the higher all-vendors average of purchases in the 1988 survey reflects the higher than usual ratio of Unisys to IBM user respondents. The seeming drop in third-party leasing results from the same phenomenon.

Hardware Configurations

Typical size of system main memory continues to grow. Chart 4 illustrates the most commonly reported range (the mode) for each vendor's respondents.

Concerning the high end of main memory, four years ago only 2 percent of the respondents had over 32 megabytes of main memory. By last year, 7 percent had over 64 megabytes. This year, a total of 14 percent reported over 64 megabytes, including 4 percent over 128 megabytes. (IBM user respondents indicated 28 percent with over 64 megabytes, including 8 percent with over 128 megabytes; the total averages, therefore, would have been higher with the usual expected IBM representation in the survey.)

Similarly, high-capacity disk storage rose to a reported average 42 percent of installations having over 10 gi-

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U.S. User Ratings of Mainframes

CHART 7. RESPONDENTS' BUDGETS FOR INFORMATION SYSTEMS

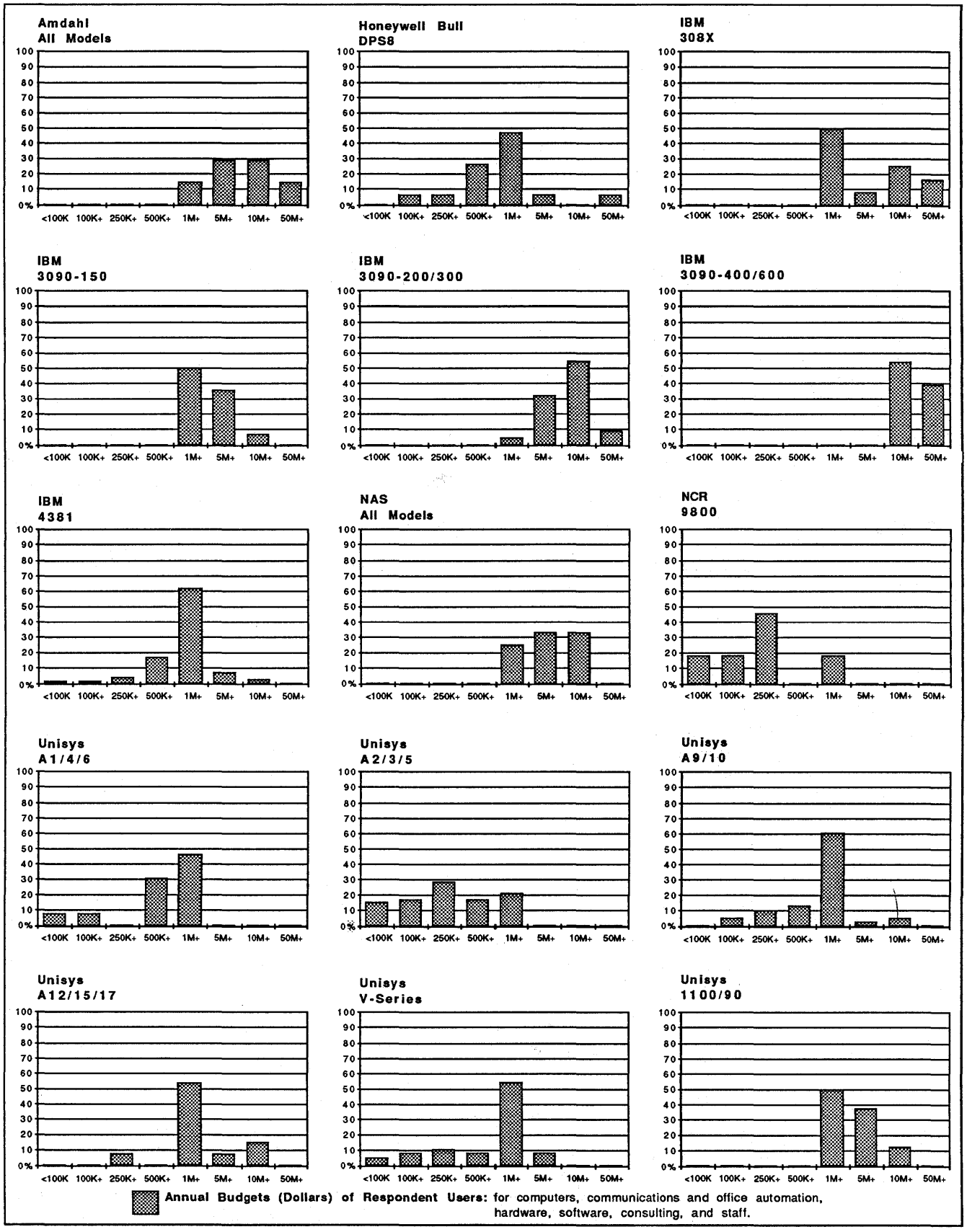

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CHART 8. OVERALL VENDOR RATINGS BY 1988 RESPONDENTS

	Avg. Of All Mainframes	Amdahl	Honeywell Bull	IBM	NAS	NCR	Unisys	Other Mainframes
Rating								
Excellent (10)-Poor (1)								
Ease of Operation	7.8	✓	O	O	✓	✓	✓	+
Reliability of Mainframe	9.1	O	–	+	+	O	O	O
Reliability of Peripherals	8.1	O	–	+	✓	+	–	✓
Maintenance Service (MFR):								
Responsiveness	8.3	✓	–	+	✓	–	O	✓
Effectiveness	8.2	✓	–	+	✓	O	O	✓
Technical Support:								
Troubleshooting	7.4	✓	–	+	✓	O	O	✓
Education	7.2	✓	–	+	✓	O	O	✓
Documentation	6.9	✓	–	+	✓	+	O	+
Manufacturer's Software:								
Operating System	8.3	✓	O	–	✓	–	✓	–
Compilers & Assemblers	8.2	✓	O	O	✓	O	+	O
Application Programs	6.7	✓	–	O	✓	+	O	✓
Ease of Programming	7.5	✓	O	O	✓	✓	✓	O
Ease of Conversion	7.4	✓	–	–	✓	✓	✓	+
Overall Satisfaction	8.1	✓	–	O	+	+	+	+
Additional Ratings:								
Excellent (10)-Poor (1)								
Timely Hardware Installation	8.3	✓	O	+	✓	+	O	O
Timely Software Installation	7.9	✓	O	+	+	✓	O	+
Ease of Expansion	8.4	✓	–	O	✓	✓	+	O
Compatibility of Peripherals from Other Systems	8.0	✓	–	O	✓	✓	+	✓
Compatibility of Programs/Data from Other Systems	7.9	✓	–	O	✓	✓	+	+
Power/Energy Efficiency	7.8	✓	O	O	✓	✓	+	–
Productivity Aids to Reduce Programming Costs	6.7	✓	–	–	✓	+	✓	✓
Software Support	6.8	✓	O	+	✓	+	O	+

Key: ✓ 0.5 or more above average for all mainframes.
+ Above average.
O Average or slightly below average.
– 0.5 or more below average.

gabytes (up 7 percent from last year), with IBM alone having 69 percent of its user respondents at that level.

We also asked the users how many local and remote workstations/terminals they were using. Chart 5 shows the usage of local and remote terminals by manufacturer and model.

Planned Extensions/Acquisitions

We asked how users were planning to spend their enhancement/acquisition dollars in 1988-89. Chart 6 shows approximate user rankings of the most popular plans.

Hardware expansion and additional data communications facilities top the list at over 60 percent of respondents, as they have for several years. More software from the manufacturer and more software from other suppliers each are planned by about 50 percent.

Interest in more specific acquisitions varied. NCR, Unisys, and Honeywell Bull users showed the most interest in a UNIX operating system. Amdahl and IBM users showed above-average interest in laser printers. At 46 percent, NCR user respondents were positively charged with enthusiasm for power conditioning systems; Amdahl, NAS, and Unisys users also showed above-average interest. IBM and NCR users especially had their eyes on optical disk devices. Finally, IBM, Honeywell, and Amdahl planners focused on image processing systems.

Organizational Plans and Budgets

Last year, 42 percent of respondents said they had an information center and 7 percent said they planned to add one. This year's usage of information centers stands at 45 percent. About 10 percent of respondents plan to add an information center in 1988-89.

We also asked about the use of Management Information Directors or Chief Information Officers. Over 60 percent

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of the respondents say they have one, but less than 1 percent plan to establish such a position in 1988-89.

Of course, we also asked about budgets. "What is your organization's total annual budget for information systems services, including computers, communications and office automation, hardware, software, consulting, and staff?" Chart 7 graphs the answers to suggest the range of organizations that employ various systems.

User Satisfaction Ratings

Consistent with our belief that what users think is extremely important, we asked them to rate their computer systems, associated software, and vendor support, by assigning for each of 22 factors a rating of 1 (Poor) to 10 (Excellent).

These system/model numerical ratings appear in Table 1; then the numbers are totaled and weighted by vendor in Table 2. For an enhanced contrast overview of the summary vendor ratings, Chart 8 graphically distinguishes above- and below-average ratings.

Recall that some user groups may perhaps be kinder or harsher in their judgments than others, in the way that some schoolteachers award A's more freely than others. As related food for thought, consider that this year's collective minicomputer ratings almost all run a little higher than mainframe ratings.

Worth noting in the summary ratings are the high marks given to a vendor not previously mentioned: the "Other" computer must be a pretty good machine! Datapro regrets that the handful of responses received for systems from Control Data, Alliant, IPL, and Ultimate were not sufficient for separate tabulation. We consider it important to cover these systems and hope for a larger response from their users in our next survey.

Also worth considering, and comparing with the Overall Satisfaction rating, are two other upshot judgments we asked of each user: "Did the computer system do what you expected it to do? And would you recommend this system to another user?"

In Chart 9, note that some systems with relatively low ratings are nevertheless recommended by as many as 100 percent, while some highly rated systems are not. Although paradoxical effects of averaging may come into play somewhat, discrepancies in these judgments probably also reflect a realistic viewpoint. After all, an older system may not now be reasonable to recommend, even though it performed as expected in a highly satisfactory way. And a system that did not perform as expected may yet have proved quite satisfactory.

CHART 9. SYSTEM/MODEL ASSESSMENTS—THREE SUMMARY RATINGS

System/Model	Survey Respondents	Overall Satisfaction (1-10)	System Performs As Expected (% Yes)	Would Recommend To Other Users (% Yes)
Amdahl All Models	7	8.6	100	86
Honeywell Bull				
DPS8	15	6.9	87	67
Other	18	7.9	89	89
IBM				
308X	24	8.0	86	79
3090-150	14	8.2	93	79
3090-200/300	22	7.9	96	96
3090-400/600	13	8.3	92	92
3090-Other	11	7.8	91	91
4381	71	8.1	96	90
Other	15	7.3	93	87
NAS All Models	12	8.5	100	83
NCR 9800	11	8.4	91	91
Unisys				
A1/4/6	13	8.6	92	92
A2/3/5	52	8.5	90	94
A9/10	38	8.3	87	87
A12/15/17	13	8.8	100	100
V-Series	37	8.5	97	92
1100/90	8	6.4	100	62
Other	7	7.3	71	100
Other Mainframes	10	8.2	100	100

THANK YOU

Datapro extends a sincere thanks to everyone who responded to our 1988 Computer Users Survey. We hope that this compendium of fellow users' opinions will be of significant value to you, and we look forward to hearing from you again next year.

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U.S. User Ratings of Mainframes

TABLES FOLLOW

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TABLE 1. MAINFRAME CHARACTERISTICS AND RATINGS —BY VENDOR AND MODEL

Survey Item / Manufacturer and Model	Amdahl All Models	Honeywell Bull DPS8	Honeywell Bull Other	IBM 308X	IBM 3090-150	IBM 3090-200/300	IBM 3090-400/600	IBM 3090-Other
Number of User Responses	7	15	18	24	14	22	13	11
Avg. Life of System (months)	14.4	43.0	20.6	21.8	13.4	13.2	9.0	19.1
Acquisition Method (%)								
Purchase	71.4	66.7	66.7	50.0	50.0	27.3	15.4	63.6
Rent/Lease from Manufacturer	0.0	26.7	0.0	8.3	21.4	27.3	7.7	9.1
Lease from Third Party	28.6	6.7	33.3	41.7	28.6	45.5	69.2	27.3
Principal Applications (%)								
Accounting/Billing	57.1	86.7	77.8	58.3	92.9	59.1	53.8	54.5
Banking	0.0	0.0	11.1	29.2	21.4	4.5	15.4	0.0
Construction/Architecture	0.0	0.0	0.0	0.0	7.1	0.0	7.7	0.0
Education	14.3	26.7	11.1	25.0	7.1	9.1	0.0	18.2
Engineering/Scientific	42.9	6.7	0.0	16.7	7.1	27.3	23.1	27.3
Health Care/Medical	0.0	13.3	16.7	12.5	7.1	0.0	15.4	0.0
Insurance	28.6	20.0	22.2	12.5	7.1	40.9	38.5	18.2
Manufacturing	0.0	26.7	11.1	29.2	21.4	13.6	7.7	27.3
Mathematics/Statistics	14.3	13.3	0.0	16.7	7.1	18.2	7.7	0.0
Order Processing	14.3	66.7	38.9	33.3	57.1	36.4	46.2	27.3
Payroll/Personnel	42.9	73.3	38.9	50.0	50.0	63.6	53.8	27.3
Petroleum/Fuel Analysis	28.6	0.0	0.0	8.3	0.0	0.0	7.7	0.0
Process Control	14.3	0.0	0.0	16.7	0.0	4.5	0.0	0.0
Purchasing	14.3	66.7	27.8	37.5	42.9	40.9	30.8	18.2
Sales/Distribution	14.3	33.3	27.8	20.8	14.3	27.3	15.4	18.2
Word Processing, Office Automation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Publishing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government Local	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	28.6	13.3	16.7	4.2	21.4	27.3	15.4	9.1
Source of Application Programs (%)								
Developed Internally	85.7	100.0	94.4	83.3	85.7	90.9	92.3	81.8
Contract Programmers	0.0	13.3	16.7	25.0	57.1	50.0	53.8	27.3
Packaged from Manufacturer	14.3	46.7	22.2	50.0	21.4	54.5	61.5	63.6
Independent Suppliers	85.7	26.7	61.1	58.3	71.4	68.2	30.8	72.7
Type of System (%)								
Departmental	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
Organizational	100.0	100.0	94.4	100.0	100.0	95.5	100.0	90.9
Use Third-Party Maintenance (%)	0.0	0.0	0.0	4.2	7.1	4.5	7.7	0.0
Have Information Center (%)								
Yes	71.4	40.0	38.9	66.7	57.1	72.7	76.9	63.6
Plan to in 1988-89	14.3	0.0	0.0	16.7	7.1	4.5	0.0	9.1
Have Mgmt. Info. Director or Chief Info. Officer (%)								
Yes	42.9	53.3	55.6	75.0	85.7	59.1	61.5	72.7
Plan to in 1988-89	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1. MAINFRAME CHARACTERISTICS AND RATINGS —BY VENDOR AND MODEL (Continued)

Survey Item / Manufacturer and Model	Amdahl All Models	Honeywell Bull DPS8	Honeywell Bull Other	IBM 308X	IBM 3090-150	IBM 3090-200/300	IBM 3090-400/600	IBM 3090-Other
System Ratings:								
Excellent (10) - Poor (1)								
Ease of Operation	8.7	6.7	8.0	6.7	7.0	7.3	7.5	6.8
Reliability of Mainframe	9.1	7.9	8.6	9.5	9.0	9.1	9.3	9.3
Reliability of Peripherals	8.1	7.2	7.6	8.7	8.8	8.0	8.8	8.6
Maintenance Service (Mfr.):								
Responsiveness	8.8	7.2	8.2	8.5	8.6	8.5	8.0	8.5
Effectiveness	9.2	6.9	8.0	8.7	8.4	8.5	8.3	8.8
Technical Support:								
Troubleshooting	9.0	6.1	6.7	7.5	7.9	8.1	7.6	8.0
Education	8.7	5.7	6.3	7.3	7.9	8.0	7.2	7.8
Documentation	8.8	5.7	5.9	6.9	7.7	7.4	7.1	7.2
Manufacturer's Software:								
Operating System	9.0	7.8	8.1	7.9	7.8	8.2	8.8	7.2
Compilers & Assemblers	9.0	7.5	8.2	7.9	7.9	8.0	8.4	7.2
Application Programs	9.0	5.4	5.9	6.6	7.2	7.3	7.0	6.4
Ease of Programming	8.4	6.5	7.6	6.7	6.6	6.6	7.3	6.5
Ease of Conversion	8.5	5.9	7.5	6.4	7.0	6.9	6.6	5.7
Overall Satisfaction	8.6	6.9	7.9	8.0	8.2	7.9	8.3	7.8
Additional Ratings:								
Excellent (10) - Poor (1)								
Timely Hardware Installation	9.3	7.6	8.3	9.2	8.1	8.3	9.3	9.1
Timely Software Installation	9.1	7.6	8.1	8.5	8.1	7.8	8.7	8.2
Ease of Expansion	9.0	7.1	7.9	8.1	8.7	8.3	8.6	8.0
Compatibility of Peripherals from Other Systems	9.7	5.4	7.1	8.6	7.9	8.4	7.9	8.8
Compatibility of Programs/Data from Other Systems	9.6	4.9	7.2	8.6	8.1	8.1	8.5	8.5
Power/Energy Efficiency	8.7	6.4	8.5	7.3	7.0	7.2	7.6	8.1
Productivity Aids to Reduce Programming Costs	7.6	4.9	6.6	5.5	6.5	6.2	6.7	6.8
Software Support by Vendor	8.2	6.4	6.6	6.5	7.5	7.3	7.4	7.4
Vendor's Proposed System Configuration (%)								
Adequate	85.7	66.7	83.3	83.3	71.4	86.4	84.6	54.5
Too Large	0.0	0.0	0.0	8.3	7.1	0.0	15.4	18.2
Too Small	0.0	26.7	11.1	0.0	14.3	9.1	0.0	0.0
Vendor Hardware/Software Changes— Keeping Up with and Implementing (%)								
Very Easy	57.1	40.0	11.1	8.3	14.3	4.5	0.0	0.0
Easy	0.0	53.3	72.2	70.8	42.9	59.1	76.9	54.5
Difficult	28.6	6.7	16.7	20.8	42.9	31.8	23.1	27.3
Very Difficult	0.0	0.0	0.0	0.0	0.0	4.5	0.0	0.0
System Has Performed as Expected (%)								
Yes	100.0	86.7	88.9	87.5	92.9	95.5	92.3	90.9
No	0.0	6.7	5.6	0.0	0.0	0.0	0.0	0.0
Undecided	0.0	6.7	5.6	0.0	7.1	4.5	0.0	0.0
Would Recommend System to Another User (%)								
Yes	85.7	66.7	88.9	79.2	78.6	95.5	92.3	90.9
No	0.0	20.0	5.6	4.2	7.1	0.0	0.0	0.0
Undecided	14.3	13.3	5.6	4.2	14.3	4.5	0.0	0.0

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U.S. User Ratings of Mainframes

TABLE 1. MAINFRAME CHARACTERISTICS AND RATINGS —BY VENDOR AND MODEL (Continued)

Survey Item / Manufacturer and Model	IBM 4381	IBM Other	NAS All Models	NCR 9800	Unisys A1/4/6	Unisys A2/3/5	Unisys A9/10	Unisys A12/A15/17
Number of User Responses	71	15	12	11	13	52	38	13
Avg. Age of System (months)	23.4	27.5	16.9	10.5	5.8	20.7	23.8	12.7
Acquisition Method (%)								
Purchase	66.2	66.7	75.0	54.5	84.6	55.8	65.8	46.2
Rent/Lease from Manufacturer	16.9	6.7	8.3	36.4	15.4	28.8	13.2	23.1
Lease from Third Party	16.9	26.7	16.7	9.1	0.0	13.5	21.1	30.8
Principal Applications (%)								
Accounting/Billing	74.6	53.3	50.0	81.8	76.9	84.6	76.3	69.2
Banking	5.6	6.7	8.3	9.1	23.1	13.5	5.3	0.0
Construction/Architecture	0.0	0.0	0.0	9.1	0.0	0.0	2.6	7.7
Education	18.3	13.3	16.7	18.2	0.0	17.3	28.9	0.0
Engineering/Scientific	18.3	13.3	0.0	0.0	0.0	3.8	5.3	7.7
Health Care/Medical	7.0	6.7	8.3	0.0	15.4	3.8	7.9	46.2
Insurance	12.7	6.7	25.0	9.1	7.7	5.8	0.0	15.4
Manufacturing	21.1	20.0	8.3	27.3	61.5	26.9	13.2	30.8
Mathematics/Statistics	9.9	0.0	0.0	0.0	0.0	1.9	7.9	7.7
Order Processing	39.4	40.0	33.3	36.4	69.2	59.6	39.5	76.9
Payroll/Personnel	60.6	40.0	41.7	81.8	61.5	63.5	63.2	69.2
Petroleum/Fuel Analysis	0.0	0.0	0.0	0.0	0.0	1.9	2.6	0.0
Process Control	4.2	0.0	0.0	9.1	0.0	1.9	0.0	0.0
Purchasing	47.9	13.3	33.3	9.1	69.2	53.8	42.1	61.5
Sales/Distribution	29.6	6.7	16.7	18.2	69.2	40.4	18.4	46.2
Word Processing, Office Automation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Publishing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government Local	5.6	13.3	0.0	0.0	0.0	0.0	2.6	0.0
Other	15.5	26.7	33.3	18.2	0.0	13.5	23.7	0.0
Source of Application Programs (%)								
Developed Internally	76.1	93.3	91.7	90.9	69.2	80.8	89.5	84.6
Contract Programmers	16.9	26.7	33.3	0.0	0.0	19.2	18.4	23.1
Packaged from Manufacturer	23.9	26.7	33.3	27.3	15.4	23.1	42.1	23.1
Independent Suppliers	62.0	53.3	66.7	36.4	30.8	38.5	52.6	61.5
Type of System (%)								
Departmental	4.2	13.3	8.3	0.0	0.0	1.9	5.3	0.0
Organizational	95.8	86.7	91.7	100.0	100.0	98.1	94.7	100.0
Use Third-Party Maintenance (%)	12.7	26.7	0.0	0.0	0.0	3.8	5.3	7.7
Have Information Center (%)								
Yes	32.4	40.0	66.7	45.5	7.7	30.8	42.1	76.9
Plan to in 1988-89	12.7	6.7	16.7	9.1	7.7	5.8	10.5	0.0
Have Mgmt. Info. Director or Chief Info. Officer (%)								
Yes	67.6	73.3	75.0	54.5	7.7	59.6	60.5	76.9
Plan to in 1988-89	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0

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U.S. User Ratings of Mainframes

TABLE 1. MAINFRAME CHARACTERISTICS AND RATINGS —BY VENDOR AND MODEL (Continued)

Survey Item \ Manufacturer and Model	IBM 4381	IBM Other	NAS All Models	NCR 9800	Unisys A1/4/6	Unisys A2/3/5	Unisys A9/10	Unisys A12/A15/17
System Ratings:								
Excellent (10) - Poor (1)								
Ease of Operation	7.2	6.7	8.8	8.4	7.6	8.5	8.7	9.5
Reliability of Mainframe	9.3	8.7	9.5	9.1	8.7	9.2	8.7	9.6
Reliability of Peripherals	8.5	8.3	8.9	8.4	8.3	8.2	7.2	7.2
Maintenance Service (Mfr.):								
Responsiveness	8.6	8.0	9.5	7.3	7.9	8.2	8.1	9.0
Effectiveness	8.4	7.9	9.6	7.8	8.4	8.1	7.5	8.1
Technical Support:								
Troubleshooting	7.7	7.2	9.2	7.3	7.5	7.4	7.0	6.9
Education	7.5	6.6	7.9	7.2	8.0	7.2	7.0	7.1
Documentation	7.2	6.4	9.0	7.2	8.2	6.7	6.4	6.7
Manufacturer's Software:								
Operating System	7.6	6.9	8.8	7.7	9.1	9.0	9.1	9.6
Compilers & Assemblers	8.1	7.3	8.7	7.8	8.8	8.8	8.8	9.0
Application Programs	6.5	6.2	8.4	7.0	7.3	7.3	6.9	5.2
Ease of Programming	6.9	6.8	8.2	8.0	8.9	8.4	8.3	8.6
Ease of Conversion	6.8	5.9	8.2	8.3	8.8	8.1	8.2	8.1
Overall Satisfaction	8.1	7.3	8.5	8.4	8.6	8.5	8.3	8.8
Additional Ratings:								
Excellent (10) - Poor (1)								
Timely Hardware Installation	8.6	8.2	9.7	8.5	7.5	7.9	8.1	8.3
Timely Software Installation	8.2	7.2	8.3	8.4	6.2	7.7	7.9	8.3
Ease of Expansion	8.2	7.1	9.3	9.1	8.6	8.9	8.6	9.0
Compatibility of Peripherals from Other Systems	7.9	7.3	9.4	9.1	9.5	7.8	7.9	8.9
Compatibility of Programs/Data from Other Systems	7.7	6.9	9.3	8.7	8.9	7.8	8.3	8.4
Power/Energy Efficiency	7.7	6.8	8.7	9.1	9.0	8.1	7.9	8.3
Productivity Aids to Reduce Programming Costs	6.4	5.7	7.3	7.1	8.7	7.4	7.3	6.6
Software Support by Vendor	6.9	6.1	7.8	7.2	7.0	6.9	6.7	6.4
Vendor's Proposed System Configuration (%)								
Adequate	78.9	66.7	91.7	81.8	69.2	67.3	78.9	92.3
Too Large	5.6	6.7	0.0	0.0	23.1	1.9	0.0	0.0
Too Small	12.7	26.7	0.0	18.2	7.7	30.8	21.1	0.0
Vendor Hardware/Software Changes— Keeping Up with and Implementing (%)								
Very Easy	8.5	0.0	50.0	36.4	46.2	15.4	23.7	46.2
Easy	63.4	40.0	25.0	54.5	46.2	67.3	68.4	53.8
Difficult	28.2	53.3	16.7	9.1	7.7	13.5	2.6	0.0
Very Difficult	0.0	0.0	0.0	0.0	0.0	1.9	5.3	0.0
System Has Performed as Expected (%)								
Yes	95.8	93.3	100.0	90.9	92.3	90.4	86.8	100.0
No	2.8	0.0	0.0	0.0	0.0	3.8	5.3	0.0
Undecided	1.4	6.7	0.0	9.1	7.7	5.8	5.3	0.0
Would Recommend System to Another User (%)								
Yes	90.1	86.7	83.3	90.9	92.3	94.2	86.8	100.0
No	8.5	6.7	0.0	0.0	0.0	1.9	0.0	0.0
Undecided	1.4	6.7	16.7	9.1	7.7	3.8	10.5	0.0

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U.S. User Ratings of Mainframes

TABLE 1. MAINFRAME CHARACTERISTICS AND RATINGS —BY VENDOR AND MODEL (Continued)

Survey Item \ Manufacturer and Model	Unisys V-Series	Unisys 1100/90	Unisys Other	Other Mainframes	
Number of User Responses	37	8	7	10	
Avg. Age of System (months)	17.3	14.0	57.4	24.9	
Acquisition Method (%)					
Purchase	56.8	75.0	0.0	100.0	
Rent/Lease from Manufacturer	18.9	12.5	57.1	0.0	
Lease from Third Party	24.3	12.5	42.9	0.0	
Principal Applications (%)					
Accounting/Billing	29.7	87.5	71.4	20.0	
Banking	62.2	12.5	14.3	0.0	
Construction/Architecture	0.0	0.0	0.0	0.0	
Education	2.7	0.0	14.3	60.0	
Engineering/Scientific	0.0	0.0	0.0	40.0	
Health Care/Medical	0.0	0.0	0.0	10.0	
Insurance	0.0	0.0	0.0	0.0	
Manufacturing	13.5	25.0	28.6	0.0	
Mathematics/Statistics	0.0	0.0	14.3	40.0	
Order Processing	21.6	37.5	42.9	10.0	
Payroll/Personnel	32.4	75.0	71.4	0.0	
Petroleum/Fuel Analysis	0.0	12.5	0.0	0.0	
Process Control	0.0	0.0	14.3	10.0	
Purchasing	18.9	62.5	42.9	0.0	
Sales/Distribution	21.6	37.5	14.3	0.0	
Word Processing, Office Automation	0.0	0.0	0.0	0.0	
Publishing	0.0	0.0	0.0	0.0	
Government Local	0.0	0.0	0.0	0.0	
Other	5.4	12.5	57.1	20.0	
Source of Application Programs (%)					
Developed Internally	70.3	100.0	85.7	70.0	
Contract Programmers	24.3	50.0	14.3	0.0	
Packaged from Manufacturer	51.4	37.5	14.3	40.0	
Independent Suppliers	62.2	50.0	42.9	40.0	
Type of System (%)					
Departmental	0.0	0.0	0.0	20.0	
Organizational	100.0	100.0	100.0	80.0	
Use Third-Party Maintenance (%)	2.7	12.5	0.0	10.0	
Have Information Center (%)					
Yes	29.7	25.0	71.4	50.0	
Plan to in 1988-89	16.2	25.0	0.0	20.0	
Have Mgmt. Info. Director or Chief Info. Officer (%)					
Yes	37.8	87.5	85.7	70.0	
Plan to in 1988-89	2.7	0.0	0.0	0.0	

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U.S. User Ratings of Mainframes

TABLE 1. MAINFRAME CHARACTERISTICS AND RATINGS —BY VENDOR AND MODEL (Continued)

Survey Item \ Manufacturer and Model	Unisys V-Series	Unisys 1100/90	Unisys Other	Other Mainframes	
System Ratings:					
Excellent (10) - Poor (1)					
Ease of Operation	8.9	6.1	6.9	8.0	
Reliability of Mainframe	9.2	7.5	8.7	9.0	
Reliability of Peripherals	7.7	6.3	6.3	8.7	
Maintenance Service (Mfr.):					
Responsiveness	8.4	7.3	7.0	8.9	
Effectiveness	7.9	7.0	7.0	8.8	
Technical Support:					
Troubleshooting	7.1	5.5	6.7	8.5	
Education	7.2	5.8	6.0	7.9	
Documentation	6.4	4.9	6.3	7.3	
Manufacturer's Software:					
Operating System	9.1	6.9	8.3	7.7	
Compilers & Assemblers	8.4	7.6	7.7	7.8	
Application Programs	6.3	4.9	6.7	7.7	
Ease of Programming	8.2	6.4	7.3	7.4	
Ease of Conversion	8.4	5.7	7.4	7.7	
Overall Satisfaction	8.5	6.4	7.3	8.2	
Additional Ratings:					
Excellent (10) - Poor (1)					
Timely Hardware Installation	7.8	6.4	8.1	8.2	
Timely Software Installation	7.4	6.9	8.0	8.0	
Ease of Expansion	8.9	6.6	7.4	8.2	
Compatibility of Peripherals from Other Systems	8.4	5.6	7.3	8.6	
Compatibility of Programs/Data from Other Systems	8.3	6.3	7.9	8.2	
Power/Energy Efficiency	8.2	6.0	6.7	7.0	
Productivity Aids to Reduce Programming Costs	7.6	4.6	6.0	7.3	
Software Support by Vendor	6.9	5.6	3.9	7.2	
Vendor's Proposed System Configuration (%)					
Adequate	83.8	100.0	85.7	100.0	
Too Large	0.0	0.0	14.3	0.0	
Too Small	16.2	0.0	0.0	0.0	
Vendor Hardware/Software Changes— Keeping Up with and Implementing (%)					
Very Easy	40.5	0.0	28.6	10.0	
Easy	54.1	75.0	42.9	80.0	
Difficult	5.4	12.5	28.6	0.0	
Very Difficult	0.0	0.0	0.0	0.0	
System Has Performed as Expected (%)					
Yes	97.3	100.0	71.4	100.0	
No	2.7	0.0	0.0	0.0	
Undecided	0.0	0.0	28.6	0.0	
Would Recommend System to Another User (%)					
Yes	91.9	62.5	100.0	100.0	
No	0.0	12.5	0.0	0.0	
Undecided	8.1	25.0	0.0	0.0	

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U.S. User Ratings of Mainframes

TABLE 2. MAINFRAME CHARACTERISTICS AND RATINGS —RECAP BY VENDOR

Survey Item / Manufacturer	Total Mainframes	Amdahl	Honeywell Bull	IBM	NAS	NCR	Unisys	Other Mainframes
Number of User Responses	411	7	33	170	12	11	168	10
Avg. Age of System (months)	20.5	14.4	30.3	19.9	16.9	10.5	20.2	24.9
Acquisition Method (%)								
Purchase	58.6	71.4	66.7	53.5	75.0	54.5	58.3	100.0
Rent/Lease from Manufacturer	17.5	0.0	12.1	15.3	8.3	36.4	22.0	0.0
Lease from Third Party	23.4	28.6	21.2	30.6	16.7	9.1	19.0	0.0
Principal Applications (%)								
Accounting/Billing	67.4	57.1	81.8	67.1	50.0	81.8	68.5	20.0
Banking	14.4	0.0	6.1	10.6	8.3	9.1	22.0	0.0
Construction/Architecture	1.2	0.0	0.0	1.2	0.0	9.1	1.2	0.0
Education	15.8	14.3	18.2	15.3	16.7	18.2	13.1	60.0
Engineering/Scientific	10.9	42.9	3.0	18.8	0.0	0.0	3.0	40.0
Health Care/Medical	7.8	0.0	15.2	7.1	8.3	0.0	7.7	10.0
Insurance	11.9	28.6	21.2	17.6	25.0	9.1	3.6	0.0
Manufacturing	20.7	0.0	18.2	20.6	8.3	27.3	23.8	0.0
Mathematics/Statistics	7.3	14.3	6.1	10.0	0.0	0.0	3.6	40.0
Order Processing	42.1	14.3	51.5	39.4	33.3	36.4	47.0	10.0
Payroll/Personnel	54.5	42.9	54.5	54.1	41.7	81.8	57.7	0.0
Petroleum/Fuel Analysis	1.9	28.6	0.0	1.8	0.0	0.0	1.8	0.0
Process Control	3.2	14.3	0.0	4.7	0.0	9.1	1.2	10.0
Purchasing	39.7	14.3	45.5	38.8	33.3	9.1	45.2	0.0
Sales/Distribution	26.5	14.3	30.3	22.9	16.7	18.2	32.7	0.0
Word Processing, Office Automation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Publishing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Government Local	1.7	0.0	0.0	3.5	0.0	0.0	0.6	0.0
Other	16.1	28.6	15.2	16.5	33.3	18.2	13.7	20.0
Source of Application Programs (%)								
Developed Internally	83.5	85.7	97.0	82.9	91.7	90.9	81.0	70.0
Contract Programmers	22.9	0.0	15.2	30.0	33.3	0.0	20.2	0.0
Packaged from Manufacturer	34.5	14.3	33.3	37.1	33.3	27.3	33.3	40.0
Independent Suppliers	54.0	85.7	45.5	60.6	66.7	36.4	48.8	40.0
Type of System (%)								
Departmental	2.9	0.0	0.0	3.5	8.3	0.0	1.8	20.0
Organizational	96.6	100.0	97.0	95.9	91.7	100.0	98.2	80.0
Use Third-Party Maintenance (%)	6.1	0.0	0.0	10.0	0.0	0.0	4.2	10.0
Have Information Center (%)								
Yes	44.5	71.4	39.4	50.6	66.7	45.5	36.3	50.0
Plan to in 1988-89	9.5	14.3	0.0	10.0	16.7	9.1	9.5	20.0
Have Mgmt. Info. Director or Chief Info. Officer (%)								
Yes	61.6	42.9	54.5	69.4	75.0	54.5	54.8	70.0
Plan to in 1988-89	0.7	0.0	3.0	0.0	0.0	0.0	1.2	0.0

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U.S. User Ratings of Mainframes

TABLE 2. MAINFRAME CHARACTERISTICS AND RATINGS —RECAP BY VENDOR (Continued)

Survey Item / Manufacturer	Total Mainframes	Amdahl	Honeywell Buil	IBM	NAS	NCR	Unisys	Other Mainframes
System Ratings:								
Excellent (10) - Poor (1)								
Ease of Operation	7.8	8.7	7.4	7.1	8.8	8.4	8.4	8.0
Reliability of Mainframe	9.1	9.1	8.3	9.2	9.5	9.1	9.0	9.0
Reliability of Peripherals	8.1	8.1	7.4	8.5	8.9	8.4	7.6	8.7
Maintenance Service (Mfr.):								
Responsiveness	8.3	8.8	7.7	8.5	9.5	7.3	8.2	8.9
Effectiveness	8.2	9.2	7.5	8.4	9.6	7.8	7.9	8.8
Technical Support:								
Troubleshooting	7.4	9.0	6.4	7.7	9.2	7.3	7.1	8.5
Education	7.2	8.7	6.0	7.5	7.9	7.2	7.1	7.9
Documentation	6.9	8.8	5.8	7.1	9.0	7.2	6.6	7.3
Manufacturer's Software:								
Operating System	8.3	9.0	8.0	7.7	8.8	7.7	8.9	7.7
Compilers & Assemblers	8.2	9.0	7.8	7.9	8.7	7.8	8.6	7.8
Application Programs	6.7	9.0	5.7	6.7	8.4	7.0	6.7	7.7
Ease of Programming	7.5	8.4	7.1	6.8	8.2	8.0	8.2	7.4
Ease of Conversion	7.4	8.5	6.8	6.6	8.2	8.3	8.1	7.7
Overall Satisfaction	8.1	8.6	7.5	8.0	8.5	8.4	8.3	8.2
Additional Ratings:								
Excellent (10) - Poor (1)								
Timely Hardware Installation	8.3	9.3	8.0	8.7	9.7	8.5	7.9	8.2
Timely Software Installation	7.9	9.1	7.8	8.1	8.3	8.4	7.6	8.0
Ease of Expansion	8.4	9.0	7.6	8.2	9.3	9.1	8.7	8.2
Compatibility of Peripherals from Other Systems	8.0	9.7	6.3	8.0	9.4	9.1	8.1	8.6
Compatibility of Programs/Data from Other Systems	7.9	9.6	6.2	7.9	9.3	8.7	8.1	8.2
Power/Energy Efficiency	7.8	8.7	7.5	7.5	8.7	9.1	8.0	7.0
Productivity Aids to Reduce Programming Costs	6.7	7.6	5.8	6.2	7.3	7.1	7.3	7.3
Software Support by Vendor	6.8	8.2	6.5	7.0	7.8	7.2	6.7	7.2
Vendor's Proposed System Configuration (%)								
Adequate	78.8	85.7	75.8	77.6	91.7	81.8	78.0	100.0
Too Large	4.1	0.0	0.0	7.1	0.0	0.0	3.0	0.0
Too Small	13.6	0.0	18.2	10.0	0.0	18.2	18.5	0.0
Vendor Hardware/Software Changes— Keeping Up with and Implementing (%)								
Very Easy	19.5	57.1	24.2	6.5	50.0	36.4	27.4	10.0
Easy	59.4	0.0	63.6	60.6	25.0	54.5	61.3	80.0
Difficult	18.2	28.6	12.1	30.6	16.7	9.1	8.3	0.0
Very Difficult	1.0	0.0	0.0	0.6	0.0	0.0	1.8	0.0
System Has Performed as Expected (%)								
Yes	92.7	100.0	87.9	93.5	100.0	90.9	91.7	100.0
No	2.2	0.0	6.1	1.2	0.0	0.0	3.0	0.0
Undecided	3.6	0.0	6.1	2.4	0.0	9.1	4.8	0.0
Would Recommend System to Another User (%)								
Yes	88.8	85.7	78.8	88.2	83.3	90.9	91.1	100.0
No	3.6	0.0	12.1	5.3	0.0	0.0	1.2	0.0
Undecided	6.1	14.3	9.1	3.5	16.7	9.1	7.1	0.0

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U.S. User Ratings of Mainframes

TABLE 3. MAINFRAME PLANS FOR 1988-89 —BY VENDOR AND MODEL

Survey Item / Manufacturer and Model	Amdahl All Models	Honeywell Bull DPS8	IBM 308X	IBM 3090-150	IBM 3090-200/300	IBM 3090-400/600	IBM 4381	NAS All Models
Plan to Acquire/Implement (%)								
Systems Software from Manufacturer	28.6	26.7	62.5	71.4	77.3	92.3	53.5	16.7
Systems Software Other Supplier	71.4	6.7	79.2	71.4	86.4	76.9	66.2	75.0
Expansions to Hardware	42.9	40.0	75.0	78.6	77.3	76.9	66.2	58.3
Expansions to Data Comm. Facilities	42.9	40.0	66.7	71.4	86.4	84.6	60.6	66.7
Unix Operating System	0.0	6.7	16.7	0.0	13.6	0.0	2.8	0.0
Laser Printers	71.4	20.0	45.8	42.9	40.9	53.8	38.0	33.3
Power Conditioning Systems	28.6	0.0	12.5	0.0	18.2	15.4	9.9	25.0
Optical Disk Devices	0.0	0.0	16.7	0.0	31.8	0.0	2.8	0.0
Image Processing	14.3	0.0	33.3	14.3	27.3	23.1	2.8	8.3
Planned Applications (%)								
Executive Information System	14.3	20.0	8.3	35.7	31.8	7.7	23.9	33.3
Decision Support System	14.3	6.7	16.7	7.1	31.8	23.1	21.1	16.7
Financial Control System	14.3	20.0	20.8	14.3	18.2	15.4	25.4	16.7
General Accounting System	14.3	20.0	20.8	7.1	13.6	7.7	23.9	8.3
Payroll/Human Resources	0.0	13.3	8.3	35.7	13.6	7.7	23.9	16.7
Sales and Marketing System	28.6	13.3	8.3	0.0	13.6	7.7	16.9	25.0
Order Processing/Inventory	0.0	6.7	8.3	7.1	18.2	7.7	18.3	8.3
Purchasing	0.0	6.7	20.8	7.1	4.5	7.7	16.9	8.3
Scheduling	0.0	6.7	8.3	0.0	4.5	15.4	7.0	16.7
Other	14.3	0.0	8.3	28.6	18.2	38.5	11.3	0.0
Planned System Extensions (%)								
Application Development Tools	14.3	26.7	33.3	35.7	59.1	53.8	39.4	66.7
Performance Monitors	28.6	13.3	29.2	28.6	40.9	15.4	23.9	66.7
Electronic Mail	14.3	0.0	12.5	14.3	13.6	15.4	29.6	33.3
Data Base Management System	28.6	6.7	20.8	21.4	40.9	7.7	25.4	8.3
Query/Report System	0.0	33.3	33.3	0.0	22.7	38.5	29.6	16.7
Data Center Control System	14.3	6.7	25.0	14.3	45.5	38.5	14.1	25.0
Graphics	0.0	0.0	0.0	0.0	27.3	15.4	5.6	25.0
Other	0.0	0.0	0.0	7.1	0.0	0.0	1.4	0.0

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U.S. User Ratings of Mainframes

TABLE 3. MAINFRAME PLANS FOR 1988-89 —BY VENDOR AND MODEL (Continued)

Survey Item / Manufacturer and Model	NCR 9800	Unisys A1/4/6	Unisys A2/3/5	Unisys A9/10	Unisys A12/A15/17	Unisys V-Series	Unisys 1100/90
Plan to Acquire/Implement (%)							
Systems Software from Manufacturer	18.2	53.8	34.6	55.3	61.5	29.7	50.0
Systems Software Other Supplier	54.5	7.7	21.2	36.8	38.5	32.4	50.0
Expansions to Hardware	54.5	76.9	53.8	63.2	61.5	45.9	87.5
Expansions to Data Comm. Facilities	36.4	92.3	44.2	50.0	84.6	67.6	87.5
Unix Operating System	18.2	0.0	7.7	13.2	30.8	2.7	37.5
Laser Printers	18.2	53.8	15.4	28.9	38.5	21.6	50.0
Power Conditioning Systems	45.5	53.8	15.4	13.2	15.4	16.2	25.0
Optical Disk Devices	9.1	0.0	0.0	5.3	7.7	0.0	12.5
Image Processing	0.0	0.0	0.0	5.3	23.1	2.7	0.0
Planned Applications (%)							
Executive Information System	9.1	0.0	23.1	28.9	46.2	16.2	37.5
Decision Support System	9.1	0.0	9.6	23.7	46.2	8.1	37.5
Financial Control System	9.1	0.0	9.6	23.7	23.1	13.5	0.0
General Accounting System	18.2	53.8	13.5	21.1	23.1	10.8	0.0
Payroll/Human Resources	45.5	15.4	21.2	21.1	15.4	2.7	12.5
Sales and Marketing System	18.2	53.8	7.7	13.2	15.4	13.5	12.5
Order Processing/Inventory	9.1	7.7	5.8	7.9	23.1	27.0	12.5
Purchasing	9.1	7.7	11.5	13.2	7.7	8.1	12.5
Scheduling	9.1	0.0	11.5	15.8	7.7	5.4	0.0
Other	18.2	7.7	5.8	15.8	15.4	5.4	0.0
Planned System Extensions (%)							
Application Development Tools	18.2	0.0	15.4	28.9	23.1	24.3	25.0
Performance Monitors	9.1	7.7	15.4	39.5	15.4	16.2	25.0
Electronic Mail	45.5	15.4	21.2	21.1	30.8	21.6	25.0
Data Base Management System	54.5	7.7	7.7	13.2	7.7	35.1	25.0
Query/Report System	63.6	46.2	21.2	26.3	15.4	37.8	50.0
Data Center Control System	0.0	0.0	1.9	21.1	7.7	18.9	12.5
Graphics	0.0	0.0	11.5	5.3	7.7	0.0	12.5
Other	0.0	0.0	0.0	2.6	15.4	2.7	0.0

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U.S. User Ratings of Mainframes

TABLE 4. MAINFRAME PLANS FOR 1988-89 —RECAP BY VENDOR

Survey Item / Manufacturer	Total Mainframes	Amdahl	Honeywell Buil	IBM	NAS	NCR	Unisys	Other Mainframes
Plan to Acquire/Implement (%)								
Systems Software from Manufacturer	50.6	28.6	42.4	65.9	16.7	18.2	43.5	30.0
Systems Software Other Supplier	49.4	71.4	21.2	72.4	75.0	54.5	29.8	30.0
Expansions to Hardware	63.3	42.9	60.6	71.2	58.3	54.5	58.3	50.0
Expansions to Data Comm. Facilities	63.7	42.9	57.6	69.4	66.7	36.4	60.1	90.0
Unix Operating System	8.3	0.0	9.1	5.9	0.0	18.2	10.7	10.0
Laser Printers	34.8	71.4	33.3	41.8	33.3	18.2	27.4	40.0
Power Conditioning Systems	17.3	28.6	12.1	13.5	25.0	45.5	18.5	30.0
Optical Disk Devices	6.3	0.0	6.1	10.6	0.0	9.1	3.0	0.0
Image Processing	10.2	14.3	15.2	16.5	8.3	0.0	3.6	10.0
Planned Applications (%)								
Executive Information System	22.9	14.3	24.2	22.4	33.3	9.1	24.4	10.0
Decision Support System	17.8	14.3	12.1	20.6	16.7	9.1	16.1	30.0
Financial Control System	16.8	14.3	18.2	20.6	16.7	9.1	13.7	10.0
General Accounting System	18.0	14.3	18.2	18.2	8.3	18.2	19.0	10.0
Payroll/Human Resources	18.5	0.0	21.2	20.0	16.7	45.5	16.1	10.0
Sales and Marketing System	13.6	28.6	12.1	12.4	25.0	18.2	14.3	0.0
Order Processing/Inventory	12.7	0.0	6.1	14.7	8.3	9.1	13.7	0.0
Purchasing	12.4	0.0	9.1	14.1	8.3	9.1	11.3	30.0
Scheduling	8.8	0.0	6.1	8.2	16.7	9.1	9.5	10.0
Other	12.4	14.3	9.1	15.9	0.0	18.2	8.9	30.0
Planned System Extensions (%)								
Application Development Tools	32.1	14.3	39.4	40.6	66.7	18.2	21.4	30.0
Performance Monitors	25.1	28.6	15.2	29.4	66.7	9.1	22.0	0.0
Electronic Mail	21.9	14.3	9.1	21.8	33.3	45.5	22.6	20.0
Data Base Management Systems	21.4	28.6	18.2	25.3	8.3	54.5	17.3	10.0
Query/Report System	27.3	0.0	30.3	24.7	16.7	63.6	29.2	20.0
Data Center Control System	16.1	14.3	12.1	22.4	25.0	0.0	11.3	10.0
Graphics	8.0	0.0	6.1	8.8	25.0	0.0	7.1	10.0
Other	2.4	0.0	3.0	2.4	0.0	0.0	2.4	10.0

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