FOILS

Section 6

User Research Programs

Douglas Tayler
Director, User Research
INPUT

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JJ88-DT3-1

Round Table Session
Topics

- Data Management: Current Trends and Challenges
- Systems Integration: Buyer Issues
- Workstation Strategies
- Information Systems Budget

INPUT

Data Management

Current Trends and Challenges

(Research in Process)

INPUT

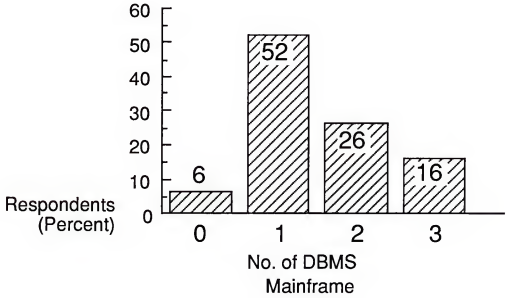
JJ88-DT3-3

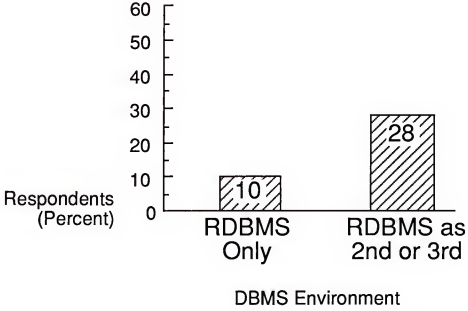
Objectives

- Identify Data Management Trends and Issues
  - Technology
  - Responsibility
  - Resources
- Track Progress with Relational DBMS
  - By Information Systems
  - By End User
- Track Progress with Distributed DBMS
- Set Objectives for Data Management in 1990s

INPUT

Mainframe DBMS Environment





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JJ88-DT3-5

Minicomputer DBMS Environment

- DBMS Use
  - 58% Are Using
  - 32% Are Not Using
  - 10% Did Not Know
- RDBMS Use
  - 25% Are Using
  - 43% of Those Using DBMS

INPUT

JJ88-DT3-6

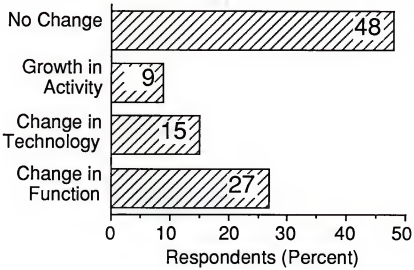
Considering New Data Bases

- 30% Have New DBMS Under Consideration
- All Are Relational
- Most Often Mentioned Are:
  - DB2
  - Oracle
  - Ingress

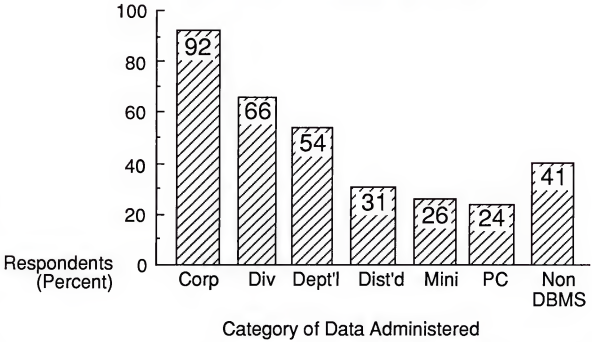
INPUT

JJ88-DT3-7

Data Management Changing Responsibilities



Data Administration Breadth of Responsibility



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JJ88-DT3-8

Key Issues
Strategy & Direction

- Managing Distributed Data
- Ownership—User versus IS Responsibilities
- Managing Growth and Technology
- Planning for New Technology
- Management Support for Data Management Process

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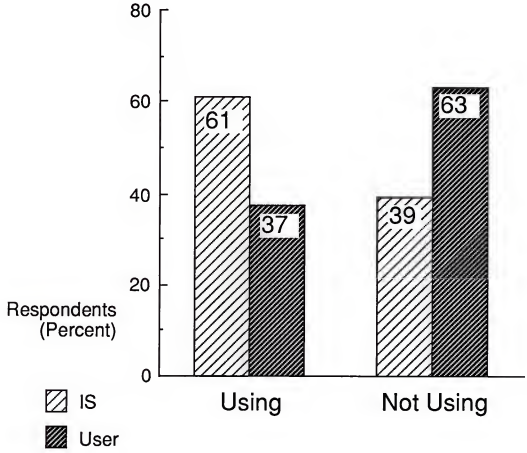
JJ88-DT3-9

Relational DBMS Application
Who Is Using It?



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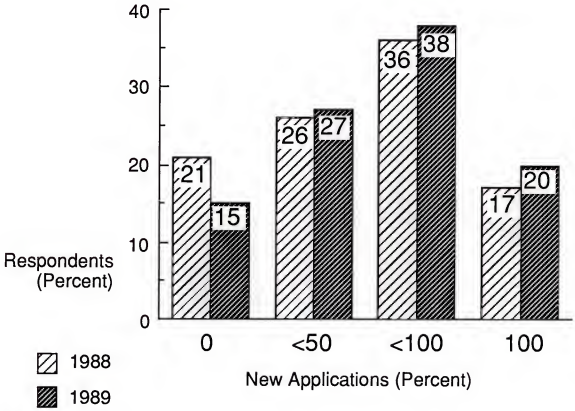
JJ88-DT3-10

Relational DBMS Application Magnitude of Mainframe Use



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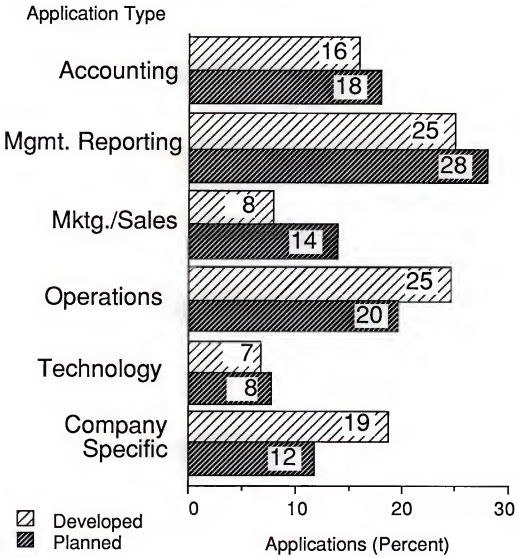
JJ88-DT3-11

Relational DBMS Application
How Is It Being Used?



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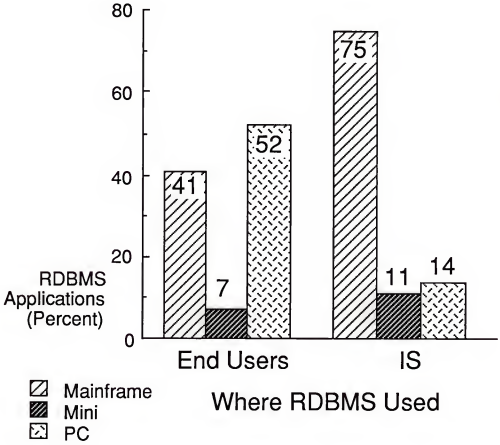
JJ88-DT3-12

Relational DBMS Application
Where Are End Users Using It?



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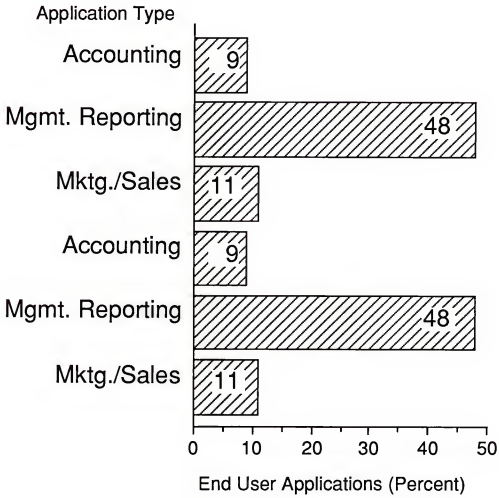
JJ88-DT3-13

Relational DBMS Application
How Are End Users Using It?



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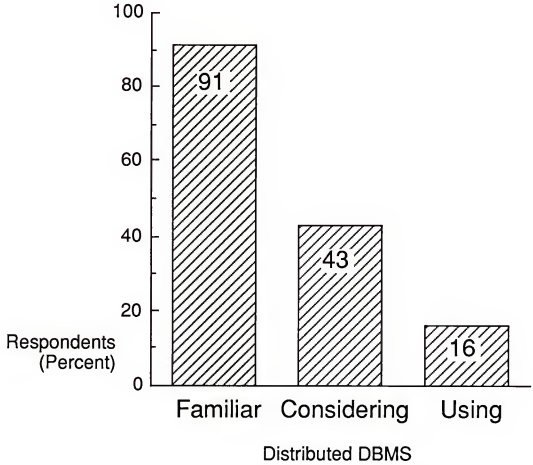
JJ88-DT3-14

Distributed DBMS Application
What Is the Activity Level?



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JJ88-DT3-15

Distributed DBMS Application
Sample Applications

- Customs Clearance
- Shop Floor
- Retail Branch Operations
- Computer Aided-Engineering
- Inventory Tracking
- Departmental Reporting

INPUT

JJ88-DT3-16

Data Management
Current Trends & Challenges
Conclusions

- The Role Is Changing
- New DBMS Technology Is Being Used
- The End User Is Developing with RDBMS
- IS Management Needs to Increase Emphasis

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Systems Integration

Buyer Issues

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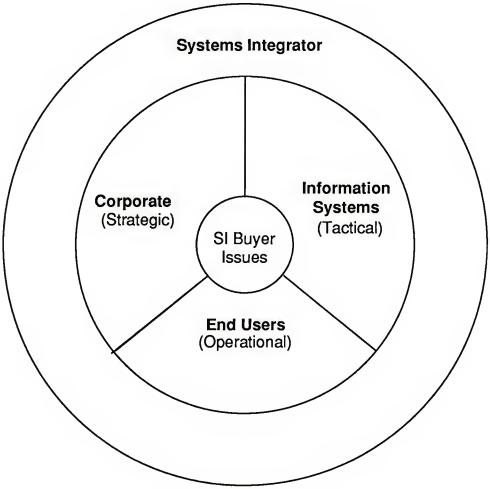
JJ88-DT3-18

Systems Integration—
Communities Involved



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JJ88-DT3-19

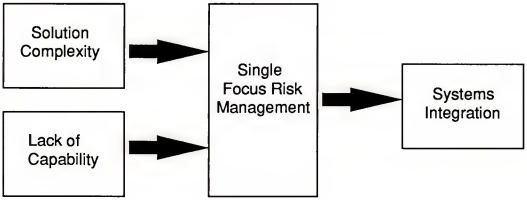
Process Elements

Elements	Communities			
	Corp	IS	EU	SI
Strategic				
Rationale	*	*		
Financial Implications	*			
Legal	*			*
Approval	*			
Stewardship	*			
Tactical				
Specification		*	*	
Acceptance Criteria		*		
Bid Process		*		*
Selection Criteria		*		
Technology Review		*		*
Project Management		*		*
Environmental Impact		*		*
Operational				
Involvement			*	*
Training			*	*
Support			*	*

INPUT

JJ88-DT3-20

IS And SI—Today
Blocking Factors Lead to Systems Integration



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JJ88-DT3-21

The Corporate Viewpoint

Legal Concerns

- Not an Area of High Concern
  - Routinely Uneventful
  - Timely and Efficient
- Contract Typically Buyer Generated
- Performance Bonds Appear to Be a Non-Issue
  - No Examples Found
  - Liability Issues Well Managed

INPUT

The Corporate Viewpoint

Financial Implications

- Internal Processes Used
- Only One Factor in the Approval

Project Approval

- Typically Follows Vendor Selection
- Prime Vendor Frequently Involved
- Internal Processes Used
- Time Required—From Inception to Signed Contract

  - Up to 6 Months 30%
  - 7 to 12 Months 50%
  - Over 12 Months 20%

Stewardship (Ongoing Senior Management Involvement)

- Tied to Interest of the Sponsor
- Typically Declines after Approval

INPUT

JJ88-DT3-23

Information Systems Issues—Project Definition

- Manage the Level of Detail
- Use to Encourage Vendor Creativity
- Do Not Concentrate on Technology
- Involve the End Users at This Point—a Source of Creativity

INPUT

JJ88-DT3-24

Information Systems Issues—
Project Definition Participation

Group	Percent of Cases Represented
Middle Management (DIR/MGR)	73
Information Systems	67
Upper Management	33
Outside Consultants	20
End Users	20
Customers	6

INPUT

JJ88-DT3-25

Information Systems Issues—
Duration of Project Definition Phase

Period	Percent of Respondents
<6 Months	27
6-12 Months	27
12-24 Months	33
24-36 Months	13

INPUT

JJ88-DT3-26

Information Systems Issues—Acceptance Criteria

- Not Well Recognized as a Specific Element of the SI Process.
- Usually Developed as Part of the Project Specification.
- Good Acceptance Criteria Can Serve as Protection for the Vendor—Help to Develop.
- Need to Be Phased Throughout the Project—Do Not Ignore Signals of Problems.

INPUT

JJ88-DT3-27

Information Systems Issues—Acceptance Methodologies

Type	Percent of Respondents
Performance Criteria	40
Functionality Definition	26
Simulation	13
Prototype	7
Parallel Processing	7
Unknown	7

INPUT

JJ88-DT3-28

Information Systems Issues—
Selection Criteria

- Pare Down the Number of Bidders
- Reference Selling Key
  - A Record of Success
  - Provable Prior Experience
  - Site Visits Very Valuable
  - Importance Growing
- Vendor Project Manager Can Be a Swing Factor

INPUT

JJ88-DT3-29

Information Systems Issues—Vendor Selection Criteria

Type	Percent of Respondents
Industry Experience	86
Application Knowledge	86
Cost/Performance	86
SI Experience	79
Project Management Skills	64
Support Skills	64
Service Orientation	50
On-Site Visits	43
References	43
Alliances	21

INPUT

JJ88-DT3-30

Information Systems Issues—
Duration of Vendor Selection Phase

Period	Percent of Respondents
<6 Months	54
6-12 Months	20
12-18 Months	13
Unknown	13

INPUT

JJ88-DT3-31

Information Systems Issues—
Environmental & Organizational Impact

- Open Communication Key to Success
  - Address Alternative Opinions
  - Opportunity for Second Guessing by IS
  - Involve the End User
- Manage the Interface with Project Staff
  - Appears to Be a Training Ground for Vendor Staff
  - Maintain Continuity of Vendor Project Staff
- Monitor Standards of Quality
  - Adopt Buyer's if Higher

Information Systems Issues—Project Management

- More Critical than the Ratings Indicate
- Continuity of Vendor Project Manager
  - The Good Ones Get Reassigned Too Soon
  - One Manager for the Life of the Project
- Managing the Subcontractors Key—Prime Vendor Must Keep Control
  - Buyer Tendency to Go around the Prime
- Use a Third Party as QA
- Keep the Users Involved—They Can Become the Vendor's Ally

INPUT

JJ88-DT3-33

End-User Perspective—Involvement

A "Single" Objective

The User Becomes the "Champion."

INPUT

JJ88-DT3-34

Adding It Up—Conclusions

Issues and Overall Success

Rank	High Success	Medium Success	Low Success
1	Environ. & Org. Impact	Bid Process	Acceptance Criteria
2	User Perspective	Environ & Org. Impact	Project Definition
3	Selection Criteria	Project Definition	Selection Criteria
4	Project Definition	User Perspective	Bid Process
5	Bid Process	Selection Criteria	Technology Review
6	Acceptance Criteria	Technology Review	Project Management
7	Project Management	Project Management	Environ. & Org. Impact
8	Technology Review	Acceptance Criteria	User Perspective

INPUT

JJ88-DT3-35

IS and SI—Future Information Systems Organization—1990s

- Smaller, More Flexible and Responsive
- Expert Based—Technology and Business
- Consultant Style—Information Engineers and Solution Builders
- Champion for Information Technology

An Internal "SI Competitor"

INPUT

JJ88-DT3-36

Workstation Strategies

1988 and Beyond

INPUT

JJ88-DT3-37

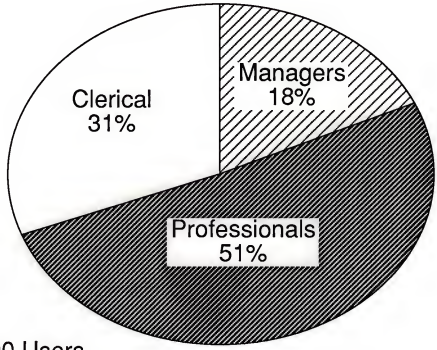
Objectives

- Status of the Standard Terminal
- Impact of the PC Population
- Need to Plan Workstation Direction
- Direction of Workstation Technology
- Plans of Workstation Vendors

INPUT

JJ88-DT3-38

User Demographics
Users by Category



460,000 Users
280,000 Workstations

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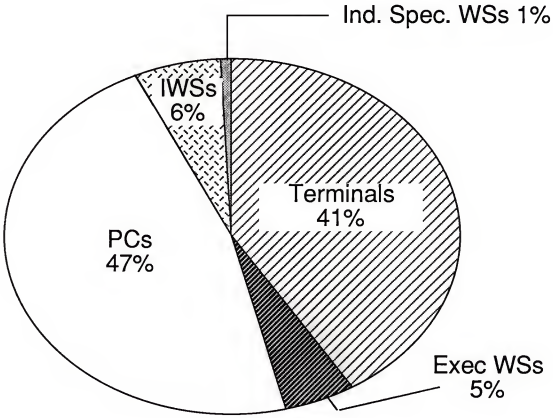
JJ88-DT3-39

Workstation Population by Type



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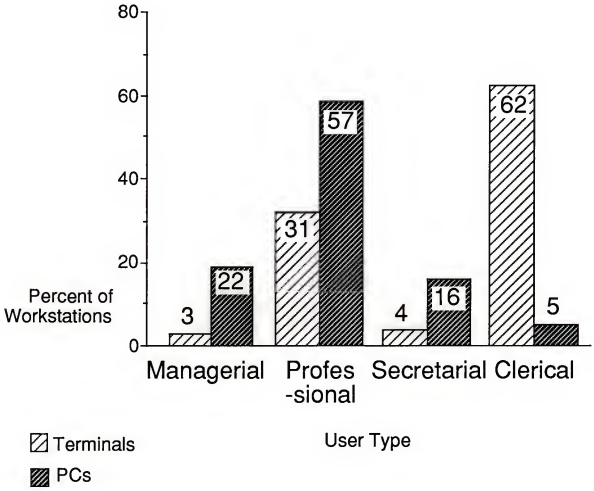
JJ88-DT3-40

Distribution of Workstations



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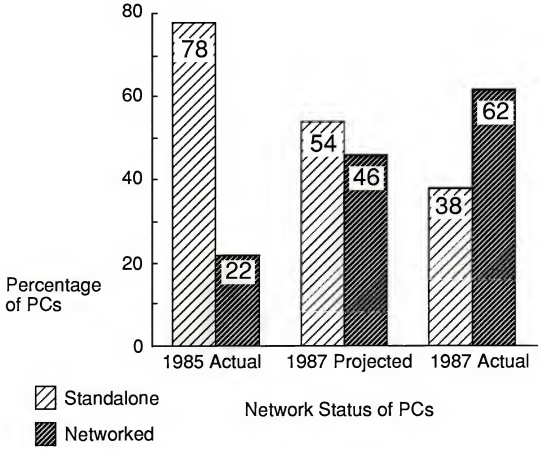
JJ88-DT3-41

PC Connectivity by Percent of PCs
1985 & 1987



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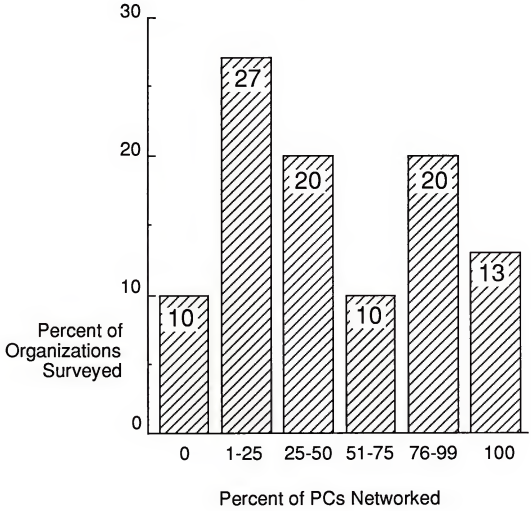
JJ88-DT3-42

PC Connectivity by Percent of Organizations Interviewed



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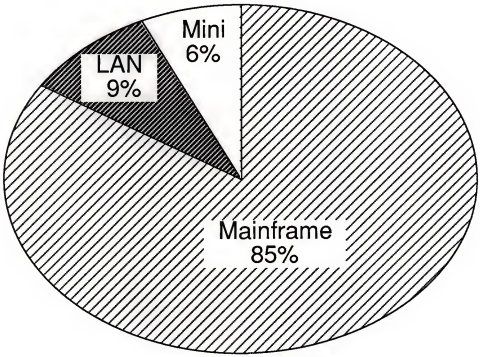
JJ88-DT3-43

Networked PCs by Type of Connectivity



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JJ88-DT3-44

Integrated Workstation Applications—Characteristics

- Graphic Interfaces
- Remote Data Entry/Collection
- Data Analysis with Data Entry
- High Processing Loads

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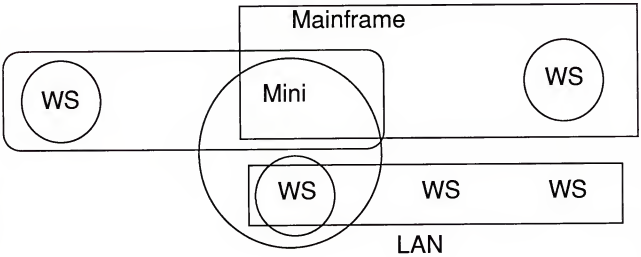
JJ88-DT3-45

Integrated Workstation Applications
Three-Tier Computing



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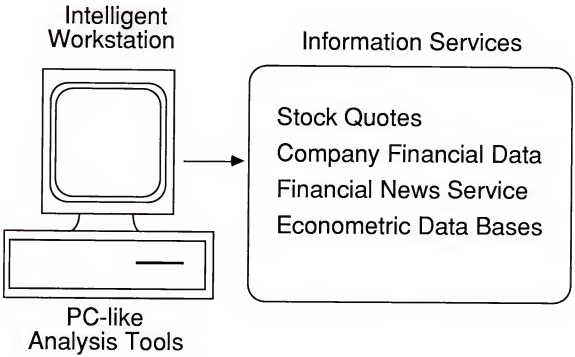
JJ88-DT3-46

Integrated Workstation Applications
An Example



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JJ88-DT3-47

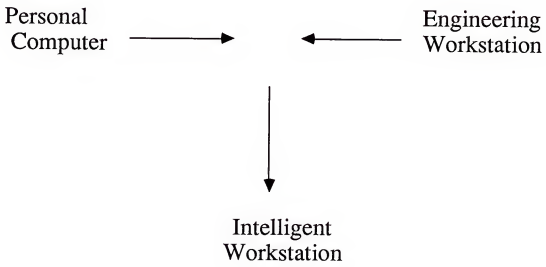
Integrated Workstation Applications—Candidates

- Executive Support Systems
- Electronic Mail
- Operational Reporting
- Software Development
- Imaging

INPUT

JJ88-DT3-48

Workstation Technology



INPUT

JJ88-DT3-50

Integrated Workstation Applications
Distribution of Functions

Workstation Functions	Central Processor Functions
User Interface	Main File Maintenance
Data Entry and Maintenance	Application Network Management
Secondary Data Management	Primary Data Management
Current Activity	Primary Systems Output
Analysis and Reporting	Weekly, Monthly Processing
Ad Hoc Analysis	Backup & Security

INPUT

JJ88-DT3-49

Converging WS Technology

Factor	PC	Engr WS
Power	Expanding	Adjusting
Price	Rising	Declining
User Interface	Improving	Evolving
Operating System	DOS-OS/2	UNIX &/or DOS
Communications	Expanding	Established
Connectivity	Focused	Flexible
Acceptance	Established	Emerging

INPUT

JJ88-DT3-51

Workstation Technology
IWS—1992

Factor	IWS
Power	6-8 Meg
Price	$7-10,000
User Interface	Icon Based
Operating System	OS/2 + UNIX
Communications	Imbedded
Connectivity	Multiple
Acceptance	Evolutionary

INPUT

JJ88-DT3-52

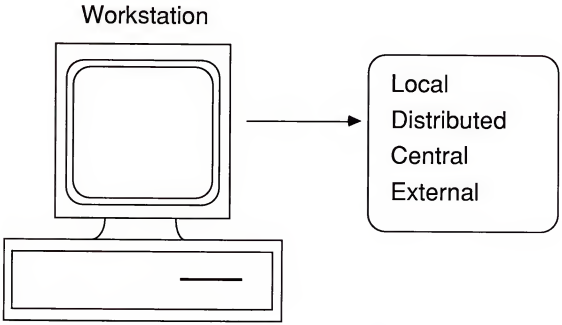
Summary of Findings

- More PCs than Terminals
- 22% of PCs Used by Management
- 62% of PCs Connected to the Network
- Engineering WSs Entering Business Systems
- Vendors Exploding WS Capabilities
- A True IWS Is on the Way

INPUT

JJ88-DT3-53

Tomorrow's Workstation



Plan for It Now

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JJ88-DT3-54

Information Systems Budget

Analysis

INPUT

JJ88-DT3-55

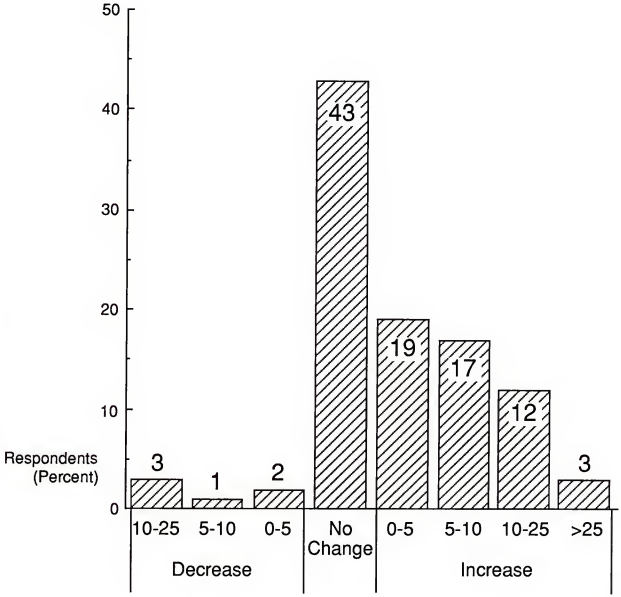
Information Systems Budget
Computer Hardware
(Percent)

Category	'87	'88	'88	'89
	(Distribution)		(Growth)	
Mainframes	43	44	7	4
Minicomputers	16	14	-8	2
Personal Computers	9	10	17	6
Mass Storage	16	16	7	1
Other	16	16	7	1
Total	100	100	5	4

INPUT

JJ88-DT3-56

Information Systems Budget
Distribution of Hardware Budget Changes
1989



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JJ88-DT3-57

Technology Issue—Survey Results

Issue	Responses (Percent)
Networking	29
Hardware	26
Data Base	10
Managing Technology	6
Other	29

INPUT

JJ88-DT3-58

Information Systems Budget
External Products and Services
(Percent)

Category	'87 (Distribution)	'88 (Distribution)	'88 (Growth)	'89 (Growth)
Professional Services	13	14	13	0
Processing Services	5	5	5	1
Application Software	15	15	5	0
Systems Software	18	18	5	1
Turnkey Systems	3	3	5	0
Hardware Maintenance	25	24	1	2
Software Maintenance	14	15	13	2
Other	6	6	5	0
Total	100	100	5	2

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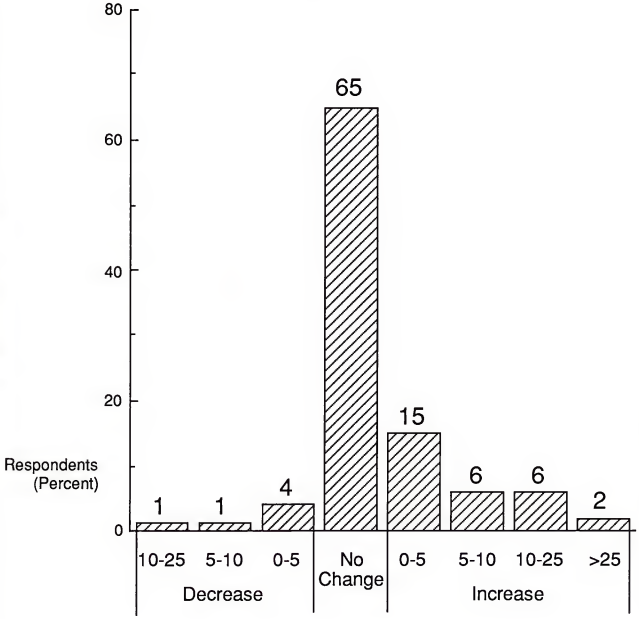
JJ88-DT3-59

Information Systems Budget
Distribution of External Services Budget Changes
1989



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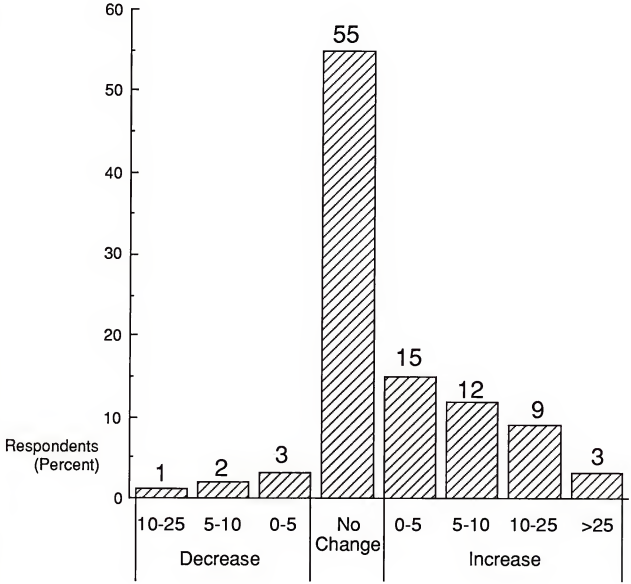
JJ88-DT3-60

Information Systems Budget
Distribution of Communications Budget Changes
1989



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JJ88-DT3-61

User Research Programs

Douglas Tayler
Director, User Research

INPUT

1

Round Table Session

Topics

* Data Management: Current Trends and Challenges
* Systems Integration: Buyer Issues
* Workstation Strategies
* Information Systems Budget

2

Data Base Management

Current Trends and Challenges

(Research in Process)

June 1988

INPUT

3

NOTES:

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headings to
helvetica 18

USM2-DT2-1

Objectives

- Identify Data Management Trends and Issues
  - Technology
  - Responsibility
  - Resources

INPUT

4

NOTES:

Combine 2a & b

USM2-DT2-2a

Objectives

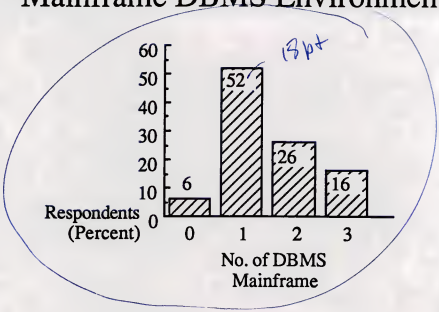
- Track Progress with Relational DBMS
  - By Information Systems <#
  - By End User
- Track Progress with Distributed DBMS
- Set Objectives for Data Management in 1990s

INPUT

NOTES:

USM2-DT2-2b

Mainframe DBMS Environment



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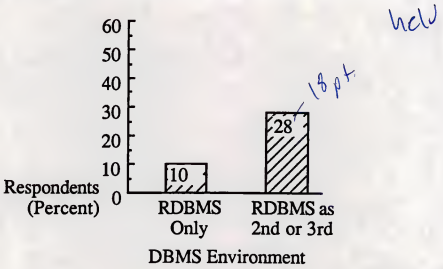
NOTES:

Put Both charts on one Foil

USM2-DT2-6

Mainframe DBMS Environment



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NOTES:

USM2-DT2-6a

Minicomputer DBMS Environment

- DBMS Use
  - 58% Are Using
  - 32% Are Not Using
  - 10% Did Not Know
- RDBMS Use
  - 25% Are Using
  - 43% of Those Using DBMS

INPUT

6

NOTES:

USM2-DT2-7

Considering New Data Bases

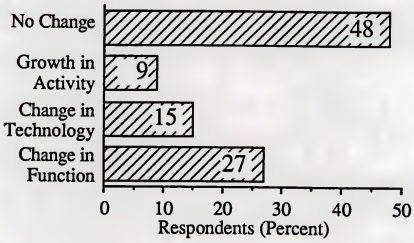
- 30% Have New DBMS Under Consideration
- All Are Relational
- Most Often Mentioned Are:
  - DB2
  - Oracle
  - Ingress

INPUT

NOTES:

USM2-DT2-8

Data Management
Changing Responsibilities



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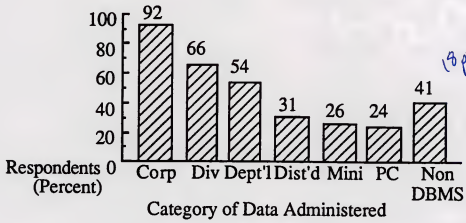
USM2-DT2-13

Data Administration
Breadth of Responsibility



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NOTES:

USM2-DT2-14

Key Issues
Strategy & Direction

- Managing Distributed Data
- Ownership—User versus IS Responsibilities
- Managing Growth and Technology

INPUT

9

NOTES:

Combine

USM2-DT2-17a

Key Issues
Strategy & Direction

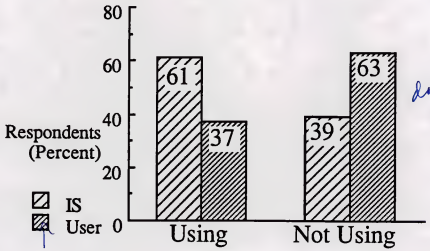
- Planning for New Technology
- Management Support for Data Management Process

INPUT

NOTES:

USM2-DT2-17b

Relational DBMS Application
Who Is Using It?

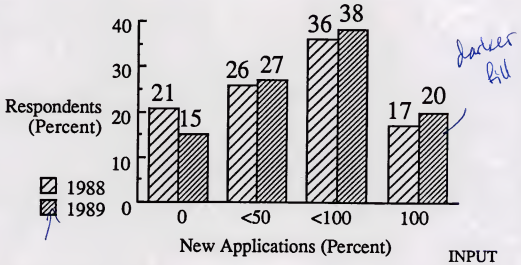


INPUT

NOTES:

USM2-DT2-20

Relational DBMS Application Magnitude of Mainframe Use

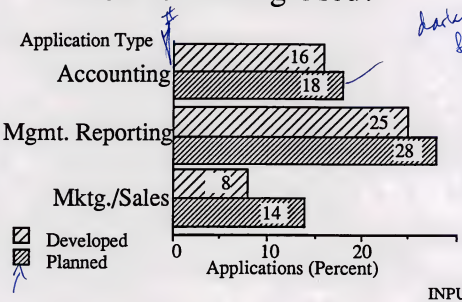


INPUT

NOTES:

USM2-DT2-22

Relational DBMS Application How Is It Being Used?

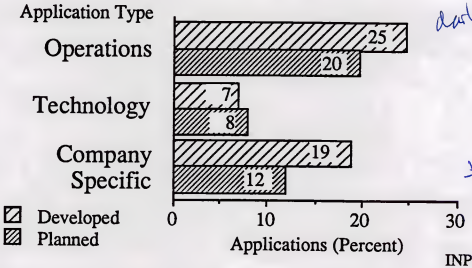


INPUT

NOTES:

USM2-DT2-23

Relational DBMS Application How Is It Being Used?

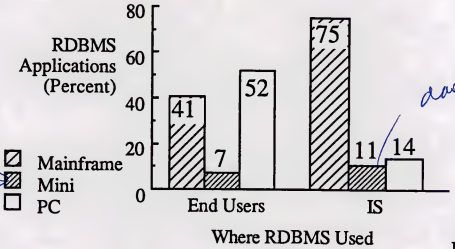


INPUT

NOTES:

USM2-DT2-23a

Relational DBMS Application Where Are End Users Using It?



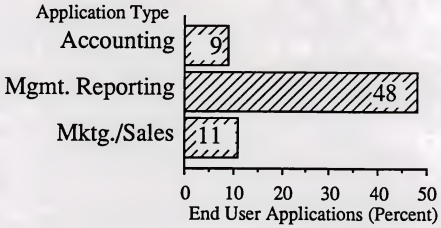
INPUT

NOTES:

USM2-DT2-24

Relational DBMS Application
How Are End Users Using It?

new



INPUT

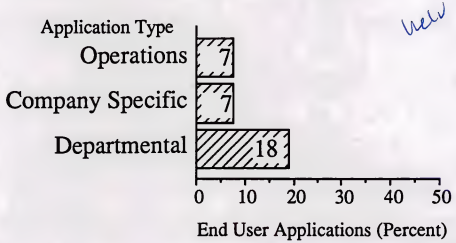
14

NOTES:

Combers

USM2-DT2-25

Relational DBMS Application
How Are End Users Using It?

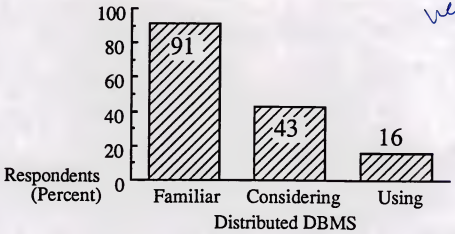


INPUT

NOTES:

USM2-DT2-25a

Distributed DBMS Application
What Is the Activity Level?



INPUT

NOTES:

USM2-DT2-28

Distributed DBMS Application Sample Applications

- Customs Clearance
- Shop Floor
- Retail Branch Operations
- Computer Aided-Engineering
- Inventory Tracking
- Departmental Reporting

INPUT

16

NOTES:

USM2-DT2-29

Data Management
Current Trends & Challenges
Conclusions

- The Role Is Changing
- New DBMS Technology Is Being Used
- The End User Is Developing with RDBMS
- IS Management Needs to Increase Emphasis

INPUT

17

NOTES:

USM2-DT2-32

helvetica

Systems Integration

bolder

Buyer Issues

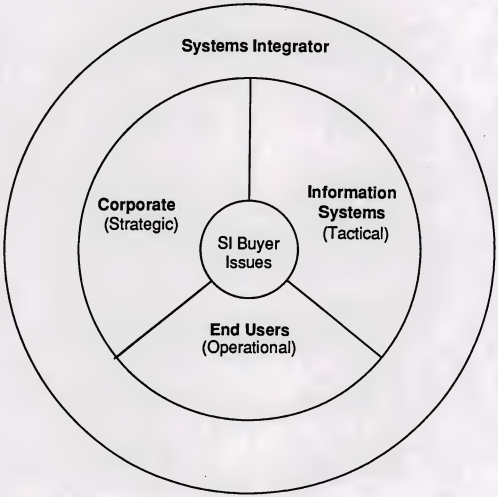
~~Douglas H. Tayler~~
~~Director, Information Systems~~
~~Program~~

18

align all dashes

INPUT

Systems Integration—
Communities Involved



INPUT

Process Elements

delete lines

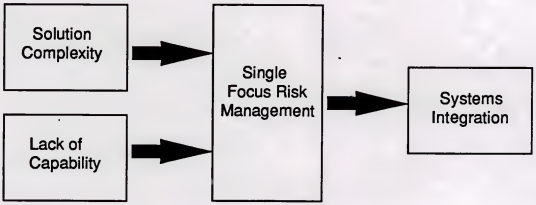
spread out

Elements	Communities: Corp	IS	EU	SI
Strategic				
Rationale	*	*		
Financial Implications	*			
Legal	*			*
Approval	*			
Stewardship	*			
Tactical				
Specification		*	*	
Acceptance Criteria		*		
Bid Process		*		*
Selection Criteria		*		
Technology Review		*		*
Project Management		*		*
Environmental Impact		*		*
Operational				
Involvement			*	*
Training			*	*
Support			*	*

20

INPUT

IS And SI—Today
Blocking Factors Lead to Systems Integration



21

INPUT

The Corporate Viewpoint

Legal Concerns

- Not an Area of High Concern
  - Routinely Uneventful
  - Timely and Efficient
- Contract Typically Buyer Generated
- Performance Bonds Appear to Be a Non-Issue
  - No Examples Found
  - Liability Issues Well Managed

22

INPUT

The Corporate Viewpoint

Financial Implications

- Internal Processes Used
- Only One Factor in the Approval

Project Approval

- Typically Follows Vendor Selection
- Prime Vendor Frequently Involved
- Internal Processes Used
- Time Required—From Inception to Signed Contract

  - Up to 6 Months 30%
  - 7 to 12 Months 50%
  - Over 12 Months 20%

Stewardship (Ongoing Senior Management Involvement)

- Tied to Interest of the Sponsor
- Typically Declines after Approval

23

INPUT

Information Systems Issues—Project Definition

- Manage the Level of Detail
- Use to Encourage Vendor Creativity
- Do Not Concentrate on Technology
- align Involve the End Users at This Point—a Source of Creativity

29.

INPUT

Information Systems Issues—
Project Definition Participation

Group	Percent of Cases Represented
Middle Management (DIR/MGR)	73
Information Systems	67
Upper Management	33
Outside Consultants	20
End Users	20
Customers	6

25

INPUT

Information Systems Issues—
Duration of Project Definition Phase

Period	Percent of Respondents
<6 Months	27
6-12 Months	27
12-24 Months	33
24-36 Months	13

26

INPUT

Information Systems Issues—Acceptance Criteria

- Not Well Recognized as a Specific Element of the SI Process.
- Usually Developed as Part of the Project Specification.
- Good Acceptance Criteria Can Serve as Protection for the Vendor—Help to Develop.
- Need to Be Phased Throughout the Project—Do Not Ignore Signals of Problems.

27

INPUT

Information Systems Issues—Acceptance Methodologies

Type	Percent of Respondents
Performance Criteria	40
Functionality Definition	26
Simulation	13
Prototype	7
Parallel Processing	7
Unknown	7

28

INPUT

Information Systems Issues—
Selection Criteria

- Pare Down the Number of Bidders
- Reference Selling Key
  - A Record of Success
  - Provable Prior Experience
  - Site Visits Very Valuable
  - Importance Growing
- Vendor Project Manager Can Be a Swing Factor

29

INPUT

Information Systems Issues—Vendor Selection Criteria

Type	Percent of Respondents
Industry Experience	86
Application Knowledge	86
Cost/Performance	86
SI Experience	79
Project Management Skills	64
Support Skills	64
Service Orientation	50
On-Site Visits	43
References	43
Alliances	21

30

INPUT

Information Systems Issues—
Duration of Vendor Selection Phase

Period	Percent of Respondents
<6 Months	54
6-12 Months	20
12-18 Months	13
Unknown	13

31

INPUT

Information Systems Issues—
Environmental & Organizational Impact

- Open Communication Key to Success
  - Address Alternative Opinions
  - Opportunity for Second Guessing by IS
  - Involve the End User
- Manage the Interface with Project Staff
  - Appears to Be a Training Ground for Vendor Staff
  - Maintain Continuity of Vendor Project Staff
- Monitor Standards of Quality
  - Adopt Buyer's if Higher

32

INPUT

Information Systems Issues—Project Management

- More Critical than the Ratings Indicate
- Continuity of Vendor Project Manager
  - The Good Ones Get Reassigned Too Soon
  - One Manager for the Life of the Project
- Managing the Subcontractors Key—Prime Vendor Must Keep Control
  - Buyer Tendency to Go around the Prime
- Use a Third Party as QA
- Keep the Users Involved—They Can Become the Vendor's Ally

33

INPUT

End-User Perspective—Involvement

A "Single" Objective

The User Becomes the "Champion."

34

INPUT

Adding It Up—Conclusions

Issues and Overall Success

Rank	High Success	Medium Success	Low Success
1	Environ. & Org. Impact	Bid Process	Acceptance Criteria
2	User Perspective	Environ & Org. Impact	Project Definition
3	Selection Criteria	Project Definition	Selection Criteria
4	Project Definition	User Perspective	Bid Process
5	Bid Process	Selection Criteria	Technology Review
6	Acceptance Criteria	Technology Review	Project Management
7	Project Management	Project Management	Environ. & Org. Impact
8	Technology Review	Acceptance Criteria	User Perspective

35

INPUT

IS and SI—Future
Information Systems Organization—1990s

- Smaller, More Flexible and Responsive
- Expert Based—Technology and Business
- Consultant Style—Information Engineers and Solution Builders
- Champion for Information Technology

36

An Internal "SI Competitor"

INPUT

Workstation Strategies

1988 and Beyond

hold

INPUT

37

NOTES:

Change all headings to 18
hold

USM2-DT4-1

Objectives

- Status of the Standard Terminal
- Impact of the PC Population
- Need to Plan Workstation Direction
- Direction of Workstation Technology
- Plans of Workstation Vendors

INPUT

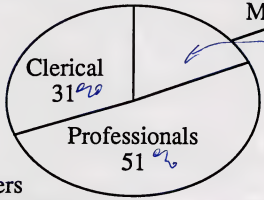
38

NOTES:

USM2-DT4-3

User Demographics

Percent of Users by Category



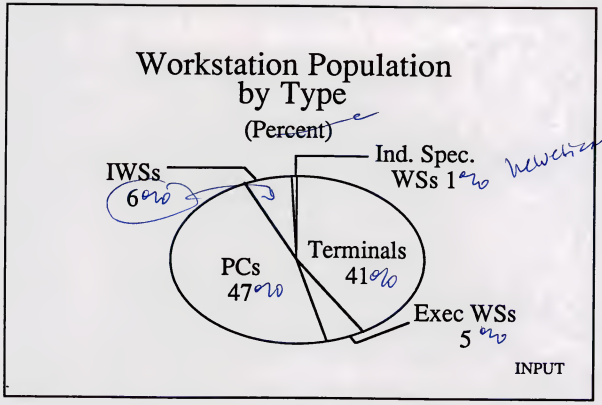
460,000 Users
280,000 Workstations

INPUT

39

NOTES:

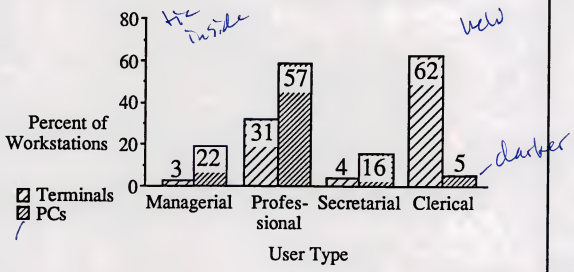
USM2-DT4-5



40

NOTES:

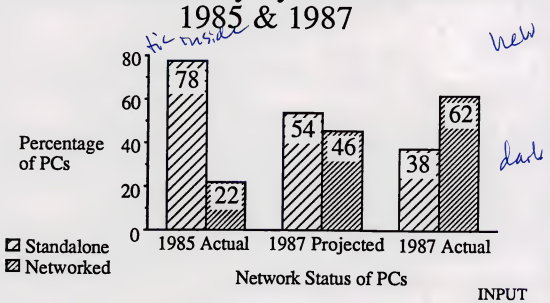
USM2-DT4-14



NOTES:

USM2-DT4-16

PC Connectivity by Percent of PCs 1985 & 1987



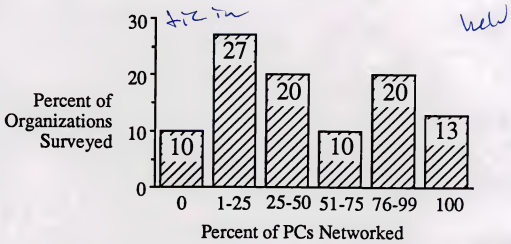
INPUT

42

NOTES:

USM2-DT4-17

PC Connectivity by Percent of Organizations Interviewed



INPUT

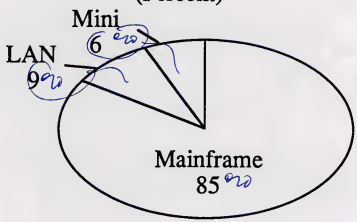
43

NOTES:

USM2-DT4-18

Networked PCs by Type of Connectivity

(Percent)



INPUT

NOTES:

USM2-DT4-19

Integrated Workstation Applications—Characteristics

- Graphic Interfaces
- Remote Data Entry/Collection
- Data Analysis with Data Entry
- High Processing Loads

INPUT

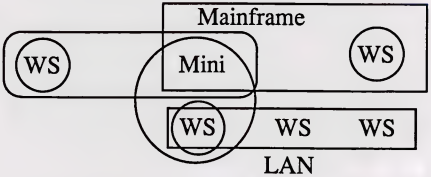
45

NOTES:

USM1-DT4-28

Integrated Workstation Applications

Three-Tier Computing



INPUT

46

NOTES:

USM2-DT4-27

Integrated Workstation Applications
An Example

Information Services

- Stock Quotes
- Company Financial Data
- Financial News Service
- Econometric Data Bases

INPUT

47

NOTES:

USM2-DT4-29

Integrated Workstation Applications—Candidates

- Executive Support Systems
- Electronic Mail
- Operational Reporting
- Software Development
- Imaging

INPUT

48

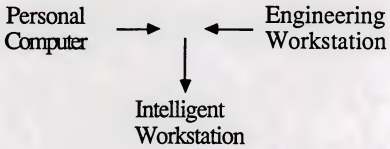
NOTES:

USM2-DT4-30

Integrated Workstation Applications
Distribution of Functions

Workstation Functions	Central Processor Functions
User Interface	Main File Maintenance
Data Entry and Maintenance	Application Network Management
Secondary Data Management	Primary Data Management
Current Activity	Primary Systems Output
Analysis and Reporting	Weekly, Monthly Processing
Ad Hoc Analysis	Backup & Security

Workstation Technology



INPUT

50

NOTES:

USM2-DT4-34

Converging WS Technology

Factor	PC	Engr WS
Power	Expanding	Adjusting
Price	Rising	Declining
User Interface	Improving	Evolving
Operating System	DOS-OS/2	UNIX &/or DOS

INPUT

51

NOTES:

Combine

USM2-DT4-35

Converging WS Technology

Factor	PC	Engr WS
Communications	Expanding	Established
Connectivity	Focused	Flexible
Acceptance	Established	Emerging

bold

delete line

INPUT

NOTES:

USM2-DT4-36

Combine

Workstation Technology
IWS—1992

bold deleted line

Factor	IWS
Power	6-8 Meg
Price	$7-10,000
User Interface	Icon Based
Operating System	OS/2 + UNIX

INPUT

52

NOTES:

USM2-DT4-37

Workstation Technology
IWS—1992

Factor	IWS
Communications	Imbedded
Connectivity	Multiple
Acceptance	Evolutionary

INPUT

NOTES:

USM2-DT4-37a

Summary of Findings

- More PCs than Terminals
- 22% of PCs Used by Management
- 62% of PCs Connected to the Network
- Engineering WSs Entering Business Systems
- Vendors Exploding WS Capabilities
- A True IWS Is on the Way

INPUT

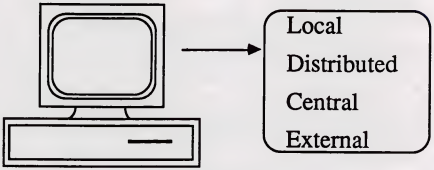
53

NOTES:

USM2-DT4-9 & 9a

Tomorrow's Workstation

Workstation



Plan for It Now

INPUT

NOTES:

USM2-DT4-45

Information Systems Budget

Analysis

55

Information Systems Budget
Computer Hardware

(Percent)

Category	'87	'88	'88	'89
	(Dist'n)		(Growth)	
Mainframes	43	44	7	4
Minicomputers	16	14	-8	2
Personal Computers	9	10	17	6
Mass Storage	16	16	7	1
Other	16	16	7	1
Total	100	100	5	4

56

Information Systems Budget
Distribution of Hardware Budget Changes
1989

Bar chart

Y axis: One bar for each label
Labels and values:

10 to 25% Decrease	3%
5 to 10% Decrease	1%
0 to 5% Decrease	2%
No Change	43%
0 to 5% Increase	19%
5 to 10% Increase	17%
10 to 25% Increase	12%
>25% Increase	3%

X axis: Percent of Respondents

decrease { 10 - 25
5 - 10
0 - 5

No change

Increase { 0 - 5
5 - 10
10 - 25

> 25

57

Technology Issue - Survey Results

Issue	% Responses
Networking	29
Hardware	26
Data Base	10
Managing Technology	6
Other	29

Information Systems Budget
External Products and Services

(Percent)

Category	'87	'88	'88	89
	(Dist'n)		(Growth)	
Professional Services	13	14	13	0
Processing Services	5	5	5	1
Application Software	15	15	5	0
Systems Software	18	18	5	1
Turnkey Systems	3	3	5	0
Hardware Maintenance	25	24	1	2
Software Maintenance	14	15	13	2
Other	6	6	5	0
Total	100	100	5	2

Information Systems Budget
Distribution of External Services Budget Changes
1989

Bar chart

Y axis: One bar for each label

Labels and values:

10 to 25% Decrease	1%
5 to 10% Decrease	1%
0 to 5% Decrease	4%
No Change	65%
0 to 5% Increase	15%
5 to 10% Increase	6%
10 to 25% Increase	6%
>25% Increase	2%

X axis: Percent of Respondents

60

Exhibit VI-11
Information Systems Budget
Distribution of Communications Budget Changes
1989

Bar chart

Y axis: One bar for each label

Labels and values:

10 to 25% Decrease	1%
5 to 10% Decrease	2%
0 to 5% Decrease	3%
No Change	55%
0 to 5% Increase	15%
5 to 10% Increase	12%
10 to 25% Increase	9%
>25% Increase	3%

X axis: Percent of Respondents

61